



# **Snapper and Grouper:**

## **SFP Fisheries Sustainability Overview 2015**





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## PHOTO CREDITS

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## KEYWORDS

Developing countries, FAO, fisheries, grouper, improvements, seafood sector, small-scale fisheries, snapper, sustainability



## EXECUTIVE SUMMARY

The goal of this report is to provide a brief overview of the current status and trends of the snapper and grouper seafood sector, as well as to identify the main gaps of knowledge and highlight areas where improvements are critical to ensure long-term sustainability.

Snapper and grouper are important fishery resources with great commercial value for exporters to major international markets. The fisheries also support the livelihoods and food security of many local, small-scale fishing communities worldwide. It is therefore all the more critical that management of these fisheries improves, thus ensuring this important resource will remain available to provide both food and income.

Landings of snapper and grouper have been steadily increasing: in the 1950s, total landings were about 50,000 tonnes, but they had grown to more than 612,000 tonnes by 2013. Almost half of these snapper landings are from Indonesia, while the landings of grouper are mainly from China and Indonesia.

Despite the number of reported landings, however, the status of many snapper and grouper stocks is unknown, particularly in the multispecies small-scale fisheries in developing countries where the reporting system is absent or insufficient. This is a concern since the life history characteristics of these species (e.g., slow-growing, late-maturing, seasonal-spawning aggregations) make them particularly susceptible to overexploitation.

In some cases, even basic data collection and management would be an improvement, and this report offers recommendations to catchers and regulators concerning the appropriate data to gather and where to report it.

The responsibility for addressing the problem does not just lie there. Retailers and other companies throughout the seafood supply chain must also get involved, and this report suggests how they can take action to put a stop to unsustainable fishing practices and help put proper fisheries management into place.



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## 1 INTRODUCTION

Sustainable Fisheries Partnership (SFP) helps the seafood industry access information to guide responsible seafood sourcing and enhances the ability of seafood companies and partners to influence policies and management practices to improve fisheries and reduce the environmental impacts of fishing ([www.sustainablefish.org](http://www.sustainablefish.org)).

SFP produces annual reports for several seafood sectors that analyze the performance of relevant fisheries and principal sustainability challenges. The main objective is to provide clear and actionable information on the respective sector in order to better support the needs of the various industry sectors in their efforts to ensure sustainable seafood supplies.

In 2015, SFP developed for the first time a brief analysis of the snapper and grouper sector group. Considering the FAO database, a simple approach for identifying the species covered by this sector was adopted in this report: "snapper" comprises the species of the Lutjanidae family, while "grouper" includes species from the Serranidae<sup>1</sup> family. The goal of this report is to provide a brief overview of the current status and trends in the sector, as well as to identify the main gaps of knowledge.

Snapper and grouper are important fisheries resources with a great commercial value for export to major international markets but also for the livelihoods and food security of many local, small-scale communities worldwide. Snapper and grouper are important predators, often considered a species-complex in fisheries management due to some similarities in life-history characteristics, habitat use, and in the way they are harvested (Heyman et al. 2014). The life history characteristics of these species (e.g., slow-growing, late-maturing, seasonal-spawning aggregations) make them particularly susceptible to overexploitation.

Snapper and grouper species are targeted by commercial, artisanal (subsistence/traditional), and recreational fisheries, using a wide variety of gears, in most of the cases, in multi-species fisheries. Effective management of these fisheries is of higher importance (Coleman et al. 2000). However, because most of these fisheries are undertaken in developing countries, the status of most snapper and grouper stocks is unknown.

The snapper and grouper seafood sector group represents about 8.5% of the landings (in weight) of miscellaneous coastal fishes<sup>2</sup> and less than 1% of the total world capture production (FAO 2015). In terms of value of imports, this sector group represents about 10% of the total value of the miscellaneous coastal fishes (FAO 2015).

Although they are of high commercial value, species-specific landings statistics are not reported for most snapper and grouper species. The landings data from the FAO database by species presents high constraints because of the low degree of resolution: more than 80% of the snapper landings are reported as "snappers nei"<sup>3</sup> and about 61% of grouper landings are reported as "groupers nei." In part, this occurs because of the difficulty of identifying many of the species in some countries (e.g., Indonesia) where there is a high diversity of species with similar morphological characteristics, making it difficult to identify and report at the species level. Tables 1 and 2 present the landings of the main species of snapper and grouper, respectively. Besides the generic reporting as "snappers nei," "snappers, jobfishes nei," and "jobfishes nei," the main species of snappers reported to the

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<sup>1</sup> Groupers are usually defined as sub-family Epinephelidae but due FAO database constrains, data at level of family (Serranidae) was used instead in the analysis.

<sup>2</sup> FAO ISSCAAP 33: "Miscellaneous coastal fishes"

<sup>3</sup> nei – nowhere else identified



FAO database are: mangrove red snapper, yellowtail snapper, southern red snapper, northern red snapper, lane snapper, and vermilion snapper.

