

**MSC Pre-Assessment  
for the Brazil whitemouth croaker (*Micropogonias furnieri*)  
trawl and bottom gillnet fishery**

prepared by



commissioned by



**AUTHORS:**  
Rochelle Bezerra  
Ernesto Godelman

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## 1. Executive Summary

This work presents a preevaluation of the whitemouth croaker (*Micropogonias furnieri*) trawl and bottom gillnet fishery in Brazil against the Marine Stewardship Council (MSC) *Standard*, using the Fisheries Certification Requirements from version 2.01.

An extensive review of the relevant documents and research regarding the croaker fishery in Brazil was undertaken by the evaluation team. The objective was to evaluate the fishery performance against the MSC standard. The following stakeholders were identified:

- Secretariat of Aquaculture and Fisheries of the Ministry of Agriculture, Livestock and Food – SAP/MAPA;
- Federation of Fishermen and Fish Farmers of Rio Grande do Sul – FEPARS
- Federation of Fishermen of the State of Santa Catarina – FEPESC;
- Industrial and Shipowners Union of Itajaí and Região – SINDIPI;
- Fishermen Union of the State of Santa Catalina – SINDPESCA;
- Federal University of Rio Grande (FURG);
- University of Vale de Itajaí (UNIVALI)
- Company Cais do Atlântico

According to the available information, as well as other data provided by the fishery stakeholders, the evaluation team concluded that the whitemouth croaker (*Micropogonias furnieri*) trawl and bottom gillnet fishery in Brazil does not meet the MSC standard and recommends to enter into a Fishery Improvement Project to face the sustainability challenges.

### 1.1. Version details

**Table 1:** Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	Version 2.01
MSC Fisheries Standard	Version 2.01
Assessment tree	Default
MSC General Certification Requirements	Version 2.5
MSC Pre-Assessment Reporting Template	Version 3.1

## 2. Introduction

### 2.1. Objectives and Scope of Preevaluation

This a preevaluation of the whitemouth croaker (*Micropogonias furnieri*) trawl and bottom gillnet fishery in Brazil against the sustainable fisheries Marine Stewardship Council (MSC) *standard* (version 2.01). This provisional evaluation is based on limited data gathered by the evaluation team and provided by the stakeholders to the date of this report. This document aims at presenting actionable information regarding the fishery status against the *standard*. The main focus would be to identify sustainability issues within the fishery that should be approached to turn it into a certifiable fishery according to the MSC *standard*.

### 2.2. Restriction to the Fishery Preevaluation

The main limitations to this preevaluation were: lack of information regarding the composition of species that interact with the fleet under evaluation in order to identify primary, secondary and ETP species; scarcity of data regarding the impact on the habitat and ecosystem, as well as updated information about the fishery. To solve some of these hurdles, the evaluation team used, in addition to scientific papers, media reports and data provided by the stakeholders during online interviews. Whenever the available information was not enough to clarify a scoring issue, the evaluation team made that clear in the scoring justification/rationale.

### 2.3. Unit of Analysis

The MSC Standard defines the Unit of Analysis as the ensemble of the stock of the target species in a specific geographical area, harvested by a certain fleet with specific fishing gear and under certain fishery management system. For this preevaluation, the unit of analysis is the following:

<b>Specie</b>	Whitemouth croaker/Corvina/ <i>Micropogonias furnieri</i>
<b>Geographical area</b>	Brazil EEZ (FAO Statistical area 41)
<b>Method of capture</b>	Trawl and bottom gillnet
<b>Stock</b>	Atlantic Ocean
<b>Management system</b>	Ministry of Agriculture, Livestock and Food (MAPA), through the Secretariat of Aquaculture and Fisheries (SAP).
<b>Client group</b>	Beaver Street Fisheries INC, USA

### 2.4. Total Allowable Catch and Landing Data

There is no Total Allowable Catch for the whitemouth croaker (*Micropogonias furnieri*) trawl and bottom gillnet fishery in Brazil. The government does not have a continuous data gathering program since 2008. The MPA published data of fishery statistics only till 2011. Currently, there are a few isolated initiatives that do not become effective policies. According to IBAMA reports, for the period

under analysis from 2001 till 2006, the states of Santa Catarina, Rio Grande do Sul, São Paulo e Rio de Janeiro are the largest producers of corvina in the regions south and southeast of Brazil. With Santa Catarina in first place. (Table 2).

More recent data regarding species catch were obtained by means of statistical reports resulting from Monitoring Programs implemented in agreement with the government. Those reports were carried out by the University of Vale de Itajaí (UNIVALI) for the state of Santa Catarina, by the Center for Research and Management of Fishery Resources in Lagoons and Estuaries (CEPERG-IBAMA) and by the Federal University of Rio Grande (FURG), for the state of Rio Grande do Sul.

As the statistical bulletins (2000 to 2006) made available by IBAMA do not present production according to fishing gear, to analyze production in Santa Catarina and Rio Grande do Sul, data from UNIVALI, CEPERG and FURG were used. Since 2000, UNIVALI has been carrying out fisheries monitoring projects for the State of Santa Catarina, however the platform (<http://pmap-sc.acad.univali.br>) that makes the data available is temporarily unavailable.

For Santa Catarina, the team of evaluators had access to corvina catch data from 2000 to 2012 by fishing gear (Table 3) and no information was found for the years 2013, 2014, 2015 and 2020. For the years 2016, 2017, 2018, 2019, 2021, 2022 and 2023 (Table 4) the data only indicates the total production of croaker for artisanal and industrial fishing. In the years 2016 and 2019, the data only refers to the second semester (August to December).

And for Rio Grande do Sul, we used the statistical bulletins for the period (2000 to 2011) made available by IBAMA/CEPERG and from 2012 onwards, the bulletins made available by the Federal University of Rio Grande (Table 5). Many statistical bulletins analyzed present partial data, by semester, not representing the entire state production.

The *Micropogonias furnieri* in Santa Catarina occurs mainly through bottom gillnets and pair trawling (Figure 1) and its main landing points are Itajaí, Navegantes, Porto Belo and Laguna. The main species captured by pair trawling are demersal fish such as croaker, whitemouth croaker, striped weakfish and hake in general.

The bottom gillnet fleet catches mainly demersal fish such as Atlantic searobin and croaker, most important of all, whitemouth croaker, which in 2002 accounted for almost 50% of the fleet's total landings. In 2010, whitemouth croaker was responsible for 73% of the production landed by the bottom gillnet fleet. In relation to the production of pairs, the most important species in terms of volume unloaded were: whitemouth croaker (2,229 t), croaker (1,710 t) and striped weakfish (1,474 t) which, together, contributed 55% of the total (UNIVALI /CTTMar, 2011).

The drop of almost 100% observed in landings of croaker, caught with a purse seine, throughout 2008 is justified by IBAMA Ordinance No. 43 of September 24, 2007, which prohibited trawlers from catching whitemouth croaker, croaker, king weakfish and striped weakfish in the territorial waters and the Exclusive Economic Zone-ZEE. As a result, one can clearly observe the drop in volumes recorded for these species (UNIVALI/CTTMar, 2008).

In discharges from industrial fishing, in 2016, three demersal species (whitemouth croaker, croaker and striped weakfish) made up almost 70% of total production during the period. Of these, whitemouth croaker led the production reported by industrial fishing, with 6,329.7 t (20.7% of the total). In artisanal fishing, whitemouth croaker was the most relevant category in weight, totaling 2,358.6 t, contributing 27.5% of all production of this modality in the period (UNIVALI/EMCT/LEMA, 2016).

In Rio Grande do Sul, whitemouth croaker fishing occurs mainly using pair trawls and bottom gillnets (Figure 2) and the fishing port of the city of Rio Grande, located at the exit of Laguna dos Patos, is the largest fishing center of State. According to FURG (2012), the municipalities of Rio Grande, Pelotas, São José do Norte and São Lourenço do Sul have the largest share of landings in the state. In 2020, among the fish landed, the main species was the skipjack tuna (*Katsuwonus pelamis*) representing 23.2% of the total with 4,121.86 t, followed by whitemouth croaker representing 16.4% of the total with 2,923, 17 t. Two other important species in terms of biomass landed were croaker (*Umbrina canosai*) with 2,605.11 t and striped weakfish (*Cynoscion guatucupa*) with 2,247.39 t (FURG/SEMA, 2021).

YEAR	STATE	INDUSTRIAL (t)	ARTISANAL (t)	TOTAL (t)
2001	Rio de Janeiro	2.057,0	1.289,5	3.346,5
	São Paulo	4.900,0	430,0	5.330,0
	Santa Catarina	11.302,0	1.083,0	12.385,0
	Rio Grande do Sul	8.296,5	2.866,5	11.163,0
	<b>Total (t)</b>	<b>26.555,50</b>	<b>5.669,00</b>	<b>32.224,50</b>
2002	Rio de Janeiro	2.359,5	708,5	3.068,0
	São Paulo	4.044,5	320,0	4.364,5
	Santa Catarina	13.937,5	1.161,0	15.098,5
	Rio Grande do Sul	9.300,0	2.124,0	11.424,0
	<b>Total (t)</b>	<b>29.641,50</b>	<b>4.313,50</b>	<b>33.955,00</b>
2003	Rio de Janeiro	2.648,5	718,0	3.366,5
	São Paulo	5.051,0	490,0	5.541,0
	Santa Catarina	13.514,5	1.249,0	14.763,5
	Rio Grande do Sul	7.148,5	1.462,0	8.610,5
	<b>Total (t)</b>	<b>28.362,5</b>	<b>3.919,0</b>	<b>32.281,50</b>
2004	Rio de Janeiro	2.437,0	775,0	3.212,0
	São Paulo	3.374,5	273,0	3.647,0
	Santa Catarina	10.931,0	1.209,0	12.140,0
	Rio Grande do Sul	7.740,0	1.930,0	9.670,0
	<b>Total (t)</b>	<b>24.482,50</b>	<b>4.187,00</b>	<b>28.669,00</b>
2005	Rio de Janeiro	2.417,5	795,5	3.213,0
	São Paulo	3.747,0	323,0	4.070,0
	Santa Catarina	12.558,5	1.504,0	14.062,5
	Rio Grande do Sul	5.247,5	1.132,5	6.380,0
	<b>Total (t)</b>	<b>23.970,50</b>	<b>3.755,00</b>	<b>27.725,50</b>
2006	Rio de Janeiro	2.881,5	947,5	3.829,0
	São Paulo	4.383,5	414,0	4.797,5
	Santa Catarina	18.141,0	1.982,0	20.123,0
	Rio Grande do Sul	6.335,0	1.979,5	8.314,5
	<b>Total (t)</b>	<b>31.741,00</b>	<b>5.323,00</b>	<b>37.064,00</b>

**Table 2.** Whitemouth croaker harvest in Brazil for the period 2001-2006 (in tons). The states of Santa Catarina and Rio Grande do Sul were the main harvesters in Brazil. Source: IBAMA (2000-2006)

SANTA CATARINA	TRAWLS			BOTTOM GILLNET	SURFACE GILLNET	PURSE SEINE	LONGLINE	TOTAL	
	YEAR	SINGLE TRAWL	DOUBLE TRAWL						PAIR TRAWL
	2000		353,0	2.152,6	412,9		3.395,8		6314,197
	2001	89,6	660,5	3.556,50	5.463,4		1.481,6	50,3	11.301,9
	2002	139,0	496,7	3.473,5	7.232,1	2,0	2.585,9	0,83	13.930,0
	2003	198	286	2.560	8.114		2.357	0,05	13.514,6
	2004	81,2	370,0	1.447,1	6.224,6		2.788,1	12,2	10.923,1
	2005	101,6	806,6	1.578,0	7.989,2		2.083,3		12.558,7
	2006	210,5	486,4	2.505,1	12.872,9		2.066,0		18.140,9
	2007	167,6	274,4	2.762,7	9.080,7		3.769,0	0,5	16.054,8
	2008	109,3	200,5	2.498,5	11.997,1		4,7	16,8	14.826,9
	2009	107,5	333,9	1.426,3	13.084,0		150,6	18,0	15.120,4
	2010	571,3	326,9	2.228,9	16.273,4		51,9	2,9	19.455,3
	2011	238,8	125,1	1.622,3	14.371,0		42,7	5,3	16.166,3
	2012	65,5	99,4	947,4	11.989,2		171,1	4,9	13.277,4

**Table 3.** Whitemouth croaker landing in Santa Catarina for the period 2000-2012 (in tons). Source: UNIVALI/EMCT/LEMA (2000-2012).



SANTA CATARINA	ARTISANAL	INDUSTRIAL	TOTAL
YEAR			
2016	2.358,63	6.329,74	8.688,37
2017	10.332,48	11.125,15	21.457,63
2018	7.475,87	11.226,39	18.702,26
2019	7.309,51	7.624,39	14.933,90
2021	10.730,22	5.405,87	16.136,09
2022	12.843,51	8.587,38	21.430,89
2023	11.257,41	6.006,23	17.263,64

**Table 4.** Whitemouth croaker landing in Santa Catarina for the period 2016-2023 (in tons). Source: UNIVALI/PMAP-SC (2016-2023).

According to data from Comex Stat (2023), from the Ministry of Industry, Foreign Trade and Services, the volume of whitemouth croaker exports quadrupled from 2014 to 2023 (table 5). Reaching, in 2023, a total of 8,913.5 t and 19 million dollars, consolidating Rio Grande do Sul as the main exporter of whitemouth croaker.

YEAR	EXPORTATION (t)	FOB VALUE (US\$)
2014	2.924,83	5.209.670,0
2015	2.849,93	5.162.328,0
2016	3.719,60	6.444.902,0
2017	2.697,96	4.318.890,0
2018	2.097,24	3.770.483,0
2019	4.037,20	8.538.710,0
2020	5.450,81	9.688.677,0
2021	3.751,54	6.527.999,0
2022	8.374,72	17.157.314,0
2023	8.913,51	19.053.846,0

**Table 5.** Whitemouth croaker exports in the period 2014-2023 (in tons). Source: COMEXSTAT (2023).

RIO GRANDE DO SUL	ARTISANAL	TRAWLS			BOTTOM GILLNET	PURSE SEINE	DIVERSE GEAR	TOTAL
		SINGLE TRAWL	DOLBLE TRAWL	PAIR TRAWL				
YEAR								
2000	1.322,29	67,97	176,60	1.434,60	3.071,49	1.115,63	83,04	7.271,63
2001	2.866,41	343,52	262,94	1.574,34	5.745,83	48,14	321,36	11.162,53
2002	2.124,14	226,35	289,23	1.207,53	6.155,89	973,81	447,39	11.424,34
2003	1.462,25	39,58	301,44	1.094,45	5.191,53	473,38	47,90	8.610,52
2004	1.930,13	93,07	67,95	762,36	5.194,25	1.620,61	1,94	9.670,31
2005	1.132,52	38,03	116,91	1.005,17	3.576,04	457,08	54,47	6.380,20
2006	1.979,58	33,82	159,94	1.819,13	4.167,19	5,93	148,78	8.314,36
2007	2.108,62		38,31	1.856,11	4.835,90	16,26	65,07	8.920,28
2008	1.246,68		205,55	1.327,65	3.724,75	25,01	150,95	6.680,58
2009	1.188,63	9,44	41,15	1.664,74	3.352,36	476,32	66,57	6.799,21
2010	2.681,78	0,34	168,42	1.849,79	1.770,55	195,95	301,59	6.968,42
2011	1.591,16	1,03	200,16	2.403,32	1.211,01	165,89	477,77	6.050,34
2012	810,77				2.705,40		230,00	3.746,16
2013	650,00	524,30		598,40	2.244,84			4.017,54
2014	413,39	269,44	38,78	1.634,08	1.318,79			3.674,48
2015	494,02	120,34	80,76	1.277,76	1.745,32	0,16		3.718,36
2016	283,60	35,11	13,10	1.090,09	2.260,11			3.682,01
2017		45,92	138,00	309,90	2.135,23			2.629,05
2018		101,23	4,50	1.097,49	1.031,20	95,00		2.329,43
2019		9,22	84,65	1.386,58	1.909,08	17,00		3.406,53
2020		47,02	15,28	904,05	1.899,42	57,40		2.923,17

**Table 6.** Whitemouth croaker landing in Rio Grande do Sul for the period 2000 to 2020 (in tons). Source: IBAMA/CEPERG (2000 to 2011); FURG (2012 to 2020).

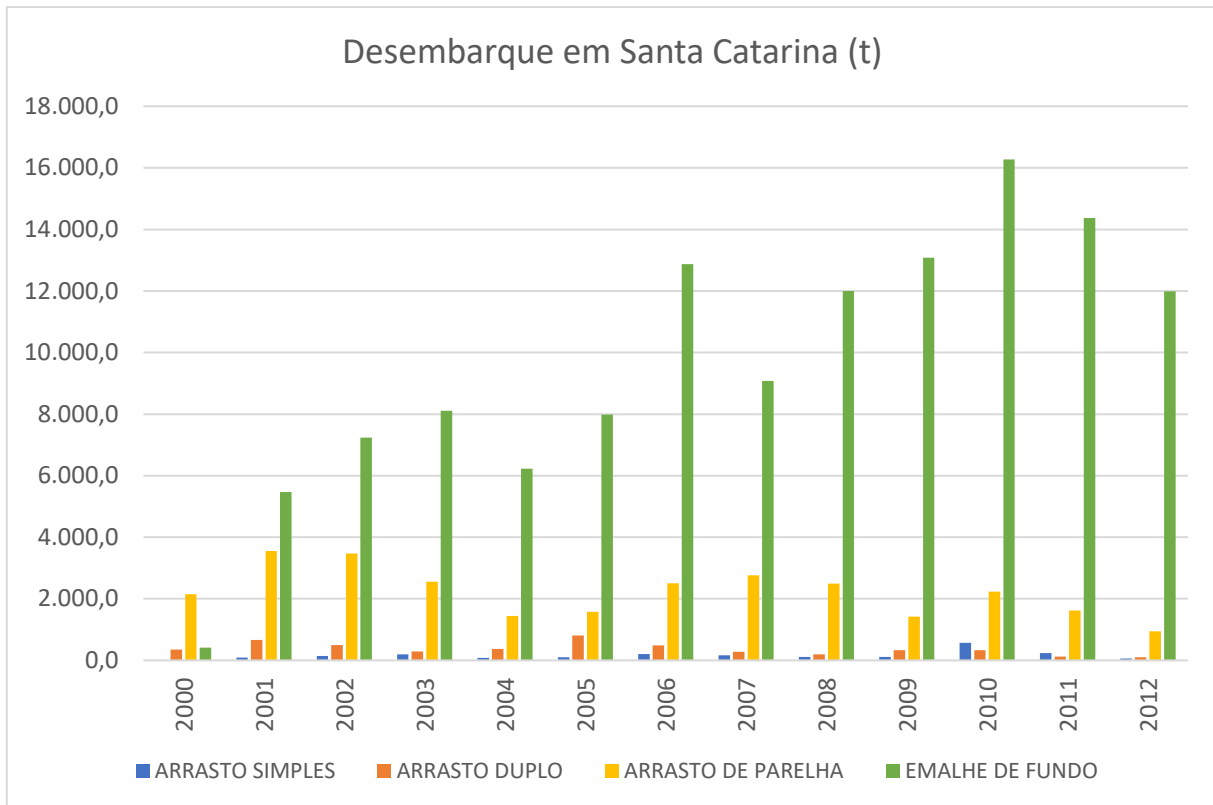


Figure 2. Chart representing Table 3. Whitemouth croaker harvest in Santa Catarina for the period 2000 - 2012.

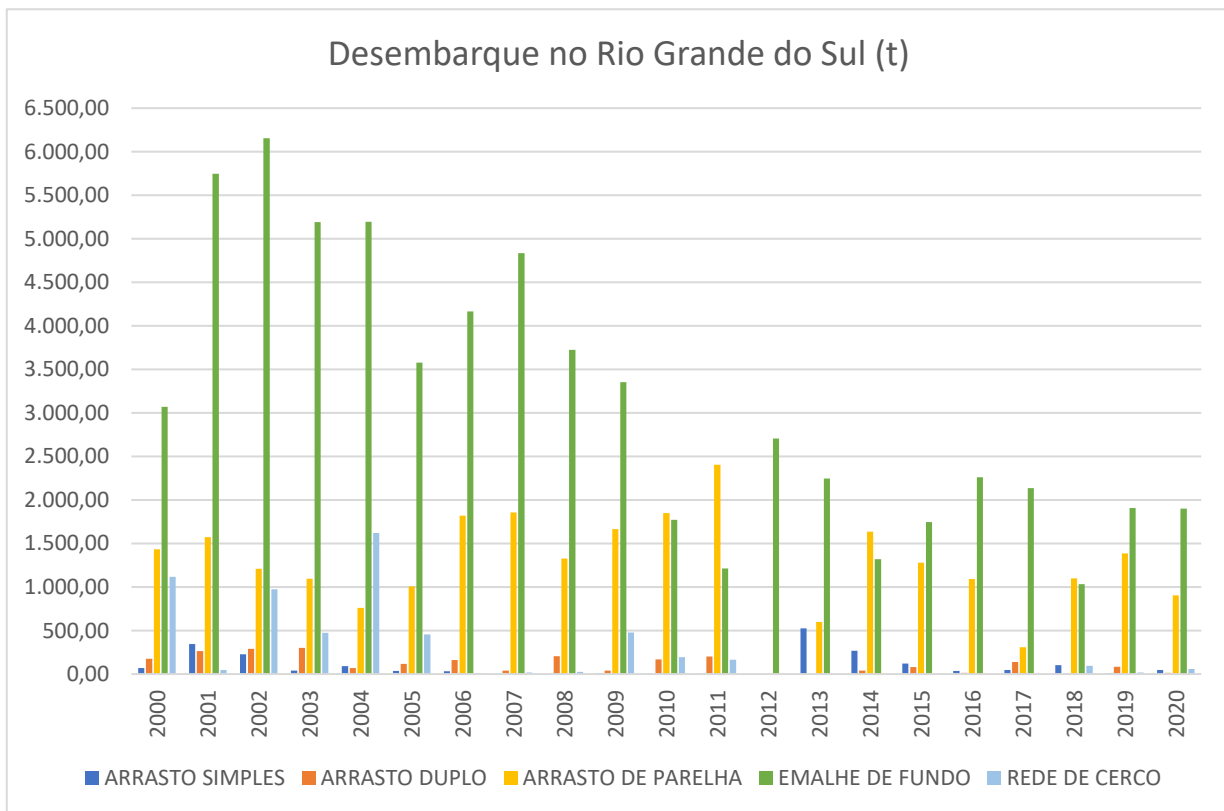


Figure 3. Chart representing Table 6. Whitemouth croaker harvest in Rio Grande do Sul for the period 2000 - 2019.

### 3. General Description of the Fishery

#### 3.1. Scope of the Fishery Regarding the MSC Program

The fishery under evaluation is within the scope of the MSC standard for sustainable fisheries;

- ✓ It is a capture fishery;
- ✓ The fishing operations are not performed using poisons or explosive substances;
- ✓ The fishery is not carried out according to unilateral exceptions that could be controversial in the face of international agreements;
- ✓ There have been no successful claims against the group of clients due to violations related to forced labor in the past two years; and,
- ✓ The fishery is not under controversy and/or conflict.

#### 3.2. Description of the Fishery

*Micropogonias furnieri* (whitemouth croaker) is one of the most abundant and harvested species in the Southern Brazilian continental shelf (HAIMOVICI, IGNÁCIO; 2005). Captured mainly through trawls and gillnets, the states of Santa Catarina and Rio Grande do Sul are the main landing sites.

Industrial trawling started in the coast of Rio Grande do Sul in 1947, with two wooden vessels owned by the company Leal Santos: Albamar and Brisamar, both with 23.7 m of length, followed by two others in 1948, Libertador and Pioneiro of 17.1 and 15.7 m, respectively. These vessels used pair trawlers till 1952. In the early days, trawling took place at less than 20 m in depth between Rio Grande and Albardão, spreading after 1953 to reach Punta Médanos (37°S latitude) in Argentina. The main target species were white croaker (*Micropogonias furnieri*), king weakfish (*Macrodon atricauda*), croaker (*Umbrina canosai*), striped weakfish (*Cynoscion guatucupa*) and common hake (*Merluccius hubbsi*), the latter in Uruguayan and Argentinian waters (HAIMOVICI, *et. al.*, 2014).

In the 1970s, the activity increased in the South of Brazil due to the closure of the Uruguayan and Argentinian territorial waters to the Brazilian vessels. An additional reason was the tax incentives of the federal government for fisheries industrialization (PEZZUTO, *et al.*, 2007). Till the early 1980s, trawlers had between 22 to 35 m in length and between 250 to 650 HP. Otter trawls were common in winter and pair trawls during the rest of the year (HAIMOVICI, *et al.* 1989). The demersal fishery in the continental shelf takes place with otter trawls, pair trawls, double / single or outrigger nets and bottom gillnets (VASCONCELLOS, *et. al.*, 2007). Pair trawls represented the largest portion of the demersal species landings till 2001, when the gillnet fishery landings began to exceed those of the trawls (HAIMOVICI, *et. al.*, 2014).

Trawling and bottom gillnet fisheries can be characterized as multispecific. The bottom gillnet is a type of net that is placed vertically at the bottom by means of anchors (poita) and are signaled by mooring buoys on the surface. The mesh size varies depending on the type of species harvested. Trawls can be of different types: (a) single, which uses a conic net that is trawled by a single vessel. The horizontal opening of the net is maintained by a pair of hydroports; (b) pair trawl, involving two vessels that should maintain uniform speed and constant distance between them. It consists in the use of a large conic net whose opening is maintained by the distance between the vessels, in general of the same size and; (c) double trawl, using two identical conic nets, with two hydroports to maintain the horizontal opening of the nets. They are trawled by an outrigger vessel to allow for simultaneous trawl. (CEPSUL/IBAMA, 1994).

Otter and pair trawls have experienced little technological advances as time went by, although the fishing power has increased due to the addition of satellite navigation and the use of echo sounders. The use of small mesh (50 to 70 mm) and a pocket lining made both fisheries scarcely selective. Pair trawls target croaker. Recently, otter trawls were limited to the winter months, targeting mainly croaker, striped weakfish and, to a lesser degree, white croaker and dogfish (VASCONCELLOS *et al.*, 2007).

