

APPENDIX VI – Stock Status Report – Alfonsino

STATUS REPORT

Beryx splendens

Common Name: Alfonsino

FAO-ASFIS Code: ALF



2014

Updated: 9-Oct-14

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1. Description of the fishery

1.1 Description of fishing vessels and fishing gear

The Korean trawl fishery in the SEAFO CA started in 2010 using trawl nets by two fishing vessels, F/V Adventure and F/V Dongsan Ho. Table 1 and Fig. 1-3 show the gear specifications for F/V Adventure. HAMPIDJAN NET, bottom fishing, is a two-piece net, 66 m in length. The head rope is 48 m long; the 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 the 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 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. The cod-end mesh size is 120 mm.

Table 1: Gear specifications for F/V Adventure.

Gear Specifications		bottom fishing HAMPIDJAN	bottom fishing (custom manufactured)	midwater
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)	midwater 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

F/V Dongsan Ho is a stern trawler which has two types of fishing gears; midwater trawl net and bottom trawl net - this vessel will not be operating in the future. The gear used for the operation in the SEAFO Convention Area is the midwater KITE gear (Fig. 3 & 4), which consist of ropes, whose upper part has kites and lower part has chains. The height of the net's gate is approximately 50 m, and the total length is around 280 m. When set the midwater net, the gear sinks underwater, whose sinking depth is controlled by wire ropes. Bottom trawl net is that PE Net (Fig. 1 & 2) is used in the SEAFO Area, to which upper and

lower parts plastic buoys and rubber balls are attached respectively. When set the bottom net, the gear sinks underwater, and the depth is controlled by warp wires.

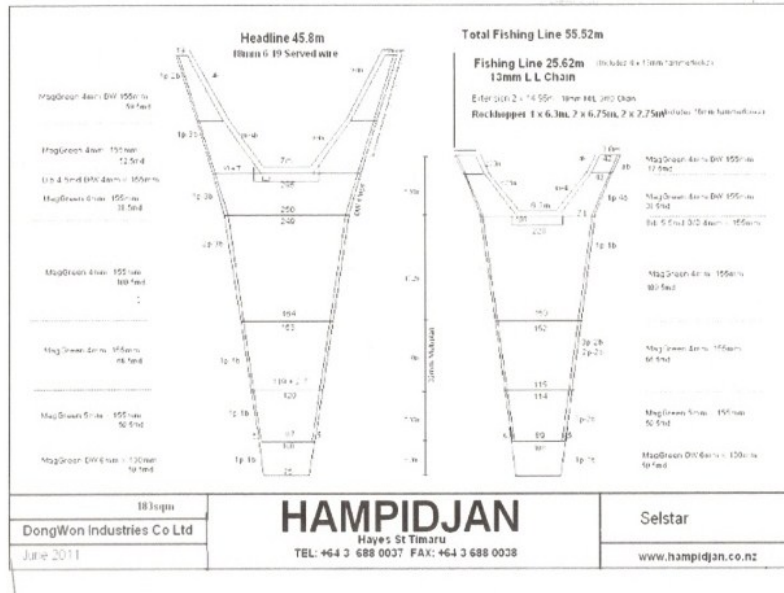


Figure 1: Diagram of HAMPIDJAN NET of the F/V Adventure.

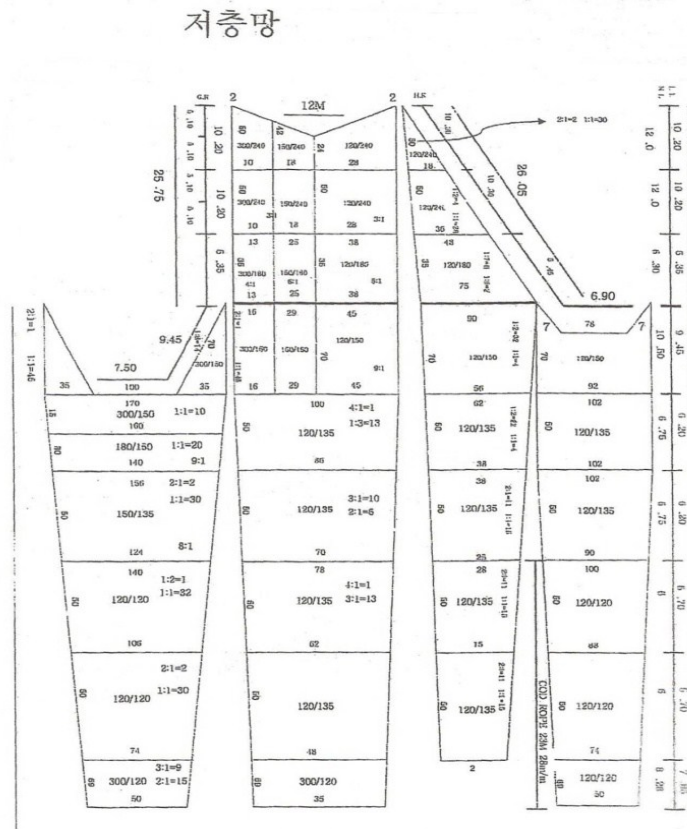


Figure 2: Drawing of the Custom Manufactured Bottom Trawl Net of the F/V Adventure.

