

The logo features a blue background with a pattern of fish swimming in water. The text "South Pacific Regional Fisheries Management Organisation" is written in white, bold, sans-serif font across the top of the image.

# South Pacific Regional Fisheries Management Organisation

## **2<sup>nd</sup> Meeting of the Scientific Committee**

Honolulu, Hawaii, USA

1-7 October 2014

**SC-02-25**

**Ecuador Annual report**  
***National Institute of Fisheries***

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3 Oct 2014



NATIONAL INSTITUTE OF FISHERIES

## Fisheries Research Program

# 2014 NATIONAL REPORT, FISHERIES AND BIOLOGICAL ASPECTS OF JACK MACKEREL (*Trachurus murphyi*) IN ECUADORIAN WATERS

## 1. INTRODUCCIÓN

In Ecuador the small pelagic fishery represents the most important fishery resource due to the commercial and social importance. Its landings, processing (canned fish and flour fish) and exportations generate an important income to the country. Between small pelagic fishes, thread herring (*Opisthonema* spp.), chub mackerel (*Scomber japonicus*), Pacific anchoveta (*Cetengraulis mysticetus*), Frigate tuna (*Auxis* spp.), Round herring (*Etrumeus teres*), sardine (*Sardinops sagax*), anchovy (*Engraulis ringens*), jack mackerel (*Trachurus murphyi*) are the most important fisheries resources captured by the purseine fleet. This species are distributed along the coast of Ecuador, registering the most concentrations in the Gulf of Guayaquil and the minor catches in front of Manabi coast (González et al 2008).

In this report, we present biological and fishery information of jack mackerel, collected for the small pelagic fish monitoring program of the National Institute of Fisheries in the Ecuadorian purse seine fleet, when this resource is available in Ecuadorians waters.

## 2. FISHING ASPECTS

### 2.1 FISHING GEAR

One of the principal components of fishing methodology for small pelagic fishes is the "seine". This type of gear catches species with 70 meters of depth, and concentrated in compact schools.

The dimensions for this gear can vary, in accordance to the size vessel (Castro 2012):

