

Gulf of Mexico Red & Gag Grouper Discussion Paper

The following document is a discussion paper prepared by the Fisheries Leadership and Sustainability Forum in response to a request from members of the Gulf of Mexico Fishery Management Council. This paper examines the complexity and required changes surrounding red and gag grouper management in the Gulf of Mexico.

In a complex regulatory environment, Councils are tasked with managing sustainable fisheries and providing opportunities for public comment from diverse stakeholders. The purpose of this discussion paper is to facilitate critical thinking by framing the issues affecting reef fish management, and examining the ways in which management measures may interact. We hope that this paper will stimulate discussion and broaden the array of solutions under consideration by drawing on the experiences of experts in fisheries management representing different regions, disciplines and areas of expertise.

We asked reviewers to consider the following focus questions:

1. Have market mechanisms been used in other fisheries to allow the transfer of catch between the private recreational, for-hire and commercial components of the fishery? Or, have these alternatives been proposed and rejected and if so, why?
2. What are specific mechanisms for increasing accountability and reducing management uncertainty in recreational fisheries, while preserving traditional open access (an open season where all anglers have equal opportunity to participate)? Can or have these mechanisms been applied selectively to a single species or group of species within a multispecies fishery? How can managers increase buy-in and compliance from anglers?
3. Are there any examples of recreational regulations that take into consideration the relationship between depth and discard mortality by reducing regulatory discards at depths where a released fish is less likely to survive? Are there any strategies for overcoming the challenge of enforcement in this situation?
4. What mechanisms could be used to capture dead regulatory discards and into additional harvest?
5. Are there any differences in the distribution and preferred habitat of red and gag grouper, and red/gag grouper and other reef species that could be translated to management strategies which would selectively decrease pressure on one species while allowing components of the fishery to harvest the full ACL of another species?
6. The combination of the changes happening in the commercial fishery may result in a shift



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in the composition and volume of landings, consolidation, and gear switching. The duration of this transition period cannot be predicted but will last at least several years. In other multispecies fisheries that have experienced a process of transition, are there any examples of built-in strategies that allow managers to monitor and proactively address any trends that emerge?

7. Are their management measures available to reduce/forestall/minimize the transition of gag grouper from a directed fishery to a bycatch fishery given the substantial reduction in harvestable amount?
8. Are there consensus building tools or mediation techniques to help facilitate problem solving in a multi-stakeholder process that may minimize the political tensions?

Please be aware that this discussion paper is intended for the sake of discussion only. It does not represent the opinions of the Gulf of Mexico Fishery Management Council or the Council's staff, and should not be construed as a policy recommendation on the part of reviewers or the Fisheries Leadership & Sustainability Forum. Review of the final discussion paper by Council members is voluntary and the Council is under no obligation to consider information contained therein during the Amendment 32 scoping process.

Sincerely,

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Complexity and Change:
Red and Gag Grouper Management in the Gulf of Mexico

Purpose

Management of the Gulf of Mexico reef fishery, especially red and gag grouper, has reached a new level of complexity with social, economic, ecological and biological considerations. In January 2010, the Gulf of Mexico Fishery Management Council (GMFMC) implemented an IFQ program for the commercial sector of the shallow water grouper (SWG) fishery. The Council also faces tight deadlines for the implementation of annual catch limits (ACLs) and accountability measures (AMs) as mandated by the Magnuson-Stevens Reauthorization Act of 2006 (MSRA). In addition to these long anticipated regulatory changes, GMFMC is facing unexpected and urgent challenges: the requirement to end overfishing and develop a rebuilding plan for gag by August 2011, likely reductions in acceptable biological catches (ABCs) for both red and gag grouper due to an episodic mortality event, and major changes to the commercial longline fleet in order to comply with the Endangered Species Act. The Council is currently conducting the scoping process for Amendment 32 to the Reef Fish Fishery Management Plan (FMP). Amendment 32 will set annual catch limits for red and gag grouper, end overfishing of gag and establish a gag rebuilding plan.

This discussion document is designed to facilitate critical thinking by framing the issues affecting reef fish management, and examining the ways in which management measures may interact. Its purpose is to stimulate discussion and creative problem solving by drawing on the experiences of stakeholders as well as experts in fisheries management representing different regions, disciplines and areas of expertise. While upcoming regulatory changes have firm deadlines, their effects on the SWG fishery will occur on a less predictable timeline. This document is structured as a snapshot in time in order to capture and examine the “moving parts” in management based on the information that is currently available.

The introduction to this document includes a description of GMFMC and the SWG fishery, a problem statement, an overview of Amendment 32 and management measures proposed during the scoping process, and an outline of recent and upcoming management actions. Part One discusses management strategies, regulatory changes and current trends in the commercial, private recreational and for-hire components of the fishery. Part Two analyzes the linkages and crosscutting issues that affect the entire SWG fishery. Part Three broadens the array of proposed management solutions based on feedback gathered during the review process. Part Three includes relevant case studies and analysis.

Introduction: Red and Gag Grouper and the Shallow Water Grouper Fishery

The Gulf of Mexico Fishery Management Council includes 17 voting representatives from the states of Florida, Alabama, Mississippi, Louisiana and Texas. The original multispecies reef fish fishery management plan (FMP), first drafted in 1984, includes 42 species of which 11 have undergone stock assessments. The 15 grouper species in the reef fish management unit are grouped into shallow water grouper (SWG) and deepwater grouper (DWG) components.¹ The SWG fishery includes red and gag grouper, as well as scamp, yellowmouth and yellowfin grouper, rock hind, and red hind.

In the Gulf of Mexico, red and gag grouper contribute 93% of recreational grouper landings and 80% of commercial landings in 2008 (GMFMC 2009b) and are the most valuable component of the reef fish complex. All sectors of the SWG fishery target or land both species, and management actions therefore affect both species. Amendment 30B recognizes this close relationship by co-managing the two species with concurrent management measures.

Changes to the SWG fishery will primarily impact stakeholders in Florida, where the vast majority of landings, and targeted fishing trips occur. From 1993-2006, 97.8% of all commercial red grouper landings and 96.7% of gag landings occurred in Florida (GMFMC 2008a). MRFSS data indicates that recreational fishing trips targeting and/or landing red or gag grouper occurred almost exclusively in Florida (GMFMC 2008a).

Problem Statement:

Within the context of past, present and pending management actions, what strategies can the Council employ to cope with the reduced ACL for gag grouper that will occur under a rebuilding plan and achieve the following:

- 1) Preserve directed commercial and recreational fisheries for gag, and avoiding managing gag grouper as a bycatch fishery;
- 2) Reduce bycatch mortality and dead discards of gag, as well as other species in the shallow water grouper fishery, and enable all sectors to utilize their full allocations of other species; and
- 3) Consider the challenges of a multispecies fishery in which fishing effort overlaps across sectors, gear types, species and areas.

¹ Goliath and Nassau grouper are prohibited species.

Recent and Upcoming Management Actions

Amendment 32

Amendment 32 proposes to end overfishing of gag and establish a rebuilding plan, reduce the harvest of red grouper consistent with harvesting the stock at optimum yield, revise ACLs to reflect 2009 stock assessment updates, revise AMs, minimize gag bycatch while maximizing harvest from the SWG fishery, and to improve data collection and accountability in the recreational sector (GMFMC 2009b).

The first goal of this discussion document is to examine the cumulative effects and interactions between management actions. The second is to broaden the array of management strategies under consideration for Amendment 32, and identify new and innovative solutions that have not been considered to date. Specific management strategies that have already been proposed in the Amendment 32 scoping document could achieve some of the objectives identified in the problem statement and focus questions. These strategies are outlined in Appendix 1.

Open-ended questions posed by the Amendment 32 scoping document include:

- What management measures do you feel would be most effective in reducing gag harvest while minimizing discard mortality (or keeping an increase in discard mortality as small as possible)
- What innovative methods could be used to reduce or prevent bycatch of gag, and allow red grouper quotas to be filled?
- What strategies could be used to reduce dead discards of gag in the recreational fishery?