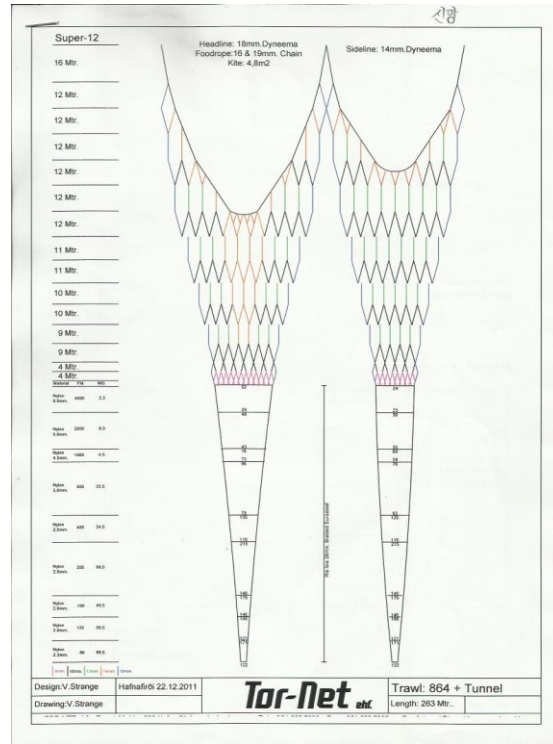


Figure 3: Drawing of midwater trawl net of the F/V Adventure.

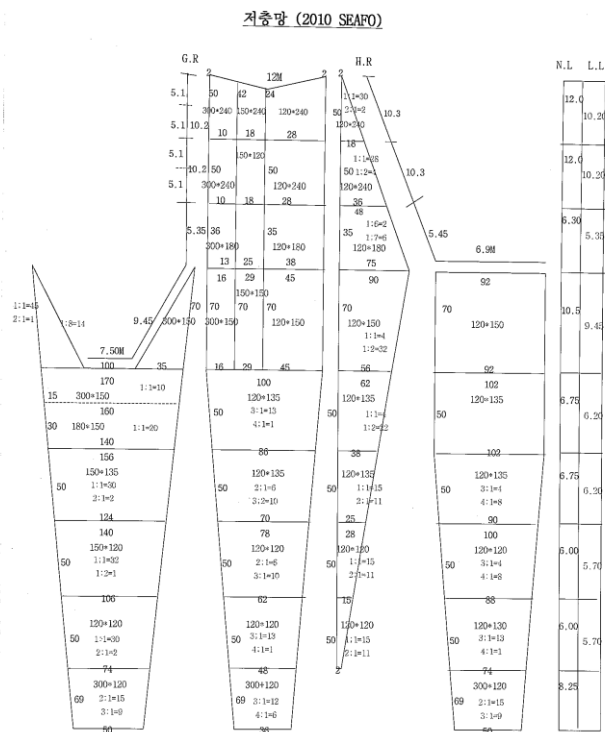


Figure 4: Drawing of midwater trawl net of the F/V Dongsan Ho.

1.2 Spatial and temporal distribution of fishing

During the period from 2010 to 2011 Korean trawl vessels (Dongsan Ho and/or Adventure) caught Alfonsino mainly in the northern part and in the southern part of Division B1 in 2012 and 2013 (Fig. 5-8). It was possible to distinguish two or three main areas or fishing grounds in Division B1.

Table 1: The total number of sets from which alfonsino catches were derived for the period 2010-2013.

2010	2011	2012	2013
19	15	28	7

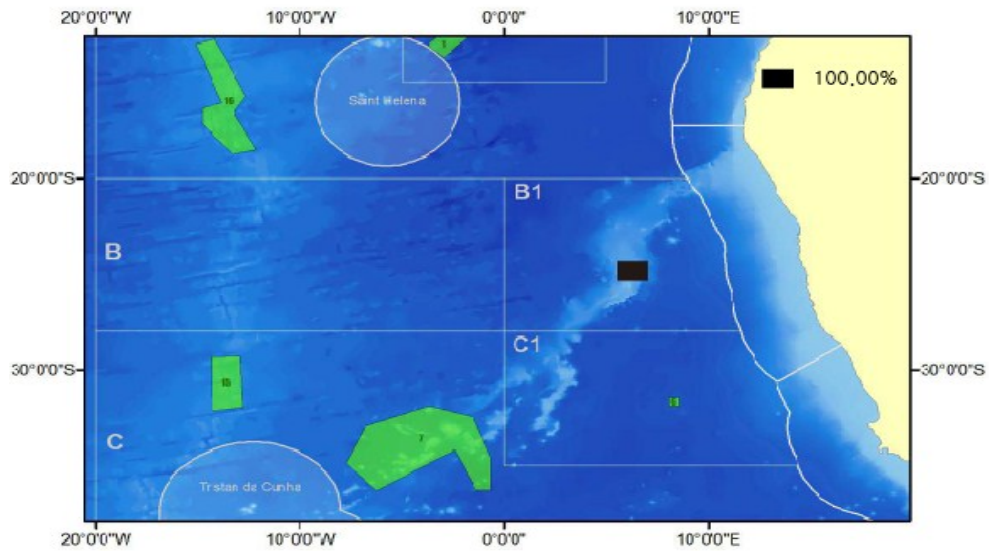


Figure 5: Annual estimated catch (1.6 tonnes) of Alfonsino in 2013 derived from the Observer Reports aggregated to 100km diameter rectangle.