**Table 1.** Total landings (tonnes) of snappers by species, 2010–2013 average (FAO data).

Common name	Scientific name	Landings average 2010-2013 (t)	% of total	Cumulative %
Snappers nei	<i>Lutjanus spp</i>	141007	54.5	54.5
Snappers, jobfishes nei	<i>Lutjanidae</i>	66529	25.7	80.2
Mangrove red snapper	<i>Lutjanus argentimaculatus</i>	11394	4.4	84.6
Yellowtail snapper	<i>Ocyurus chrysurus</i>	8798	3.4	88.0
Southern red snapper	<i>Lutjanus purpureus</i>	8228	3.2	91.2
Northern red snapper	<i>Lutjanus campechanus</i>	3811	1.5	92.7
Jobfishes nei	<i>Pristipomoides spp</i>	3688	1.4	94.1
Lane snapper	<i>Lutjanus synagris</i>	3635	1.4	95.5
Vermilion snapper	<i>Rhomboplites aurorubens</i>	2473	1.0	96.5
Pacific red snapper	<i>Lutjanus peru</i>	2442	0.9	97.4
John's snapper	<i>Lutjanus johnii</i>	2418	0.9	98.4
Spotted rose snapper	<i>Lutjanus guttatus</i>	813	0.3	98.7
Malabar blood snapper	<i>Lutjanus malabaricus</i>	686	0.3	98.9
Two-spot red snapper	<i>Lutjanus bohar</i>	476	0.2	99.1

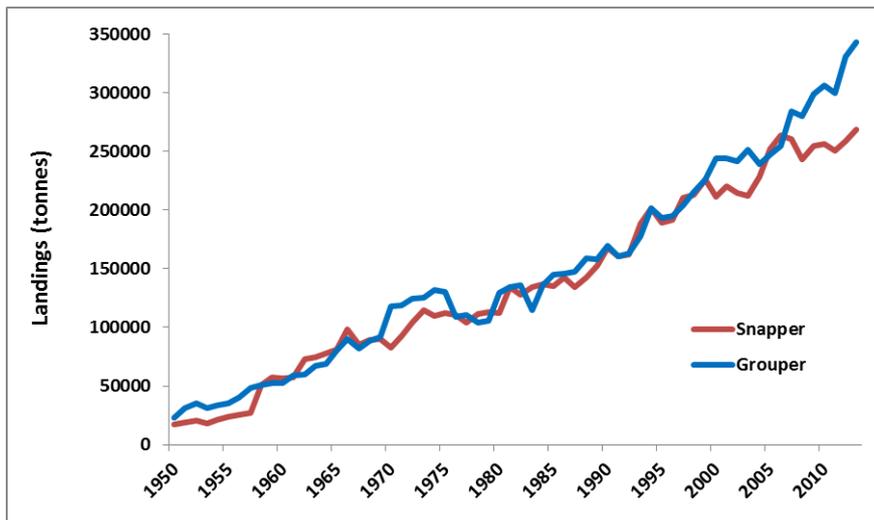
For groupers, in addition to the generic “groupers nei” and “groupers, seabasses nei” the species most commonly landed are: chocolate hind, leopard coral grouper, humpback grouper, orange-spotted grouper, and greasy grouper (Table 2).

**Table 2.** Total landings (tonnes) of groupers by species, 2010–2013 average (FAO data).

Common name	Scientific name	Landings average 2010-2013 (t)	% of total	Cumulative %
Groupers nei	<i>Epinephelus spp</i>	141823	44.1	44.1
Groupers, seabasses nei	<i>Serranidae</i>	55597	17.3	61.4
Chocolate hind	<i>Cephalopholis boenak</i>	48035	14.9	76.3
Leopard coral grouper	<i>Plectropomus leopardus</i>	16045	5.0	81.3
Humpback grouper	<i>Cromileptes altivelis</i>	9487	3.0	84.3
Orange-spotted grouper	<i>Epinephelus coioides</i>	8277	2.6	86.9
Greasy grouper	<i>Epinephelus tauvina</i>	7012	2.2	89.0
Honeycomb grouper	<i>Epinephelus merra</i>	5441	1.7	90.7
[Paralabrax spp]	<i>Paralabrax spp</i>	5351	1.7	92.4
White grouper	<i>Epinephelus aeneus</i>	3941	1.2	93.6
Argentine seabass	<i>Acanthistius brasilianus</i>	3143	1.0	94.6
Duskytail grouper	<i>Epinephelus bleekeri</i>	2813	0.9	95.5
Red grouper	<i>Epinephelus morio</i>	2272	0.7	96.2
Brazilian groupers nei	<i>Mycteroperca spp</i>	2172	0.7	96.9

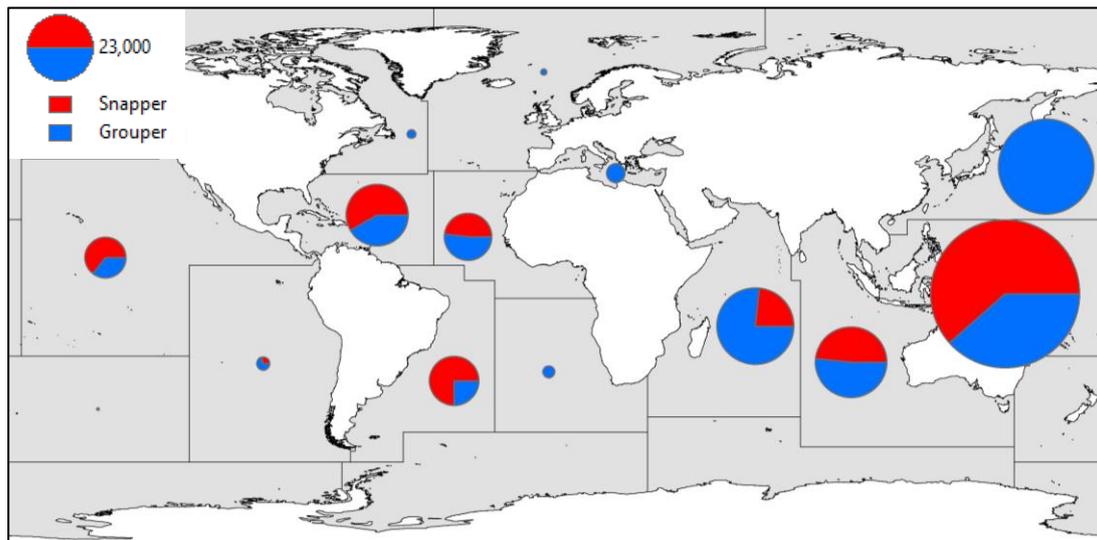
According to FAO statistics for 2011–2015), snapper and grouper landings have been continuously increasing. In the 1950s, total landings were about 50,000 tonnes. They then steadily increased, reaching the highest value in 2013 with more than 612,000 tonnes landed (Figure 1). In general, this trend of increasing catches reflects growing demand and intensification of fishing effort for these valuable species.