Other Recent and Upcoming Management Actions

Table 1: Management actions affecting gag and red grouper

Date	Event/Action	Outcome
May-Aug. 2005	Red tide	Caused non-fishing mortality of gag and red grouper
April 2009	Gag update assessment	Gag are overfished and undergoing overfishing
April 2009	Red grouper assessment update	Red grouper are not overfished or undergoing overfishing
April 2009	Amendment 30B	Implemented measures to end overfishing of gag, set ACLs, ACTs and AMs for red and gag grouper, establishes interim recreation : commercial allocation of 24:76 for red grouper and 61:39 for gag, requires federally permitted commercial and for-hire vessels to abide by federal regulations in state waters
May 2009	Emergency rule	Prohibited bottom longlining in the eastern Gulf inshore of 50 fathoms, effective May 18-October 28, 2009
August 2009	Amendment 29	Approved an IFQ program for the commercial component of the grouper and tilefish fisheries
August 2009	Notification of overfishing of gag by Southeast Regional Administrator	Requires the Council to end overfishing and implement a rebuilding plan for gag within two years
October 2009	Alternative rule	Prohibits longlining inshore of 35 fathoms east of Cape San Blas, Florida and limits longline vessels to fishing 750 hooks

January 2010	Amendment 29: Start date of IFQ program	Implemented an IFQ program in commercial sector of the grouper and tilefish fishery
2010 (anticipated)	Amendment 31	Will require an endorsement to fish east of Cape San Blas, Florida; establish a June-August closure shoreward of 35 fathoms, limit longline vessels to fishing 750 hooks
August 2011	Deadline for Council's Rebuilding Plan for Gag Grouper	The Council must end overfishing and gag and implement a rebuilding plan no later than this date

Status of Red and Gag Grouper: results of recent SEDAR stock assessments

Stock assessments in the Gulf region are carried out through the Southeast Data, Assessment and Review (SEDAR) process.

Red Grouper

The Gulf of Mexico red grouper stock has been rebuilt over the past decade and Amendment 30B sets the TAC at equilibrium optimum yield for 2010. However, while a 2009 stock assessment update found that red grouper is not overfished or undergoing overfishing (SEDAR 2009a), the stock has declined since 2005. An episodic mortality event in 2005 possibly caused by red tide resulted in mortality of an estimated 20% in addition to natural and fishing mortality (GMFMC 2009b). Consequently the ACT set by Amendment 30B for 2010, at 7.57 mp, exceeds the Scientific and Statistical Committee ABC recommendation of 5.96 mp and a reduced ACL and ACT have been proposed for 2011 (GMFMC 2009b).

From 1999 to 2007, the stock assessments for red grouper have shown that the species has rebuilt relatively quickly from an overfished/undergoing overfishing designation due to several strong year classes. Stock assessments conducted in 1999 (Schirippa et al 1999) and 2002 (SEFSC 2002) found that red grouper were overfished and undergoing overfishing, although the 2002 assessment suggested that the stock was already rebuilding more quickly than anticipated. A rebuilding plan was implemented in 2004. The last full stock assessment, SEDAR 12 in 2007 found that red grouper are no longer overfished or undergoing overfishing, indicating that the fishery could be managed at OY. The next full stock assessment is scheduled for 2011.

Gag Grouper

Gulf of Mexico gag grouper are currently overfished and undergoing overfishing (SEDAR 2009b). GMFMC was notified of this designation by the National Marine Fisheries Service in August of 2009 and must develop a plan to end overfishing and rebuild the stock by August of 2011. The same 2005 episodic mortality event that caused high non-fishing mortality of red grouper similarly resulted in additional 18% mortality of gag grouper (GMFMC 2009b). As with red grouper, a lower ABC will be needed to support rebuilding and account for non-fishing mortality.

The most recent full stock assessment in 2006 (SEDAR 10) determined that gag was undergoing overfishing. GMFMC implemented management measures to end overfishing via Amendment 30B in 2008. Prior to Amendment 30B it was not possible to make a determination of "overfished" for gag due to the absence of an SFA-compatible minimum stock size threshold (MSST); however according to the MSST definitions included in 30B gag was not considered

overfished at that time (GMFMC 2008a). The next full SEDAR assessment is scheduled for 2011.

Proposed ACL Reductions

Amendment 30B set ACLs and AMs for gag and red grouper. At that time the SSC only made an ABC recommendation for 2010. The SSC has since requested that assessment analyses for red grouper be rerun with 2009 data, which would reflect catch trends and the impact of an emergency longline closure which began in May. 2009 data will be available in the spring of 2010 and the SSC will provide their ABC recommendation at this time (GMFMC 2009b).

ACLs can be altered if the Council’s SSC makes new ABC recommendations or if the status of a stock changes. Both scenarios have occurred in the SWG fishery in 2009: gag were determined to be overfished and experiencing overfishing, and the SSC has requested that assessment analyses be re-run, which could lead to a new ABC recommendation. New ABC recommendations, the need to develop a rebuilding plan for gag, and the need to account for non-fishing mortality of both species will result in lower than anticipated ACLs and ACTs in 2011.

The 2009 ACLs and ACTs were set in Amendment 30B, and the 2010 and 2011 ACLs and ACTs are proposed in the Amendment 32 scoping document. The proposed ACLs are based on yields that would support a 10-year rebuilding timeline, while the proposed ACTs would support a 7-year rebuilding timeline. (GMFMC 2009b) Recreational values are based on a three-year moving average strategy set under Amendment 30B in which 1-year landings would be used in 2009 and a 2-year average in 2010. This timeline is moved forward by a year to begin in 2010. Final ACLs and ACTs for both red and gag grouper will be proposed for 2011 once 2009 landings data is available, although preliminary projections are given for gag grouper using current analyses.

Table 2: Current and proposed ACLs and ACTs for **red grouper**, millions of pounds

	Commercial		Recreational	
	ACT	ACL	ACT	ACL
2009	5.75	5.87	1.82	1.85
2010	3.73	4.53	1.18	1.43

Table 3: Current and proposed ACLs and ACTs for **gag grouper**, millions of pounds

	Commercial		Recreational	
	ACT	ACL	ACT	ACL
2009	1.32	1.66	2.06	2.59
2010	0.26	0.32	0.41	0.50
2011	0.39	0.47	0.515	0.615

Part 1: Components of the Gag and Red Grouper Fishery

Commercial

Shallow Water Grouper IFQ

From 2004-2007 landings of grouper and tilefish (also included in the IFQ program) averaged 10.8 million lbs. worth \$25.4 million, of which 10 million lbs. worth \$23.5 million were landed in Florida (74 Fed.Reg. 44738). On average, red grouper accounts for 67% of commercial landings and 62% of the ex-vessel value of SWG, while gag accounts for 18% and 21% respectively (GMFMC 2008b).

Amendment 29 to the Reef Fish FMP developed an IFQ program to reduce effort in the commercial sector of the grouper and tilefish fisheries. The program took effect January 1, 2010 and is the second IFQ program in the region as well as the second IFQ program developed for a sub-sector of the reef fishery. Amendment 26 implemented an IFQ program for the commercial red snapper fishery in 2007.

The purpose of Amendment 29 and the IFQ program is to rationalize effort and reduce overcapacity while achieving OY from the fishery (GMFMC 2008b). Prior to 2010, the SWG fishery was managed under a limited-entry system with input controls including size limits, trip limits, area and gear restrictions, and closures. A moratorium on new permits has been in place since 1992. Amendment 30B also includes a provision requiring federal permit holders to comply with federal closed seasons and other regulations (whichever is more restrictive, federal or state) in state waters. Over time, overcapitalization in the fishery led to increasingly stringent regulations and early season closures, perpetuated the race to fish, and caused fluctuations in the supply of fish and lower dockside values.

