

The Reef Fishery in St. Vincent

La Pesquería de Arrecife de San Vicente

Le Récif de Pêche de St. Vincent

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ABSTRACT

This study seeks to address some of the significant information gaps relating to the reef fishery of the main island of St. Vincent. Data on fishers, fishing practices, fishing effort, catches, and marketing were collected largely by interviewing reef fishers using a standardised questionnaire. Landing sites around the entire island were visited and a sample size of 87% of all reef fishers identified was interviewed. There are approximately 270 reef fishers in St. Vincent concentrated around the landing sites. Reef fishing is important, but not the primary source of income for most of these fishers. The most commonly utilized fishing gear is the deep-set bottom handline. Other deep gears include the handline and bottom longline, whilst shallow-set gear includes rod and line, trammel net, speargun, and fish trap. The predominant boat type used is the flat transom; fishing grounds around St Vincent are generally 1-5 km away from landing sites, but fishers may travel as much as 10 - 70 km to reach fishing grounds in the Grenadine islands of Bequia, Balliceaux, Mustique and Canouan. A crew of 2 - 3 is typical of the reef fishery and reef fishing is practiced by most fishers three to six days a week between the months of June and December, although a few fish year round. The most commonly caught reef fishes are snappers, groupers, jacks, and barracudas, although there is a marked difference in species composition of the catch between deep and shallow-set gears. An average of 14 kg of reef fish is caught per fisher per reef fishing trip and most fishers perceive that the size and the abundance of reef fishes are declining.

KEY WORDS: Reef fishery, St. Vincent

INTRODUCTION

Reef fisheries around the Caribbean are predominantly small scale and artisanal with relatively low entry cost, making the industry attractive. Reef fishing provides employment for more than 120,000 full-time fishers and many part-time workers in the Caribbean (Burke et al. 2011), and provides a vital source of protein for millions of people living in the Caribbean region (Burke and Maidens 2004). Despite the importance of the reef fishery and its known impacts on the reefs, the fishery is poorly described or understood in many countries across the Caribbean and remains largely unmanaged, St Vincent and the Grenadines (SVG) being no exception. This study is focussed on the reef fishery of the main island of St. Vincent. The multi-island state of SVG comprises more than thirty islands, islets and cays and is located towards the southernmost end of the Windward Island chain.

Although the Fisheries Division collects and maintains species level records of reef fish landed by site, the reef fishery on the main island of St Vincent has been described only in relatively generic reports about the fisheries, such as Fishery Division reports (e.g. Jardine and Straker 2003), national reports to the annual scientific meetings of the CARICOM Regional Fisheries Mechanism (CRFM) (e.g. Jardine-Jackson and Isaacs 2012), and as a country fishery profile (e.g. FAO 2002). A single reef fish species, the red hind (*Epinephelus guttatus*), has received more attention and has undergone several exploratory and preliminary assessments by the CRFM Reef and Slope Working Group (e.g. Straker et al. 2001, Constantine et al. 2003, Babb et al. 2004). Beyond these however, significant knowledge gaps remain on the other species in the reef fishery, and on the current nature and extent of the reef fishery in the main island of St. Vincent. This situation makes the management of the fishery difficult and without effective management the reef fish resource is unlikely to be utilized optimally. In fact, the stated management objective for the shallow reef fish fishery is to promote stock recovery (Jardine-Jackson and Isaacs 2012), suggesting that the resource is believed to already be over-exploited.

This study seeks to address some of the significant information gaps relating to the reef fishery of the main island of St. Vincent, and thus contribute to the ongoing management planning process towards sustainable use of the fishery resources. The overall objective is to describe the current extent and nature of the reef fishery on the main island of St. Vincent.

METHODOLOGY

Data on the number of fishers, fishing practices, effort, current harvest, and market were collected by interviewing reef fishers using a standardised questionnaire during the months of July, August, and September 2013. The questionnaire was given to key informants (Fisheries Division Staff and Data Collectors) for their input and was field tested before full-scale data collection began.

