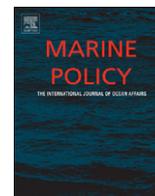




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## Red snapper discards in the Gulf of Mexico: Fishermen's perceptions following the implementation of Individual Fishing Quotas

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### ABSTRACT

In 2007, an Individual Fishing Quota (IFQ) program was introduced to the valuable red snapper (*Lutjanus campechanus*) fishery in the US Gulf of Mexico. This study assessed the current perceived scale and causes of red snapper discarding in the Gulf in recent years within the commercial reef fish fishery, according to commercial fishermen. Data were collected through interviews, which took place with fishermen in April and May 2010, and which were unexpectedly halted due to the Deepwater Horizon oil spill that occurred in late April 2010. Results suggest that for those fishermen fully participating in the IFQ program, snapper discarding has decreased since program implementation. For those not fully involved in the program (e.g., due to participation costs), discarding has likely since increased.

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### 1. Introduction

Global discarding<sup>1</sup> equates to approximately a third of the world's catch that is brought aboard fishing vessels, and has been recognized as a serious fisheries management problem over the last few decades. Further, discarding accounts for a poorly known added mortality in fish and other marine populations, and poses challenges for fisheries stock assessment and management [1,2]. The introduction of Individual Fishing Quota (IFQ) programs has been identified by some as a potential solution in certain fisheries by replacing regulations that mandate discarding, increasing monitoring, and giving fishermen added incentives for resource stewardship [1]. However, even with increased monitoring of landings, assessing the impacts of such programs on discarding practices is often not straightforward. This may be due to a continued lack of reliable at-sea monitoring of catches and discarding and potential problems in interpreting information in fishermen's logbooks. Logbooks typically underreport discards and are often subject to poorly understood changes in reporting

practices with shifts in management [3]. However, it may be feasible to improve understanding of the impacts of new management measures on practices such as discarding by formally interviewing fishermen [4], a technique employed in this study.

Red snapper (*Lutjanus campechanus*) comprise part of the reef fish fishery in the Gulf of Mexico, a multi-species fishery, which is one of the Gulf's most valuable [5]. The red snapper fishery has also been deemed by some as 'the most controversial fishery in US waters of the Gulf of Mexico' [6]. Recreational and commercial red snapper fisheries, as well as other fisheries with high red snapper bycatch such as the shrimp trawl fishery, have all contributed to the depletion of snapper stocks [7]. After a marked decline in the 1980s, red snapper were classified as overfished, and retain this status today [8].

In January 2007, in response to the red snapper population decline and worsening economic performance of the fishery, an IFQ program was established. Taking nearly 10 years to create and put into operation, this program was aimed at ending the over-exploitation and decline of red snapper in the Gulf [9].

Prior to 2007, the red snapper fishery in the Gulf was a 'derby' style fishery, in which fishermen competed against each other to obtain their catch before the quota was filled, having only a short window to do so, with trip limits and high minimum size limits aimed at lengthening fishing seasons [9]. On the contrary, the new IFQ program provides shares and allocations<sup>2</sup> of the allowable catch

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<sup>1</sup> Throughout this paper, the term 'discards' refers to any catch that is not kept. 'Bycatch' refers to any catch that is not targeted, and thus may include discards.

<sup>2</sup> 'Shares' refer to a percentage of the total commercial quota, while 'annual allocations' refer to pounds of fish in a share.

to fishermen at the beginning of each year; these are freely transferable between commercial reef fish fishermen within specified limits. The initial allocation of quota shares under the IFQ program was based on a fisherman's historical catch over a specified time [10]. The IFQ program has eliminated closed seasons and daily trip limits, giving fishermen today more flexibility.

When the red snapper IFQ program was adopted, other changes to the red snapper fishery were implemented as well, including a reduction in the legal length of red snapper (from 15 in to 13 in), and the following year, the mandatory use of certain bycatch reduction tools (see Appendix A).

Under the previous derby style fishery discard rates of red snapper were high, i.e., about half of reported landings [11], as all red snapper accidentally caught during the long closed season or in excess of the trip limit were discarded, and many caught during the open season measured less than the minimum size limit [9]. However, while the reduced minimum size limit and the red snapper IFQ program appear to have helped decrease overall discards in the Gulf, recent reports indicate discard rates have been increasing in the eastern Gulf [12,11]. The main objective of this study was to seek improved understanding of changes in discarding practices in the Gulf of Mexico red snapper fishery that have come about since the introduction of IFQs. This has been achieved by obtaining industry perspectives<sup>3</sup> on red snapper discarding before and after IFQ program implementation. Based on results, outlooks on future management are offered.

## 2. Methods

### 2.1. Interviews

Initially, our questionnaire was piloted with four individuals: two questionnaires were sent to fishermen from the northwest coast of Canada for initial comments and feedback,<sup>4</sup> and two fishermen from the Gulf of Mexico were then interviewed over the phone (this comprised a trial run: see [13], for the importance of pre-testing questionnaires). Input from these four pilots helped structure the final questionnaire (these pilots were not included in results).

An introductory letter, explaining the research and emphasizing anonymity of results, was read aloud, sent to, or verbally summarized for, each interview participant.

The interviews were carried out between April 21 and May 21, 2010. The first nine interviews were conducted in-person in New Orleans at a Gulf of Mexico Reef Fish Shareholders' Alliance (also referred to as the 'Alliance') meeting, on April 21 and 22. The other interviews were conducted over the phone between April 30th and May 21st. Initially, interviews were set up with the help of Alliance staff, after which point fishermen volunteered names of other fishermen (i.e., snowball sampling, see [14–16]).