The SWG IFQ program has many common elements found in catch share programs including: an overage provision, transferability, caps on quota and allocation to prevent excessive shares, and a mechanism for cost recovery. Other elements of the program have been tailored to the needs of the reef fish fishery. The five share categories include red grouper, gag, other shallow water grouper (SWG), deepwater grouper (DWG) and tilefish. The combination of species-specific quotas and quota categories is designed to allow flexibility and limit regulatory discards, while enabling the commercial sector to harvest near OY for gag and red grouper, which are the most valuable components of the fishery. The quotas for red and gag grouper are intended to help balance catch and quota, allow species-specific management measures, and facilitate the setting of ACLs.

Another innovative component of the ITQ program is the creation of a multi-use allocation category. A portion of the quota for gag and red grouper (8% for gag, 4% for red grouper) is reserved annually in the form of a multi-use allocation, which can be used to land either species (GMFMC 2008b). This measure was intended to reduce regulatory discards and provides flexibility for fishermen to land their catch even if they have filled their allocation for one of the two species. Due to the reduced ACLs for both species that will result from Amendment 32, there is a risk that the use of these multi-use allocations as they were originally designed could

cause the commercial fishery to exceed its allocation (GMFMC 2009b). Multi-use allocations will be adjusted under Amendment 32.

The SWG IFQ, like the red snapper IFQ, sets limited-term restrictions on transfers of quota and allocation outside the fishery. For the first five years following implementation of the IFQ program, quota and allocation can only be transferred between permit holders (GMFMC 2008b). After this period any citizen or resident alien is eligible to purchase shares or allocation, though they must possess a commercial reef fish permit to land their catch. The purpose of this limitation is to allow an initial adjustment period for participants to adapt to IFQ management, during which the limited pool of quota buyers will keep quota shares at a lower price (GMFMC 2008b). The Council considered but rejected a “use it or lose it” provision, and unharvested shares will not be redistributed.

Fishermen and dealers share the responsibility for monitoring, data collection and cost recovery. Permit holders are able to track their landings, quota and allocation in real time using an online accounting system. Fishermen must submit a declaration of fishing activity prior to each fishing trip, notify NMFS 3 to 12 hours in advance of landing, and offload their SWG catches between 6:00 am and 6:00 pm at certified landing sites (GMFMC 2008b). Catch information is entered by the dealer at the time of the transaction and validated by the fisherman. The same system is used to track transfers of quota and allocation, and to collect a cost recovery fee paid by fishermen.

The purpose of the IFQ program is to rationalize effort and reduce capacity via consolidation within the fishery. The transferability of quota and shares within an ITQ managed fishery facilitate consolidation among the fleet by allowing less efficient businesses to exit the fishery. In its first year following implementation of the red snapper IFQ, 10% of initial shareholders exited the program (GMFMC 2008b). The extent of consolidation that is likely to occur in the fishery, and the rate at which it will occur, will be influenced by other concurrent regulatory changes as well as factors external to the fishery.

New Restrictions on Bottom Longlining Gear

Bottom longlining for shallow water grouper in the eastern Gulf was closed shoreward of 50 fathoms by emergency rule from May 18, 2009 through October 28, 2009 due to interactions with loggerhead sea turtles (74 Fed.Reg.20229). Sea turtle takes are associated with all gear types in all sectors of the reef fishery, but primarily occur in the bottom longline fishery. A 2005 Biological Opinion estimates the take of 113 hardshell sea turtles (including 85 loggerheads) over a three-year period (GMFMC 2009a). However, data from three observer programs estimates the actual number of takes over this period at 1160 hardshell sea turtles, which triggered an ESA Section 7 consultation for the reef fish fishery (GMFMC 2009a). A new Biological Opinion prepared by NMFS in October 2009 reflects the anticipated effects of actions proposed under Amendment 31 and resulted in a no jeopardy finding (NMFS 2009).

Amendment 31 to the reef fish FMP has proposed measures to reduce sea turtle interactions in the SWG longline fishery. The preferred alternatives would reduce interactions with sea turtles in three ways:

- 1) Gear restrictions: vessels would be limited to 1000 hooks, of which only 750 can be fished or rigged for fishing;

- 2) Time and area closures: the use of bottom longlines east of Cape San Blas, Florida would be prohibited shoreward of 35 fathoms between June and August to reduce fishing activity during the time and in the area where the majority of takes were observed; and
- 3) Effort reduction: a longline endorsement would be required to fish east of Cape San Blas².

The long-term management measures outlined in Amendment 31 will not be implemented until later in 2010 and the emergency rule expired on October 28, 2009. In the interim, NMFS has issued an alternative rule prohibiting all bottom longlining shoreward of 35 fathoms east of Cape San Blas and restricting the number of hooks to 750 (74 Fed.Reg. 53889).

The number of active bottom longlining vessels would be reduced by 79% and effective effort would be reduced 48-55% (GMFMC 2009a). Vessels that did not qualify for a longlining endorsement are likely to switch to fishing with vertical lines. Fishermen in the SWG group fishery commonly use more than one gear type, and even among those vessels eligible for a longlining endorsement, the new seasonal shallow water closure may become an incentive to switch to vertical lines. Vertical lines, also referred to as “bandit gear”, often have multiple hooks depending on the target species and are paired with an electric reel. The transition between gear types will include a learning curve, with implications for catch volume and composition and the rate of consolidation in the fishery based on the number of fishermen who are able to switch gear types effectively.

Recreational

In the private and recreational sectors, 96% of trips for which anglers reported catching red or gag grouper took place in Florida (GMFMC 2008a). Gag is the more popular target. On average, the number of recreational fishing trips targeting gag annually is more than double the number that target red grouper (GMFMC 2008a). In 2006, private and for-hire recreational trips catching red or gag grouper generated \$119.5 million in sales (GMFMC 2008a).

Recreational landings of gag and red grouper are managed using input controls including size limits, species-specific bag limits, an aggregate grouper bag limit, and seasonal closures to protect spawning aggregations. The disadvantages associated to some extent with all of these measures include highgrading, regulatory discards and discard mortality. Adjusting the combination of management measures involves tradeoffs. For example, a lower minimum size can reduce the number of regulatory discards (and discard mortality), but this causes an increase in catch per unit effort (CPUE) which may need to be offset with a lower bag limit.

Managers can model these tradeoffs and adjust the combination of management strategies to achieve specific management goals, which under the present circumstances involves shifting fishing effort toward red grouper and away from gag. Adjustments made in Amendment 30B were predicted to reduce gag harvest by an estimated 26% and increase red grouper harvest by 17% (GMFMC 2008a).

² Eligibility would require an annual average of 40,000 lbs. reef fish landings during the qualifying period of 1999-2007 (GMFMC 2009a).

For-hire

The for-hire sector includes charterboats and headboats. The distinction between headboats and charterboats is determined by whether they charge a per-person or a per-vessel fee, and the same vessel may operate under both categories. Charterboats are generally smaller and carry fewer anglers. Like the commercial fishery, the for-hire reef fish fishery operates under a limited entry system. A federal for-hire permit has been required since 1996 and a moratorium on new permits has been in place since 2002. There are currently 1692 permits, of which 76 headboats participate in the headboat logbook program (GMFMC 2008a).

Anglers fishing on a for-hire trip are bound by the same regulations (bag limits, etc.) as private recreational anglers. For-hire vessels may be subject to additional restrictions that are not applicable to private recreational anglers. The Amendment 30B provision requiring federal permit holders to comply with federal closed seasons and other regulations when fishing in state waters also applies to the for-hire industry. This cannot be applied to private recreational anglers, as they do not hold federal permits.

The for-hire sector could potentially be regulated separately from the private recreational sector, a measure referred to as “sector separation”. This is under consideration during the Amendment 32 scoping process and will be discussed in greater detail in the next section of this document.