Until recently, snapper and grouper had presented the same level of landings. However, most evidently since 2007, there has been a slight increase in the landings of grouper (320,000 tonnes average 2010–2013), while the snapper landings have been more stable (259,000 tonnes average 2010–2013). This could be related to improvements in reporting in terms of species identification and/or an increasing level of reporting by some countries. Additionally, the *Sea Around Us* database (Pauly and Zeller 2015) suggests more than 400,000 tonnes per year of unreported snapper and grouper catches, although the trend in unreported catches has been decreasing in recent years.



**Figure 1.** Snapper and grouper total landings during the period between 1950 and 2013. Source: FAO FishStatJ (FAO 2015)

The geographic distribution of the total landings (based on 2010–2013 average) of snapper and grouper per FAO major fishing area is shown in Figure 2. The higher percentage of landings of snapper (in red in Figure 2) occurs mainly in Western Central Pacific (FAO 71, 57.4%), Eastern Indian Ocean (FAO 57, 10.3%), Western Central Atlantic (FAO 31, 9.3%), and Southwest Atlantic (FAO 41, 7.7%), with those four regions representing almost 85% of the total of landings for snapper.



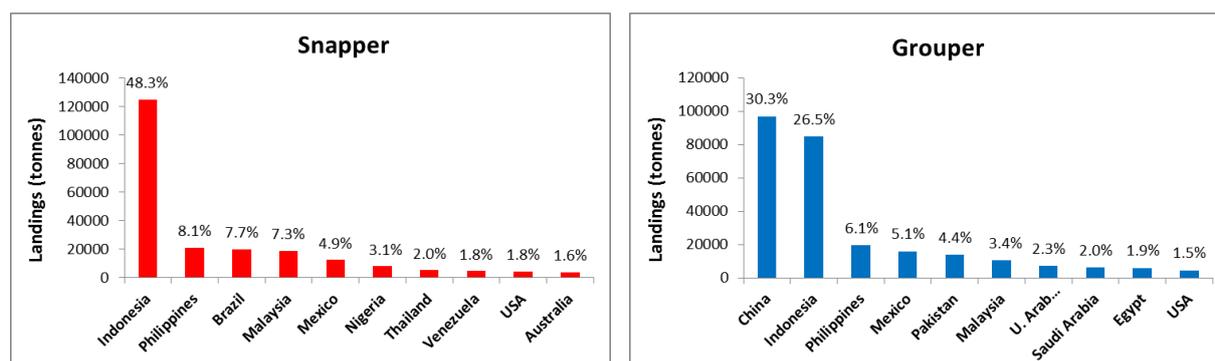
**Figure 2.** Total landings (2010–2013 average) of snapper and grouper per major FAO fishing area. Source: FAO FishStatJ (FAO 2015)

The major FAO fishing areas with higher percentage of grouper landings (in blue in Figure 2) are: Pacific Northwest (FAO 61, 30.8%), Western Central Pacific (FAO 71, 29%), Western Indian Ocean (FAO 51, 15.4%), and Eastern Indian Ocean (FAO 57, 8.9%).



## 2 MAIN PRODUCERS

According to FAO data (2010–2013 average landings), Indonesia, Philippines, Mexico, Malaysia, and the United States are important producers of both snapper and grouper, while Brazil is also important for snapper and China and Pakistan are important for grouper. Almost half of the snapper landings are from Indonesia, while the landings of grouper are mainly from China and Indonesia, together contributing more than 55% of the total landings for 2010–2013. The ten top producer countries for snapper and grouper represent more than 80% of the total landings of each group of species (Figure 3). Main species landings in the top 10 producer countries for snapper and grouper are presented in Appendix A.



**Figure 3.** Top 10 producer countries of snapper (left panel) and grouper (right panel) based on the average landings between 2010 and 2013. Source: FAO FishStatJ (FAO 2011–2015)

Multispecies small-scale fisheries represent an important component of the landings of the snapper and grouper seafood sector group. This adds very important socio-economic concerns to management of these fisheries. Additionally, very often those small-scale fisheries occur in developing countries where the reporting system is absent or insufficient, creating a scarcity of information that further complicates management.

## 3 MAIN MARKETS

Based on the FAO global fisheries commodities production and trade database (FAO 2014), the snapper and grouper seafood sector group has been increasingly important in terms of imports since the beginning of the 1990s— from 5,000 tonnes in 1990 to more than 25,000 tonnes in 2011 (Figure 4).



