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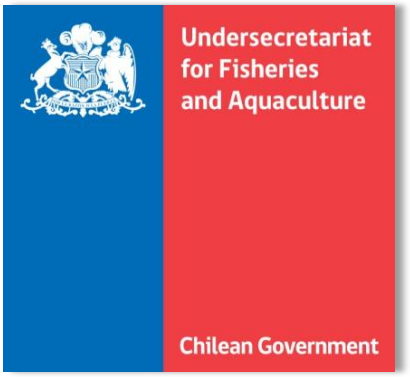
Annual Report of Chile to the Scientific Committee – Jack Mackerel

Chile



CHILE ANNUAL REPORT

SPRFMO-SCIENTIFIC COMMITTEE

Chilean Jack mackerel (*Trachurus murphyi*)

June, 2026

SUMMARY

Since 2020, the fishing operations on Chilean Jack mackerel have been conducted exclusively within the Chilean EEZ. During 2025, the industrial fleet targeting this resource was made up of 41 fishing vessels using purse seines.

A progressive increase in Jack mackerel catches was observed during the 2021–2025 period, reaching a maximum of 1,219,027 t in 2025. This trend is explained by the increase in the quota allocated to Chile plus quota transfers from other SPRFMO members.

Since 2021, size-structured Jack mackerel catches have shown a wide range of sizes, between 7 and 67 cm fork length (FL), with main modes fluctuating between 27 and 44 FL cm. Thus, during the 2025, the size range of includes specimens between 17 and 58 cm in FL, with a marked mode of 32 cm in FL.

Between 2021 and 2025, the Jack mackerel catches included a broad range of age groups, from I to XII, with age group V consistently representing the main mode across all years. While some variability was observed between years, the overall age structure remained stable, with contributions from multiple cohorts in most seasons.

Finally, it is important to reiterate that, as of January 2020, Image Recording Devices (DRI or EMS) have been implemented to monitor compliance with Bycatch Reduction Plans and fishery regulations across the entire industrial fleet. In addition, the mandatory use of Electronic Logbook Systems (SIBE) was also introduced in 2020 to report, on a set-by-set basis and in real time, total catches, bycatch and discards, and the spatial and operational characteristics of the fishing activity, in accordance with national legislation.

To date, the implementation of these Electronic Monitoring Systems (IRD and ELS) in the Chilean industrial fleet has focused primarily on ensuring compliance with regulations related to discards and incidental catch of seabirds, marine mammals, sea turtles and chondrichthyans. However, the potential for using these technologies beyond compliance particularly as tools for scientific monitoring and the collection of fishery-dependent data is now being explored. This approach is expected to complement traditional human observer programs, supporting a more robust ecosystem-based fisheries management approach. In the specific case of the Jack mackerel fishery, observer data collected between 2015 and 2025 confirmed low levels of incidental mortality, with most cases including sea lions, seabirds and sea turtles being released alive using proper handling protocols. These outcomes reflect the ongoing commitment of Chile to strengthen sustainable practices and ecosystem considerations in the management of this key pelagic resource.

1. DESCRIPTION OF THE FISHERY

1.1 Composition of the Fleet

From 2021 to December 2025, the Jack mackerel fishing operations have been concentrated exclusively within the Chilean EEZ. (**Table I**, **Table II**).

Until December 2025, 41 fishing vessels were operating, which represents an increase of around 8% compared to the previous year and a decrease of approximately 25% compared to 2021 (**Table I**). This change in the composition of the Chilean fishing fleet is mainly explained by a lower participation of vessels with a hold capacity of 300-600 m^3 as of 2021; while the number of vessels larger than 1,200 m^3 has remained stable during the same period.

Table I. Combined number of industrial purse seine vessels catching Jack mackerel in both the Chilean EEZ and the SPRFMO area between 2021 and 2025. Data were assembled by year and hold capacity.

Hold capacity (m^3)	2021	2022	2023	2024	2025
0 ≤ 300	0	0	0	0	0
300 ≤ 600	27	23	18	10	8
600 ≤ 900	5	4	3	3	4
900 ≤ 1,200	1	1	1	3	2
1,200 ≤ 1,500	8	8	8	8	11
1,500 ≤ 1,800	10	10	10	10	11
1,800 ≤ 2,100	4	4	4	4	5
TOTAL	**55**	**50**	**44**	**38**	**41**

Table II. Number of industrial purse seine vessels catching Jack mackerel in the SPRFMO area between 2021 and 2025. Data were assembled by year and hold capacity.

Hold capacity (m^3)	2021	2022	2023	2024	2025
0 ≤ 300	0	0	0	0	0
300 ≤ 600	0	0	0	0	0
600 ≤ 900	0	0	0	0	0
900 ≤ 1,200	0	0	0	0	0
1,200 ≤ 1,500	0	0	0	0	0
1,500 ≤ 1,800	0	0	0	0	0
1,800 ≤ 2,100	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**

1.2 Catches, Seasonality of Catches, Fishing Grounds and Bycatch

a) Catches

During the 2021-2025 period, an increase was observed in the Jack mackerel catches, with a maximum reached in 2025 (**Figure 1** and **Table III**). This trend is explained by the increase of the quota allocated, plus transferences of quota from other SPRFMO members. In addition, the stock conditions estimated for that period, which supported the management measures then in force, contributed to the higher catch levels observed.

Thus, in December 2025, 1,219,027 t of Jack mackerel have been caught in the Chilean EEZ. It is highlighted that in 2021 catches of Jack mackerel were obtained entirely within the Chilean EEZ.

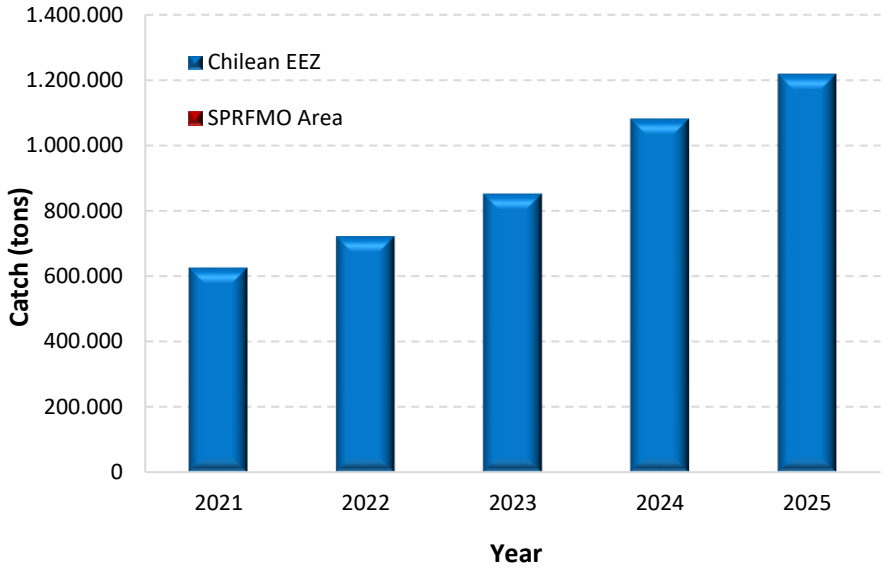


Figure 1: Total annual Jack mackerel catch within the Chilean EEZ and the SPRFMO area for the period 2021–2025 .

Year	Chilean Jack Mackerel (t)		
	Chilean EEZ	SPRFMO Area	Total
2021	626,393	0	626,393
2022	722,622	0	722,622
2023	852,831	0	852,831
2024	1,082,349	0	1,082,349
2025	1,219,027	0	1,219,027

Table III. Total annual Jack mackerel catch within the Chilean EEZ and the SPRFMO area for the period 2021 – 2025 .