Reef fishers were located with the assistance of Data Collectors and a Fisheries Officer (second author) in a scoping exercise which involved visiting all landing sites around the island. Reef fishers identified were then used to help find others, using a ‘snowball approach’. A sample size of 87% of all identified reef fishers was interviewed and considered to adequately represent the reef fisher population. Direct observations on the fishing practices, fishing gears, and catch composition were made at the landing sites, and information was also gathered through informal conversation with reef fishers. Revisits in the months of September and October were made to clarify data collected.

The responses from the questionnaires were coded and placed in a database using Microsoft Excel. ArcGIS 10 software was used to generate maps indicating the landing sites and fishing grounds utilised by fishers.

RESULTS

Demographics

There are approximately 270 reef fishers at twenty nine landing sites located all around the main island of St. Vincent (Figure 1). A total of 234 fishers were interviewed of which 230 interviewees were males and four respondents were females. Most (45%) of the respondents fell into the 35-50 year old age group and most (56%) fishers have been fishing for more than 20 years.

Livelihood Dependence

Almost one third (32%) of respondents indicated that reef fishing is their primary source of income, and 6% rely completely on their reef fishing income. Most (59%) fishers are also involved in other types of fishing, trolling for large oceanic pelagic species being the most important. More than half of the reef fishers also have alternate jobs outside the fishing industry, for example in agriculture, the construction industry, and the government sector.

Fishing Grounds

A total of 39 fishing grounds were named by fishers around the main island of St Vincent, the most heavily used being off Georgetown on the east coast, and Baleine on the north coast (Figure 1). Also, very popular (used by 26% of the respondents) are fishing grounds located in the Grenadines such as Bequia, Mustique, and Canouan. Fishers will travel up to 10 - 70 km to access reefs in the Grenadines, however, most fishers on the island of St. Vincent travel < 5 km to access their main fishing grounds.

Boats and Gears

Most (87%) fishers access the reefs by using a boat, but only 38% of the fishers own a boat. The most commonly utilised boats in the reef fishery are firstly the small (3 - 5 m) wooden and/or fiberglass flat transom vessel with a 15 hp outboard, and secondly the larger (6 - 8 m) fibreglass

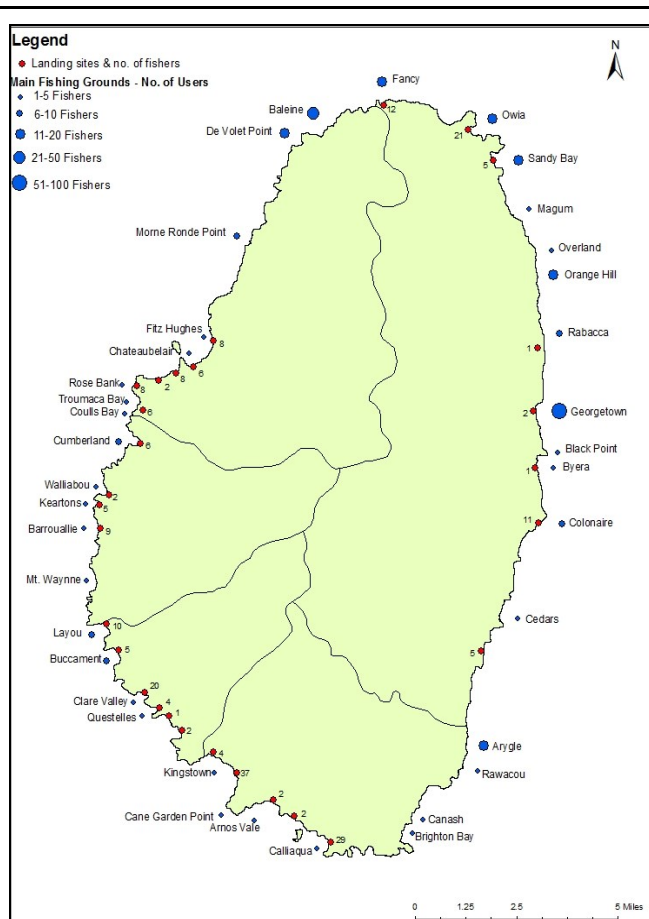


Figure 1. Map of the main island of St Vincent showing the main reef fishing grounds and landing sites utilised by reef fishers as identified by 234 interviewed respondents. The numbers of interviewed reef fishers operating from each landing site (red dots) are shown. The relative size of the named fishing grounds (blue circles) indicates the number of fishers using these areas as their main fishing grounds.

pirogue equipped with a single 75 hp outboard engine. Other boats used in the fishery include wooden double-enders and kayaks with no engine. Most boats (41%) have a crew of 2 - 3 members.

