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**Ref.: The impacts of salmon farms on Patagonian ecosystems and endemic species, in the
region of Magallanes, Chile**

Esteemed Secretaries, Vice-Chairperson, Presidents, and Regional Representatives:

Please accept our warmest regards. The Interamerican Association for Environmental Defense (AIDA) is a non-governmental organization that works to protect the right to a healthy environment in the Americas.¹ Our Marine Biodiversity and Coastal Protection Program promotes the sustainable use of marine resources and the protection of species and threatened ecosystems.

¹ More information on our website: <http://www.aida-americas.org/www.aida-americas.org>.

The objective of this communication is to inform you of the negative impacts the salmon industry is having on the pristine ecosystems of Chilean Patagonia, especially in the closed or semi-closed systems (fjords and enclosed bays) of the Magallanes and Chilean Antarctic Region, at the country's southern tip. Large-scale salmon farming poses an imminent threat as the industry abandons devastated waters further north and looks to expand into more pristine territory.

Although the precautionary principle is well established in Chilean legislation—particularly in the General Law on Fisheries and Aquaculture² (LGPA, for its initials in Spanish)—there has been a lack of application when it comes to this fast-growing industry. Some of the impacts of the salmon industry include: modification of benthic communities through increased nutrient loads in coastal waters and the associated problems of aquatic anaerobism and intensification of harmful algal blooms; increased sedimentation; increased harvests of wild fish populations for the production of fish feed; the use and abuse of harmful chemicals, including antibiotics; and the escape of farmed salmon into the wild.

Currently, the environmental effects of intensive salmon farming in Chile are little understood³ and Patagonia is at high risk of losing important marine ecosystem services.⁴ The salmon farms could have regional impacts⁵ on fjord ecosystems such as marine lagoons, wetlands, and archipelagos; they could also harm marine biodiversity, including species like whales, cetaceans, seabirds, krill, turtles, and endemic cold-water corals. At the same time, the human rights to health and to a healthy environment are at risk.⁶

Because of the remoteness of the area, and the fact that the problem occurs underwater, the destruction of Patagonia's ecosystems is largely invisible and awareness of the problem is relatively low. Scientific information is deficient, regulations are lax or inadequate, and, with

² The Precautionary Principle is defined in article 1 C° of the cited law through the following mandates: "*i) there should be more caution in the administration and conservation of resources when scientific information is uncertain, unreliable or incomplete; and ii) the lack of sufficient, reliable or complete scientific information should not be used as a reason for postponing or not adopting conservation and administration measures.*"

Ministerio de Economía, Fomento y Reconstrucción, *Ley no.18,892 Ley General de Pesca y Acuicultura*, published December 23, 1989. Available at: <https://www.leychile.cl/Navegar?idNorma=30265>

³ Buschmann, A. et al. A review of the impacts of salmonid farming on marine coastal ecosystems in the southeast Pacific. *ICES Journal of Marine Science*, Volume 63, Issue 7, 1 January 2006. DOI 10.1016/j.icesjms.2006.04.021. Available at: <https://academic.oup.com/icesjms/article/63/7/1338/760174> [A review of the impacts of salmonid farming]

⁴ Forsterra, Gunter et al. *Animal Forests in Chilean Fjords: Discoveries, Perspectives and Threats in Shallow and Deep Waters*. Springer International Publishing Switzerland 2016. DOI 10.1007/978-3-319-17001-5_3-1. Available at: https://link.springer.com/referenceworkentry/10.1007/978-3-319-21012-4_3?no-access=true [Animal Forests in Chilean Fjords]

⁵ Pascual MA, Lancelotti JL, Ernst B, Ciancio JE, Aedo E, García, Asorey M; 2009. Scale, connectivity, and incentives in the introduction and management of non-native species: the case of exotic salmonids in Patagonia. *Frontiers in Ecology and the Environment* 7: 533–540. Available at: <https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1890/070127>

⁶ Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, John H. Knox. Available at: http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session22/A.HRC.22.43_sp.pdf

insufficient scientific backing, control and enforcement are lacking. Precautionary and science-based management approaches are scarcely practiced. The development of an ecosystem-based regulatory framework embedded in the precautionary principle is urgent.⁷

We respectfully request that you investigate the facts presented here regarding the current and potential impacts of salmon farming in the Magallanes region, and provide technical and scientific support to assist the Chilean State in addressing the problems it implies.

I. CHILEAN PATAGONIA: GEOGRAPHY, FLORA AND FAUNA

Chilean Patagonia is located in the southernmost part of the country, covering 1.25 million square kilometers of continental surface and 132,033 square kilometers of Antarctic territory. Due to its great expanse, the region presents important climatic variations, influenced mainly by the geographical relief, the sea and the winds.⁸

The coastline of Chilean Patagonia extends 1,500 lineal kilometers through a labyrinth of channels, islands, and fjords. The area covers more than 80,000 kilometers in total, making it the largest and most ragged fjord region in the world. Marked differences often occur within short spatial distance, shaping many unique habitats and niches for marine organisms, resulting in elevated species richness when compared to coasts further north.⁹ Lakes and ice fields are abundant in the area, making it an important freshwater reserve in the world.

Regional flora has adapted to very particular living conditions in Patagonia, exceeding the minimum requirements of most species. Nearly impenetrable forests with heavy precipitation are home to endemic trees like the Magellanic coigüe, ñirre and lenga. Terrestrial fauna is rich in endemic species, many of them protected, including black-necked swans, condors, huemules, pumas, flamingos, guanacos, wildcats, rheas, red foxes, and black-backed eagles.¹⁰

Marine fauna is equally extensive, including some of the largest cetaceans on the planet, the blue, humpback, Sei and minke whales, the Chilean dolphin, killer whale, false killer whale, bottlenose dolphin and Cuvier's beaked whale.¹¹ All of these species are protected by national law¹² and

⁷ Animal Forests in Chilean Fjords, *supra* note 4

⁸ "Ubicación Geográfica," *Patagonia Chile. Sitio Oficial Región de Magallanes y Antártica Chile* [website]. Available at: <http://patagonia-chile.com/site/informacion/ubicacion-geografica/>

⁹ Animal Forests in Chilean Fjords, *supra* note 4

¹⁰ "Flora y Fauna," *Patagonia Chile. Sitio Oficial Región de Magallanes y Antártica Chile* [website]. Available at: <http://patagonia-chile.com/site/que-hacer/naturaleza/flora-y-fauna/>

¹¹ Viddi, Francisco et al. Spatial and seasonal variability in cetacean distribution in the fjords of northern Patagonia, Chile. *ICES Journal of Marine Science* 67(5):959-970. June 2010. DOI: 10.1093/icesjms/fsp288. Available at: https://www.researchgate.net/publication/238411869_Spatial_and_seasonal_variability_in_cetacean_distribution_in_the_fjords_of_northern_Patagonia_Chile [Spatial and seasonal variability in cetacean distribution]

¹² Ministerio de Economía, Fomento y Reconstrucción; Subsecretaría De Pesca, *Ley no. 20.293 Protege a los cetáceos e introduce modificaciones a la Ley n° 18.892 General de pesca y acuicultura*, published October 25, 2008. Available at: <http://www.leychile.cl/Navegar?idNorma=280305> [Ley no. 20.293 Protege a los cetáceos]

international treaties, and are listed at some level of risk by the International Union for Conservation of Nature and Natural Resources (IUCN).¹³

The Chilean dolphin deserves special mention, since it is found only in these Antarctic waters and is the only cetacean species endemic to Chile. According to a report by the Scientific Committee of the International Whaling Commission, populations of large and small cetaceans in Chilean Patagonia are threatened by physical exclusion of habitat, accidental entanglement in aquaculture equipment, sediment pollution, and an increase in maritime traffic¹⁴—clearly linking the problem to the fast-growing salmon industry.