#### Vessels Class I – II

Length	220 – 450 bz
Depth	20 – 60 bz
Mesh size in cabecero	5/8" – 1 1/8" inch

#### Vessels Class III – IV

Length	330 - 450 bz
Depth	40 - 60 bz
Mesh size in cabecero	3/4" – 1 1/8" inch



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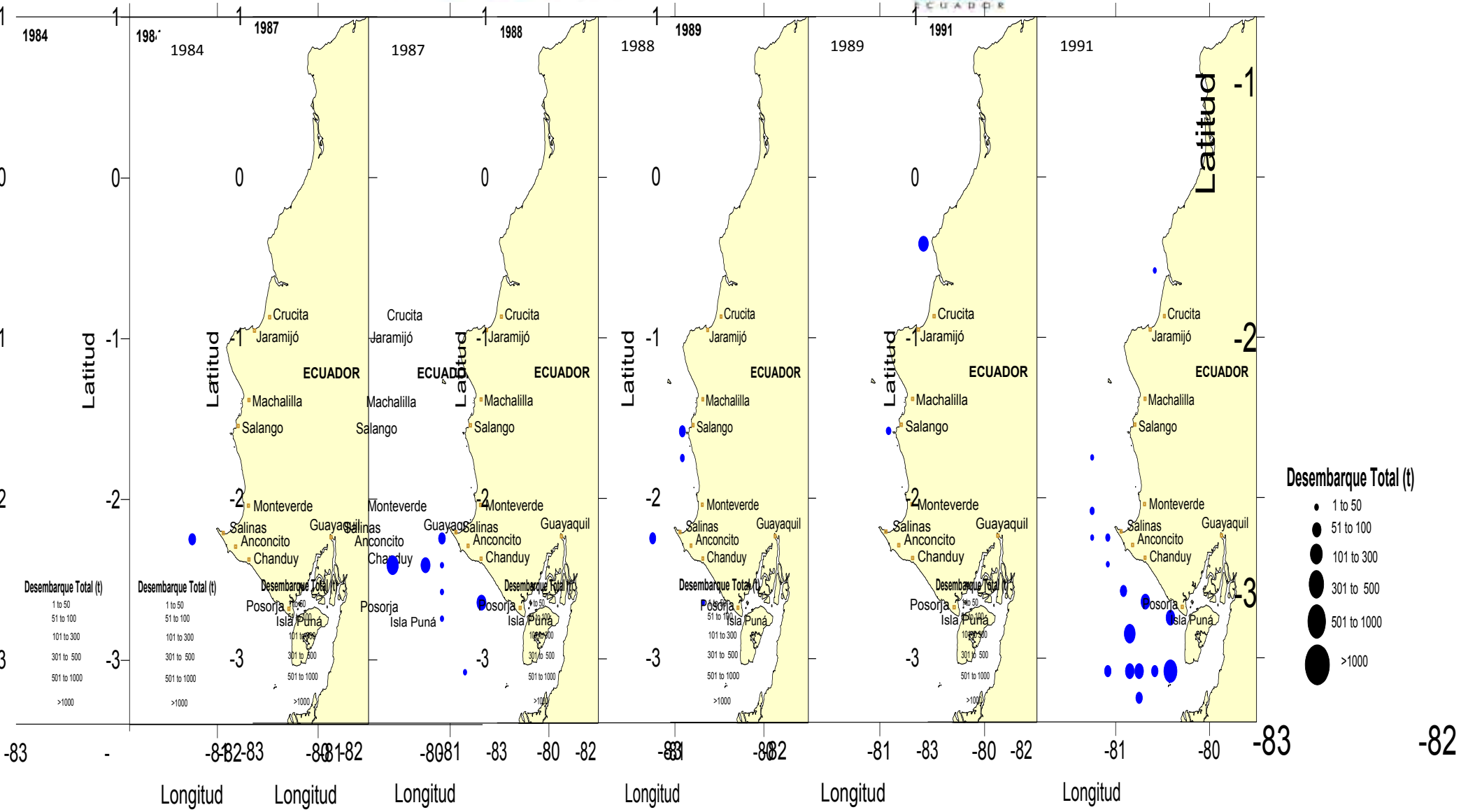
According to Ministerial Agreement 047 (April 9, 2010), it was established that “Fishery of small pelagic fishes as mackerel (*Scomber japonicus*), thread herring (*Opisthonema* spp.), jack mackerel (*Trachurus murphyi*), pacific anchoveta (*Cetengraulis mysticetus*); frigate tuna (*Auxis* spp.) and similar, must be done with seines and mesh size not less than 1 1/8” inch (González 2012).

## 2.2 FISHING ZONES

The principal fishing zones with the higher concentrations of Jack mackerel, when is available in Ecuadorian waters, correspond to the Gulf of Guayaquil and around Peninsula de Santa Elena.

Catch information is recorded in the national institute of fisheries data base since 1984; during 1991, 1995 - 1996 were registered catches in the internal part of Gulf of Guayaquil; being around Santa Clara Island 1 600 t reported in both periods. In 2001 were reported catches in front of Manabi Coast, and south of Isla de la Plata.

For 2011 fishing zones were reported in front of Province of Manabi, being this around Península de Santa Elena where were registered the higher concentrations of jack mackerel (figure 1).