The Chilean fleet targeting Jack mackerel also registered catches of Chub mackerel. During 2025, landings of this species totaled 132,487 t, exceeding the average annual catches recorded during the 2021–2024 period (99,094 t). Although this represented a 15% decrease compared with 2024 (155,174 t), it was the second highest annual catch recorded since 2021. Furthermore, from 2021 to 2025, Chub mackerel fishing operations were conducted exclusively within the Chilean EEZ (**Figure 2** and **Table IV**).

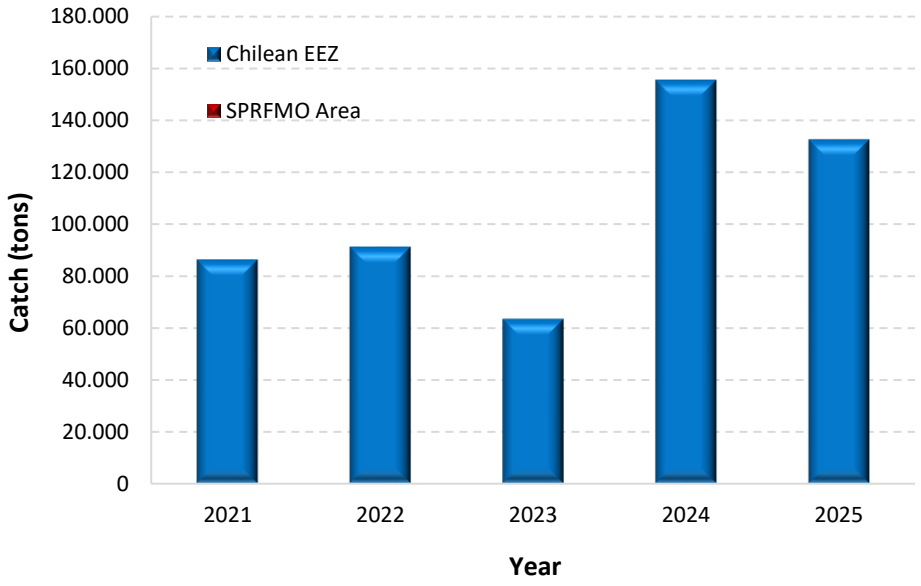


Figure 2: Total annual Chub mackerel catches in the Chilean EEZ and SPRFMO area for the period 2021 - 2025 .

Year	Chub Mackerel (t)		
	Chilean EEZ	SPRFMO Area	Total
2021	86,287	0	86,287
2022	90,115	0	90,115
2023	63,382	0	63,382
2024	155,174	0	155,174
2025	132,487	0	132,487

Table IV. Total annual Chub mackerel catches in the Chilean EEZ and SPRFMO area for the period 2021 - 2025 .

b) Seasonality of Catches

During the 2021–2025 period, Jack mackerel catches exhibited a consistent seasonal pattern despite interannual differences in total catch volumes. On average, 72% of the annual catches were made during the first half of the year (January–June), when the highest catch levels were consistently recorded (**Figure 3**).

In 2024, catches remained at relatively high levels from January through April, followed by a decline to June. A temporary increase was observed in July, however, catches decreased to their lowest levels in September before gradually increasing toward the end of the year (**Figure 3**).

In 2025, catches were high at the beginning of the year, with January recording the second highest monthly catch of the year. Catch levels then declined in February, showed a slight increase in March, and continued to decrease through September, reaching their lowest levels during the third quarter of the year. From October onward, catches recovered steadily, with a pronounced increase between November and December, culminating in December with the highest monthly catch recorded during 2025 (220,112 t) (**Figure 3**).

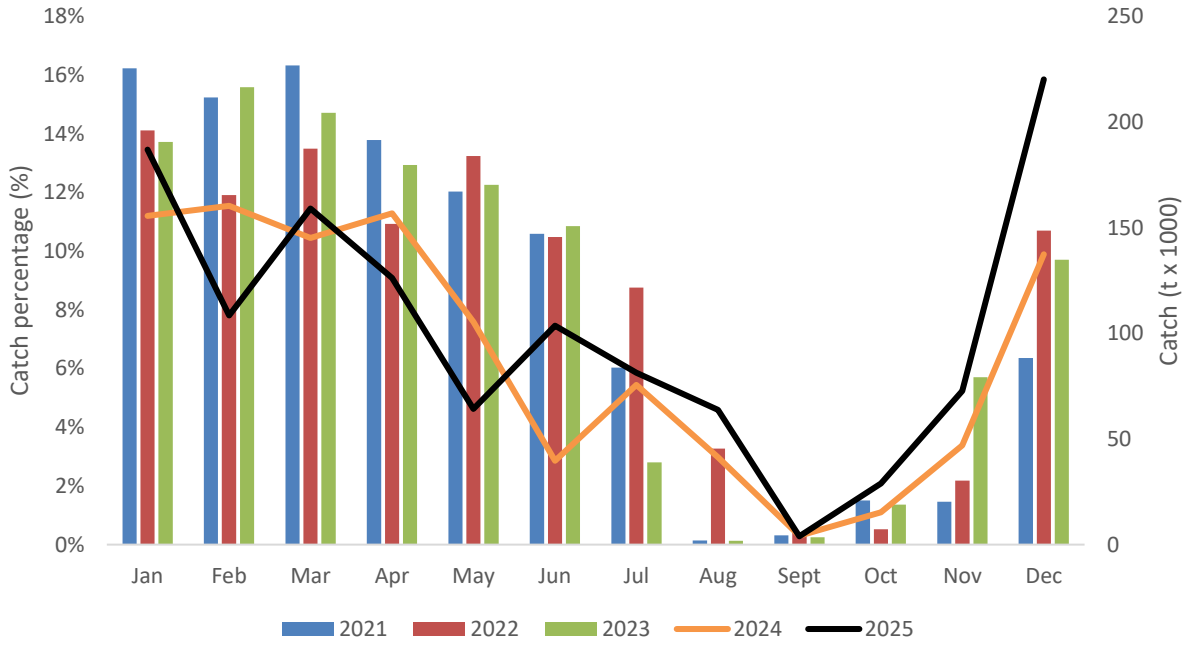


Figure 3: Seasonality of the Jack mackerel catches by the purse-seine fleet for the period 2021 - 2025. Source: SERNAPESCA.

c) Spatial Distribution of Catches

During the 2021–2025 period, the spatial distribution of Jack mackerel catches by the industrial purse-seine fleet showed a relatively consistent pattern. In the central-southern zone of Chile, fishing activity was concentrated predominantly in coastal waters, generally within approximately 150 nautical miles (nm) of the coast, with the main fishing grounds located between the Biobío and Los Lagos regions. In northern Chile, catches were also concentrated mainly in coastal waters, generally within approximately the first 50 nm of the coast, between the Arica and Parinacota and Atacama regions.

In the early years of the study period, fishing activity in northern Chile was largely associated with the operation of the anchovy fleet. However, in recent years, fishing activity has progressively shifted towards a Jack mackerel fishery. In 2025, the spatial distribution of catches expanded farther offshore in northern Chile, particularly off the Atacama Region, where an offshore fishing area was observed that had not been evident in previous years (**Figure 4**).

d) Bycatch

Chub mackerel has been the main bycatch species recorded for the Jack mackerel target fishery. Other species caught as bycatch showed a negligible amount.

As mentioned in letter c) above, in the northern part of the country and unlike previous years, during 2025 the catches were rather directed to Jack mackerel than as bycatch of Anchovy, with Jack mackerel landings doubling those of Anchovy.

