# STATUS REPORT

*Beryx splendens*
Splendid Alfonsino *
FAO -ASFIS code: BYS

**2023**

**Updated November 2023**

*In this document it will be referred to as Alfonsino

**TABLE OF CONTENTS**

# 1. Description of the fishery

## *1.1 Description of fishing vessels and fishing gear*

The Korean trawl fishery was the only fishery targeting alfonsino in the SEAFO CA in recent years (according to the table 2). During the period 2010-2013 the Korean mid-water trawl fishery targeted mainly splendid alfonsino but instead caught mainly pelagic armourhead. During this period two fishing vessels participated in the fishery, and activity ended in 2014 (update table 2 with 0 for 2014 if nothing was landed). Since 2017, no fishing activity targeting this species was conducted in SEAFO CA.

Although primarily considered as a midwater trawl fishery, 94% of the tows recorded by onboard observers were classified as "Demersal". Whether or not these trawls were bottom trawls remains uncertain, and this is an issue that still requires clarification.

In the SEAFO CA the vessel 1 stern trawler operated with the following fishing gears (Table 1 and Figs. 1- 4 provide the specifications of the fishing gears):

- HAMPIDJAN NET is a bottom otter trawl with two-piece nets of 66 m in length. The head rope is 48 m long; ground rope is 50 m; the height, width and girth of the net are 5.5 m, 30 m and 100 m, respectively. The cod-end mesh size is 120 mm. The ground gear is 50 m in length and 903 kg in weight, and the float is 1,018 kg.
- MANUFACTURED NET is a four-piece net with an overall length of 66.9 m. The lengths of the head rope and ground rope are 59.0 m and 77.9 m, respectively. The height, width and girth of the net are 5.5 m, 200 m and 83 m, respectively. The cod-end mesh size is 120 mm. The ground is 77.9 m in length and the weight of the ground is 2,068 kg. The float is 913.200 kg with the floating rate of 44%.
- MIDWATER NET is 210 m long. The lengths of head rope and ground ropes are 93.6 m. The height and width of the net are 70.0 m and 240-260 m, respectively. The girth of the net is 816 m and the cod-end mesh size is 120 mm.

**Table 1:** Fishing gear specifications for vessel 1 (name of vessel)

| Gear Specifications | | HAMPIDJAN NET bottom trawl | MANUFACTURED NET bottom trawl | MIDWATER NET |
|---|---|---|---|---|
| Otter board | type | VRS-TYPE | VRS-TYPE | VRS-TYPE |
| | material | Steel | Steel | Steel |
| | size (mm) | 2,300 x 4,030 | 2,750 x 4,900 | 1,854 x 3,818 |
| | weight (kg) | 3,930 | 4,320 | 2,000 |
| | under water weight (kg) | 2,619 | 2,473 | 1,145 |
| Trawl Net | purpose | bottom fishing (figure1) | bottom fishing (figure2) | mid-water fishing (figure3) |
| | net length overall(m) | 66 | 66.9 | 210.0 |
| | head rope (m) | 48 | 59.0 | 93.6 |
| | ground rope (m) | 50 | 77.9 | 93.6 |
| | net height (m) | 5.5 | 5.5 | 70 |
| | net width (m) | 30 | 200 | 240~260 |
| | net girth (m) | 100 | 83 | 816 |
| | mesh size (mm) | 120 | 120 | 120 |

The vessel 2 was a stern trawler which operated with two types of fishing gears: a mid-water trawl net; and the bottom trawl net. The gear used for the operation in the SEAFO Convention Area was the mid-water KITE gear (Figure 4).

The height of the net opening of the mid-water gear is approximately 50 m, and the total length is around 280 m. When net is settled, it sinks underwater and the sinking depth of the net is controlled by the wire ropes. The upper and lower parts of the bottom trawl net PE Net have attached plastic buoys and rubber balls respectively. As in the case of KITE gear the wire ropes control the sinking depth of the settled gear.