The questionnaire was comprised of 24 questions and encompassed three broad themes: (1) fishing, (2) discarding, and (3) personal reflections on fishing and sustainability (see shareholdersalliance.org for full questionnaire). Interviews generally lasted between 20 and 30 min (see [17], for benefits of interviews of this length). They were not tape-recorded, and were all kept anonymous.

Thirty-one reef fish fishermen from the Gulf of Mexico were interviewed for this study: 26 were commercial fishermen, 25 of which had IFQs; four represented charter for hire operations, two

of which also participated in the commercial IFQ fishery; and one was a representative of a recreational fishing company booking service who was not eligible to participate in the IFQ fishery.

### 2.2. Other data

The US National Marine Fisheries Service (NMFS) collects data on red snapper discards, which are taken from fishermen's self-reported logbooks and observer records. In addition, NMFS computes red snapper discard rates through the statistical model CATCHEM, which is based on historical catch records. These data sets were compared with those accumulated in this study, and thus 'convergent validity' was explored (i.e., through triangulation, see [18]).

## 3. Results

Fifty-five percent of all interviewees fished exclusively in the eastern Gulf, 23% fished in the western Gulf, and 23%, in both.<sup>5</sup> Current average catch of red snapper (per trip) was highest in the western Gulf (Fig. 1). The most common species targeted amongst interviewees were snapper (red and vermilion), and grouper species. Bandit gear (vertical hook and line fishing gear employing roughly 20–40 baited hooks) was the dominant gear employed, followed by longlining, hook and line,<sup>6</sup> and rod and reel; buoy gear and spearguns were the least commonly used gear. Fishing boats ranged in size from 23 ft to 67 ft, and interviewees ranged in fishing experience from 6 years to 64 years, the average interviewee having 30 years of fishing experience.

Forty-seven percent of eastern Gulf fishermen interviewed believe red snapper discarding has increased since 2007 (i.e., post-IFQ implementation), compared with 0% of strictly western Gulf fishermen (Fig. 2a). In addition, no western Gulf fishermen interviewees stated having current high discard rates (i.e.,  $\geq 15\%$ <sup>7</sup> of catch in lbs), which differed from the 41% of eastern Gulf fishermen with high discard rates (Fig. 2b). Seventy-three percent of respondents holding an IFQ share and half of the few respondents who lacked IFQ shares believed that red snapper discarding has decreased since, and in part because of, IFQ implementation (Fig. 2c, note that this difference is not statistically significant due to low sample size of non-IFQ shareholders). The years 1997 to just before 2007 (i.e., just prior to IFQ implementation), was the period that most interviewees (i.e., 50%) indicated having highest amounts of red snapper discards; however, 32% of respondents believed post-IFQ establishment was the period in which they had the most discards (*note*: none of these respondents were strictly western Gulf fishermen, Fig. 2d).

Eighty-four percent of all fishermen interviewed, regardless of whether they were an IFQ shareholder or not, viewed IFQs positively for the red snapper fishery.

Across interviewees, size limits were the main stated cause of either all or part of their red snapper discards, at 68% of respondents. Thirty-two percent of all those interviewed said 'lacking fishing quota' caused at least part of their red snapper discards, and 14% said issues around red snapper value sometimes drove them to discard (Fig. 3). The category 'Other' included answers like 'closed seasons', 'limit caught', and 'fish weren't legal'.

<sup>5</sup> Here, western Gulf refers to states Texas to Louisiana; eastern Gulf refers to Mississippi to Florida.

<sup>6</sup> This could mean a variety of gears, including longline and bandit.

<sup>7</sup> Fifteen percent was the natural division between 'high' and 'low' discard rates, as data generally fell either above or below this rate (natural breaks method; see [19]). Also note that fishermen who responded qualitatively as having 'very little discards' were included in the  $< 15\%$  category.

<sup>3</sup> Note that while this study focused predominantly on commercial fishermen, some charter fishermen were also included.

<sup>4</sup> This because of the author's connections with fishermen from the area of northwest Canada who had relevant fishing/fisheries experience.

When it came to historical Gulf of Mexico management regimes pertaining to red snapper, given the chance, none of the respondents who fished in the western Gulf would revert back to how they used to fish 5 years ago, or even 20 years ago (i.e., in relation to

management of that time). However, for those respondents fishing exclusively in the eastern Gulf, about 17% would choose to return to how they used to fish 5 years ago, and given the chance, 19% would revert back to red snapper fishing as it was 20 years ago (Fig. 4).