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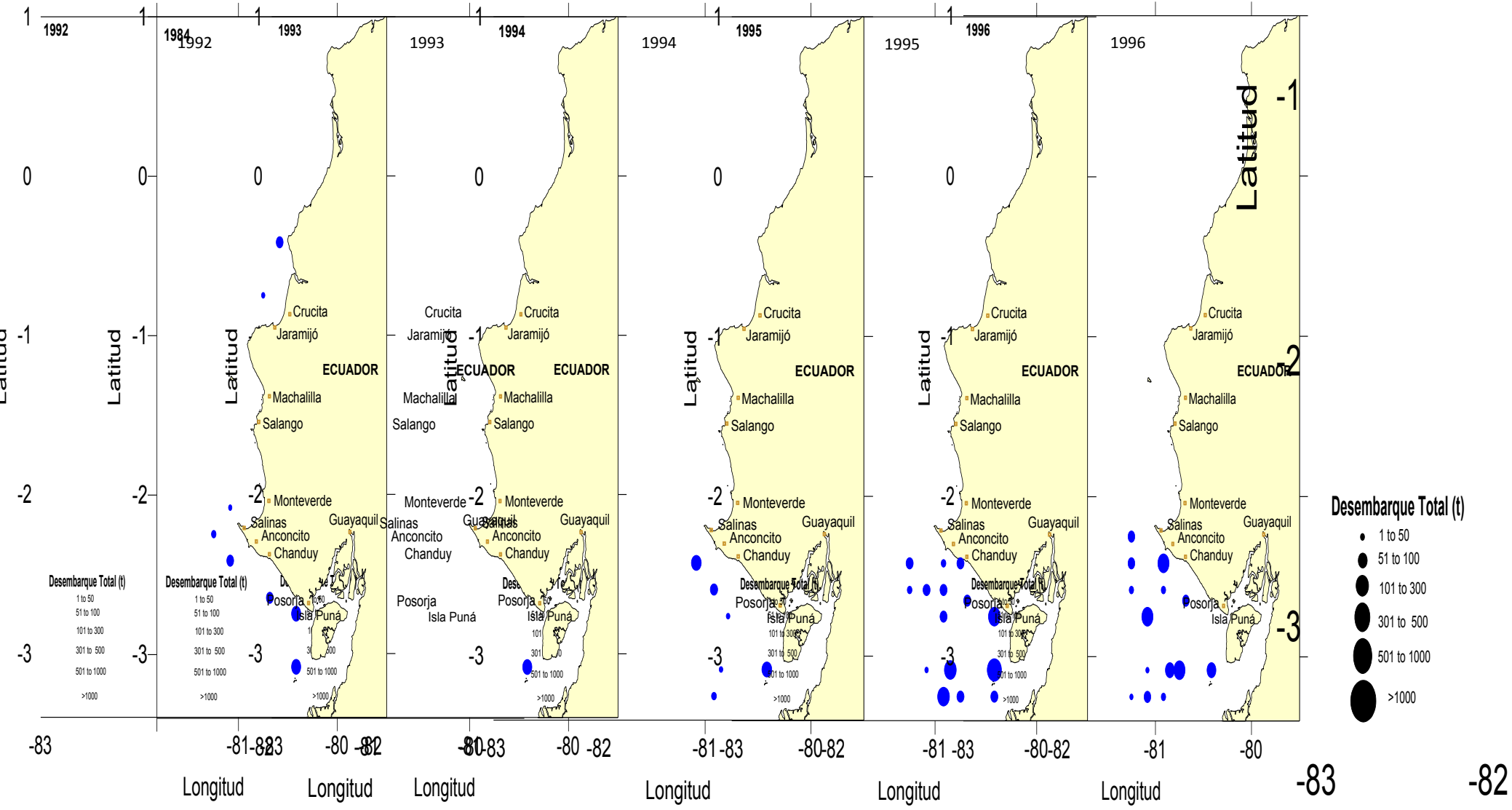