All components: Closed Areas

Two existing closures, the Madison-Swanson and Steamboat Lumps restricted fishing areas³, were created in 2000 and extended indefinitely by Amendment 30B. The purposes of these closures, which measure 219 nm², are to protect spawning habitat for reef fish, particularly male gag, and to help assess the utility of closures as a management strategy (GMFMC 2008a). The closures are considered too small to have any population effects and the Council will consider expansion or creation of additional closures (GMFMC 2008a). An additional seasonal (January-April) closure of an area known as the edges, which measures 390 nm², was approved under Amendment 30B. The closure will provide additional protection for spawning aggregations and male grouper.

Grouper are protogynous hermaphrodites, and begin life as female then become males in response to biological or social cues that are not fully understood. Fishing pressure can alter the sex ratio between mature gag, with adverse reproductive consequences. The 2001 gag stock assessment found that males comprise only 5% of the mature population of gag, compared to an estimated 37% in an unfished population (GMFMC 2008a). Minimum size limits are one source of selectivity. Fishing pressure is thought to be more selective for males, particularly during spawning, because they are more aggressive. Red grouper do not aggregate during spawning and have not experienced a comparable change in sex ratio.

³ These areas are closed to all fishing November-April, though surface trolling is permitted May-October.

Part 2: Fishery-wide challenges

Allocation

MSA National Standard 4 states that allocation of fishing privileges among groups of fishermen shall be “fair and equitable.” In 2007 the Council established an Ad Hoc Allocation Committee, with the purpose of examining fair and equitable methods of allocating catch between the recreational and commercial sectors and increasing the transparency of these decisions (GMFMC 2008a). Amendment 30B sets TACs based on an interim allocation 61% recreational and 39% commercial for gag, and 24% recreational, 76% commercial for red grouper. This allocation will remain in place until the completion of Amendment 28, at which point the allocation formula will be reviewed and possibly revised. The Council selected the current allocation as the preferred alternative because it is based on the longest available time series of landings, 1986-2005, and captures the relationship between sectors over time (GMFMC 2008a).

Allocation decisions involve tradeoffs (losses and gains). Due to differences in methodology and availability of data, it is not possible to directly compare value of commercial, recreational and for-hire sectors. SEFSC is currently analyzing the relative value of red grouper and other species to each sector, and this information will be used to inform the Council when it considers allocation decisions (74 Fed.Reg.17607).

Quota currently held by IFQ permit holders can be transferred out of the fishery after the initial 5-year restriction and fished only by someone holding a commercial reef fish permit. The Council is currently discussing the use of market forces to determine allocation between sectors. One option would be to allow any additional catch resulting from an increase in ABC and total ACL to be transferable between sectors. Another option would be to make the entire ACL transferable between sectors. However, the transfer of catch between sectors may require an adjustment factor to account for differences in management uncertainty.

Accountability and Management Uncertainty

The new SWG IFQ program relies on real-time monitoring, which will result in low management uncertainty in the commercial sector. The recreational fishery, by contrast, is characterized by comparatively higher management uncertainty. Recreational catch and socioeconomic data is gathered using the MRFSS⁴ and the NMFS headboat survey. MRFSS was created in 1979, and over the last three decades the demands of current management plans have exceeded the capabilities of the survey. MRFSS is gradually being replaced by the new Marine Recreational Information Program (MRIP), which is intended to produce more accurate and timely recreational fishing data and garner stronger support and greater confidence from the recreational angling community. MRIP will be phased in but the transition is behind schedule.

The new MRIP still will not permit real-time data collection and neither MRFSS nor MRIP can be used for in-season AMs.

⁴ The state of Texas conducts a separate Texas Marine Recreational Fishing Survey.

The data lag associated with both MRFSS and likely with MRIP contributes to a higher level of management uncertainty in the recreational fishery. Within the recreational sector there is concern that the management uncertainty associated with MRFSS and MRIP, in combination with the new requirements for ACLs and AMs, will result in a loss of opportunity in the form of shortened seasons, smaller bag limits and other restrictions. There is also concern that management uncertainty increases the risk of exceeding ACLs and triggering accountability measures, and that this will result in a ratcheting effect of increasingly more stringent regulations.

Improving data collection and accountability has become an additional focus of the Amendment 32 scoping process. The specific proposals that have been suggested to date are outlined in greater detail in Part 3 of this document.

Some for-hire permit holders support the separation of the recreational allocation into private recreational and for-hire allocations. Participants in the for-hire industry and the recreational community as a whole are divided on this issue. Sector consideration is under consideration during the Amendment 32 scoping process and the Council's Limited Access Privilege Program Advisory Panel is also involved in this discussion.

Sector separation is proposed as a way to improve management flexibility and reduce management uncertainty. For-hire operators would be required to account for the weight or number of fish. This would provide permit holders with flexibility to fish their quota without being subject to closures and bag limits, which can affect the viability of a for-hire business by influencing consumer demand for for-hire trips. Some private recreational fishing interests are concerned that the creation of a separate for-hire ACL, in addition to the commercial ITQ program would constrain the growth of the private recreational industry.

Consolidation of the Commercial Fleet and Spillover Effects

The regulatory changes discussed in Part I, along with the lower ABC likely for 2011, will cause effort in the commercial fishery to shift between gear types and by area. The transition to the SWG IFQ program will simultaneously cause consolidation and a net reduction in commercial fishing effort. The extent and the rate of consolidation, along with likely shifts in fishing effort, will cause the commercial fishery to evolve in ways that are difficult to predict.

Gear switching

Fishermen whose vessels did not qualify for a longlining endorsement in the eastern Gulf of Mexico may switch from longlining to vertical line fishing. Not all fishermen will be able to make the transition successfully. Some vessels already attempted to switch gear types unsuccessfully during the emergency closure. The first barrier to gear switching is the initial investment in new gear. Some vessels have attempted to reduce the costs of gear switching by using conventional rods and reels rather than investing in specialized bandit gear, which has resulted in lower landings (GMFMC 2009a). One organization has offered to subsidize gear switching for a limited number of vessels, which may increase the number of vessels able to transition successfully. During the IFQ qualifying period, an average of 790 vessels used

vertical line and 167 used longlines although vessels may use more than one gear type (74 Fed.Reg. 44737).

Longlining and vertical line fishing require different sets of skills and experience. Whereas longlines cover large amounts of ground (the average mainline measures 2.4nm), vertical line fishing requires fishermen to find higher concentrations of fish (GMFMC 2008a). Still another complicating factor is a fishermen's ability to withstand the financial strain of a transition period. The initial learning curve may cause substantial enough losses to put some fishermen out of business. Those who choose not to switch gear types, or switch unsuccessfully, are likely to exit the fishery and cause additional consolidation to occur. Those who do switch gear types may still experience reduced harvests during the transition period.

Catch Composition

There is a difference in species selectivity between longlines and vertical lines, and gear switching and consolidation may affect commercial catch composition. While longlines account for the majority of red grouper landings (60.7% vs. 24.6% for vertical lines), vertical lines account for the majority of gag landings (64.3% vs. 32.2% for longlines) (average 1993-2006, GMFMC 2008a)⁵. A shift in fishing effort toward vertical lines will increase selectivity for gag. However, longlines have also accounted for the majority of total landings by weight in the entire SWG fishery (51.7% vs. 37.2% in the vertical line fishery, average 1993-2006, GMFMC 2008a)⁶. Consolidation along with the greatly reduced capacity of the longlining fleet may leave a percentage of the commercial quota uncaught, particularly for red grouper. There will be a transition period of reduced harvests as the commercial sector sorts out what its catches will be and what percentage is landed by each gear type.

Business viability and consolidation

The implementation of the IFQ program, new longlining restrictions, and the extent and rate of consolidation that occur in the commercial sector will all interact to affect the ability of commercial operations to stay in business. All of these factors together will have a reciprocal impact on the magnitude and the rate of consolidation. In general, lower ACLs will reduce quota shares and facilitate consolidation. Fishermen who do not receive an endorsement to fish in the eastern Gulf longline fishery and switch to vertical lines will face the cost of switching gear in addition to lower harvests as they adjust to the new gear. Changes in the fishery can also affect fish prices and net profitability. The IFQ program itself may also provide a sense of security (GMFMC 2009a) that influences fishermen's decisions to exit the fishery.