The gillnet fishery is divided in: (a) coastal, also known as semi-industrial gillnet, performed by small size vessels that till 1992 were considered as part of the artisanal fishery and, (b) oceanic or industrial gillnet, performed by medium/large size vessels. The sailing autonomy of coastal vessels increased with time, staying at sea for as long as the oceanic fleet, using the same quantity of nets and fishing generally in the same area (CEPERG, 2009). Initially, the industrial fleet targeted elasmobranchs in the outer shelf. Later, it started fishing in all the shelf targeting white croaker (*Micropogonias furnieri*), striped Weakfish (*Cynoscion guatucupa*) and croaker (*Umbrina canosai*) (VASCONCELLOS; HAIMOVICI & RAMOS, 2014). According to these authors, over the last 20 years, the gillnet fishery suffered several challenges due to the changes in the fishing grounds of the different fleets and the increase in the size of mesh. The intensification contributed to the fall in density of the target species, estimated from the landings per Unit-Effort.

Each modality has specific technical characteristics, depending on the fishing grounds and target species. Por instance, pair trawls focus on coastal demersal fish. On the other hand, otter trawls target mainly shrimp. However, the vessels that use that fishing gear present significant overlap in fishing grounds and a lot of common catch species with the pair trawls fleet.

The industrial pair trawl fleet in the Southeast and South of Brazil included 324 vessels, 194 from the state of Santa Catarina and 130 from other states. As regards the authorized catch species, 57 vessels have as target demersal fish, 10 oceanic fish, 230 pink shrimp and 27 shrimp. In general, trawlers fishing in the slope (oceanic trawl) and on the continental platform (demersal fish) presented a slightly larger size in comparison with the shrimp vessels that also operate in the medium and outer shelf (QUEIROLO, *et al.*, 2016).

According to the Register of marine fishing gear and vessels in Brazil (2020), the following vessels are used for the industrial fishery in Santa Catarina and Rio Grande do Sul, with whitemouth croaker as target species: (a) trawls: engine powered vessels, engine power 60-180 hp and average length from 8-12 meters (b) gillnets: engine powered vessels, engine power 11-270 hp and length from 8 to 22m.

*Micropogonias furnieri* it has a wide geographic distribution, occurring between the Yucatán Peninsula (Gulf of Mexico, 20°N) and the Gulf of San Matias (Argentina, 41°S) (HAIMOVICI and UMPIERRE, 1996). Its record landings in Argentina, Uruguay and Brazil attained 100,000 ton in recent years (HAIMOVICI *et al.*, 2016).

### 3.3. Principle 1: Stock Status

Principle 1 of the MSC *standard* states that “a fishery should be managed in a way that avoids recruitment overfishing or stock reduction. Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe.”

#### 3.3.1. Description of the Species

The whitemouth croaker *Micropogonias furnieri* (Desmarest, 1823), is a coastal and estuarine demersal fish of the Sciaenidae family, abundant and intensely exploited by coastal and industrial fleets between Southeast Brazil (22°S) and northern Argentina (40°S) (HAIMOVICI et al. 2016) (Figure 3). Important fishing resource, both in the southeast and south of Brazil as well as in Uruguay and Argentina, with fishing developing throughout the region, mainly up to 50 m deep (HAIMOVICI, 1987).



Figura 3. Whitemouth croaker *Micropogonias furnieri*. Source: Haimovici e Ignácio (2005).

*Micropogonias furnieri*, as many other world stocks, is a migratory species. Considered a long-lived species (can reach 38 years), it presents spawning in installments (VAZZOLER, 1971), slow growth and medium size (65 cm) (HAIMOVICI and UMPIERRE, 1996). Females grow faster and reach larger sizes than males (HAIMOVICI and IGNACIO, 2005).

They have an average size at first maturation of 36.3 cm (females) and 31.4 cm (males) and according to Haimovici et al (2021), in the south and southeast of Brazil the species spawns seasonally in coastal and estuarine waters and the pelagic eggs are transported to estuaries and coastal lagoons where the juveniles develop. In southern Brazil, spawning occurs from spring to summer (HAIMOVICI and IGNACIO, 2005).

According to Vasconcellos and Haimovici (2006), the distribution of the species from southeastern Brazil to Argentina is continuous and genetic studies have not found evidence to support the existence of isolated populations throughout the region (Figure 4). However, recent studies indicate that, despite presenting a continuous distribution, there are two independent stocks of croaker in the south and southeast of Brazil and several published studies indicate some degree of mixing between the fish that breed throughout southern Brazil, Uruguay and Argentina (HAIMOVICI et al., 2016).

The separation between the stock fished in Rio Grande do Sul and the common fishing zone of Uruguay and Argentina is less clear. Morphological characteristics and the life cycle of the species indicate the existence of at least two stocks in southern Brazil, north and south of Cabo de Santa Marta Grande (29° S) (HAIMOVICI and IGNACIO, 2005).

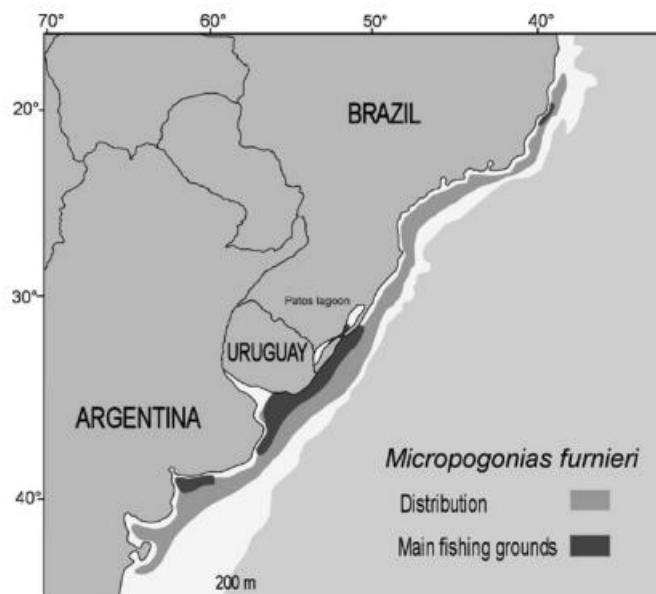


Figure 4. Distribution and main fishing grounds of whitemouth croaker *Micropogonias furnieri* in southern Brazil, Uruguay and Argentina. Source: Vasconcellos e Haimovici (2006).

Haimovici and Umpierre (2016), analyzing the population structure of corvina in the extreme south of Brazil, identified 2 population groups: (a) a “south-Brazilian” whose main spawning area is the coastal region close to Barra de Rio Grande and breeding areas in the Lagoa dos Patos estuary and adjacent coastal region and, (b) “Uruguayan”, with reproduction occurring at the same time on the Uruguayan Atlantic coast and probably also on the Prata River. Also according to the authors, the croakers that spawn in spring and summer in Uruguay move to the continental shelf of Rio Grande do Sul in winter to feed.

Stock assessments form the basis for efficient fisheries management. And the stock identification and the establishment of the connection between neighboring populations are core questions to assess and manage marine coastal fish species (CANEL et al., 2019).

Haimovici and Ignacio (2005), using pair trawl landing data in Rio Grande do Sul, between 1976 and 1998, determined population structure and mortality of whitemouth croaker. Regarding the population structure in the South region, average length was 47 cm (1976-1980), showing a decreasing trend down to 42.1 cm (1997-1998) (Figure 5). This reduction in length is consistent with the age class registers, where the most frequent age class till where it is observed that between the first and last period, the proportion of croakers (captured by pair trawlers) aged over 15 years decreased from 34.4 to 7.9 (Figure 6). Regarding total mortality (Z) and survival rate (S) they showed an upward trend, moving from than 0.075 to than 0.223. Considering a value of M between 0.11. (Figure 7).

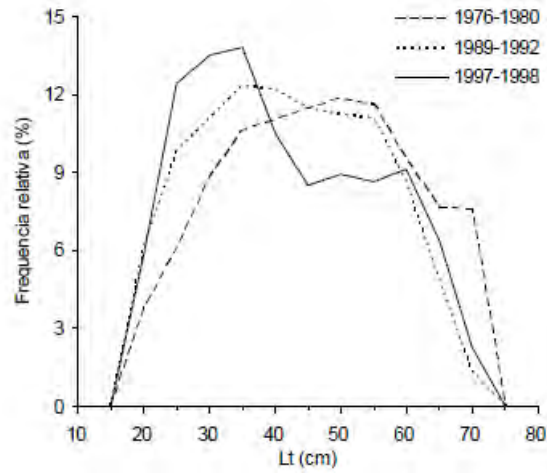


Figure 5. Whitemouth croaker (*Micropogonias furnieri*) composition per length in the commercial pair trawl fishery in Rio Grande do Sul. Source: *Haimovici and Ignacio (2005)*.

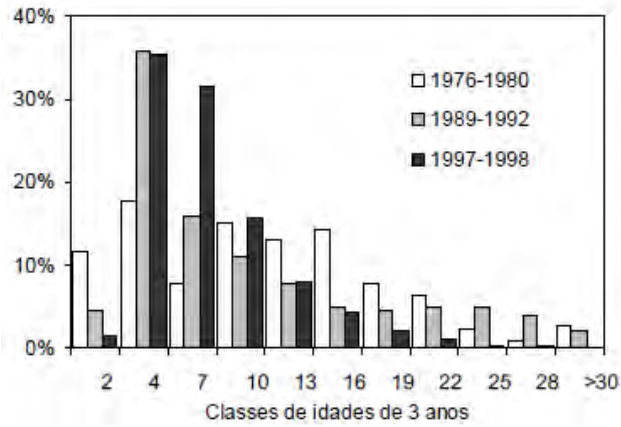


Figure 6. Whitemouth croaker (*Micropogonias furnieri*) composition per age in the commercial pair trawl fishery in Rio Grande do Sul in the sampled periods Source: *Haimovici and Ignacio (2005)*.

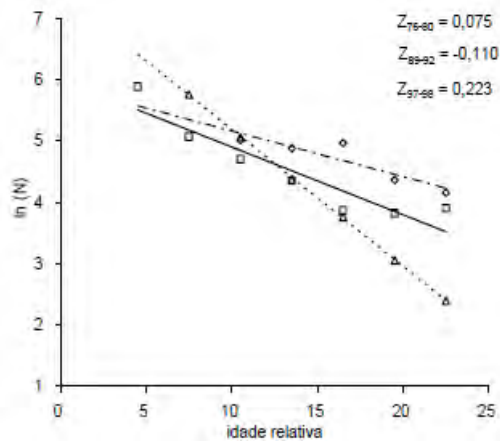


Figure 7. Linearized capture curve of *M. furnieri*. *Haimovici and Ignacio (2005)*.



Haimovici and Ignacio (2005), determined the evolution of the stock biomass, using a Schaeffer Biomass Dynamic Model:  $B_t = B_{t-1} + rB_{t-1} (1 - B_{t-1} / k) - Lt_{-1}$  and  $CPUE_t = q B_t$ , where  $B$  is the stock estimated biomass,  $C$ , catch,  $r$ , an intrinsic growth rate of the population,  $k$ , stock virgin biomass,  $q$ , harvest coefficient and  $t$ , the year. Parameters  $r$ ,  $k$  and  $q$  were estimated minimizing the differences between the CPUEs observed and using a Bayesian method model. A priori, this model applies a probability distribution for parameter  $r$  and it is considered that all the errors occur in the relation between biomass and CPUE. In this assessment, the hypothesis was considered that the stock explored in the south of Brazil shows little mixture with those exploited in the southeast of Brazil and in Uruguay and Argentina. This model estimated that biomass in 1996 was close to 220,000 t and that it decreased to 70,000 t in 2002. Fishing mortality shows a gradual increase from values close to 0.1 at the beginning of the series to greater than 0.2 at the end (Figure 8).

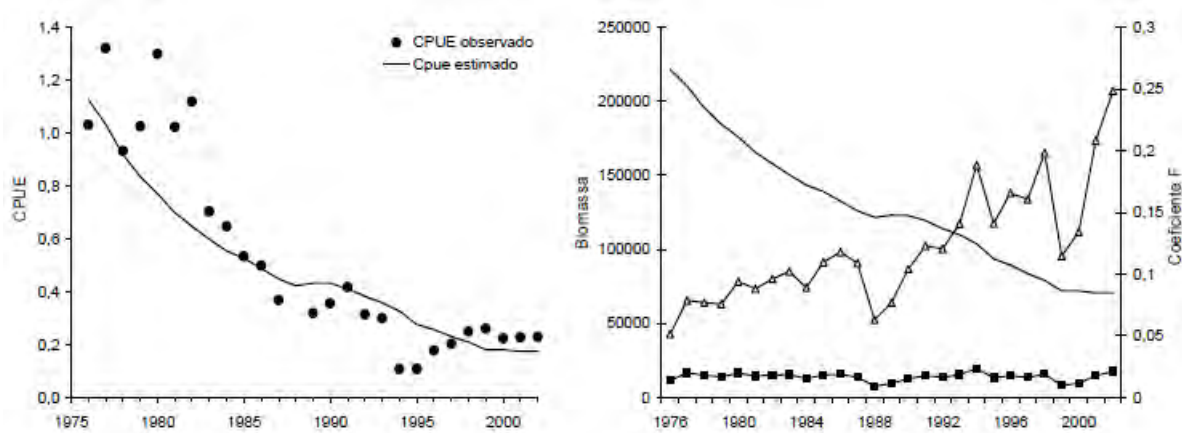


Figure 8. Evolution of biomass and instantaneous fishing mortality (F), estimated from the CPUE of whitemouth croaker in pair trawl fishing. Source: Haimovici and Ignacio (2005).

Cardoso et. al., (2019), based on the results of two projects, one financed by the Ministry of Environment, entitled “Fisheries monitoring in the extreme South of Brazil and assessment of impact on biodiversity” and a second one financed by the Foundation Grupo Boticário, estimated *Micropogonias furnieri* spawning potential ratio (SPR) with a model commonly used for assessing the remaining reproductive potential in fish populations under any level of fishing pressure. Based on length frequencies and basic life-cycle data, an estimate was obtained, calculating the difference between the expected length composition in a virgin situation and that observed in catches (HORDYK et al. 2014). The model assumes that the length composition shown is representative of the population: the length compositions are obtained from bottom trawl landing samplings. Bottom trawls could be considered a non-selective fishing gear. The result for *Micropogonias furnieri* regarding the potential spawning fraction estimated for the period 2015 to 2017, was of 15% (Figure 9). This suggests that the fishing mortality in previous years caused a loss of 85% of the stock reproductive potential. The steep decline in older individuals could be considered an additional source of concern regarding the stock status.

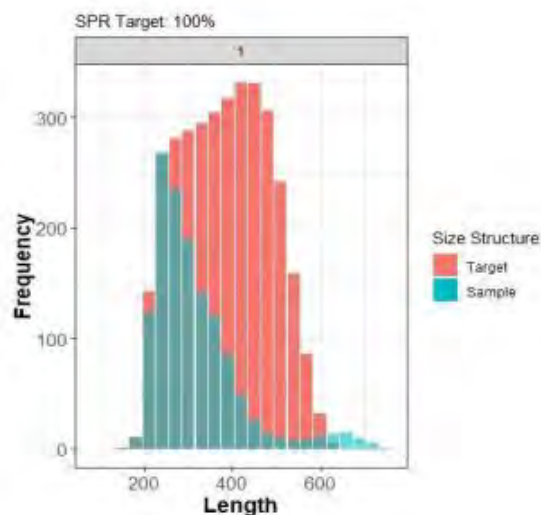


Figure 9. Length composition in red represents a virgin situation. Length composition in green represents the remnant of the *Micropogonias furnieri* stock between 2014 and 2017 in South Brazil with the addition of the fishing mortality. Source: Cardoso, et. al, (2019)

Cardoso et al. (2022), analyzed the stock situation along the Brazilian Southern Margin, separating between northern and southern stocks. The “northern” stocks were delimited between the north of Rio de Janeiro and Cabo de Santa Marta Grande, Santa Catarina. The resources defined as “southern” were those that occurred between the latitudes of Cabo de Santa Marta Grande and Chuí, Rio Grande do Sul. Stocks without evidence of differences between north and south were considered “single stock” (Figure 10). Whitemouth croaker was analyzed separately in northern and southern stocks (Table 7).

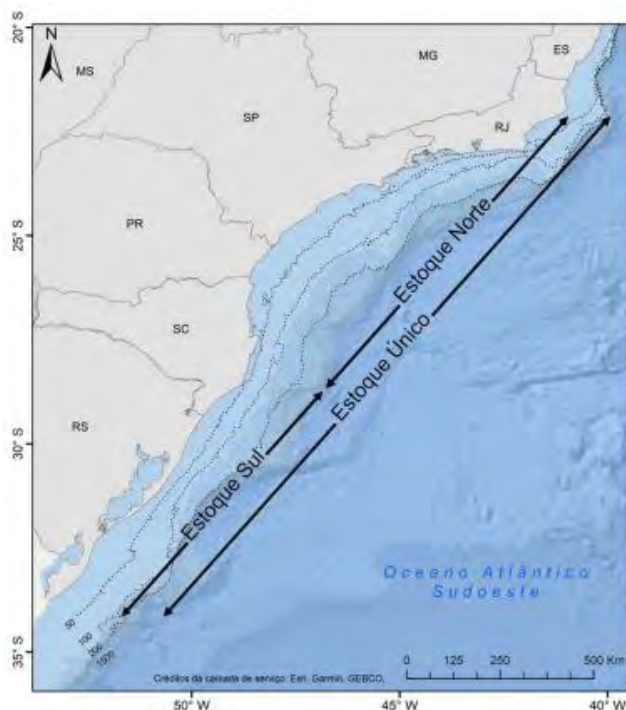


Figure 10. Definition of latitudinal limits along the Brazilian southern margin. Source: Cardoso et al. (2022).

The authors observed a continuous increase in landings from the 42 demersal stocks analyzed between the 1960s and the 2000s, reaching a peak above 100,000 tons. Remaining between 75,000 and 90,000 t until the 2010s. And after 2011, they observed an abrupt decline in landings reaching values lower than 35,000 t in 2019. This reduction can be interpreted as a real decrease in catches or the result of a smaller coverage of data collection programs.

Four stocks for the total biomass analyzed drew attention due to their large contribution: southern whitemouth croaker, northern whitemouth croaker, southern croaker and single stock of striped weakfish. The southern croaker stock was the first of these to enter a level of biological insecurity (classified as overfished and suffering from overfishing), having been in this state since the 1980s to the present. The northern stock also showed a trend of declining biomass since the 1980s but entered a state of biological insecurity only after the 2010s (Figure 11).

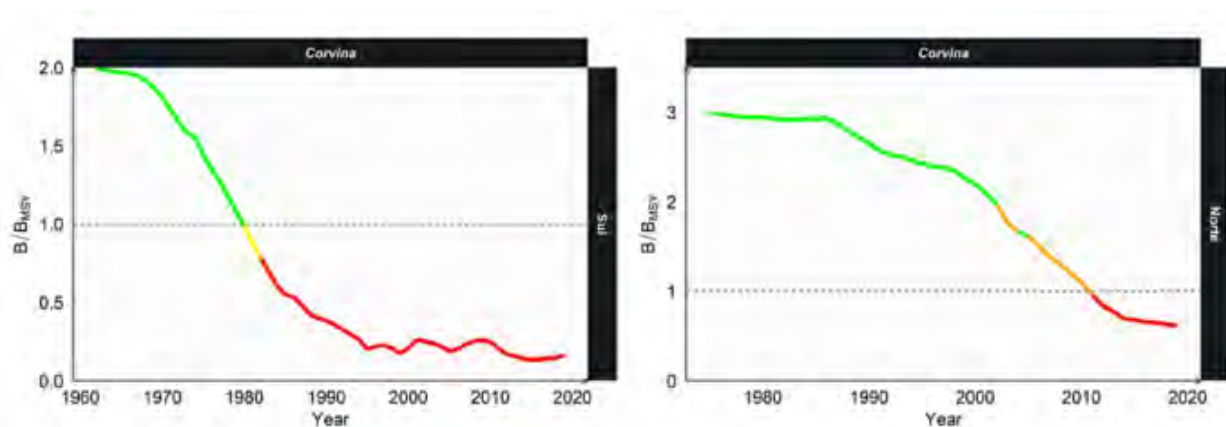


Figure 11. B/Bmsy trajectories for southern and northern whitemouth croaker stocks. Green lines: Biological safety. Yellow lines: Biological safety, requires attention. Orange lines: Biological safety, requires attention. Red lines: Biological insecurity. Source: Cardoso et al. (2022).

The ratio of annual fishing effort (F) to the fishing effort that would generate maximum sustainable yield (Fmsy) also demonstrated a continuous increase in fishing mortalities since the beginning of the time series for whitemouth croaker stocks. (Figure 12).

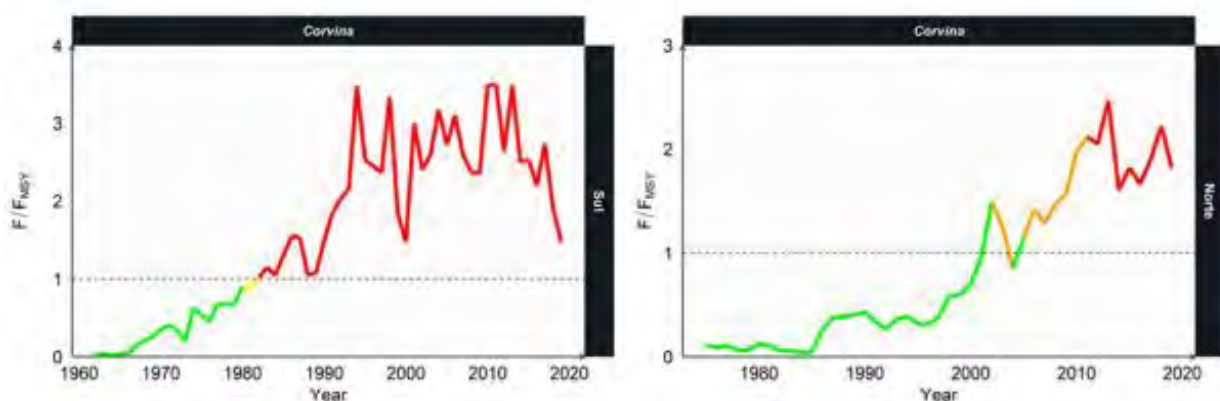


Figure 12. F/Fmsy trajectories for southern and northern whitemouth croaker stocks. Green lines: Biological safety. Yellow lines: Biological safety, requires attention. Orange lines: Biological safety, requires attention. Red lines: Biological insecurity. Source: Cardoso et al. (2022).

Table 7. Whitemouth croaker stocks analyzed. The models used are also indicated, Maximum Sustainable Yields (MSY), Biomass of final year in relation to the biomass that would generate the maximum sustainable yield (B/B<sub>MSY</sub>) and Fishing mortality in the final year in relation to the fishing mortality that would result in the maximum sustainable yield. Cardoso et al. (2022).

Estoque	Modelo	Período	MSY	B/B <sub>MSY</sub>	F/F <sub>MSY</sub>	Estado do estoque
Norte	*JABBA	2019	6.320,0	0,6	1,9	Sobreexplorado e sofrendo sobrepesca
Sul	**SS3	2019	15.394,3	0,2	1,5	Sobreexplorado e sofrendo sobrepesca

\* Bayesian production surplus model with state-space structure that uses distinct catch series and abundance series indices as input data. It also makes it possible to adapt the model according to the best existing information.

\*\* Model structured by age using the Stock Synthesis platform.

### 3.4. Principle 2: Interaction with other Components of the Ecosystem

The MSC Standard defines primary species as those non target species caught by the fishery, are within the scope of the standard and have management measures and limit or target reference points. On the other hand, it defines as secondary species those non-target species within the scope of the standard, but are not managed according to reference points; or those species outside the scope of the standard (amphibians, birds, reptiles, marine mammals) that are not considered as Endangered, Threatened and Protected Species (ETP).

Within the categories of primary and secondary species, we consider as main species, those that represent more than 5% or more of the catches of the UoA fleet, or those species considered as vulnerable that represent 2% of the catches of the UoA fleet. The species below those thresholds are considered as minor. Figure 12 shows the decision tree for the classification of species according to Principle 2.

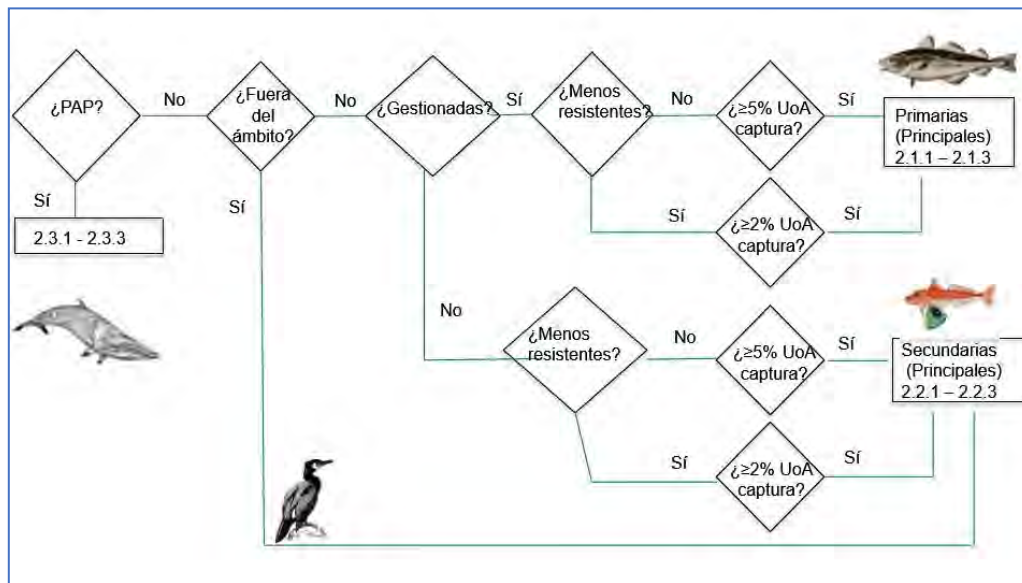


Figure 12. Decision tree to classify fishery non-target species in: ETP, primary, secondary, main, and minor species. Source: MSC, 2017.