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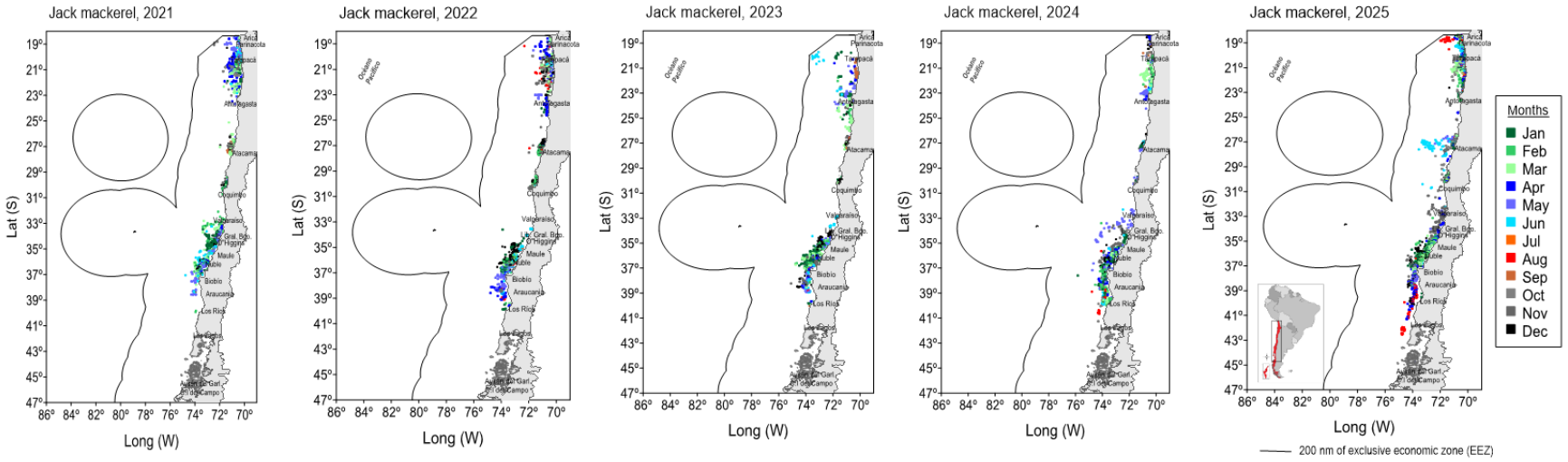

Figure 4: Spatial-temporal distribution of the industrial purse seine fleet targeting Jack mackerel for period 2021-2025. Source: IFOP.

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2. EFFORT AND CPUE FOR JACK MACKEREL FISHERY

The information in this chapter refers to the fleet targeting Jack mackerel that operates in the center-south zone of the country. Catches, effort and CPUE were calculated for each trip where Jack mackerel represented over 50% of the total composition of the catch.

Until 2010, an increasing trend in the average length of fishing trips has been observed (**Figure 5**), which is explained by the distances of the fishing grounds of Jack mackerel from the coast. Later, during 2012 and 2013, catches were concentrated within the Chilean EEZ, condition that reduced considerably the average length of the fishing trips by 50%. In 2015, the catches were again obtained outside the Chilean EEZ, increasing the average length of the fishing trips to around 7 days. For the period 2015 to December 2025, the total number of fishing trips showed a sustained and slight increase, while the average length of fishing trips showed a downward trend and a relative stability towards the end of the series, because catches have concentrated near the coast, within the first 150 nm. Between 2021 and 2025, the number of fishing trips increased from approximately 812 to 1,221 trips, while the average trip duration remained close to 2.36–2.44 days between 2021 and 2023, increasing to approximately 2.87 days in 2024 and 3.7 days in 2025.

Figure 6a shows the nominal CPUE of the industrial purse-seine fleet operating in the central-southern zone of Chile between 2001 and 2025. After reaching its lowest levels during 2010–2015, the nominal CPUE increased steadily, peaking in 2023. Since then, a decline has been observed in 2024 and 2025. This decrease coincided with an increase in the number of vessels participating in the fishery and the continued high annual catch levels, suggesting that the reduction in nominal CPUE may reflects changes in fishing effort and fleet dynamics rather than a marked reduction in catch levels.

As shown in **Figure 6b**, annual catches increased progressively from 2016 onward, reaching their highest levels in 2025. During the same period, catches per fishing day increased markedly up to 2023, followed by a decline in 2024 and 2025, while the number of vessels operating in the fishery increased slightly. These results indicate that, despite maintaining high catch volumes, the average catch obtained per fishing day has decreased in recent years.

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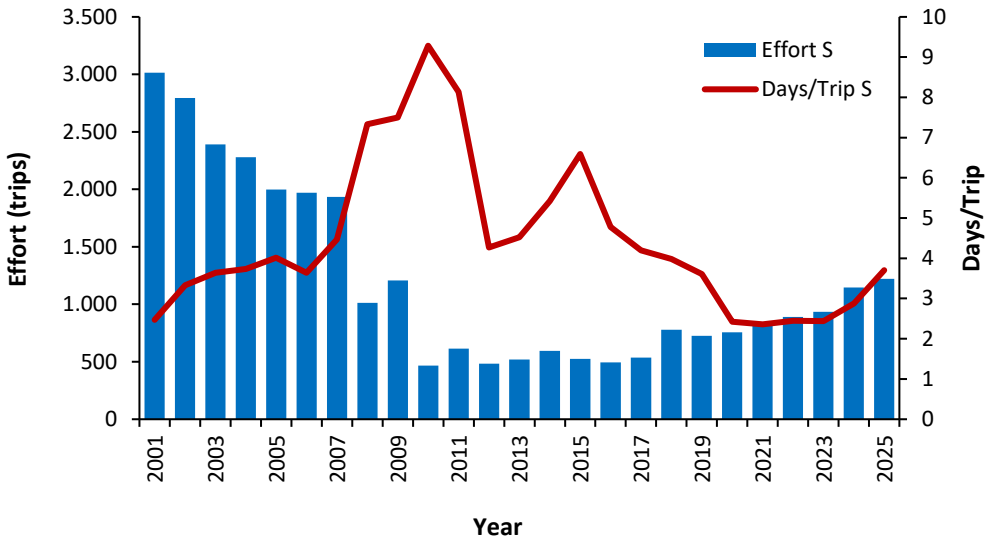

Figure 5: Effort in number of fishing trips with catch (blue), and length of fishing trips in days (red) for the purse seine fleet in the center-southern zone targeting Jack mackerel, period 2001 to 2025 . Source: IFOP, based on data from SERNAPESCA.