The leatherback sea turtle, listed as “vulnerable” on the Red List of the IUCN¹⁵, is also present. This species is protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),¹⁶ the Convention on the Conservation of Migratory Species of Wild Animals (CMS),¹⁷ and by Chile itself, through an extractives ban that runs until 2025.¹⁸

The region also enjoys an interesting presence of complex marine animal forests, which are dominated by endemic cold-water stony corals, hydrocorals, brachiopods, polychaetes, giant barnacles, sponges, and ascidians, many of which have been discovered only recently.¹⁹ These benthic communities create three-dimensional habitats that are used by other species, and are one of the reasons that Chilean Patagonia represents a hotspot of marine biodiversity.

Calcifying anthozoans or hard corals are the most important marine structure-building organisms. They create entire ecosystems and provide habitat and substrate for thousands of species throughout all taxa.²⁰ Today we know that many the world’s coral reefs are not located in the shallow tropics, as hitherto believed, but are instead found in deeper and colder waters where they are easily overlooked, and thus have been much less studied.²¹ While most of these cold-water coral reefs are located at depths that complicate research, there are a few places in the world where

¹³ “The IUCN Red List of Threatened Species,” *International Union for Conservation of Nature and Natural Resources* [website]. Available at: <http://www.iucnredlist.org/> [IUCN Red List of Threatened Species]

¹⁴ Report of the Scientific Committee of the International Whaling Commission, Santiago de Chile, 1 – 13 June 2008; Available at: <https://iwc.int/private/downloads/ORwUoi98B63OCXiyPVaOUg/screportfinal.pdf>

¹⁵ IUCN Red List of Threatened Species, *supra* note 13

¹⁶ Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, 1973). Appendices I, II and III. Available at: <https://cites.org/eng/app/appendices.php>

¹⁷ Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979). Appendices I and II Available at: <https://www.cms.int/en/page/appendix-i-ii-cms> [Convention Conservation Migratory Species of Wild Animals]

¹⁸ Ministerio de Economía, *Decreto núm. 225 exento Establece veda para los recursos hidrobiológicos que indica*, published November 11, 1995. Available at: <https://legislacion-oficial.vlex.cl/vid/establece-veda-recursos-hidrobiologicos-496534270>

¹⁹ Animal Forests in Chilean Fjords, *supra* note 4

²⁰ “Cold-water corals in Chilean Patagonia,” *Anthozoa. Ecosystem Research in Chilean Patagonia*. [webpage]. Available at: <http://www.anthozoa.com/cold-water-corals-in-chilean-patagonia-2/>

²¹ Roberts JM, Wheeler AJ et al. Reefs of the Deep: The Biology and Geology of Cold-Water Coral Ecosystems. *Science*, 312: 543–547. 2016. Available at: <http://science.sciencemag.org/content/312/5773/543>

deep-water emergence brings cold-water coral communities close to the surface. The channels and fjords of Chilean Patagonia are one of those unique places.

In spite of its outstanding richness, Chilean Patagonia is one of the least studied marine regions in the world. The largest portion of it is very remote. Due to harsh weather conditions and the difficult and costly access to suitable research vessels, huge portions of its ecosystems are virtually unknown.²² As a result, the high-impact salmon industry is growing faster than scientific knowledge and its consequent precautionary regulation.

II. PROTECTED AREAS IN THE MAGALLANES REGION

The Magallanes Region has the largest number of protected areas in the country. However, most of the conservation efforts have been focused on land. Until recently, only 0.1% of the marine territory was protected.²³

In early 2018, the government of Chile announced the creation of Cabo de Hornos Marine Park to protect 140,000 square kilometers of Southern Patagonia.²⁴

A month later, the same government announced the creation of a Patagonian national park network, to protect an additional 4.5 million hectares of land and sea. The network will create new parks, amplify existing ones and re-classify several national reserves into national parks. The late American philanthropist Douglas Tompkins donated vast expanses of land to make this major conservation effort possible.²⁵

As part of the network's formation, the Alacalufes National Reserve is being made into the Kawésqar National Park, elevating its protective status and changing its name in recognition of local indigenous communities, who will be co-administering the area. Chile's President confirmed the park's creation in November 2017, but the process has been tainted with controversy since the protection does not include the waters within and around the area.

In light of the dispute, Kawésqar communities proposed the creation of a marine-coastal protected space (ECMPO, for its initials in Spanish) in most of the waters that should have been included in

²² Animal Forests in Chilean Fjords, *supra* note 4

²³ Bevilacqua, Romina. "Tierra de Fuego cuenta con una nueva área marina protegida". *Ladera Sur*. October 23, 2017. Available at: <http://www.laderasur.cl/esta-pasando/tierra-del-fuego-cuenta-con-una-nueva-area-marina-prottegida/>.

²⁴ "Consejo de Ministros para la Sustentabilidad aprueba Parque Marino Cabo de Hornos", *Prensa Antártica*, January 23, 2018. Available at: <https://prensaantartica.com/2018/01/23/consejo-de-ministros-para-la-sustentabilidad-aprueba-parque-marino-cabo-de-hornos/>

²⁵ González, Cristina. "Autoridades ratifican creación de Red de Parques de la Patagonia", *SusTempo*. April 10, 2017. Available at: <https://sustempo.com/red-de-parques-patagonia>

the Kawésqar Park. The request was admitted for processing, with which 80% of salmon farming concessions in the area were frozen. Still, full protection of the national reserve is not guaranteed.²⁶

III. SALMON FARMING IN CHILE

Chile's salmon industry, though relatively new, has grown rapidly over the past 20 years. Today it is the nation's primary aquaculture activity and has made Chile the second largest salmon producer in the world, behind Norway.²⁷

The rapid growth of the industry has overwhelmed the rather weak legal and institutional framework available to regulate this sector. Historically, regulation has been reactive, with crisis episodes pushing regulatory changes. Even though improvements have been made, the framework has been incapable of avoiding or adequately responding to new crisis that arise, with devastating consequences.²⁸

It was only after 20 years that stricter and more precise regulations were passed, due primarily to the crisis of Infectious Salmon Anemia (ISA) that wreaked havoc on the industry between 2007 and 2009.²⁹ In less than a year, 2,200 lineal kilometers of coastline were affected, mainly due to the total absence of bio-security measures, the excessive manipulation of fish, poor technical and scientific preparation, lack of wastewater treatment in processing plants, and the proximity of the farms.³⁰

The ISA virus has not been the only sanitary problem facing the industry. Before that, farmed salmon were affected by parasite sea lice (*Caligus rogercresseyi*) and were developing resistance to the pesticides used to stop it. This weakened the fish and made them more susceptible to ISA. At the same time, the fish were suffering bacterial diseases, including *Rickettsial Salmon Syndrome* (SRS) and *Infectious Pancreatic Necrosis* (IPN).³¹ The industry has also suffered from the proliferation of toxic algae, which have significantly increased in frequency and intensity, fueled by a warming climate and the excessive quantity of nutrients discharged into the marine environment.