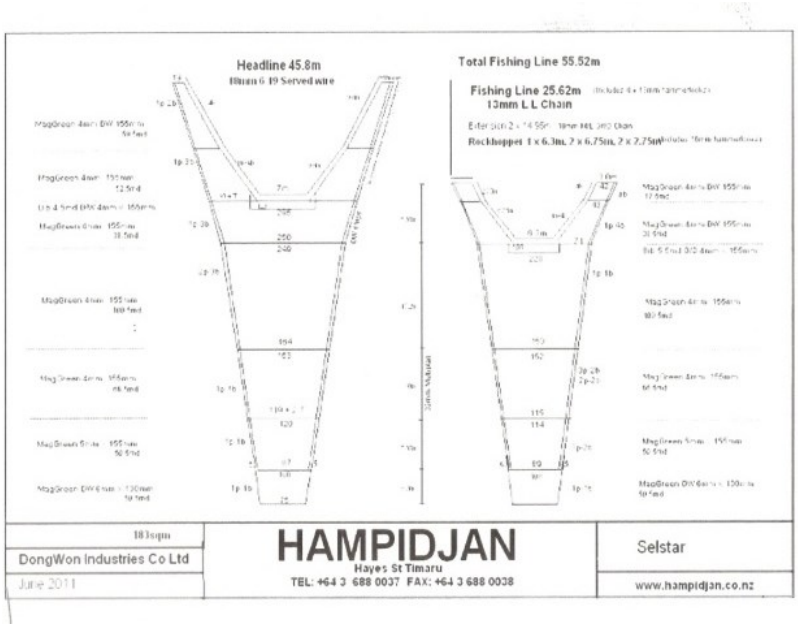


**Figure 1:** Diagram of HAMPIDJAN NET of the vesse1.

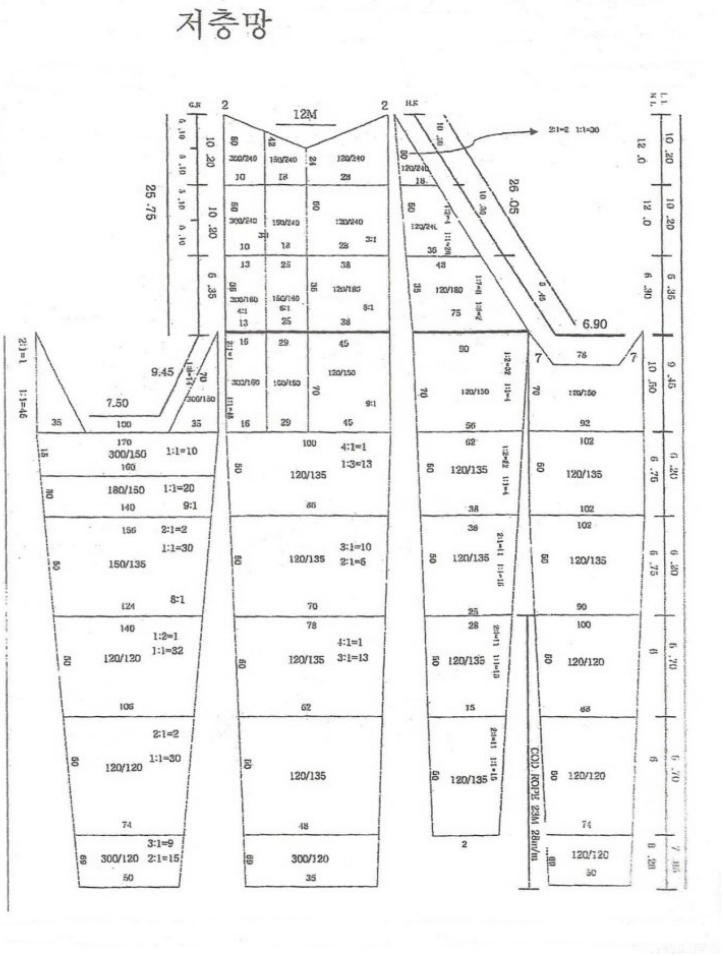


**Figure 2:** Drawing of the Custom Manufactured Bottom Trawl Net of the vesse1.

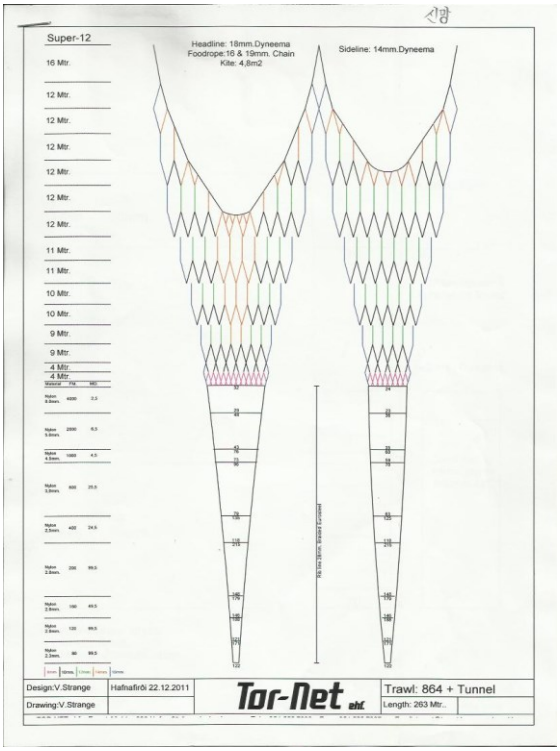


**Figure 3:** Drawing of mid-water trawl net of the vesse1.

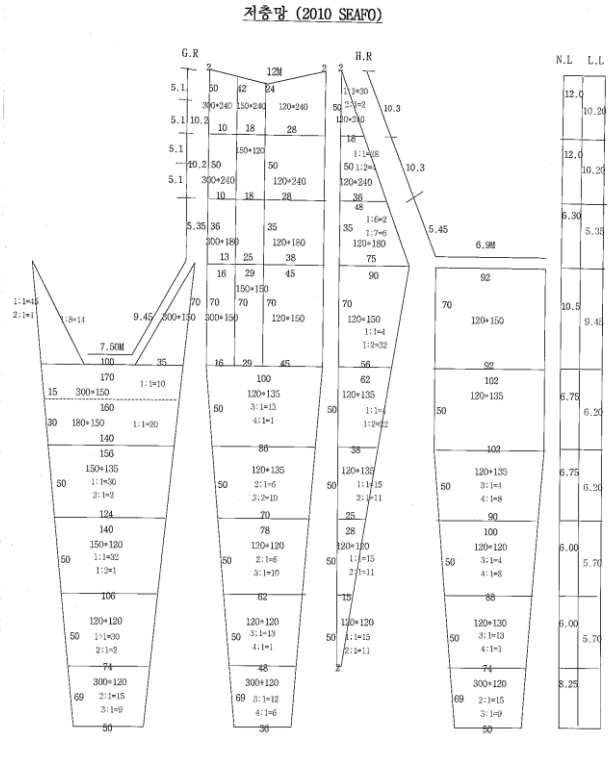


**Figure 4:** Drawing of mid-water trawl net of the vessel 2.

## *1.2 Spatial and temporal distribution of fishing*

During the period from 2010 to 2011 the Korean trawl vessels caught Alfonsino mainly in the northern part of Division B1 and in the southern part in 2012 and 2013 (Figs. 5-8). The three main fishing grounds in Division B1 are shown in these figures.