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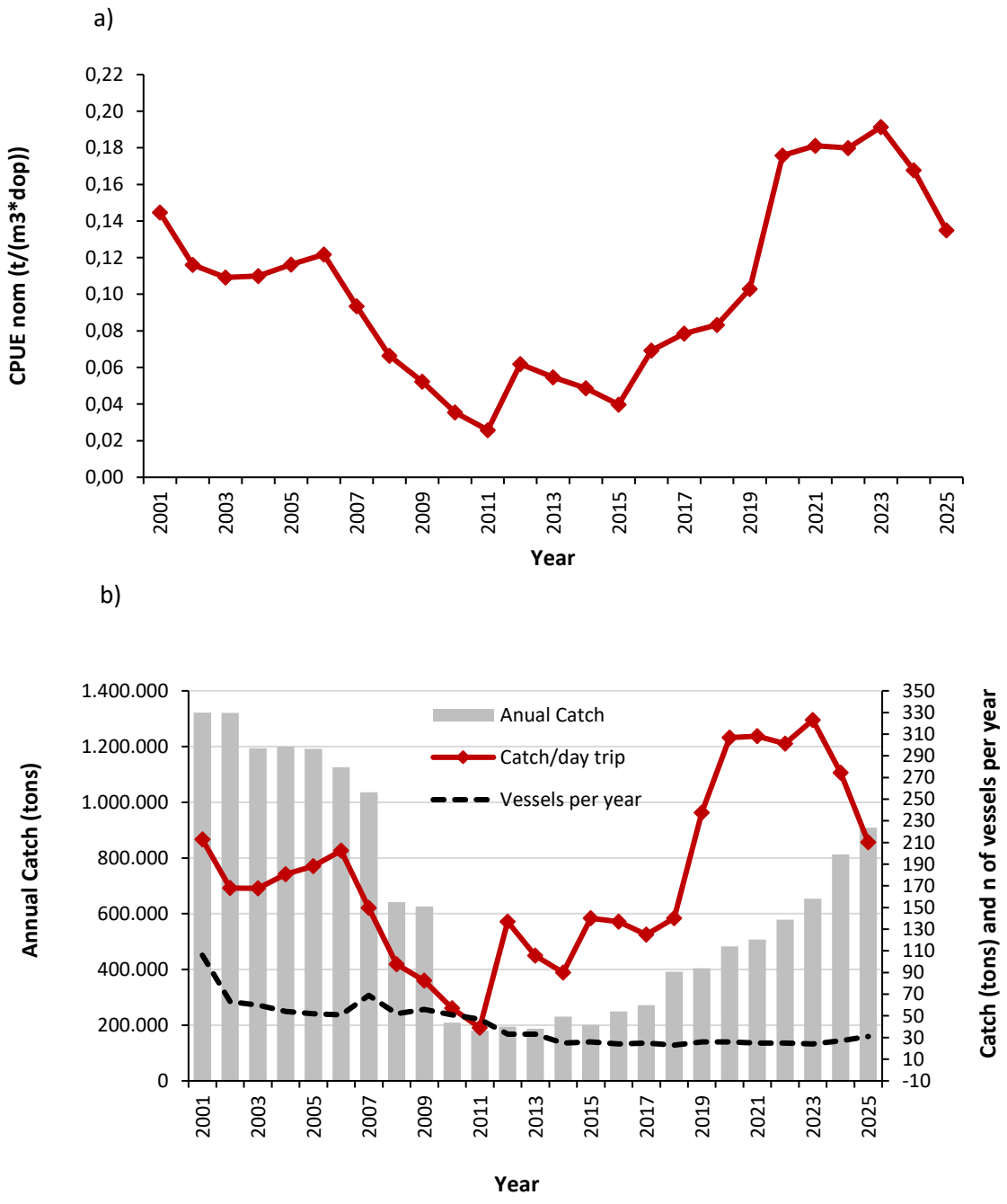

Figure 6: a) Nominal CPUE for the purse seine fleet in the center-southern zone targeting Jack mackerel and, b) Total catch per year (grey bars), catch per day of fishing trips (red line) and number of vessels with catch of Jack mackerel for the purse seine fleet in the center-southern zone, period 2001 to 2025. Source: IFOP-SERNAPESCA.

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3. RESEARCH PROGRAMS

Research programs performed in the Jack mackerel fishery include permanent projects carried out annually by IFOP (Fisheries Research Institute) along with complementary studies and other projects.

Permanent projects performed by IFOP during 2025-2026 include:

- **Fishery monitoring.**

  This study allows obtaining information on the evolution of the main biological and indicators of the fishery associated with the Jack mackerel fishery for both the industrial and the small-scale fleets. The monitoring is conducted between the northern boundary of Chile and 47°00' SL and includes information collected at sea and at landing points by certified scientific observers.

- **Bycatch research and Monitoring Program for Jack mackerel fishery.**

  Since 2015, this study monitors, through scientific observers onboard, the levels of bycatch and the interactions of the fishery with seabirds, marine mammals and sea turtles, as well as the associated non target species caught, and other ecosystem information used for management. The information collected by this project has been considered to establish mandatory bycatch mitigation measures and to certify the fishery against the MSC requirements (principle 2).

- **Hydroacoustic assessment of Jack mackerel between Arica-Parinacota and Valparaíso Regions, 2026.**

  This research cruise took place from March 21st through May 04th 2025 and included an exploration area located between the north of Arica (18°25´SL) and Valparaiso (33°00’ SL), unlike 2021 when the assessment covered up to the northern limit of Antofagasta (23°25´SL). As usual, transects were made perpendicular to the coast, reaching up to 100 nm off the coast. As a preliminary result, the estimated Jack mackerel biomass in the prospected area was 3,059,591 t (Catasti *et al.,* 2026).

- **Assessment of the total allowable catch.**

  Similarly, as done by the SPRFMO SWG, this study has used the Joint Jack mackerel (JJM) model. This project is aimed at establishing the status of the resource, and to assess the biologically sustainable exploitation rates. The results are used by the Fishing Authority to update and/or improve the stock assessment, simulating different exploitation scenarios and conducting additional analyses.

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Projects financed by the Fisheries and Aquaculture Research Fund (FIPA) during 2024 -2025 include:

- **Research project FIPA 2024-27: "Design and implementation of management strategies evaluation using the openMSE platform for the Jack mackerel fishery."**

  This project contributed to the development and evaluation of Management Strategy Evaluation (MSE) approaches for the Jack mackerel fishery through the integration of participatory processes, quantitative modelling, and advanced simulation tools implemented in the OpenMSE platform. Based on workshops with the Management Committee, stakeholder consultations, and expert judgement, a set of performance indicators was defined to evaluate alternative management procedures under different productivity and uncertainty scenarios. The study assessed management procedures incorporating alternative harvest control rules, catch stabilization mechanisms, and Banking & Borrowing provisions using operational models representing different stock productivity assumptions. In addition, simplified MSE approaches and an alternative estimation model were developed to improve computational efficiency while maintaining adequate representation of uncertainty. The results identified management procedures capable of balancing biological conservation, fishery performance, and catch stability, providing valuable technical guidance for future national and regional discussions on harvest strategies and management procedures for the Jack mackerel fishery.

- **Research project FIPA 2025-10 "Review and proposed methodological improvements for national hydroacoustic assessments of Jack mackerel (*Trachurus murphyi*)".**

  This project has focused on reviewing and improving the methodological and statistical basis of national hydroacoustic surveys for Jack mackerel, with the objective of enhancing the accuracy, consistency, and comparability of acoustic estimates of density, abundance, and biomass. The study evaluated historical survey designs and identified key sources of uncertainty associated with differences in spatial coverage, sampling strategies, survey timing, and acoustic equipment. Based on these analyses, alternative survey designs and advanced modelling approaches were developed, including spatial, spatiotemporal, Bayesian, and geostatistical methods to improve the estimation of acoustic density and its associated uncertainty. Preliminary results support the implementation of more flexible and cost-effective survey designs, the incorporation of environmental covariates, and the standardization of acoustic protocols and parameters. These advances are expected to strengthen the scientific basis of hydroacoustic abundance indices and improve their application in Jack mackerel stock assessment processes at both national and SPRFMO levels.

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4. BIOLOGICAL SAMPLING, LENGTH AND AGE COMPOSITION OF THE CATCH

4.1 Biological sampling

Biological information for Jack mackerel and its associated species is obtained on a regular basis from samples collected along the entire distribution of the fishery. Samplings are conducted on a daily basis, mainly at landing sites and processing plants and are also complemented with information gathered by scientific observers onboard fishing vessels. The information collected includes fork length measurements, otolith collection, total weight, gutted weight, gonad weight, and sex and maturity stages.

In 2025, a total of 98,231 specimens of Jack mackerel were sampled of which 28,201 were used to collect biological samples. For the industrial fleet, samples included at-sea sampling as well as port sampling, covering the entire range of activities reported for this fishery in Chile. The main landing ports for biological sampling were Iquique and Caldera in the northern area, and Talcahuano and Valdivia in the center-south area of the fishery. In relation to Chub mackerel, during 2025 a total of 10,079 specimens were sampled of which 2,059 were used to collect biological samples (**Table V**).