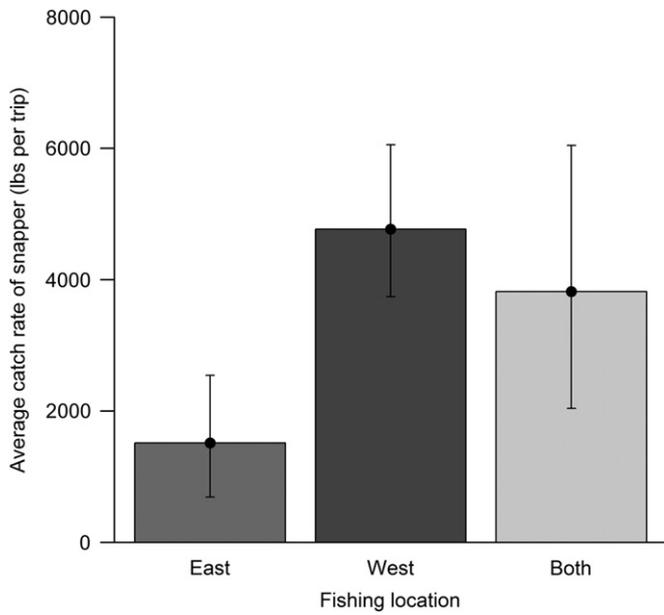


Fig. 1

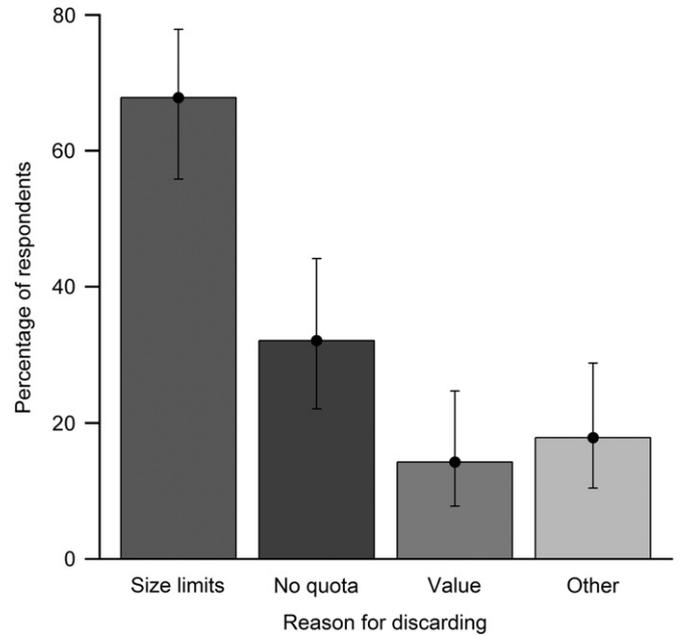


Fig. 3

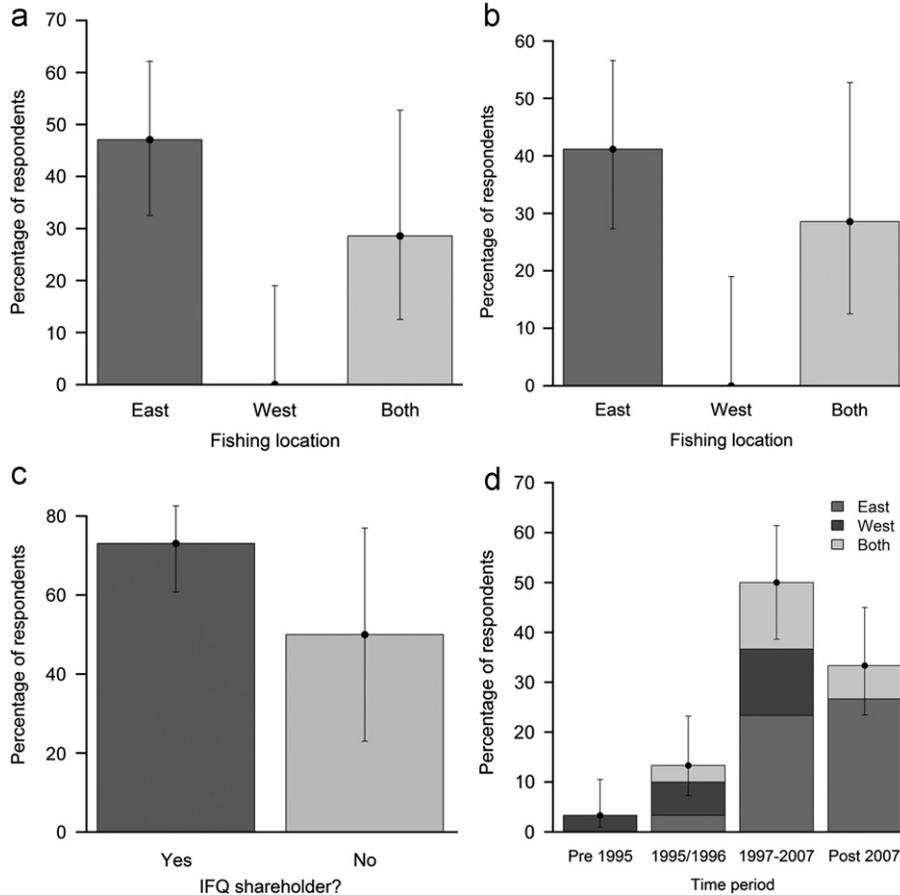


Fig. 2

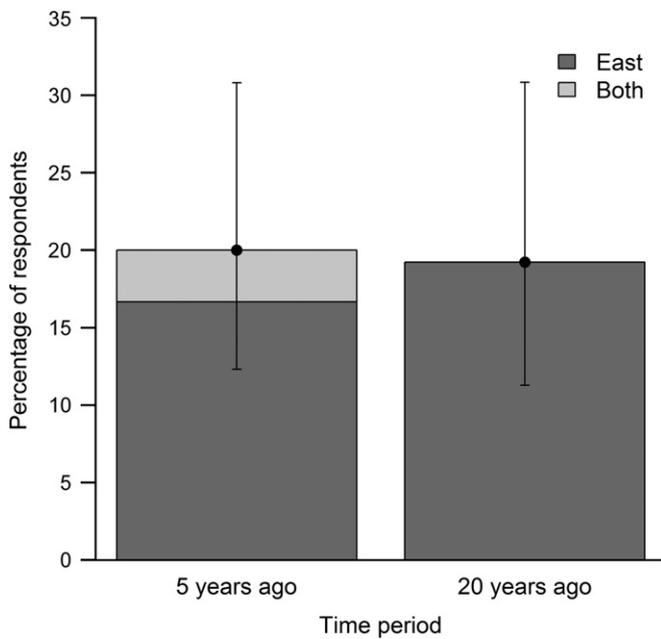


Fig. 4

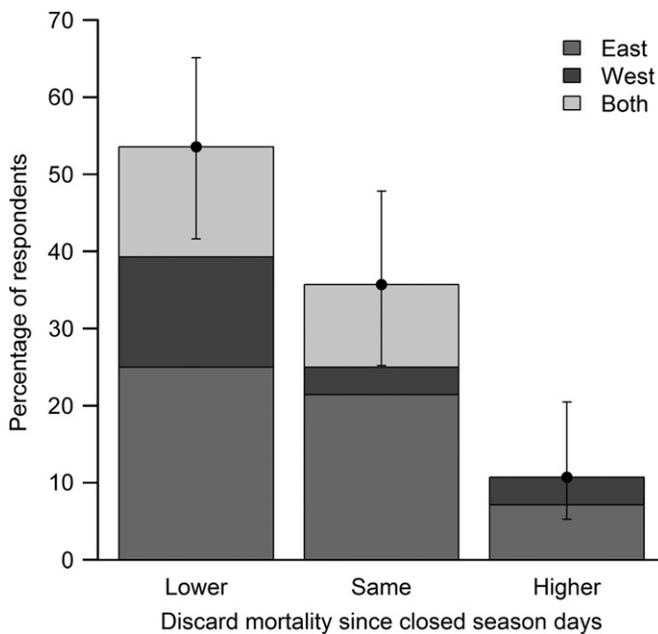


Fig. 5

Regarding fishing mortality, 54% of interviewees believed that there was a lower individual mortality of their red snapper discards since the derby fishing days, while 36% believed fishing mortality had stayed the same, and 11% believed it had increased (Fig. 5).

Finally, regarding amount of snapper discards through the years, fishermen's responses corresponded to NMFS' log book and CATCHEM data (NMFS, unpublished data), which provide estimates of the number of discarded red snapper from 1991 through 2008 (Fig. 6). These data suggest, as do the majority of fishermen interviewed that the highest amounts of discards occurred during the period 1997 and 2006, and that discard numbers have since dropped substantially. According to CATCHEM analyses, the average number of discards between 1997 and 2006 was over

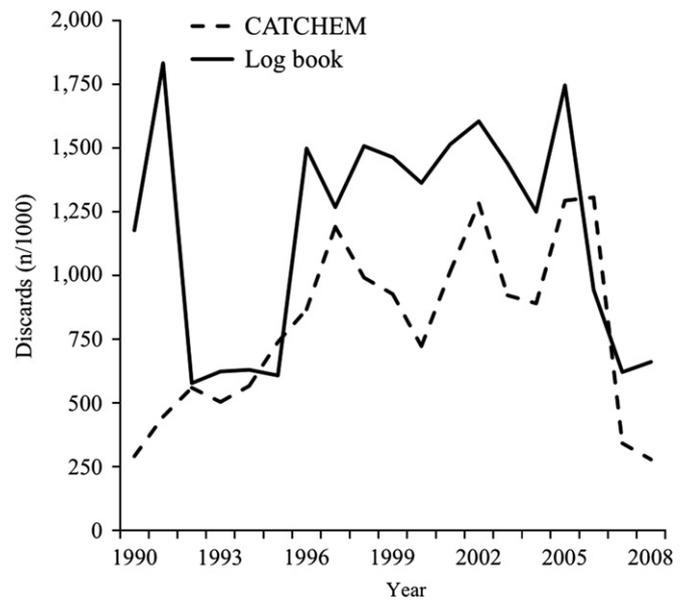


Fig. 6

three times higher than the average recorded between 2007 and 2008; similarly, log book data indicates that the average was over two times higher for the same periods. It should be noted that the log book estimates of discards were higher on average than the estimates obtained from the CATCHEM stock assessment model. If log book estimates typically under-estimate actual discards [3], our results suggest that either these log book data do not, or the CATCHEM model estimates are themselves negatively biased; or, both data sets could be negatively biased.

#### 4. Discussion

The most striking findings from this study concerned the differing trends in red snapper discarding between respondents fishing in the eastern Gulf and those fishing in the west.

To emphasize this disparity, here are the perspectives of two interviewees. The first is a western Gulf fisherman, the second, an eastern Gulf fisherman.<sup>8</sup> They are responding to the same question, 'Would you say there is less wasted fish now than when you started out in the fishery?'

Fisherman A: Oh for sure, definitely. We hardly throw back any snappers, the size is better (we don't really catch small fish anymore), and when we do we just move to another spot. We have all the time in the world now.

Fisherman B: No, there's a lot more wasted fish now than before! We are throwing back more now than we ever had, waaaaay more. Discards on red snapper...[...] believe me when I tell you, some people are throwing back every single one they catch because they have no choice, they cannot bring them in. If they don't have a lease or don't own an IFQ, they can't bring them in. It's like having vermons out here: you wish they [red snapper] weren't here at all, you start to hate them, don't want to see them. And most people here don't have the money to lease them.

