

EXHIBIT A

Managing the Gulf of Mexico Commercial Red Snapper Fishery

by

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Executive Summary

The Gulf of Mexico red snapper resource is overexploited. Red snapper catch has declined, even as fishers work harder and their incomes fall. Current management has unwittingly encouraged intense, short-season races, or “derbies,” among fishers to rapidly harvest the commercial red snapper quota, causing unnecessary damage to both fishery resources and fishing communities. This paper provides a background on the commercial red snapper fishery, explores the economic and ecological effects of derby management, and recommends Individual Transferable Quotas (ITQs) as an efficient and ecologically sound management strategy.

Despite intentions to restore red snapper stocks by 2000, partly through limiting total catch and fishing licenses, the Gulf of Mexico Fishery Management Council (the Council) has created perverse incentives for individual fishers to maximize their catch in the shortest time possible. These derbies are hugely inefficient and environmentally damaging. They have exacerbated the problems of excess fishing capacity, caused inequity among fishers, and forced fishery closures for nine to ten months each year. Derby management has also resulted in supply gluts, depressed fish prices, wasteful disposal of red snapper by-catch during the off-season, increased pressures on other reef fish, and damage to the long-term viability of red snapper stocks. The immediate economic hardships caused by derbies have compelled the Council to increase the total allowable catch even in light of the perilous conditions of the stock, forestalling the planned recovery of the red snapper fishery by twenty years.

In order to halt the negative impacts of derby management, the Council designed a workable, inexpensive system of Individual Transferable Quotas (ITQs), a market-based strategy that puts the proper incentives in place for fishers to sustainably manage the red snapper resource. By removing incentives for derby-style fishing, ITQs in North Pacific, South Atlantic, and Mid-Atlantic fisheries have lengthened the fishing season; reduced fisher fatalities; increased fleet maintenance and fisher safety; created higher, more stable fish prices; delivered more consistent, higher quality fish to processors and consumers; and reduced excess capacity and other market inefficiencies.

Of the available management options for the Gulf of Mexico red snapper fishery, ITQs offer the most cost-effective and socially beneficial means to promote the long-term sustainability

of the reef fish industry and the multi-species complex of reef fishes. ITQs would generate annual net economic benefits of \$2.0 million for the industry, compared to slight, unquantified gains from the current license-limitation regime, and net economic losses of \$1.7 million annually from open-access fishing.

Despite approval of the Council's ITQ program by the National Marine Fisheries Service, Congress has instituted a moratorium on ITQs until 2000, which, while possibly benefiting a small number of fish processors and a few large fishing fleets, is preventing the efficient and equitable use of the red snapper resource – and damaging the productivity of the marine ecosystem.

The authors make five major recommendations for red snapper fishery management in the Gulf of Mexico:

1. *Manage the fishery as a single, multi-species fishery stock.* Since the reef fish fishery is a multi-species complex, management of any one species affects others. By managing for all commercial reef fish species, the Council can ensure more efficient use of the entire fishery resource and eliminate adverse effects and costs from multiple, single-species programs.
2. *Manage the reef fish fishery under a comprehensive ITQ program.* ITQs for the full suite of commercial species will eliminate derbies, minimize by-catch waste, increase fisher revenue, and benefit the entire fishery stock.
3. *Address similar problems in the recreational fishing sector.* By reforming similarly perverse incentives for recreational fishers, the Council can avoid equally damaging single-species derbies in the recreational sector, which has exceeded its allocations and landed greater quantities of red snapper than the commercial sector has in recent years. Management strategies are also needed to reduce catch-and-release fish mortality.
4. *Implement Gulf shrimp fishery by-catch reduction strategies.* Shrimp trawls may cause the most damage to red snapper stocks. The Council should stringently enforce regulations

to reduce red snapper by-catch in shrimping, including the use of by-catch reduction devices.

5. *Investigate the potential of no-take marine reserves.* Well-designed no-take reserves have been proven to increase reef fish landings and accelerate stock recovery. Such reserves could be crucial to the future of the red snapper fishery.

If implemented, these recommendations can help prevent overexploitation of the Gulf of Mexico red snapper stock and of the entire multi-species fishery, benefiting the reef fish industry, the marine environment, and society. If the current system of perverse incentives and fish derbies is not addressed, stocks will continue to decline along with the commercial reef fish fishery. Individual Transferable Quotas are the most promising means to address these problems, while improving the health of the region's fishing economy and the marine ecosystem on which it depends.

Introduction

This paper reviews recent management of the Gulf of Mexico red snapper fishery and recommends an alternative management strategy – Individual Transferable Quotas (ITQs). While the paper deals with the commercial fishery, large quantities of red snapper are also harvested in a recreational fishery and captured incidentally in Gulf shrimp trawls.

This paper begins with background information on the red snapper fishery. It next analyzes the current management regime and its impacts on the commercial fishery. This is followed by an assessment of an ITQ proposal for red snapper management and its anticipated effects. The paper closes with several recommendations to improve and implement an ITQ program for the Gulf of Mexico red snapper fishery.

