

Fishing areas for abalone in the Los Lagos Region in Chile

Jürgen Betzhold

Subsecretaria de Pesca y Acuicultura (SUBPESCA), Chile

Abstract

From the year 1997, the State of Chile has implemented the Area of Management and Exploitation of Benthic Resources (AMERB from the Spanish acronym). Such a system, enshrined in the General Law of fisheries and aquaculture, grants rights to legally constituted fishers organizations for use or exclusive exploitation of benthic resources (benthic invertebrates and algae), prior to the approval of a management plan based on the sustainability of the resources in that territory. This case study summarizes the current state of the implementation of the AMERB in southern Chile, focused on the case in the Los Lagos region. The fishery is associated and authorized in the resource management plans of the Loco or Chilean abalone (*Concholepas concholepas*), a mollusc of high commercial value for small-scale fishers. This system has achieved, on the one hand, regular access to the benthic fisheries. It promotes the conservation of these resources and the consolidation of fishers' organizations and their management capacity, making the production levels recover in the AMERBs, as well as increasing fishers' incomes through organized commercial management (the management, exploitation and marketing of the resource). Finally, the AMERBs generated a new form of governance between users and administrators in the territory. Since the establishment of the first AMERB sectors and after more than 20 years of implementation, it is possible to say that this has been valued by fishers' organizations, since they have improved the conservation of resources in their assigned area. This leads to the positive economic and social development of the fishing communities. However, there are aspects that can be improved, such as security, and market price, declining due to increased supply.

Keywords: Chile, Chilean abalone, AMERB

1. INTRODUCTION

1.1 Description of the fishery

The Chilean abalone resource is distributed along the Chilean coast from Arica (18° LS) to Cape Horn in Chile (55 ° LS), including the islands of the archipelago of Juan Fernandez. Fishing is carried out in coastal areas at a maximum of 3 nautical miles from the coastline. The fishery of the abalone resource within the AMERB is a selective fishery since fishing occurs through Hooka diving in areas authorized by approval of the annual management plan by AMERB. This derives results through direct assessments of the stock of the primary and secondary resources in the area. This fishery is characterized by being in full exploitation, with other secondary benthic resources that can generally be caught in the authorized areas of the Los Lagos region.

In the Los Lagos region, there are more than ten landing sites of benthic resources, which accommodate fishing communities. This information is relevant as the extraction is by fishing area, the AMERB, which is itself administered by an association of fishers to which the area is assigned. The relevant management plans assign these areas to one or more groups of fishers. Each group can define an independent management plan in spaces that can be separated by kilometres or overlapping. An example of this is shown in Figure 1, of a territory located in the Los Lagos Region. Of the 11 areas listed, they are administered by 11 independent fishers associations, but they share 1 or 2 ports. It should be noted that this situation is repeated along the coast of the region, whereby a total of 284 current AMERB, 67 are operational for exclusive abalone extraction.



Figure 1. Map of various AMERBs in the Los Lagos Region.

Source: Subpesca map viewer.

The fishing occurs mainly through Hooka diving. This is a kind of semi-autonomous diving through which the diver is given air from a compressor on boats ranging from six to 12 meters, with an outboard motor of about 80 horsepower (hp). Normally, the operation is for 1-6 hours, with two divers and one diver Assistant. The abalone extracted cannot exceed the volume indicated in the management plan, and it must meet the minimum size of 10 cm. The abalone are kept in nets, to be landed later on the beach and counted by the buyer. The final destination in 90 percent of cases is plant processing, which carry out canning or freezing, for marketing in international markets.

1.2 Economic contribution and social implications of the fishing activity

The abalone resource is for direct human consumption; ten percent is going to domestic consumption, while 90 percent of canned and frozen products are exported to Taiwan (Province of China), Japan, Singapore, Hong Kong, China, United States of America, Canada, Mexico and Malaysia. Exports of abalone reached USD 13.2 million in 2016, nine percent less than during the year 2015.

The Los Lagos Region has 25 500 small-scale fishers, the highest number in the country. This region also accommodates the highest number of AMERB, (284) with approximately 6 000 people directly involved in the fishing of benthic resources. With regard to abalone, in September 2018 there were a total of 67 AMERB operating, involving more than 1 300 people, with an authorized extraction of 5.1 million units of abalones.

With regard to income, due to the fact that 90 percent of the product is going to processing plants, the income of fishers is only 25 percent of the final value of the finished product in international

markets. It should be noted that this fishery has a strong rural component associated with multiple employment, where fishers are engaged in agriculture, livestock or services, as the abalone resource undergoes a seasonal ban. Fishers occupy 40 percent of their time in the abalone fishery, and the remaining in other activities. Despite this and the low beach price paid per abalone (USD 1.5), it remains a profitable activity for fishers. Fisheries is close to the coast, not more than 10 km of distance or more than six hours of navigation, meaning that areas tend to be managed by communities of fishers who live nearby.