²⁶ Greenpeace. "Comunidades kawésqar dan duro golpe a la industria salmonera en la Patagonia", April 27, 2018. Available at: <http://www.greenpeace.org/chile/es/noticias/Comunidades-kawesqar-dan-duro-golpe-a-la-industria-salmonera-en-la-Patagonia/>

²⁷ Niklitschek, Edwin J. et al. Southward expansion of the Chilean salmon industry in the Patagonian Fjords: main environmental challenges. *Reviews in Aquaculture*. 2013. DOI: 10.1111/raq.12012. Available at: <http://onlinelibrary.wiley.com/doi/10.1111/raq.12012/abstract> [Southward expansion of the Chilean salmon industry in the Patagonian Fjords]

²⁸ Fundación Terram. La regulación Ambiental aplicable a la salmonicultura y los principios jurídico-ambientales que la inspiran. August 2018. Available at: <http://www.terram.cl/2018/08/los-desafios-para-la-regulacion-ambiental-de-la-salmonicultura/> [La regulación Ambiental aplicable a la salmonicultura]

²⁹ Southward expansion of the Chilean salmon industry in the Patagonian Fjords, *supra* note 27

³⁰ Pumalín Foundation. Salmonicultura en Chile: La Agonía 2.0. El Estado Sanitario de la Industria Salmonera en Chile. December 2012. Available at: http://www.globalmagazine.info/sites/default/files/fichiers_joints/node,%201287,%20edit/la_agonia_2.0.pdf

³¹ Id.

Because of all the problems the industry faced in Northern Patagonia, it began to move south in search of pristine waters and some of the country's last untouched coastlines. The industry's expansion into Magallanes is happening quickly. From 2015-2016, 81% of new salmon farm concessions in the country were located there.³² The threat is likely to grow in coming years, as local authorities and the government have recently named Magallanes the new aquaculture hub of Chile.³³ This could have catastrophic consequences for local ecosystems.

IV. BASICS OF THE INDUSTRY'S REGULATION IN CHILE

The Undersecretariat of Fisheries and Aquaculture (SUBPESCA) and the National Fisheries and Aquaculture Service (SERNAPESCA)—both offices under the Ministry of Economy, Development and Tourism—are the public bodies in charge of regulating and supervising, respectively, the aquaculture sector in Chile. The General Fisheries and Aquaculture Law (LGPA) is the main sectorial norm regulating aquaculture in Chile. This law mandated the dictation of two relevant regulatory bodies: the Environmental Regulatory Body on Aquaculture (RAMA, for its initials in Spanish) and the Regulation Body of Measures for the Protection, Control and Eradication of High-Risk Diseases for Hydrobiological Species (RESA, for its initials in Spanish). Both of these norms were only put forward 10 years after the LGPA entered into force, showing the lack of attention authorities were paying to environmental and sanitary issues related to the aquaculture sector.³⁴

To produce salmon, a company must obtain an aquaculture concession and a favorable Environmental Qualification Resolution (EQR). The process to obtain an aquaculture concession begins with the presentation of a Technical Project (TP) before SUBPESCA, outlining the features of the requested production. Aquaculture concessions must be located within so-called Areas Appropriate for Aquaculture. Once the TP is approved, the concession is granted and the company must pass through the Environmental Impact Assessment (EIA) System.

Projects entering the EIA System must do so through the submission of an Environmental Impact Statement (EIS) or an Environmental Impact Assessment (EIA). Most aquaculture projects in Chile enter the EIA System through the less stringent EIS, which does not demand public participation or analysis of synergic impacts, and does not contain detailed environmental analysis of the areas where the intervention is to take place. This happens despite the fact that many of these

³² Index Salmón Estudios de Mercado. Análisis Especial – INDEXSALMON Concesiones de Acuicultura Otorgadas período 2015-2016, con publicación Diario Oficial. Available at: <http://docplayer.es/69237733-Analisis-especial-indexsalmon-concesiones-de-acuicultura-otorgadas-periodo-con-publicacion-diario-oficial.html>

³³ “En Magallanes se podrían cosechar 100.000 toneladas de salmónes durante el 2020” *Aqua*. March 30, 2016. Available at: <http://www.aqua.cl/2016/03/30/en-magallanes-se-podrian-cosechar-100-000-toneladas-de-salmones-durante-el-2020/>

³⁴ La regulación Ambiental aplicable a la salmicultura, *supra* note 28

projects do cause “adverse significant impacts over the quantity and quality of natural renewable resources,” which is one of the grounds by which projects must enter through an EIA.³⁵

Once the EIA System approves the project, it issues a favorable Environmental Qualification Resolution (EQR), which indicates the authorized production and other conditions with which the company must comply. With an approved concession and a favorable EQR, salmon centers are ready to operate.

V. IMPACTS OF SALMON FARMS ON MARINE ECOSYSTEMS AND BIODIVERSITY

Impacts of salmon farms on the carrying capacity of marine environments

Fish aquaculture generates considerable organic and inorganic waste that accumulates in marine sediments, coming from uneaten fish feed, feces, antibiotics and chemicals.³⁶

Without regulating the number of fish permitted per marine space, the carrying capacity of water bodies can be easily exceeded, increasing the demand for oxygen, which generates eutrophication. Eutrophication gives rise to anaerobic conditions in the marine environment, making it difficult or even impossible to sustain aquatic life.³⁷ Some of the effects of eutrophication include: red tides, turbid waters, chemical changes in sediments, and the death of marine vegetation, corals and fish.³⁸ In 2001, the Group of Experts on the Scientific Aspects of Marine Pollution concluded that organic eutrophication constituted the greatest threat to oceans and coastal areas.³⁹

³⁵ Id.

³⁶ Of the total food supplied for salmon production, only around 25% of the nutrients are assimilated by them, while 75% to 80% remains in the environment.