<sup>8</sup> The former fisherman has over 20 years more fishing experience than the latter.

Our results correspond with those from NMFS, which also describe more discards in the eastern Gulf for commercial reef fish fishermen as compared with the western Gulf. For example, according to log book data, in 2008 there were over three times as many discarded red snapper reported in the eastern Gulf in the commercial handline fishery than in the western Gulf, and in the commercial longline fishery, over 50 times more discards (NMFS, unpublished data). One explanation is reported in [12] ‘...red snapper abundance has been increasing in the eastern Gulf over the past 10 years and fishermen have indicated they are discarding more red snapper. Most commercial grouper fishermen in the eastern Gulf were allocated few red snapper IFQ shares and are unable to retain large quantities of red snapper caught when fishing for grouper.’ Although these fishermen are eligible to purchase red snapper quota shares and annual allocation, some have not fully done so due to the costs of quota shares and accessibility, as emphasized by this respondent:

As far as managing, it's the number one system [the IFQ program]. As far as a true fishermen owner/operator- ain't worth [anything]. Because nobody can afford to get into it as an owner/operator, fish houses own a lot of the quota. [...] We need new entries, and it's hard to get them. We need some transparency where you can't own quota shares for your whole [] life, you can't pass them down through kid to kid to kid. You need a mechanism where you have to earn it, like be a deckhand for so long.

Historically, red snapper catches were greatest in the western Gulf, and consequently, as the 2007 IFQ initial allocations were based on those catches, more quota shares were allocated to those fishing in the west. Recently, fishermen across the Gulf have been reporting more red snapper in the ocean; but, as interviewees explain, the relatively small overall quota (kept lower to aid stock recovery) coupled with rapidly rebuilding stocks contributes to the likelihood of discards; thus, fishermen have been calling for increased quota (a common concern of fishermen in rebuilding fisheries).

Beyond this, there are likely other factors that affect current red snapper discarding rates, most notably, size limits (Fig. 3). However, observer data indicate that the recent implementation of the reduced minimum size length (at 13 in) has helped to decrease discard rates: ‘Overall, the proportion of fish caught and landed Gulf-wide has increased from 52.7% prior to implementation of the 13 in size limit, to 74.6–79.3% after implementation of the 13 in [11]; also indicates in 2008, 59% of observed snapper discards were of legal size (i.e.,  $\geq 13$  in), suggesting that discarding continued because, for reasons previously stated, some fishermen do not have the IFQ shares and/or annual allocation that are required to land the fish. As the 13 in size limit was established the same year as the IFQ program, both measures have likely contributed to discarding patterns post-2007.

Discarding associated with ‘value’ reasons are explained by one respondent:

Our fish are graded in size increments (1-2lbs... 10+ lbs..) There's a small value shortage of 1-2lb fish. 2-10lb fish are the most valuable fish. When you get to the 10+lb fish, there is about a \$1 difference in the value of the fish. [...] If the fish is dead, we keep 'em, but if it's a 10lb+ fish and alive and kicking, we will throw 'em back. Bigger fish survive a lot easier than the smaller ones.

When it came to survival rates of their red snapper discards, most respondents agreed that fishing mortality is lower today than under the previous derby management. Interviewees' stated reasons for this were having more time now to deal with discards

(i.e., no more ‘race to fish’ approach), and the recent mandatory use of venting and dehooking devices (see Appendix A). It appears the decrease in minimum size limit, along with the IFQ program and the introduction of bycatch reduction tools, coupled with recent gear regulations, show encouraging results.

One important finding from our research had to do with respondents' views on red snapper biomass. While red snapper are currently classified as overfished [8], fishermen interviewed for this study offer a different perspective, as illustrated by one respondent here:

Every day there are more and more! [...] I've seen more fish than I've ever seen in my life, I've landed on piles of red snapper in the eastern gulf which supposedly has less snapper than the western. [It's an] extreme situation... [...] the red snapper just swim in front of you [...]. It truly has gotten to that point. [...] I usually never have to run from a fish but it's happening to me.

According to respondents, irrespective of where they fished, the population of red snapper in the Gulf has increased dramatically. Theories on this ranged from Hurricane Katrina exposing oil pipes in 2005, which then became artificial cover for fish, to the increase in shrimp food for snapper following the declining numbers of shrimp trawlers, to the regulatory changes and reductions in discards. This reported swell in stock biomass has caused respondents to view the red snapper fishery as currently sustainable.

Of further interest is that the overwhelming majority of fishermen interviewed had a good overall opinion of the red snapper IFQ program. This indicates a general support for the new initiative, and the adaptability of Gulf fishermen to regime change.

Finally, perhaps the most important question of the entire questionnaire was the last: ‘How could the red snapper fishery be improved?’ Across respondents, the recommendations for improving the red snapper fishery were as follows:

- Increase quota for eastern Gulf fishermen.
- Accountability for recreational sector.
- IFQs for all reef fish in Gulf.
- Cap on individual ownership of IFQs.

Settling on an initial quota allocation for fishermen is a fundamental challenge in IFQ implementation [20]. Recommendations to increase quotas for those fishing in the eastern Gulf should be considered in light of sound data and information to ascertain claims of snapper biomass increases in these areas. With regard to the recreational fishery, which routinely exceeds its designated quota [21], new federal requirements may help to keep catches within the limits. It is reasonable to expect management and accountability standards for the recreational sector similar to those of the commercial fishery, especially as the recreational sector accounts for a large portion of the red snapper catch and discards in the Gulf of Mexico: according to log book data, in 2008, 86,000 dead red snapper were discarded by recreational fishermen in the western Gulf, compared to the 62,000 snapper from the commercial western handline and longline fisheries combined (NMFS, unpublished data).