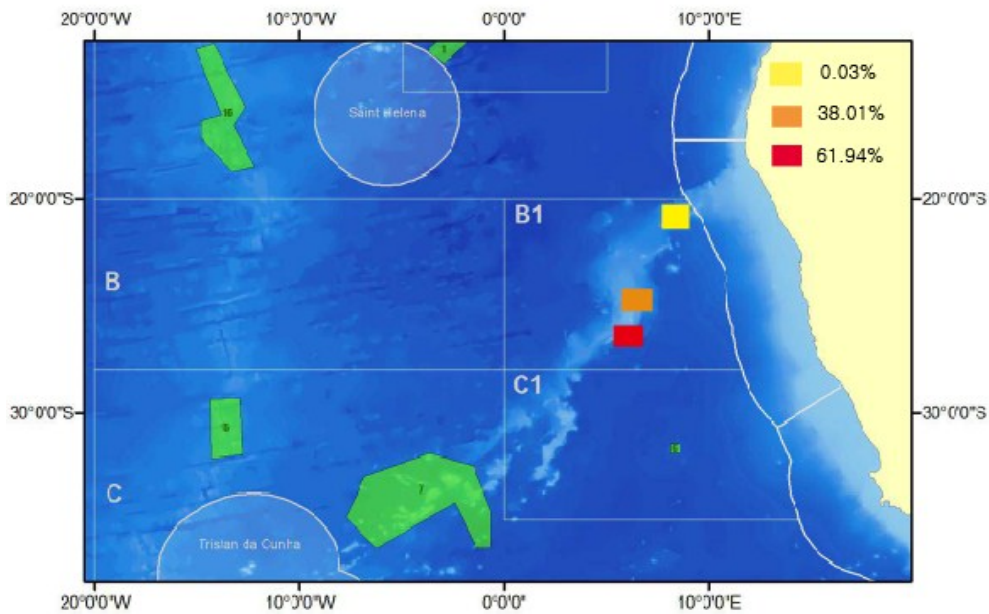


Figure 6: Annual estimated catch of Alfonsino in 2012 derived from the Observer Reports aggregated to 100km diameter rectangle.

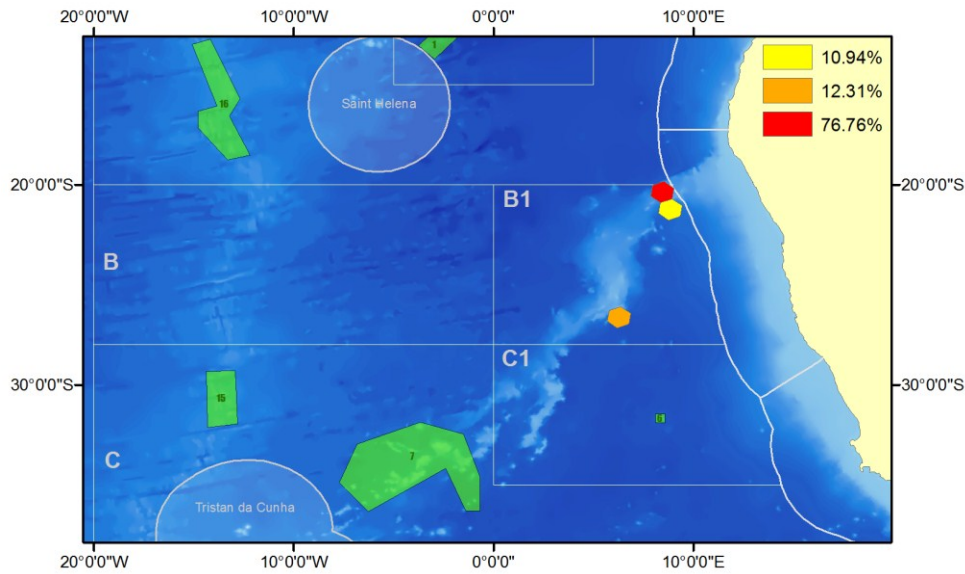


Figure 7: Annual estimated catch of Alfonsino in 2011 derived from the Observer Reports aggregated to 100km diameter hexagonal cells.