Fishers in the reef fishery utilise multiple gears targeting a range of habitat depths (Figure 2). For example, they use handlines (1 - 7 hooks), bottom handlines (7 - 16 hooks), and bottom longlines (35 - 400 hooks) mostly targeting the deep slope (50 - 180 m), while they also use fish traps, spearguns, rod and line, and trammel nets targeting shallow coral reef (< 50 m). Most reef fishers however, target deep slope fishes with only around 25% of fishers targeting shallow reef fishes. All line gears and most fish pots are baited. Commonly utilised baits are small pelagic fishes such as robin, dodger, jacks, ballyhoo, and sprat. Respondents indicated that they bait fish traps with ripe fruits. Almost all (87%) of the respondents using spearguns free dive, whilst those who spearfish with SCUBA use one or two tanks.

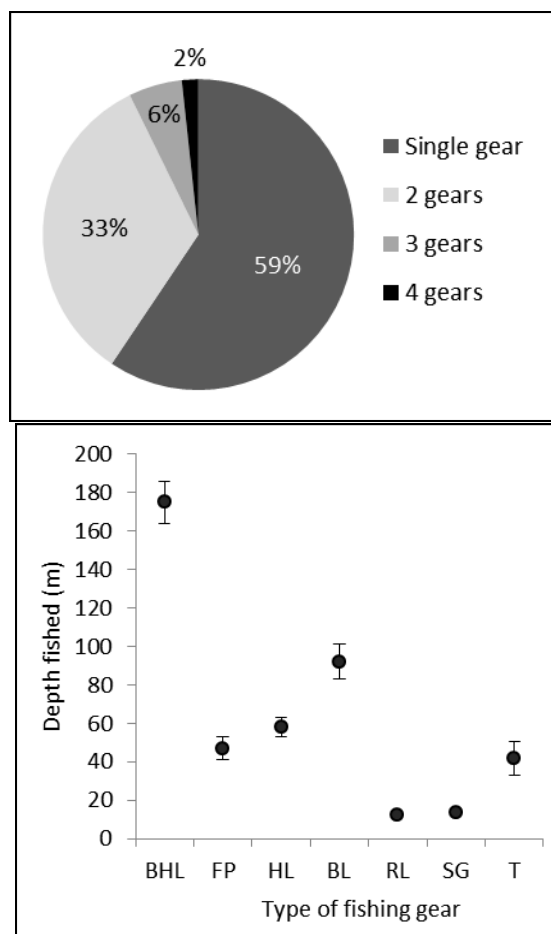


Figure 2. Multi-gear reef fishery in the main island of St Vincent, showing (above) the proportion of fishers using one or more gears ($n = 234$ respondents), and (below) the average stated depth at which the gear is set ($n = 350$). BHL – bottom handline, FP – fish pot/trap, HL – handline, BL – bottom longline, RL – rod and line, SG – speargun, T – trammel net.

Fishing Effort

The vast majority of respondents (92.6 %, $n = 94$) target reef fishes seasonally; during the months of June through December. Over 90% of the reef fishers make one fishing trip daily and most respondents make four trips weekly. Respondents utilising the bottom handline, fish traps and trammel nets will fish for greater than nine hours per fishing trip on average, whilst those using a bottom longline and handline will fish for 7 - 8 hours per fishing trip. Spear fishers generally fish for 3 - 4 hours per trip.