This paper was prepared for consideration by the Committee to Review Individual Fishing Quotas of the National Research Council and others interested in the future of fishery management in the Gulf of Mexico and nationally.

Background

Gulf of Mexico red snapper are a major component of a larger multi-species reef fish fishery – the Gulf's third most valuable fishery – from which more than 20 million pounds worth about \$40 million are harvested annually (Goodyear 1995).^{1 2} Only the crab/oyster and shrimp fisheries are more valuable (Weber et al. 1992). In Texas alone, these two fisheries combined are worth nearly \$200 million annually (Robinson et al. 1996).³

In 1996, commercial fishers using handlines⁴ on 420 vessels⁵ in the Gulf of Mexico landed a 4.65 million pound red snapper quota with a market value of \$8 million (SEP 1997). Annual red snapper landings have declined steadily from over ten million pounds throughout the

¹ The predominant members of the reef fish fishery are snappers and groupers.

² Data are for reef fishes landed at U.S. Ports on the Gulf of Mexico and the Florida Keys in 1994. The value is the ex-vessel price paid to fishers.

³ The value is the ex-vessel price for 1994.

⁴ Red snapper are primarily harvested with “handlines” (i.e. “bandit” rigs and rod and reel) that are operated either manually or with the assistance of electric or hydraulic reels. The bandit rig is the most commonly used gear.

⁵ Gulf reef fish vessels are relatively small, an average of 38 feet in length and 277 horsepower, and are equipped with sophisticated navigation and fish finding equipment (Waters 1996).

1960s to under six million pounds during the 1980s (Schirripa and Legault 1997). A government-imposed cap on total landings, which began in 1990, has limited annual harvests to between two and five million pounds. The real ex-vessel price⁶ of red snapper rose steadily as landings⁷ declined from the mid-1960s to 1992, but has dropped substantially since that time (Figure 1).



Source: Goodyear (1995) and Schirripa and Legault (1997).

The red snapper fishery is managed by the Gulf of Mexico Fishery Management Council (Council), a part of the National Marine Fisheries Service (NMFS), under the “Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico” implemented in 1984. At that time, the Council’s efforts were aimed at rebuilding a red snapper fishery estimated to be “slightly overfished” by imposing a minimum size limit on catch and restrictions on gear used by fishers. The Council anticipated that stock improvements would be evident within one year after implementation of the plan (GMFMC 1981).

⁶ The ex-vessel price is the price paid to fishers. These data represent the average annual ex-vessel price of red snapper landed in the Northern and Western Gulf of Mexico, adjusted for inflation.

⁷ These data represent the commercial landings from the Gulf of Mexico, excluding catches from foreign waters.

However, the expected recovery of the fishery did not occur. The first red snapper stock assessment,⁸ conducted in 1988, concluded that the fishery was “significantly overfished” (GMFMC 1997:4). A 1997 NMFS Report to Congress confirmed the overfished status of this stock (NMFS 1997). Recent data show indications of both recruitment overfishing and growth overfishing.⁹ According to Goodyear (1995), recruitment was strong through 1981 but has been poor since that time, with the exception of a strong recruitment in 1989.¹⁰ In 1985, red snapper stocks came perilously close to recruitment failure, and the population remains in serious condition – “any decline below current levels should be strongly avoided, as it could lead to precipitous population declines” (p. 18). Goodyear (1995) also identified growth overfishing – as indicated by a decrease in mean size of red snapper landed – between 1979 and 1994 in all Gulf states. For example, the mean size of red snapper landed in Florida has decreased from about 24 inches to less than 18 inches.

The 1997 stock assessment (based on data through 1996) predicts that stock recovery – moving from a current 3% spawning potential ratio (SPR)¹¹ to a target of 20% – will take more than 20 years under current management conditions (Schirripa and Legault 1997).¹² There are, however, signals that stocks might be improving. A slight improvement in recruitment has been documented from 1993 to 1995 (Schirripa and Legault 1997). Furthermore, both recreational and commercial fishers have convinced fishery managers to raise the cap on total landings arguing that red snapper have become increasingly abundant.¹³ There is, however, little empirical evidence that this apparent trend represents a long-term recovery. Two alternative explanations can be offered. First, fish become densely aggregated during the extended fishery closure each year and, thus, are more easily harvested. Second, a high abundance could be the result of a large number of fish that entered the fishery as a result of the strong 1989 recruitment.

⁸ The stock assessment analyzes commercial and recreational catch data to provide a projection of the possible future condition of the stock given a variety of alternative management actions.

⁹ *Recruitment overfishing* results when fishing reduces adult stocks and egg production to a point where the population may not be able to reproduce itself. *Growth overfishing* occurs when fishes are caught before they have had a chance to grow resulting in a shift to smaller sized individuals in a population.

¹⁰ *Recruitment* is the number of postlarval fish survivors.