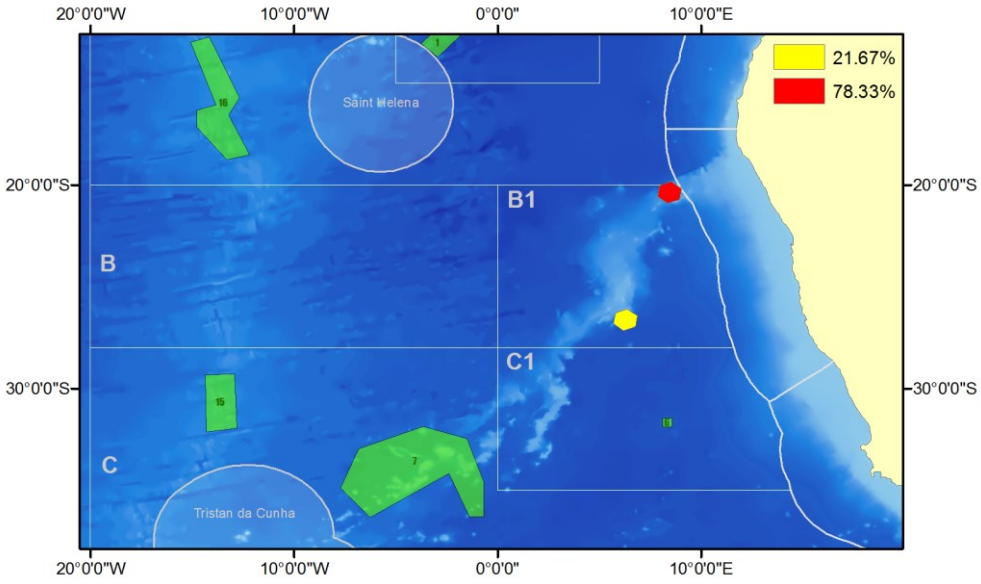


**Figure 5:** Proportion of catch of Alfonsino (*B. splendens*) aggregated to 100km diameter hexagonal cells (2010).

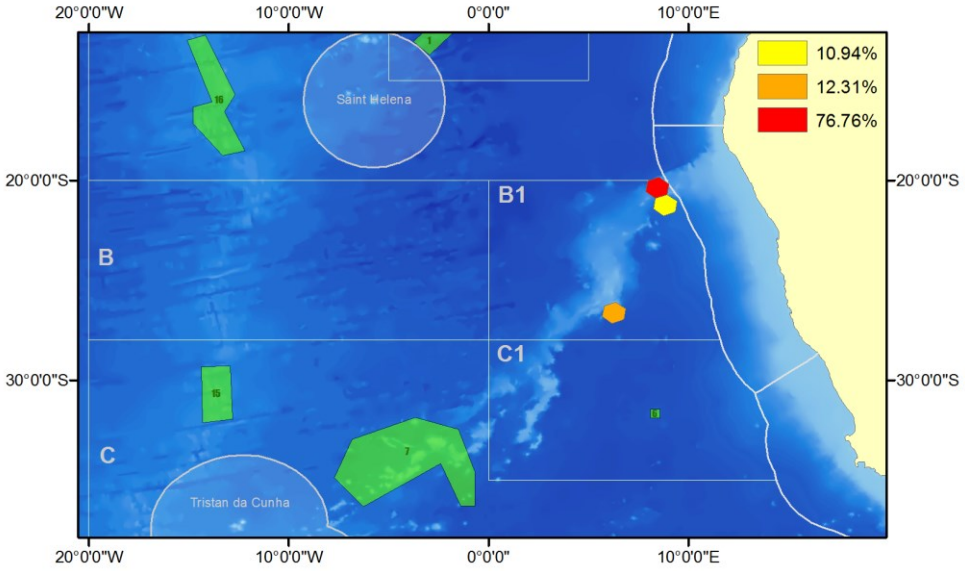


**Figure 6:** Proportion of catch of Alfonsino (*B. splendens*) aggregated to 100km diameter hexagonal cells (2011).

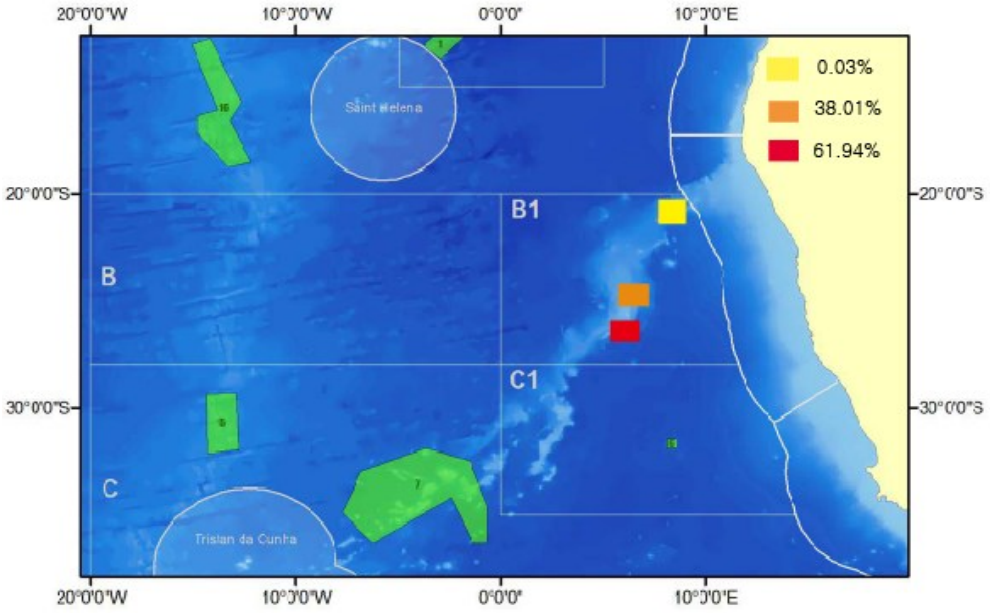


**Figure 7:** Proportion of catch of Alfonsino (*B. splendens*) by subarea (Jan-Nov 2012).

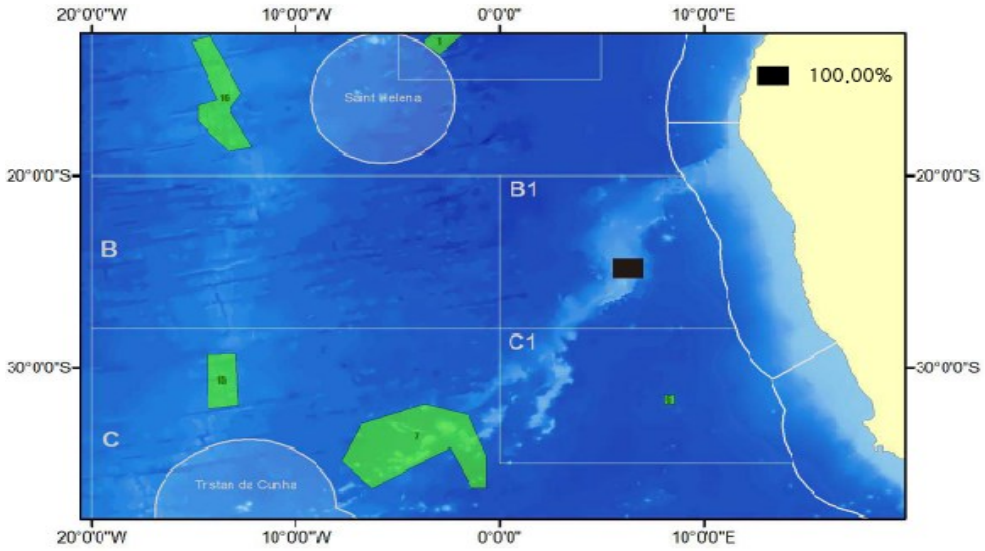


**Figure 8:** Proportion of catch of Alfonsino (*B. splendens*) by subarea (2013).

In 2017, only one vessel from Namibia conducted fishing operations in a closed area in Division C1 (Fig. 9).