Table V. Number of Jack mackerel and Chub mackerel specimens collected in 2025 to gather biological and length samples (IFOP).

Landing Port	Jack Mackerel		Chub Mackerel	
	Length Sampling	Biological Sampling	Length Sampling	Biological Sampling
Arica y Parinacota	5,416	841	2,716	203
Iquique	13,295	1,970	2,633	142
Antofagasta	4,614	677	1,720	41
Caldera	16,097	4,952	711	373
Coquimbo	7,572	3,500	1,679	847
San Antonio	6,425	1,525	90	38
Talcahuano	32,131	11,173	371	264
Valdivia	10,764	3,093	145	137
Chilóe	1,917	470	14	14
Guaitecas	0	0	0	0
TOTAL	98,231	28,201	10,079	2,059

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4.2 Length and age composition of the catches

Jack Mackerel

Since 2021, size-structured catches of Jack mackerel have shown a wide range of sizes, between 7 and 67 FL cm, with main modes fluctuating between 27 and 44 FL cm (**Figure 7**). In 2021, the size distributions were bimodal, with noticeable modes between 27–28 cm and 37-39 cm FL. In contrast, in 2022 and 2023, the size structure became more concentrated, with a mode of 41 cm FL and 36 cm respectively.

In 2024, two main modes were observed in the size distribution of Jack mackerel catches, at 30 cm FL and 35 cm FL. During 2025, the size composition of Jack mackerel catches exhibited a narrower distribution, ranging from 17 to 58 cm FL, with a pronounced mode at 32 cm FL. There was a low incidence of both specimens smaller than 29 cm FL, and larger than 40 cm FL.

In 2021, the age structure was broader, with the highest catch frequencies observed between age groups V and VI. These distributions were relatively symmetrical, with a gradual decline in the number of specimens toward both younger and older age groups. In 2022 and 2025, catches were more concentrated, showing a narrower distribution with a peak around age group V and VI, and reduced contributions from both younger and older age groups.

By 2025, the age composition of Jack mackerel catches was characterized by a broad distribution of age groups, with age group V representing the dominant mode. Age groups IV and VI also contributed substantially to the catches, while the frequency of older age groups gradually declined, although specimens up to age group XII remained present. This pattern reflects the contribution of multiple cohorts to the fishery, with age groups IV–VI accounting for the largest proportion of the catches. (**Figure 8**).

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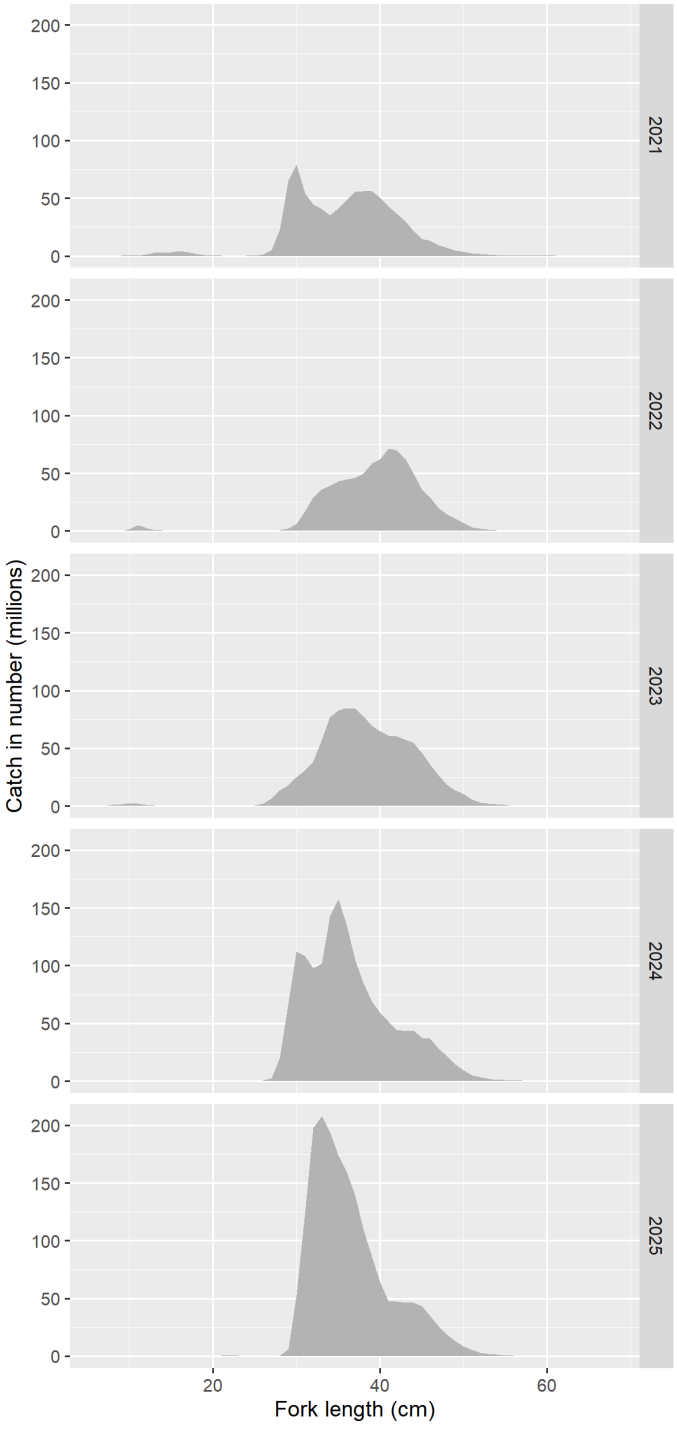

Figure 7. Length structure of catches of Jack mackerel for the period 2021 - 2025. Source: IFOP.

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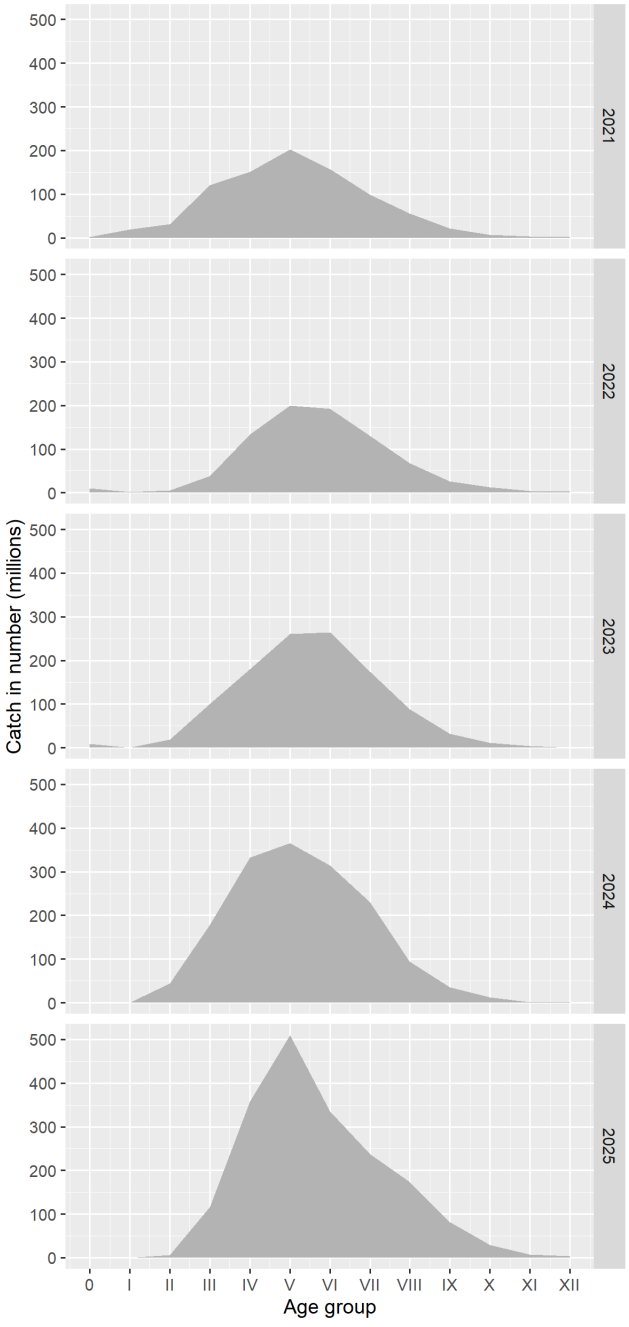

Figure 8: Age-structured catch in number of specimens of jack mackerel, using the new age assignment criteria, 2021–2025. Source: IFOP.