Buschmann A. Impacto Ambiental de la Acuicultura. El Estado de la Investigación en Chile y el Mundo. University of Los Lagos, December 2001. Available at:

<http://www.cetmar.org/DOCUMENTACION/dyp/ImpactoChileacuicultura.pdf>

³⁷ Paragraph 2 of Article 3 of the Environmental Regulation for Aquaculture (RAMA), explains that anaerobic conditions denote that the carrying capacity of a body of water has been exceeded: “[...] for the purposes of this regulatory body, it shall be understood that the capacity of a body of water is exceeded when the sedimentation area or the water column, as appropriate, presents anaerobic conditions”

Ministerio de Economía, Fomento y Reconstrucción; Subsecretaría De Pesca, *Decreto 320 Reglamento Ambiental para la Acuicultura*, published 14 December, 2001. Available at:

<https://www.leychile.cl/Navegar?idNorma=192512> [RAMA]

³⁸ Interamerican Association for Environmental Defense (AIDA). Herramientas para la Pesca Sostenible. Chapter 10: Acuicultura y Maricultura. P. 9. Available at: http://www.aida-americas.org/es/project/herramientas_pesca_%20sostenible

³⁹ S. Muslow et al. Sediment profile imaging (SPI) and micro-electrode technologies in impact assessment studies: Example from two fjords in Southern Chile used for fish farming. P. 153. Science Direct. Journal of Marine Systems. September 2005. Available at: <https://www.sciencedirect.com/science/article/pii/S0924796306000984>

In September 2016, the Office of the Comptroller General of the Republic⁴⁰ produced two reports on audits carried out on the state services responsible for regulating and overseeing aquaculture activities, SERNAPESCA and SUBPESCA.⁴¹ The audits showed that between 2013 and 2015, 53% of the centers operating in the Magallanes region presented anaerobic conditions—confirming the severity of the situation facing the region. A scientific report prepared for AIDA in January 2018 confirmed the results.⁴²

The fact that more than half the concessions operating in the Magallanes region have generated anaerobic conditions confirms that they are being granted without enough scientific evidence to ensure that the ecosystem is capable of sustaining the authorized productions. In fact, there is a total lack of studies on the carrying capacity of the sites chosen for salmon farms. The capacities of these sites to decompose, recycle, absorb or disperse the enormous quantities of waste are not known. This situation denotes bad environmental management and implies significant damages and possibly irreversible consequences for the environment. It also demonstrates the fragility of the Magellan marine environment. The lack of research establishes the indifference with which aquaculture companies operate in the area and the inability of the supervising Chilean agencies to contain damages.

The companies operating the farms are breaching national regulations, particularly article 17 of RAMA, which states, "It is responsibility of the project owners that the centers operate at levels compatible with the capacities of the lake, river and / or marine bodies of water, for which they must always maintain aerobic conditions."⁴³ Moreover, they are violating their EQR, which declares, "The right to operate is subject to the strict compliance of all regulations."

The excessive discharge of nutrients into the marine environment is also related to the proliferation of toxic algae, which have significantly increased in frequency and intensity as a result of salmon farming.⁴⁴ The *Alexandrium catenella* is an alga that has proliferated in Chilean seas where aquaculture centers operate, devastating the health of the marine environment. According to the scientific research, there could be a link between the intensification of red tides and the greater

⁴⁰ The Office of the Comptroller General of the Republic is an autonomous control body whose task is to verify that the organs of the State Administration act within the scope of their powers, subject to the procedures contemplated by the law and using public resources efficiently and effectively.

⁴¹ Contraloría General de la República. Informe Final Subsecretaría de Pesca y Acuicultura N° 211. September 14, 2016. Available at: http://www.terram.cl/wp-content/uploads/2016/09/Reporte-final-211-16-Subsecretar%C3%ADa-de-Pesca-y-Acuicultura_Cumplimiento-de-las-funciones-que-encomienda-la-normativa.pdf [CGR Informe Final SERNAPESCA N° 210]; Contraloría General de la República. Informe Final Servicio Nacional de Pesca y Acuicultura N° 210. September 15, 2016

⁴² Kol, Héctor. Estado de la Salmonicultura Intensiva en la Región de Magallanes, Chile. January 2017. Available at: <http://www.aida-americas.org/salmon-farms-in-chilean-patagonia-approved-without-adequate-environmental-evaluation>

⁴³ RAMA, *supra* note 37

⁴⁴ Animal Forests in Chilean Fjords, *supra* note 4

availability of phosphorus, nitrogen and carbon in the water column, due to the anaerobic conditions created by salmon farming.⁴⁵

In 2015 and 2016, for example, massive strandings of marine fauna were witnessed in the south of the country,⁴⁶ probably at least in part due to the proliferation of toxic algae.⁴⁷ In 2016, an algae bloom event caused the worst mass mortality of fish and shellfish ever recorded in the coastal waters of western Patagonia, affecting the salmon industry as well, which was left with approximately 12,700 tons of dead fish (nearly 12% of the Chilean salmon production).⁴⁸ This massive mortality rate overwhelmed traditional disposal systems, creating a serious sanitary problem. In an attempt to solve it, public authorities granted salmon companies permission to dump 9,000 tons of decaying salmon into the sea. Local fishermen presented a legal claim against the governmental authorities that permitted such disposal, which was admitted before Chile's Supreme Court in May 2018. The court ruling recognized that the defendants violated legal regulations for environmental emergencies and infringed upon the constitutional right of the appellants to live in an environment free of pollution.⁴⁹

Impacts of salmon farms on species of importance for the conservation of biodiversity

Scientific literature shows that aquaculture, fisheries and the associated traffic have had negative impacts on marine animals.⁵⁰ It is evident that companies should be obliged to carry out load capacity studies and evaluate cumulative and synergistic impacts, before being granted the concessions.

Known or potential effects of aquaculture on cetaceans include: (a) competition for space and displacement from habitat due to farming structures; (b) exclusion from habitat due to acoustic harassment devices aimed at deterring predators from fish farms; (c) harassment due to increased boat traffic related to operating farms; (d) changes in availability of prey species; (e) environmental contamination (pesticides, fungicides, anti-fouling paints, antibiotics, etc.); (f) accidental

⁴⁵ Avila, Marcela, et al. Efecto de factores abióticos en el crecimiento vegetativo de *Alexandrium catenella* proveniente de quistes en laboratorio. p. 183. *Revista de Biología Marina y Oceanografía* Vol. 50, S1: 177-185, April 2015. Available at: <https://scielo.conicyt.cl/pdf/revbiolmar/v50s1/art04.pdf>

⁴⁶ Casado, Daniel. "El mar se está muriendo..." *Ladera Sur*. May 2, 2017. Available at: <http://www.laderasur.cl/reportajes/el-mar-se-esta-muriendo/>

⁴⁷ Häussermann, V. et al. Largest baleen whale mass mortality during strong El Niño event is likely related to harmful toxic algal bloom. *PeerJ*, . May 2017. DOI 10.7717/peerj.3123. Available at: <https://peerj.com/articles/3123/>

⁴⁸ León-Muñoz, et al.(2018) Hydroclimatic conditions trigger record harmful algal bloom in western Patagonia (summer 2016). *Scientific Reports*.- (2018) 8:1330 | DOI:10.1038/s41598-018-19461-4. Available at: https://www.nature.com/articles/s41598-018-19461-4?WT.feed_name=subjects_earth-and-environmental-sciences ,

⁴⁹ Corte Suprema de Chile, *Julio Cárdenas en representación sindicato trabajadores independientes pescadores artesanales buzos mariscadores ayudantes y ramos similares Bahía Cualín contra SERNAPESCA y otros*. Court decision on May 22, 2018. Available at:

<http://www.pjud.cl/documents/396543/0/PROTECCION+VERTIMIENTO+DE+SALMONES.pdf/2935945a-e957-4ec8-b7c6-e7955e7225f6>

⁵⁰ Spatial and seasonal variability in cetacean, *supra* note 11

entanglement in farming gear;⁵¹ and (g) eutrophication that increases risk of harmful algae blooms, which can kill whales.