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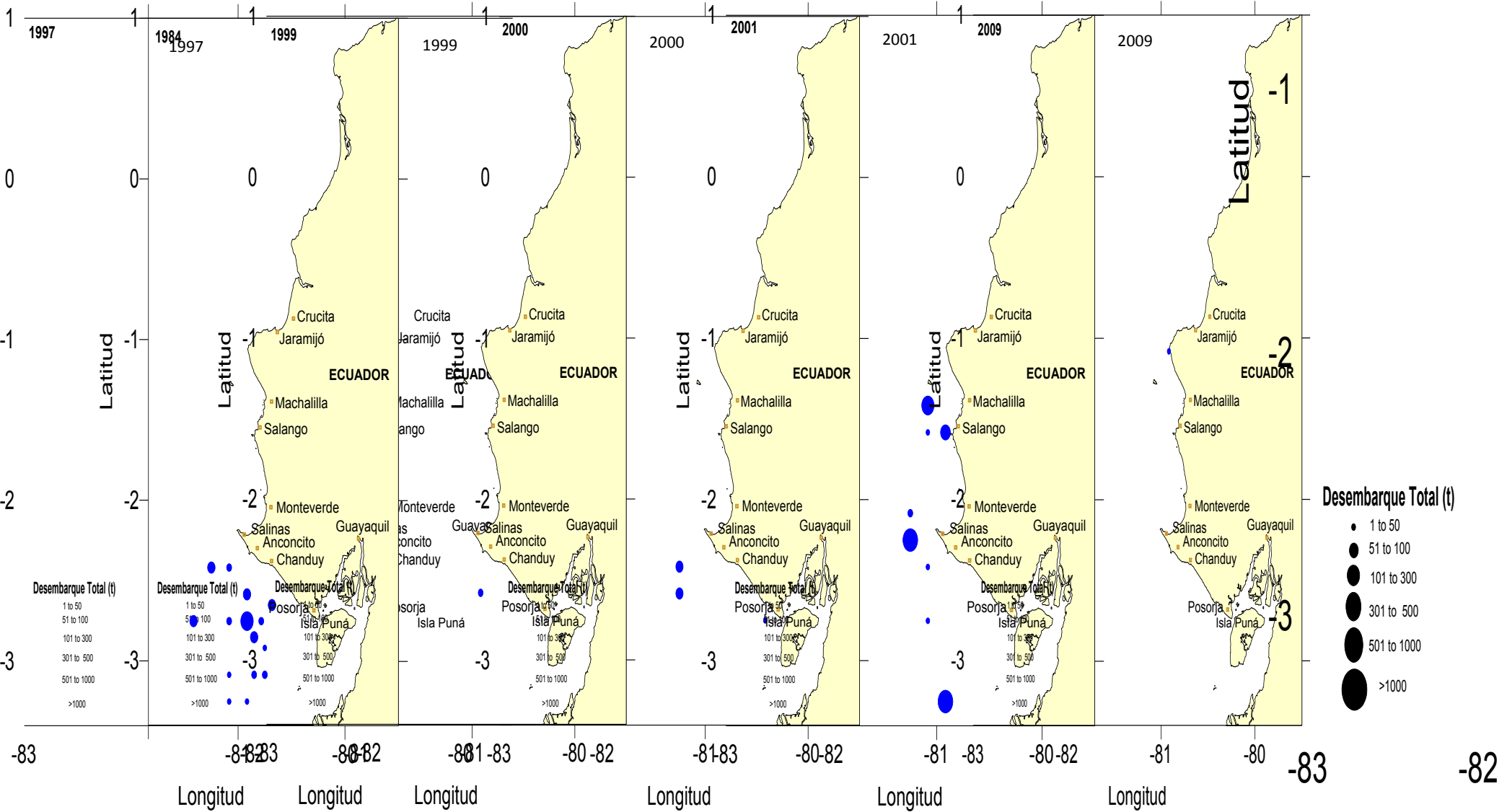
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Longitud



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Latitud -1

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Cru  
Jaramij

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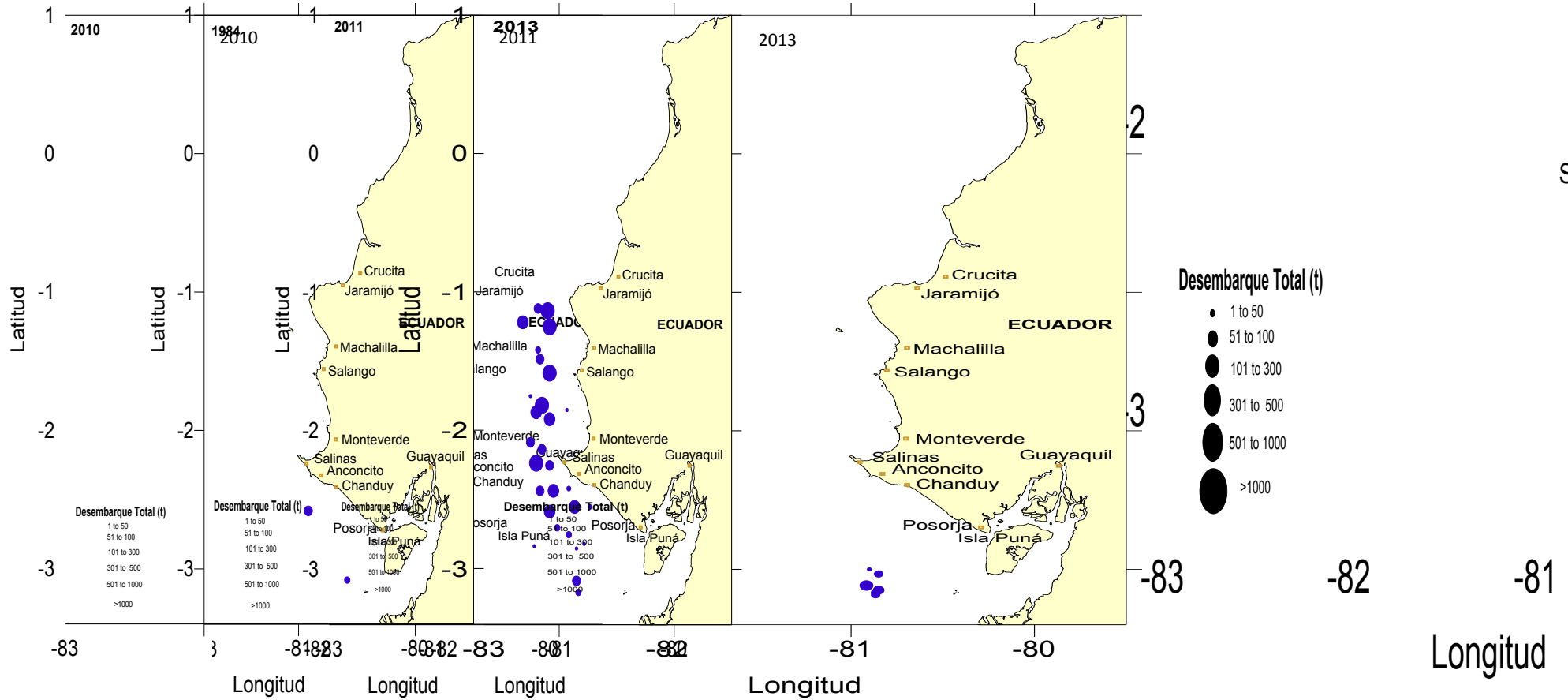