It is encouraging that respondents expressed support for the implementation of IFQs for other fish species beyond red snapper; indeed, some respondents have suggested that all reef fish be included in an IFQ-type program. Such programs can fit with an ecosystem-based management approach, and IFQs have proven favorable in multi-species fisheries [20]. Finally, some of these recommendations were the same as those proposed over 10 years ago in [22], and others touch on already well-known criticisms

associated with IFQs, such as the potential to allow power to consolidate in the hands of a few shareholders [23]. In this example with the Gulf red snapper IFQ program, while caps have been imposed on individual ownership of allocation [11], some interviewees have suggested that the caps are perhaps not enough to prevent the concentration of quota share ownership.

It is important to note factors beyond the scope of this report also affect the red snapper fishery and must ultimately be incorporated into the Gulf's overall reef fish management plan in order for it to fully succeed. One example is red snapper as bycatch in other fisheries, such as shrimp: according to the Gulf Council's assessment of red snapper, ten times as many red snapper have in the past been caught as bycatch in the shrimp fishery than in the commercial and recreational fisheries combined [24].<sup>9</sup> In addition, as previously noted, the recreational fishery accounts for a large part of the Gulf's overall red snapper catch and discards. Finally, only the red snapper fishery, which is but one of the multiple species within the Gulf's reef fish complex, is analyzed here; how one species is managed will undoubtedly affect other species within this complex. A comprehensive approach, where all sectors and species are included in the plan, would benefit both stakeholders and stocks.

## 5. Shortcomings and pitfalls

### 5.1. Biased fishermen responses

Perhaps the most obvious setback to this method of data collection, i.e., fishermen interviews, is the inevitable risk of bias in respondents. There are a multitude of reasons why respondents could give biased answers to questionnaires, both intentionally and unintentionally (e.g., memory decay; see [25,17]). In order to address potential biases, triangulation was employed, whereby a question was asked in multiple ways to gauge accuracy of responses [18]. In addition, many open-ended questions were included in the questionnaire, allowing respondents increased chance to reflect [26], and thus possibly aiding recollection [17].

### 5.2. BP's Deepwater Horizon oil spill, April 2010

Our study was substantially affected by the Gulf of Mexico oil spill that was triggered by the oil rig explosion of Deepwater Horizon on April 20, 2010. Consequences were great for fishermen in the area, and interviews were subsequently stopped<sup>10</sup>; thus the total number of fishermen interviewed for this research was about half its intended number.

### 5.3. IFQ shareholders versus non-shareholders

Data collection began by interviewing fishermen associated with the Gulf of Mexico Reef Fish Shareholders' Alliance—therefore, initial respondents were IFQ shareholders. Our goal was to survey fishermen participating in the IFQ program with varying business strategies and IFQ shareholding; however, because the study was unexpectedly stopped short (due to the Deepwater Horizon explosion previously explained), sample size targets to enable thorough comparisons between different shareholder groups were not

<sup>9</sup> Though by weight, the shrimp fishery discards about 20–55% of the commercial and recreational red snapper catch (because the shrimp fishery is dominated by juvenile snapper).

<sup>10</sup> Interviews during this time were both unethical, as families grieved, and unattainable, as fishermen were unavailable due to heavy involvement in post oil spill clean-up. The severity of the situation for Gulf fishermen following the oil spill was exemplified by one fisherman who killed himself 2 months after the oil spill began.

achieved. Likewise, obtaining data from similar numbers of participants fishing in eastern and western Gulf regions, respectively, would have further strengthened our findings; this, too, was not possible due to the study's sudden interruption.

## 6. Conclusion and recommendations

While IFQs are not new in the field of fisheries management, they have recently emerged at the forefront of discussion: the debate around their effectiveness is somewhat contentious, with some reports documenting the positive effects of IFQ programs, and others, their failures [27,23,28–30]. However, it is generally agreed that each fishery should be individually assessed in order to determine its potential success with an IFQ program.

The aim of this study was to assess how the recent IFQ program in the Gulf of Mexico has affected red snapper discarding practices. Our results indicate that an IFQ program for red snapper could in fact lead to overall decreases in discarding for those with adequate quota shares; however, the result of such a program for those without sufficient quota shares could actually increase discarding. Such findings indicate a critical divide between fishermen in the Gulf, and addressing this trend could improve the program's outcomes. For instance, consistent with [11], as the snapper stock rebuilds, fishermen in the eastern Gulf (where small initial red snapper IFQ allocations were granted) should be better integrated into the management program.

In addition, given that large amounts of red snapper below the minimum size limit continue to be discarded [11], and that the mortality rate of red snapper is still relatively high (approximately 80%, see [24]), an elimination of the minimum size limit could be considered, and was one of the suggestions made by some fishermen. However, the potential consequences of this proposal on the red snapper population and the fishery (e.g., the potential for growth overfishing) would need to be quantitatively evaluated before such a measure could be considered for implementation.