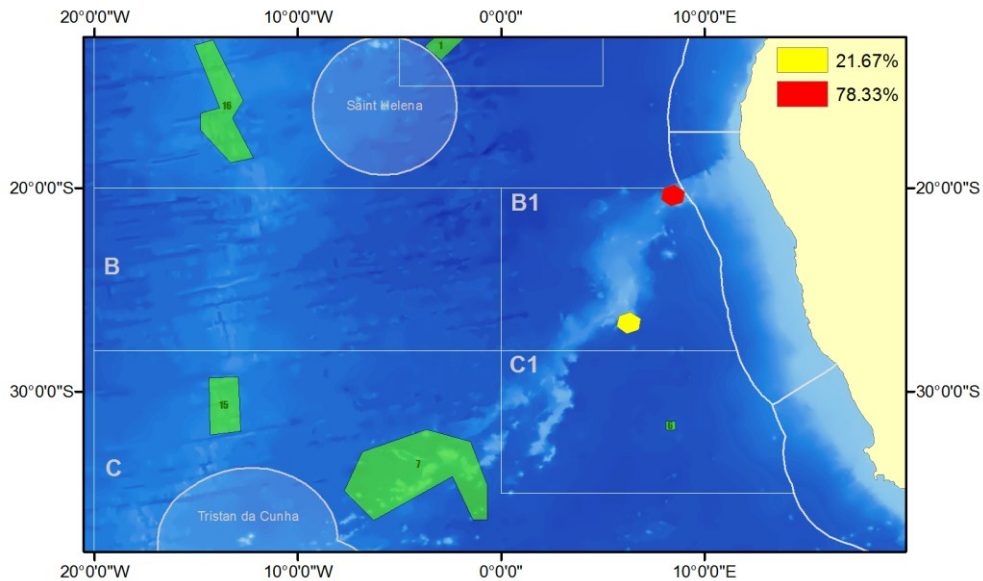


Figure 8: Annual estimated catch of Alfonsino in 2010 derived from the Observer Reports aggregated to 100km diameter rectangle hexagonal cells

1.3 Reported retained catches and discards

Table 2 presents alfonsino catches by country, as well as fishing gear and the divisions in which the catch was taken. Historically, the main fishing countries worked in the SEAFO CA 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. In recent years South Korea conducted a trawl fishery for 4 years and the reported landings during 2010 to 2013 were, 198 tonnes, 196 tonnes, 172 tonnes and 1.6 tonnes, respectively. 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.

Table 2a: Catches (tonnes) of alfonso (*B. splendens*) made by various countries. Values in *italics* are taken from Japp (1999). Values in **bold** are from the FAO.

Flag State	Namibia		Norway		Russia		Portugal		Ukraine		Korea	
Fishing method	Bottom trawl		Bottom trawl		Bottom trawl		Bottom trawl		UNK		Mid-water trawl	
Management Area	B1		A1		UNK		UNK		UNK		B1	
Catch details (t)	Retained	Discarded	Retained	Discarded	Retained	Discarded	Retained	Discarded	Retained	Discarded	Retained	Discarded
1976					252 [#]							
1977					2972 [#]							
1978					125 [#]							
1993									172 [§]			
1994												
1995	1 [#]		N/F	N/F								
1996	368 [#]		N/F	N/F					747 [§]			
1997	208 [#]		836		2800 [#]				392 [§]			
1998	N/F	N/F	1066		69 [§]							
1999	1		N/F	N/F			3 [§]					
2000	<1		242				1 [§]					
2001	1		N/F	N/F			7 [§]					
2002	0		N/F	N/F			1 [§]					
2003	0		N/F	N/F			5 [§]					
2004	6		N/F	N/F	210							
2005	1		N/F	N/F	54							
2006	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
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
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
2010	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	159	0
2011	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	165	0
2012	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	172	0
2013	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	N/F	2	0
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

* Provisional (Aug 2014)
 § = Values from FAO

N/F = No Fishing.

Blank fields = No data available.

UNK = Unknown.

= Values taken from the Japp (1999).

Two species targeted, but *Beryx splendens* constitutes majority of the catch total.

Table 2b: Catches (tonnes) of alfonsino (*B. splendens*) made by various countries. Values in *italics* are taken from Japp (1999). Values in **bold** are from the FAO.

Nation	Spain		Poland		Cook Island		Mauritius		Cyprus		South Africa	
Fishing method	Mid-water trawl and Longlines		UNK		Bottom trawl		Bottom trawl		Bottom trawl		Bottom trawl	
Management Area	UNK		UNK		UNK		UNK		UNK		B1	
Catch details (t)	Retained	Discarded	Retained	Discarded	Retained	Discarded	Retained	Discarded	Retained	Discarded	Retained	Discarded
1976												
1977												
1978												
1993												
1994												
1995			1964 [§]								60 [#]	
1996											109 [#]	
1997	186 [§]										124 [#]	
1998	402 [§]											
1999												
2000												
2001	2											
2002												
2003	2											
2004	4				142		115		437			
2005	72											
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
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
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
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
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
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
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
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
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

* Provisional (Aug 2014)

§ = Values from FAO

N/F = No Fishing.

Blank fields = No data available.