Effects of consolidation on CPUE across sectors

Consolidation across the commercial fleet will result in reduced effort and reduced fishing mortality on target species. In the longline fishery, the anticipated 79% reduction in vessels and 48-55% reduction in effective effort (GMFMC 2009a) may translate to higher CPUE for vessels remaining in the fishery, though the reduced number of hooks mandated by Amendment 31 will still limit fishing effort. In the vertical line fishery, gear switching could increase localized

⁵ The commercial trap fishery, which was phased out over a ten-year period ending in 2007, accounts for the remaining percentage. The trap fishery primarily targeted red grouper and averaged 14.3% of landings from 1993-2006.

⁶ The remaining 11.2% was harvested by the commercial trap fishery.

pressure and competition, and cause localized decreases in availability although reduced pressure throughout the commercial sector could also result in higher harvest rates.

The closure of The Edges may cause commercial harvest to shift to shallower water during the closed season. Meanwhile, the closure included in Amendment 31, which restricts longlining to 35 fathoms or deeper June-August to reduce interactions between bottom longlines and sea turtles, could have the opposite effect and cause fishing pressure to shift to deeper water during this closure. This is a concern because male and female gag distribute differently after spawning, and male gag tend to stay in deeper water. Shifting harvest to deeper water may inadvertently cause fishermen to selectively target male gag. Due to differences in the spawning behavior of red grouper and gag, new closures may have unintended consequences, particularly for gag. Closures could also increase interactions between longline and vertical gear fishermen, and between commercial and recreation fishermen.

Discard mortality and bycatch of gag grouper

Discard mortality is a critical factor underpinning management of red and gag grouper across all sectors. Discard mortality varies dramatically with gear type, hooking location, handling, and depth. In addition to causing waste in the form of foregone yield, discard mortality can have ecological consequences. Grouper are slow growing, long-lived and late to mature, in addition to being protogynous hermaphrodites. These life history characteristics cause grouper to be susceptible to population level effects of fishing pressure and discard mortality.

The commercial sector has lower discard rates than the recreational sector, but a higher rate of discard mortality. Dead discards represent waste from the fishery, in that they must be accounted for yet yield no benefit. For gag, dead discards are estimated at 1.3% of removals by weight in the commercial fishery, 23% in the recreational fishery. For red grouper, dead discards are estimated at 14% in the recreational fishery and 12% in the commercial fishery (GMFMC 2008a). Shifts in fishing effort between sectors, gear types, and fishing location and depth, along with regulatory changes, could all affect the amount of dead discards.

Discard mortality of gag could function as a constraint on the harvest of red grouper. In the commercial fishery, adjustments to the quota for red and gag grouper will alter the ratio between these quotas (and thus IFQ shares) in comparison to past landings. The quotas proposed for 2011 of 3.73 mp for red grouper and 0.32 mp for gag would amount to a ratio of 12:1, while the ratio of red: gag grouper landings has been closer to 4:1 (GMFMC 2009b).

Discard mortality of gag could also result in constraints on the recreational sector. The 2010 ABC for gag is so low that closed season discards could use the entire recreational portion of the ABC and exceed the sector's ACL. However, discard mortality is currently reflected in ACLs and ACTs. If the Council implements measures to reduce gag discards it may be possible to capture this "savings" and apply it to the harvested ACL. These strategies could also be applied to the recreational red grouper fishery. It would not be plausible to eliminate all discards, but some portion of discard mortality could likely be utilized.

Discard mortality, along with recreational data collection, is the second major focus of new management strategies proposed in the Amendment 32 scoping document. The specific strategies proposed to date will be examined in Section 3.

Ongoing concerns: the larger context of the reef fishery

The economic condition of other individuals, businesses and communities along the Gulf coast will all influence fishermen's ability to adapt to new regulations and stay in business. All sectors of the red and gag grouper fisheries operate within the broader context of the reef fishery, and on a larger scale within the context of the Gulf region. Forces operating on the fishery are often beyond the scope of management, yet management plans must take these contingencies into consideration. These factors interact in complex ways to influence the input costs and dockside value of the commercial harvest. In the for-hire sector economic conditions will affect consumer demand for for-hire trips, and in the private recreational sector, people's willingness and ability to maintain a boat and accommodate fishing expenses.

While economic factors may constrain recreational fishing effort in the short term, there is some inherent risk in incorporating this level of effort reduction into management measures, given the higher management uncertainty of the recreational sector. A subsequent increase in effort could prevent management measures from achieving their intended goals, and could potentially cause the sector to exceed its ACL, triggering AMs.

Examples of other concerns include the following:

Reef fishery

Effort in the commercial, private recreational and/or for-hire sectors could shift from grouper to other reef species, or to shift from other overfished and/or undergoing overfishing species such as greater amberjack or gray triggerfish. Effort could also shift from the reef fishery to other Gulf fisheries.

Other ocean users

Fifteen new liquefied natural gas terminals are proposed for the Gulf. Six of these would be open systems that would circulate 100-200 million gallons of water per day, and could potentially kill pelagic reef fish larvae (GMFMC 2008a).

Fuel Prices

Fuel prices can reduce fishing effort across the fishery. An increase in fuel prices can reduce the profit margin of commercial and for-hire businesses, and affect their ability to stay in business. Recreational anglers may be less willing or able to pay the costs of a fishing trip. During the Amendment 30B scoping process the Council acknowledged that while increasing fuel prices may result in effort reductions, it is not currently possible to assign a value to this reduction.

Imports and Aquaculture

Imports now dominate the reef fish market. In 2006, imports of all reef fish accounted for more than double the value and volume of domestic reef fish production. Offshore marine aquaculture is also gaining traction in the Gulf. In January of 2009 GMFMC completed an FMP for

regulating offshore marine aquaculture. The purpose of this FMP is to establish a permitting process and enable the Council to supplement the yield of Gulf fisheries with farmed seafood. Red grouper and 13 other reef species are identified among the 22 species with the highest potential for aquaculture. Aquaculture of reef fish in the Gulf of Mexico could influence demand and value of wild-caught reef fish in the future.

Natural events

Harmful algal blooms (HAB), particularly the “red tide” phenomenon associated with the algae *Karenia brevis*, can be fatal to fish. A mortality event likely caused by red tide in 2005 caused mortality of 18% for gag and 20% for red grouper in addition to natural and fishing induced mortality (GMFMC 2009b). HAB also cause economic losses to coastal communities due to tourism and recreational opportunities in addition to direct losses to the fishery. The reef fishery may experience the repercussions of a severe HAB for years.

Hurricanes can cause losses of fishing infrastructure and property and restrict opportunities for fishing. In past amendments, GMFMC has recognized that an active hurricane season may result in reduced fishing effort and landings. For example, in Amendment 27, GMFMC proposed to consider reductions in recreational fishing effort associated with the busy hurricane seasons of 2004 and 2005 when analyzing recreational management measures.

Part 3: Case Studies and Analysis

The following analysis is based on conversations and feedback from reviewers. Reviewers recognized that the Gulf Council is dealing with a complex set of issues, and acknowledged that having considered the cumulative effects and interactions between management actions demonstrates the Council's thorough and thoughtful approach to managing gag and red grouper.

All information in this section is for the purpose of discussion only and does not constitute a management recommendation on the part of reviewers, the Gulf of Mexico Fishery Management Council and staff, or the Fisheries Leadership & Sustainability Forum. The experts who applied their time and experience to this discussion document represent a diversity of disciplines, and have firsthand experience with a wide variety of fisheries and management issues. The purpose of this analysis is to compile their collective insight into the challenges of red and gag grouper management, so that the Council can benefit from the experiences and lessons learned in other regions.