2. MANAGEMENT OF THE FISHERY AND RIGHTS-BASED APPROACHES

The Undersecretary of Fisheries and Aquaculture (SUBPESCA) implements administrative measures in line with the General Law of Fisheries and Aquaculture (LGPA N ° 20.653), articulated through their decrees and administrative decisions. SUBPESCA is assisted by the Scientific Technical Committee, who makes recommendations from a biological point of view to regulate the fishery with a precautionary approach. In the Los Lagos Region, given the socio-economic relevance of this fisheries, there exist regional panels for abalone, which is composed by small-scale fishers who make recommendations to the authority from an ecosystem approach.

2.1 Management of the fishery

The fishery of the abalone is subject to a plan of management and exploitation, which includes all activities under the AMERB system must meet these requirements. To summarize, the management plan must comply with the following minimum requirements:

- Study methodology;
- Information on extractive fishing activities carried out during the previous period;
- Information on management actions in the previous period;
- State of the population of the main species of the management plan. Direct assessment or other indicators generally accepted for the informed species may be used for such purposes;
- Analysis of the overall performance of the area considering the objectives for the project management and the indicators established by the Secretary;
- Actions of management and operation proposed for the next period;
- Programme of activities and schedule; and
- Sources and amounts.

The National Service of Fisheries and Aquaculture (SERNAPESCA), an entity of the Ministry of Economy, Development and Tourism, carries out comprehensive control and health management. In conjunction with the Navy of Chile, through port authorities, they carry out control and supervision of fishing activities in the AMERBs, from monitoring the catch and landing in authorized ports. SERNAPESCA also performs inspections in the processing of plants. Sanctions for illegal fishing range from economic sanctions to the confiscation of boats and fishing gear. In some cases, there can be a civil penalty from the local police. The illegal cases punished correspond to thefts of abalone, through illegal diving in the AMERB, and in some cases of fishers from neighbouring communities and other cases, people from the same communities.

2.2 Brief history former rights-based approaches used in the fishery

Initially, the abalone fishery was open-access without registration, and there was no AMERB. This changed given the collapse of the fishery during the end of the last century. In 1985 began the application of two management systems, with the assignment of user rights or restricted access called "Benthic regime of extraction" (RBE) and the AMERB system, in addition to other measures such as the establishment of a legal minimum size, a biological fishing ban, the closure of the artisanal fisheries register (RPA) and an extractive fishing ban for the resource in the areas of free access.

Only in 1998 with the exploitation of the abalone resource did AMERB become a fully consolidated system. Between 2001 and 2016, 94 percent of annual landings of abalone came from the AMERB. Annual national landings in this period averaged 2 800 tonnes, with a maximum of 4 662 tonnes in 2016. In 2017, a strong increase in the number of registrations (up to 23 411 from 15 833 in 2016) came from the categories of collectors and fish workers, while the number of divers declined slightly.

2.3 Rights-based approach: allocation and characteristics

The rights of this fishery, circumscribed exclusively inside an AMERB, are of the exclusive use of fisherfolks' organizations. They must possess an ROA (register of an artisanal organization) that is validated by the national fisheries service, (an entity that certifies that its members are formed exclusively by fishers). These organizations may be unions, professional associations, cooperatives, federations or indigenous communities. Extraction quotas can be assigned annually or biennially. These fishing rights may not be rented or sold, and in the case that SERNAPESCA irregularities are detected, this can lead to losing the rights over this area for the managed fishers' organization.

3. CONTRIBUTION OF THE RIGHTS-BASED APPROACH TO ACHIEVING SUSTAINABILITY

3.1 Sustainable use of the resources

In the last indirect assessment of the abalone resource, using an estimation of biological parameters and growth in key areas of extraction from VIII to XI Region during the year 2017, it is estimated that the average length of the abalone is slightly less than the historical average. Estimates of growth parameters did not show significant differences between regions.

The age of recruitment is estimated at five years. Above this age, the contribution of individuals is generally poor in the analyzed AMERBs. This can be explained by the high levels of exploitation they are subjected to. Since 2011, size and average weight have been declining. At the seasonal level, the average weight of the abalone decreases steadily from the second quarter onwards (March-May). This is probably related to the reproductive process. The value of the natural mortality is estimated to be next to 0.36. Fishing mortality average for the last five years in 123 AMERB, suggests that stocks of abalone between the VIII and XI regions are overfished.