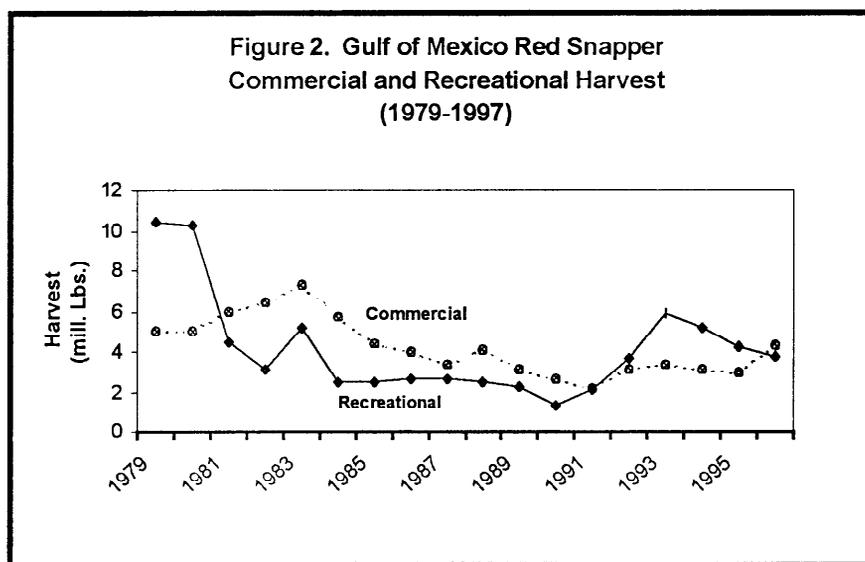
¹¹ *SPR* is the ratio of the number of eggs that could be produced by an average recruit over its lifetime in a *fished* stock to that of an *unfished* stock.

¹² Under new 1996 Magnuson-Stevens Fishery Conservation and Management Act reauthorization provisions, the target SPR will likely be increased to about 40% (RFSAP 1997).

¹³ See, for example, May 24, 1995 letter to Andrew J. Kemmerer, Regional Director of NMFS, from members of the Gulf of Mexico Fishery Management Council (Julius Collins, Philip D. Horn, and Albert L. King).

Scientists consider red snapper to be highly vulnerable to overfishing. Red snapper are predominately sedentary and geographically restricted to reef and reef-like hard bottom habitats. They are long-lived – the oldest individuals are estimated to be older than 50 years¹⁴ – and experience low natural mortality (Goodyear 1995). Red snapper become increasingly fecund as they grow larger; larger females may spawn more times over a longer period than smaller females, and maximum egg production is estimated to be at about 30 inches when the fish is 14 years old (Goodyear 1995).¹⁵ The current population is comprised of relatively younger, smaller and less fecund fish because fishing effort has removed many large and highly prolific individuals. As a result, spawning stock biomass and total egg output is diminished (Goodyear 1995, PDT 1990).

Overfishing of red snapper stocks is not the result of commercial fishing alone. In four of the last five years, recreational fishers have caught more pounds of red snapper than commercial fishers (Figure 2). Also, scientists predict that the by-catch in the Gulf shrimp fishery may have a more adverse influence on long-term stock recovery than the commercial and recreational fisheries combined (Schirripa and Legault 1997). Finally, illegal fishing and fish sales are an on-going problem. Although this paper examines the commercial harvest, these other factors play a significant role.



Source: Schirripa and Legault (1997).

Red Snapper Fishery Management

¹⁴ Age estimates based on readings of otoliths.

¹⁵ Estimate based on an unfished population.

This section discusses the current red snapper management regime through 1997 and the effects of management on the fishery. The Council has created a regulatory maze by implementing 15 major “amendments,” and numerous other “emergency” management actions, to the original reef fish fishery management plan. Table 1 summarizes the development of these regulations from 1984 through 1997.

Table 1. History of Regulations Affecting the Gulf of Mexico Commercial Red Snapper Fishery (1984 to 1997)

Date	Management Action
1984	<i>Reef Fish Fishery Management Plan implemented:</i> Minimum size limit set at 12". Prohibitions set on the use of certain gear types within an inshore stressed area.
1988	<i>First red snapper stock assessment conducted:</i> Red snapper are found to be “significantly” overfished. <i>Goal established: to rebuild declining stocks from an estimated 2% to a recommended 20% Spawning Potential Ratio (SPR).</i>
1990	<i>Total Allowable Catch (TAC) established.</i> Commercial quota set at 3.06 million pounds (but 2.7 million pounds are landed). <i>Reef fish vessel permits are required for fishing under commercial quota.</i> Sales of recreationally caught red snapper are prohibited. Minimum size limit increased to 13". Stock recovery target set at year 2000.
1991	Commercial quota reduced to 2.04 million pounds. Stock recovery target moves forward to 2007.
1992	<i>Derby fishery begins.</i> <i>Moratorium placed on new reef fish vessel permits.</i> Commercial quota set at 2.04 million pounds (but 3.14 million pounds are landed).
1993	<i>Red snapper endorsement program implemented.</i> Trip limit of 2,000 pounds for endorsement holders; 200 pounds for others with reef fish vessel permit. Commercial quota raised to 3.06 million pounds. Stock recovery target moves forward to 2009.
1994	Commercial quota remains at 3.06 million pounds. Minimum size limit increased to 14".
1995	<i>Individual Transferable Quota (ITQ) program approved by NMFS.</i> Commercial quota remains at 3.06 million pounds. Minimum size limit increased to 15". Stock recovery target moves forward to 2019.
1996	<i>ITQ moratorium established by Congress through 2000.</i> Reef fish vessel permit moratorium extended through 2000. Endorsement program extended through 1997. Commercial quota increased to 4.65 million pounds.
1997	<i>Mini-derbies established.</i> Commercial quota remains at 4.65 million pounds.