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- John Watson, Consultant & Retired from NOAA Fisheries as Laboratory Director for the Southeast Fisheries Centre's Mississippi Laboratories

Strategies for Managing the Grouper Tilefish IFQ: Specific Suggestions

Reviewers suggested the following strategies for increasing flexibility in the commercial SWG fishery.

Tracking change in the commercial fleet

The catch reporting infrastructure necessary to support the grouper-tilefish IFQ can also generate data that could be used to track other trends in real-time. In addition to monitoring landings and catch composition it may be possible to examine other trends and effects of consolidation, gear switching, and spatial shifts in fishing effort.

In some fisheries such as halibut and sablefish in Alaska, managers publish an end of the year “report to the fleet” which helps create transparency and inform stakeholders.

Spatial Closures

With the implementation of the grouper-tilefish IFQ program, there will be real-time data that can provide information on catch composition, gear type and fishing effort and longer-term trends like spatial shifts in fishing effort. This information could be used to establish closures (short-term or long-term) that would shift fishing effort away from high gag bycatch areas and help the commercial fishery harvest more of its ACL for red grouper. Closures have been used in other regions to direct fishing effort away from areas where there is high bycatch of weak constraining stocks. Special access programs in closed areas have been used in New England as an incentive for fishermen who are able to fish more selectively.

Fleet Communication and Cooperation

In other fisheries, vessels can communicate in real-time to reduce discards and avoid bycatch. Examples from U.S. fisheries include the North Atlantic swordfish longline fishery, the North Pacific and Alaska trawl fisheries, and the Alaska demersal longline fishery (Gilman et al 2006). Examples of effective communication and cooperation can also be found in fisheries where a certain number of interactions with a species trigger the closure of a fishery.

Arrangements for Pooling Risk and Cooperative Management

Angler management organizations can influence member behavior by providing peer accountability. This approach can be applied to recreational as well as commercial sectors. Examples from commercial sectors include the original Cape Cod hook sector, in which members cooperatively managed a hard bycatch quota for cod. Another example is the Incentive Plan Agreement developed to manage Chinook salmon bycatch in the Alaska pollock fishery, which creates an incentive to keep bycatch below cap levels while providing the fleet with greater flexibility.

Transition to IFQ management

Other Councils have explored ways of coping with unanticipated consequences of transitioning to IFQ management. The Pacific non-whiting shoreside groundfish trawl fishery, now in the process of transitioning to IFQ management, is developing an Adaptive Management Program which will set aside 10% of the sector’s quota for unintended consequences. The details of the Adaptive Management Program will be developed following implementation of the IFQ program as a trailing action.

References and additional resources:

Chinook salmon incentive plan agreement:

<http://www.fakr.noaa.gov/sustainablefisheries/bycatch/salmon/chinook/rir/rir1209.pdf>

Gilman, E.L., Dalzell, P., and S. Martin. 2006. Fleet communication to abate fisheries bycatch. *Marine Policy* 30: 360-366

Case Studies

The following case studies were suggested by reviewers as examples of how challenges similar to those facing the Gulf Council have been addressed in other regions and fisheries. These examples are included solely for the purpose of discussion and are not intended to indicate support or oppose to any of the measures under consideration by the Council now or in the future. Furthermore, each of these fisheries may differ from the Gulf of Mexico reef fishery in terms of definition of the management unit, stock status, biological and ecological characteristics of the species and ecosystems involved, extent of participation by different sectors, and many other variables. The management strategies discussed below may not be directly applicable or appropriate for the Gulf of Mexico reef fishery.

Background Information

Across fisheries and regions, catch monitoring and accountability are noted as, in the words of one reviewer, “the gatekeeper to sustainability, accountability and public confidence in fisheries.” (Gislason, pers.comm.) Many of the mechanisms included in the Amendment 32 scoping document, such as fish tags, stamps, and reporting methods are intended to achieve these goals. Tags and stamps have long been used in other fisheries as well as in wildlife management to identify a discrete set of users, collect information, and in some cases to constrain harvest. The benefits and the challenges of implementing this approach in the Gulf of Mexico are reviewed in detail by Johnston et al 2007.

Catch monitoring in recreational fisheries poses many challenges due to the number and heterogeneity of participants, the open access nature of recreational fisheries, and the geographical scale of regional exclusive economic zone (EEZ) fisheries. While many effective examples of recreational data collection have occurred on small scales, this does not preclude the application of these strategies to a wider region.

Experience also suggests that improved recreational data collection may not provide an immediate fishery-wide solution, although this depends on the purpose and the scale for which it is being used. Different goals may require different timelines. Voluntary catch reporting in particular is more likely to be an interactive process that will become more valuable and robust over time as participation increases and creates a feedback loop (Grist, pers. comm.) The use of recreational data collection methods to track changes over time will by definition take multiple years. A recreational catch monitoring/data collection strategy may be more effective if it is initially closely tailored to the specific needs and management objectives of a fishery. Pilot programs may be an effective way to test and refine the use of harvest tags for gag in the Gulf of Mexico (Johnston et al 2007).

Recreational Data Collection: Online Reporting in Virginia

Virginia's Recreational Assessment Program

Virginia's Marine Resources Commission (VMRC) operates the Virginia Recreational Assessment Program, an initiative designed to enhance recreational data collection. Within this program is an online reporting system, which serves multiple purposes and is used for reporting catches in both exclusive economic zone (EEZ) and state waters. Anglers have the option of submitting reports online or filling out and mailing a paper copy. Reporting is mandatory for some species and optional for others.

The program was originally developed for the striped bass trophy fishery. Anglers are allowed to harvest "trophy" striped bass over the minimum size limit during a designated trophy fishing season. The target take for these fisheries is measured in numbers of fish (30,000 in 2009). The harvest of striped bass is only permitted in state waters and is prohibited in federal waters. Anglers are required to report the date, the body of water where they were fishing, and the length of their catch to the nearest ¼ inch. They also have the option of providing the weight in pounds of their catch and the lengths of any fish released. For-hire operators are required to fill out daily landing forms for all striped bass caught and harvested during all open seasons. VMRC operates a separate online charter boat reporting system.

Reporting of tilefish and grouper is also mandatory, and all private and for-hire recreational fishing vessels must obtain a free recreational Tilefish and Grouper Landing Permit. This permit has enabled VMRC to identify and communicate with a discrete set of users. Reports must be submitted daily, and anglers are required to report all fish harvested as well as those released. Anglers are also required to submit vessel identification information, the number of people on board, the city and county of landing, the gear type and number of lines used, and the number of hours fished. Anglers fill out a daily form as well as a monthly harvest report.

Many anglers perceive that catch data will be used to create additional restrictions, and resist participating in voluntary reporting. Experience from other regions suggests that anglers may be more willing to report their catch when they can see the benefits of doing so and/or when there is a value-added function for anglers. Virginia's website also includes a Fisherman's Journal, which anglers can use to archive the details of their fishing trips. Anglers can choose whether to make the information public or private. The information benefits individuals as well as the larger recreational fishing community, while the data contributes to stock assessments. For example, the data generated by online reporting can help model the effects of a minimum size adjustment. (Grist, pers. comm.) Anglers may be more supportive of recreational data collection in the Gulf if the development of this program is interactive and if anglers can see visible benefits to their participation.

Recreational data collection methods will also benefit from ongoing public outreach and awareness campaigns. One of the challenges to this online reporting system has been maintaining visibility in a cost effective manner. Advertising is achieved by working with stakeholders, including fishing clubs, pier owners and tackle shops, newsletters and radio ads, and by word of mouth.