According to the Comptroller's audit carried out by SERNAPESCA, "the species present in the Chilean fjords are extremely sensitive to organic sedimentation, and the cultivation of mussels and salmon produces large additional amounts of fine sediment derived from animal excrement, the loss of supplementary food, and dead animals, which can produce, in the future, severe stress in these communities."⁵² According to scientific publications, dolphins have been affected by aquaculture activity in other regions of the world.⁵³ Currently, the endemic Chilean dolphin is threatened by the growing aquaculture industry.⁵⁴ This species is listed as an endangered species on the IUCN Red List⁵⁵ and is considered an endangered migratory species by the CMS.⁵⁶

Additionally, between February and April 2015, there was a mass mortality of the endangered Sei Whale in Central Chilean Patagonia, an event linked to bio-oceanographic conditions like harmful algal blooms. An increase of salmon farms in that area makes the repetition of such an event more probable, posing a serious threat to the southern hemispheric Sei Whale population.⁵⁷

The Southern right whale, likewise, has been classified as "critically endangered," with an estimated population of barely 50 mature specimens in the coastal regions of Chile and Peru. The main threats to this species include entanglement in fishing nets, collision with vessels and degradation of habitat.⁵⁸ For this reason, the Chilean Government proposed a Conservation and Population Management Plan for the Southern right whale in 2012, within the framework of the International Whaling Commission (IWC).⁵⁹

Apart from the larger species affected by salmon farming, the marine forests of the Patagonian fjords have also observed population declines, including long-living animals such as deep-water corals, deep-water sea anemones, gorgonians, calcified ectoprocts, and decapods. In fact, many of

⁵¹ Heinrich, S. Ecology of Chilean dolphins and Peale's dolphins at Isla Chiloé, southern Chile. 2006. PhD Thesis, University of St Andrews. Available at: <https://core.ac.uk/download/pdf/1154286.pdf>

⁵² CGR Informe Final SERNAPESCA N° 210, *supra* note 41

⁵³ Würsing, B. and Gailey, G. Marine Mammals and Aquaculture: Conflicts and Potential Resolutions. CAB International 2002. In: Responsible Marine Aquaculture. DOI 10.1079/9780851996042.0045 Available at: <https://www.cabi.org/cabebooks/ebook/20023099967>

⁵⁴ Viddi, F. et al, Identifying Key Habitats for the Conservation of Chilean Dolphins in the Fjords of Southern Chile. Aquatic Conservation: Marine and Freshwater Ecosystems Volume 26, Issue 3. March 2015. DOI: 10.1002/aqc.2553. Available at: [10.1002/aqc.2553](https://doi.org/10.1002/aqc.2553)

⁵⁵ IUCN Red List of Threatened Species, *supra* note 13

⁵⁶ Convention Conservation Migratory Species of Wild Animals, *supra* note 17. Appendix II. A

⁵⁷ "El misterio de las 337 "ballenas sei" varadas en el sur de Chile. *BBC Mundo*, December 2, 2015. Available at: http://www.bbc.com/mundo/noticias/2015/12/151202_chile_ballenas_sei_varadas_patagonia_wbm

⁵⁸ Galleti Vernazzani, Barbara et al. Revised Conservation Management Plan for Eastern South Pacific Southern Right Whale Population (Eubalaena australis) – Submitted by Chile and Per – April 2016. International Whaling Commission. SC/66b/BRG/23. p. 16. Available at: https://archive.iwc.int/pages/download_progress.php?ref=6097&search=%21collection24469&order_by=relevance&offset=0&restypes=&starsearch=&archive=0&per_page=240&default_sort_direction=DESC&sort=DESC&content=Modal&k=&curpos=22&size=&ext=pdf. [Revised Conservation Management Plan for Eastern South Pacific Southern Right Whale Population]

⁵⁹ Id.

these populations have decreased by 75% in just ten years.⁶⁰ This has likely been caused by eutrophication, increased sedimentation, and the use of chemicals in salmon farming.⁶¹ Beneath salmon farms, the seafloor and benthic animals frequently appear covered by a white layer of chemotrophic bacteria, and corals near salmon farms are often necrotic.⁶² In 2013, a large coral mortality killed more than 99% of the stony corals along more than 10 km of the Comau fjord.⁶³ This mortality likely happened due to hypoxia after a strong algal bloom, connected to eutrophication from increased salmon activity.⁶⁴

Escaped farmed salmon are also reason for concern, and the ecological effects they may have on native species have not been sufficiently studied.⁶⁵ In fact, populations of escaped farmed salmon could reduce the abundance of native marine fish species through competition and/or predation.⁶⁶ Only recently, a farming center in the region of Los Lagos, Chile, reported the escape of almost 700 thousand salmon, due to bad weather. The environmental consequences of such event are unknown and potentially disastrous, not only because of the predatory nature of salmon, but also because many of the escaped fish had high levels of antibiotics on them, making them unsuitable for human consumption⁶⁷.

Use of antibiotics and other chemicals

In Chile, preventive use of antibiotics in salmon farming is banned and, when used to treat disease, antibiotics must be given out with a veterinary prescription. Despite of this method of control, antibiotic use in Chile is higher than in any of the other countries that concentrate salmon

⁶⁰ Häussermann Vreni, et al. Gradual changes of benthic biodiversity in Comau Fjord, Chilean Patagonia – lateral observations over a decade of taxonomic research. 2013. SPIXIANA, Zeitschrift für Zoologie. Available at: http://pfeil-verlag.de/wp-content/uploads/2015/05/spix36_2_01.pdf

⁶¹ Animal Forests in Chilean Fjords, *supra* note 4

⁶² Id.

⁶³ Försterra G, Häussermann V, et al. Mass die off of the cold-water coral *Desmophyllum dianthus* in the Chilean Patagonian fjord region. 2014 Bull Mar Sc 90 (3): 895-899. Available at: https://www.researchgate.net/publication/263286565_Mass_die-off_of_the_cold-Water_coral_Desmophyllum_dianthus_in_the_Chilean_Patagonian_fjord_region

⁶⁴ Mayr, C. et al. Response of nitrogen and carbon deposition rates in Comau Fjord (421S, southern Chile) to natural and anthropogenic impacts during the last century February 2014. Elsevier. Available at: <https://www.sciencedirect.com/science/article/pii/S0278434314000582>

⁶⁵ A review of the impacts of salmonid farming, *supra* note 3

⁶⁶ Buschmann, Alejandro H. et al. Salmon aquaculture and coastal ecosystem health in Chile: Analysis of regulations, environmental impacts and bioremediation systems. Elsevier Ocean & Coastal Management. 2009. DOI :10.1016/j.ocecoaman.2009.03.002. Available at: <http://www.aquaculture.stir.ac.uk/public/GISAP/pdfs/Buschmann.pdf>