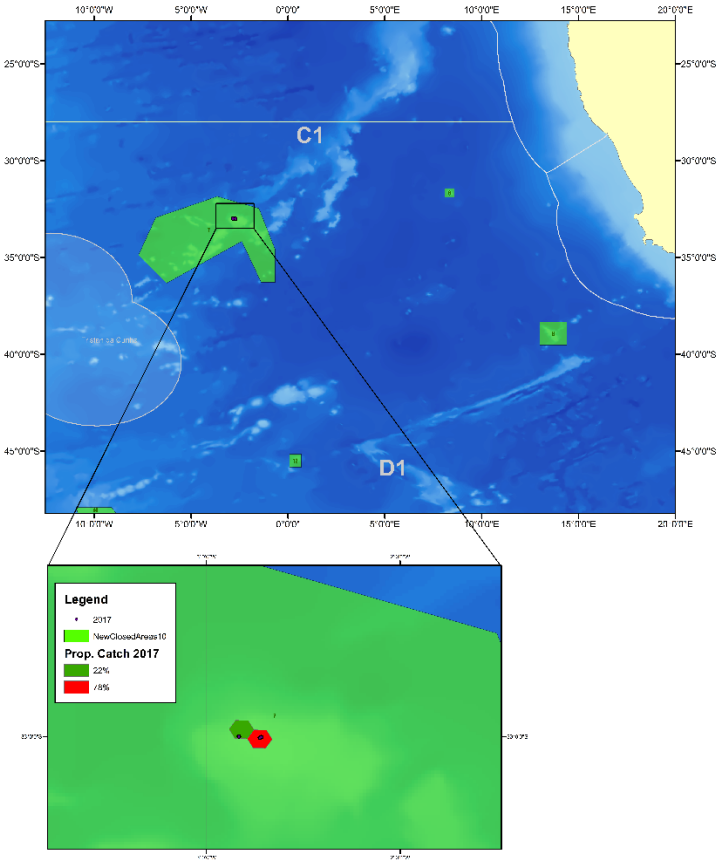


**Figure 9:** Proportion of catch of Alfonsino (*B. splendens*) aggregated to 100km diameter hexagonal cells (2017)

From 2018 - 2023, no fishing activity targeting Alfonsino was recorded in SEAFO CA. In 2022 a small Alfonsino bycatch has been reported from a research survey in Division B1.

### *1.3 Reported retained catches and discards*

Table 2 presents Alfonsino catches by country, as well as fishing gear and the sub-divisions in which the catch was taken. The main fishing countries worked in the area included Russia (bottom trawl) in the late 1970s, Ukraine in the mid-1990s, Russia (bottom trawl), Norway (bottom trawl), Spain (MWT /BLL), Poland and Namibia (bottom trawl) in the late 1990s, and South Korea (mid-water trawl) for 4 years from 2010 to 2013, respectively, 198 tonnes, 196 tonnes, 172 tonnes and 1.6 tonnes. Historically the highest catches of the fish were recorded by Russia with 2,972 and 2,800 tons in 1977 and 1997 respectively, Poland 1,964 tonnes in 1995, and Norway 1,066 tons in 1998 in the SEAFO CA.

### *1.4 IUU catch*

Potential IUU fishing activity in Division A of the SEAFO CA has been reported to the Secretariat in 2012, but the extent of this is still unknown. The vessel was included in the SEAFO IUU vessel list in 2012.

***Table 2:*** *Catches (tonnes) of Alfonsino (B. splendens), (**ALF**) made by various countries.*

| Flag State | Namibia | | Namibia | | Namibia | | Norway | | Russia | | Portugal | | Ukraine | | Rep of Korea | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fishing method | Bottom trawl | | Bottom trawl | | Bottom trawl | | Bottom trawl | | Bottom trawl | | Bottom trawl | | UNK | | Mid-water trawl | |
| Management Area | B1 | | C0 | | C1 | | A1 | | UNK | | UNK | | UNK | | B1 | |
| Year | Retained | Discarded | Retained | Discarded | Retained | Discarded | Retained | Discarded | Retained | Discarded | Retained | Discarded | Retained | Discarded | Retained | Discarded |
| 1976 | | | | | | | | | 252# | | | | | | | |
| 1977 | | | | | | | | | 2,972# | | | | | | | |
| 1978 | | | | | | | | | 125# | | | | | | | |
| 1993 | | | | | | | | | | | | | 172§ | | | |
| 1994 | | | | | | | | | | | | | | | | |
| 1995 | 1# | | | | | | -- | -- | | | | | | | | |
| 1996 | 368# | | | | | | -- | -- | | | | | 747§ | | | |
| 1997 | 208# | | | | | | 836 | | 2,800# | | | | 392§ | | | |
| 1998 | -- | -- | | | | | 1,066 | | 69§ | | | | | | | |
| 1999 | 1 | | | | | | -- | -- | | | 3§ | | | | | |
| 2000 | <1 | | | | | | 242 | | | | 1§ | | | | | |
| 2001 | 1 | | | | | | -- | -- | | | 7§ | | | | | |
| 2002 | 0 | | | | | | -- | -- | | | 1§ | | | | | |
| 2003 | 0 | | | | | | -- | -- | | | 5§ | | | | | |
| 2004 | 6 | | | | | | -- | -- | 210 | | | | | | | |
| 2005 | 1 | | | | | | -- | -- | 54 | | | | | | | |
| 2006 | -- | -- | | | | | -- | -- | -- | -- | <1 | | | | | |
| 2007 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2008 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2009 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2010 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | 159 | 0 |
| 2011 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | 165 | 0 |
| 2012 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | 172 | 0 |
| 2013 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | 13 | 0 |
| 2014 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2015 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2016 | -- | -- | | | | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2017 | 0 | 0 | <1 | 0 | <1 | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2018 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2020 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2021 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2022 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2023* | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