Figure 1. Spatial Distribution of jack mackerel in Ecuadorian waters.

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## 2.3 LANDINGS

In Ecuadorian waters, first reports of this specie were identified for Massay (1983); afterwards, in 1984 and 1990, has been reported variables catches (September - October), located in the southern of Gulf of Guayaquil (Aguilar 1992); the landings were associated to secondary species in the small pelagic fishery.

During 1990 jack mackerel represented 2% (4 144 t) of the total landings of small pelagic fish, showing a gradual monthly increase, reaching in 1991 a total of 45 313 t (16%); fishing records of this species were variable in subsequent years, reporting in 1995 up to 174 393 t (45%).

Since 1996 the mackerel catch levels showed a gradual decline, reaching in 2000 a 2% of the total catch made by the purse seine fleet. In 2001 there was a sharp increase in landings of this species, recording 134 011 t, approximately.

During the period 2002 - 2009, the availability of this resource was minimal, reporting catches isolated in 2002, 2007 and 2009 (604 t, 927 t and 1 935 t, respectively).

From the last week of December 2010 were reported catches of jack mackerel off the coast of Ecuador, the same corresponded the 25% of total landings (4 613 t), later during the first quarter of 2011 records landing of the fleet were mostly represented by this resource, accumulating a total of 69 153 t, then disappearing in landings of small pelagic fishes, until August 2012 where there were 104 t. By 2013 there were 3 564 t, while for 2014 only 3.5 t (Table 1, Figure 2).

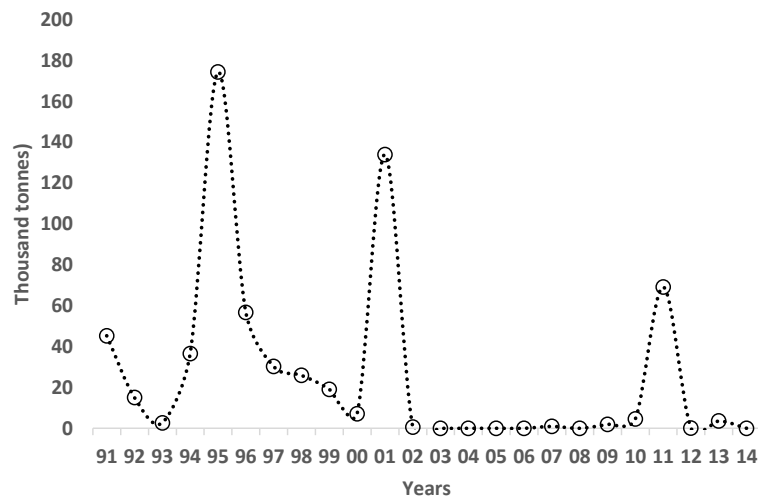
**Table 1.** Historical catches (t) of Jack mackerel in Ecuadorian Waters