In general terms, the *Micropogonias furnieri* fishery in Brazil takes place within the South Brazil Shelf Large Marine Ecosystem (LME), that includes the South and Southeast Continental Shelves in Brazil. LMEs are areas differentiated by specific characteristics of bathymetry, hydrography, productivity and trophic relations. These areas can be larger than 200,000 km<sup>2</sup> and are adjacent to continents in coastal areas, generally with a primary productivity that exceeds that of the open ocean. They represent almost 80% of the world marine fish catches (ROSSO, 2015).

The South Brazil Shelf LME, extends from 22° to 34° S, and borders the states of Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul (EKAU; KNOPPERS, 2003 *apud* HEILEMAN e GASALLA, 2009). Depending on the Brazil-Malvinas confluence systems and estuary flows, this region could be considered as the most productive (150-300 gCm<sup>-2</sup>ano<sup>-1</sup>) of the area bathed by the Brazil current (HEILEMAN e GASALLA, 2009).

According to Freitas (2014), the Southeast Brazil Continental Shelf (PCSE) is located between Cabo Frio (23° S) and Cabo de Santa Marta Grande (28°S), with smooth topography, concave shape and isobaths parallel to the coastline. It presents an average depth of 70m and the shelf break varies between 120 and 180m in depth. The South Continental Shelf (PCS), located between Cabo Santa Marta Grande and Arroio Chuí, presents relatively smooth topography and the shelf break, on average, is at 180m in depth. This region is officially named the Southeast-South Region of Brazil. In the South Continental Shelf (PCS), the coastal and oceanic waters are subject to the action of the Brazil and Malvinas currents, and the Cabo Frio region (PCSE) presents upwellings due to the NE winds regime that shift coastal waters towards the continental shelf (MADUREIRA e ROSSI- WONGTSCHOWSKI; 2005).

The South marine ecosystem has the largest abundance of demersal fish stocks in Brazil (FISCHER e HAIMOVICI 2010). It is due to the long continental shelf and the upper slope with low declivity covered by sand and mud bottoms. It is caused as well by the influence of the subtropical convergence, bringing from regions further south cold waters of high productivity (ODEBRECHT e CASTELLO, 2001 *apud* FISCHER e HAIMOVICI 2010).

The continental margin of Southeast/South of Brazil, bordered by the 2,000 m isobath, presents a total area of 502,190 km<sup>2</sup>. According to Port (2015), 45.9% of this area is located north of 25°S (North), 25.4% between parallels 25°S-29°S (Center) and 28.7% south of 29°S (South). More than 99% of this

area is covered by soft substrates. Thus, it is available for the bottom trawl fishery. The north area presents more variety of sediments. The center and south intervals are dominated by sand and mud. In the south shelf, substrates change from sandy to muddy as depth becomes greater, with most of the shelf from 10 to 100 m in depth being adequate for the bottom trawl fleet (HAIMOVICI, 1998).

The species distribution is determined by the characteristics of the habitats, the type of seabed and the impact on the fishing grounds of the fleets. The multi-species character of the fleet catch and the fact that the same species is harvested using different fishing gears, increases the complexity of the fishery analysis (ROSSO, 2015). Indeed, this is the case for whitemouth croaker, which is included in the demersal fish multi-species fishery. Moreover, as regards landing statistics, usually they do not include bycatch data (bycatch and discards) nor estimates of illegal fishing (FERREIRA, 2009).

*Micropogonias furnieri* is a target species, together with some others, of the bottom gillnet, pair trawl and single trawl coastal fleets. Moreover, it is also bycatch of double/single trawls (BRASIL, 2011). The fishery is multi-species and there is an overlap of the catch of the gillnet fleet with that of the trawlers targeting demersal fish (PEREZ *et al.*, 2001). It is usually found close to soft sediments, mainly sand and mud in the continental shelf (ROSSO, 2015). However, Port (2015) explains that the impact caused by habitat disruption and changes in the community structure are barely known or little analyzed. Its catch takes place mainly in the inner continental shelf (30m to 100m in depth). It could also take place in the coastal area (0 to 30m) and shelf break (100 to 250m) (ROSSO, 2015) (Figure 12).

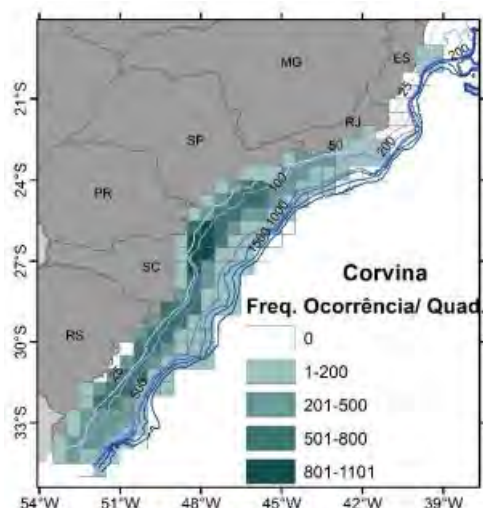


Figure 12. Spatial distribution of croaker landed in Santa Catarina by the industrial fleets between 2010 and 2012. Values correspond to the frequency of occurrence per geographical quadrant of 30'x30' resolution. Source: Rosso (2015).

According to Rosso (2015), in Brazil fisheries management processes focus on the target species, without taking into account the habitat features, the interspecific interactions and the fact that different fleets are harvesting the same stock. In the case of multi-species fisheries, no matter how focused on the target species they might be, the fishing gear catches other bycatch species. Given this multispecificity, the fragility of the benthic ecosystems and the collapse of several fish stocks from deep waters, the author highlights the importance of managing the stocks in the Southeast-South region of Brazil using an ecosystemic approach.

Rosso (2015), analyzing demersal fishery data landed in Santa Catarina from 2010 to 2012, identified six main fishing areas, based on the spatial distribution of demersal stocks, in the spatial dynamics of

the industrial fishery and the characteristics of the benthic environment in the Southeast-South Region of Brazil. Whitemouth croaker was included in the South and North Inner Continental Shelf Group, together with other similar species (Table 8).

GRUPO DE PESCA	PROFUNDIDADE	LIMITES LATITUDINAIS	ASSOCIAÇÃO DE RECURSOS	TIPO DE FUNDO	TIPO DE FROTA
Plataforma Continental Interna Sul	Até 100 m	28°S (Sul de Santa Catarina) a 34° S (Sul do Rio Grande do Sul)	Camarão barba-ruça; camarão santana; abrótea; bagre; betara; castanha; cabra; corcoroca; <b>corvina (estoque Sul)</b> ; emplastro; espada; garoupa; goete; gordinho; linguado; linguado-areia; maria-mole; papa-mosca; pargo-rosa; peixe-porco; pescada; pescada-amarela; pescadinha-real; tira-vira.	Lamoso (47,9%) Areno-lamoso (23,6%) Arenoso (21,5%)	Emalhe fundo; arrasto parelha; arrasto duplo; arrasto simples
Plataforma Continental Interna Norte	30-100 m	28°S (Sul de Santa Catarina) a 23°S (Sul do Rio de Janeiro)	Camarão-rosa; lula; polvo; abrótea; bagre; cabra; <b>corvina (estoque Sudeste)</b> ; emplastro; gordinho; goete; linguado-areia	Arenoso (38,2%) Lamoso (27,2%) Areno-lamoso (23,9%)	Pote polvo; arrasto duplo; emalhe fundo; arrasto parelha

Table 8- Fishing units for the Southeast-South of Brazil proposed for *Micropogonias furnieri*, with its corresponding features. Source: ROSSO, 2015.

### 3.4.1 Trawl Fishery

Trawl is a scarcely selective fishing gear that operates in areas of high biodiversity. According to Port (2015), in the South and Southeast it is distributed around two main areas: (a) covering the continental shelf area of the southeast bay of Brazil (22-28°S), with Penaeidae shrimp as target species of the double trawl vessels and; (b) in the area included in the continental shelf along Rio Grande do Sul, considered as one of the largest areas of the Brazilian continental shelf margin, that presents high primary and secondary productivity.

This area is responsible for the important trawl fishery targeting sciaenidae fish (*Micropogonias furnieri*, *Cynoscion acoupa*, *C. guatucupa*, *Umbrina canosai*), bastard halibut (*Paralichthyes* spp.) and shrimp species (*Pleoticus muellery* and *Artemesia longinaris*). Still, according to the author, it is likely that the benthic habitats of that area would be the most disrupted in the Brazilian continental margin, due to the long years of bottom trawl fishing pressure when harvesting different species. Habitats are composed mainly of sand and mud, and for the period under study, this was the area that presented the highest fishing productivity (0.5-0.6t/km<sup>2</sup>).

The industrial pair trawl fishery in the Southeast-South region of Brazil is one of the most traditional. According to the analysis by Port (2015), landing data in Santa Catarina from 2003 to 2011 by the industrial trawl fleet, resulted in the identification of approximately 130 fish species, more than 15 crustacean species (shrimp, lobster and crabs) and 7 mollusc species (squids, octopuses and bivalves), in a depth range of 10 m to 800 m. Considered as a multi-species fishery of demersal fish, the main harvested species are sciaenidae fish such as croaker (*Umbrina canosai*), white croaker (*Micropogonias furnieri*), and striped weakfish (*Cynoscion guatucupa*) (ROSSO, 2015; PORT, 2015). During a meeting with the *Micropogonias furnieri* processing company in Santa Catarina, it was confirmed that in the trawl fishery those three species are harvested. However, it was impossible to estimate the catch percentage of each species.

Regarding the ecosystem structure, Port (2015) analyzed the impact of the industrial trawl fishery on the ecosystems of the Southeast/South continental margin of Brazil. The conclusion was that more than 74% of the area trawled by this type of fleet is located in the intervals of latitudes South (29°-34°) and Center (25°-29°). Of the total accumulated trawled area, almost 60% was covered with muddy sand and mud and the rest were substrates with fine and medium sand. In areas above 200 m in depth, and on the interval of latitude North (19°-25°), are found respectively sediments of the slope and gravel substrates. They were barely impacted by the trawl fishery. Of the landed biomass (from 2003

to 2011), almost 63% was original from areas with muddy sand and mud substrates, which is precisely the croaker habitat according to other authors.

This study also defined three main “fishing strategies”, one with whitemouth croaker as target species (Table 9), according to the identification from Dias *et al.* (2012), *apud* Port (2015). The three strategies are: (a) shrimp trawl (AC), operating in the inner and medium shelf, mainly using pair trawls, and concentrating in two different areas: one between 24°S-29°S and the other south of 29°S, targeting some coastal shrimps and a group of demersal fish including croaker (*U. canosai*), Atlantic searobin (*Prionotus punctatus*) and bastard halibut (*Paralychthys* spp.), representing 60% of the landed biomass between 2003-2011 for this strategy; (b) slope trawl (AT), operating in the slope areas (250-400 m in depth), using double and single trawls that have as main target the Brazilian codling (*Urophycis mystacea*), common hake (*Merluccius hubbsi*) and monkfish (*Lophius gastrphysus*) e; (c) Pair trawl (AP), operating in the inner shelf (<75m) with two vessels trawling a single net. Target species are some sciaenidae fish, including *Umbrina canosai*, whitemouth croaker (*Micropogonias furnieri*), striped weakfish (*Cynoscion guatucupa*), yellow hake (*C. acoupa*) and Jamaica weakfish (*C. jamaicensis*). They represent almost 78% of the total landed biomass for the period under analysis. According to the author, the shrimp trawl fishing strategy (AC) had the highest impact on the substrate.

To assess the fishery impacts as regards the Average Trophic Level, the Fishing in Balance Index (FiB) was analyzed. Fishing strategies AC and AT followed the general trawl pattern, whereas the pair trawl started to register a decline in the FiB value from 2008, reaching negative values in 2010 and 2011. Port (2015) argues that this situation for AP could be an indicator that the environment exploited by this fishing strategy (inner shelf) is suffering a disruption in its ecological functions.

Estratégia de pesca	Espécies-alvo		Outras espécies	
Arrasto de parelha	corvina	<i>Micropogonias furnieri</i>	pescada-amarela	<i>Cynoscion acoupa</i>
	castanha	<i>Umbrina canosai</i>	goete	<i>Cynoscion jamaicensis</i>
	maria-mole	<i>Cynpscion guatucupa</i>	cabra	<i>Prionotus punctatus</i>
			raias emplastro	Família Rajidae
			pescadinha-real	<i>Macrodon ancylodon</i>
			gordinho	<i>Perpilus paru</i>
			olho-de-boi	<i>Seriola lalandi</i>

Table 9- Fishing strategies with *Micropogonias furnieri* as target species and other species caught. Source: PORT. 2015.

Summarizing, analyzing the biological indicators, Port (2015) identified two scenarios for the trawl fishery in the South and Southeast: (a) coastal exploitation of stocks, presenting wider diversity and lower trophic level organisms, less vulnerability and more resilience to the fishing activity and; (b) exploitation of external areas to the shelf and slope, less diversity, with higher trophic level species, more vulnerable and less resilient to the fishing activity.

The study by Port (2015) did not consider the discards, which could imply an underestimate of the values. The author considers that a total catch evaluation should be performed, including discard data. Indeed, according to Perez *et. al* (2001), they represent on average 33% of the catch (pair and single) and 45% (double catch). This evaluation would also allow a better understanding of the interaction of the fishing gear with the ocean seabed.

The ecological impact of the disruptions caused by the trawl fishery depend on the equipment used and the type of substrate. According to Kaiser *et al.*, (2006), those communities that inhabit the shelf with sand and mud substrate present significant negative impacts in the short-term when they suffer the otter trawls. However, those impacts tend to be of short duration. This disruption in the seabed is similar to the one produced by double and pair trawls used in the Brazilian coast.

64 bycatch species were identified in 47 sets monitored in the spring of 2011 and summer and autumn of 2012 by observers onboard of bottom trawls. Of those, 37 teleost fish (representing 92.5% in



number and 78.4% in weight), 13 elasmobranchs (5% in number and 21.3% in weight), 11 crustaceans (1.6% in number and 0.8% in weight), 3 molluscs, in addition to cnidarians and echinoderms that were not identified at the level of species (representing less than 1%). The bycatch percentage (40%) was larger between 10 to 20 m in depth, decreasing at greater depths (CARDOSO, *et al.*, 2021).

Among discards, the presence of 5 teleost fish with commercial value was observed: *M. furnieri* (2% in number and 3% in weight), *U. canosai* (8% and 7%), *C. guatucupa* (14% and 8%), *Macrodon atricauda* (2% and 2%) and *Urophycis brasiliensis* (1% and 1%). The first three species included fish with a total length below 20 cm (sexually immature individuals), *M. atricauda* presented fish mainly below 20 cm (males can be sexually mature and females are immature) and *U. brasiliensis* mainly below 30 cm (include mature organisms).

Taxonomic group	Species	Taxonomic group	Species
Elasmobranchs	<i>Sympterygia acuta</i>	Teleost fish	<i>Paralichthys orbignianus</i>
Elasmobranchs	<i>Atlantoraja platana</i>	Teleost fish	<i>Oncopterus darwini</i>
Elasmobranchs	<i>Atlantoraja cyclophora</i>	Teleost fish	<i>Paralichthys patagonicus</i>
Elasmobranchs	<i>Zapterix brevirostris</i>	Teleost fish	<i>Astroscopus sexspinosus</i>
Elasmobranchs	<i>Psammobatis sp.</i>	Teleost fish	<i>Pagrus pagrus</i>
Elasmobranchs	<i>Sphyrna lewini</i>	Teleost fish	<i>Gymnachirus nudus</i>
Elasmobranchs	<i>Sympterygia bonapartii</i>	Teleost fish	<i>Selene sp.</i>
Elasmobranchs	<i>Squatina guggenheim</i>	Teleost fish	<i>Citharichthys spilopterus</i>
Elasmobranchs	<i>Atlantoraja castelnaui</i>	Teleost fish	<i>Engraulius anchoita</i>
Elasmobranchs	<i>Mustelus sp.</i>	Teleost fish	<i>Lagocephalus laevigatus</i>
Elasmobranchs	<i>Pseudobatos horkellii</i>	Teleost fish	<i>Menticirrhus americanus</i>
Elasmobranchs	<i>Myliobatis sp.</i>	Teleost fish	<i>Zalieutes mcgintyi</i>
Elasmobranchs	<i>Gimnura altavela</i>	Teleost fish	<i>Balistes capricus</i>
Teleost fish	<i>Paralonchurus brasiliensis</i>	Teleost fish	<i>Paralichthys isosceles</i>
Teleost fish	<i>Stephanolepis hispidus</i>	Teleost fish	<i>Oligoplites saliens</i>
Teleost fish	<i>Cynoscion guatucupa</i>	Teleost fish	<i>Percophis brasiliensis</i>
Teleost fish	<i>Trichiurus lepturus</i>	Teleost fish	<i>Syngnathus folletti</i>
Teleost fish	<i>Umbrina canosai</i>	Crustaceans	<i>Arenaeus cribrarius</i>
Teleost fish	<i>Prionotus punctatus</i>	Crustaceans	<i>Dardanus insignis</i>
Teleost fish	<i>Trachurus lathami</i>	Crustaceans	<i>Hepatus pudibundus</i>
Teleost fish	<i>Steliffer sp</i>	Crustaceans	<i>Ovalipes trimaculatus</i>
Teleost fish	<i>Peprilus paru</i>	Crustaceans	<i>Portunus spinimanus</i>
Teleost fish	<i>Micropogonias furnieri</i>	Crustaceans	<i>Artemesia longinaris</i>
Teleost fish	<i>Dules auriga</i>	Crustaceans	<i>Callinectes sapidus</i>
Teleost fish	<i>Macrodon atricauda</i>	Crustaceans	<i>Libinia spinosa</i>
Teleost fish	<i>Brevoortia pectinata</i>	Crustaceans	<i>Loxopagurus loxochelis</i>
Teleost fish	<i>Ctenosciaena gracilicirrus</i>	Crustaceans	<i>Scyllarides sp.</i>
Teleost fish	<i>Porychthys porosissimus</i>	Molluscs	<i>Adelomelon brasiliensis</i>
Teleost fish	<i>Chylomicterus spinosus</i>	Molluscs	<i>Doryteuthis sp. (lulas)</i>
Teleost fish	<i>Cynoscion jamaicensis</i>	Molluscs	<i>Octopus tehuelchus</i>
Teleost fish	<i>Urophycis brasiliensis</i>	Cnidarians	-
Teleost fish	<i>Mullus argentinus</i>	Echinoderms	-

Table 10- Sampled species from the bycatch in monitored trawls in the South of Brazil. Data from 2011-2012. Source: Cardoso *et al.*, (2021).

### 3.4.2 Bottom gillnet fishery

Bottom gillnet, used to catch several fish and crustacean species (PIO, 2011), is considered a passive fishing gear, catches occur by the retention of fish in the net meshes. It is considered as one of the most selective fishing gears as regards the size and species harvested. Indeed, in addition to the fishing ground location, the mesh size can be chosen according to the target species. Therefore, gillnets can be used from the shore to the high seas (HAIMOVICI *et al.*, 2006).

As the fishery targets mainly demersal fish, such as angel sharks (*Squatina guggenheim*, *Squatina occulta* and *Squatina argentina*), whitemouth croaker (*Micropogonias furnieri*) and croaker (KLIPPEL, *et al.*, 2005), it is obvious that there is lack of information regarding bycatch, fishing effort and fishing grounds of those fisheries (PIO, 2011).

According to Ferreira (2009), the bottom gillnet fishery in Rio Grande do Sul (RS) has three main target species: whitemouth croaker (*Micropogonias furnieri*), croaker (*Umbrina canosai*), and striped weakfish (*Cynoscion guatucupa*). The specificity of the bottom gillnets of the Southeast-South industrial fleet according to the target species, is represented in Table 11.

Target species	Mesh (cm)	Height (m)
Whitemouth croaker ( <i>Micropogonias furnieri</i> )	13-16	2-4
Croaker ( <i>Umbrina canosai</i> )	9-10	3-4
Striped weakfish ( <i>Cynoscion guatucupa</i> )	9-10	3-4
Southern kingfish ( <i>Menticirrhus spp</i> )	7	1,5-3
Flounder ( <i>Paralichthys isosceles</i> )	20	2-3
Guitarfish ( <i>Rhinobatos spp</i> )	18	3
Demersal dogfish	18-20	2-4
Angel shark	35-40	3,6-5

Table 11. Characteristics of the bottom gillnets according to the main target species. Source: adapted from Klippel *et al.*, 2005.

Pio (2011), analyzing the data (2001 to 2008) of the bottom gillnet industrial fleet in the Southeast-South of Brazil, concluded that there is a species composition pattern in the different mesh sizes. Indeed, croaker is caught using a 10 cm net mesh and white croaker using a 13 cm net mesh, thus confirming the values presented by Klippel *et al.*, (2005).

Performing a characterization of the industrial bottom gillnet fisheries, with data from 2001 to 2008, in the Southeast-South of Brazil, the same author highlighted the existence of 5 fishing groups, according to the respective target species, bycatch, fishing gear and fishing grounds. In one of the groups, croaker was the main stock harvested, followed by white croaker, and its bycatch included mainly Brazilian codling, lumptail searobin, striped weakfish and different species of hake. It used mainly the 100 mm mesh and operated mostly in the South region of Santa Catarina and North of Rio Grande do Sul.

Fogliarini (2017), assessing the bycatch in the gillnet fishery in the South of Brazil, with data between 2013 and 2015 obtained by the observers onboard of vessels in Rio Grande, obtained an average discard rate of 20% for bids directed to the whitemouth croaker.

In the bottom gillnet sets, whitemouth croaker and bottom fish (croaker and hake) categories, discards included crustaceans, echinoderms, chondriactians, teleost fish, reptiles and mammals (Table 12). From these, chondriactians represented most of the discarded biomass (34%), and the Brazilian guitarfish *Pseudobatos horkeli* and the angel shark *Squatina* spp, represented 20.4% of the total biomass (Fogliarini, 2017). Due to the reduction in abundance of these species over time, the landings and commercialization are banned (Brazil, 2014). Therefore, even if they have commercial value, they are discarded onboard.

From the teleost fish, Argentine menhaden (*Brevoortia pectinatai*) was one of the most discarded, around 23% of the total biomass. Discard is caused by its low commercial value. The catch of 7 franciscana dolphins (*Pontoporia blainvillei*) was registered in 32 sets targeting whitemouth croaker performed close to the coast (the species is distributed in waters below the 30 m isobath 30m). Also, the catch of 4 green turtle (*Chelonia mydas*) was recorded in sets targeting whitemouth croaker. Fogliarini (2017) concluded that the highest discard rates occurred in areas near the coast, close to the 50m isobath, during the summer, in 0 to a 20 m depth ranges, decreasing with greater depths.

Dolphins in Brazil were classified as “Vulnerable” in the National Action Plan for Aquatic Mammals (IBAMA, 2001) and appear in the Official List of Bycatch Threatened with Extinction. Contudo, Ferreira (2009), analyzing the dolphin bycatch from 1994 to 2005, observed that the highest dolphin catch rates were related with white croaker nets, that the catches diminish when the fishing effort moves away from the shoreline and that, since 2000, there was a reduction in bycatch. The conclusion was that the decline in the white croaker landings by the gillnet fleet and the increase in croaker landings suggests a change in the target species of the fleet, causing a space and time adjustment in the fishing grounds, fishing at 35 m in depth. Thus, there is a reduction in the overlap of the fishing grounds with the dolphin concentration areas. This could also indicate a drop in the species abundance.

Comparing the discard rates of the gillnet fisheries studied by Fogliarini (2017) with those of the bottom trawl fisheries in the South of Brazil, it can be observed that the discard of the gillnet fleet targeting bottom fish was lower.

As indicated in items **3.4.1** and **3.4.2**, based on the data obtained from the review of the literature, it can be claimed that during the catch of whitemouth croaker with the trawl and bottom gillnet fleets in the Southeast/South region of Brazil, the catch of other species also takes place. Among them, teleost fish, crustaceans, molluscs and elasmobranchs. Regarding discards in the bottom trawl fishery, Artigo claims the presence of cnidarians and echinoderms. For the bottom gillnet fishery, among the bycatch the following species were observed: teleost fish, crustaceans, elasmobranchs, reptiles and mammals. Reptiles and mammals were reported in a revision of the article. From those species, the Brazilian guitarfish (*Pseudobatos horkellii*), angel shark (*Squatina* sp.), franciscana dolphin (*Pontoporia blainvillei*) and the green turtle (*Chelonia mydas*) are considered as ETP species. However, further research would be necessary to confirm the list of non-target species in the whitemouth croaker trawl and bottom gillnet fishery. It is not certain if any of the other mentioned species is managed according to biological reference points. Therefore, they would be considered as “secondary species”, as defined by the MSC. Nevertheless, there is not enough information regarding bycatch or discard to classify these species as “minor” or “main” secondary species.