* Provisional (Data received up to 31 August 2023). -- = No Fishing. Blank fields = No data available. UNK = Unknown. # = Values taken from the Japp (1999). § = Values from FAO

***Table 2(cont).***

| **Flag State** | **Spain** | | **Poland** | | **Cook Island** | | **Mauritius** | | **Cyprus** | | **South Africa** | | **Research** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fishing method** | **Mid-water trawl and Longlines** | | **UNK** | | **Bottom trawl** | | **Bottom trawl** | | **Bottom trawl** | | **Bottom trawl** | | **Bottom Trawl** | |
| **Management Area** | **UNK** | | **UNK** | | **UNK** | | **UNK** | | **UNK** | | **B1** | | **B1** | |
| **Year** | **Retain** | **Discard** | **Retain** | **Discard** | **Retain** | **Discard** | **Retain** | **Discard** | **Retain** | **Discard** | **Retain** | **Discard** | **Retain** | **TOTAL** |
| 1976 | | | | | | | | | | | | | | **252** |
| 1977 | | | | | | | | | | | | | | **2,972** |
| 1978 | | | | | | | | | | | | | | **125** |
| 1993 | | | | | | | | | | | | | | **172** |
| 1994 | | | | | | | | | | | | | | |
| 1995 | | | 1,964§ | | | | | | | | 60# | | | **2,025** |
| 1996 | | | | | | | | | | | 109# | | | **1224** |
| 1997 | 186§ | | | | | | | | | | 124# | | | **4546** |
| 1998 | 402§ | | | | | | | | | | | | | **1,537** |
| 1999 | | | | | | | | | | | | | | **4** |
| 2000 | | | | | | | | | | | | | | **243** |
| 2001 | 2 | | | | | | | | | | | | | **10** |
| 2002 | | | | | | | | | | | | | | **1** |
| 2003 | 2 | | | | | | | | | | | | | **7** |
| 2004 | 4 | | | | 142 | | 115 | | 437 | | | | | **914** |
| 2005 | 72 | | | | | | | | | | | | | **127** |
| 2006 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **<1** |
| 2007 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2008 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2009 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2010 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **159** |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **165** |
| 2012 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **172** |
| 2013 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **13** |
| 2014 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2015 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2016 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2017 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **1** |
| 2018 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2019 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2020 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2021 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| 2022 | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | <1 | **<1** |
| 2023* | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | N/F | | **N/F** |
| **TOTAL** | **668** | | **1,964** | | **142** | | **115** | | **437** | | **293** | | **<1** | **14,669** |

* Provisional (End of August 2023). -- = No Fishing. Blank fields = No data available. UNK = Unknown. # = Values taken from the Japp (1999). § = Values from FAO.

Two species targeted: *Beryx splendens* represents majority of catch

## 2. Stock distribution and identity

*Alfonsino* is a benthopelagic species that has a global distribution and been reported from all tropical and temperate oceans (excluding northeast Pacific and Mediterranean Sea) between latitudes of about 65° N and 43° S. It occurs from depths of about 25 m to at least 1300 m (Busakhin 1982). In the Atlantic Ocean the species occurs in both the western (Gulf of Maine to Argentina) and eastern Atlantic (from the coast off Spain to South Africa; Fig. 10). Adults inhabit the outer shelf (180 m) and slope to at least 1,300 m depth probably moving further from the bottom at night but ascending to feed in midwater during the night; often found over seamounts and underwater ridges. The species is oviparous, spawning in batches. Eggs, larvae and juveniles are pelagic.

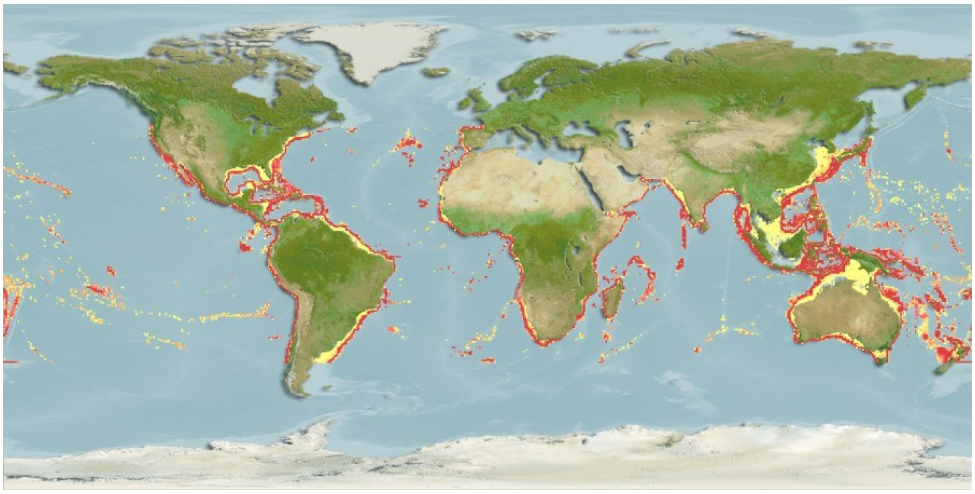

**Figure 10:** The distribution of Alfonsino (*B. splendens*; source: FishBase)

## 3. Data available for assessments, life history parameters and other population information

### *3.1 Fisheries and surveys data*

Lack of historical fishing data (including effort) in the SEAFO CA prevent the application of standard assessment methods. Only catch and effort (per haul) data for a period of three years (2010-2012) is available for quantitative stock assessment.

### *3.2 Length data and frequency distribution*

Length frequency data collected by Korean trawl fisheries between 2010 and 2013 is summarised in Tables 3 and 4 and shown Figure 11. Number of samples in 2013 were not sufficient to obtain a reliable length frequency distribution. Alfonsino in the southern area of Division B1 was largest with average length of 26.5 cm and 28.0 cm at the 3$^{rd}$ quartile, with two modes at 22 cm and 27 cm in 2011. In the southern area of Division B1 the length of the fish was also the largest in 2011 and reached about 50 cm fork length. No trend was apparent in 2012 (May-June) due to paucity of samples (23 samples). Overall length trends between the areas during 2012-2013 were asymmetric. The length of the species in the northern part was larger than that of southern part in 2012 and 2013.