UNK = Unknown.

= Values taken from the Japp (1999).

Two species targeted, but *Beryx splendens* constitutes majority of the catch total.

1.4 IUU catch

IUU fishing activity in the SEAFO CA has been reported to the Secretariat latest in 2012, but the extent of IUU fishing is at present unknown.

2. Stock distribution and identity

Alfonsino has a global distribution and has been reported from all tropical and temperate oceans (excluding from the 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 at both at western (Gulf of Maine to the Gulf of Mexico) and eastern Atlantic (off south Western Europe and the Canary Islands to South Africa) (Fig. 9). This species is benthopelagic: 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. There is no information on migration behaviour.

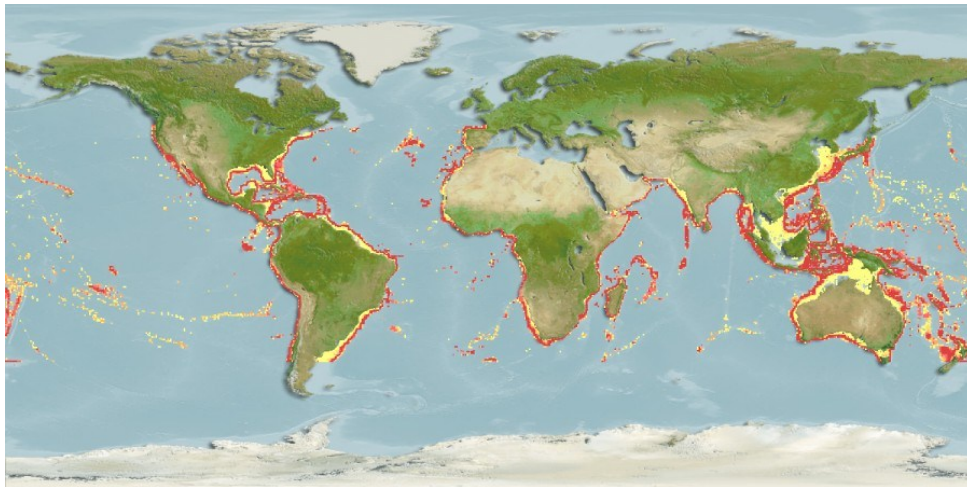


Figure 9: The predicted/potential distribution of alfonsino (*B. splendens*) based on habitat suitability considerations (FishBase).

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

3.1 Fisheries and surveys data

Non-availability of the historical data and fishing trends for fishing activities in the SEAFO CA prevent application of standard assessment methods. However, only catch and effort (per haul) data for a period of three years (2010-2012) are available for quantitative stock assessment.

3.2 Length data and frequency distribution

Using the data collected by Korean trawl fisheries between 2010 and 2013, the length frequency distributions were analysed (Table 3). In 2013 the length sampling was insufficient.

In 2011 the length of alfonsino in the southern area of Division B1 was the largest with average 26.5 cm

and 28.0 cm at the 3rd quartile, with two modes at 22 cm and 27 cm. 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 appeared in 2012 (May-June) due to paucity of samples (23 samples). The length of the species in the northern part was larger than that of southern part of B1 in 2012.

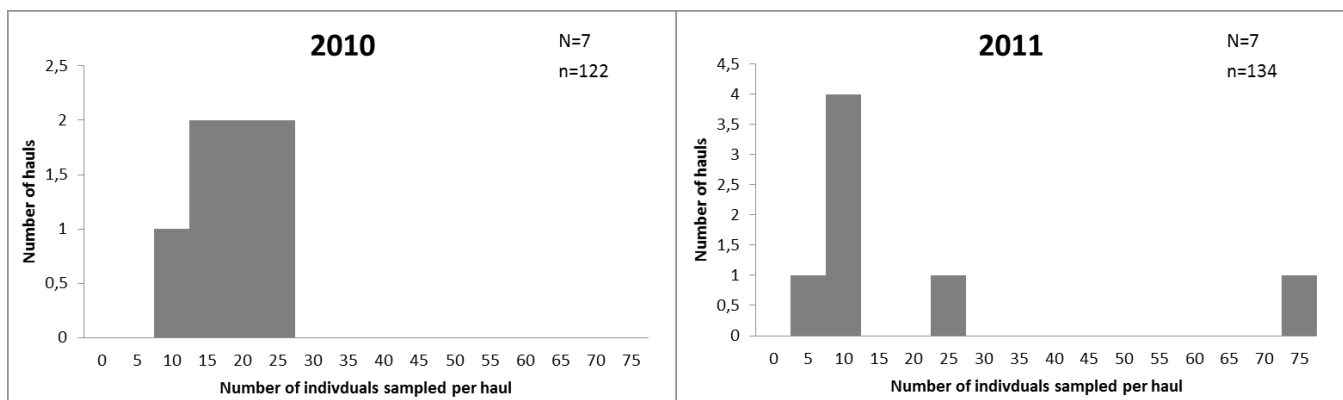
Females tend to have a higher von Bertalanffy L_{inf} value than males, but growth appears relatively similar between areas (i.e., east and west Atlantic, and North and South Pacific) (Lehodey & Grandperrin 1996, Rico et al. 2001, Gili *et al.*, 2002).