⁶⁷ Osorio, Valentina. “Fuga de salmones en Calbuco: La incertidumbre en autoridades locales y ambientalista por el verdadero impacto”. *Emol*. July 29, 2018. Available at: <http://www.emol.com/noticias/Economia/2018/07/29/914911/Fuga-de-salmones-Recompensa-economica-para-recaptura-de-las-especies-e-incertidumbre-en-el-dano-ambiental-provocado-marcen-los-dias-posteriores.html>

production.⁶⁸ In 2017 Chile used 1,386 times more antibiotics than Norway for the same production of salmon.⁶⁹

SERNAPESCA annually discloses data on antibiotic use in salmon farms in Chile. However, it provides no data on antibiotic use per biomass or per company, making it difficult to advocate for better practices. For years, the NGO Oceana has been leading a legal battle to gain access to that information. In 2017, a courtroom victory enabled the release of a ranking of antibiotic use per company from 2012 to 2014. Then, in 2018, another victory gave way to the release of information for years 2015 to 2017 (both victories included info on most but not all companies). According to the data, the most intensive antibiotic users applied more than 900 grams of antibiotics per ton of salmon produced per year, exceeding by almost 20 times the amount of antibiotics used in the bovine industry.⁷⁰ But the battle wages on. Certain companies, including some of the largest transnationals, continue to deny access to information which is key to understanding how much antibiotics are used per amount of fish.

A percentage of the antibiotics used in salmon farming are released into the environment through unconsumed food and feces, leading to their accumulation. Although technologies have been implemented to reduce the flow of unconsumed food into the environment, there is still filtration. Antibiotics remain in sediments from one day to 1.5 years.⁷¹ While present on the sea floor they become available to fish and other species, which can accumulate into toxic levels unacceptable for human consumption.⁷²

Multiple studies have demonstrated that the transfer of antibiotics to resistant genes happens between different populations and bacterial species, including animals and humans. But what's not often discussed is that the use of antibiotics in industrial farming has negative impacts on human and animal health⁷³ and creates antibiotic resistant bacteria.⁷⁴ Enough evidence exists to indicate that the main force behind the evolutionary process of bacterial resistance is industrial substance abuse, which is the case of Chile's salmon industry.⁷⁵ Aquatic and terrestrial

⁶⁸ Salmon aquaculture and coastal ecosystem health in Chile, *supra* note 66

⁶⁹ Animal Forests in Chilean Fjords, *supra* note 4; Antibakterielle midler til oppdrettsfisk og rensefisk – rekvireringer, forbruk og diagnoser 2013-2017, Rapport 5 – 2018, Veterinærinstituttet, Norwegian Veterinary Institute. Available at: <https://www.vetinst.no/rapporter-og-publikasjoner/rapporter/2018/antibakterielle-midler-til-oppdrettsfisk-og-rensefisk--rekvireringer-forbruk-og-diagnoser-2013-2017>

⁷⁰ Fish Information & Services (FIS). Oceana reveals Chilean salmon companies using the most antibiotics. 2017. [web]. Available at: <http://www.fis.com/fis/worldnews/worldnews.asp?l=e&country=0&special=&monthyear=&day=&id=95038&ndb=1&df=0>

⁷¹ Milewski, I. Impacts of Salmon Aquaculture on the Coastal Environment: A Review. Conservation Council of New Brunswick. Available at: https://www.iatp.org/sites/default/files/Impacts_of_Salmon_Aquaculture_on_the_Coastal_E.pdf

⁷² Id.

⁷³ Millanao B., Ana et al. Uso inadecuado y excesivo de antibióticos: Salud pública y salmonicultura en Chile. Rev Med Chile 2011; 139: 107-118. Available at: https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0034-98872011000100015.

⁷⁴ Cabello, Felipe C. Antibióticos y acuicultura en Chile: consecuencias para la salud humana y animal. Revista Médica Chile 2004; 132: 1001-1006. Available at: <https://scielo.conicyt.cl/pdf/rmc/v132n8/art14.pdf>

⁷⁵ Id.

environments have no boundaries to impair the passing of antibiotic resistant genes, evidencing a global problem that could have repercussions in faraway environments.⁷⁶ In fact, scientists have warned that by 2050, 10 million lives a year and \$100 trillion USD will be at risk due to the rise of drug-resistant infections.⁷⁷

The World Health Organization (WHO) recognized the fact that antimicrobial resistance threatens the core of modern medicine and the sustainability of global public health when they launched a Global Action Plan on Antimicrobial Resistance in 2015, and subsequent guidelines in 2017.⁷⁸ Although the main antibiotic used in Chilean salmon farming is not one of those included in the list of important medicines listed by the WHO, the high antibiotic usage in general, together with the generation of anaerobic conditions, puts Chile in a position of non-compliance with respect to the WHO's Global Action Plan on Antimicrobial Resistance. The said Action Plan recommends the reduction of all medically important antimicrobials in food-producing animals and the prevention of infectious disease.⁷⁹

VI. THE SALMON INDUSTRY AND THE BREACHING OF INTERNATIONAL CONVENTIONS RATIFIED BY CHILE

Article 5 of the Political Constitution of the Republic of Chile declares the respect for human rights, which are guaranteed by the National Constitution as well as by international treaties ratified by Chile.⁸⁰ The expansion of the salmon industry has led Chile to breach several treaties regarding the conservation of natural resources and marine biodiversity. What follows below are the violations related to each of the Conventions:

1. Convention on Biological Diversity (CBD), ratified by Chile in December 1994.

The Convention's main objective is the conservation of biological diversity, its sustainable use, and the fair and equitable sharing of the benefits derived from such use.⁸¹

Among its provisions, the CBD states that Parties must establish protected area systems, where biological resources important for the conservation of biological diversity are regulated or administered; environmentally appropriate and sustainable development is promoted in areas

⁷⁶ Id.

⁷⁷ O'Neill, Jim. Tackling Drug-Resistant Infections Globally: Final Report and Recommendations. 2016. Available at: https://amr-review.org/sites/default/files/160525_Final%20paper_with%20cover.pdf

⁷⁸ World Health Organization (WHO). Global Action Plan on Antimicrobial Resistance. ISBN 978 92 4 150976 3. 2015. Available at: <http://www.who.int/antimicrobial-resistance/global-action-plan/en/>

⁷⁹ World Health Organization (WHO). WHO Guidelines on Use of Medically Important Antimicrobials in Food-Producing Animals. 2017. Available at: <http://apps.who.int/iris/bitstream/10665/258970/1/9789241550130-eng.pdf?ua=1>

⁸⁰ Ministerio Secretaría General de la Presidencia. *Decreto 100. Fija el texto refundido, coordinado y sistematizado de la Constitución Política de la República de Chile*. Published September 22, 2005. Available at: <https://www.leychile.cl/Navegar?idNorma=242302>

⁸¹ United Nations, *Convention on Biological Diversity* (Río de Janeiro, June 5, 1992). Available at: <https://www.cbd.int/convention/text/>

adjacent to protected areas; degraded ecosystems are rehabilitated and restored; and the recovery of threatened species is promoted through plans or other management strategies.⁸²

The CBD issued a Strategic Plan for Biodiversity 2011-2020, outlining a global framework for action through which countries commit themselves to protect biological diversity and improve the benefits it provides for the wellbeing of people.⁸³ The 20 Aichi Targets are framed within this Strategic Plan, addressing the causes of biodiversity loss. Among other things, these goals call on Parties to achieve sustainability in production and consumption; to sustainably manage zones destined for aquaculture; to end pollution, including that caused by excess of nutrients; and to reduce pressure on coral reefs (among them, cold water corals) and other vulnerable ecosystems.⁸⁴ The completion of these goals will not be met by 2020, should the salmon industry continue operating the way it has for the last 20 years.