**Table 3:** Results of length composition of Alfonsino collected by Korean vessels in the SEAFO CA (B1) (2010-2013)

| | 2010 | | 2011 | | 2012 (5~6) | | 2012(11) | | 2013 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | South | North | South | North | South | North | South | North | South | North |
| No. of samples | 200 | 841 | 174 | 593 | 514 | 23 | 77 | - | 97 | 5 |
| Minimum length | 19.0 | 17.0 | 20.0 | 15.0 | 17.0 | 26.0 | 24.0 | - | 17.0 | 25.0 |
| Maximum length | 42.0 | 47.0 | 50.0 | 48.0 | 34.0 | 35.0 | 39.0 | - | 31.0 | 34.0 |
| Average length | 25.8 | 24.8 | 26.5 | 27.8 | 24.8 | 31.0 | 31.5 | - | 23.7 | 27.4 |
| Median length | 25.0 | 24.0 | 25.0 | 28.0 | 25.0 | 32.0 | 32.0 | - | 22.0 | 26.0 |
| 1st quartile length | 23.0 | 22.0 | 23.0 | 25.0 | 23.0 | 30.0 | 29.0 | - | 21.0 | 25.0 |
| 3rd quartile length | 27.0 | 26.0 | 28.0 | 31.0 | 26.0 | 32.5 | 34.0 | - | 27.0 | 27.0 |
| Average Depth (m) | 210.9 | 211.1 | 229.6 | 238.4 | 323.8 | 288.5 | 248.2 | - | 250.0 | 265.1 |

**Table 4:** Number of hauls by year, minimum and maximum number of individuals per set and the number of individuals sampled between 2010 to 2013 in the SEAFO CA.

| Year | No. of Sets Observed | Mean Individuals | Min. Individuals | Max. Individuals | Mean sample size/tonnes |
|---|---|---|---|---|---|
| 2010 | 7 | 17.429 | 10 | 25 | 0.92 |
| 2011 | 7 | 19.143 | 5 | 75 | 1.36 |
| 2012 | 29 | 7.345 | 1 | 16 | 0.06 |
| 2013 | 7 | 3.143 | 1 | 7 | 1.94 |

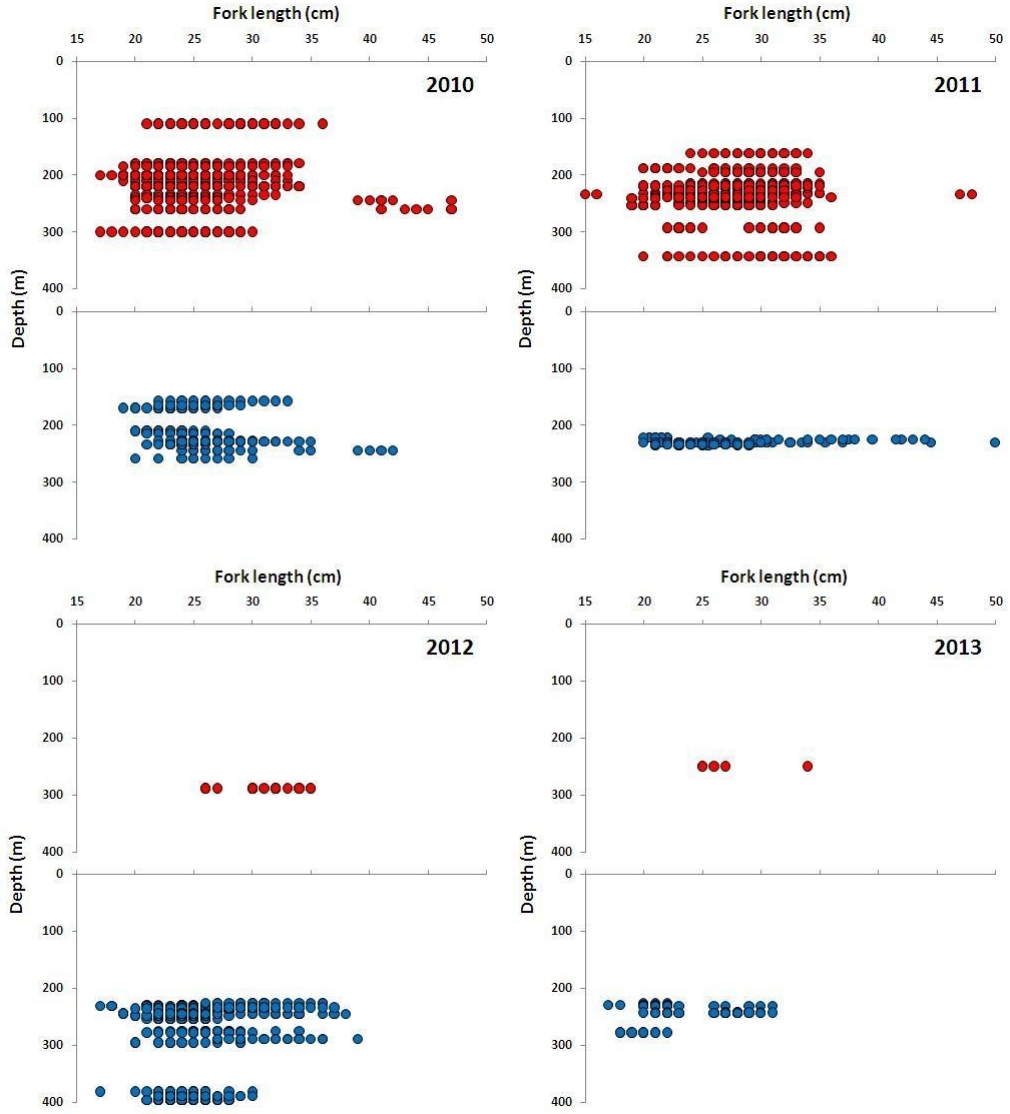


**Figure 11:** Length distribution of Alfonsino (*Beryx splendens*) by depth for 2010-2013. (Red dot represents length samples from the Northen Area and the blue dots represent length samples from the Southern Area)

### *3.3 Length-weight relationships*

Figure 12 shows the length-weight relationship of alfonsino for 2010-2013. The length-weight relationship parameters for both sexes combined were 0.022 for a and 3.010 for b.