It is encouraging to hear that fishermen consider the red snapper fishery to be sustainable, and that, in their experience, red snapper have recently proliferated in biomass; nevertheless, such testaments must be supported with science [6,17,13] before they can be positioned to influence management.<sup>11</sup>

The 2010 Gulf oil spill reminds us that fish stocks and marine ecosystems are susceptible to influences beyond those of fisheries—many of these beyond the control of industry and regulators. However, there are examples of how IFQs can provide fishermen with options to manage their operations during disasters (e.g., options that are not available to people working under a derby system). In this case, since IFQ management provides year-round fishing and transferability of harvest privileges, commercial snapper boats blocked in by the expansive oil spill closures, which reached over 30% of the Gulf and lasted several months, could sell their share to a portion of their 2010 catch to fishermen in Texas and Florida where waters remained open, helping to sustain income and keep seafood markets active. (On the contrary, for-hire recreational fishermen managed by open access and long closures were shut down for business from Louisiana through the Florida Panhandle during its short summer season opening.) Further, these IFQ shares have a transparent market price that, if affected by the oil spill, can be documented for a recovery claim.

However, for those fishermen unable to participate in the IFQ program, the benefits of such management are lost.

<sup>11</sup> For example, in both commercial and recreational red snapper fisheries, observer data indicates higher red snapper discards than self-reported data (which was, incidentally, the stated motivation behind the CATCHEM models [31]).

In any case, to keep the fishery robust given natural variability and to hedge against future disasters, rebuilding and maintaining stocks to stay above overfished levels could help facilitate stock resiliency.

## Acknowledgments

This paper is dedicated to Allen Kruse.

## Appendix A

Interviewees' stated reasons were having more time now to deal with discards (i.e., no more 'race to fish' approach), and the recent mandatory use of venting and dehooking devices (see Table A1).

**Table A1**

The evolution of commercial fishery regulations pertaining to red snapper in the Gulf of Mexico, as shown in [32,12].

Year	Rule-making vehicle	Action
1984	FMP	<ul style="list-style-type: none"> <li>13 in minimum TL</li> </ul>
1990	Amendment 1	<ul style="list-style-type: none"> <li>7-Fish bag limit</li> <li>3.1 mp commercial quota</li> <li>Rebuilding goal 20% SSBR</li> </ul>
1991	Amendment 3	<ul style="list-style-type: none"> <li>Revise TAC framework to be more flexible</li> </ul>
1991	Regulatory amendment	<ul style="list-style-type: none"> <li>2.04 mp commercial quota</li> <li>1.96 mp recreational allocation</li> <li>Effect 50% bycatch reduction by 1994 in the shrimp fishery</li> <li>Projected to achieve 20% SPR by 2007</li> </ul>
1992	Emergency rule	<ul style="list-style-type: none"> <li>Open commercial red snapper fishery from April 3 to May 14 with 1000 lbs trip limit due to the season closing in just 53 days</li> </ul>
1992	Amendment 4	<ul style="list-style-type: none"> <li>Moratorium on the issuance of new reef fish commercial permits for 3 years</li> </ul>
1992	Emergency rule	<ul style="list-style-type: none"> <li>Create commercial red snapper 2000 lbs and 200 lbs endorsement for 1993</li> </ul>
1992	Emergency rule	<ul style="list-style-type: none"> <li>Close the commercial fishery from December 1, 1992 to February 15, 1993</li> </ul>
1993	Regulatory amendment	<ul style="list-style-type: none"> <li>3.06 mp commercial quota</li> <li>2.94 recreational allocation</li> <li>Projected to achieve 20% SPR by 2009</li> <li>Change opening day of the 1994 commercial season to February 10</li> <li>Restrict commercial vessels to landing no more than one trip limit per day</li> </ul>
1993	Amendment 6	<ul style="list-style-type: none"> <li>Extended commercial red snapper endorsements</li> </ul>
1994	Amendment 5	<ul style="list-style-type: none"> <li>Raise minimum size limit incrementally from 14 to 16 in TL over a 5-year period</li> <li>Establish Class 1 and Class 2 licenses</li> <li>Create Alabama SMZ's</li> </ul>
1994	Regulatory Amendment	<ul style="list-style-type: none"> <li>Change opening day of commercial season to February 24, 1995</li> <li>Retain 6 million lbs red snapper TAC and commercial trip limits</li> </ul>