Taxon	Common name	Taxon	Common name
Filo cnidaria	Água viva	<i>Porichthys porosissimus</i>	Mamangava
Ordem Isopoda	-	<i>Lophius gastrophysus</i>	Peixe-sapo
Infraordem Brachyura	-	<i>Zenopsis conchifer</i>	Peixe-galo-de-fundo
<i>Dardanus</i> sp.	Ermitão	<i>Prionotus nudigula</i>	Cabrinha
<i>Farfantepenaeus</i> sp.	Camarão-rosa	<i>Prionotus</i> sp.	Cabrinha
<i>Metanephrops rubellus</i>	Pitú	<i>Epinephelus marginatus</i>	Garoupa-verdadeira
<i>Acanthocarpus alexandri</i>	Caranguejo pontudo	<i>Hyporthodus niveatus</i>	Garoupa-pintada
Classe asteroidea	Estrela-do mar	<i>Priacanthus arenatus</i>	Olho-de-cão
Classe Echinoidea	Ouriço-do-mar	<i>Lopholatilus villarii</i>	Batata
<i>Callorhynchus callorhynchus</i>	Peixe-elefante	<i>Pomatomus saltatrix</i>	Anchova
<i>Squalus</i> sp.	Cação bagre	<i>Parona signata</i>	Peixe-tábua
<i>Squatina guggenheim</i>	Cação-anjo-espinhoso	<i>Chloroscombrus chrysurus</i>	Palombeta
<i>Squatina</i> sp.	Cação-anjo	<i>Trachinotus marginatus</i>	Pampo
<i>Isurus oxyrinchus</i>	Cação-anequim	<i>Pagrus</i>	Pargo-rosa
<i>Mustelus</i> sp.	Cação	<i>Cynoscion guatucupa</i>	Pescada-olhuda
<i>Mustelus schimitti</i>	Cação-cola-fina	<i>Cynoscion jamaicensis</i>	Goete
<i>Rhizoprionodon lalandii</i>	Cação-cortador	<i>Menticirrhus</i> sp.	Papa-terra
<i>Sphyrna</i> sp.	Cação-martelo	<i>Paralanchurus brasiliensis</i>	Maria-luiza
<i>Pseudobatos</i> sp.	Cação-martelo	<i>Nemadactylus bergi</i>	Lambreta
<i>Atlantoraja</i> sp.	Raia-viola	<i>Astroscopus sexspinosus</i>	Miracéu
<i>Bathyraja</i> sp.	Raia-emplastro	<i>Percophis brasiliensis</i>	Tira-vira
<i>Sympterygia acuta</i>	Raia-emplastro	<i>Trichiurus lepturus</i>	Peixe-espada
<i>Dasyatis hypostigma</i>	Raia-prego	<i>Katsuwonus pelamis</i>	Bonito-listrado
<i>Myliobatis</i> sp.	Raia	<i>Paralichthys patagonicus</i>	Linguado-branco
Tubarão não identificado	-	<i>Paralichthys</i> sp.	Linguado-branco
Raia não identificada	-	Familia bastidae	Peixe-porco
<i>Conger orbignianus</i>	Congro	<i>Dermochelys coriácea</i>	Tartaruga-de-couro
<i>Brevoortia pectinata</i>	Savelha	<i>Chelonia mydas</i>	Tartaruga-verde
<i>Genidens</i> sp.	Bagre	<i>Pufinus griseus</i>	Pardela-escura
<i>Urophycis brasiliensis</i>	Abrótea	<i>Pontoporia blainvillei</i>	Toninha

Table 12. Discard biomass composition of the bottom gillnet fishery between August 2013 and March 2015. Sets targeting white croaker and bottom fish (croaker and hake) categories. Source: Fogliarini (2017).

## 3.5. Principle 3: Management System Background

### 3.5.1. General Management

From 1962 to 1989, fisheries in Brazil were managed by the SUDEPE (Superintendency of Fisheries Development). It had in its jurisdiction all the main fishery management tools. According to Dias-Neto (2010), the rise and fall of the national fishery took place in this period. From 1989 till 1998, the

environmental body IBAMA remained responsible for the fisheries management. It was not until 1998 that the Department of Fisheries and Aquaculture (DPA-MAPA) was created and the fisheries were divided between “overexploited” (under the jurisdiction of IBAMA) and “underexploited” (under the jurisdiction of DPA). In 2003, the government creates the Special Secretariat of Aquaculture and Fisheries (SEAP), that maintains all the roles of the DPA but it is no longer linked to the MAPA. The SEAP falls under the jurisdiction of the Presidency.

In 2009, **Law nº 11.959** transformed the Special Secretariat of Aquaculture and Fisheries (SEAP) into the Ministry of Fisheries and Aquaculture (MPA). Some of the roles were not clearly divided between the MPA and the Ministry of the Environment (MMA/IBAMA). Hence, **Decree n º 6.981 / 2009** was published, joining the efforts of MPA and MMA for the sustainable use of resources, thus establishing the Shared Management System (SGC). The SGC aimed to support the drafting and implementation of rules, criteria and management measures and it was structured through Permanent Management Committees (CPGs), of consulting and advisory nature (IPEA, 2013). Among the CPGs, the Permanent Management Committee for the Sustainable Use of Southeast and South Demersal Stocks - CPG Demersal Southeast and South would be responsible for the *Umbrina canosai* fishery. This CPG was created by **Directive Nº 9/2015**.

The fishing activity is regulated by **Law nº 11.959, dated June 29<sup>th</sup>, 2009** that rules the National Policy for the Sustainable Development of Aquaculture and Fisheries (BRAZIL, 2009). The law was enacted to promote:

- The sustainable development of fisheries and aquaculture as a source of food, employment, income and leisure, guaranteeing the sustainable use of the fishing stocks, as well as the optimization of the ensuing economic benefits, in harmony with the preservation and conservation of the environment and the biodiversity.
- The management, promotion and surveillance of the fishing activity.
- The preservation, conservation and recovery of fishing stocks and aquatic ecosystems.
- The socioeconomic, cultural and professional development of those involved in the fishing activity, as well as their communities.

The last few years have seen a lot of changes in the institutions responsible for the management of fishery resources in Brazil. In 2015, The Ministry of Aquaculture and Fisheries was extinguished and incorporated to the Ministry of Agriculture, Livestock and Food – MAPA, in ministerial reform of October 2015. In March 2017, the Secretariat of Aquaculture and Fisheries from the MAPA is transferred to the Ministry of Industry, Foreign Trade and Services - MDIC, which becomes responsible for the national fisheries and aquaculture policy. In November of the same year, the Secretariat of Aquaculture and Fisheries was transformed again into the Special Secretariat of Aquaculture and Fisheries (SEAP), linked to the Presidency of the Republic.

In January 2019, **Provisional Measure nº 870/2019** terminates the SEAP and, together with **Decree nº 9.667, dated January 2<sup>nd</sup>, 2019** (later revoked by **Decree nº 10.253, 2020**), transferred to the Ministry of Agriculture, Livestock and Food, by means of the Secretariat of Aquaculture and Fisheries, the competence of the national fisheries and aquaculture policy, even the management of the use of the resources and the licenses, registers and authorizations to practice the aquaculture and fishing activity. Moreover, the decree highlighted the jurisdiction of the Ministry as regards research, cooperatives and associations and international aquaculture and fisheries negotiations. This implied that fisheries management in Brazil, shared in the past between the Secretariat of Fisheries and the Ministry of the Environment (MMA), now became the only responsibility of the Ministry of Agriculture, Livestock and Food (MAPA).

In April 2019, the federal government published **Decree Nº 9.759** terminating the Management Committees.

The Secretariat of Aquaculture and Fisheries (SAP) published on the MAPA website (<http://www.agricultura.gov.br/assuntos/aquicultura-e-pesca/comites-permanentes-de-gestao-cpgs>) that the procedures to reestablish the Committees by Decree had been launched.

Only on June 30<sup>th</sup>, 2021 **Decree Nº 10.736, dated June 29<sup>th</sup>, 2021** was published establishing the National Collaborative Network for the Sustainable Management of Fishery Resources -Rede Pesca Brasil, of a consultative and advisory nature, with the objective of supporting management for the sustainable use of fishing resources, to be structured by a scientific technical bank and 10 Permanent Management Committees (CPGs). Among them the Permanent Management Committee for the Fishery and the Sustainable Use of the Demersal Fishing Stocks of the Southeast and South Regions.

Article 9° of the Decree establishes that the committees will meet at least once a year. The recommendations should be approved, preferably, by consensus. If reaching a consensus proved impossible, it should be subjected to voting during the permanent committee meeting. The Decree also defines the structure of the Committees, setting the procedures for appointing the Executive Secretariat, the creation of specific working teams and technical-scientific groups.

In 2018, the State of Rio Grande do Sul, published **Law nº 15.223, dated September 5<sup>th</sup>, 2018** establishing the State Policy for the Sustainable Development of the Fisheries. Among other provisions, it banned the use of any trawl pulled by motor vessels within 12 MN of the coastal area of Rio Grande do Sul (Figure 13). After its publication, several actions were undertaken to revoke the ban, contending that it was unconstitutional. As there had been no discussion with the representatives of the users of the regional resources, the Federal Supreme Court suspended the law in December 2020, mentioning that the Constitution delegated to the Union the exclusive competency to legislate over the territorial waters. In January 2021, the SAP published **Directive SAP/MAPA Nº 9, dated January 14<sup>th</sup>, 2021** suspending again the fishing activities within the 12 MN limit until a Plan for the Sustainable Recovery of Trawling in the Coast of Rio Grande do Sul was put in place.

Within this context, in March 2021, the SAP/ MAPA published a “Plan for the Sustainable Recovery of Trawling in the Coast of Rio Grande do Sul”, considering social, environmental and economic issues through **Directive SAP/MAPA Nº 115, dated April 19<sup>th</sup>, 2021**. The plan is applicable to the trawl fisheries targeting demersal fish and shrimp *Artemesia longinaris* and *Pleoticus mulleri*, within the 12 nautical miles strip of the coast of Rio Grande do Sul. The aim is to establish complementary measures to the ones already in place to ensure the sustainability of trawls targeting demersal fish and shrimp in the shores of the state of Rio Grande do Sul, as regards the reduction of bycatch and discards. This would cause the reduction/elimination of bycatch, mortality of ETP species and fishing activities in their reproductive/spawning areas (SAP/MAPA, 2021).

In 2022, **SAP/MAPA Ordinance No. 634, of March 21, 2022**, was published, establishing additional rules for sustainable motorized shrimp trawling in the maritime strip of the coastal zone adjacent to the State of Rio Grande do Sul, from 3 (three) nautical miles to 12 (twelve) nautical miles. The use of a bycatch fauna reduction device and the use of a Turtle Escape Device are mandatory. The Ordinance suspends the effects of SAP/MAPA Ordinance No. 9, of January 14, 2021.

Subsequently, **SAP/MAPA Ordinance No. 798, of May 17, 2022**, was published, suspending SAP/MAPA Ordinance No. 115, of April 19, 2021, and Ordinance No. 634, of March 21, 2022.

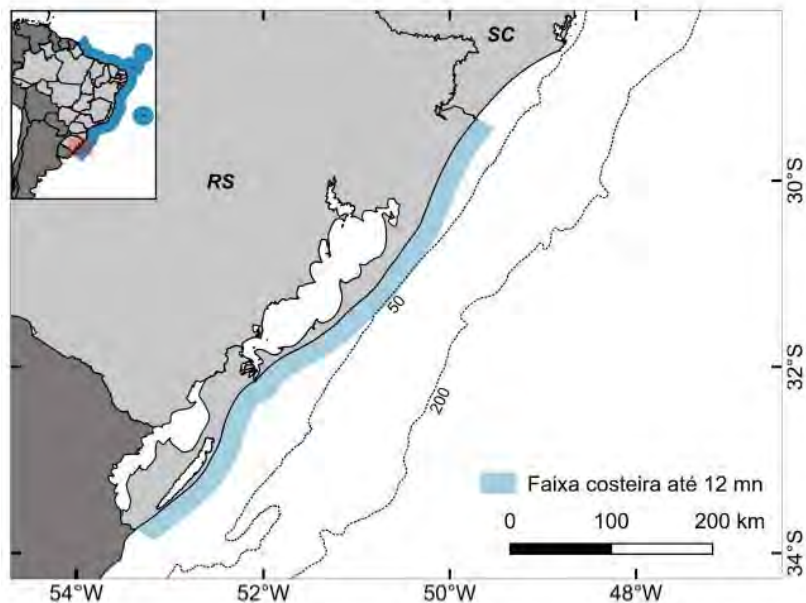


Figure 13. Coastal strip up to 12 nautical miles (~22,23 km, in pale blue) that includes the territorial waters in front of the State of Rio Grande do Sul with an approximate area of 13,700 km<sup>2</sup>. Source: Cardoso *et al.*; (2019).

In 2020, through **Decree 10.544 dated November 16<sup>th</sup>, 2020**, the Federal Government approved the X Sectorial Plan for Marine Resources. The plan, implemented from January 1<sup>st</sup>, 2021 till December 31<sup>st</sup>, 2023, sets goals for the sustainable development of fisheries and aquaculture in Brazil, drafted in accordance with the Sustainable Development Goals (SDG). Measures referring to fisheries are:

- Restructure the General Fisheries Registry system and update the fleet data (ODS 14.4)
- Re-register fishermen in the General Fisheries Registry (RGP) system (ODS 14.4).
- Restructure the National Program for Satellite Tracking of Fishing Vessels (ODS 14.4).
- Resume the activities to improve fishery statistics and support biodiversity monitoring programs, focusing on the monitoring of the fishing activity and its associated biodiversity, as well as other initiatives already in place (ODS 14.4).
- Support policies to encourage the consumption of sustainable fishery products.
- Strengthen the participative management technical actions among those institutions related to the fishing activity.
- Assess, strengthen and put in place recovery plans for threatened species (ODS 14.4)
- Review and update regulatory acts related to the fishing activity, trying to strengthen sustainability, based on the best technical and scientific data available and with social participation (ODS 14.4, 14.b, 14.c);
- Assess, strengthen or implement management plans for the fishing stocks (ODS 14.4)
- Support scientific research projects, as well as the monitoring and development of the fishing sector (ODS 14.4);
- Support the organization of professional training courses for fishermen (ODS 14.b);

- Strengthen the Brazilian participation in international fisheries agreements (ODS 14.4, 14.c);
- Support actions against the dumping of garbage at sea (ODS 14.1); and
- Fight illegal, not reported and non-regulated fishing, as well as the destructive fishing practices (ODS 14.4).

Some actions have already been implemented, such as the revision of regulatory acts that rule fishing activities and the re-registration of fishermen in the RGP system. On June 30<sup>th</sup>, 2021, the Secretariat of Aquaculture and Fisheries published **Directive SAP/MAPA Nº 270, dated June 29<sup>th</sup>, 2021** establishing, on an exceptional and temporary basis, the rules, criteria and administrative procedures for the national registration and re-registration of private individuals in the General Fisheries Registry, Fishermen and Professional Fishermen category.

In September 2022, **SAP/MAPA Ordinance No. 1,269/2022** was published, designating the members of the Southeast/South Demersal CPG, composed of 15 representatives of public administration bodies and entities and 15 representatives of society involved in fishing activities. Its responsibility is to advise the Aquaculture and Fisheries Secretariat of the Ministry of Agriculture, Livestock, and Food Supply in adopting measures and executing actions aimed at the management unit, in addition to assisting it in their implementation and evaluation. Subsequently, on July 27, 2023, **MPA Ordinance No. 121, of 27/2023**, was published updating the list of members.

The [1st Ordinary Meeting of the CPG Demersais Sudeste e Sul](#) took place in August 2023. And during this pre-evaluation, the 2nd meeting was scheduled for March 2024.

On **January 1, 2023, Provisional Measure No. 1,154** came into force, establishing the basic organization of the bodies of the Presidency of the Republic and the Ministries, with the recreation of the Ministry of Fisheries and Aquaculture (MPA). Subsequently, this measure was converted into **Law No. 14,600, of June 19, 2023**, which presents the Shared Management of fisheries resources between the Ministry of Fisheries and Aquaculture (MPA) and the Ministry of the Environment and Climate Change (MMA) and presents the competences of each Ministry.

According to the Law, the following areas of competence of the MPA are included:

- Formulate and regulate the national aquaculture and fishing policy and promote the sustainable development of the production chain and food production;
- Policies, initiatives and strategies for participatory management of the sustainable use of fishing resources;
- Organization and maintenance of the General Register of Fishing Activities;
- Establishment of norms, criteria, standards and measures for regulating the sustainable use of fishing resources and aquaculture, in conjunction with the Ministry of the Environment and Climate Change;
- Granting of licenses, permits and authorizations for the practice of aquaculture and fishing activities in the national territory;
- Authorization for the leasing and nationalization of fishing vessels and their operation, observing sustainability limits;
- Implementation of the policy for granting economic subsidies to the price of diesel oil established by Law No. 9,445 of March 14, 1997;
- Providing the Ministry of the Environment and Climate Change with data from the General Register of Fishing Activities relating to licenses, permits and authorizations granted for fishing



and aquaculture, for the purposes of automatic registration in the Federal Technical Registry of Potentially Polluting Activities and Users of Environmental Resources;

- Preparation, implementation, monitoring and evaluation of plans, programs and actions, within the scope of its competences;
- Promotion and intra-sectoral and inter-sectoral coordination necessary for the execution of aquaculture and fishing activities;
- Preparation and implementation, directly or through partnerships, of plans, programs and projects for aquaculture and fishing research and monitoring of fishing stocks;
- Production of fishing statistics, directly or through partnerships with institutions, organizations or entities;
- Promotion of the modernization and implementation of infrastructure and systems to support fishing or aquaculture production and the processing and marketing of fish, including the dissemination of technology, aquaculture and fishing extension and training;
- Administration of public fishing terminals, directly or indirectly;
- Establishment and auditing of the health control program for fishing vessels, except factory boats;
- Support, advice and participation, in interaction with the Ministry of Foreign Affairs, in negotiations and events that involve the compromise of rights and interference in national interests regarding fishing and aquaculture; and
- Signing of administrative contracts, agreements, transfer contracts, partnership and cooperation terms, agreements, adjustments and similar instruments, within the scope of their competences.

The Minister of Fisheries and Aquaculture published **Ordinance MPA No. 58, of May 22, 2023**, establishing procedures related to the shared management of the sustainable use of fisheries resources, within the scope of the MPA. According to the Ordinance, the establishment of norms, criteria, standards and measures for ordering the sustainable use of fisheries resources and aquaculture must be done in conjunction with the Ministry of the Environment and Climate Change.

The National Council for Aquaculture and Fisheries (CONAPE) was recreated by **Decree No. 11,625 of August 2, 2023**, after being deactivated for 5 years. CONAPE is an advisory body of the Ministry of Fisheries and Aquaculture, whose mission is to propose the formulation of public policies, with a view to promoting the articulation and debate of the different levels of Government with civil society, for the management of aquaculture and fishing activities in the national territory.

Currently, the Ministry of Fisheries and Aquaculture (MPA) is structured into direct advisory bodies to the Minister; decentralized units: Federal Superintendencies of Fisheries and Aquaculture in the States; collegiate body: National Council for Aquaculture and Fisheries - CONAPE; and specific singular bodies, formed by four secretariats, which act in an articulated manner, in actions organized among themselves: National Secretariat for Aquaculture, National Secretariat for Artisanal Fishing, National Secretariat for Industrial, Sport and Amateur Fishing, and National Secretariat for Registration, Monitoring and Research.

In Brazil, the Federal Constitution defines the fishing stocks as a State property, allowing the users to appropriate those resources under certain binding rules. As we have seen, management faces certain challenges (IPEA, 2013). Castello (2007), talking about the factors that posed difficulties to fisheries

management in Brazil and worldwide, claims that the key issue to reach sustainable development would be to review the condition of free access and common property of the resources. Indeed, it is impossible to allow unrestrained access to the resources to the users when they are limited. Otherwise, it would lead to the loss of economic value and recruitment and growth overfishing.

Cardoso *et. al.*, (2019) used FISHPATH ([www.fishpath.org](http://www.fishpath.org)), management decisions support system, to perform an analysis about the management alternatives for the demersal fishery in the South of Brazil, characterizing the demersal fishery in terms of: (1) Institutional monitoring capacity; (2) Availability of data about species biology, catch and effort to perform stock assessment; (3) The management context in which the fisheries are included; (4) Socioeconomic characteristics of the fishery; (5) Technological characteristics of the fishery; (6) Company's ability to put in practice management measures (monitoring, assessment and surveillance).

The results depict the following scenario: there is lack of data about the species, the Brazilian fisheries management system has little ability to perform a continuous follow-up of the fisheries, mainly bottom gillnet and trawl, as they are multi-species, have an impact on a large number of species and a lot of them are in danger of collapse. Therefore, the management measures selected in this work as the most likely to be effective are those related to the creation of closed areas and establishing fishing effort limits. These are the four main management alternatives: 1) Space restriction: closed areas. 2) Effort limits per fishing grounds. 3) Space restriction: seasonal closure of areas whenever there is information about the use of the area per species. 4) Time restriction: period of fixed effort limit or fishing days' limit. The system points at two basic types of measures as the most effective: space restriction and time restriction of the fishing effort. These measures are translated into closed areas and closed fishing seasons.

Moreover, it highlights that the existing measures within the current national management context (technical restrictions of the fishing gears, restriction of minimum sizes, restriction of the fishing effort) are not considered as good management options. More complex options such as catch quotas, entry control (effort limits) and exit control (catch limits) are not recommended for the Brazilian context due to the low control and monitoring capacity for ensuring compliance with such measures.

### 3.5.2. Fishery Specific Management

Since Law nº 11.959 was passed, fishing regulations in Brazil are enforced by means of different directives, guidelines and regulations. Find here below some of the most significant laws applicable to the trawl and gillnet fisheries in the South region.

- **Directive SUDEPE Nº N-26, dated July 28<sup>th</sup>, 1983.** Forbids any kind of trawls at less than 3 (three) miles from the coastline of the state of Rio Grande do Sul.
- **Directive IBAMA Nº 95, dated August 22<sup>nd</sup>, 1997.** Limits to the territorial waters located between parallels 21º17' S (border between the states of Espírito Santo and Rio de Janeiro) and the border between Brazil and Uruguay, the bottom trawl fleet, whatever the fishing gear, fishing for demersal fish: white croaker (*Micropogonia furnieri*), croaker (*Umbrina canosai*), king weakfish (*Macrodon ancylodon*), striped weakfish (*Cynoscion guatucupa*), and corresponding bycatch. Fishing is limited to those vessels dully registered in the General Fisheries Registry that are already in possession of a Fishing Permit for bottom trawl (demersal fish/bycatch).
- **Regulatory Instruction SEAP/PR Nº 03, dated May 12<sup>th</sup>, 2004.** Sets up the criteria and procedures for the General Fisheries Registry. Applicable to private individuals (fishermen) and legal entities (fishing vessels and companies).
- **Regulatory Instruction MMA Nº Nº 31, dated December 13<sup>th</sup>, 2004.** Establishes the compulsory use of TED, incorporated to trawls used in vessels above 11m, in the Brazilian coast, independently from the target species.
- **Regulatory Instruction MMA Nº 53, dated November 22<sup>nd</sup>, 2005.** Sets up the minimum catch size for marine and estuarine species of the Southeast and South coast of Brazil. It is not applicable to the species caught by trawls. For whitemouth croaker *Micropogonias furnieri*, the minimum catch size is 25 cm.
- **Interministerial Regulatory Instruction SEAP/MMA/MD Nº02, dated September 4<sup>th</sup>, 2006.** Establishes the National Program for Satellite Tracking of Fishing Vessels - PREPS in order to monitor, manage and control the fishing fleet authorized to operate. Annex I of the instruction rules that all the vessels with gross tonnage above or equal to 50 and total length above 15 m, targeting demersal fish using trawls in depths below 100 m (in the South and Southeast regions) and bottom gillnets (in the South and Southeast regions) must be equipped with a tracking device established by PREPs.
- **Directive IBAMA Nº 43, dated September 24<sup>th</sup>, 2007.** Considering the crises caused by the operation of purse seiners (trawlers) on the following stocks: whitemouth croaker (*Micropogonia furnieri*), croaker (*Umbrina canosai*), king weakfish (*Macrodon ancylodon*) and striped weakfish (*Cynoscion guatucupa*, sin. *C. striatus*), it bans the harvest of those species by purse seiners (trawlers) in the territorial waters and the Exclusive Economic Zone-ZEE of the Southeast and South regions.
- **Regulatory Instruction Nº 18, dated June 18<sup>th</sup>, 2008.** Defines the procedures to put in place the administrative measures (warning, suspension or termination of the fishing license and vessel register), recording the non-compliance with the regulations applicable to the fishing sector.

- **Interministerial Regulatory Instruction MPA/MMA Nº 10, dated June 10<sup>th</sup>, 2011, modified by IN MPA Nº14 2014, 02, INI MPA / MMA Nº01 / 2015, INI MPA / MMA Nº46 / 2015.** Approves the general regulations and the organization of the fishing vessels authorization system for access and sustainable use of the fishing stocks, establishing the fishing gear, target species and fishing grounds allowed. *Micropogonias furnieri* fishery is allowed according to the conditions illustrated in Table 13.
- **Interministerial Regulatory Instruction MPA/MMA Nº 12, dated August 22<sup>nd</sup>, 2012.** Sets up the criteria and standards for managing the gillnet fishery in the Brazilian territorial waters in the Southeast and South regions. Some of the criteria established are:
  - I. In the Brazilian territorial waters neighboring the coastline of the states of Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Espírito Santo and Rio Grande do Sul, the maximum allowable gillnet length, including the lengths of the baskets or nets, is of:
    - 3,000 (three thousand) meters for vessels with gross tonnage (GTON) below or equal to 10 (ten);
    - 7,000 (seven thousand) meters for vessels with gross tonnage (GTON) above 10 (ten) and below 20 (twenty);
    - 10,000 (ten thousand) meters for vessels with gross tonnage (GTON) above 20 (twenty) and below or equal to 50 (fifty);
    - 13,000 (thirteen thousand) meters for vessels with gross tonnage (GTON) above 50 (fifty).
  - II. Maximum height for gillnets is 4 meters.
  - III. Ban, each year, between May 15<sup>th</sup> and June 15<sup>th</sup>, the operations of vessels above 20 (twenty) GTON using bottom gillnets in the Brazilian territorial waters in the Southeast and South regions.
  - IV. Ban any modality of gillnet fishery in closed areas corresponding to the geographical zones defined in the Regulatory Instruction
  - V. Forbid the gillnet fishery to motor propelled vessels in a distance of less than 1 (one) nautical mile from the shoreline.
  - VI. Forbid the gillnet fishery to motor propelled vessels in a distance of less than 5 (five) nautical miles from the shoreline, from the Albardão lighthouse/RS to the south limit of the state of Rio Grande do Sul;
  - VII. Urgently create the Permanent Management Committee for the Demersal Fishery in the Southeast and South and Working Groups - GTs, to advise on management measures and rules for the bottom gillnet fishery in those regions.
  - VIII. Ban the granting of new fishing licenses, as well as any previous fishing permit for vessels construction or conversion (modification of fishing gear), for any gillnet modality.
- **Interministerial Regulatory Instruction Nº4, dated October 16<sup>th</sup>, 2013.** Establishes criteria and standards for the gillnet fishery targeting anchovy (*Pomatomus saltatrix*), whitemouth

croaker (*Micropogonias furnieri*), striped weakfish (*Cynoscion guatucupa*), croaker (*Umbrina canosai*), Brazilian codling (*Urophycis brasiliensis*) and corresponding bycatch in the coastline of the state of Rio Grande do Sul.