Source: GMFMC 1997.

Current Management Regime

Based on the conclusions of the 1988 red snapper stock assessment, the Council implemented several restrictive measures in 1990 to rebuild stocks – most notably a total allowable catch (TAC), a commercial quota and closure, and a recreational bag limit. The TAC is divided almost evenly between the commercial and recreational sectors (51% and 49%, respectively).

As a result of implementing an annual commercial quota without allocating secure individual rights to the harvest, a “derby,” or a race to catch fish, ensued in 1992. Under derby conditions, red snapper fishers are encouraged to harvest fish as quickly as possible to maximize their share of the quota before it is filled and the season closed. Since creating the derby, the Council has sought to combat its negative consequences for the fishery.

A commercial red snapper fisher today must contend with a plethora of regulations. During the 1997 season, under the commercial quota, fishers were allowed to harvest up to 4.65 million pounds of red snapper 15 inches and larger. Only those fishers with a reef fish vessel permit – a permit issued to vessel owners or operators who can demonstrate that at least 50% of their earned income is derived from commercial fishing – were allowed to harvest red snapper. (A moratorium on the issuance of new reef fish vessel permits has been in place since 1992.) Those concurrently having a red snapper “endorsement” – a license issued in 1993 to fishers having a reef fish vessel permit and a record of at least 5,000 pounds of red snapper landings in two of the three years between 1990 and 1992 – could harvest up to 2,000 pounds of fish per trip. Fishers without endorsements were limited to 200 pounds per trip. During 1997, red snapper were harvested for the first time during “mini-seasons.” Two-thirds of the quota was harvested beginning February 1. The final one-third of the quota was harvested at two week intervals beginning on September 2. Finally, fishers could sell their catch only to federally licensed buyers.

Effects of Current Management on the Fishery

In spite of the Council’s endeavors, excess fishing capacity and the race for fish have resulted in fishery closures of nine to ten months each year, unsafe conditions for fishers, depressed prices for fish, ecological harm, and inequities among fishers.

The red snapper commercial fishing season closes when the annual quota is filled. Prior to the derby, monthly catches of red snapper were relatively uniform throughout the year. In 1990,

fishers landed under three million pounds over the entire year. But in 1995, the 3.06 million pound quota was harvested in just 51 days, and the 1997 quota of 4.65 million pounds was harvested in only 74 days (SEP 1997). Short seasons, in conjunction with intense fishing effort, account for many of the adverse effects of the derby.

Fisher and vessel safety is also compromised in the derby. During the open season, red snapper fishers race to catch fish during all kinds of weather, sometimes delay routine vessel maintenance, and may neglect their personal health (Cox 1997, GMFMC 1997). Thomas et al. (1993) report that nearly 90% of red snapper fishers operate in dangerous conditions that they would normally avoid. They also found that 77% of fishers have less money available for vessel maintenance since the derby began and that vessels are carrying smaller crews, by an average of one person (25% fewer). The derby has not yet been responsible for deaths or vessel loss, but accidents are inevitable under such adverse conditions.

Quantity gluts created by the derby are implicated as a primary cause of a decline in ex-vessel red snapper prices. The price paid to fishers falls each year when massive quantities of red snapper are landed during the short open season. From 1962 to 1990, the real annual ex-vessel price of red snapper rose steadily from under \$1.00 per pound to nearly \$2.25 per pound (Goodyear 1995) as landings fell from over ten million pounds to under three million pounds per year (Schirripa and Legault 1997). However, between 1990 and 1994, the real annual ex-vessel price fell to under \$1.50 per pound (Goodyear 1995) while annual landings remained relatively unchanging between two and four million pounds (Schirripa and Legault 1997) (Figure 1). This drop has been attributed to the derby, at least in part, since the real ex-vessel prices for some other reef fishes have continued to rise during this time, even as landings remained steady.¹⁶ As a result of these conditions, red snapper fishers with endorsements reported a \$16,000 decline in annual income from the late 1980s to 1993, a drop of 40% (Thomas et al. 1993).

The derby exacerbates overcapacity in the red snapper fishery because fishers must make increasingly rapid trips to compete in the race. Overcapacity can be detected in analyzing the downward trend in the number of days required to harvest the quota. A 3.06 million pound annual quota for 1993 to 1995 was harvested in 95, 78, and 51 days, respectively, even with an increased

¹⁶ For example, for grouper, a species not regulated under a TAC and derby, average annual ex-vessel

minimum size limit, restrictive trip limits, and a slight decline (from 131 to 126) in number of endorsed red snapper vessels (endorsed vessels landed nearly the entire quota) (GMFMC 1997). The Council reports that, in 1993, as few as 21 of the top red snapper vessels alone could have harvested the entire quota if they fished year-round with derby intensity (GMFMC 1995a). Fishers increase their pace by either purchasing more powerful vessels, resting fewer hours between trips, or by hiring temporary extra crew members. Alternatively, some fishers offer anecdotal evidence that seasons are progressively shorter, in part, because fish are more abundant and easier to catch. This could be the consequence of the formation of dense aggregations during the closed season, or large numbers of fish in the fishery as a result of the strong 1989 recruitment, or even the beginnings of stock recovery.