**Table A1** (continued)

Year	Rule-making vehicle	Action
		<ul style="list-style-type: none"> <li>Reduce daily bag limit from 7 fish to 5 fish</li> <li>Increase the minimum size limit for recreational fishing from 14 in to 15 in a year ahead of the scheduled automatic increase</li> </ul>
1994	Amendment 7	<ul style="list-style-type: none"> <li>Establish dealer reporting</li> </ul>
1995	Regulatory Amendment	<ul style="list-style-type: none"> <li>Raise TAC from 6 mp to 9.12 mp</li> <li>Start commercial season February 28</li> </ul>
1994	Amendment 9	<ul style="list-style-type: none"> <li>Allow collection of commercial landings 1990–1992 for ITQ</li> <li>Extend the moratorium on the issuance of new reef fish permits</li> </ul>
1995	Amendment 8	<ul style="list-style-type: none"> <li>Attempted to establish ITQ system (Congress repealed it)</li> </ul>
1996	Regulatory Amendment	<ul style="list-style-type: none"> <li>Increase TAC to 9.12 mp</li> <li>Extend recovery date to 20% SPR to 2019</li> <li>Split commercial quota in a spring and fall season</li> </ul>
1996	Amendment 13	<ul style="list-style-type: none"> <li>Extend the red snapper endorsement system through the remainder of 1996 and, if necessary, through 1997, in order to give the Council time to develop a permanent limited access system</li> </ul>
1997	Amendment 12	<ul style="list-style-type: none"> <li>NMFS disapproved proposed provisions to cancel the automatic commercial red snapper size limit increases to 15 in total length in 1996 and 16 in total length in 1998</li> </ul>
1997	Regulatory amendment	<ul style="list-style-type: none"> <li>Change start of fall season from 9/15 to 9/2</li> <li>Fall season first 15 days of each month until the quota is filled</li> <li>Change the recreational red snapper allocation to a quota</li> <li>RA close recreational fishery in EEZ when landing projected to exceed its allocation</li> </ul>
1997	Regulatory amendment	<ul style="list-style-type: none"> <li>Cancel planned increase in the red snapper minimum size limit to 16 in TL</li> </ul>
1998	Amendment 15	<ul style="list-style-type: none"> <li>Establish a permanent two-tier red snapper license limitation system (Classes 1 and 2)</li> <li>The commercial season was split in two, with two-thirds of the quota allocated to a February 1 opening and the remaining quota to a September 1 opening</li> </ul>
1998	Regulatory amendment	<ul style="list-style-type: none"> <li>Maintain 9.12 mp TAC</li> <li>Zero bag limit for the captain and crew of for-hire recreational vessels (not implemented)</li> </ul>
1998	Regulatory amendment	<ul style="list-style-type: none"> <li>6 mp TAC, with release of all or part of the remaining 3.12 mp contingent upon the capability of BRD's to achieve better than a 50% reduction in juvenile red snapper shrimp trawl mortality</li> <li>Reduce the bag limit to 4 fish and zero fish for captain and crew of for-hire vessels</li> <li>Set the opening date of the recreational fishing season to March 1</li> <li>Reduce the minimum size limit for red snapper to 14 in total length for both directed fisheries</li> <li>Change the opening of the fall fishing season from the first 15 days to the first 10 days of each month beginning September 1</li> </ul>

Table A1 (continued)

Year	Rule-making vehicle	Action
1998	Emergency rule	<ul style="list-style-type: none"> <li>Reduce the recreational bag limit for red snapper from 5 to 4 fishes per person</li> <li>Reopen the recreational fishing season in January 1999</li> </ul>
1999	Interim rule	<ul style="list-style-type: none"> <li>Increase the minimum size of recreationally caught red snapper to 18 in.</li> <li>Close the recreational red snapper fishery in the EEZ on August 19, 1999</li> </ul>
1999	Interim rule	<ul style="list-style-type: none"> <li>Change 2000 recreational season from April 24 to October 31</li> <li>Reinstate 4-fish bag limit for captain and crew</li> <li>Reduce opening of spring commercial season from 15 to 10 days</li> </ul>
2000	Amendment 17	<ul style="list-style-type: none"> <li>Extend the reef fish permit moratorium for another 5 years, from the existing expiration date of December 31, 2000–2005, unless replaced sooner by a comprehensive controlled access system</li> </ul>
2000	Regulatory amendment	<ul style="list-style-type: none"> <li>Maintain the TAC at 9.12 mp for the next 2 years</li> <li>Increase the recreational minimum size limit from 15 in to 16 in TL</li> <li>Set the red snapper recreational bag limit at 4 fish</li> <li>Reinstate the for-hire captain and crew bag limit</li> <li>Set the recreational red snapper season from April 15 to October 31, subject to revision by the RA to accommodate reinstating the bag limit for captain and crew</li> <li>Set the commercial red snapper Spring season to open on February 1 and be open from noon on the 1st to noon on the 10th of each month until the Spring sub-quota is reached</li> <li>Set the commercial red snapper Fall season to open on October 1 and be open from noon on the 1st to noon on the 10th of each month until the remaining commercial quota is reached</li> <li>Retain the red snapper commercial minimum size limit to 15 in TL</li> <li>Allocate the red snapper commercial season sub-quota at 2/3 of the commercial quota, with the Fall season sub-quota as the remaining commercial quota</li> </ul>
2003	Amendment 20	<ul style="list-style-type: none"> <li>Establish a 3-year moratorium on the issuance of any additional charter vessel/headboat permits for vessels fishing the EEZ of the Gulf of Mexico (Gulf) for Reef Fish or CMP fishes</li> <li>Allow permits (except those issued to historical captains) to be transferable to other persons</li> <li>Require vessel captains or vessel owners to participate in data collection surveys as a permit condition</li> </ul>
2005	Amendment 22	<ul style="list-style-type: none"> <li>Establish status determination criteria and biological reference points</li> <li>Establish red snapper rebuilding plan</li> <li>Establish additional reef fish bycatch reporting methodologies</li> </ul>
2005	Amendment 2	<ul style="list-style-type: none"> <li>Extend the commercial reef fish permit moratorium indefinitely from the existing expiration date of December 31, 2005, unless</li> </ul>

Table A1 (continued)

Year	Rule-making vehicle	Action
		replaced by a comprehensive controlled access system
2006	Amendment 25	<ul style="list-style-type: none"> <li>Extend the recreational for-hire reef fish permit moratorium indefinitely from the expiration date of June 16, 2006 and create a limited access system</li> </ul>
2006	Amendment 26	<ul style="list-style-type: none"> <li>Establish an Individual Fishing Quota program for the commercial red snapper fishery</li> <li>Reduce the commercial minimum size limit from 15 to 13 in</li> </ul>
2007	Amendment 27	<ul style="list-style-type: none"> <li>Bycatch reduction gear (e.g., circle hooks, venting and dehooking tools)</li> </ul>

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