Table 3: Results of length composition of Alfonsino collected by Korean vessels in Division B1 (2010-2012).

	2010		2011		2012 (5~6)		2012(11)	
	South	North	South	North	South	North	South	North
No. of samples	200	841	174	593	514	23	77	-
Minimum length	19.0	17.0	20.0	15.0	17.0	26.0	24.0	-
Maximum length	42.0	47.0	50.0	48.0	34.0	35.0	39.0	-
Average length	25.8	24.8	26.5	27.8	24.8	31.0	31.5	-
Median length	25.0	24.0	25.0	28.0	25.0	32.0	32.0	-
1 st quartile length	23.0	22.0	23.0	25.0	23.0	30.0	29.0	-
3 rd quartile length	27.0	26.0	28.0	31.0	26.0	32.5	34.0	-

Table 4: Summary of fork length distribution of Alfonsino (*Beryx splendens*) by depth for 2010-2013.

	2010		2011		2012(5~6)		2012(11)	
	South	North	South	North	South	North	South	North
No. of Samples	841	200	174	593	514	23	77	-
Average Depth (m)	210.9	211.1	229.6	238.4	323.8	288.5	248.2	-
Average FL (cm)	25.8	24.8	26.5	27.8	24.8	31.0	31.5	-



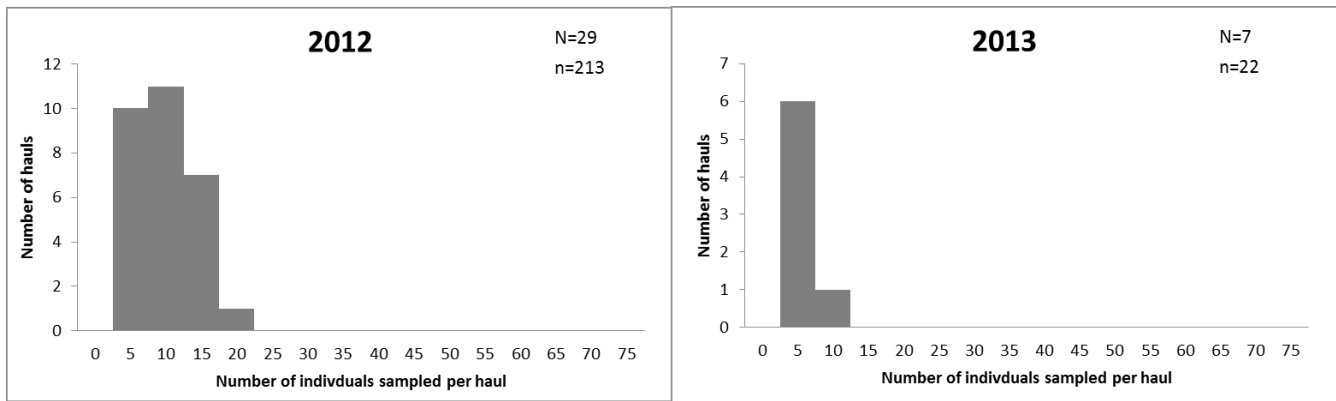


Figure 10: The number of individuals of Alfonsino sampled per haul over the period 2010 to 2013 in the SEAFO CA. Data from Observer Reports submitted to SEAFO. N = number of hauls sampled per year; n = total number of individuals sampled.

Table 5: Number of sets by year, minimum and maximum number of individuals per set and the number of individuals sampled during the period 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

3.3 Length-weight relationships

Figure 11 shows the length and weight relationship of Alfonsino for 2010-2013. Two parameters of the length-weight relationship were 0.022 for α and 3.010 for β of combined sex of Alfonsino.