5. ECOSYSTEM APPROACH CONSIDERATIONS IN THE JACK MACKEREL FISHERY

Background

There is a growing concern that the current levels of fishing mortality, as a result of unmanaged bycatch and discards, threaten both the long-term sustainability of many fisheries worldwide and the maintenance of biodiversity in different areas, compromising the food security affecting the livelihood of people and countries that depend on fishing resources. However, the use and definition of these terms vary widely. Thus, in some countries, the term bycatch is referred to the part of the catch that is retained and sold but is not the target species for the fishery. In others, bycatch consider species and sizes of fish that are discarded or returned to sea (dead or alive). On the other hand, the OECD defines bycatch as “the total fishing mortality, excluding that accounted directly by the retained catch of target species”. This last definition thus includes fish that dies as a result of the interactions with the fishing gears, even if they do not leave the water, and could include mortalities resulting from “ghost-fishing”. As a reference, FAO defines bycatch as “any catches conducted during the fishing process beyond species and sizes of the marine organisms targeted by the fishery, from sponges, corals, commercial or not commercial fish, seabirds, marine mammals and marine reptiles”.

In this regard, Chile amended its General Law for Fisheries and Aquaculture in 2012 (through Law N° 20.625, known as “Discard Law”) incorporating the terms ***discards*** defined as “the action of returning to sea hydro biological species caught (target and non-target)” and ***incidental catch*** as specimens of “marine mammals, seabirds and turtles caught during fishing operations”. This law triggered an unprecedented process of diagnosis, reduction and control of discards and incidental catch in Chilean fisheries which has involved the joint effort of the regulatory, research and control agencies along with collaborative work with fishing users, leading the country to the gradual solution of the problem. In addition and considering the challenges of controlling and registering discards and incidental catch at sea, Chile recently incorporated the mandatory use of EMS (Image Recording Devices (IRD) onboard vessels and Electronic Logbook System (EMS)) to monitor compliance with measures and to report fishing activities in real time, respectively, with differentiated application depending on the type of fleet. Along with the use of these monitoring technologies, Chile has maintained and improved its human observation programs on board but for purposes exclusively scientific.

The Chilean policies to manage discards and incidental catch are broad in scope, encompassing target and non-target fish, accompanying fauna (bony fishes, Chondrichthyes, invertebrates, etc.), seabirds, marine mammals and sea turtles. Under a stepwise approach to solve the problem, the Law N° 20.625 considered exceptions to penalties, conditional on a minimum of two years fishery-based research monitoring programs by observers on board to quantify and identify the causes of discards and incidental catch. This background allowed the development, at a later stage, of mandatory reduction plans for these practices, tailored for each fishery, which are currently being monitored and recorded at sea through the incorporation of new technological tools (IRD) and (EMS). In this context, from 2014 onward, information onboard commercial fleets, for a Nationwide Research Program on discards and incidental catch in small pelagic purse seine fisheries have been collected, to establish reduction plans for these practices. For these purposes a team of trained observers from the National Observer Program has been employed. At the same time, similar programs have also been developed in demersal fisheries.

In January 2015, a specific research program for the Jack mackerel industrial purse seine fishery was initiated, which was concluded in April 2019 with the enactment of a mandatory reduction plan for the entire

fleet, built together with the stakeholders at the Management Committee of the fishery. Among other aspects, the reduction plan includes:

- Ban of discard for Jack mackerel and its accompanying fauna.
- Mandatory release, using specific handling protocols, for all specimens of seabirds, marine mammals, sea turtles, and chondrichthyans incidentally caught during fishing operations.
- Management measures and technological means to eliminate discards of accompanying fauna and reduce incidental catch.
- A scientific and compliance monitoring program, through observers onboard and EMS, to evaluate the effectiveness of the measures adopted by the reduction plan
- A code of good fishing practices.
- Incentives for innovation in systems aimed at reducing discards and incidental catch.

It should be noted that the observer programs have the sole objective of collecting biological and fisheries data to be used in scientific advice for management, without any jurisdiction with compliance. Therefore, the control of compliance with the measures for discards and incidental catch is being supervised remotely by electronic monitoring systems (IRD) and (EMS) onboard all vessels of the industrial fleet, while artisanal vessels longer than 15 m (total length) will be required to carry EMS in a later stage. For such purposes IRD specific regulations have been enacted and the system has been fully implemented in the entire industrial fleet as of January 2020. Also as of 2020, industrial vessel owners have the obligation to report, in real time, and on a set-by-set basis, all catches, discards and incidental catch through the Electronic Logbook System (ELS) implemented by the National Fisheries and Aquaculture Service, according to the Law. The information reported in the electronic logbooks includes:

- Geographic Location of the set.
- Time (beginning and end) of the set.
- Amount (weight) or number of specimens caught by species or species groups.
- Incidental catch by species or species groups.
- Additional information (notes).

In Chile both tools IRD and ELS have been implemented as new technologies to improve control of compliance with fishing regulation. However, the extension of its use beyond control, such as the scientific monitoring of fishing activities to gather fisheries dependent data, has begun to be explored recently, with the aim of complementing these tools with traditional human observer programs.
Finally, it should be highlighted that at its 8th Annual Meeting, the SPRFMO Commission selected the SPRFMO Observer Program Accreditation Evaluator. Afterward, in 2020 the Observer Programs of 3 Members, including Chile, were evaluated and granted accreditation (CTC8-Doc10_Rev2 SPRFMO Observer Program Implementation Report) in accordance with CMM 16-2021, which recognizes the high standard of the Chilean Observers Program.

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Observer Program Report

To characterize the incidental catch and mortality of seabirds, marine mammals and sea turtles that occurred in the industrial purse-seine fishery for Jack mackerel, a total of 4,955 fishing sets were monitored by scientific observers onboard between January 2015 and December 2025. The results are presented for the entire period (combined) with the aim of showing better estimates and trends for both catch and mortality rates, which in this case also correspond to the average incidental catch and the average mortality per fishing set. As mentioned for previous reports, in the Jack mackerel fishery both, the incidental catch and resulting mortality for these groups of species are low, mainly due to the fact that the fishing operations are rather oceanic (compared to artisanal fleets) and also because the crews are making efforts to release specimens alive whenever possible, through the use of handling protocols and the compliance with good fishing practices according to the mandatory bycatch reduction plans previously mentioned.

The species affected by incidental catch are mainly marine mammals (2,835 specimens), followed by Procellariiform seabirds including albatrosses, petrels and shearwaters (424 specimens altogether), and coastal seabirds such as seagulls, pelicans and penguins (375 specimens altogether). In addition, the incidental capture of two leatherback turtle specimens was recorded, which were released alive after maneuvers with the net by the crew. The only species of marine mammal affected is the South American sea lion (*Otaria flavescens*), while the main species of seabirds caught incidentally were the Dominican gull (*Larus dominicanus*), the Black-browed albatross (*Thalassarche melanophris*) and the Peruvian pelican (*Pelecanus thagus*) (**Table VI**).