**Figure 4.** Evolution of the import and export volumes (tonnes) for snapper and grouper sector reported for the period between 1990 and 2011. Source: FAO 2014

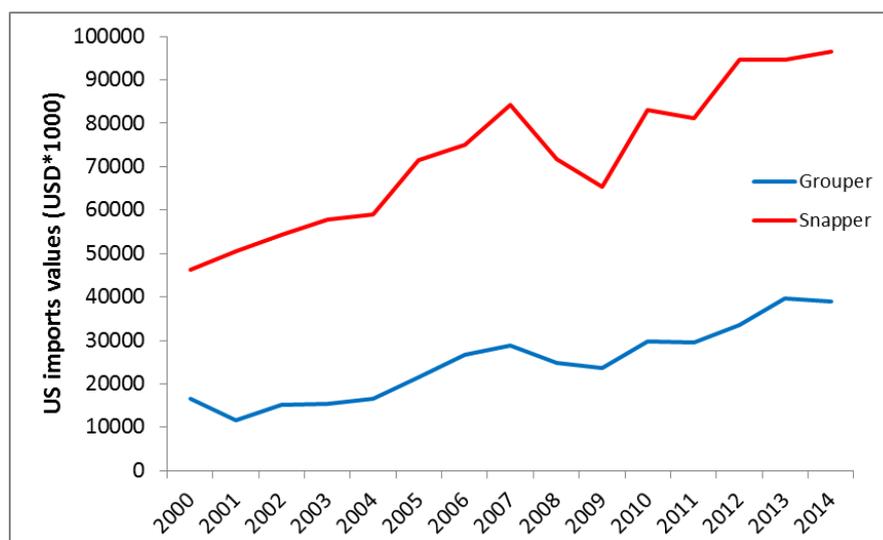


The United States represented almost 100% of the total volume of snapper imports reported in 2011. According to FAO trade data, the main exporting countries of snapper species are New Zealand, Brazil, Nicaragua, and Suriname, representing more than 90% of the reported total snapper exports in 2011. However, for many of the main producer countries (e.g., Indonesia, Philippines) there are no reported exports in the FAO database. The United States, Taiwan, and Saudi Arabia account for almost 100% of the total reported volume of grouper imports. According to the FAO trade database, the main exporter countries of grouper are Maldives and Nicaragua, neither of which are among the ten top producers. These results highlight the lack of reporting of production trade data, namely exports, by the top producer countries of snapper and grouper.

### 3.1 United States (US)

The US is the largest documented importer of snapper and grouper species, thus a brief analysis of the data from their Foreign Trade Data Base (NMFS) is undertaken in this sub-section to compensate for the low level of coverage represented by FAO's trade database.

Data from NMFS shows that the US imports snapper mainly from Mexico, Nicaragua, Brazil, Panama, and Suriname, accounting for more than 70% of the total snapper imports. The US imports grouper mainly from Mexico and Panama (accounting for about 80% of the total imports of grouper). In terms of value (USD), the import values of snapper and grouper species to the US more than doubled from 2000 to 2014, for both groups of species (Figure 5).



**Figure 5.** Evolution of the US import values (USD\*1000) for snapper and grouper between 2000 and 2014. Source: Foreign Trade Data Base, NMFS

The US also produces a substantial amount of snapper and grouper in domestic fisheries, primarily in the Gulf of Mexico and with a lesser amount in the Atlantic. Red grouper and northern red snapper dominate harvest in the Gulf, followed distantly by vermilion and yellowtail snapper and gag grouper. In the Atlantic, vermilion snapper and gag grouper dominate harvest, followed by red grouper and yellowtail snapper.

It is not possible to directly compare US harvest of snapper and grouper with import volumes because US harvest volume is reported in whole fish weights while imports are reported in product weight (whole gutted fish or fillets), but general comparisons can be drawn. During 2011–2014, the US imported an average of 14,860 tonnes of snapper (product weight) worth an average of \$91.7 million (NOAA OST 2015), while US snapper harvest during that same time period averaged 4,849 tonnes (whole weight) worth \$35.4 million (NMFS 2013; NMFS 2015). Clearly, imports dominate in the US snapper market. During 2011–2014, the US imported an average of 4,818 tonnes of grouper (product weight) worth an average of \$35.5 million (NOAA OST 2015), while US grouper harvest during that same time period averaged 4,015 tonnes whole weight worth \$28.7 million (NMFS 2013;



NMFS 2015). Thus, in the US grouper market, domestic and imported product are on a more even footing, though imports do exceed domestic harvest.

Snapper and grouper are especially popular in the southeastern United States where these species commonly are harvested. Mid-range retail stores purchase imported snapper and grouper, while high-end retail stores tend to purchase only US-harvested snapper and grouper because of conservation concerns about imported products. The foodservice industry is a substantial outlet for a large portion of imported snapper and grouper, though, as with retail, higher-end restaurants also prefer domestic snapper and grouper because of sustainability issues. Snapper and grouper from Latin America tend to be sold more in the southeastern US because the market is familiar with the species imported from these regions (they are generally the same as those which are harvested by the domestic fisheries in the southeastern US). In contrast, snapper and grouper from other parts of the world, especially from the Pacific, tend to be sold more throughout the rest of the country, where people are less familiar with specific species and products can be sold as generic “snapper” or “grouper.”

### 3.2 Southeast Asia

Around 80% of the total snapper and grouper production (2010–2013) was reported from the Indo-Pacific region. With the rapidly developing economies of China and other Southeast Asian countries, there has been an increasing demand for fish in this region. The snapper and grouper fisheries are especially important for the livelihoods and food security of many coastal communities. Additionally, the Live Reef Food Fish Trade (LRFFT), based in Hong Kong, is particularly important for the grouper sector, representing nearly 20% of the reported global grouper catch (Sadovy de Mitcheson et al. 2013). This market is characterized by the high prices applied to snapper and grouper species. Some studies (Warren-Rhodes et al. 2003) highlight some problems associated with this activity, namely the high demand for fish from mostly unregulated fisheries and the fishing methods used (e.g., cyanide).