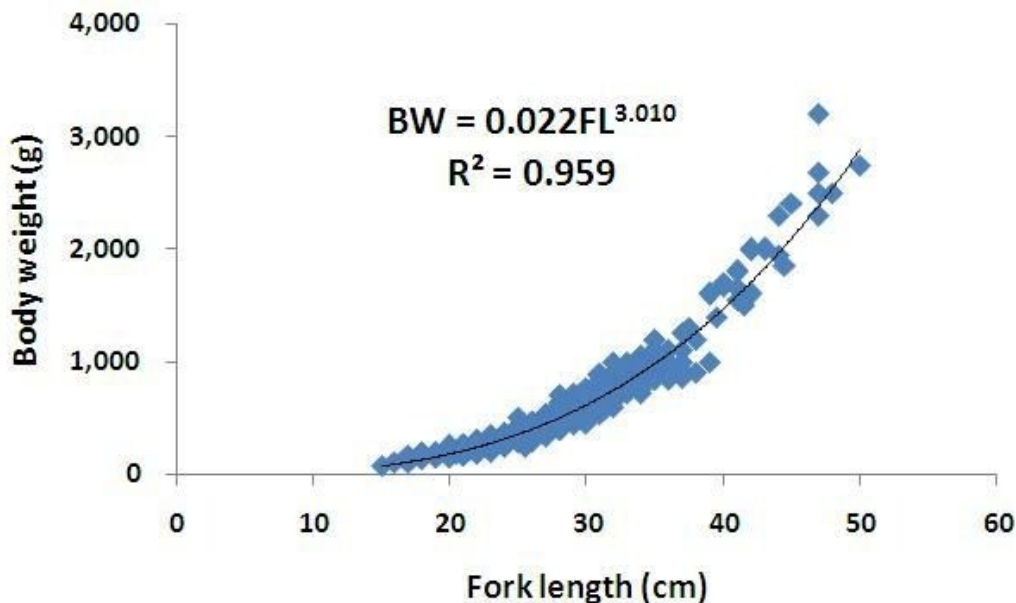


Figure 11: Relationship between length and weight of Alfonsino (*B. splendens*) in the SEAFO CA for 2010 - 2013.

3.4 Age data and growth parameters

The maximum observed age of Alfonsino in the Guinean Gulf was 20 years. The species is known to aggregate and thus is vulnerable to overfishing.

The growth parameters of Alfonsino were estimated as $K=0.097 \text{ year}^{-1}$, $L_{\text{inf}}=48 \text{ cm}$, and $t_0=-3.08\text{year}^{-1}$ using the specimens from Guinean Gulf (López-Abellán *et al.* 2008).

3.5 Reproductive parameters

The annual numbers and proportion of the fish by gonad maturity stage by Korean trawl fisheries during the period of 2010 - 2013 are presented in Table 6 and Figure 13. 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 6: 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

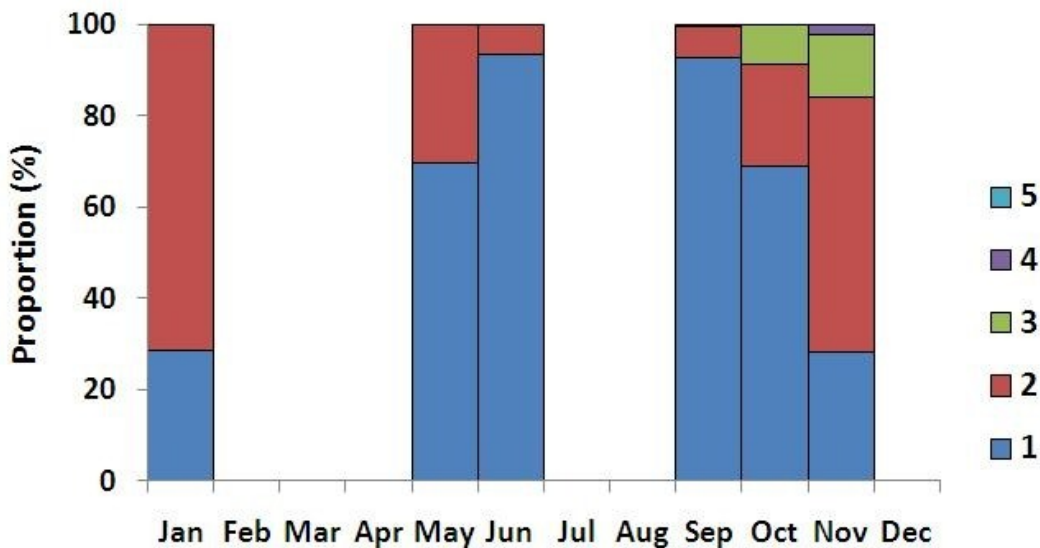


Figure 12: The proportion of maturity stage of alfonsino in the SEAFO CA for 2010-2013.(1: immature, 2: developing, 3: pre-spawning, 4: spawning, and 5: spent).

3.6 Natural mortality

There is no available information to derive estimates of natural mortality rates for 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 in the SEAFO CA. CPUE in the Korea trawl fishery in B1 was explored as a potential index of biomass to be used for future evaluation of biomass trends.

4.2 Data used

The data used to calculate CPUE of alfonsino were derived from fishing hauls in which the total catch of *Beryx splendens* represented more than 80% of the total combined catch per set 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 is usually very low.

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.

The SC explored the possibility of applying a local depletion model (DeLury, 1947; Leslie and Davis, 1939). It was decided, however, not to pursue this option as the data did not satisfy the assumptions of the method.

4.4 Results

The progression in CPUE over time showed marked variability and no clear trend as observed in figure 14.