3.2 Economic viability of the fishery

The fishing effort and the fishing capacity have increased in the last five years, due to the interest generated by the stability of the price of abalone. Durations in effort and distance travelled remain the same, given that the AMERB tend to be located near to the fishing communities. In this context, the operating cost is low in fuel supplies, given the renewability of the fleet with engines that are more efficient. In general, there is no concentration of ownership of the gears or vessels, as the community is managing the resource, and each member of the community brings his own boat. There is, however, a concentration for the intermediate buyers and processing plants.

3.3 Social equality

In the processing plants, 80 percent of the workforce are women. With regard to income, due to the fact that 90 percent of the product is going to processing plants, the income of fishers is only 25 percent of the final value of the finished product in international markets. Among fishers, there are practically no women involved.

4. MAIN CHALLENGES AND WAY FORWARD

4.1 Challenges for the fishery

On the basis of official information available, AMERB implementation has enabled the fishery to stay alive. However, there remain problems associated with expectations for current production in the AMERBs, economic benefits, and illegal exploitation. The main conflicts among fishing communities

occur when one AMERB gets a higher allocation than another. This competition between communities for the same resource can lead to abalone theft from a neighbouring AMERB, producing economic damage. Another conflict is created through the figure of the intermediaries and their concentration of buying power, given that about 80 percent of the purchase is in the hands of three companies. This impacts the beach price being paid to fishers. Finally, inter-agency coordination must be strengthened for the more intensive environmental and health monitoring of the AMERBs.

4.2 Improving fishery sustainability in the future

The abalone is fully over-exploited. Thanks to the AMERB system, permanent monitoring of the management plans is implemented that ultimately authorizes and protects the control of fishers' organizations who manage their respective areas. It is necessary to implement programmes of surveillance of these management measures, on the basis of direct territorial assessments of the AMERB. This is particularly relevant as today there are no institutional verification mechanisms that ensure what is assessed in the area is effective, if they are actually evaluating the stock directly, or if it's only an indirect historical data report.

On the other hand, it is found necessary that the ecosystem approach is implemented in benthic fisheries stock assessments, integrating the economic, social and environmental factors. Otherwise, the purely biological approach tends to close the access to the fisheries, thus leading to illegal fishing and the black market of abalone trade.

5. LESSONS LEARNED

The abalone resource is presently allocated by a Territorial Use Rights for Fishing (TURF) system that allocates certain amounts of abalone to each AMERB system. The system seems to work well, albeit, the albacore resource seems to be overexploited, and all major indicators of the health of the resource are declining. Fishers are involved in the drafting, presenting and implementing of management plans, together with the authorities.

Conflicts and problems that occur are between small-scale fishers' communities in neighbouring AMERBs. When one area receives a higher allocation than another, this leads to resource theft. A better explanation of the reasoning behind resource allocation needs to be given by the government authorities. Yet, another problem is the concentration of the buyers, which leads to low beach prices. One obvious way out from this situation would be for fishers' organization to also become involved in the processing and marketing of the abalone resource.

REFERENCES

- ESTADO DE SITUACIÓN DE LAS PRINCIPALES PESQUERÍAS CHILENAS, AÑO 2017**, Departamento de Pesquerías, División de Administración Pesquera, Subsecretaría de Pesca y Acuicultura, Chile.
- Informe Técnico (R. Pesq.) Nº 167-2016**. Modificación excepcional del periodo de veda biológica para el recurso Loco (Concholepas concholepas) en la X Región, 2016. Subsecretaria de Pesca y Acuicultura, Chile.
- Guía de especies, Instituto de Fomento Pesquero, IFOP.
- D.S. Nº 355/95.- REGLAMENTO SOBRE AREAS DE MANEJO Y EXPLOTACION DE RECURSOS BENTONICOS. Información Comercial DIRECON – ProChile 2017
- NODO DE MEJORAMIENTO COMPETITIVO PARA AREAS DE MANEJO PRODUCTORAS DE LOCO DE LA REGIÓN DE LOS LAGOS, Fundación Chiquihue- CORFO. Informes desempeño recurso LOCO (Concholepas concholepas) en la Décima Región de los Lagos. SERNAPESCA Los Lagos, 2018
- Programa de Vigilancia de las Áreas de Manejo, Región de Los Lagos. SERCOTEC/GORE, año 2013-2015. www.subpesca.cl

Appendix 1**Acronyms**

AMERB	Áreas de Manejo y Explotación de Recursos Bentónicos, Areas of Management and Exploitation of Benthic Resources
LGPA	Ley General de Pesca y Acuicultura, General Law of Fisheries and Aquaculture
SERNAPESCA	National Service of Fisheries and Aquaculture
SUBPESCA	Undersecretary of Fisheries and Aquaculture
TURF	Territorial Use Rights for Fishing
USD	United States of America Dollar