## 4 SUSTAINABILITY INFORMATION ON THE SECTOR

The status of many snapper and grouper stocks is unknown, particularly in the multispecies small-scale fisheries in developing countries where there is an absent or insufficient reporting system to collect catch and effort data and a lack of fishery-independent data (scientific surveys) (Robinson et al. 2014). Only a small portion of the fisheries have been the target of research and, in many cases, stock assessments are not undertaken or are not publicly available. Also, knowledge of the life history characteristics of these species is limited in many regions.

Globally, according to the criteria and categories of the IUCN Red List of Threatened Species, applied to all known 163 grouper species, 12% of the species are considered at risk of extinction if current trends continue, and 13% are considered to be “near threatened.” Additionally, 30% of all species are considered to be “data deficient” (Sadovy de Mitcheson et al. 2013; IUCN 2015). Furthermore, several species of shallow and deepwater snapper stocks are considered vulnerable to overfishing (Fakoya et al. 2015) although just a few species have been evaluated by the IUCN Red List.

The main risk to the sustainability of the snapper and grouper seafood sector results from overexploitation and lack of effective management. These species face different threats to their populations such as nursery habitat destruction, juvenile extraction, spawning aggregations over-exploitation, etc. (e.g., Begossi et al. 2012; Renán et al. 2015).

After settlement, juveniles remain on nursery grounds until they reach maturity and then move to other areas, joining the adult population (Martinez-Andrade 2003). These areas function as essential fish habitats and their preservation is very important to prevent overfishing. However, these areas where the juveniles mature are not sufficiently protected (Sadovy de Mitcheson et al. 2013). Often,



these long-lived species are caught below the size at first maturity, which may adversely affect the exploited fish stock (Begossi et al. 2012).

When adults, many snapper and grouper species form predictable, localized, seasonal spawning aggregations that are quite vulnerable to overfishing since these spots are very attractive for fishers. Additionally, many of these species present “hyperstability”—fishers are able to target dense aggregations in spite of declines in overall population size (Robinson et al. 2014), allowing a population to appear stable even in an advanced phase of degradation or collapse. According to Russell et al. (2014), almost half of the aggregation sites studied have an “unknown” status, about a third of the records show a “decreasing” status, and 5% of the grouper aggregations are recorded as “gone.” Appropriate management of these areas is crucial for the health of these stocks.

An additional complication, which exacerbates the lack of effective management, is that some of the grouper species are protogynous hermaphrodites, i.e., they may switch sex later in the lifespan (female to male). Usually, fishers prefer to catch larger individuals (males), which may result in an imbalanced sex ratio of the population when no management measures are in place to account for this characteristic.

Snapper and grouper are caught by a variety of gears: hook and line, bottom longline, spear, traps, gillnets, and trawl. In some regions, certain fishing practices (e.g., use of dynamite and cyanide) are causing severe negative impacts on habitats and fishes stocks. In general, the possible effects of the snapper and grouper fisheries on coral reefs and interactions with the ecosystem are not well understood. Snapper and grouper inhabit tropical and subtropical areas where sea turtles also live, but this fishery is not likely to jeopardize sea turtles (e.g., for US fisheries, Finkbeiner et al. 2011). However, more studies are required in other regions.

In general, snapper and grouper fisheries worldwide are poorly managed. The commercial and artisanal components of the fisheries present a huge challenge to scientists and managers due the characteristics of these species and the lack of data. In addition, in some regions, recreational fishing may also have significant impacts on stocks, since many species are subject to a high level of discarding (often dead). Snappers have also been referenced as a major bycatch species of the industrial shrimp fishery (Bonini et al. 2011).

Nevertheless, there are some good examples of improvement knowledge and management actions in some areas (e.g., US, Australia, New Zealand, and other Pacific countries) that have rebuilt some depleted stocks (e.g., gag and red grouper in the US Gulf of Mexico and snapper fisheries in the Northern Australia and New Zealand). A variety of management measures are in place for some snapper and grouper fisheries, including minimum size limits to protect juvenile fish, recreational bag limits and commercial fishing quotas, gear and seasonal controls, and marine protected areas. However, better management of fishing worldwide and other conservation efforts adapted to these species are urgently needed (Sadovy de Mitcheson et al. 2013). Due to the global economic value of snapper and grouper fisheries and their importance for livelihoods and food security of many local communities, co-management practices integrating the local populations will be crucial for the successful and sustainable exploitation of these resources.

## **5 MARINE STEWARDSHIP COUNCIL AND FISHERY IMPROVEMENT PROJECTS**

Despite the economic importance snapper and grouper fisheries, the seafood industry has not encouraged them to be certified by the Marine Stewardship Council (MSC). Only recently, in March 2015, a Costa Rican fishery became the first snapper fishery in the MSC program, entering into full assessment—the Nicoya Peninsula artisanal snapper targets snapper species (spotted rose snapper and yellow snapper) with bottom longlines.