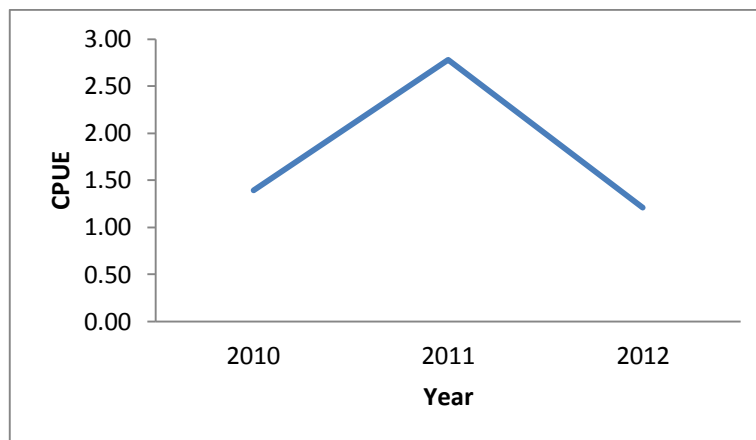


Figure 13: Plot of nominal CPUE for 2010-2012.

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 (2010-2012) of catch and effort data. Catch and effort data for 2013 was not used in the assessment of the nominal CPUE due to an incomplete fishing season. 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 4 years from 2010 to 2013, however, only 2011-2012 were used for assessment due to an incomplete fishing season for 2013. These data, although short in series, could 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 to use 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}

$$C_{Y-1} = \frac{\sum_{y-3}^{y-1} C_i}{3} = \frac{159 + 165 + 172}{3} = 165$$

And calculation of the catch advise for 2015 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 SE 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 actylopterus*) 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

In the past the main method used to catch alfonsino appears to have been bottom trawling. In the recent fishery both midwater and bottom trawls seem to have been used. 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. There are observations of sub-threshold catches of VME indicators for 2013 (Fig. 14).

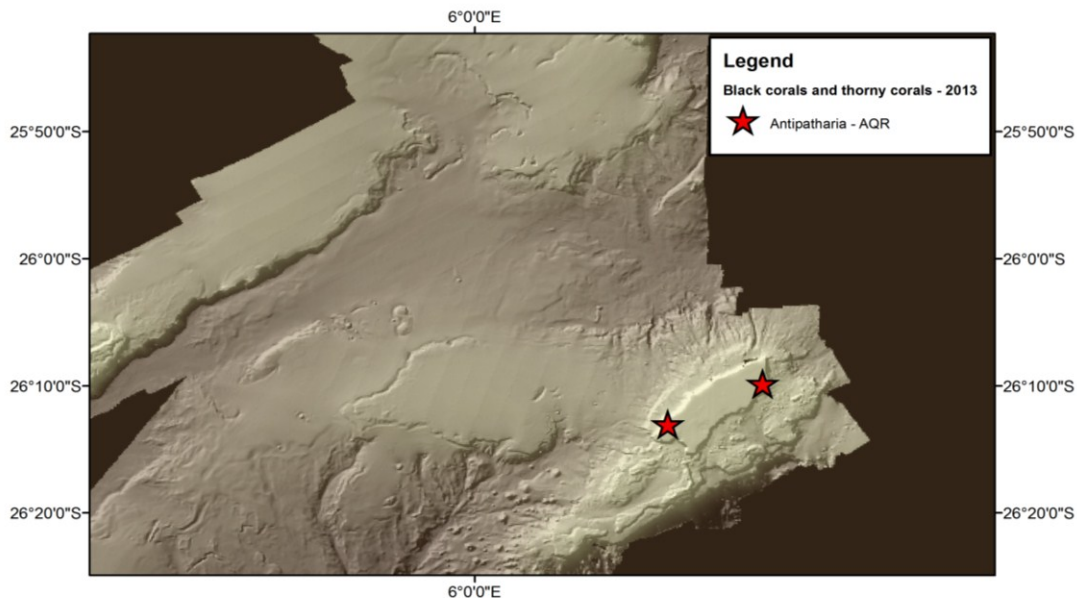


Figure 14: Locations of VME bycatches recorded from the alfonsino fishery during 2013.

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

See section 5.3 above.

6. Current conservation measures and management advice

In 2012 the Commission adopted a TAC of 200t the SEAFO CA for 2013 and 2014 (CM 27/13).

In accordance with the proposed HCR, using the average catch from 2010-2012, the recommended TAC is 132 tons for the Division B1 for 2015-2016. Considering the possibility that Alfonsino occurs outside B1 the SC maintains its recommendation from 2012 for a TAC for the entire SEAFO CA of 200 tons of which a maximum of 132 tons may be taken in B1.

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

Conservation Measure 04/06	On the Conservation of Sharks Caught in Association with Fisheries Managed by SEAFO
Conservation Measure 14/09	To Reduce Sea Turtle Mortality in SEAFO Fishing Operations.
Conservation Measure 25/12	On Reducing Incidental By-catch of Seabirds in the SEAFO Convention Area
Conservation Measure 18/10	on the Management of Vulnerable Deep Water Habitats and Ecosystems in the SEAFO Convention Area
Conservation Measure 27/13	on Total Allowable Catches and related conditions for Patagonian toothfish, Orange roughy, alfonsino and Deep-sea red crab in the SEAFO Convention Area in 2011 and 2012
Conservation Measure 26/13	on Bottom Fishing Activities in the SEAFO Convention Area

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