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<b>January</b>	850	26	79	19	3665	8928	850	0	11151	0	40530
<b>February</b>	1139	0	109	876	602	1584	0	0	6377	27	20559
<b>March</b>	0	0	0	9245	21681	8887	161	0	374	68	17685
<b>April</b>	0	0	0	7260	23522	12113	14409	17	611	150	16268
<b>May</b>	8214	0	28	4801	35302	8280	5707	0	157	0	15319
<b>June</b>	1686	247	0	17	11517	3200	9039	1066	26	0	23305
<b>July</b>	10383	193	0	6	8097	6784	0	3589	10	10	345
<b>August</b>	4425	501	0	6	4948	1142	128	13586	0	0	0
<b>September</b>	13556		86	9350	14263	2793	8	1767	349	0	0
<b>October</b>	1799	7510	1028	1162	7658	2232	0	24	17	1307	0
<b>November</b>	3261	4415	1343	12	11676	263	0	544	0	2296	0
<b>December</b>	0	2130	0	3821	31462	576	0	5307	0	3263	0
<b>TOTAL</b>	45313	15022	2673	36575	174393	56782	30302	25900	19072	7121	134011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>January</b>	0	0	0	0	0	0	0	286	0	53763	0	3031	3.5
<b>February</b>	0	0	0	0	0	0	0	356	0	15272	0	9	0
<b>March</b>	0	0	0	0	0	0	0	132	0	73	0	0	0
<b>April</b>	0	0	0	0	0	0	0	925	0	45	0	0	0



May	0	0	0	0	0	0	0	5	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0	6	0	0	0	0	0
August	0	0	0	0	0	927	0	144	0	0	104	407	0
September	0	0	0	0	0	0	0	63	0	0	0	0	0
October	397	0	0	0	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	18	0	0	0	0	66
December	207	0	0	0	0	0	0	0	4613	0	0	0	54
<b>TOTAL</b>	<b>604</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>927</b>	<b>0</b>	<b>1935</b>	<b>4613</b>	<b>69153</b>	<b>104</b>	<b>3564</b>	<b>3.5</b>