A decision on Alien species that threaten ecosystems, habitats or species was also dictated during COP 6, in recognition that these represent one of the primary threats to biodiversity, especially in isolated ecosystems⁸⁵.

The salmon industry is moving towards the Magallanes Region without the preliminary studies needed to guarantee the protection of the area's biodiversity. Several salmon production sites currently in operation have already caused oxygen depletion in the marine area, including some located within protected areas—proving that both pending and established concessions constitute a threat to these pristine waters. Several events of salmon escapes further demonstrate the risks of the industry, which is based on the introduction of a predatory alien species. Above all, lessons can be drawn from precedent-setting cases in the Los Lagos and Aysén regions, where a lack of precaution brought about several environmental crises whose negative effects on biodiversity continue to this day.

It is not yet clear how the waters adjacent to already-existing protected areas will be secured, how newly created protected areas in Magallanes will consider their inland and adjacent seas, or what will happen to the concessions that have already been granted for farms in protected areas. This makes it necessary to investigate Chile's compliance with its global commitments to this Convention.

2. Convention on the Conservation of Migratory Species of Wild Animals (CMS), ratified by Chile in December 1981.

⁸² Id.

⁸³ The Conference of the Parties. COP 10 Decision X/2. Strategic Plan for Biodiversity 2011-2020. Available at: <https://www.cbd.int/decision/cop/?id=12268>

⁸⁴ Aichi Biodiversity Targets. Available at: <https://www.cbd.int/sp/targets/>

⁸⁵ The Conference of the Parties. COP 6 Decision VI/23. Alien species that threaten ecosystems, habitats or species. Available at: <https://www.cbd.int/decision/cop/?id=7197>

This Convention provides a global platform for the conservation and sustainable use of migratory species, their habitats and migratory routes.⁸⁶

Four migratory species of cetaceans feed and transit through Patagonian waters. They are listed in Appendix I, as follows: The Blue Whale (*Balaenoptera musculus*), the Northern Rorqual (*Balaenoptera borealis*), the Southern Right Whale (*Eubalenea australis*) and the Sperm Whale (*Physeter macrocephalus*). Three species listed in Appendix II of the Convention are also found there: The Black Dolphin or Tonina (*Ephalorhynchus eutropia*), the Southern or Antarctic Dolphin (*Lagenorhynchus australis*), and the South American sea lion or common sea lion (*Otaria flavescens*).

States have an obligation to preserve and restore their habitats; to address impediments to their migration routes; and to prevent, eliminate, reduce or control the factors that threaten these species, particularly related to the introduction of exotic species.⁸⁷

Despite the fact that Chile ratified the Convention, and passed a Law for the Protection of Cetaceans in October 2008,⁸⁸ whale die-offs are still occurring and many of these species are in latent danger of extinction.

3. International Whaling Commission (IWC), signed by Chile in July 1979.

The International Whaling Commission (IWC) is an intergovernmental organization focused on conserving cetaceans and adequately managing whaling. Its legal framework is the International Convention for the Regulation of Whaling, established in 1946 with the objective of conserving whale stocks and enabling the orderly development of the whaling industry.⁸⁹ The Convention is backed up by a Scientific Committee, composed by some of the most important biologists specialized in whales globally. This Committee meets before every meeting of the Commission, and can also have extra-programmatic meetings.

Chilean Law 20.293 declares the nation's maritime spaces free from whaling and protects cetaceans. However, the IWC's scientific and conservation working groups have identified ongoing threats to whales from salmon aquaculture.

In the Scientific's Committee report, after its annual meeting in 2008, the threat of salmon farms to cetacean conservation was noted. In their review of conservation issues regarding small cetaceans in the southeast Pacific, the Committee expressed concern for Chilean dolphins, particularly in light of the rapidly developing aquaculture and coastal industry. The Committee also mentioned both habitat degradation and the exclusion of small cetaceans from their habitat by

⁸⁶ Convention Conservation Migratory Species of Wild Animals, *supra* note 17

⁸⁷ Id. Article III, number 4, paragraphs a), b), and c).

⁸⁸ Ley no. 20.293 Protege a los cetáceos, *supra* note 12

⁸⁹ International Whaling Commission. *International Convention for the Regulation of Whaling* (Washington, December 2, 1946). Available at: <https://archive.iwc.int/pages/view.php?ref=3607&k>

aquaculture developments, expressing concern over the more than 800 salmon farms which “might be developed in Chile in the next four years”.⁹⁰

A Conservation Management Plan for Eastern South Pacific Southern Right Whale populations, submitted by Chile and Peru to the IWC in 2016, also highlights the connection between aquaculture and whale conservation. When summarizing threats and impacts to the South Pacific Southern right whale population, the report mentions entanglement in aquaculture gear, habitat degradation and water pollution from aquaculture. It also mentions that toxic algal blooms have been associated with excessive antibiotic use, as well as the presence of copper antifouling (an environmental toxin), organic residuals from aquaculture, and wastewater from urban centers.⁹¹

Finally, a report issued by the Scientific Committee in March 2017, highlighted the link between harmful algal blooms (HABs) and the aquaculture industry. Specifically, the report noted the rapid global expansion of aquaculture systems that may alter coastal habitats and increase the occurrence and intensity of HABs. It states that the global distribution and increasing ubiquity of HABs and their toxins has resulted in an increased risk to cetacean health at the individual and population levels. The report advises member governments to support best aquaculture practices and implement relevant international agreements, initiatives and standards set out by FAO’s Fisheries and Aquaculture Department.⁹²

4. Inter-American Convention for the Protection and Conservation of Sea Turtles (CIT), joined by Chile in February 2010.

The objective of this Convention is to promote the protection, conservation and recovery of sea turtle populations and of the ecosystems on which they depend.⁹³

On the Chilean coast, there are at least five species of turtles facing some degree of vulnerability, one of which, the Leatherback sea turtle (*Dermochelys coriácea*), reaches the Magallanes Region. The Leatherback is in danger of extinction and has been included in Appendix I of the CMS⁹⁴ and in the Red List of the IUCN.⁹⁵

In its Annex II, the Convention refers to the protection and conservation of sea turtle habitats, describing the measures that Parties can or should take. The first of these is to require