- Allow in the coastline of the state of Rio Grande do Sul the transport, storage and gillnet fishery to national fleet vessels duly authorized to use coastal gillnets diversified for the catch of anchovy, white croaker, hake, croaker and Brazilian codling as target species.
  - The vessels included in the head of this article must be duly registered in the General Fisheries Registry-RGP, with fishery authorization for the modality of diversified coastal gillnet for the use of coastal bottom and surface gillnets.
  - Limit to a total of 68 (sixty-eight) the total of vessels included in the head of this article, which must have a Gross Tonnage (GTon) below or equal to 50 (fifty).
  - The vessels must prove their adherence to the PREPS and maintain in good operation the remote monitoring equipment linked to the National Program for Satellite Tracking of Fishing Vessels -PREPS.
  - In the case of those vessels concerned by this Interministerial Regulatory Instruction, the bottom gillnet used must abide by the Interministerial Regulatory Instruction 12, dated August 22<sup>nd</sup>, 2012.
- 
- **Interministerial Directive Nº 9, dated September 1<sup>st</sup>, 2015.** Creates the Permanent Management Committee for the Sustainable Use of Southeast and South Demersal Stocks - CPG Demersal Southeast and South and the Scientific Subcommittee.
  - **Law nº 15.223, dated September 5<sup>th</sup>, 2018.** Establishes the State Policy for the Sustainable Development of the Fisheries and creates the State Fund for Fisheries. In Indent “e”, Item VI, of Art. 30, the law bans the use of any trawl pulled by motor vessels, in all the State of Rio Grande do Sul, including the 12 MN of the coastal area of the State.
  - **Decree Nº 9.759, dated April 11<sup>th</sup>, 2019.** Terminates the Management Committees.
  - **Directive SAP/MAPA Nº 9, dated January 14<sup>th</sup>, 2021.** Forbade the use of any trawl pulled by motor vessels in the 12 MN of the coastal area of Rio Grande do Sul, until a Plan for the Sustainable Recovery of Trawling in the Coast of Rio Grande do Sul was put in place.
  - **Directive SAP/MAPA Nº 115, dated April 19<sup>th</sup>, 2021.** Approves the Plan for the Sustainable Recovery of Trawling in the Coast of Rio Grande do Sul, enforced on the date of publication.
  - **Directive SAP/MAPA Nº 270, dated June 29<sup>th</sup>, 2021.** Establishes, on an exceptional and temporary basis, the rules, criteria and administrative procedures for the national registration and re-registration of private individuals in the General Fisheries Registry, Fishermen and Professional Fishermen category.
  - **Decree Nº 10.736, dated June 29<sup>th</sup>, 2021.** Reestablish the Permanent Management Committees, among them the Permanent Management Committee for the Fishery and the Sustainable Use of the Demersal Fishing Stocks of the Southeast and South Regions.
  - **MPA Ordinance No. 135, of September 27, 2023.** Officializes the PesqBrasil-Mapa de Bordo System. It is established that the completion and submission of the Mapa de Bordo will be done exclusively in the PesqBrasil System.

Table 13. Authorization for fishing whitemouth croaker (*Micropogonias furnieri*) as target and bycatch species in the gillnet and trawl fisheries. Source: MPA/MMA (2011).

REDES DE ESPERA E DE ARRASTO					
AUTORIZAÇÃO DE PESCA PRINCIPAL					
MODALIDADE E/OU PETRECHOS	ESPÉCIE ALVO	CAPTURA INCIDENTAL	FAUNA ACOMPANHANTE PREVISÍVEL	AUTORIZAÇÃO COMPLEMENTAR	ÁREA DE OPERAÇÃO
Emalhe costeiro (fundo)	<b>Corvina</b> , castanha, pescada, abrótea	Viola, cação anjo, boto e tartaruga	Savelha, cabrinha, cações, peixe-espada, guavira, linguado, maria-Lujza, papaterra, pescadas, pescadinha, raias, anchova, gordinho, miracel, merluza, tira-vira, congrio, namorado, pargo, batata, bagres, camarão branco, robalo, preiereba, vermelho, sororoca, siri e guete		Mar territorial S/SE; e ZEE S/SE
Arrasto (fundo) - duplo	Camarão rosa (santana e barba ruça)	Tartaruga, cherne poveiro, mero, cação anjo, viola, demais sp	<b>Corvina</b> , linguado, trilha, abrótea, lula, castanha, betara, cabrinha, pescada, pescadinha, sapateira, raias, cações, pargo-rosa, congro rosa, congro-preto, polvo, peixe-sapo, tira-vira, namorado, batata, merluza, maria-mole, lacraia, sapateira, gitú, cavaca, lagosta, vermelhos, garoupa, badejo, olho de cão, peixe espada, xixarro, trombeta, porquinho, siri e goete	Arrasto (fundo). Espécies: camarão cristalino, pitu, fauna acompanhante das espécies ocorrentes na área.	Mar territorial S/SE; e ZEE S/SE (fora da área do camarão rosa)- acima de 100M
Arrasto (fundo) - duplo	Camarão santana e barba ruça	Boca-de-velho, canejo, caçãobico-doce e cação-cola-fina Cação-anjo-liso	<b>Corvina</b> , castanha, abrótea, savelha, tainha, bagre, pescada olhuda, pescada-gé, pescada- rabo-de-fogo, pescada-deptusca, curuca, cururuca, cascote, papa-terra, judeu, betara, miraguaia, cabeça-de-coco, corvina-riscada, linguado, enxova e peixe-espada		Mar territorial RS; e ZEE RS
Arrasto (fundo) - duplo ou simples	Camarão sete barbas (Santana e barba ruça)	Cação-anjo-liso	<b>Corvina</b> , linguado, trilha, abrótea, lula, castanha, betara, cabrinha, pescadas, pescadinha, raias, cações, camarão-branco, maria-luiza, porquinho, siri, goete, maria-mole, siri e peixe sapo	Garateia com atração luminosa (vulgo zangarilho) Espécie: lula	Mar territorial S/SE; e ZEE S/SE
Arrasto (fundo) - duplo ou simples	Camarão sete barbas (Santana e barba ruça)	Cação-anjo-liso	<b>Corvina</b> , linguado, trilha, abrótea, lula, castanha, betara, cabrinha, pescadas, pescadinha, raias, cações, camarão-branco, maria-luiza, porquinho, siri, goete, maria-mole, siri e peixe sapo	Rede de espera (superfície) Espécies: tainha, anchova, sororoca, guavira	Mar territorial S/SE; e ZEE S/SE
Arrasto costeiro (fundo) - duplo	<b>Corvina</b> , castanha, pescada e pescadinha real, linguado, abrótea, cabrinha	Cação-anjo-espinhoso	Trilha, lula, betara, pescadas, sapateira, raias, pargo-rosa, congro-rosa, congro-preto, peixe sapo, tira-vira, namorado, batata, lacraia, gitú, cavaca, vermelhos, garoupa, badejos, olho de cão, peixe espada, goete e maria-mole.		Mar territorial S/SE (profundidades inferiores a 250 metros); e ZEE S/SE (profundidades inferiores a 250 metros)
Arrasto costeiro (fundo simples e parelha)	<b>Corvina</b> , castanha, pescada e pescadinha real	Raia-viola	Linguado, trilha, abrótea, lula, cabrinha, pargos, congro-rosa, peixe-sapo tira-vira, namorado, batata, lacraia, pitú, cavaca, vermelhos, garoupa, badejos, olho de cão e peixe espada		Mar territorial S/SE (profundidades inferiores a 250 metros); e ZEE S/SE (profundidades inferiores a 250 metros)

## 4. Preevaluation under the MSC guidelines

### 4.1. Summary of Likely Scoring Levels

Table 14. Key to likely scoring levels

The information available to the assessment team suggests that the fishery would not meet the scoring guideposts to achieve 60 points in the relevant performance indicator.	< 60
The information available to the assessment team suggests that the fishery would meet the scoring guideposts to achieve 60 points in the relevant performance indicator, but not all scoring guideposts to achieve 80 points. Therefore, a condition would be raised during a full assessment in order to improve the score.	60 – 79
The information available to the assessment team suggests that the fishery would meet or exceed the scoring guideposts to achieve 80 points in the relevant performance indicator. Therefore, an unconditional pass for the relevant performance indicator might be achieved.	≥ 80

Table 15. Summary of preevaluation scoring

Principle	Component	PI	Performance Indicator	Likely scoring
1	Outcome	1.1.1	Stock status	<60
		1.1.2	Stock rebuilding	<60
	Management	1.2.1	Harvest Strategy	<60
		1.2.2	Harvest control rules and tools	<60
		1.2.3	Information and monitoring	<60
1.2.4	Assessment of stock status	60-79		
2	Primary Species	2.1.1	Outcome	100
		2.1.2	Management	80
		2.1.3	Information	<60
	Secondary species	2.2.1	Outcome	<60
		2.2.2	Management	<60
		2.2.3	Information	<60
	ETP species	2.3.1	Outcome	<60
		2.3.2	Management	<60
		2.3.3	Information	<60
	Habitats	2.4.1	Outcome	<60
		2.4.2	Management	<60
		2.4.3	Information	<60
Ecosystem	2.5.1	Outcome	<60	
	2.5.2	Management	<60	
	2.5.3	Information	<60	
3	Governance & policy	3.1.1	Legal and customary framework	<60
		3.1.2	Consultation, roles and responsibilities	80
		3.1.3	Long term objectives	80
	Fishery specific management system	3.2.1	Fishery specific objectives	60-79
		3.2.2	Decision making processes	<60
		3.2.3	Compliance and enforcement	<60
		3.2.4	Management performance evaluation	60-79

The recommendations to improve each Performance Indicator (PI) scoring below 80 are summarized in the following table:

MSC PI	Sustainability problem	Recommendations to score SG80
1.1.1	It is likely that the <i>Micropogonias furnieri</i> stock is below the point where recruitment would be impaired (PRI).	Data gathering should be improved to determine the likelihood of the stock being above the PRI.
1.1.2	There is no evidence of <i>Micropogonias furnieri</i> stock rebuilding within a specified timeframe.	Monitoring to provide evidence that the stock rebuilding strategies are achieving their goal.
1.2.1	There is no harvest strategy designed for <i>Micropogonias furnieri</i> .	Put in place specific management measures for <i>Micropogonias furnieri</i> that take into account the current stock status and structure. They should include harvest control rules and tools, surveillance and control measures, fishery and stock monitoring programs, etc.
1.2.2	There is no harvest control rule in place for <i>Micropogonias furnieri</i>	Immediate action is necessary to avoid a new decline in abundance. Establish well defined and effective harvest control rules to guarantee a reduction in the exploitation rate as the PRI is approached to keep the stock fluctuating at a target level consistent with MSY. These rules should be permanently monitor abundance regarding target and limit references, for instance, including the possibility of setting TACs. These HCRs should be robust to the main uncertainties.
1.2.3	Significant weakness due to the lack of consistency and continuity in the data gathering programs. There is lack of logistic structure and human resources to perform the necessary tasks.	Gather relevant information in a timely manner related to stock structure, stock productivity and fleet composition, abundance, and fishery removals, in addition to regular monitoring of stock abundance to support the harvest control rule, in addition to the monitoring of other fisheries that have <i>Micropogonias furnieri</i> as a bycatch.
1.2.4	Not consider the major sources of uncertainty.	Design a sophisticated stock assessment, including plenty of data, adequate for the stock and harvest control rule. The assessments should be subject to peer review.
2.1.3	Primary species have not been identified and there is no fishery monitoring. Therefore, there is not enough available data to identify the main primary species.	Monitoring should be implemented to be able to identify the fishery non-target species. Data gathered should include quantitative and qualitative information adequate to assess the impact of the UoA on those species.
2.2.1	There is no comprehensive list of non-target species for the croaker trawl and bottom gillnet fishery that could be used for analysis. There is not enough data to classify which species are main or minor.	Idem 2.1.3  A RBF would be necessary to score this PI.
2.2.2	Given the information available, it is unclear which are the species involved with the <i>Micropogonias furnieri</i> fishery. In addition, it is not clear if shark finning occurs in the fishery or not.	Once the list of main secondary species caught in the croaker fishery is defined, a partial strategy should be implemented to guarantee that the fishery does not hinder rebuilding. Moreover, data should provide sufficient evidence that shark finning does not take place in the fishery.
2.2.3	Available information is not enough to provide a complete list of secondary	Idem 2.1.3



	species, or to classify them as main and minor, or to assess the impact of the UoA with respect to status or to support a partial strategy to manage them.	
<b>2.3.1</b>	Even if there is some information regarding the interaction with turtles, dolphins and elasmobranchs, it is unclear which ETP species truly interact with the UoA. The direct or indirect effects of the UoA on the stocks involved cannot be assessed.	Idem 2.3.1  To score this PI, it would be necessary to gather more data and perform a Productivity-Susceptibility Analysis (PSA).
<b>2.3.2</b>	It is unclear which are the ETP species that truly interact with the fishery. Therefore, it cannot be claimed that a strategy is necessary to guarantee that the interaction does not hinder the recovery of those species.	In case a strategy was required, it should ensure that the effects of the trawl and gillnet fishery do not hinder the recovery of the ETP species. It would be necessary to gather significant data and a proper monitoring strategy to evaluate the performance and signal changes in the risk level in order to consider how to improve the measures/strategy.
<b>2.3.3</b>	Information available is not enough to confirm the ETP species that interact with the UoA and there is no clear evidence of direct effects of the fishery on those species.	Idem 2.1.3
<b>2.4.1</b>	Data available are not enough to claim that the UoA is unlikely to cause harm to habitat structure and function.	Adequate information about the interaction of the trawl and bottom gillnet fishery with the habitats should be collected to perform a Consequence Spatial Analysis (CSA).
<b>2.4.2</b>	There are regulations in place for the trawl and gillnet fishery. However, it cannot be claimed that those measures minimize the impacts on the habitat structure and function.	Idem 2.4.1
<b>2.4.3</b>	Information is not adequate to determine the spatial overlap of habitat with fishing gear.	Idem 2.4.1 A Consequence Spatial Analysis should be regularly performed with the data gathered to detect any increase in risk.
<b>2.5.1</b>	Data available are not enough to claim that the UoA is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	Specific studies about the impact of the UoA on the ecosystem function should be encouraged and performed. In addition, a Scale Intensity Consequence Analysis (SICA) should be developed to assess the impact of the fishery on the ecosystem in general.
<b>2.5.2</b>	Even if there are measures in place that protect the ecosystem, it cannot be claimed that the potential impact of the fishery on primary, secondary or ETP species -that are also key elements of the ecosystem- are taken into account, thus ensuring the protection of the ecosystem structure and function.	Idem 2.5.1
<b>2.5.3</b>	Even if some impacts of the trawls and gillnet fishery could be analyzed with the information available, the information is not adequate to study the interaction with ETP species or habitats. Moreover,	Idem 2.5.1.  Data gathering should continue and a SICA analysis should be performed to detect any risk increase.

	information regarding secondary species are also incomplete.	
<b>3.1.1</b>	The legal framework in Brazil cannot be considered as effective and consistent with MSC Principles 1 and 2. In Brazil, there is no official statistics program.	A monitoring plan should be implemented to gather more information in order to assess transparency and effectiveness of the mechanism for the resolution of legal disputes arising within the system.
<b>3.2.1</b>	Well defined and measurable short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2 are not included in the fishery management system.	It is necessary to review the fishery specific management objectives currently established and look for improvement.
<b>3.2.2</b>	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives. However, there is no approved management plan for the <i>Micropogonias furnieri</i> fishery that could establish decision-making processes. There is no evidence that the management system can respond to serious issues and there is no data gathering program. Moreover, it cannot be claimed that decision-making processes use the precautionary approach and there is evidence that the official reports regarding fishery performance and management measures are not provided to the stakeholders.	Management plans should be drawn up for the fishery. And the government should implement a data collection program and ensure that information on fishery performance is available.
<b>3.2.3</b>	There is evidence showing that the monitoring, control and surveillance mechanism is not effective. Sanctions to deal with non-compliance exist but there must be evidence that they are consistently applied.	A monitoring plan should be applied. There must be evidence that onboard maps are being presented and that vessels are using the satellite tracking system. There must be evidence that the sanctions are consistently applied and the fishermen are compliant with the management system.
<b>3.2.4</b>	The Management Committees evaluate some parts of the management system. However, the system is not subject to regular internal or external review.	Once the harvest control rules are established for the fishery, mechanisms should be put in place to assess them. In addition, the management system should be subject to permanent review and improvement.

## 4.2. Evaluation against Indicators

### PI 1.1.1 – Stock Status

<b>PI 1.1.1</b>	<b>The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</b>																				
<b>Scoring Issue</b>	SG 60	SG 80	SG 100																		
<b>a</b>	<b>Stock status relative to recruitment impairment</b>																				
<b>Guidepost</b>	It is <b>likely</b> that the stock is above the point where recruitment would be impaired (PRI).	It is <b>highly likely</b> that the stock is above the PRI.	There is a <b>high degree of certainty</b> that the stock is above the PRI.																		
<b>Met?</b>	<b>NO</b>																				
<b>Justification</b>	<p>The most recent stock assessment conducted for <i>Micropogonias furnieri</i> along the southern coast of Brazil classified both northern and southern corvina stocks as overexploited and overfished.</p> <table border="1"> <thead> <tr> <th>Estoque</th> <th>Modelo</th> <th>MSY</th> <th>B/B<sub>MSY</sub></th> <th>F/F<sub>MSY</sub></th> <th>Estado do estoque</th> </tr> </thead> <tbody> <tr> <td>Norte</td> <td>*JABBA</td> <td>6.320,0</td> <td>0,6</td> <td>1,9</td> <td>Sobreexplorado e sofrendo sobrepesca</td> </tr> <tr> <td>Sul</td> <td>**SS3</td> <td>15.394,3</td> <td>0,2</td> <td>1,5</td> <td>Sobreexplorado e sofrendo sobrepesca</td> </tr> </tbody> </table> <p>The stock is likely to be below the point where recruitment would be affected and the fishery would not achieve SG60 for this aspect of the score.</p> <p>This means that Stock Rebuilding would score PI 1.1.2.</p>			Estoque	Modelo	MSY	B/B <sub>MSY</sub>	F/F <sub>MSY</sub>	Estado do estoque	Norte	*JABBA	6.320,0	0,6	1,9	Sobreexplorado e sofrendo sobrepesca	Sul	**SS3	15.394,3	0,2	1,5	Sobreexplorado e sofrendo sobrepesca
Estoque	Modelo	MSY	B/B <sub>MSY</sub>	F/F <sub>MSY</sub>	Estado do estoque																
Norte	*JABBA	6.320,0	0,6	1,9	Sobreexplorado e sofrendo sobrepesca																
Sul	**SS3	15.394,3	0,2	1,5	Sobreexplorado e sofrendo sobrepesca																
<b>b</b>	<b>Stock status in relation to achievement of MSY</b>																				
<b>Guidepost</b>		The stock is at or fluctuating around a level consistent with MSY.	There is a <b>high degree of certainty</b> that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.																		
<b>Met?</b>		<b>NO</b>																			
<b>Justification</b>	<p>Same as scoring aspect a.</p> <p>The stock is likely not to be, or to fluctuate, around a point consistent with the MRS.</p>																				
<b>RBF Required?</b>	<b>NO</b>	<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>																		

### PI 1.1.2 – Stock Rebuilding

<b>PI 1.1.2</b>		<b>Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Rebuilding timeframes</b>			
	<b>Guidepost</b>	A rebuilding timeframe is specified for the stock that is <b>the shorter of 20 years or 2 times its generation time</b> . For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed <b>one generation time</b> for the stock.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		There is no evidence of a stock rebuilding strategy or measures within a specified timeframe for the <i>Micropogonias furnieri</i> stock. Therefore, the fishery would not score SG60.  As a result, the fishery <b>would not score SG60</b> for this scoring issue.		
<b>b</b>	<b>Rebuilding evaluation</b>			
	<b>Guidepost</b>	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, <b>or it is likely</b> based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is <b>strong</b> evidence that the rebuilding strategies are rebuilding stocks, <b>or it is highly likely</b> based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		Currently, management authorities are not monitoring to determine if a rebuilding strategy is effective.  Therefore, the fishery <b>would not meet SG60</b> for this scoring issue.		
<b>References</b>				
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

## PI 1.2.1 – Harvest Strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guidepost	The harvest strategy is <b>expected</b> to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy <b>work together</b> towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is <b>designed</b> to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	<b>NO</b>		
Justification		Presently, there is no harvest strategy in place for <i>Micropogonias furnieri</i> . The management system is based on general control rules for the trawl and bottom gillnet fishery harvesting demersal species. Therefore, they might not reflect the reality of <i>Micropogonias furnieri</i> . As a result, it cannot be expected that the harvest strategy would achieve stock management objectives reflected in P.I 1.1.1 SG80. The fishery <b>would not meet SG60</b> for this scoring issue.		
b	Harvest strategy evaluation			
	Guidepost	The harvest strategy is <b>likely</b> to work based on prior experience or plausible argument.	The harvest strategy may not have been fully <b>tested</b> but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been <b>fully evaluated</b> and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	<b>NO</b>		
Justification		This scoring issue <b>would not meet SG60</b> . Indeed, it is unlikely that, based on prior experience or plausible arguments, the harvest strategy would achieve its objectives. There is no evidence that it is maintaining <i>Micropogonias furnieri</i> stocks at target levels.		
c	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	<b>NO</b>		
Justification		The current monitoring would not be enough to determine if the harvest strategy is working. As a result, the fishery <b>would not score SG60</b> .		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			<b>NO</b>
Justification		According to the standard, the fishery would score SG60, as well as SG80 by default.		

e*	<b>Shark finning</b>			
	<b>Guidepost</b>	It is <b>likely</b> that shark finning is not taking place.	It is <b>highly likely</b> that shark finning is not taking place.	There is a <b>high degree of certainty</b> that shark finning is not taking place.
	<b>Met?</b>	<b>DOES NOT APPLY</b>		
<b>Justification</b>		This scoring issue is not applicable because the target species is not a shark.		
f*	<b>Review of alternative measures*</b>			
	<b>Guidepost</b>	There has been a review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock.	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	<b>Met?</b>	<b>NA</b>		
<b>Justification</b>		There is no unwanted capture of whitemouth croaker.		
		<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>	

PI 1.2.2 – Harvest Control Rules and Tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>HCRs design and application</b>			
	<b>Guidepost</b>	Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	<b>Met?</b>	NO		
<b>Justification</b>		There is no harvest control rule in place for <i>Micropogonias furnieri</i> . There is no evidence of a specific control plan that might be considered or enacted to achieve a reduction on the exploitation. Therefore, the fishery would not score SG60.		
b	<b>HCRs robustness to uncertainty</b>			
	<b>Guidepost</b>		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a wide range of uncertainties including the ecological role of the stock, and there is evidence that the HCRs are robust to the main uncertainties.
	<b>Met?</b>		NO	
<b>Justification</b>		According to the standard, the fishery would score SG60 by default. Neither are there harvest control rules for <i>Micropogonias furnieri</i> , a system to achieve a reduction on the exploitation rate as the point of recruitment impairment is approached. Therefore, it is impossible to evaluate if the HCRs are robust to the main uncertainties. Therefore, the fishery would not score SG80.		
c	<b>HCRs evaluation</b>			
	<b>Guidepost</b>	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	<b>Met?</b>	NO		
<b>Justification</b>		Even if there are no specific harvest control rules, some tools are used to control trawls. However, they do not seem to be enough to keep the stock at exploitation levels consistent with MSY. They did not succeed either in containing the reduction of the biomass, illustrated by all the evaluation models applied. Therefore, the fishery would not score 6.		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

PI 1.2.3 – Information/Monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guidepost	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A <b>comprehensive range</b> of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	YES	NO	
Justification		<p>There is information related to the whitemouth croaker (<i>Micropogonias furnieri</i>) trawl and bottom gillnet fishery in Brazil, obtained from several sources: SUDEPE, IBAMA, FURG, REVIZEE Program, CEPERG, CGMAP, SINPESQ, UNIVALI, CTTMAR and MAPA. Scientists have conducted research on the basis of these data. This research can be accessed online by means of technical reports or scientific papers published in scientific magazines. Different information categories were identified, such as total landings per month and per year, per fishing port, description of biological features (size, sex, growth and distribution), population parameters (growth, mortality, reproduction, migration and stock identification), distribution of spawning areas, type of fishing fleet, fleet characteristics, harvest method, CPUE, tropic features, etc. All these information categories were used to monitor the fishery. Meanwhile, a significant weakness is the lack of consistency and continuity in the data gathering programs. There is lack of logistic structure and human resources to perform the necessary tasks.</p> <p>Consequently, some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy (in case it existed). The fishery <b>would score SG60</b> but not SG80.</p>		
b	Monitoring			
	Guidepost	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are <b>regularly monitored at a level of accuracy and coverage consistent with the harvest control rule</b> , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	<b>All information</b> required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent <b>uncertainties</b> in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	NO		
Justification		Basic data regarding the marine extractive fishery production were obtained by landing control systems, onboard maps, production reports provided by the fishing companies and statistical sampling. These control systems are deficient basically due to the lack		



	<p>of sufficient data gathering staff, low commitment from the productive sector, poor reporting and the absence of an integrated institutional policy focused on the creation of national fishery statistics (IBAMA 2007). In addition to these problems, in 2012, the Brazilian government cancelled the program that collected national fishery statistics, including those areas where the majority of landings corresponded to sciaenidae (Rio Grande do Sul and Santa Catarina). According to the report of the National Program for Biodiversity Monitoring of the ICMBio 2019 (Torres, <i>et. al.</i>, 2019), Marine and Coastal Subprogram, there is a clear need for consistent monitoring data, as well as research, related to the fishery and conservation measures. This would ensure the continuity of activities with socioeconomic significance, within the general framework of conservation and stock recovery management of threatened species such as <i>Micropogonias furnieri</i>. Moreover, indicators are not available or monitored with sufficient frequency to support the harvest control rule as defined by the MSC.</p> <p>Therefore, the fishery <b>would not meet SG60</b>.</p>		
<b>c</b>	<b>Comprehensiveness of information</b>		
	<b>Guidepost</b>		There is good information on all other fishery removals from the stock.
	<b>Met?</b>		<b>YES</b>
<b>Justification</b>	<p>Regarding <i>Micropogonias furnieri</i> removals by other fleets in Brazil: it is known that this fishery is an allowable bycatch in several bottom trawl fleets with overlapping fishing areas. In addition, they are retained by vessels from the industrial and coastal sector.</p> <p>Therefore, there is good information on all other fishery removals from the stock and the fishery would <b>score SG80</b>. If scoring issue a) would have reached SG100, it would have been the same for this scoring issue.</p>		
	<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>	

#### PI 1.2.4 – Assessment of Stock Status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Appropriateness of assessment to stock under consideration</b>			
	<b>Guidepost</b>		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	<b>Met?</b>		<b>YES</b>	<b>NO</b>
<b>Justification</b>		<p>The fishery scores SG60 by default. As indicated in PI 1.2.1 and 1.2.2, there is no harvest control rule for this fishery.</p> <p>Consequently, the fishery <b>would score SG80</b>.</p>		
b	<b>Assessment approach</b>			
	<b>Guidepost</b>	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Justification</b>		<p>Assessments estimate stock status based on reference points considered appropriate for the species.</p> <p>Therefore, the fishery <b>would achieve SG60</b> for this aspect of the score but does not achieve SG80.</p>		
c	<b>Uncertainty in the assessment</b>			
	<b>Guidepost</b>	The assessment <b>identifies major sources</b> of uncertainty.	The assessment <b>takes uncertainty into account</b> .	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a <b>probabilistic</b> way.
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Justification</b>		<p>Although assessments identify uncertainties, they do not consider all sources of uncertainty.</p> <p>Thus, the fishery would <b>with SG60</b> for this aspect of the scoring, but not with SG80.</p>		
d	<b>Evaluation of assessment</b>			
	<b>Guidepost</b>			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.