It is necessary to point out that according to Chilean regulations the term incidental catch does not necessarily refers to mortality, since it relates to specimens caught in the fishing gears which in certain cases can be released alive by the crew, using appropriate handling protocols. Considering these conditions, observers onboard are required to differentiate and register both incidental catch and mortality. Consequently, and to prevent confusion, in Table VI the distinction is made between N° of individuals incidentally caught v/s N° individuals dead as a result of incidental catch. In fact, the incidental mortality resulting from interactions with this fleet is low, totaling 53 specimens out of 3,635 caught for the entire period (2015-2025), where the Pink-footed shearwater and the South American sea lion represented the main species in relation to the total number of dead specimens because of incidental catch.

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Table VI. Incidental catch and mortality by species in the Jack mackerel purse-seine industrial fishery operating between Valparaíso and Los Lagos, Chilean administrative regions (32°10'23'' - 43°44'17'' SL) including international waters of the SPRFMO. Source: data collected by scientific observers onboard from 4,955 fishing sets between January 2015 and December 2025 Source: Ossa *et al*. (2026) Preliminary data, final annual report under evaluation.

Common name	Scientific name	N° of individuals incidentally caught	N° individuals dead as a result of incidental catch	Mort (%)	AIC	CVAIC (%)[1]	AIM	CVAIM (%)[1]
South american sea lion	*Otaria flavescens*	2,835	17	0.6	0.6	561	0.003	1,983
Dominican gull	*Larus dominicanus*	245	2	0.8	0.05	2,044	0.0004	4,976
Black-browed albatross	*Thalassarche melanophris*	215	1	0.5	0.04	1,748	0.0002	7,038
Peruvian pelican	*Pelecanus thagus*	113	5	4.4	0.02	2,654	0.001	4,668
Unidentified albatross	*Thalassarche spp.*	61	0	0	0.01	2,947	0	-
Sooty shearwater	*Ardenna grisea*	47	2	4.3	0.009	3,639	0.0004	4,976
Grey-headed albatross	*Thalassarche chrysostoma*	36	0	0	0.007	3,027	0	-
Wilson´s storm petrel	*Oceanites oceanicus*	18	1	5.6	0.004	3,126	0.0002	7,038
Pink-footed shearwater	*Ardenna creatopus*	20	20	100	0.004	2,813	0.004	2,813
Humboldt penguin	*Spheniscus humboldti*	14	1	7.1	0.003	6,074	0.0002	7,038
Cape petrel	*Daption capense*	8	0	0	0.002	5,129	0	-
White-chinned petrel	*Procellaria aequinoctialis*	8	1	12.5	0.002	6,221	0.0002	7,038
Southern giant-petrel	*Macronectes giganteus*	8	0	0	0.002	5,129	0	-
Unidentified storm-petrel	*Hydrobatidae*	1	1	100	0.0002	7,038	0.0002	7,038
Unidentified penguin	*Spheniscus spp.*	2	1	50	0.0004	4,976	0.0002	7,038
Magellanic penguin	*Spheniscus magellanicus*	1	1	100	0.0002	7,038	0.0002	7,038
Wandering albatross	*Diomedea exulans*	1	0	0	0.0002	7,038	0	-
Leatherback sea turtle	*Dermochelys coriacea*	2	0	0	0.0004	4,976	0	-

Mort (%) = Mortality: Number of dead animals / Number of animals of the same species captured
AIC = Average Incidental Catch: Number of animals caught / Number of sets observed
CVAIC = AIC Coefficient of variation
AIM = Average Incidental Mortality: Number of dead animals / Number of sets observed
CVAIM = AIM Coefficient of variation

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[1] It is important to highlight that the coefficient of variation (CV) indicates the size of a standard deviation in relation to its mean. The higher the coefficient of variation, the greater the dispersion level around the mean. When the mean value is close to zero, the CV becomes very sensitive to small changes in the mean. Using as example the data in **Table VI** above, a notable flaw would be if the expected return in the denominator is close to zero. In this case, the coefficient of variation could be misleading.

Regarding the spatial and temporal variability of the incidental catch and mortality for both marine mammals and seabirds, its occurrence is mainly explained by the distance of the fishing from the coast in relation to the seasons of the year. During warm seasons (spring-summer) the fleet operates near the coast (35 nm in average), compared with cold seasons (autumn-winter) when operations become more oceanic with an average of 60 nm from the coast.

This pattern of spatial-temporal operation has a great effect on the intensity of interactions, especially with foraging species restricted to terrestrial colonies or those of coastal distribution, such as the South American sea lion and coastal seabirds (Baylis et al., 2008, Ainley et al., 2009, Sabarros *et al*., 2014). For these two groups, the average incidental catches in the Jack mackerel fishery increased during the warm seasons, compared to cold seasons.

An opposite condition occurred with albatrosses whose interaction with the fishery increased during the cold seasons (autumn-winter). Records of albatross' incidental catch were mainly observed at 100 nm or more from the coast (82% of the albatrosses), condition which coincides with Spear & Ainley (2008) who reported that albatrosses are much more abundant in oceanic than neritic waters during winter for the south-central zone of Chile, (**Figure 9**).

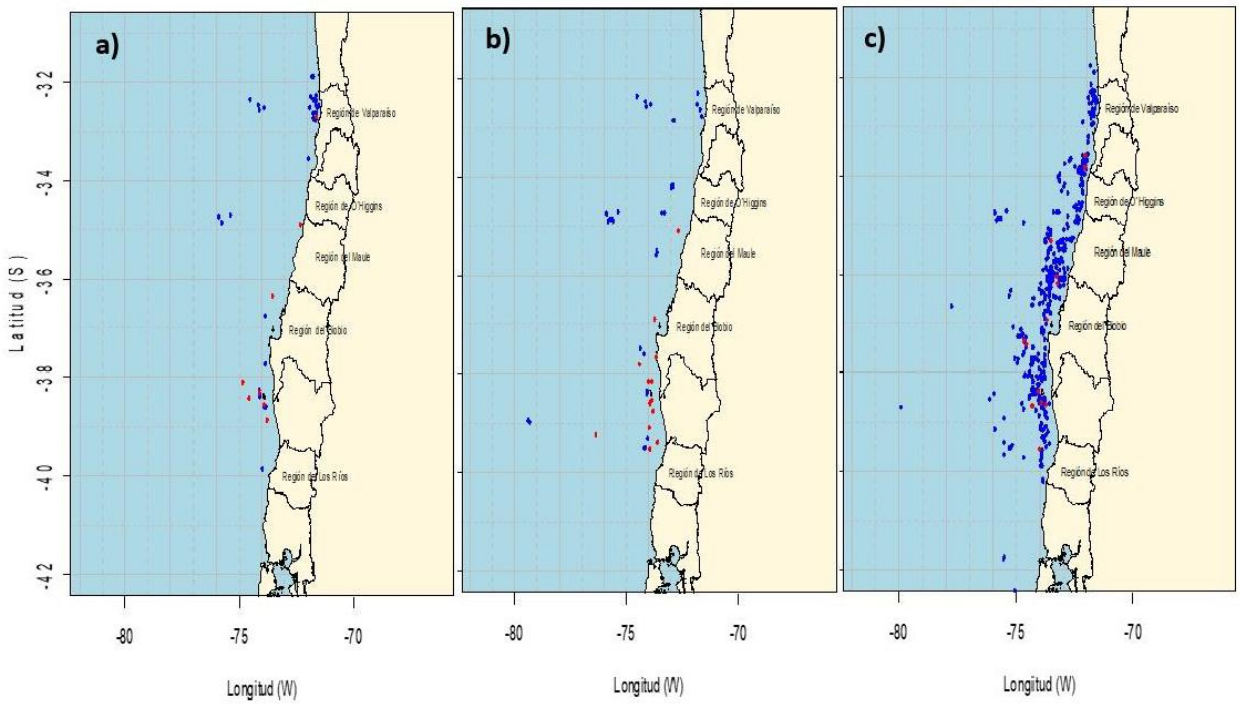

Figure 9. Geographic distribution of fishing sets with records of incidental catch (blue) and mortality (red) reported in the Jack mackerel purse-seine fishery that operated in the south-central zone off Chile during period 2015-December 2025: a) coastal seabirds; b) Procellariform seabirds; c) South American sea lion. Source: Ossa *et al*. (2026) Preliminary data, final annual report under evaluation).