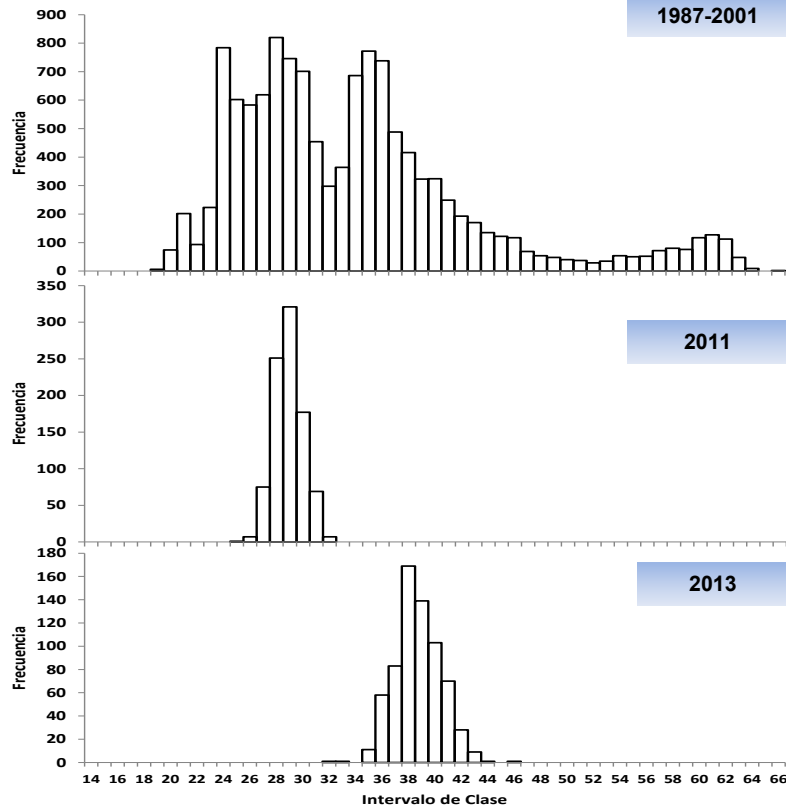


**Figure 2.** Total annual landing (t) of jack mackerel in Ecuadorian waters.

### 3. BIOLOGICAL ASPECTS

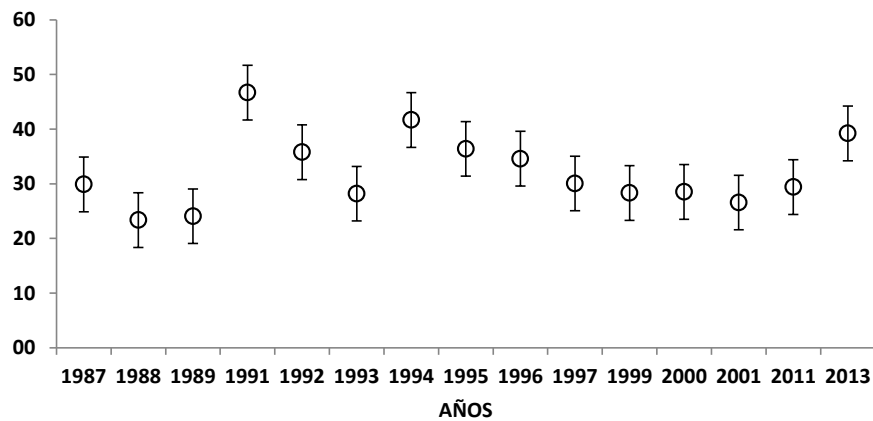
#### 3.1 SIZE STRUCTURE

The size structure of mackerel caught by the Ecuadorian fleet of small pelagic fish can be described in two phases or periods: 1) the composition for the years 1987 to 2001 ranged between 19 and 66 cm TL, mostly represented by individuals between 24 and 36 cm TL (65.8%), 2) in 2011, the structure was composed of organisms between 25 and 32 cm TL, made up largely of individuals between 28 and 29 cm TL (63%), and 3) for the 2013 the size range was between 32 and 46 cm TL, with greater presence of organisms between 38 and 40 cm TL (61%) (Figure 3).



**Figure 3.** Size structure of Jack mackerel in Ecuadorian waters.

Figure 4 shows the average catch size for the period under review, highlighting the years 1991, 1994 and 2013 with the highest recorded values (46.7, 41.7 and 39.2 cm TL, respectively).



**Figure 4.** Average catch size of Jack mackerel registered in Ecuadorian waters.

In general, due to the sporadic presence of the resource in Ecuadorian waters, it is not possible to define clear trends from the available size structure, or capable of displaying the entry of recruitments or track cohort, and project on the stock structure.

### 3.2 STOMACH CONTENTS

A total of 21 stomachs of jack mackerel, caught in the Gulf of Guayaquil in November 2013 were analyzed, of which 12 were females and 9 males. In the laboratory were identified, separated, weighed and counted preys, according to standard methods.

According to the index of relative importance, the fish were the main prey, also highlighting the tintinnids.

Several studies of stomach contents of *T. murphyi*, made in Peru and Chile, shows that the anchovy *Engraulis ringens* is an abundant prey, followed in importance by euphausiids.



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## REFERENCES

- Aguilar, F. 1992.** La pesquería de especies pelágicas en el Ecuador. Bol. Cient. Téc. INP. Ecuador. 12(2): 1 – 6.
- Aguilar, F. 1999.** La pesquería de peces pelágicos pequeños en el Ecuador entre 1981 y 1998. Bol. Cient. Tec. Inst. Nac. de Pesca. XVII (14).
- Arriaga, L. y J. Pacheco. 1989.** Estadística pesquera en Ecuador. Seminario taller sobre estandarización de estadísticas pesqueras en el Pacífico Sudeste. CPPS – FAO. PP. 20.
- Castro, R. 2012.** Información sobre las redes de cerco de jareta que captura pelágicos pequeños en la costa ecuatoriana en el 2010. Informe Interno. Instituto Nacional de Pesca.
- González N., M. Prado, R. Castro, F. Solano, V. Jurado y M. Peña. 2008.** Análisis de la Pesquería de Peces Pelágicos Pequeños en el Ecuador (1981-2007). Instituto Nacional de Pesca.
- González N. 2012.** La presencia de Jurel (*Trachurus murphyi*) en aguas ecuatorianas. Informe Técnico, Instituto Nacional de Pesca
- Grechina, A. 1992.** Historia de investigación y aspectos básicos de la ecología del jurel (*Trachurus symmetricus murphyi*) en alta mar del Pacífico Sur. En: H. Arancibia y L. Cubillos (eds.). Documento Técnico. Instituto de Investigación Pesquera, Talcahuano, 1(2): 1-47.
- Serra, R. 1991.** Important life history aspects of the chilean jack mackerel, *Trachurus symmetricus murphyi*. Invest. Pesq. (Chile), 36: 67-83.