Derbies also damage fishery ecology. Red snapper by-catch mortality is a serious problem for fishers targeting other reef species during the extended closed season. Before the derby, commercial fishers harvested red snapper and other reef species in the multi-species fishery together throughout the year. During closed seasons, fishers are not able to avoid red snappers – the most common fish in this fishery – as they target other species. Although there are no quantitative data on red snapper by-catch mortality after closures, the Council and red snapper fishers speculate that release mortality is high and likely has an adverse impact on stock restoration (Cox 1997, GMFMC 1997).

Another consequence of the derby has been a substantial growth in landings of other reef and non-reef fishes (SEP 1995). Red snapper fishers reported increases in their efforts to harvest species such as vermilion snapper and triggerfish during the closed season (GMFMC 1995b, Thomas et al. 1993). For example, prior to the derby, vermilion snapper were harvested only incidentally with red snapper. Now there is a directed fishery for this species that intensifies after the red snapper season closes each year. Already, a minimum size limit has been established and a TAC is being considered for vermilion snapper because the fishery is showing clear signs of overfishing (Schirripa 1996). Until the Council begins to manage the reef fish fishery as a multi-species complex, its management measures will continue to simply shift fishing effort from regulated to non-regulated species.

prices rose from \$2.01 in 1990 to \$2.51 in 1995. (GMFMC 1997).

Quota overruns occur under derby management. For example, the 1992 commercial quota of 2.04 million pounds was filled in just 53 days. Commercial fishers, citing “economic and social upheavals,” convinced NMFS to reopen the fishery for an additional 43 days. A 600,000 pound TAC overrun was the result (GMFMC 1995a). Such actions hamper efforts to rebuild stocks.

Inequities among fishers have resulted as the Council has attempted to control the derby. Red snapper endorsements could be transferred only on death or disability or to another vessel owned by the endorsement holder. Thus, it has been virtually impossible for new participants to enter the fishery or for more efficient fishers to expand. Further, the two levels of trip limits (2,000 and 200 pounds) do not account for individual fishers’ catch histories or differing capabilities. Finally, derby conditions favor fishers located closer to the resource, those who can fish in unfavorable weather, and those who have larger boats (GMFMC 1995a).

At this time, there is no end in sight to the red snapper derby. In 1998, fishers are faced with a new set of regulations because the endorsement program – originally implemented only as an interim measure – expired at the end of 1997. If a new system were *not* in place, the fishery would have reverted to open access. There is scant hope that the new license limitation program and mini-seasons – little different than the current program – will have any positive impacts beyond preventing a return to open access. In fact, the Council predicts that a greater number of vessels will be allowed to enter the fishery at the 200 pound trip-limit level (GMFMC 1997). For example, in 1996 there were 129 endorsed red snapper fishers and 302 vessels without endorsements. Under license limitation, the Council predicts it will issue 134 Class 1 licenses (equivalent to an endorsement) and 700 Class 2 licenses (equivalent to non-endorsed vessels) (GMFMC 1997). Consequently, the adverse impacts of the derby will likely be exacerbated in the near future.

Individual Transferable Quotas

Individual transferable quotas (ITQs) have been used in a number of fisheries in the U.S. and around the world to end the race for fish and its negative effects on the fishery (e.g., see Casey et al. 1995 and Gauvin et al. 1994). This section discusses a red snapper ITQ proposal developed by the Council, an ITQ moratorium imposed by Congress, and the estimated benefits and costs of the ITQ program had it been implemented.

ITQ Proposal

In the mid-1990s, the Council and NMFS attempted to implement an alternative management program called Individual Transferable Quotas (ITQs). The Council determined that ITQs were the only strategy available that could end the derby (GMFMC 1995a). In November 1995, NMFS approved the ITQ program for implementation in April 1996 (50 CFR Part 641).

Under the ITQ proposal, the commercial quota would have been divided into individual shares and distributed to fishers based on their historical participation in the fishery. Thereafter, participants could have entered and left the fishery, or adjusted their individual harvest, by buying and selling individual shares. The derby would end because fishers could harvest their shares at any time of the year without fear that someone else would catch their fish and the season would close. Ultimately, fishers would have been able to reduce their fishing costs, avoid dangerous conditions, and have time to maintain their vessels (GMFMC 1995a). Society would have benefited from more efficient harvest capacity, a more reliable and high quality product, and less ecological harm.