Additional Resources:

Johnston, R.J., Holland, D.S., Maharaj, V., and T.W. Campson. 2007. Fish harvest tags: An alternative management approach for recreational fisheries in the US Gulf of Mexico. *Marine Policy* 31: 505-516

Evaluation of fish tags as an attenuated rights-based management approach for Gulf of Mexico recreational fisheries. R.J. Johnston, D.S. Holland, V. Maharaj and T.W. Campson. Connecticut Sea Grant Publication CTSG-08-07. 1080 Shennecossett Road, Groton CT 06340, 76 pp.
http://web2.uconn.edu/seagrant/publications/fisheries/fish_tags_GOM.pdf

Virginia Recreational Assessment Program:

http://www.mrc.virginia.gov/rec_assessment/index.shtm

Virginia Marine Resources Commission Recreational Fishing Online Reporting:

<https://www.vasaltwaterjournal.com/>

Halibut Management in British Columbia in Alaska: Allocation and Transferability between the Commercial and For-Hire Sectors

Halibut is managed as a transboundary stock under the International Pacific Halibut Commission (IPHC), which is composed of government-appointed commissioners from the United States and Canada. IPHC conducts stock assessments and makes catch limit recommendations but does not allocate catch between sectors. Canada's counterpart to NMFS is Fisheries and Oceans Canada (DFO).

In both the U.S. and Canada, the commercial sector of the halibut fishery is managed under a well established catch share program (individual vessel quotas in Canada since 1991, and individual fishing quotas in the U.S. since 1995).

The following two case studies are examples of mechanisms similar to those proposed or subject to future consideration by the Gulf Council. However, it is important to recognize that there are very significant differences between the Pacific halibut fishery and the Gulf of Mexico reef fishery, beginning with the different layers of jurisdiction involved in management of a transboundary fishery. The composition of the recreational fishery is also very different than the Gulf of Mexico reef fishery. In direct contrast to the Gulf of Mexico reef fishery, the private recreational sector is small, and the recreational fishery in general is seasonal. The nature of catch transfers between sectors is unusual: due to the low bag limits and large size of halibut, quota transfers may be expressed in numbers of fish rather than by weight. Finally, although halibut can be considered a groundfish species, they are managed on a species-specific level, partly as a function the transboundary nature of the stock and IPHC's role, and also due to the directed nature of the fishery.

There do not appear to be any examples of fisheries in which all sectors (commercial, for-hire and private recreational) are integrated and quota is freely transferable. It is unclear whether sector separation would be necessary in the Gulf of Mexico order to have quota be transferable

between the commercial and for-hire sectors. Challenges would include building the institutional capacity within sectors to enable transfers and holding sectors accountable for their allocations and discards.

Reviewers noted that inter-sector trading is challenging because (1) trading of catch between sectors would require adjustments for different levels of management uncertainty; (2) the units or “currency” of transfer may be different between sectors (e.g. pounds of quota weigh vs. numbers of fish); and (3) recreational and commercial fisheries are structured differently and managed to meet different goals – trading between sectors may have to be set as an objective early in the process.

British Columbia: Leasing between Sectors

Consideration of an allocation formula was driven by expansion of the recreational sector and an increase in halibut landings. There continues to be a disparity in the quality of catches data and level of accountability between the commercial and recreational sectors.

Development of the allocation framework began as a facilitation process with stakeholders but they were unable to reach consensus and an allocation recommendation was made by an independent third party. DFO ultimately adopted a slightly higher recommendation for the recreational sector to allow for growth. One of the principles of the arrangement, to which both sectors agreed, was that the entire TAC should be harvested and that any catch not harvested by the recreational sector could be harvested by the commercial sector.

The Pacific halibut allocation framework set an initial 12% recreational allocation, with the provision that quota could be transferred between sectors if both sides developed a mechanism to facilitate the transfer. The purpose of the allocation framework was to enable growth in the recreational sector, while providing stability for the commercial fishery. The Minister of Fisheries and Oceans also made a commitment not to close the recreational fishery in-season.

Adjustments are made with one year of lag time. In years when there is a recreational surplus, the next year’s projected surplus can be purchased by the commercial sector. If the recreational fishery exceeds its 12% allocation, it would be required to purchase quota from the commercial sector the following year, or operate under additional input controls.

The commercial sector is represented by the Pacific Halibut Management Association, a nonprofit. The recreational sector is currently represented by the Sport Fish Advisory Board, an advisory board to DFO on recreational fishing issues. Fees generated from leasing in past years are held as an endowment and in recent years have been used to lease quota from the commercial sector to cover overages. The absence of a legal entity representing the recreational sector may become a barrier to future transfers.

References and Additional Resources:

Fisheries and Oceans Canada News Release, October 27 2003: Minister Thibault Announces Pacific Halibut Allocation Framework

<http://www.dfo-mpo.gc.ca/media/npres-communic/2003/pr59-eng.htm>

Allocation of halibut for the Canadian commercial and recreational sectors in the Pacific Region: <http://www.iphc.washington.edu/halcom/commerc/CanadaStuff/KelleherAllocationHalibutReport.pdf>

Commercial vs. recreational fisheries allocation in Canada: Pacific herring, salmon and halibut http://www.fakr.noaa.gov/NPFMC/current_issues/halibut_issues/stakeholder/April/CommercialRecreationalCanada.pdf

Alaska: For-hire IFQ proposal, limited entry program and catch sharing program

The North Pacific Fishery Management Council (NPFMC) first began considering management of the expanding for-hire fleet in 1993. Expansion of the for-hire fishery was a concern because commercial catch limits were initially set by accounting for removals due to natural mortality, bycatch, and subsistence and recreational fishing, which meant that the commercial limit could decrease as other uses increased. Guideline harvest levels (GHLs) were adopted in 1997, but there is no overage provision and the for-hire sector has exceeded these levels in recent years.

Between 2000 and 2004, the Council went through the process of developing an IFQ program for the for-hire fleet. The IFQ program proceeded to a Proposed Rule for public comment. As the program was originally structured, IFQ permits would be issued in numbers of fish, rather than in pounds of quota, based on an average weight conversion factor. Quota would be transferable within the for-hire sector, and quota could be transferred from the commercial to the for-hire sector but not vice versa (Smith pers. comm.), although the Council could later revise this policy. Initial allocations would be based on logbook data submitted by for-hire operators to the Alaska Department of Fish and Game. As with commercial catch share programs, there was a mechanism to prevent acquisition of excessive shares. Electronic logbooks and harvest reports were discussed as strategies for data collection. Progress was held up for several reasons, including the accuracy of logbook data as a basis for an initial allocation and the involvement of political officials. NPFMC ultimately voted to rescind its recommendation in 2005.

In 2007, NPFMC adopted a moratorium on new entrants to the for-hire fishery and set a control date of December 9, 2005. The limited entry system has been under development and a final rule on this action was issued in January 2010. Eligibility for the limited entry program will be based on past participation in the fishery. The program will limit the number of permits an individual can hold, and will also limit the number of anglers that can fish on each trip. Depending on a permit applicant's level of participation in the fishery he will receive transferable or non-transferable permit(s). Non-transferable permits will be issued to those with a lower level of participation during the qualifying period. Transferable permits will provide access for new entrants, while the exit of non-transferable permits from the fishery will eventually result in consolidation. Although the limited entry program will not limit harvest by the for-hire sector, it will stabilize participation in the fishery while the Council develops an allocation policy.

A draft Catch Sharing Plan (CSP) was developed in 2008 to establish an allocation between the commercial and for-hire sectors, and to facilitate accountability. The CSP includes contingencies such that the allocation between sectors and the input controls (such as bag limits) used to manage recreational harvest will vary according to a set schedule, depending on the catch limit recommendations set by IPHC. The CSP also allows for-hire limited entry permit holders

to lease a limited amount of quota from the commercial sector. Commercial quota pounds are converted to numbers of fish, expressed as Guided Angler Fish (GAF).