Meanwhile, several fishery improvement projects (FIPs) have been underway. Table 3 presents the list of ongoing FIPs for snapper or/and grouper fisheries. The FIPs' main focus regions have been Indonesia, the Gulf of Mexico, and Brazil. The stocks are ranked into three sustainability categories (A, B, and C) according to scores on FishSource ([www.fishsource.com](http://www.fishsource.com)), the SFP public database of fisheries information. The categorization is based on the quality of management (criteria 1 to 3) and status of the target stock (criteria 4 and 5). The categories, defined within the context of FishSource's 10-point scoring scale, are: Category A – very well managed fisheries that score 8 and above across all FishSource scores; Category B – reasonably managed fisheries that score 6 or above across all FishSource scores; Category C – poorly managed fisheries where at least one FishSource score is below 6. The majority of stocks of snapper and grouper under FIP projects are poorly managed (Category C) or their condition has not been evaluated yet.

## 6 RECOMMENDATIONS AND FINAL CONSIDERATIONS

As this report has shown, many snapper and grouper fisheries are in need of the most basic data collection and management. Thus, the following improvement recommendations will be from that perspective. Of course, some fisheries have more advanced management in place and have more complex needs. In these cases, FishSource may contain more specific improvement recommendations.

### 6.1 Catchers and Regulators

1. **Initiate species-specific harvest data collection.** In order to properly assess and manage fish populations, it is necessary to collect harvest data at a species-specific level. Data collection should include total weight harvested as well as representative samples of catch length, sex, and age. In regions with high catch diversity, species-specific data samples should be collected by fishery observers or dockside monitors, with only family- or genus-specific data collected by fishermen.
2. **Train fishers and buyers in species identification.** To ensure consistency and accuracy of harvest data, fishers and buyers should undergo training on species identification and should be provided simple, easy-to-use identification manuals. In regions with high catch diversity, it may be acceptable to train fishermen to identify fish only at the family and genus levels as long as observers or dockside monitors are identifying a sample of the overall catch at the species level.
3. **Collect fishing effort data.** One of the simplest methods of constraining harvest is to limit fishing effort, but it is important to first establish a baseline against which future adjustments can be made. Fishing effort data may be collected by implementing or improving a fisher logbook program, and then verified with a scientific observer program.
4. **Improve reporting to the FAO.** The FAO Fisheries and Aquaculture Department provides advice and objective information to member states to help promote responsible aquaculture and fisheries. This information is also used by not-for-profit organizations and the seafood supply chain to determine where assistance is most needed to implement sustainable fishing practices.

### 6.2 Retailers and Supply Chain

1. **Connect with national fisheries management authorities.** It is important that politicians and fishery managers are aware of your company's interest in sustainability. Let them know about your long-term goals for the sustainability of your seafood supply, and offer your support in fishery improvement efforts.



2. **Establish a zero tolerance policy for use of cyanide and dynamite.** These methods of seafood harvest are incredibly destructive to the surrounding ecosystem and are never acceptable practices.
3. **Help your suppliers to develop and implement data collection and species identification training programs.** The seafood industry is likely to be able to accomplish these tasks faster than government, and will begin to establish a baseline and develop best practices.
4. **Ensure a fishery management plan is in place.** For fisheries that have the above-mentioned programs and policies in place, the focus should shift to ensuring appropriate fishery management plans are implemented, including harvest control rules to ensure a healthy and stable population as well as regulations to minimize ecosystem impacts.

Evaluating long-term fishery sustainability based on the best available data is of primary importance for improved management and conservation. This report presents a first overview of the snapper and grouper seafood sector and highlights areas where improvements are critical to ensure long-term sustainability.



**Table 3.** List of the fishery improvement projects (FIPs) for snappers and/or groupers and SFP's ranking categories (A–C). Category A – very well managed fisheries that score 8 and above across all FishSource scores; Category B – reasonably managed fisheries that score 6 or above across all FishSource scores; Category C – poorly managed fisheries where at least one FishSource score is below 6.

Name	Leader	Year started	Stage	Progress rating	Date last assessment	Common name	Scientific name	Gears	Evaluation category
Indonesia Snapper and Grouper	PT ILUFA/PT Intan Seafood	Mar-12	4	B - Good progress	Nov-15	Groupers nei	<i>Epinephelus spp</i>	Handlines mechanized	Not scored
						Snappers nei	<i>Lutjanus spp</i>	Handlines hand operated Bottom longlines	C
	Sea Delight	Jan-10	3	C - Some recent progress	Nov-14	Snappers nei	<i>Lutjanus spp</i>	Handlines hand operated	Not scored
						Groupers nei	<i>Epinephelus spp</i>	Bottom longlines	Not scored
	Industry steering group	Jan-15	3	C - Some recent progress	Oct-15	Snappers nei	<i>Lutjanus spp</i>	Gillnets	C
						Groupers nei	<i>Epinephelus spp</i>	Hooks and lines Handlines hand operated Bottom longlines	Not scored
Gulf of Mexico Reef Fish	SFP	Jan-10	5	A - Exceptional progress	Oct-15	Red grouper	<i>Epinephelus morio</i>		B
						Gag grouper	<i>Mycteroperca microlepis</i>	Vertical Lines Bottom longlines	A
						Northern red snapper	<i>Lutjanus campechanus</i>		C
Mexico grouper	Sea Delight	Apr-14	4	B - Good progress	May-15	Red grouper	<i>Epinephelus morio</i>	Handlines mechanized Handlines hand operated	C
						Black grouper	<i>Mycteroperca bonaci</i>	Bottom longlines	Not scored
North Brazilian red snapper	Netuno	Apr-14	2	E	Nov-15	Southern red snapper	<i>Lutjanus purpureus</i>	Hooks and lines Traps	C