Fish Catches

As many as 33 reef fish species were said to be commonly caught by reef fishers; these mostly belong to the Serranidae (grouper), Lujanidae (snapper), Sphyraenidae (barracuda), Balistidae (triggerfish), Acanthuridae (surgeonfishes), Carangidae (jacks), and Scaridae

(parrotfish) families. A total of 24% of the respondents indicated groupers; naming coney, redhind, graysby, rockhind, and black grouper as the species most commonly caught, whilst almost the same proportion (22% of the respondents) named snappers (queen, blackfin, vermilion, silk, mutton and mahogany), and 21% named jacks, referred to locally as 'cavalli' (amber jack, pompano and black jack). Other species reported to be commonly caught are barracudas, surgeonfishes, triggerfishes, squirrelfishes, Atlantic bigeyes, grunts, porgies, goatfishes, sandtile fish, and parrotfishes.

All deep-set hook and line gears commonly caught reef fishes from the grouper, snapper, and jack families, whilst shallow-set trammel nets take mostly jacks; spear fishers target mainly barracudas, surgeonfishes, and triggerfishes; and shallow fish traps captured a variety of reef species.

Over 90% of the respondents indicated their species of choice was captured on each fishing trip. Most fishers indicated a preference for the Lutjanidae, Serranidae, Carangidae, and Sphyraenidae families. Respondents' preference is based mainly on the price (39%), and on the availability of a market (23%), although a number of other reasons were offered including a demand for the species by the general public. The price for reef fishes ranges from EC\$10 - 18 per kg depending on the species¹.

Capture of Lionfish

Only 18% of the respondents indicated they currently capture the lionfish. The lionfish is mostly captured by fish traps and spear fishers. When lionfish are captured, 66% of respondents indicated that lionfish are killed and thrown back, whilst 34% indicated bringing them ashore for consumption. Most fishers indicated 1 - 3 lionfish are captured weekly.

Catch Rates and Marketing

The stated mean total catch across all types of fishing gears per fishing trip ranges from 2 - 57 kg of reef fish. Fish pots had the lowest overall average stated mean catch per trip of 8 kg, whilst the bottom longline had the highest at 19 kg. More than 85% of the fish caught by fishers are sold. The other portions of fish are kept for personal consumption and given to friends/family members.

Management Issues

Over 60% of the respondents indicated that they had observed changes in the composition of reef fishes over the past ten years. These changes include reduced fish abundance (the majority of responses) and reduced size of reef fishes. The common explanations for the observed changes offered by respondents included pollution, the presence of lionfish, climate change, overfishing, and poor fishing practices (Figure 3).

¹Exchange rate: 1US=2.71EC

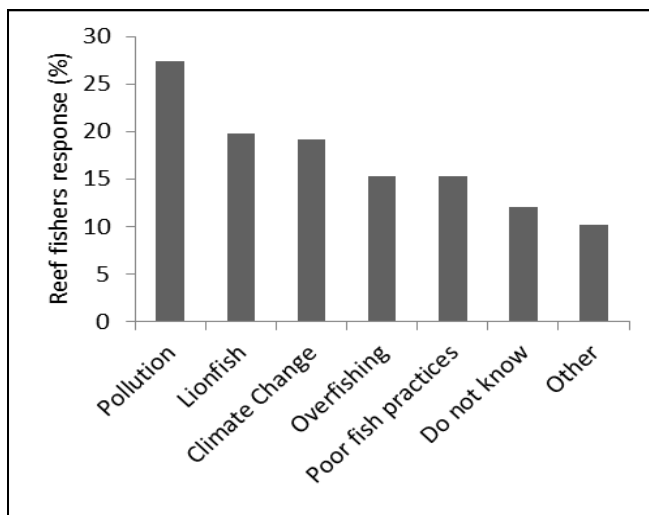


Figure 3. Perceived threats causing reduction in abundance and size of reef fishes as stated by interviewed reef fishers in St. Vincent (n = 157 respondents).