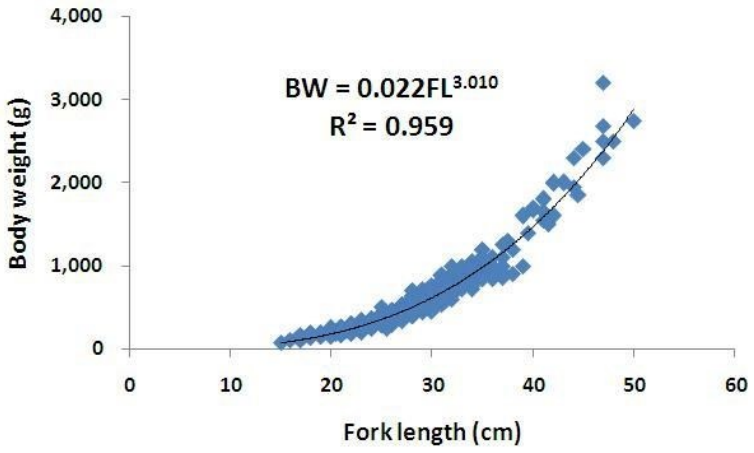


**Figure 12:** Relationship between length and weight of Alfonsino (*B. splendens*) in the SEAFO CA for 2010 - 2013.

### *3.4 Age data and growth parameters*

The maximum observed age of Alfonsino in the Gulf of Guinea was 20 years. The growth parameters for Alfonsino were estimated as K=0.097 year^-1, $L_{inf}$=48 cm, and $t_0$=-3.08 year^-1 using the specimens from the Gulf of Guinea (López-Abellán *et al*. 2008).

### *3.5 Reproductive parameter*

Spawning season is believed to span from November to February (Nova Caledonia). Length at 1st maturity was estimated as fork length 39.67 cm for females (95% c.i.=39.34, 40.02 cm) and 36.88 cm for males (95% c.i.=36.45, 37.36 cm) (Flores et al. 2012). Fecundity was estimated at 270,000 – 650,000 eggs (source: FishBase).

The biological productivity of *B. splendens* is likely to be moderate to low in general (Anonymous, 2007). Alfonsino is a serial spawner and reproduces in the areas that they normally inhabit. Average size at sexual maturity is between 30–34cm (4–6 years old) and can vary between localities (González et al. 2003). The annual numbers and proportion of fish by gonad maturity stage sampled from the Korean trawl fishery during the period of 2010 - 2013 are presented in Table 5 and Figure 13. Time of spawning also varies markedly between seasons. The proportion of immature fishes was 99.4%, 91.4%, 98.6% and 97.1% in 2010, 2011, 2012 and 2013, respectively. The fish, which is in pre-spawning and spawning gonad stages, appeared from October indicating that the spawning season may start from sometime after October. To get more accurate reproduction results of Alfonsino in the SEAFO Area, there is a need to collect data for a few more years.

**Table 5:** Annual number of fish by maturity stages of Alfonsino (*B. splendens*) in the SEAFO CA for 2010 to 2013.

| Year | Month | Maturity stage | | | | |
|---|---|---|---|---|---|---|
| | | Immature | Developing | Pre-spawning | Spawning | Spent |
| 2010 | Sep | 882 | 66 | 6 | 0 | 0 |
| | Oct | 33 | 6 | 0 | 0 | 0 |
| | Nov | 0 | 20 | 0 | 0 | 0 |
| 2011 | Jan | 95 | 239 | 0 | 0 | 0 |
| | Sep | 37 | 1 | 0 | 0 | 0 |
| | Oct | 18 | 20 | 12 | 0 | 0 |
| | Nov | 26 | 77 | 34 | 2 | 0 |
| 2012 | May | 16 | 7 | 0 | 0 | 0 |
| | Jun | 452 | 32 | 0 | 0 | 0 |
| | Nov | 29 | 40 | 3 | 5 | 0 |
| 2013 | Oct | 42 | 4 | 0 | 0 | 0 |
| | Nov | 28 | 25 | 3 | 0 | 0 |

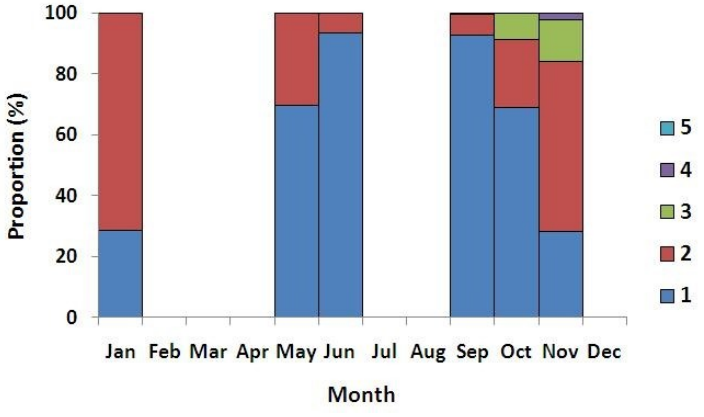


**Figure 13:** The proportion of maturity stage of Alfonsino in the SEAFO CA for 2010-2013. (1: immature, 2: developing, 3: pre-spawning, 4: spawning, and 5: spent).

### *3.6 Natural mortality*

There is no available information and data in the SEAFO CA.

### *3.7 Feeding and trophic relationships (including species interaction)*

There is no available information and data in the SEAFO CA.

### *3.8 Tagging and migration*

No tagging and migration studies on Alfonsino have been done in the SEAFO Area.

## 4. Stock assessment

### *4.1 Available abundance indices and estimates of biomass*

There is no available information and data for the SEAFO CA.

### *4.2 Data used*

The data used are derived from fishing hauls in which total catch of *Beryx splendens* represented more than 80% of the total catch of *P. richardsoni* and *Beryx splendens* caught by Korean trawls around the Valdivia Bank. This criterion is used since the catches of these two species are negatively correlated, i.e., when one of these two species occurs in the haul the other does not.

In each haul the estimate of CPUE of *Beryx splendens* is represented as the ratio of total catch of the species by the haul duration time.

### *4.3 Methods used*

Nominal CPUE was used to derive a perception of the development of the fishery in the period 2010-2012.

### *4.4 Results*

The progression in CPUE over time showed marked variability with no clear trend (Fig 15).