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## APPENDICES

### Appendix A

**Table App.A-1.** Landings (tonnes) by species for each of the top 10 producer countries of snapper.

Countries	FAO major fishing area	Species	Scientific name	Landings 2013 (t)	% in the country
Indonesia	Indian Ocean, Eastern	Snappers nei	<i>Lutjanus spp</i>	18950	14.9%
		Jobfishes nei	<i>Pristipomoides spp</i>	877	0.7%
	Pacific, Western Central	Snappers nei	<i>Lutjanus spp</i>	104466	81.9%
		Jobfishes nei	<i>Pristipomoides spp</i>	3187	2.5%
<b>Total</b>			<b>127480</b>		
Philippines	Pacific, Western Central	Snappers, jobfishes nei	Lutjanidae	20457	100.0%
<b>Total</b>			<b>20457</b>		
Brazil	Atlantic, Southwest	Snappers, jobfishes nei	Lutjanidae	6246	35.3%
		Southern red snapper	<i>Lutjanus purpureus</i>	5418	30.7%
		Yellowtail snapper	<i>Ocyurus chrysurus</i>	4322	24.5%
		Lane snapper	<i>Lutjanus synagris</i>	1689	9.6%
<b>Total</b>			<b>17675</b>		
Malaysia	Indian Ocean, Eastern	Mangrove red snapper	<i>Lutjanus argentimaculatus</i>	954	4.3%
		Snappers nei	<i>Lutjanus spp</i>	186	0.8%
		Snappers, jobfishes nei	Lutjanidae	111	0.5%
	Pacific, Western Central	Mangrove red snapper	<i>Lutjanus argentimaculatus</i>	10583	48.1%
		Snappers, jobfishes nei	Lutjanidae	5190	23.6%
		Snappers nei	<i>Lutjanus spp</i>	4986	22.7%
<b>Total</b>			<b>22010</b>		
Mexico	Atlantic, Western Central	Northern red snapper	<i>Lutjanus campechanus</i>	3078	17.0%
		Snappers, jobfishes nei	Lutjanidae	1771	9.8%
		Yellowtail snapper	<i>Ocyurus chrysurus</i>	1516	8.4%
		Vermilion snapper	<i>Rhomboplites aurorubens</i>	1143	6.3%
		Cubera snapper	<i>Lutjanus cyanopterus</i>	456	2.5%
		Grey snapper	<i>Lutjanus griseus</i>	386	2.1%
		Lane snapper	<i>Lutjanus synagris</i>	142	0.8%
		Pacific, Eastern Central	Pacific red snapper	<i>Lutjanus peru</i>	4652
	Snappers, jobfishes nei		Lutjanidae	3544	19.6%
	Spotted rose snapper		<i>Lutjanus guttatus</i>	789	4.4%
	Yellow snapper		<i>Lutjanus argentiventris</i>	327	1.8%
	Mexican barred snapper		<i>Hoplopagrus guentherii</i>	312	1.7%
	<b>Total</b>			<b>18116</b>	
Nigeria	Atlantic, Eastern Central	Snappers nei	<i>Lutjanus spp</i>	8752	100.0%
<b>Total</b>			<b>8752</b>		
Thailand	Indian Ocean, Eastern	Snappers, jobfishes nei	Lutjanidae	2772	53.7%
	Pacific, Western Central	Snappers, jobfishes nei	Lutjanidae	2393	46.3%
<b>Total</b>			<b>5165</b>		
Venezuela	Atlantic, Western Central	Snappers, jobfishes nei	Lutjanidae	4800	95.9%
		Yellowtail snapper	<i>Ocyurus chrysurus</i>	205	4.1%
<b>Total</b>			<b>5005</b>		
United States of America	Atlantic, Western Central	Northern red snapper	<i>Lutjanus campechanus</i>	2428	50.1%
		Vermilion snapper	<i>Rhomboplites aurorubens</i>	1075	22.2%
		Yellowtail snapper	<i>Ocyurus chrysurus</i>	919	19.0%
		Grey snapper	<i>Lutjanus griseus</i>	129	2.7%
		Mutton snapper	<i>Lutjanus analis</i>	82	1.7%
		Snappers, jobfishes nei	Lutjanidae	21	0.4%
		Silk snapper	<i>Lutjanus vivanus</i>	17	0.4%
		Lane snapper	<i>Lutjanus synagris</i>	12	0.2%
	Pacific, Eastern Central	Snappers nei	<i>Lutjanus spp</i>	116	2.4%
		Green jobfish	<i>Aprion virescens</i>	47	1.0%
		<b>Total</b>		<b>4846</b>	
Australia	Indian Ocean, Eastern	Snappers, jobfishes nei	Lutjanidae	1674	33.4%
	Pacific, Southwest	Snappers, jobfishes nei	Lutjanidae	0	0.0%
	Pacific, Western Central	Snappers, jobfishes nei	Lutjanidae	3345	66.6%
<b>Total</b>			<b>5019</b>		