Key provisions of the proposed ITQ program include the following:

- *Allocation* – Initial shareholders would be vessel owners or operators with red snapper landings between 1990 and 1992 and a reef fish vessel permit on the control date of August 29, 1995.¹⁷ Initial shareholders would receive percentage shares of the commercial quota based on the average of the highest two years' landings in the three-year base period 1990-1992. All of the commercial quota would be assigned to ITQ shareholders. Minimum quota shares would be equivalent to 100 pounds.

¹⁷ If the earned income of an operator was used to qualify for the reef fish vessel permit, then the operator is the initial shareholder rather than the vessel owner.

- *Transfer of ITQ shares* – No restrictions would be placed on transfers of shares to U.S. citizens and resident aliens.¹⁸
- *Duration of program* – The Council and NMFS would evaluate the program after four years (March 31, 2000) to be modified, extended, or terminated.
- *Record-keeping* – ITQ coupons would have separate sections for the owner/operator and the dealer. To track the quota and verify harvest, coupon sections from both would be submitted to NMFS – dealers on a monthly basis and fishers with their regular logbook forms.

Many concerns were voiced – among fishers, processors, and fishery managers¹⁹ – during the three years it took to design the red snapper ITQ program. Of the issues raised, probably the most contentious and persistent were that enforcement would be inadequate, administrative and enforcement costs for an ITQ program would be higher than for other options (open access and license limitation), consolidation of ITQs could create a monopoly in the fishery, and the base-period dates for determining quota allocation were not fair. To complicate matters, uncertainty about Congress' position on ITQs created a great deal of confusion. Other important concerns were also highlighted – especially those related to poor quality of the biological and catch data available – that were not related directly to ITQ implementation and are not discussed in this paper.

Fishers and fishery managers alike worried that a lack of enforcement on the part of federal and state governments could threaten the success of the ITQ program. At the existing enforcement level, a substantial amount of illegal and unreported landings are suspected. Some fishers fear that illegal landings might increase under ITQ management and be easily disguised since fresh red snapper would be available year-round (GMFMC 1995b, GMFMC 1995c). It was further noted that state cooperation would be crucial to minimize illegal landings (GMFMC 1995b).

The enforcement level considered by NMFS to achieve the minimum acceptable compliance under ITQs would require a budget equal to the current level of about \$450,000 per

¹⁸ Transfers would be prohibited for the first six months, and restricted to other shareholders for 18 months.

¹⁹ Three Council members submitted a letter of opposition to NMFS regarding implementation of the ITQ program citing several reasons: biological and catch data are flawed and stocks are not overfished; the ITQ will penalize the commercial sector in favor of the recreational sector; and that the 1990-1992 base period to qualify for ITQs is inequitable.

year. To achieve a higher level of compliance, the Council estimated that annual enforcement costs would be over \$1.5 million (GMFMC 1995a). There were few expectations that NMFS would have provided this higher level of enforcement and this issue remained largely unresolved.

It is encouraging, however, that representatives from each of the five Gulf states indicated that they would likely be able to promulgate complementary regulations once the ITQ program was implemented (GMFMC 1995a). Furthermore, amid the concerns over enforcement levels, the Council reasoned that, based on the experiences of other ITQ programs, enforceability could be expected to improve over time because the fishery would be slower-paced and easier to monitor. Also, fishers would self-police in an effort to reduce non-compliance, since they would have an interest in protecting their fishing rights and helping the program succeed (GMFMC 1995a). Ultimately, the level of compliance is related to the amount spent on enforcement, regardless of which management program is in place.

Costs were estimated to be higher to implement and maintain the ITQ program than either the open access or license limitation options. Upon examining the costs and benefits of an ITQ program, however, the Council found that benefits outweighed the costs (GMFMC 1995a). Start-up costs would be only moderately different under ITQ and license limitation management, \$430,000 versus \$360,000, respectively. Annual costs (considering the minimum acceptable level of compliance) would be \$660,000 for ITQs compared with \$520,000 for license limitation.²⁰ The benefits of the ITQ program (measured as the change in expected annual revenue based on a quota of three million pounds), however, were expected to be over \$2.5 million. Thus, the estimated overall change in net economic benefits was a gain of nearly \$1.9 million plus additional (but not quantified) gains from expected lower harvesting costs. Furthermore, the Council expected that enforcement costs would go down over time as compliance improved (GMFMC 1995a).

The other management options, open access and license limitation, were much less favorable. The Council predicted a net economic loss of up to \$1.7 million annually under open access and a small (but not quantified) net economic benefit under license limitation (GMFMC 1995a).

²⁰ If enforcement were to be increased to a "higher enforcement level," then annual costs of the ITQ program would increase to \$1.8 million with an overall net benefit of over \$2.3 million.

The Council investigated the concern that a large percentage of ITQ shares could be consolidated by a single entity and result in excess market power. However, the Council and NMFS found no compelling reasons to believe that undue consolidation would occur. They concluded that, given the large number of substitute species and products for red snapper available to consumers, a major consolidation of ITQ shares in the fishery would be unlikely (GMFMC 1995a). Consolidation also appeared improbable because the fishery depends on small boats and captains with substantial local knowledge (GMFMC 1995a). Ultimately, the Council determined that existing anti-trust laws would be adequate protection and, thus, did not establish a limit on ITQ ownership (GMFMC 1995a). As a fallback, however, the Council, under its existing fishery management authority, could make adjustments to the program if it appeared that too much (or too little) consolidation was occurring.