	<b>Met?</b>			
<b>Justification</b>		The fishery <b>would score SG60 and SG80</b> by default.		
<b>e</b>	<b>Peer review of assessment</b>			
	<b>Guidepost</b>		The assessment of stock status is subject to peer review.	The assessment has been <b>internally and externally</b> peer reviewed.
	<b>Met?</b>		<b>NO</b>	
<b>Justification</b>		The fishery <b>would score SG60</b> by default. For the fishery to score SG80, the assessment should be subject to peer review.		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>60</b>

### PI 2.1.1 – Primary Species Status

<b>PI 2.1.1</b>		<b>The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Main primary species stock status</b>			
	<b>Guidepost</b>	Main primary species are <b>likely</b> to be above the Point of Recruitment Impairment (PRI)  OR If the species is below the PRI, the UoA has measures in place that are <b>expected</b> to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are <b>highly likely</b> to be above the PRI  OR If the species is below the PRI, there is either <b>evidence of recovery</b> or a demonstrably effective strategy in place <b>between all MSC UoAs which categorise this species as main</b> , to ensure that they collectively do not hinder recovery and rebuilding.	There is a <b>high degree of certainty</b> that main primary species are above the PRI <b>and are</b> fluctuating around a level consistent with MSY.
	<b>Met?</b>			
<b>Justification</b>		The MSC standard defines as “primary species” those that are not covered by P1, that fall within the scope of the MSC program, and for whom there are management tools in place, destined to achieve management of the target stock by means of limit reference points. Several species are harvested by the whitemouth croaker trawl and gillnet fishery. However, it is known that beyond the species considered as ETP, none is managed according to biological reference points. Therefore, there are no “primary species” in this fishery and it would score <b>SG100 by default</b> .		
<b>b</b>	<b>Minor primary species stock status</b>			
	<b>Guidepost</b>			Minor primary species are highly likely to be above the PRI  OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species
	<b>Met?</b>			
<b>Justification</b>		As there are no primary species in this fishery, it would score <b>SG 100 by default</b> for this scoring issue.		
<b>RBF Required?</b>	<b>NO</b>	<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>100</b>	

## PI 2.1.2 – Primary Species Management Strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimize the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Management strategy in place</b>			
	<b>Guidepost</b>	There are <b>measures</b> in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to above the point where recruitment would be impaired.	There is a <b>partial strategy</b> in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the point where recruitment would be impaired.	There is a <b>strategy</b> in place for the UoA for managing main and minor primary species.
	<b>Met?</b>			
<b>Justification</b>		There are no primary species. Therefore, the fishery would score <b>SG80 by default</b> .		
b	<b>Management strategy evaluation</b>			
	<b>Guidepost</b>	The measures are considered <b>likely</b> to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some <b>objective basis for confidence</b> that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	<b>Testing</b> supports <b>high confidence</b> that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	<b>Met?</b>			
<b>Justification</b>		There are no primary species. Therefore, the fishery would score <b>SG80 by default</b> for this scoring issue.		
c	<b>Management strategy implementation</b>			
	<b>Guidepost</b>		There is <b>some evidence</b> that the measures/partial strategy is being <b>implemented successfully</b> .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	<b>Met?</b>			
<b>Justification</b>		There are no primary species. Therefore, the fishery would score <b>SG80 by default</b> for this scoring issue.		
d*	<b>Shark finning*</b>			
	<b>Guidepost</b>	It is <b>likely</b> that shark finning is not taking place.	It is <b>highly likely</b> that shark finning is not taking place.	There is a <b>high degree of certainty</b> that shark finning is not taking place.
	<b>Met?</b>			
<b>Justification</b>		There are no primary species. Therefore, the fishery would score <b>SG80 by default</b> for this scoring issue.		
<b>Review of alternative measures*</b>				

<b>e*</b>	<b>Guidepost</b>	There is a review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of main primary species.	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	<b>Met?</b>			
<b>Justification</b>		There are no primary species. Therefore, the fishery would score <b>SG80 by default</b> for this scoring issue.		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>80</b>

PI 2.1.3 – Primary Species Information/Monitoring

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Information adequacy for assessment of impact on main primary species</b>			
	<b>Guidepost</b>	Qualitative information is <b>adequate to estimate</b> the impact of the UoA on the main primary species with respect to status.  OR <b>If RBF is used to score PI 2.1.1 for the UoA:</b> Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is <b>adequate to assess</b> the impact of the UoA on the main primary species with respect to status.  OR <b>If RBF is used to score PI 2.1.1 for the UoA:</b> Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is <b>adequate to assess with a high degree of certainty</b> the impact of the UoA on main primary species with respect to status.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		Currently, no primary species have been identified for this fishery. Bearing in mind the lack of continuity of the different data collecting programs and that there is no consistent monitoring program in place, it is impossible to identify the main primary species (those that represent 5% or more of the total fishery) with the information available. Thus, the evaluation team considers that the qualitative information would not be adequate to estimate the impact of the UoA on the status of the main primary species.  Therefore, the fishery <b>would not score SG60</b> for this scoring issue.		
b	<b>Information adequacy for assessment of impact on minor primary species</b>			
	<b>Guidepost</b>			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	<b>Met?</b>			
<b>Justification</b>		The fishery would score <b>SG60</b> and <b>SG80</b> by default.		
c	<b>Information adequacy for management strategy</b>			
	<b>Guidepost</b>	Information is adequate to support <b>measures</b> to manage <b>main</b> primary species.	Information is adequate to support a <b>partial strategy</b> to manage <b>main</b> Primary species.	Information is adequate to support a <b>strategy</b> to manage <b>all</b> primary species and evaluate with a <b>high degree of certainty</b> whether the strategy is achieving its objective.

	<b>Met?</b>	<b>NO</b>		
	<b>Justification</b>	<p>Currently, no primary species have been identified for this fishery. The information available would not be adequate to support measures to manage main primary species, if they were established. In fact, it would be impossible to identify the main primary species (for instance, those that represent 5% or more of the total fishery) with the information available.</p> <p>Thus, the fishery <b>would not score SG60</b>.</p>		
		<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>	



PI 2.2.1 – Secondary Species Status

PI 2.2.1	The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.		
Scoring Issue	SG 60	SG 80	SG 100
a	<b>Main secondary species stock status</b>		
<b>Guidepost</b>	<p>Main secondary species are <b>likely</b> to be within biologically based limits.</p> <p>OR</p> <p>If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.</p>	<p>Main secondary species are <b>highly likely</b> to be above biologically based limits</p> <p>OR</p> <p>If below biologically based limits, there is either <b>evidence of recovery</b> or a <b>demonstrably effective partial strategy</b> in place such that the UoA does not hinder recovery and rebuilding.</p> <p>AND</p> <p>Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that also have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.</p>	<p>There is a <b>high degree of certainty</b> that main secondary species are within biologically based limits.</p>
<b>Justification</b>	<p>The MSC standard defines as “secondary species” those non-target species that are caught by the fishery that fall within the scope of the MSC program, but are not considered as “primary”; or non-target species that do not fall within the scope of the program, but for whom the definition of ETP is not applicable. Secondary species within the scope of the standard that represent 5% or more of the fleet catches or vulnerable species that represent 2% or more of the catches of the fleet under assessment, are considered as “main secondary species”.</p> <p>A complete list of non-target species that could have been used for this analysis was impossible to obtain for the whitemouth croaker trawl and bottom gillnet fishery. Its multi-species character and the overlap between the catch of the bottom gillnet fleet and the catch of the demersal trawls, makes the analysis even more difficult. The research made available to the assessment team, present more general information, focusing on the gillnet and trawl fishery in the Southeast-South region of Brazil, without specifying the catches of the <i>Micropogonias furnieri</i> fisheries. That information would be necessary to define the primary and secondary species for the preevaluation. Analyzing the lists provided by the authors previously mentioned, a lot of the bycatch species in the gillnet fishery coincide with those of trawls. However, analyses performed</p>		

		<p>by other researchers for the same modality, throw different results. This shows the diversity of the species caught and stresses the need to gather data separately for each modality.</p> <p>When comparing the lists with the allowable bycatch species (Regulatory Instruction N° 10) for the modalities that target <i>Micropogonias furnieri</i>, it can be observed that a lot of the species caught do not comply with the legislation. Therefore, there is no certainty about the total or which species are being caught by the fishery.</p> <p>In a meeting held with the <i>Micropogonias furnieri</i>, processing company during the drafting of this report, it was confirmed that trawls harvest croaker, whitemouth croaker and striped weakfish, the latter in much lower proportions.</p> <p>Thus, to score this PI, more data would be necessary, as well as a RBF to determine the risk that this fishery represents for other species.</p>	
<b>b</b>	<b>Minor secondary species stock status</b>		
	<b>Guidepost</b>		<p>Minor secondary species are highly likely to be above biologically based limits.</p> <p>OR</p> <p>If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species</p>
	<b>Met?</b>		
<b>Justification</b>		To score this PI, it would be necessary to gather more information and apply a RBF.	
<b>RBF Required?</b>	<b>YES</b>	<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

## PI 2.2.2 – Secondary Species Management Strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimize the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Management strategy in place</b>			
	<b>Guidepost</b>	There are <b>measures</b> in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a <b>partial strategy</b> in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a <b>strategy</b> in place for the UoA for managing main and minor secondary species.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		There are management measures in place for the trawling and gillnet fleets. Nevertheless, it is not clear yet which species are really involved in the <i>Micropogonias furnieri</i> , fishery. It is necessary to identify the species and their proportion to determine if they require a strategy for managing secondary species.  Therefore, the fishery <b>would not score SG60</b> for this scoring issue.		
b	<b>Management strategy evaluation</b>			
	<b>Guidepost</b>	The measures are considered <b>likely</b> to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is <b>some objective basis for confidence</b> that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	<b>Testing</b> supports <b>high confidence</b> that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		It cannot be claimed that the current measures work, based on a plausible argument.  Thus, the fishery <b>would not score SG60</b> .		
c	<b>Management strategy implementation</b>			
	<b>Guidepost</b>		There is <b>some evidence</b> that the measures/partial strategy is being <b>implemented successfully</b> .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	<b>Met?</b>		<b>NO</b>	

<b>Justification</b>		The fishery would score <b>SG60</b> by default. However, as there is not enough information to determine if management measures are necessary, it is impossible to assess if the measures are being implemented successfully.  Thus, the fishery <b>would not score SG80</b> for this scoring issue.		
<b>d*</b>	<b>Shark finning*</b>			
	<b>Guidepost</b>	It is <b>likely</b> that shark finning is not taking place.	It is <b>highly likely</b> that shark finning is not taking place.	There is a <b>high degree of certainty</b> that shark finning is not taking place.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		Some authors claim that the trawl and bottom gillnet fishery includes shark catches. Despite Regulatory Instruction MPA/MMA N°14, dated November 26 <sup>th</sup> , 2012, that forbids shark finning in Brazil, it is not clear if the removals are taking place or not.  Therefore, the evaluation team considers that the fishery <b>does not score SG60</b> for this scoring issue.		
<b>e*</b>	<b>Review of alternative measures to minimize mortality of unwanted catch*</b> [Scoring issue need not be scored if are no unwanted catches of secondary species]			
	<b>Guidepost</b>	There is a review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of <b>unwanted</b> catch of main secondary species.	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of <b>unwanted</b> catch of main secondary species and they are implemented as appropriate.	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of <b>unwanted</b> catch of all secondary species, and they are implemented, as appropriate.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		During the drafting of this report, it was impossible to present a list of species that truly interact with the whitemouth croaker fishery. Nevertheless, as stated by some authors, the volume of bycatch of the trawl and bottom gillnet fisheries is very high.  As a result, it cannot be affirmed that there are alternative measures to minimize UoA-unwanted catch of main secondary species Thus, the fishery <b>does not score SG60</b> for this scoring issue.		
		<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>	

### PI 2.2.3 – Secondary Species Information/Monitoring

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guidepost	Qualitative information is <b>adequate to estimate</b> the impact of the UoA on the main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA:  Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and <b>adequate to assess</b> the impact of the UoA on main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA:  Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and <b>adequate to assess with a high degree of certainty</b> the impact of the UoA on main secondary species with respect to status.
	Met?	NO		
Justification		<p>During the drafting of this report, it was impossible to present a comprehensive list of secondary species for this fishery. Regulatory Instruction MPA/MMA N° 10, dated June 10<sup>th</sup>, 2011, defined fishing methods (see section 3.5.2) and gave a list of species that could be part of the allowable bycatch of those fisheries targeting <i>Micropogonias furnieri</i>. Nevertheless, when analyzing some bycatch and discards research on the trawl and gillnet fishery in the South and Southeast of Brazil, the evaluation team observed that many species did not comply with Regulatory Instruction N° 10, without certainty about the total and which species are being caught by the fishery. Some research points out to a figure larger than indicated in the Regulatory Instruction. Consequently, there is no adequate information to identify the secondary species that truly interact with the fishery.</p> <p>Consequently, the fishery <b>would not score SG60</b> for this scoring issue.</p>		
b	Information adequacy for assessment of impacts on minor secondary species			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			
Justification		The fishery scores <b>SG60 and SG80</b> by default.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support <b>measures</b> to manage <b>main</b> secondary species.	Information is adequate to support a <b>partial strategy</b> to manage <b>main</b> secondary species.	Information is adequate to support a <b>strategy</b> to manage <b>all</b> secondary species, and <b>evaluate</b> with

				a <b>high degree of certainty</b> whether the strategy is <b>achieving its objective</b> .
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>There is no adequate information to identify the main secondary species and there is no monitoring strategy that could support the implementation of management measures for those species.</p> <p>Therefore, the fishery <b>would not score SG60</b> for this fishing issue.</p>		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

### PI 2.3.1 –ETP Species Status

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species		
		The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guidepost	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/stock are known and <b>likely</b> to be within these limits.	Where national and/or international requirements set limits for ETP species, the <b>combined effects of the MSC UoAs</b> on the population/stock are known and <b>highly likely</b> to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a <b>high degree of certainty</b> that the <b>combined effects of the MSC UoAs</b> are within these limits.
	Met?			
Justification		<p>The criteria to determine if a species should be considered as Endangered, Threatened and Protected Species (ETP) are:</p> <ul style="list-style-type: none"> <li>(a) Recognized as ETP species by the national legislation;</li> <li>(b) Its listing in Appendix I of the Convention on International Trade in Endangered Species (CITES);</li> <li>(c) If the species is included in any binding international conservation agreement, such as Annex 1 of the Agreement on Conservation of Albatross and Petrels (ACAP) and;</li> <li>(d) Species classified as “out of scope” of the MSC Program (amphibians, reptiles, marine birds and mammals) but that appear on the IUCN Red List as vulnerable species, endangered or in critical danger.</li> </ul> <p>In some research made available to the assessment team to perform this preevaluation, the following species appeared on the ETP list: Brazilian guitarfish (<i>Pseudobatos horkellii</i>), angel shark (<i>Squatina sp.</i>), franciscana dolphin (<i>Pontoporia blainville</i>) and green turtle (<i>Chelonia mydas</i>).</p> <ul style="list-style-type: none"> <li>• <i>Pseudobatos horkelii</i> is listed in the IUCN as “critically endangered”. It was listed in Directive N° 445 of the Ministry of Environment banning its harvest and commerce, enforced in December 2014. Nevertheless, due to the industry pressure, the ban was suspended during 2015 and first half of 2016. Directive N° 445 faces a legal claim from the National Secretariat of Aquaculture and Fisheries (SAP) for its suspension.</li> <li>• <i>Squatina guggenheim</i> is listed in the IUCN as “endangered” and it is included in Directive MMA N° 445, banning its harvest and commercialization.</li> <li>• <i>Pontoporia blainvillei</i> is listed in the IUCN as “vulnerable”. Its main threat is the accidental mortality due to net fishing. The threats also include habitat degradation, such as the destruction of the benthic community and the bycatch of small sciaenidae fish, main prey of the franciscana dolphin.</li> <li>• <i>Chelonia mydas</i> listed in the IUCN as “vulnerable”, presents as one of its main threats the mortality related to bycatch mainly in the coast when using bottom gillnets.</li> </ul> <p>With the information gathered during the drafting of this report, there was no more certainty regarding the ETP species that interact with the whitemouth croaker fishery. Therefore, it is impossible to determine the specific impact of the croaker bottom trawl and bottom gillnet fishery on each one of the ETP species with whom the fishery might</p>		

	<p>be interacting. It is necessary to collect data confirming the ETP species that suffer a direct or indirect impact of the UoA and estimate its effects on the stock.</p> <p>Thus, to score this PI it would be necessary to gather more information and apply a RBF, through the Productivity-Susceptibility Analysis (PSA). The PSA is a semiquantitative analysis based on the assumption that the potential risk for a species (scoring issue) depends on the degree in which it is susceptible to an impact and of its intrinsic productivity (or its ability to recover from such fishery impact).</p>			
<b>b</b>	<b>Direct effects</b>			
	<b>Guidepost</b>	Known direct effects of the UoA are likely to not <b>hinder recovery</b> of ETP species.	Known direct effects of the UoA are <b>highly likely</b> to not <b>hinder recovery</b> of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.
	<b>Met?</b>			
<b>Justification</b>		<p>Currently, it is impossible to ensure that known direct effects of the UoA are not likely to hinder recovery of ETP species. It would be necessary to collect data to estimate the mortality rate in relation to the total number of species interactions with the fishery or the stock size.</p> <p>Thus, a RBF should be applied to score this PI.</p>		
<b>c</b>	<b>Indirect effects</b>			
	<b>Guidepost</b>		Indirect effects have been considered and are thought to be <b>highly likely</b> to not create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	<b>Met?</b>			
<b>Justification</b>		In general, a RBF should be applied to score this PI.		
<b>RBF Required?</b>	<b>YES</b>	<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>	



### PI 2.3.2 –ETP Species Management Strategy

PI 2.3.2		<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> <li>• meet national and international requirements;</li> <li>• ensure the UoA does not hinder recovery of ETP species.</li> </ul> <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimize the mortality of ETP species.</p>		
Scoring Issue		SG 60	SG 80	SG 100
a	<p><b>Management strategy in place (national and international requirements)</b></p> <p>[Scoring issue need not be scored if <u>there are no</u> requirements for protection or rebuilding provided through national ETP legislation or international agreements].</p>			
	<b>Guidepost</b>	There are <b>measures</b> in place that minimize the UoA-related mortality of ETP species and are expected to be <b>highly likely to achieve</b> national and international requirements for the protection of ETP species.	There is a <b>strategy</b> in place for managing the UoA’s impact on ETP species, including measures to minimize mortality, which is designed to be <b>highly likely to achieve</b> national and international requirements for the protection of ETP species.	There is a <b>comprehensive strategy</b> in place for managing the UoA’s impact on ETP species, including measures to minimize mortality, which is designed to <b>achieve above</b> national and international requirements for the protection of ETP species.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>There are national strategies to reduce the interaction of marine mammals with the Brazilian fisheries, such as the National Action Plan for the Conservation of Porpoises and the National Action Plan for the Conservation of Small Cetaceans. There has been a reduction in the level of species bycatch due to the reduction in the fishing effort and the creation of new marine protected areas. Regulatory Instruction MPA/MMA N° 12/2012 regulates the use of gillnets in the South and Southeast regions, as well as the prohibition to increase the fishing fleet as far as the fishing effort is above the sustainable levels. Other strategies include the definition of different conservation areas.</p> <p>In Brazil, the green turtle is protected by laws that forbid the use of any part of the animal or any product derived therefrom. There is a National Action Plan for the Conservation of Marine Turtles, as well as protecting the species within several conservation units. Brazil has signed the Convention on International Trade in Endangered Species of Wild Fauna and Flora-CITES, as well as the Interamerican Convention for the Protection and Conservation of Marine Turtles.</p> <p>The National Plan of Action (PAN) for the Conservation of Marine Skates and Sharks Threatened with Extinction aims at mitigating the impact on elasmobranchs threatened with extinction in Brazil.</p> <p>However, it would be necessary to confirm the list of ETP species that Interact with the UoA and gather evidence in order to claim that national and international requirements for protecting these species are met. Thus, the fishery <b>would not score SG60</b> for this scoring issue.</p>		
b	<b>Management strategy in place (alternative)</b>			
	<b>Guidepost</b>	There are <b>measures</b> in place that are expected to	There is a <b>strategy</b> in place that is expected to ensure	There is a <b>comprehensive strategy</b> in place for

		ensure the UoA does not hinder the recovery of ETP species.	the UoA does not hinder the recovery of ETP species.	managing ETP species, to ensure the UoA does not hinder the recovery of ETP species
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>As mentioned here above, there are measures in place that try to reduce the catch of mammals, elasmobranchs and reptiles in Brazil. Nevertheless, it is impossible with the information available to assess if these measures are adequate. It would be necessary to gather significant data and a proper monitoring strategy to evaluate the performance and signal changes in the risk level in order to consider how to improve the measures/strategy.</p> <p>Therefore, as long as the adequate information is not available, this scoring issue <b>would not meet SG60</b>.</p>		
<b>c</b>	<b>Management strategy evaluation</b>			
	<b>Guidepost</b>	The measures are <b>considered likely</b> to work, based on <b>plausible argument</b> (e.g. general experience, theory or comparison with similar fisheries/species).	There is an <b>objective basis for confidence</b> that the measures/strategy will work, based on <b>information</b> directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a <b>quantitative analysis</b> supports <b>high confidence</b> that the strategy will work.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>Despite existing measures, there is no evidence that they will work. These measures should be assessed and reviewed to guarantee their efficacy. Moreover, there should be a continuous follow-up. However, there is no consistent monitoring plan to collect those data.</p> <p>Thus, this scoring issue <b>does not meet SG60</b>.</p>		
<b>d</b>	<b>Management strategy implementation</b>			
	<b>Guidepost</b>		There is some <b>evidence</b> that the measures/strategy is being implemented successfully.	There is <b>clear evidence</b> that the strategy/comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	<b>Met?</b>		<b>NO</b>	
<b>Justification</b>		<p>The fishery would score SG60 by default. However, there is no evidence that the measures are being implemented successfully, in addition to the fact that they are not sufficient.</p> <p>As a result, the fishery <b>would not score SG80</b> for this scoring issue.</p>		
<b>e</b>	<b>Review of alternative measures to minimize mortality of ETP species</b>			
	<b>Guidepost</b>	There is a review of the potential effectiveness and practicality of alternative measures to	There is a <b>regular</b> review of the potential effectiveness and practicality of alternative measures to minimize UoA-related	There is a <b>biennial</b> review of the potential effectiveness and practicality of alternative measures to minimize

		minimize UoA-related mortality of ETP species.	mortality of ETP species and they are implemented as appropriate.	UoA-related mortality ETP species, and they are implemented, as appropriate.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		There has been no review of the potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of ETP. As a result, <b>SG60 would not be reached</b> for this scoring issue.		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

### PI 2.3.3 –ETP Species Information

PI 2.3.3	<p>Relevant information is collected to support the management of UoA impacts on ETP species, including:</p> <ul style="list-style-type: none"> <li>• Information for the development of the management strategy;</li> <li>• Information to assess the effectiveness of the management strategy; and</li> <li>• Information to determine the outcome status of ETP species.</li> </ul>		
Scoring Issue	SG 60	SG 80	SG 100
a	<b>Information adequacy for assessment of impacts</b>		
Guidepost	<p>Qualitative information is <b>adequate to estimate</b> the UoA related mortality on ETP species.</p> <p>OR</p> <p>If RBF is used to score PI 2.3.1 for the UoA:</p> <p>Qualitative information is <b>adequate to estimate productivity and susceptibility</b> attributes for ETP species.</p>	<p>Some quantitative information is <b>adequate to assess</b> the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species.</p> <p>OR</p> <p>If RBF is used to score PI 2.3.1 for the UoA:</p> <p>Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.</p>	<p>Quantitative information is available to assess with a high degree of certainty the <b>magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status</b> of ETP species.</p>
Met?	NO		
Justification	<p>During this assessment, literature was used to study the ETP that could be suffering the impact of the whitemouth croaker fishery. Data was found regarding the general catch of different target species during the trawl and bottom gillnet fishery. However, it would be necessary to learn more precisely the catches that are a direct consequence of the whitemouth croaker fishery. As a result, the assessment team cannot claim that the qualitative information is adequate to estimate the UoA related mortality on ETP species. Moreover, the information is not enough to use RBF.</p> <p>Consequently, the fishery <b>would not score SG60</b> for this scoring issue.</p>		
b	<b>Information adequacy for management strategy</b>		
Guidepost	<p>Information is adequate to support <b>measures</b> to manage the impacts on ETP species.</p>	<p>Information is adequate to measure trends and support a <b>strategy</b> to manage impacts on ETP species.</p>	<p>Information is adequate to support a <b>comprehensive strategy</b> to manage impacts, minimize mortality and injury of ETP species, and evaluate with a <b>high degree of certainty</b> whether a strategy is achieving its objectives.</p>
Met?	NO		
Justification	<p>As mentioned in PI 2.3.2, there are strategies to reduce the catch of mammals, elasmobranchs and reptiles in the Brazilian fishery. However, it would be necessary to confirm the list of ETP species that truly interact with the UoA, in order to claim that the information is adequate to support measures to manage the impacts on ETP species.</p>		