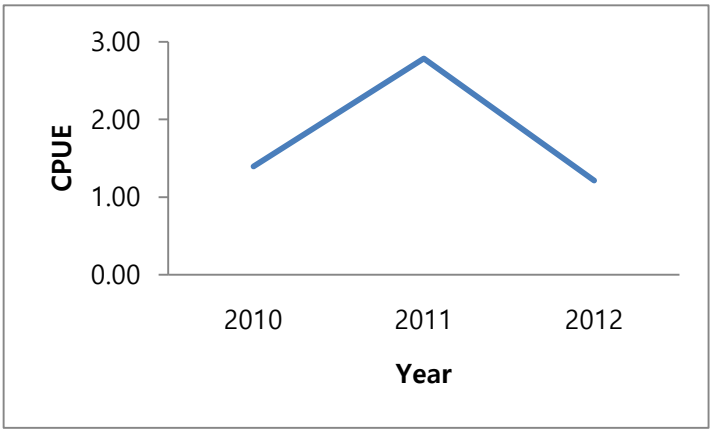


**Figure 15:** Plot of nominal CPUE (Catch in tonnes per hour) for 2010-2012.

*4.5 Discussion*

It should be recognized that the data available for assessment is extremely sparse and represents a short time series. The perception of the stock as described is based on only 3 years of catch and effort data. Length frequency distributions could not be derived based on the insufficient length samples submitted to the Secretariat.

*4.6 Conclusion*

Catch and effort data per haul on Alfonsino were collected by Korean vessels for only 3 years from 2010 to 2012. These data, although short in series, can be used to get a perception of the trend in nominal CPUE.

*4.7 Biological reference points and harvest control rules*

No biological reference points could be determined and the SC suggests using an empirical Harvest Control Rule (HCR) to regulate the fishery until the data situation is improved. A candidate HCR consists of the average catch of the last three years to which a 20% uncertainty cap is applied.

ICES Harvest Control Rules, category 5: Data poor stocks (only landings data). Calculation of average catch for three years (2010- 2012) as $C_{Y-1}$

$$C_{Y-1} = \frac{\sum_{y-3}^{y-1} C_i}{3}$$

$$= (159+ 165+172)/3$$
$$=165$$

And calculation of the catch advise as

$$C_{Y+1} = 0.8 \times C_{Y-1}$$

$$= 0.8*165$$
$$= 132t$$

## 5. Incidental mortality and by-catch of fish and invertebrates

*5.1 Incidental mortality (seabirds, mammals and turtles)*

No by-catch of seabirds, mammals and turtles were reported.

*5.2 Fish by-catch*

In the case of Southeastern Atlantic fisheries, Alfonsino is often found in association with other fish species as, for example, in 2011 the following species (per ton) were caught; Boarfish (*Capros aper*) 14 tonnes, Blackbelly rosefish (*Helicolenus dactylopterus*) 3 tonnes, Imperial blackfish (*Schedophilus ovalis*) 6 tonnes, Oilfish (*Ruvettus pretiosus*) 8 tonnes, and Silver scabbardfish (*Lepidopus caudatus*) 4 tonnes.

*5.3 Invertebrate by-catch including VME taxa*

The main method used to catch Alfonsino is with bottom trawling. Trawling for this species on seamounts impacts habitat (Clark and O'Driscoll, 2003, Koslow et al., 2001), but the precise impact of this on invertebrate populations on the seamounts is unknown.

### *5.4 Incidental mortality and by-catch mitigation methods*

By-catch mitigation measures to reduce incidental mortality for seabirds, mammals and turtles are in place (see current conservation measures in section 6).

### *5.5 Lost and abandoned gear*

There was no reported lost and abandoned gear from the trawl fisheries for Alfonsino in the SEAFO CA.

### *5.6 Ecosystem implications and effects*

The main method to catch Alfonsino is bottom trawling and repeated trawl disturbances will alter the benthic community on a seamount. However, the precise impact of such trawling on the ecosystem as a whole is unknown. (see Conservation Measure CM30-15).

## 6. Current conservation measures and management advice

Alfonsino is a seamount-associated species that form aggregations, and the experience worldwide is that serial depletion of aggregations at different seamounts can happen. In the recent fisheries for the species in SEAFO the fishery was concentrated on a single seamount summit, the Valdivia Bank, where it was mainly a bycatch in the target fishery for pelagic armourhead. There are information available from 2015 and 2022 from limited observations on RV Dr Fridtjof Nansen surveys. In 2015 only scattered specimens of the species occurred in the main fishing area. In 2022 Splendid alfonsino (*Beryx splendens*) was caught in the Northern region and in the Valdivia region. While catch density in the Valdivia region were negligible, catch density in the northern region were comparatively higher: 4785 kg per square nautical mile.

It is also recognized that the last ten year's interruption in the exploitation has provided potential for recovery of the resource in the main fishing area on Valdivia Bank. There is however not enough information from any source to determine with certainty whether recovery has happened or not happened.

The SC however recognized that without future fishery data nor survey information the basis for providing scientific advice will deteriorate. The SC therefore discussed what advisory option would be most appropriate while maintaining the potential for data provision from a fishery. It must also be taken into account that the alfonsino is mainly a bycatch and that the catches will depend on the activity level in the target fishery for armourhead.

The SC considered the TAC level advised in 2013 as precautionary at that time. Considering no fishing pressures in the last 10 years and the development of the resource, the SC recommends a TAC of 200 tonnes (status quo) for the SEAFO CA, of which a maximum of 132 tonnes may be taken in Division B1 for 2024.

Other Conservation Measures that are applicable to this fishery can be seen in Table 7.

**Table 7**: Other Conservation Measures that are applicable to this fishery.

| | |
|---|---|
| Conservation Measure CM 04-06 | On the Conservation of Sharks Caught in Association with Fisheries Managed by SEAFO |
| Conservation Measure CM 14-09 | To Reduce Sea Turtle Mortality in SEAFO Fishing Operations. |
| Conservation Measure CM 25-12 | On Reducing Incidental Bycatch of Seabirds in the SEAFO Convention Area |
| Conservation Measure CM 30-15 | On the Management of Vulnerable Deep Water Habitats and Ecosystems in the SEAFO Convention Area |
| Conservation Measure CM-TAC-01 (2023) | Total Allowable Catches and related conditions for Patagonian Toothfish, Deep-Sea Red Crab, Alfonsino, Orange Roughy and Pelagic Armourhead for 2024 in the SEAFO Convention Area. |

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