⁹⁰ IWC, 2008. Report of the Scientific Committee. J. CETACEAN RES. MANAGE. 11 (SUPPL.), 2009. Meeting in Santiago, Chile from 1-13 June 2008, p. 50 Available at: <https://iwc.int/scientific-committee-reports>

⁹¹ Revised Conservation Management Plan for Eastern South Pacific Southern Right Whale Population, *supra* note 58

⁹² IWC, 2017. Report of the Scientific Committee y Annex K, about SWG on Environmental Concerns; IWC/67/Rep01(2017)rev1 07/06/2017. P. 77. Meeting in Bled, Slovenia, 9-21 May 2017. Available at: <https://iwc.int/scientific-committee-reports>

⁹³ *Inter-American Convention for the Protection and Conservation of Sea Turtles* (2001) Available at: <http://www.iacseaturtle.org/eng-docs/Texto-CIT-ENG.pdf>

⁹⁴ Convention Conservation Migratory Species of Wild Animals, *supra* note 17. Appendices I and II

⁹⁵ IUCN Red List of Threatened Species, *supra* note 13

environmental impact assessments for any activities that may affect sea turtles, including for the operation of aquaculture facilities.⁹⁶

5. United Nations Convention on the Law of the Sea (UNCLOS), ratified by Chile in August 1997.

The Law of the Sea establishes a comprehensive regime of law and order for the oceans and seas of the world, while delineating governing rules for the use of their resources.⁹⁷

The Convention stipulates that States have an obligation to protect and preserve the marine environment. It indicates that States must take the necessary measures to prevent, reduce and control the pollution of the marine environment from any source. It also addresses the problem of intentional or accidental introduction of alien species, which may cause significant and harmful changes to the marine environment.⁹⁸

The Magallanes region is made up of fjords and channels, meaning that much of its waters are enclosed, with low possibility of replacement. This makes the area particularly sensitive to external contamination, more so than other marine areas of the country where the salmon industry has already caused serious environmental damage (such as the island of Chiloe, in the Los Lagos Region).

6. Antarctic Treaty and the Convention on the Conservation of Antarctic Marine Living Resources, ratified by Chile in July 1981.

The Antarctic Treaty, signed by twelve countries including Chile, designates Antarctica as a region of peace and cooperation. Among its principles and objectives are the protection and conservation of Antarctica's living resources.⁹⁹ The Treaty serves as the basis for several complementary agreements, which together are commonly referred to as the Antarctic Treaty System.

One of the agreements that make up the Antarctic Treaty System is the Convention of Antarctic Marine Living Resources. The Convention's main objective is to protect the seas around Antarctica and conserve its living marine resources. It emerged as response to the unregulated increase of krill catches in the Southern Ocean, which could be detrimental to Antarctic marine ecosystems and, in particular, to species that depend on krill.¹⁰⁰

⁹⁶ *Inter-American Convention for the Protection and Conservation of Sea Turtles* (2001). Annex II: Protection and Conservation of Sea Turtle Habitats. Available at: <http://www.iacseaturtle.org/eng-docs/Texto-CIT-ENG.pdf>

⁹⁷ United Nations, *United Nations Convention on the Law of the Sea* (1994). Available at: http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf

⁹⁸ Id.

⁹⁹ *The Antarctic Treaty* (Washington, December 1, 1959) Available at: <https://www.ats.aq/e/ats.htm>

¹⁰⁰ *Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)*. (Canberra, May, 1980). Available at: <https://www.ccamlr.org/en/organisation/camlr-convention> [Convention on the Conservation of Antarctic Marine Living Resources]

Krill, which inhabit the open sea, play a key role in the trophic chain—they are the primary food source for penguins, fish, mammals, and large cetaceans. Due to its high content of fatty acids and Omega 3, krill flour is desired as feed by the salmon industry above both traditional fishmeal and fish oil.¹⁰¹ The increase in krill catch could have catastrophic consequences on Antarctic biodiversity and could be in violation of Article II of the Convention, which establishes conservation principles according to which all harvesting and related activities must take place in the area of application of the Convention. Among other details, the principles order the prevention of population decline of species collected at levels that do not ensure their restoration, and the prevention of potentially non-reversible changes and effects of the introduction of exotic species, among others.¹⁰²

7. Code of Conduct for Responsible Fisheries, from the Organization of the United Nations for Food and Agriculture (FAO), adopted by Chile in 1999.

To promote the conservation and sustainable use of fisheries, in 1995, the FAO adopted a Code of Conduct for Responsible Fisheries. The objective was to strengthen the international legal framework for more effective conservation, management and sustainable exploitation of living aquatic resources. The Code of Conduct says that States must ensure their laws and regulations provide sanctions that are sufficiently severe to be effective, including the possibility to deny, withdraw or suspend authorizations in cases of non-compliance.¹⁰³

The document also establishes measures for sustainable aquaculture development and management. Among other details, States must: have adequate legal and administrative frameworks that facilitate the development of responsible aquaculture; promote responsible aquaculture, including prior assessment, based on reliable scientific information, of the effects of aquaculture development on genetic diversity and the integrity of ecosystems; have plans and strategies that ensure aquaculture development is ecologically sustainable and allows for the rational use of shared resources; and establish strategic impact evaluation and monitoring procedures to reduce or avoid harmful ecological changes and the economic and social consequences of water abstraction, land use, effluent disposal, use of medicines and chemicals, and other aquaculture activities.¹⁰⁴

Chile is currently violating the aforementioned norms because of the damage salmon farms are causing to rich marine environments in the south of the country. This includes the indiscriminate use of antibiotics, which is a serious threat to public health.

¹⁰¹ “Se expande el uso de krill de la Antártica para salmónica” *Aqua*. November 30, 2016. Available at: <http://www.aqua.cl/2016/11/30/se-expande-el-uso-de-krill-de-la-antartica-para-salmonicultura/>

¹⁰² Convention on the Conservation of Antarctic Marine Living Resources, *supra* note 100

¹⁰³ Food and Agriculture Organization of the United Nations. *Code of Conduct for Responsible Fisheries*. (1995). Available at: <http://www.fao.org/docrep/005/v9878e/v9878e00.htm>

¹⁰⁴ *Id.*

VII. REQUESTS

In light of the above, we kindly request your Authorities to send advisory missions to Chile to take note of this serious situation, and to:

- Provide support and recommendations to the Chilean State to promote scientific research that will help identify the real and potential impacts of the salmon industry in Chilean Patagonia.
- Investigate the facts described in this document regarding the damage that the salmon industry poses for the Magallanes region.
- Remind the Chilean State of its obligations under the conventions, codes and rules that are being breached by this situation.
- Require the Chilean State to ensure the application of the precautionary principle and to develop a complete strategic environmental impact assessment of the industry in Magallanes, including information on the carrying capacity of marine areas affected and potentially affected by salmon farming.
- As a response to the results of the investigations and assessments mentioned above, require when appropriate, the application of sanctions, moratorium, and/or the cancellation of salmon farms concessions in the Magallanes and Chilean Antarctic region of Patagonia.

We appreciate your attention to this matter. If you require additional information on the topic, please contact AIDA attorneys Florencia Ortuzar and/or Camilo Thompson, details below.



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