The most contentious issue may have been choosing the base dates, or the time period, used to determine historical participation and to allocate ITQs. The years 1990 to 1992 were ultimately selected by the Council as dates to determine historical participation and allocation of initial ITQ shares. There were at least two compelling reasons for selecting these years. First, the endorsement and two-tier trip-limit regulations, which radically changed many fishers' behaviors, had not yet been implemented. Second, after 1992, in anticipation of a future ITQ program, fishers may have "padded" landing records.

There are, however, a number of reasons a fisher might prefer a different time period. For example, 1990-1992 were the first years of the TAC and derby management. They were not typical of historical landings for all fishers. Fishers who left the fishery because of its poor condition or had vessel problems during more than one of the base years would not fare well. Additionally, fishers may have underreported landings for various reasons. Under these circumstances, fishers who might have otherwise supported ITQs found themselves in opposition because of the base dates.

Finally, concerns abounded because Congress was concurrently working to define the limits of ITQs in U.S. fisheries during re-authorization of the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265). Some fishers feared that Congress would impose

an ITQ user fee. Fishery managers as well as fishers fretted over Congress' use of the term "*individual fishing quotas*" instead of ITQs and what it would mean if transfers were not allowed. It was unclear whether Congress would require the recreational red snapper fishery to operate under a quota and what that might mean to commercial ITQ holdings. These congressional actions increased uncertainty and may have reduced industry support for ITQs.

ITQ Moratorium

Although NMFS approved ITQ management for the red snapper fishery, two congressional initiatives converged to undermine the program. First, in a FY 1996 Commerce Appropriations conference report, Congress directed NMFS "not to expend any funds to implement or enforce an ITQ system in the Gulf of Mexico . . ." Second, in the October, 1996 reauthorization of the Magnuson-Stevens Act, Congress ordered the Council to ". . . not, prior to October 1, 2000, undertake or continue the preparation of any fishery management plan . . . for the Gulf of Mexico commercial red snapper fishery that creates an individual fishing quota program . . ." [Section 407(b)]. Through these initiatives, Congress blocked the implementation of ITQs for the Gulf's commercial red snapper fishery.

There was significant industry support for the red snapper ITQ proposal. The moratorium was not the result of Congress trying to rescue red snapper fishers from an over-zealous Council. The precise reasons for the ITQ moratorium are somewhat obscure and explanations varied from individual to individual. However, after discussion with representatives of the Council, industry, and others, several themes became apparent.²¹ The themes paint a picture of congressional intervention with Council and NMFS actions and of a minority of fishers and fish processors wielding significant influence.

Opposition in Congress was led by some members with negative perceptions of ITQs. ITQs are generally touted to be a success in ending the race for fish. However, in some cases, the fish-processing sector has attracted the attention of Congress by arguing that processors are threatened by ITQs for two reasons. One, ex-vessel prices are higher because fishers under ITQ management gain a degree of market power. Two, buyers from outside traditional marketing and

²¹ Those who provided information for this section asked to remain anonymous.

processing channels have increasing opportunities to purchase fish because more stable supplies are available under ITQ management.

Members of Congress representing Gulf Coast states might have saved the red snapper ITQ program by modifying the date the moratorium became effective. However, a small number of fishers and processors worked to ensure that the red snapper ITQ was not implemented. There are at least two apparent reasons for this opposition. First, a few fishers thrive under derby conditions. For example, some operations with a fleet of red snapper vessels and an abundance of crew have been able to adjust favorably to derby conditions and consequently are harvesting a much larger percentage of the quota, per red snapper endorsement than “mom-and-pop” operations having one vessel and one captain. These fishers would not have benefited from the ITQ proposal which used the pre-derby 1990-1992 base date for determining historical participation, as compared to a base date during the derby.

Second, some Gulf Coast processors benefit from paying low ex-vessel prices to fishers during the derby. They believe that their businesses would be adversely impacted under ITQ management because ex-vessel prices would rise and fishers would eventually sell their fish to alternative buyers. Apparently, this contingent of fishers and processors, which included at least one Council member, had significant influence. Because the Magnuson-Stevens Act was being reauthorized during the red snapper ITQ implementation stage, these individuals were able to recruit members of Congress to help them implement the red snapper ITQ moratorium and, further, to move the base date for any future red snapper ITQ forward to 1993-1996.

Estimated Benefits and Costs

If the ITQ plan had been implemented instead of continuing with derby management, then several positive changes could have been realized. The ITQ proposal was designed to eliminate the three overriding problems in the derby – unnecessary risks to fishers and vessels, depressed ex-vessel prices caused by a temporal glut of fish, and inefficiencies due to excess fishing capacity. ITQs would also have reduced ecological harm, strengthened efforts to rebuild red snapper stocks, and created the possibility of greater equity among fishers than the existing management system.