References and Additional Resources:

Alaska Department of Fish and Game's Saltwater Charter Logbook program:

http://www.sf.adfg.state.ak.us/Static/guides/PDFs/SWLogsheet_2010.pdf

Pacific Halibut Fishery limited access for guided sport charter vessels in Alaska, Final Rule:

<http://www.fakr.noaa.gov/frules/75fr554.pdf>

Proposed Rule and Request for Comments (includes history of for-hire halibut fishery):

<http://www.fakr.noaa.gov/prules/74fr18178.pdf>

Draft North Pacific Fishery Management Council Motion on Area 2A and 3C Catch Sharing Plan:

http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/HalibutCSPmotion1008.pdf

Western Australia Pink Snapper Fishery and Recreational Fish Tags

In the Shark Bay region of Western Australia, there are three distinct populations of pink snapper in Denham Sound, the Eastern Gulf, and Freycinet Estuary. They are managed as separate stocks, independently of one another and the oceanic population, and can only support very limited harvests of 5-15 metric tons (mt) each. Management of Australia's pink snapper (a kind of porgy) poses challenges similar to those faced by the Gulf of Mexico and South Atlantic reef fisheries due to their similar life history traits. Although recreational tags were used on a very small scale in this fishery, this system is an example of how a directed fishery can be maintained even within the constraints of a small allowable catch. In this case, the alternative would have been closure of the fishery.

An Integrated Fisheries Management plan for Shark Bay pink snapper was developed in 2003 to set a combined TAC for the recreational and commercial fisheries and establish an initial allocation. In the commercial fishery, pink snapper is managed as a bycatch species. There are only ten licenses in the Shark Bay Beach Seine and Mesh Net Fishery. Stocks in the Eastern Gulf and Denham Sound have reached spawning biomass targets, but the stock in Freycinet Estuary has not. Recreational harvest of pink snapper in the Eastern Gulf and Denham Sound is managed using a bag limit and slot size, while a recreational tag system is used in Freycinet Estuary.

The harvest in Freycinet Estuary is limited to 5 mt or about 1400 fish. Of 1400 available tags in 2010, 1050 were distributed to recreational anglers via lottery and 350 will be distributed to commercial fishermen. The recipient of a tag is the only person authorized to use that tag. Recreational anglers cannot receive more than 2 tags per year, and are limited to one pink snapper per day. The fishery operates under a keep-first-fish-caught policy, and anglers who have been issued a tag must keep and tag the first pink snapper caught regardless of size. Tags cost \$10, and revenue is used to support administration of the program.

References and Additional Resources:

Western Australia Department of Fisheries Brief: Fishing for pink snapper in Shark Bay, October 2009

<http://www.fish.wa.gov.au/docs/pub/FisheriesBriefs/Fisheries%20Brief%20No%203%20-%20Pink%20Snapper.pdf>

Frequently Asked Questions on the 2010 Freycinet Estuary Pink Snapper Lottery

<http://www.fish.wa.gov.au/docs/pub/RecPinkSnapper/index.php?0103>

Australian Orange Roughy: Directed vs. Bycatch TACs in a Commercial Fishery

Orange roughy are a deepwater species which, like grouper, are long lived, slow growing, and reproduce in spawning aggregations concentrated around areas of bottom structure. Inside the Australian Fishing Zone (AFZ), the population of orange roughy is believed to consist of multiple stocks but stock structure is unknown. Orange roughy is caught in 11 different management zones and is overfished in three (the Eastern, Southern and Western zones) due to targeted fishing from the late 1980s to early 1990s. Their status is unknown in all but one of the remaining zones. Orange roughy are not overfished in the Cascade Plateau zone. The Commonwealth Trawl Sector of the Southern and Eastern Shark and Scalefish Fishery which fishes in the Cascade Plateau Zone is a large multi-species bottom trawl fishery that targets a combination of invertebrates and finfish, including orange roughy, on the continental shelf, slope and offshore seamounts around southern Australia.

In 2006, orange roughy was listed as conservation dependant under the Environment Protection and Biodiversity Conservation Act, the Australian equivalent to the Endangered Species Act. As a result, future management of orange roughy is subject to the Orange Roughy Conservation Programme (ORCP), which prevents targeted fishing for orange roughy in any of the management zones except for the Cascade Plateau. Pursuant to the ORCP, only fishing activities required to support research and to monitor the recovery of orange roughy stocks may be conducted within other fishing zones. As such, there is no directed fishery for orange roughy in those regions and the orange roughy TACs for the southern, eastern and western zones have been established based on estimates of unavoidable bycatch. In contrast, the TAC for the relatively abundant Cascade Plateau orange roughy is significantly higher and is set to support a directed a fishery.

Differentiating between TACs for directed and incidental catch and establishing precautionary bycatch TACs in zones of low abundance are the cornerstone of the orange roughy recovery effort in Australia. This management strategy, coupled with temporal and spatial closures to protect habitat and minimize fishing pressure and an ongoing monitoring and review program, is expected to re-establish healthy spawning aggregations of orange roughy. Due to their extreme longevity and late recruitment to the fishery recovery is anticipated to take 40-45 years. There are many important differences between this fishery and the Gulf of Mexico reef fishery including but not limited to habitat type, gear type, stock structure, the composition of stakeholders, and the challenges of managing a deep sea fishery, particularly the extremely high

rate of bycatch mortality. Nevertheless, this fishery was noted as an example of a situation in which a combination of bycatch and directed TACs is used to support recovery while maintaining a directed fishery.

References and Additional Resources:

Orange Roughy Conservation Programme:

<http://www.afma.gov.au/fisheries/sess/sess/notices/2006/n20061207.pdf>

Table 2: Amendment 32 Scoping Proposals

	Component	Desired Outcome	Management Measure	Examples of Questions and Considerations
GOAL: Manage bycatch of gag	All	Reduce bycatch of gag grouper, protect spawning aggregations and support rebuilding of gag	Area closures	-Criteria for identifying new areas (gag spawning aggregation sites, geographic concentrations of gag, concentration of targeted fishing effort) -Closure to all fishing vs. bottom fishing only
	Commercial	Reduce bycatch of gag grouper and enable commercial sector fill quota of red grouper	Bycatch quota for gag	-Portion or all of gag quota?
			Reduced size limits	-Effects of retaining smaller fish
	Recreational Private, for-hire	Manage recreational harvest of red and gag grouper	Combination of bag limits, minimum size limits, and closed season	-Priorities of recreational anglers (length of open season vs. bag limit, timing of a longer closed season) -Net outcome of interactions between management measures
Reduce dead discards of gag		“Keep first gag caught” policy	-Increase in rate of landings could result in a shorter season -Creates an incentive for high grading -Potential negative impact on spawning potential	
GOAL: Improve data collection ²	Recreational Private, for-hire	Improve data collection in the recreational fishery and reduce management uncertainty	Fish tag program	-Allocation -Enforcement -Distribution (ie, physical vs. electronic) -Purpose (monitoring only, monitoring and effort limitation)
			Fish stamp program	-Purpose (data collection, data collection and effort limitation) -Transferability
	Recreational, private, for-hire	Facilitate trip reporting and data collection	Phone or internet based reporting system	-Voluntary vs. mandatory -Application to grouper only, grouper and other species, or all saltwater species -Availability of information to public -Validation of self-reported data
			For-hire	Vessel monitoring systems (VMS)
	Proposed for recreational, could be applied to all	Facilitate data collection and in-season monitoring	Electronic logbooks	-Applicability to different components of the fishery -Mandatory vs. voluntary reporting -Level of coverage: 100% vs. subset of vessels -Validation of self-reported data -Use for in-season monitoring and closures?
Other For-hire	Increase flexibility for managers and flexibility and accountability of for-hire business owners	Separate for-hire and private recreational allocations	-Opposition from within recreational fishery -Basis for allocation formula -Transferability	

1. Options for the use of fish traps in the commercial fishery and for-hire grouper endorsements are considered beyond the scope of this document. The final scoping document is available at <http://www.gulfcouncil.org/Beta/GMFMWeb/downloads/FinalScopingDoc-Amend%2032.pdf>

2: Industry proposals are not evaluated in their entirety; key strategies are included in the table

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