	Thus, the fishery <b>would not score SG60</b> for this scoring issue.		
	<table border="1"> <tr> <td style="background-color: #cccccc;">Likely PI Scoring Level (<math>&lt;60</math>, <math>60-79</math>, <math>\geq 80</math>)</td> <td style="text-align: center;"><b>&lt;60</b></td> </tr> </table>	Likely PI Scoring Level ( $<60$ , $60-79$ , $\geq 80$ )	<b>&lt;60</b>
Likely PI Scoring Level ( $<60$ , $60-79$ , $\geq 80$ )	<b>&lt;60</b>		

### PI 2.4.1 – Habitat Status

<b>PI 2.4.1</b>		<b>The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.</b>		
<b>Scoring Issue</b>		SG 60	<b>Scoring Issue</b>	SG 60
<b>a</b>	<b>Commonly encountered habitat status</b>			
	<b>Guidepost</b>	The UoA is <b>unlikely</b> to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is <b>highly unlikely</b> to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is <b>evidence</b> that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	<b>Met?</b>			
<b>Justification</b>		<p>Work analyzed by the evaluation team indicates that it is likely that the benthic habitats of the area responsible of the largest fishery targeting sciaenidae fish, would be the most affected of the Brazilian continental margin. And in the whitemouth croaker fishery, there is overlap between the catches of the gillnet fleet and those of the trawls fishing for demersal fish.</p> <p>Nevertheless, it is recommended to gather more information about the trawl and bottom gillnet fishery interaction with the habitats in order to perform a Consequence Spatial Analysis (CSA) that would allow to assess, for each fishing modality, the risks posed to the different types of habitats and score this PI.</p>		
<b>b</b>	<b>VME habitat status</b>			
	[Scoring issue need not be scored if there are no VMEs].			
	<b>Guidepost</b>	The UoA is <b>unlikely</b> to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is <b>highly unlikely</b> to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is <b>evidence</b> that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	<b>Met?</b>			
<b>Justification</b>		In the literature analyzed by the assessment team during the drafting of this document, no vulnerable marine ecosystem habitats are mentioned in the UoA. Therefore, this scoring issue need not be scored.		
<b>c</b>	<b>Minor habitat status</b>			
	<b>Guidepost</b>			There is <b>evidence</b> that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	<b>Met?</b>			

<b>Justification</b>	To score this issue, a Consequence Spatial Analysis (CSA) is recommended.		
<b>RBF Required?</b>	<b>YES</b>	<b>Likely PI Scoring Level</b> <b>(&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

## PI 2.4.2 – Habitat Management Strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Management strategy in place</b>			
	<b>Guidepost</b>	There are <b>measures</b> in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a <b>partial strategy</b> in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a <b>strategy</b> in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>Despite the existence of some regulations for the trawl and gillnet fishery (see <b>Section 3.5.2</b>), the assessment team cannot claim at the present moment that there are measures in place to minimize the impacts on the structure and function of the habitats. The fishery impact should be assessed, as mentioned in PI.2.4.1, to be able to study adequately this scoring issue.</p> <p>Therefore, the assessment team considers that the fishery <b>does not score SG60</b> for this scoring issue.</p>		
b	<b>Management strategy evaluation</b>			
	<b>Guidepost</b>	The measures are <b>considered likely</b> to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some <b>objective basis for confidence</b> that the measures/partial strategy will work, based on <b>information directly about the UoA and/or habitats</b> involved.	<b>Testing</b> supports <b>high confidence</b> that the partial strategy/strategy will work, based on <b>information directly about the UoA and/or habitats</b> involved.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>As already mentioned, there is no detailed information about the impact of the trawl and bottom gillnet fishery in the habitats. Thus, it cannot be argued that the measures are considered likely to work, based on plausible argument.</p> <p>Consequently, the fishery <b>would not score SG60</b> for this scoring issue.</p>		
c	<b>Management strategy implementation</b>			
	<b>Guidepost</b>		There is <b>some quantitative evidence</b> that the measures/partial strategy is being implemented successfully.	There is <b>clear quantitative evidence</b> that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	<b>Met?</b>	<b>BY DEFAULT</b>	<b>NO</b>	
<b>Justification</b>		The fishery would score <b>SG60</b> by default.		
d	<b>Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs</b>			
	<b>Guidepost</b>	There is <b>qualitative evidence</b> that the UoA	There is <b>some quantitative evidence</b> that the UoA	There is <b>clear quantitative evidence</b> that the UoA



		complies with its management requirements to protect VMEs.	complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	<b>Met?</b>			
<b>Justification</b>		No VME was reported in the trawl and bottom gillnet UoA.		
<b>References</b>				
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

### PI 2.4.3 – Habitats Information

<b>PI 2.4.3</b>		<b>Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Information quality</b>			
	<b>Guidepost</b>	The types and distribution of the main habitats are <b>broadly understood</b> .	The nature, distribution and <b>vulnerability</b> of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	<b>Met?</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>
<b>Justification</b>		As shown by Rosso (2015) and Port (2015), the types, distribution and vulnerability of the main habitats in the UoA area are broadly understood. Therefore, the fishery <b>would score SG60 and SG 80</b> for this scoring issue.		
<b>b</b>	<b>Information adequacy for assessment of impacts</b>			
	<b>Guidepost</b>	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear.	The physical impacts of the gear on all habitats have been quantified fully.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		Currently, the information is not adequate to understand the spatial overlap of habitat with fishing gear. Therefore, the fishery <b>would not score SG60</b> for this scoring issue.		
<b>c</b>	<b>Monitoring</b>			
	<b>Guidepost</b>		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in habitat distributions over time are measured.
	<b>Met?</b>	<b>BY DEFAULT</b>	<b>NO</b>	
<b>Justification</b>		The fishery would score <b>SG60</b> by default. To score SG80, adequate information should be collected to detect any increase in risk to the main habitats.		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

PI 2.5.1 – Ecosystem Status

<b>PI 2.5.1</b>		<b>The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.</b>		
<b>Scoring Issue</b>		<b>SG 60</b>	<b>SG 80</b>	<b>SG 100</b>
	<b>Guidepost</b>	The UoA is <b>unlikely</b> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is <b>highly unlikely</b> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is <b>evidence</b> that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	<b>Met?</b>			
		<p>Due to the lack of information that would allow an adequate score for the ETP species components (Component 2.3) and Habitats (Component 2.4), it is impossible, at the present moment, to assess the impact of the whitemouth croaker trawl and bottom gillnet fishery on the ecosystem. It would be necessary to study in detail each fishing gear.</p> <p>As a result, the assessment team considers that a RBF should be applied to score this PI.</p>		
<b>RBF Required?</b>	<b>YES</b>	<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>		<b>&lt;60</b>

## PI 2.5.2 – Ecosystem Management Strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Management strategy in place</b>			
	<b>Guidepost</b>	There are <b>measures</b> in place, if necessary, which take into account the <b>potential impacts</b> of the fishery on key elements of the ecosystem.	There is a <b>partial strategy</b> in place, if necessary, which takes into account <b>available information and is expected to restrain impacts</b> of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a <b>strategy</b> that consists of a <b>plan</b> , in place which contains measures to <b>address all main impacts of the UoA</b> on the ecosystem, and at least some of these measures are in place.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>The whitemouth croaker is a target species, among others, of the bottom gillnet, pair trawl and single trawl fisheries. It is a bycatch of the single and double trawls.</p> <p>The trawls and gillnets are regulated (see <b>Section 3.5.2</b>).</p> <p>However, even if there are measures in place aiming at the protection of the ecosystem, it cannot be claimed that the potential impacts of the UoA on primary, secondary or ETP species – that are also key elements of the ecosystem – are taken into account, thus ensuring the protection of the ecosystem structure and functions. Therefore, the fishery <b>would not score SG60</b> for this scoring issue.</p>		
b	<b>Management strategy evaluation</b>			
	<b>Guidepost</b>	The <b>measures</b> are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).	There is <b>some objective basis for confidence</b> that the measures/partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved	<b>Testing</b> supports <b>high confidence</b> that the partial strategy/strategy will work, based on information directly about the UoA and/or ecosystem involved
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>As mentioned before, there is neither confirmation of the ETP species and list of non-target species that are interacting with the fishery, nor representativeness of the whitemouth croaker trawl and bottom gillnet fishery catches. As a result, measures cannot be considered as likely to work based on plausible arguments.</p> <p>Therefore, the fishery <b>would not score SG60</b> for this scoring issue.</p>		
c	<b>Management strategy implementation</b>			
	<b>Guidepost</b>		There is <b>some evidence</b> that the measures/partial strategy is being <b>implemented successfully</b> .	There is <b>clear evidence</b> that the partial strategy/strategy is being <b>implemented successfully and is achieving its objective as set out in scoring issue (a)</b> .
	<b>Met?</b>		<b>NO</b>	

<b>Justification</b>	The fishery would reach <b>SG60</b> by default for this scoring issue. However, it would be necessary to have some evidence that the measures in place for the trawl and gillnet fishery are being implemented successfully to score SG80. So far, that evidence has not been provided.	
	<b>Likely PI Scoring Level</b> ( <b>&lt;60, 60-79, ≥ 80</b> )	<b>&lt;60</b>

### PI 2.5.3 – Ecosystem Information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Information quality</b>			
	<b>Guidepost</b>	Information is adequate to <b>identify</b> the key elements of the ecosystem.	Information is adequate to <b>broadly understand</b> the key elements of the ecosystem.	
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Justification</b>		Information is adequate to identify the key elements of the ecosystem but not to broadly understand them. Therefore, the fishery <b>would score SG60</b> , but not SG80.		
b	<b>Investigation of UoA impacts</b>			
	<b>Guidepost</b>	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information but <b>have not been investigated</b> in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and <b>some have been investigated in detail</b> .	Main interactions between the UoA and these ecosystem elements can be inferred from existing information and <b>have been investigated in detail</b> .
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		Although some impacts of the trawl and gillnet fishery could be inferred from existing information, it is not possible to reach a conclusion regarding the interaction with ETP species or the habitats. Moreover, data regarding secondary species are also incomplete. Therefore, it cannot be claimed that the main impacts of the UoA on these key ecosystem elements can be inferred from existing information during the drafting of this document.  Thus, the fishery <b>would not score SG60</b> for this scoring issue.		
c	<b>Understanding of component functions</b>			
	<b>Guidepost</b>		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are <b>known</b> .	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are <b>understood</b> .
	<b>Met?</b>		<b>YES</b>	<b>NO</b>
<b>Justification</b>		The fishery scores SG60 by default. The evaluation team considers that the main functions of the ecosystem components (target species, primary, secondary and ETP species and habitats) are known, thus meeting the requirements <b>for SG80</b> . However, it does not meet the requirements for SG100, as the information available was not enough to identify the detailed composition of these species.  Thus, the fishery <b>would score SG80</b> for this scoring issue.		
<b>Information relevance</b>				

<b>d</b>	<b>Guidepost</b>		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components <b>and elements</b> to allow the main consequences for the ecosystem to be inferred.
	<b>Met?</b>	<b>BY DEFAULT</b>	<b>NO</b>	
<b>Justification</b>		The fishery scores <b>SG60</b> by default. However, some impacts on the ecosystem components could not be assessed during this preevaluation. More information would be necessary about the interaction of the UoA with non-target and ETP species, as well as habitats to score SG80.		
<b>e</b>	<b>Monitoring</b>			
	<b>Guidepost</b>		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	<b>Met?</b>		<b>NO</b>	
<b>Justification</b>		The fishery scores <b>SG60</b> by default. However, to score SG80 it would be necessary to collect data systematically for key ecosystem components.		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

### PI 3.1.1 – Legal and/or Customary Framework

PI 3.1.1		<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> <li>• Is capable of delivering sustainability in the UoA(s); and</li> <li>• Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>• Incorporates an appropriate dispute resolution framework.</li> </ul>		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Compatibility of laws or standards with effective management</b>			
	<b>Guidepost</b>	There is an effective national legal system <b>and a framework for cooperation</b> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system <b>and organized and effective cooperation</b> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system <b>and binding procedures governing cooperation with other parties</b> which delivers management outcomes consistent with MSC Principles 1 and 2.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>At a national level, fisheries in Brazil are regulated by Law Nº 11.959 of 2009. It rules the National Policy for the Sustainable Development of Aquaculture and Fisheries, to promote: (I) the sustainable development of fisheries and aquaculture as a source of food, employment, income and leisure, guaranteeing the sustainable use of the fishing stocks, as well as the optimization of the ensuing economic benefits, in harmony with the preservation and conservation of the environment and the biodiversity; (II) the management, promotion and surveillance of the fishing activity; (III) the preservation, conservation and recovery of fishing stocks and of the aquatic ecosystems and ; (IV) the socioeconomic, cultural and professional development of those involved in the fishing activity, as well as their communities. The Law was enforced by means of different Directives, Decrees and Instructions. See Section 3.5.2 that includes those more relevant to the fishery.</p> <p>However, there is no official statistics program in Brazil. The last National Fishery Statistics Report was published by the MPA in 2011, without official consolidated data since. From 2010 to 2019, FURG and UNIVALI filled in the role of the state in collecting and analyzing the data from Rio Grande do Sul and Santa Catarina. It is necessary to establish a consistent and continuous statistical program.</p> <p>As a result, the legal framework in Brazil cannot be considered as effective by the assessment team. Therefore, the fishery <b>would not score SG60</b>.</p>		
b	<b>Resolution of disputes</b>			
	<b>Guidepost</b>	The management system incorporates or is subject by law to a <b>mechanism</b> for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a <b>transparent mechanism</b> for the resolution of legal disputes which is <b>considered to be effective</b> in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a <b>transparent mechanism</b> for the resolution of legal disputes that is appropriate to the context of the fishery and has been <b>tested and proven to be effective</b> .
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	



<b>Justification</b>	<p>The Permanent Management Committees (CPGs) were reestablished in 2022, after their extinction in 2019. Ordinance SAP/MAPA No. 1,269/2022 was published, designating the members of the CPG Demersais Sudeste/Sul, which involves several stakeholders (managers, scientists, fishermen's leaders, shipowners, NGOs, etc.), providing an opportunity to discuss and resolve problems related to fisheries.</p> <p>In contrast, the SAP/MAPA offers to organizations and individuals through the web page <a href="https://www.gov.br/pt-br/servicos/solicitar-a-elaboracao-ou-revisao-de-atos-normativos-da-atividade-pesqueira">https://www.gov.br/pt-br/servicos/solicitar-a-elaboracao-ou-revisao-de-atos-normativos-da-atividade-pesqueira</a> the possibility to present regulatory proposals or challenge current regulations for the fishing activities within the jurisdiction of the Secretariat of Aquaculture and Fisheries for the sustainable management of fishery resources, aiming at the economic, social and environmental sustainability of the activity. This service can be used by fishermen, shipowners, companies, cooperatives, colonies, councils, associations, government bodies, among others.</p> <p>Therefore, the fishery would score <b>SG60</b> for this scoring issue. To score SG80, more information would be necessary to assess the transparency of the mechanism and its effectiveness in dealing with most issues within the context of the UoA.</p>		
<b>c</b>	<b>Respect for rights</b>		
<b>Guidepost</b>	<p>The management system has a mechanism to <b>generally respect</b> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system has a mechanism to <b>observe</b> the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>	<p>The management system has a mechanism to <b>formally commit</b> to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p>
<b>Met?</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>
<b>Justification</b>	<p>Article 3º of Law 11959/2009 establishes that the fishery management system must take into account the peculiarities and needs of artisanal fishermen, people dependent on fishing for food or livelihood and family aquaculture, aiming at ensuring their survival and continuity. In article 24º, the law defines that any physical or legal person that operates in the fishing activity, as well as any vessel, should be registered in the General Fisheries Registry-RGP as a pre-requirement to obtain a fishing license. The license is allocated to a registered vessel, detailing the allowed species, fishing gears and fishing grounds.</p> <p>Thus, <b>SG60 and SG80</b> are met.</p> <p>However, it cannot be considered as a mechanism that formally commits to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood. Thus, the fishery would not score SG100.</p>		
<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>		<b>&lt;60</b>	

### PI 3.1.2 – Consultations, Roles and Responsibilities

PI 3.1.2		<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties</p>		
Scoring Issue		SG 60	SG 80	SG 100
a	<b>Roles and responsibilities</b>			
	<b>Guidepost</b>	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <b>generally understood</b> .	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <b>explicitly defined and well understood for key areas</b> of responsibility and interaction.	Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are <b>explicitly defined and well understood for all areas</b> of responsibility and interaction.
	<b>Met?</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>
<b>Justification</b>		<p>Some organizations and individuals involved in the management process have been identified and their functions, roles and responsibilities are described in section 3.5.1.</p> <p>Therefore, <b>SG80 would</b> be achieved for this aspect of the score. However, to achieve SG100 the functions, roles and responsibilities must be explicitly defined and well understood for all areas of responsibility and interaction.</p>		
b	<b>Consultation processes</b>			
	<b>Guidepost</b>	The management system includes consultation processes that <b>obtain relevant information</b> from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that <b>regularly seek and accept</b> relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that <b>regularly seek and accept</b> relevant information, including local knowledge. The management system demonstrates consideration of the information and <b>explains how it is used or not used</b> .
	<b>Met?</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>
<b>Justification</b>		<p>There is a consultation process based on Permanent Management Committees, including for demersal fish. And the Ministry of Fisheries has put out for public consultation revisions of laws so that those interested in contributing can fill out online forms with their suggestions for the drafting of the rules.</p> <p>Therefore, the management system would meet SG80 for this aspect of the score. To meet SG100, there must be evidence that national management authorities demonstrate how the information is obtained and details how it is used or not.</p>		
c	<b>Participation</b>			
	<b>Guidepost</b>		The consultation process <b>provides opportunity</b> for all interested and affected parties to be involved.	The consultation process provides <b>opportunity and encouragement</b> for all interested and affected

				parties to be involved and <b>facilitates</b> their effective engagement.
	<b>Met?</b>		<b>YES</b>	<b>NO</b>
<b>Justification</b>	<p>The Management Committees have been reestablished and offer the opportunity for all interested parties to participate. The Southeast/South Demersal CPG is currently composed of 12 members representing federal and state government agencies and entities and 15 members representing institutions involved in fishing activities.</p> <p>Thus, <b>SG80</b> will be maintained for this scoring issue. However, the lack of this mechanism in the future could imply a score reduction.</p>			
<b>Overall PI justification</b>	Scoring issues (a), (b) and (c) do not meet SG100. Thus, Performance Indicator 3.1.2 would probably score <b>80 points</b> .			
		<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>80</b>	

### PI 3.1.3 – Long Term Objectives

<b>PI 3.1.3</b>		<b>The management policy has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Objectives</b>			
	<b>Guidepost</b>	Long-term objectives to guide decision-making, consistent with the MSC fisheries standard and the precautionary approach, are <b>implicit</b> within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach are <b>explicit</b> within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are <b>explicit</b> within <b>and required by</b> management policy.
	<b>Met?</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>
<b>Justification</b>		<p>Law nº 11.959, of June 29<sup>th</sup>, 2009, that regulates the fishing activities in Brazil, established that “the fishery must be managed in order to guarantee the sustainable use of fishery resources”. Inter-Ministerial Directive Nº2/2009 states that the best scientific data available will be used and that, in the case of absence or lack of scientific data, the precautory principle should be applied for defining criteria and standards for sustainable use”.</p> <p>Therefore, the fishery would score <b>SG80</b> for this scoring issue. To meet SG100, there must be evidence that the long term objectives are explicit within the management policy.</p> <p>Therefore, the fishery <b>would score SG80</b> for this scoring issue.</p>		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>80</b>

### PI 3.2.1 – Fishery Specific Objectives

<b>PI 3.2.1</b>		<b>The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC’s Principles 1 and 2.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Objectives</b>			
	<b>Guidepost</b>	<b>Objectives</b> , which are broadly consistent with achieving the outcomes expressed by MSC’s Principles 1 and 2, are <b>implicit</b> within the fishery-specific management system.	<b>Short and long-term objectives</b> , which are consistent with achieving the outcomes expressed by MSC’s Principles 1 and 2, are <b>explicit</b> within the fishery-specific management system.	<b>Well defined and measurable short and long-term objectives</b> , which are demonstrably consistent with achieving the outcomes expressed by MSC’s Principles 1 and 2, are <b>explicit</b> within the fishery-specific management system.
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Overall PI justification</b>		<p>The fishery-specific management system considered for this assessment includes all the measures, procedures and strategies in place for the demersal fisheries in the South of Brazil and they are described in <b>item 3.5.2</b>.</p> <p>These measures tend to manage the fishing effort and the impact on other species. Therefore, it can be concluded that the objectives, which are broadly consistent with achieving the outcomes expressed by MSC’s Principles 1 and 2, are implicit within the fishery-specific management system. Thus, this fishery <b>would score SG60</b> for this scoring issue.</p>		
		<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>		<b>60</b>

### PI 3.2.2 – Decision-Making Processes

<b>PI 3.2.2</b>		<b>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives and has an appropriate approach to actual disputes in the fishery.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Decision-making processes</b>			
	<b>Guidepost</b>	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are <b>established</b> decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Justification</b>		There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives, as described in item 3.2.1. However, there is no approved management plan for the <i>Micropogonias furnieri</i> fishery that could establish decision-making processes. Thus, the fishery <b>would score SG60 for this scoring issue</b> , but not SG80.		
<b>b</b>	<b>Responsiveness of decision-making processes</b>			
	<b>Guidepost</b>	Decision-making processes respond to <b>serious issues</b> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to <b>serious and other important issues</b> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to <b>all issues</b> identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		There is no evidence that the management system can respond to serious issues in a transparent, timely and adaptive manner, as required by this scoring issue. There is no management plan in place for the fishery and there is no data gathering program from the MPA.  Therefore, the fishery <b>would not score SG60</b> .		
<b>c</b>	<b>Use of precautionary approach</b>			
	<b>Guidepost</b>		Decision-making processes use the precautionary approach and are based on best available information.	
	<b>Met?</b>		<b>NO</b>	
<b>Justification</b>		The fishery scores <b>SG60 by default</b> . However, during the drafting of this report, it cannot be claimed that decision-making processes use the precautionary approach and are based on the best available information.  Therefore, the fishery <b>would not score SG80</b> .		

<b>d</b>	<b>Accountability and transparency of management system and decision-making process</b>			
	<b>Guidepost</b>	Some information on the fishery's performance and management action is generally available on request to stakeholders.	<b>Information on the fishery's performance and management action is available on request</b> , and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders <b>provides comprehensive information on the fishery's performance and management actions</b> and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	<b>Met?</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>
<b>Justification</b>		<p>The CPGs allow the participation in their meetings of other institutions as observers or speakers to present a specific issue. This guarantees that the stakeholders are involved in the decision-making processes. Therefore, <b>SG80</b> would be met.</p> <p>However, it cannot be stated that official reports are provided to stakeholders with comprehensive information on fishery performance and management actions.</p> <p>Therefore, the fishery <b>does not score SG100</b>.</p>		
<b>e</b>	<b>Approach to disputes</b>			
	<b>Guidepost</b>	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Justification</b>		<p>For the assessment team there is no evidence that the management authority or fishery are subject to continuing court challenges. Therefore, the fishery would score <b>SG60</b>.</p> <p>To score SG80, there should be evidence that the management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.</p>		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>

### PI 3.2.3 – Compliance and Enforcement

<b>PI 3.2.3</b>		<b>Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.</b>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>MCS implementation</b>			
	<b>Guidepost</b>	Monitoring, control and surveillance <b>mechanisms</b> exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance <b>system</b> has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A <b>comprehensive</b> monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>The Brazilian legislation includes monitoring, control and surveillance measures. Law Nº 11.959, dated June 29<sup>th</sup>, 2009, regulating fishing activities, establishes in Art. 31 that the surveillance would cover the fishing, harvest, landing, conservation, transport, processing, storage and commercialization of the water resources. In addition, surveillance is the responsibility of the Federal Government, in conformity with the state, district and municipal rules. Art 32 of the same law, determines that “the competent authority could determine the use of onboard maps and satellite monitoring systems, as well as any other device or procedure that could enable remote monitoring. This would offer automatic and real time geographical location and depth of the vessels’ fishing place, according to the terms of the specific regulation”. This would meet the first part of the SG60 requirement.</p> <p>However, in this preevaluation, evidence was produced showing that the mechanism is not effective. Thus, the fishery <b>would not score SG 60</b> for this scoring issue.</p>		
<b>b</b>	<b>Sanctions</b>			
	<b>Guidepost</b>	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, <b>are consistently applied</b> and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and <b>demonstrably</b> provide effective deterrence.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>There are sanctions to deal with non-compliance. <b>Regulatory Instruction Nº 18, dated June 18<sup>th</sup>, 2008</b>, establishes the procedures to implement administrative measures (warning, suspension or cancellation of the fishing license and vessel registration), once non-compliance with the fishing regulations has been verified, regarding the Fisheries General Register - RGP, National Program for Satellite Tracking of Fishing Vessels - PREPS, National Fishing Vessels Observers Program - PROBORDO and Onboard Maps.</p> <p>However, the assessment team did not find evidence that sanctions were applied. Therefore, the fishery <b>would not score SG60</b> for this scoring issue.</p>		



<b>c</b>	<b>Compliance</b>			
	<b>Guidepost</b>	Fishers are <b>generally thought</b> to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	<b>Some evidence exists</b> to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a <b>high degree of confidence</b> that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	<b>Met?</b>	<b>NO</b>		
<b>Justification</b>		<p>There are management measures such as the compulsory handing of onboard maps and the use of the satellite vessel tracking system. As a result, there is a Mechanism for the Control and Supervision (MCS), thus meeting the first part of the SG60 requirement for this scoring issue.</p> <p>But there can be no reasonable expectation that the MCS mechanism is effective and <b>SG60 would not</b> be met for this scoring problem.</p>		
<b>d</b>	<b>Systematic non-compliance</b>			
	<b>Guidepost</b>		There is no evidence of systematic non-compliance.	
	<b>Met?</b>		<b>NO</b>	
<b>Justification</b>		The fishery scores <b>SG60 by default.</b>		
		<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>&lt;60</b>	

### PI 3.2.4 – Monitoring and Management Performance Evaluation

<b>PI 3.2.4</b>		<p>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives.</p> <p>There is effective and timely review of the fishery-specific management system.</p>		
<b>Scoring Issue</b>		SG 60	SG 80	SG 100
<b>a</b>	<b>Evaluation coverage</b>			
	<b>Guidepost</b>	There are mechanisms in place to evaluate <b>some</b> parts of the fishery-specific management system.	There are mechanisms in place to evaluate <b>key</b> parts of the fishery-specific management system	There are mechanisms in place to evaluate <b>all</b> parts of the fishery-specific management system.
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Justification</b>		<p>The Management Committees evaluate some parts of the management system, <b>scoring SG60</b> for this scoring issue.</p> <p>Thus, the fishery scores <b>SG60</b> for this scoring issue. However, the absence of that mechanism in the future could cause a score reduction.</p>		
<b>b</b>	<b>Internal and/or external review</b>			
	<b>Guidepost</b>	The fishery-specific management system is subject to <b>occasional internal</b> review.	The fishery-specific management system is subject to <b>regular internal</b> and <b>occasional external</b> review.	The fishery-specific management system is subject to <b>regular internal</b> and <b>external</b> review.
	<b>Met?</b>	<b>YES</b>	<b>NO</b>	
<b>Justification</b>		<p>Given the functioning of the southeast and south demersal CPG, the fishery complies with SG60 for this aspect of the score, but not for SG80.</p>		
			<b>Likely PI Scoring Level (&lt;60, 60-79, ≥ 80)</b>	<b>60</b>

## BIBLIOGRAPHY

BRASIL (2009). Lei nº 11.959 de 29 de junho de 2009. Diário Oficial da República Federativa do Brasil. Disponível em: < [http://www.planalto.gov.br/ccivil\\_03/ato2007-2010/2009/lei/l11959.htm](http://www.planalto.gov.br/ccivil_03/ato2007-2010/2009/lei/l11959.htm) >

BRASIL (2004). INSTRUÇÃO NORMATIVA SEAP/PR Nº 03, de 12 de maio de 2004.