Respondents perceived that pollution was the largest threat to the reef fishes. Some fishers pointed out that pollution comes from the use of pesticides and herbicides in agriculture. Other sources of pollution were stated to come directly from domestic waste and from other countries dumping their waste into the sea illegally. A total of 20% of reef fishers indicated that the relatively new presence of the invasive lionfish in the waters of St. Vincent is another threat to reef fishes. Fishers noted that the lionfish grow and reproduce faster than the native species. Reef fishers (19%) indicated climate change is also a threat with some observing that it has resulted in warmer conditions causing shallower areas to heat up quickly resulting in less fish in these areas and warmer conditions were also stated by some to be destroying the reefs. A considerable number of fishers (15%) indicated too many reef fishers are present in the waters of St. Vincent, and an equal number cited what they perceived to be poor fishing practices including:

- i) The soaking of fish pots for over a week,
- ii) Dynamiting in the past,
- iii) The use of trammel nets on the reefs, and
- iv) Beach seine fishers using a smaller size mesh than is legal.

Regarding the latter point, fishers believed a reduction in the availability of small pelagic fishes would impact on the frequency of their fishing trips, since they use these species for bait in the reef fishery.

Respondents indicated that management measures such as the removal of the invasive lionfish, law enforcement, proper waste disposal, less chemical usage, and exploring deeper waters could be undertaken to prevent the further reduction in reef fish catches. They also indicated the importance of awareness of good fishing practices, and the use of artificial reefs should be noted by managers.

DISCUSSION

The reef fishery of St. Vincent is typical of many throughout the Caribbean, being small scale, artisanal and open access (e.g. Hawkins and Roberts 2004). Reef fishing is however, of significant importance to the livelihoods of just over 1/3 of the reef fishers in St. Vincent, providing 50 - 100% of their annual income. The reef fishery is dominated by males having more than 20 years fishing experience. Most fishers use multiple gears to exploit reef fishes, and are also engaged in other fishing activities off the reef; trolling for seasonally available large oceanic pelagic fishes being the most important. This could explain the reason most respondents target reef fishes during the period June-December, the off-season for large pelagics. This further illustrates the importance of the reef fishery as a source of income and employment for fishers during the 'low season' and in helping to meet the market demand for fish during this period.

Most fishers exploit one or more nearshore fishing grounds around the island of St. Vincent. However, just over 1/3 of the fishers, mostly those from the southwest coast, travel longer distances (10 - 70 km) to access their fishing grounds in the St Vincent Grenadine islands. This explains why the predominant boat type is the small flat transom vessel with a small outboard engine, whereas those accessing distant fishing grounds in the Grenadines use the larger pirogues with much larger outboard engines. The most commonly utilised gear is the bottom handline which mostly targets deep slope, heavy bodied snappers and groupers. However the bottom longline yields the greatest average stated mean catch per fishing trip. The reason fishers utilise the less productive gear (bottom handline) more often than the bottom longline is likely because the latter carries more hooks and hence needs more bait which fishers indicated was often in short supply. Furthermore, fishers indicated that it is much more difficult to use the bottom longline during bad weather than the other line gears.

Most fishers indicated they have observed changes in reef fishes over the past ten years especially in mean size and abundance. A reduction in both these fish community metrics indicates significant fishing pressure (e.g. Valles and Oxenford, unpub. data) worthy of management attention. One of the challenges for managers is that the reef fishery in St Vincent comprises gears targeting both the deep slope and the shallow coral reef environments. Careful attention will therefore be needed to separate the trends being observed in these two different environments, with different species complexes and different vulnerabilities and responses to fishing and other environmental changes.

Fishers appear to be relatively well informed of potential threats to the reef fishery (e.g. climate change, pollution, lionfish), including those coming from fishing activities. They also suggested a number of tangible solutions to some of the issues. Informed fishers will

certainly make the job of management easier, especially as St Vincent moves towards implementing an ecosystem approach to fisheries management.

CONCLUSION

This study provides the first detailed description of the reef fishers and reef fishery of the main island of St. Vincent. The study has up-dated the information available in the Fisheries Division, and has filled significant knowledge gaps in the nature and extent of the current fishery. It also has highlighted a need by managers to pay attention to the deep slope and shallow reef sectors separately, in order to interpret changes in fish community metrics and state of the reef fishery.

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