**Table App.A-2. Landings (tonnes) by species for each of the top 10 producer countries of grouper.**

Countries	FAO major fishing area	Species	Scientific name	Landings 2013 (t)	% in the country	
China	Pacific, Northwest	Groupers nei	<i>Epinephelus spp</i>	101998	100.0%	
		<b>Total</b>		<b>101998</b>		
Indonesia	Indian Ocean, Eastern	Chocolate hind	<i>Cephalopholis boenak</i>	14193	14.2%	
		Greasy grouper	<i>Epinephelus tauvina</i>	3424	3.4%	
		Humpback grouper	<i>Cromileptes altivelis</i>	3162	3.2%	
		Honeycomb grouper	<i>Epinephelus merra</i>	2802	2.8%	
		Leopard coral grouper	<i>Plectropomus leopardus</i>	1656	1.7%	
	Pacific, Western Central	Chocolate hind	<i>Cephalopholis boenak</i>	39081	39.1%	
		Leopard coral grouper	<i>Plectropomus leopardus</i>	17257	17.3%	
		Humpback grouper	<i>Cromileptes altivelis</i>	7961	8.0%	
		Greasy grouper	<i>Epinephelus tauvina</i>	6352	6.4%	
		Honeycomb grouper	<i>Epinephelus merra</i>	4016	4.0%	
<b>Total</b>			<b>99904</b>			
Philippines	Pacific, Western Central	Groupers, seabasses nei	Serranidae	19120	100.0%	
		<b>Total</b>		<b>19120</b>		
Mexico	Atlantic, Western Central	Groupers, seabasses nei	Serranidae	9786	54.1%	
		Brazilian groupers nei	<i>Mycteroperca spp</i>	1683	9.3%	
	Pacific, Eastern Central	[Paralabrax spp]	<i>Paralabrax spp</i>	5317	29.4%	
		Groupers, seabasses nei	Serranidae	1295	7.2%	
<b>Total</b>			<b>18081</b>			
Pakistan	Indian Ocean, Western	Groupers nei	<i>Epinephelus spp</i>	14253	100.0%	
		<b>Total</b>		<b>14253</b>		
Malaysia	Indian Ocean, Eastern	Groupers nei	<i>Epinephelus spp</i>	1898	15.9%	
	Pacific, Western Central	Groupers nei	<i>Epinephelus spp</i>	10064	84.1%	
	<b>Total</b>			<b>11962</b>		
United Arab Emirates	Indian Ocean, Western	Orange-spotted grouper	<i>Epinephelus coioides</i>	4600	59.4%	
		Duskytail grouper	<i>Epinephelus bleekeri</i>	2800	36.1%	
		Groupers, seabasses nei	Serranidae	350	4.5%	
		<b>Total</b>		<b>7750</b>		
Saudi Arabia	Indian Ocean, Western	Groupers, seabasses nei	Serranidae	1824	26.9%	
		Greasy grouper	<i>Epinephelus tauvina</i>	1038	15.3%	
		White-blotched grouper	<i>Epinephelus multinotatus</i>	673	9.9%	
		Yellow-edged lyretail	<i>Variola louti</i>	476	7.0%	
		Squaretail coral grouper	<i>Plectropomus areolatus</i>	467	6.9%	
		Areolate grouper	<i>Epinephelus areolatus</i>	466	6.9%	
		Smallscaled grouper	<i>Epinephelus polylepis</i>	403	5.9%	
		Roving coral grouper	<i>Plectropomus pessuliferus</i>	402	5.9%	
		Coral hind	<i>Cephalopholis miniata</i>	388	5.7%	
		Yellowfin hind	<i>Cephalopholis hemistiktos</i>	291	4.3%	
		Peacock hind	<i>Cephalopholis argus</i>	64	0.9%	
		Brownspotted grouper	<i>Epinephelus chlorostigma</i>	59	0.9%	
		Orange-spotted grouper	<i>Epinephelus coioides</i>	55	0.8%	
		Brown-marbled grouper	<i>Epinephelus fuscoguttatus</i>	49	0.7%	
		Summan grouper	<i>Epinephelus summana</i>	48	0.7%	
		Redmouth grouper	<i>Aethaloperca rogaa</i>	42	0.6%	
		Comet grouper	<i>Epinephelus morrhua</i>	30	0.4%	
		Whitespotted grouper	<i>Epinephelus caeruleopuncta</i>	1	0.0%	
		<b>Total</b>			<b>6776</b>	
		Egypt	Indian Ocean, Western	Groupers nei	<i>Epinephelus spp</i>	2643
Groupers, seabasses nei	Serranidae			1346	22.0%	
Yellow-edged lyretail	<i>Variola louti</i>			1439	23.6%	
Greasy grouper	<i>Epinephelus tauvina</i>			66	1.1%	
Areolate grouper	<i>Epinephelus areolatus</i>			107	1.8%	
Mediterranean and Black Sea	Groupers nei			<i>Epinephelus spp</i>	504	8.3%
	<b>Total</b>			<b>6105</b>		
United States of America	Atlantic, Northwest	Black seabass	<i>Centropristis striata</i>	971	18.6%	
		Groupers, seabasses nei	Serranidae	4	0.1%	
	Atlantic, Western Central	Red grouper	<i>Epinephelus morio</i>	2498	47.7%	
		Gag	<i>Mycteroperca microlepis</i>	505	9.7%	
		Black seabass	<i>Centropristis striata</i>	433	8.3%	
		Yellowedge grouper	<i>Epinephelus flavolimbatus</i>	359	6.9%	
		Scamp	<i>Mycteroperca phenax</i>	196	3.7%	
		Snowy grouper	<i>Epinephelus niveatus</i>	100	1.9%	
		Black grouper	<i>Mycteroperca bonaci</i>	54	1.0%	
		Warsaw grouper	<i>Epinephelus nigritus</i>	52	1.0%	
		Groupers, seabasses nei	Serranidae	29	0.6%	
		Speckled hind	<i>Epinephelus drummondhayi</i>	19	0.4%	
		Rock hind	<i>Epinephelus adscensionis</i>	4	0.1%	
		Red hind	<i>Epinephelus guttatus</i>	2	0.0%	
		Yellowfin grouper	<i>Mycteroperca venenosa</i>	1	0.0%	
		Pacific, Eastern Central	Groupers, seabasses nei	Serranidae	6	0.1%
			<b>Total</b>		<b>5233</b>	