CANEL, D., LEVY, E., SOARES, I. A., BRAICOVICH, P. E., HAIMOVICI, M., LUQUE, J. L., TIMI, J. T. (2019). Stocks and migrations of the demersal fish *Umbrina canosai* (Sciaenidae) endemic from the subtropical and temperate Southwestern Atlantic revealed by its parasites. *Fisheries Research* 214, 10-18.

CARDOSO, L.G., HAIMOVICI, M., PERES, M.B., SOUZA, C.A. (2019). Cartilha: Medidas de manejo para espécies de peixes marinhos sobre exploradas no sul do Brasil. Ministério do Meio Ambiente, Fundação Boticário de Proteção à Natureza. Relatório de projeto. 22 pp.

CARDOSO LG, DA SILVEIRA MONTEIRO, D, HAIMOVICI M. (2021). An assessment of discarded catches from the bottom pair trawling fishery in southern Brazil. *Mar Fish Sci* [Internet]. 34(2):197-210. Disponível em: <https://ojs.inidep.edu.ar/index.php/mafis/article/view/183> .

CARDOSO, L.G.; SANT'ANA, R.; MOURATO, B.L.; KIKUCHI, E.; HAIMOVICI, M. & PEREZ, A., 2022. Avaliação do Estado de Exploração e Potenciais de Produção dos Recursos Pesqueiros Demersais da Margem Meridional Brasileira. In: Perez, A. & Sant'Ana, R. A Pesca Demersal nas Regiões Sudeste e Sul do Brasil: Síntese Espacial e Modelo de Gestão com Enfoque Ecosistêmico. Relatório Projeto: Subsídios Científicos para o Manejo Espacial e com Enfoque Ecosistêmico da Pesca Demersal nas regiões Sul e Sudeste do Brasil - MEEE – PDSES. Chamada MCTI/MPA/CNPq Nº 22/2015 – Ordenamento da Pesca Marinha Brasileira.

CASTELLO, J. P. (2007). Gestão sustentável dos recursos pesqueiros, isto é realmente possível? *Pan-American Journal of Aquatic Sciences* v. 2, p. 47-52, 2007.

CASTRO, G. (2006). A PESCA DE RECURSOS DEMERSAIS E SUAS TRANSFORMAÇÕES TEMPORAIS. Artigo de hipertexto. Disponível em: < [http://www.infobios.com/Artigos/2006\\_2/PescaDemersais/index.htm](http://www.infobios.com/Artigos/2006_2/PescaDemersais/index.htm) >. Consultado: 28/7/2021

CATÁLOGO DOS APARELHOS E EMBARCAÇÕES DE PESCA MARINHA DO BRASIL (2020) / organizador Vanildo Souza de Oliveira. - Rio Grande: Ed. da FURG, 2020.

CHIARAMONTE, GE (2000). *Squatina guggenheim (subpopulação brasileira)*. *A Lista Vermelha de Espécies Ameaçadas da IUCN 2000*:e.T39465A10239986. <https://dx.doi.org/10.2305/IUCN.UK.2000.RLTS.T39465A10239986.en> . Transferido em 23 de agosto de 2021

COSSEAU, M. B. e PERROTA, R. G. (1998). Peces marinos de Argentina: Biología distribución y pesca, INIDEP, Mar del Plata, 163 p.

FERREIRA, E. C. (2009). A dinâmica da pesca costeira de emalhe e o efeito nas taxas de captura acidental de toninhas *Pontoporia blainvillei* (Cetacea, Pontoporiidae), na costa sul do Rio Grande do Sul. Dissertação de mestrado. Programa de Pós-graduação em Oceanografia Biológica da Universidade Federal do Rio Grande/FURG. 2009.

FIGUEIREDO, J.L., MENEZES, N.A., (1980). Manual de peixes marinhos do sudeste do Brasil. III. Teleostei. Museu de Zoologia. Universidade de São Paulo, São Paulo.

FISCHER, L.G.; HAIMOVICI, M. Mudanças espaciais e temporais na distribuição da fauna nectônica demersal da plataforma externa e talude superior do Sul do Brasil. IV Congresso Brasileiro de Oceanografia, 2010, Rio Grande, 3007-3010.

FOGLIARINI C. O. (2017). Avaliação das capturas incidentais na pesca de emalhe no Sul do Brasil: descartes e bycatch de pinguim-de-Magalhães. MD Thesis, Biological Oceanography, Universidade Federal do Rio Grande, Rio Grande, 86 pp.

FREITAS, L. R. DE (2014). Estudo da variabilidade de frentes oceânicas a partir de imagens de temperatura da superfície do mar na costa brasileira /. Dissertação (Mestrado em Sensoriamento Remoto) – Instituto Nacional de Pesquisas Espaciais, São José dos Campos – São José dos Campos: INPE, 2014. xxviii + 130 p ; (sid.inpe.br/mtc-m21b/2014/07.08.16.52 -TDI)

HEILEMAN E GASALLA, (2009). HEILEMAN, S.; GASALLA, M 2009. XVI-54 South Brazil Shelf: LME # 15. In: SHERMAN, K; HEMPEL, G. (eds) The UNEP Ecosystem Report: a perspective on changing conditions in LMEs of the World's Regional Seas. UNEP Regional Seas Report and Studies n182. United Nations Environment Programme. Nairobi, Kenya, 2ed., 723-734 pp.

FURG (2012). Boletim estatístico da pesca artesanal e industrial no estuário da Lagoa dos Patos –2012. 38 p.

FURG (2013). Boletim estatístico da pesca artesanal e industrial no estuário da Lagoa dos Patos –1º semestre de 2013. 43 p.

FURG (2013). Boletim estatístico da marinha e estuarina do sul do Rio Grande do Sul – Ano 2013 (2º semestre) 54 p.

FURG (2014). Boletim estatístico da marinha e estuarina do sul do Rio Grande do Sul – 2014. 78 p.

FURG (2015). Boletim estatístico da marinha e estuarina do sul do Rio Grande do Sul – 2015. 78 p.

FURG (2017). Boletim estatístico da pesca marinha do Sul do Rio Grande do Sul-2017 2º semestre. Projeto de Estatísticas de Desembarque Pesqueiro da região sul do Rio Grande do Sul e região oceânica adjacente.

FURG/SEMA (2018). Boletim da pesca industrial marinha no Rio Grande do Sul – 2018. Laboratório de Recursos Pesqueiros Demersais e Cefalópodes - Instituto de Oceanografia – FURG. 15 p.

FURG/SEMA (2019). Boletim da pesca industrial marinha desembarcada no Rio Grande do Sul – 2019. Laboratório de Recursos Pesqueiros Demersais e Cefalópodes - Instituto de Oceanografia – FURG. 15 p.

FURG/SEMA (2020). Boletim da pesca industrial marinha no Rio Grande do Sul – 2019. Laboratório de Recursos Pesqueiros Demersais e Cefalópodes - Instituto de Oceanografia – FURG. 28 p. Atualizado em 23/04/2020.

HAIMOVICI, M. 1987. Estratégia de amostragens de comprimentos de teleosteosteósteos demersais nos desembarques da pesca de arrasto no litoral sul do Brasil. Atlântica, Rio Grande, 9 (1):65-82.

HAIMOVICI, M. MARTINS, A.S E P.C. VIEIRA (1996). Distribuição e abundância de teleósteos demersais sobre a plataforma continental do sul do Brasil. Revista Brasileira de Biologia 56(1):27-50.

Haimovici, M., Umpierre, R.G., 1996. Variaciones estacionales en la estructura poblacional y cambios de crecimiento de la corvina *Micropogonias furnieri* (Desmarest, 1823) en el extremo sur de Brasil. Atlântica. 18, 179–202.

HAIMOVICI, M. (1998). Present state and perspectives for the southern Brazil shelf demersal fisheries. Fisheries Management and Ecology, 5: 277-289.

Haimovici, M., Ignácio, J. M., 2005. *Micropogonias furnieri* (Desmarest, 1823). In: Cergole, M. C.; Ávila-da-Silva, A. O.; Wongtschowski, C. L. D. B. R. Análise das Principais Pescarias Comerciais da Região Sudeste-Sul do Brasil: Dinâmica Populacional das Espécies em Exploração. Série Documentos Revizee-Score Sul, IOUSP: 101–107p.

HAIMOVICI, M. ANDRIGUETTO J. SUNYE P. (2014). A pesca marinha e estuarina no Brasil: estudos de caso multidisciplinares. Rio Grande: Editora da FURG, 91p. ISBN 978-85-7566-335-6.

Haimovici, M., Cardoso, L. G., Unpierre, R. G., 2016. Stocks and management units of *Micropogonias furnieri* (Desmarest, 1823) in southwestern Atlantic. Lat. Am. J. Aquat. Res. 44, 1080–1095.

Haimovici, M., Cavole, L. M., Cope, J. M., Cardoso, L. G., 2021. Long-term changes in population dynamics and life history contribute to explain the resilience of a stock of *Micropogonias furnieri* (Sciaenidae, Teleostei) in the SW Atlantic. Fish. Res., 237, 105878.

HORDYK, A. R., ONO, K., VALENCIA, S. R., LONERAGAN, N. R. & PRINCE, J. D. (2015). A novel length-based empirical estimation method of spawning potential ratio (SPR), and tests of its performance, for small-scale, data-poor fisheries. ICES Journal of Marine Science 72, 217-231. doi: 10.1093/icesjms/fsu004

IBAMA/CEPERG, 2001. Desembarque de pescado no Rio Grande do Sul: 2000. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 41p.

IBAMA/CEPERG, 2002. Desembarque de pescado no Rio Grande do Sul: 2001. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 40p.

IBAMA/CEPERG, 2003. Desembarque de pescado no Rio Grande do Sul: 2002. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 37p.

IBAMA/CEPERG, 2004. Desembarque de pescado no Rio Grande do Sul: 2003. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 40p.

IBAMA/CEPERG, 2005. Desembarque de pescado no Rio Grande do Sul: 2004. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 44p.

IBAMA/CEPERG, 2006. Desembarque de pescado no Rio Grande do Sul: 2005. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 45p.

IBAMA/CEPERG, 2007. Desembarque de pescado no Rio Grande do Sul: 2007. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 39p.

IBAMA/CEPERG, 2008. Desembarque de pescado no Rio Grande do Sul: 2008. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 41p.

IBAMA/CEPERG, 2009. Desembarque de pescado no Rio Grande do Sul: 2009. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 42p.

IBAMA/CEPERG, 2010. Desembarque de pescado no Rio Grande do Sul: 2010. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 45p.

IBAMA/CEPERG, 2011. Desembarque de pescado no Rio Grande do Sul: 2011. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. Centro de Pesquisa e Gestão dos Recursos Pesqueiros – Rio Grande. Projeto Estatística Pesqueira, 40p.

IBDMAR (2021). Potenciais para suprir uma lacuna na gestão pesqueira: avanço nas discussões internacionais sobre a criação de organização regional de pesca para o Atlântico Sul. Disponível em: <http://www.ibdmar.org/2021/04/potenciais-para-suprir-uma-lacuna-na-gestao-pesqueira-avanco-nas-discussoes-internacionais-sobre-criacao-de-organizacao-regional-de-pesca-para-o-atlantico-sul/>

INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE (2018). Livro Vermelho da Fauna Brasileira Ameaçada de Extinção: Volume II - Mamíferos. In: Instituto Chico Mendes de Conservação da Biodiversidade (Org.). Livro Vermelho da Fauna Brasileira Ameaçada de Extinção. Brasília: ICMBio. 622p.

INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE (2018). Livro Vermelho da Fauna Brasileira Ameaçada de Extinção: Volume IV - Répteis. In: Instituto Chico Mendes de Conservação da Biodiversidade. (Org.). Livro Vermelho da Fauna Brasileira Ameaçada de Extinção. Brasília: ICMBio. 252p.

INSTITUTO DE PESQUISA ECONÔMICA APLICADA (IPEA) (2013). Boletim regional, urbano e ambiental. Diretoria de Estudos e Políticas Regionais, Urbanas e Ambientais. Brasília, n. 7, jan-jun 2013.

KAISER, M.J., CLARKE, K.R., HINZ, H., AUSTEN, M.C.V., SOMERFIELD, P.J., KARAKASSIS, I., (2006). Global analysis of response and recovery of benthic biota to fishing. Mar. Ecol. – Prog. Ser. 311, 1–14. <http://dx.doi.org/10.3354/meps311001>

MADUREIRA, L. S.P; ROSSI- WONGTSCHOWSKI, C. L. D. B (2005). Prospecção de recursos pesqueiros pelágicos na Zona Econômica Exclusiva da Região Sudeste-Sul do Brasil: hidroacústica e biomassas / editores Lauro Saint Pastous Madureira,

Carmen Lúcia Del Bianco Rossi Wongtschowski. — São Paulo: Instituto Oceanográfico — USP, 2005. — (Série documentos Revizee: Score Sul / responsável Carmen Lúcia Del Bianco Rossi-Wongtschowski).

MPA/MMA (2011). Instrução Normativa Interministerial MPA/MMA Nº 10, de 10 de junho de 2011.

MSC (2018). MSC Fisheries Standard. Version 2.01. 31 August 2018.

NION, H., MARÍN, Y.H., MENESES, P., PUIG, P., 2013. Distribución batimétrica de la familia Sciaenidae (Perciformes) en el Atlántico Sudoccidental y consideraciones sobre las pesquerías de los peces de esta familia. Fr. Mar. 23, 105–132.

PEREZ, J. A. A.; PEZZUTO, P.R.; RODRIGUES, L.F.; VALENTINI, H.; VOOREM, C. M. 2001. Relatório da reunião técnica de ordenamento da pesca de arrasto nas regiões sudeste e sul do Brasil. Notas. Técn. Facimar. 5:1-34.

PEZZUTO, P. & BENINCÁ, E. (2015). Challenges in licensing the industrial double-rig trawl fisheries in Brazil. Lat. Am. J. Aquat. Res., 43(3): 495-513.

POLLOM, R., BARRETO, R., CHARVET, P., CHIARAMONTE, G.E., CUEVAS, J.M., HERMAN, K., MARTINS, M.F., MONTEALEGRE-QUIJANO, S., MOTTA, F., PAESCH, L. & RINCON, G. 2020. *Pseudobatos horkelii*. The IUCN Red List of Threatened Species 2020: e.T41064A2951089. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T41064A2951089.en>.

PORT, D. (2015). O impacto da pesca industrial de arrasto sobre os ecossistemas da margem continental do sudeste/sul do Brasil. Tese de Doutorado. Universidade do Vale do Itajaí. 162p., 2015.

PRINCE, J. LALAVANUA, W. TAMANITOAKULA, J. LOGANIMOCE, E. VODIVODI, T. MARAMA, K. WAQAINABETE, P. JEREMIAH, F. NALASI, D. TAMATA, L. NALEBA, M. NAISILISILI, W. KALLOUDRAU, U. LAGI, L. LOGATABUA, K. DAUTEI, R. TIKARAM R. AND MANGUBHAI, S. (2019). Spawning potential surveys reveal an urgent need for effective management. 158. 28 – 36. [https://www.researchgate.net/publication/333915727\\_Spawning\\_potential\\_surveys\\_reveal\\_an\\_urgent\\_need\\_for\\_effective\\_management/citation/download](https://www.researchgate.net/publication/333915727_Spawning_potential_surveys_reveal_an_urgent_need_for_effective_management/citation/download).

QUEIROLO, D. WAHRLICH, R. MOLINA, R. FACCIN, J. & PEZZUTO, P. (2016). Industrial double rig trawl fisheries in the southeastern and southern Brazil: characterization of the fleet, nets and trawl simulation. Lat. Am. J. Aquat. Res., 44(5): 898-907.

ROSSO, A. P. 2015. Análise das relações entre frotas pesqueiras, recursos demersais e características do ecossistema: subsídios para a identificação de Unidades Geográficas de Gestão para a pesca industrial do Sudeste-Sul do Brasil. Dissertação de Mestrado. Universidade do Vale do Itajaí-UNIVALI. 106p.

SAP/MAPA (2021). Plano para a retomada sustentável da atividade de pesca de arrasto na costa do Rio Grande do Sul.

SEAFOOD BRASIL (2020): <https://www.seafoodbrasil.com.br/revisao-das-normativas-pesqueirasprocesso-bem-vindo-mas-ainda-fragil>

SEMINOFF, J.A. (SOUTHWEST FISHERIES SCIENCE CENTER, U.S.). 2004. *Chelonia mydas*. The IUCN Red List of Threatened Species 2004: e.T4615A11037468. <https://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T4615A11037468.en>.

TORRES, K. MORIGA, L. MIYASHITA, L. 2019. Estratégia integrada de monitoramento marinho costeiro: Programa Nacional de Monitoramento da Biodiversidade do ICMBio (MONITORA) - subprograma Marinho e Costeiro. ISBN: 978-65-5024-011-0. [https://www.icmbio.gov.br/portal/images/stories/o-que-fazemos/monitoramento/estrategia\\_integrada\\_de\\_monitoramento\\_marinho\\_costeiro.pdf](https://www.icmbio.gov.br/portal/images/stories/o-que-fazemos/monitoramento/estrategia_integrada_de_monitoramento_marinho_costeiro.pdf)

UNIVALI/EMCT/LEMA (2001). Boletim estatístico da pesca industrial de Santa Catarina ano 2000: ações prioritárias ao desenvolvimento da pesca e aquicultura no sul do Brasil/ Coordenador da estatística pesqueira Paulo Ricardo Pezzuto. - Itajaí : UNIVALI, 2001. 61 p.

UNIVALI/EMCT/LEMA (2002). Boletim estatístico da pesca industrial de Santa Catarina ano 2001: ações prioritárias ao desenvolvimento da pesca e aquicultura no sul do Brasil/ Coordenador da estatística pesqueira Paulo Ricardo Pezzuto. - Itajaí : UNIVALI, 2002. 89 p.

UNIVALI/EMCT/LEMA (2003). Boletim estatístico da pesca industrial de Santa Catarina ano 2002 : ações prioritárias ao desenvolvimento da pesca no Sudeste e Sul do Brasil / coordenador da estatística pesqueira Paulo Ricardo Pezzuto.-- Itajaí : Ed. UNIVALI, 2003. 93p.

UNIVALI/EMCT/LEMA (2004). Boletim estatístico da pesca industrial de Santa Catarina – ano 2003 : ações prioritárias ao desenvolvimento da pesca no Sudeste e Sul do Brasil \ Universidade do Vale do Itajaí , Centro de Ciências Tecnológicas da Terra e do Mar. – Itajaí : Universidade do Vale do Itajaí, 2004., 80 p

UNIVALI/EMCT/LEMA (2005). Boletim estatístico da pesca industrial de Santa Catarina – ano 2004 : programa de apoio técnico e científico ao desenvolvimento da pesca no Sudeste e Sul do Brasil \ Universidade do Vale do Itajaí , Centro de Ciências Tecnológicas da Terra e do Mar. – Itajaí : Universidade do Vale do Itajaí, 2006. 64 p.

UNIVALI/EMCT/LEMA (2006). Boletim estatístico da pesca industrial de Santa Catarina – ano 2005 e panorama 2001/2005: programa de apoio técnico e científico ao desenvolvimento da pesca no Sudeste e Sul do Brasil \ Universidade do Vale do Itajaí , Centro de Ciências Tecnológicas da Terra e do Mar. – Itajaí : Universidade do Vale do Itajaí, 2007.

UNIVALI/EMCT/LEMA (2007). Boletim estatístico da pesca industrial de Santa Catarina ano 2006/ Coordenador da estatística pesqueira Paulo Ricardo Pezzuto. -Itajaí : UNIVALI, 2007. 80 p.

UNIVALI/EMCT/LEMA (2008). Boletim estatístico da pesca industrial de Santa Catarina – Ano 2007: programa de apoio técnico e científico ao desenvolvimento da pesca no Sudeste e Sul do Brasil / Universidade do Vale do Itajaí, Centro de Ciências Tecnológicas da Terra e do Mar – (CTTMar). – Itajaí: Universidade do Vale do Itajaí, 2008. 71 p.

UNIVALI/EMCT/LEMA (2008). Boletim estatístico da pesca industrial de Santa Catarina – ano 2008: programa de apoio técnico e científico ao desenvolvimento da pesca no Sudeste e Sul do Brasil / Universidade do Vale do Itajaí, Centro de Ciências Tecnológicas da Terra e do Mar. – Itajaí: 2009. 73 p.

UNIVALI/EMCT/LEMA (2010). Boletim estatístico da pesca industrial de Santa Catarina – ano 2009 e panorama 2000 – 2009: programa de monitoramento e avaliação da atividade pesqueira industrial no sudeste e sul do Brasil. – Itajaí: Universidade do Vale do Itajaí], 2010 97 p

UNIVALI/EMCT/LEMA (2011). Boletim estatístico da pesca industrial de Santa Catarina – ano 2010: programa de monitoramento e avaliação da atividade pesqueira industrial no sudeste e sul do Brasil – v. 11, n. 1. Itajaí: Universidade do Vale do Itajaí, 2011. 59 p.

UNIVALI/EMCT/LEMA (2013). Boletim estatístico da pesca industrial de Santa Catarina –ano 2011: programa de estatística pesqueira industrial de Santa Catarina – v. 12, n. 1. Itajaí : Universidade do Vale do Itajaí, 2013. 59 p.

UNIVALI/EMCT/LEMA (2013). Boletim estatístico da pesca industrial de Santa Catarina – ano 2012: programa de estatística pesqueira industrial de Santa Catarina – v. 13, n. 1. Itajaí : Universidade do Vale do Itajaí, 2013. 66 p.

UNIVALI/EMCT/LEMA. Estatística Pesqueira de Santa Catarina. Consulta On-line. Projeto de Monitoramento da Atividade Pesqueira do Estado de Santa Catarina. Laboratório de Estudos Marinhos Aplicados (LEMA), da Escola do Mar, Ciência e Tecnologia (EMCT) da Universidade do Vale do Itajaí (UNIVALI). 2020. Disponível em: <http://pmap-sc.acad.univali.br/>.

VALENTIN, H. PEZZUTO, P. 2006. Análise das principais pescarias comerciais da região Sudeste-Sul do Brasil com base na produção controlada do período 1986-2004 / . — São Paulo: Instituto Oceanográfico — USP, 2006. — (Série documentos Revizee : Score Sul / responsável Carmen Lúcia Del Bianco Rossi-Wongtschowski).

VASCONCELLOS, M.; HAIMOVICI, M. 2006. Status of white croaker *Micropogonias furnieri* exploited in southern Brazil according to alternative of stock discreteness. Fisheries Research. , v.80, p.196 - 202.

VASCONCELLOS, M.; HAIMOVICI, M.; RAMOS, K. (2014) - Pesca de emalhe demersal no sul do Brasil: evolução, conflitos e (des) ordenamento. In: A pesca marinha e estuarina no Brasil: estudos de caso multidisciplinares, pp.29-40, FURG, Rio Grande, Brasil.

VASCONCELLOS, M. KALIKOSKI, D. HAIMOVICI, M. ABDALLAH, P. (2007). Capacidad excesiva del esfuerzo pesquero en el sistema estuarino costero del sur de Brasil: efectos y perspectivas para su gestión. En Aguero, M. 2007. Capacidad de pesca y manejo pesquero en America latina y el Caribe, FAO Documento Tecnico de Pesca. No 461. Roma, FAO. Pag. 403.

VAZ DOS SANTOS, A. M.; ROSSI WONGTSCHOWSKI, C. L. D. B.; FIGUEREDO, J. L. (2007) Recursos pesqueiros compartilhados: bioecologia, manejo e aspectos aplicados no Brasil. *Boletim do Instituto de Pesca*, São Paulo: submetido.

VAZZOLER, A. E. A. 1971. Diversificação fisiológica e morfológica de *Micropogon furnieri* (Desmarest, 1823) ao sul de Cabo Frio, Brasil. *Boletim do Instituto Oceanográfico*, São Paulo, 20 (2):1-71.