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In accordance with Chilean regulations, scientific observers on board must record information on all species incidentally captured in fishing sets selected for this purpose. Therefore, from the information presented in **Table VI** it is concluded that, at least in the sampled sets, no cetaceans have been caught to date by the Jack mackerel fishery.

On the other hand, regarding Chondrichthyans, specimens caught must be registered by observers when in the composition samples, but recorded in the category of accompanying fauna. However, all specimens must be returned to sea since they are not authorized to be captured or retained with purse seines gears according to Exempt Resolution 3917/2019. In addition, its devolution to sea must be carried out following mandatory handling protocols established by Exempt Resolution 2063/2020.

In relation to this last provision, some restrictions have arisen for sampling Chondrichthyans by observers since the crews return the specimens to sea as soon as they detect them onboard to avoid non-compliance issues as the fleet is being monitored by cameras (EMS) and observers.

Despite the constraints named above, records of captured sharks have been documented as a frequency of occurrence for 4,955 fishing sets sampled by observers onboard the Jack mackerel purse-seine fleet between 2015 and 2025 (**Table VII**). For these records, due to the difficulty of handling large specimens and some safety restrictions, weight was not obtained, and therefore it is not possible to make an estimates or extrapolation of total catch. These specimens were returned to the sea according to the protocol.

Table VII. Presence of captured sharks in the Jack mackerel purse-seine industrial fishery operating between Valparaíso and Los Lagos, Chilean administrative regions (32°10’23’’ - 43°44’17’’ S) including international waters of the SPRFMO. Source: data collected by scientific observers onboard from 4,955 fishing sets between January 2015 and December 2025 Source: Ossa et al. (2026) Preliminary data, final annual report under evaluation.

Common name	Scientific name	PFS	POO
Blue shark	*Prionace glauca*	74	0.015
Shortfin mako	*Isurus oxyrhinchus*	14	0.003
Porbeagle	*Lamna nasus*	7	0.001
Unidentified pelagic shark	Chondrichthyes	3	0.001
Thresher shark	*Alopias vulpinus*	3	0.001

PFS: Total presence in all fishing sets
POO: Total proportion of occurrence

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Annex V International Convention for the Prevention of Pollution from Ships (MARPOL)

Another aspect related to the ecosystem considerations of the Jack mackerel fishery is the monitoring of garbage management by the fishing fleet. In this regard, the observer program has monitored the handling of garbage generated on board vessels through the assessment of the level of knowledge of the Annex V of the International Convention MARPOL, whose main rule prohibits the dumping of plastics and synthetic materials into the sea.

The observer program has evaluated the level of knowledge and behavior of the crews, along with the implementation of the regulations of Annex V on the vessels between 2015 and 2025. The information has been collected by observers using a specific form designed for such purposes. Some aspects studied were: 1) the existence of written management plans, 2) the presence of placards displaying the disposal requirements of the Annex V in suitable and visible places, 3) use of garbage record books and 4) presence of containers.

To improve knowledge of the regulations, the observers were tasked to give talks to the crew about the main rules. A standard guide for observers was developed called "Dissemination of Annex V-MARPOL 73/78: How and what to communicate to the crews on board purse seine vessels". In addition, flyers, posters, calendars, and ecological bags with allusive messages have been designed and distributed amongst fishermen and communities. After the results were obtained, recommendations for prevention or mitigation measures were formulated to improve the implementation of Annex V on board industrial purse seine vessels.

Final Considerations

All the data collected by the observer program over the last 10 years in the industrial Jack mackerel fishery, including operational, ecosystem and fishery dependent data will be subject to a detailed review and validation during the second half of 2026.

This task will be performed through an expanded workshop with representatives from the regulatory, control and fisheries research institutions, including experts on specific topics. This review may involve changes in the numbers, estimates and trends presented in previous reports. All the results of this review will be presented in detail in an annex to the 2027 national report.

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6. OBSERVER IMPLEMENTATION REPORT

At-Sea and Port Sampling Program

In order to evaluate the sampling coverage within the SPRFMO Area, only fishing trips targeting Jack mackerel were considered for this report (i.e., trips with a Jack mackerel composition of more than 50% of the total catch per fishing trip). This report includes coverage data from fisheries observers onboard and/or at-port sampling.

During 2025 fishing activities by Chilean vessels in the SPRFMO Area did not occur, therefore sampling and monitoring were focused exclusively in the Chilean EEZ. Within this area, the sampling coverage conducted by scientific observers onboard fishing vessels was 16.1%, and at-port sampling coverage was 13.4%, with a total combined sampling coverage of 29.5% (**Table VIII**).

During 2025, 242 fishing trips were monitored by scientific observers onboard and 235 fishing trips were sampled in port. These high coverages are partly explained by the smaller number of vessels conducting the fishing effort, on more coastal schools than in previous years. However, the total sampling coverage onboard and at landing points combined (29.5%), as mentioned above, is significant in relation to the total number of fishing trips.

Table VIII. Sampling coverage by scientific observers at port and onboard for the Chilean Jack mackerel fishery 2025.

	At-Port	On Board	Total
Chilean EEZ	13.4%	16.1%	29.5%
SPRFMO area*	-	-	-
TOTAL	13.4%	16.1%	29.5%

(*) There was no activity of the Chilean fleet in the SPRFMO Area.

7. ADMINISTRATIVE MEASURES

Total catch quota

In December each year, the Undersecretariat for Fisheries and Aquaculture establishes the catch quotas for each resource in full exploitation regimes to be implemented the following year. The Jack mackerel quota procedure for 2026 by the Undersecretariat for Fisheries and Aquaculture in December 2025 was 1,178,328 t (Exempt Decree, Nº 00274-2025). This quota is currently under modification in accordance with Exempt Resolution N°. 1463-2026, which implements in Chile the conservation and management measures adopted within the framework of the SPRFMO.

Bycatch Reduction Plan

A mandatory set of measures to reduce bycatch and discards in the jack mackerel fishery was established through Exempt Resolution N° 1626 of 2019; can be found at https://www.subpesca.cl/portal/616/articles-104138_documento.pdf.

Implementation of EMS in the entire industrial fleet

- **Image Recording Devices (IRD)**

As of January 2020, mandatory Image Recording Devices (IRD or EMS) to monitor compliance with Bycatch Reduction Plans and Fishery regulation in general have been implemented.

- http://www.subpesca.cl/portal/615/w3-article-96157.html
- http://www.subpesca.cl/portal//615/w3-article-106392.html

- **Electronic Logbook System (ELS)**

During 2020, the mandatory use of Electronic Logbook Systems (ELS) in the entire industrial fleet to report in a set-by-set basis, total catches, bycatch and discards, locations of sets and other fishery information according to the requirements of the Law have also been implemented.

http://www.sernapesca.cl/sites/default/files/res.ex_.267-2020_0.pdf

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