Short and intense fishing seasons, typical in a race for fish, are the basis for many problems created by the derby. There is strong evidence from fisheries in which ITQs have been implemented that the race can be halted. For example, the annual open season in the North Pacific halibut fishery extended from just a few days each year to more than eight months after ITQ management was adopted (Conway 1995). Fishing seasons for both the South Atlantic wreckfish and Mid-Atlantic surf clam fisheries have also been significantly extended with ITQs (see SAFMC 1991 and Wang 1995, respectively). In an ITQ fishery, each fisher is guaranteed a share of the quota and there is no incentive to race. The fishing season is lengthened because the security of fishing rights allows fishers to plan their harvesting strategies efficiently, including avoiding poor weather conditions and taking advantage of favorable market conditions during the year.

Fisher and vessel safety can be greatly improved under ITQ management. No deaths have been attributed to the red snapper derby; however, participants in other derby fisheries have not been as fortunate. For example, over 100 deaths were attributed to the North Pacific halibut derby between 1990 and 1994. During the first two years of ITQ management, no fishing fatalities have been reported in the fishery (Conway 1997). Under the derby conditions that currently exist in the red snapper fishery, it may only be a matter of time before a tragic accident occurs. Safety in the red snapper fishery would improve with ITQs because incentives to race, especially during inclement weather, and to delay routine vessel maintenance would cease to exist.

In an ITQ fishery, ex-vessel prices may be expected to rise initially as the supply of fish becomes more evenly distributed over the fishing season. In the South Atlantic wreckfish fishery, for example, average monthly prices often fluctuated from under \$1.00 to about \$1.50 per pound. But after switching to ITQ management, average monthly prices became more stable at a higher level of about \$1.85 per pound (Gauvin et al. 1994). With ITQs, fishers are free to monitor market prices and plan their trips to maximize the value of their landings and are better able to provide a fresh and high-quality product over a longer period of time. The Council estimated that, with ITQs, ex-vessel red snapper prices would increase by about \$0.85 to \$1.35 per pound (GMFMC 1995a).

Excess capacity in the fishing fleet would be reduced under ITQ management. For example, in the Mid-Atlantic surf clam fishery, the number of vessels recorded fishing during a

season dropped from 115 to 72 after only one year of ITQ management. And in the South Atlantic wreckfish fishery, the fleet size declined from 49 to 31 fishers in less than two years after adoption of the ITQ program (Gauvin et al. 1994). In the red snapper fishery, initial ITQ shares would have been allocated to between 225 and 266 individuals, and the Council predicted that this number would decline as fishers with higher costs left the fishery (GMFMC 1995a). With ITQs, fishers have no incentive to maintain more capacity than necessary to harvest their quota over the year.

With respect to conservation, ITQ management gives fishers an economic interest in the long-term health of the fishery. The Council also predicted that ecological harm resulting largely from derby conditions – red snapper by-catch mortality, increased fishing pressure on other reef species, and TAC overruns – could be reduced with ITQ management.

Although some conservation benefits would be difficult to anticipate, clearly the high levels of red snapper by-catch mortality that result during the closed seasons would be reduced due to a longer season. Under ITQ management, as long as shares are available, fishers would not need to release red snapper caught incidentally because they could use a part of their allotment, or purchase ITQ shares, in order to sell the fish.

The effect that red snapper ITQ management would have on the multi-species fishery as a whole is not clear. Under derby management, many reef fishers shift their efforts to other species when the red snapper season closes. The red snapper ITQ does not require a fisher to cease harvesting other species. Many red snapper fishers, especially since the derby began, have increased their capacity to fish alternative species. It is unclear whether some fishers would revert to fishing exclusively for red snapper. Fishing pressure on the vermilion snapper stocks, which typically intensifies after the red snapper closure, could be reduced. This issue was not addressed specifically in the red snapper ITQ proposal.

Quota overruns could be reduced under ITQ management. In the red snapper fishery, fishers have routinely influenced the Council to increase the TAC beyond levels recommended by scientists and even to allow fishing to continue after the quota has been filled. In the South Atlantic wreckfish fishery, historically strong opposition to TAC reductions declined significantly after ITQ implementation (SAFMC 1991). Furthermore, fishers are less likely to cheat and more

apt to report violations under ITQ management. It is in the fishers' best interest to protect their investment by voluntarily reporting those who cheat because widespread cheating would reduce the market value of their ITQ shares.

The difficult issue of equity, especially related to choosing a base period for allocation of the quota, was not resolved in the red snapper ITQ proposal and became a major issue leading to the moratorium. Allocation of ITQ shares based on pre-derby participation would reward those with a successful history in the fishery. A means to compensate the fishers who would not benefit as much could have been integrated into the red snapper ITQ proposal to resolve this issue.

While replacing derby management with ITQs would have delivered many economic and conservation benefits, it would have imposed costs on some fishers and fishing related industries. For example, fishers who had adjusted to the derby – those closer to the resource, who can fish in unfavorable weather, and who have faster boats – would have been disadvantaged by the recommended base period. Furthermore, those involved in marketing and processing channels, and possibly even consumers, who benefit from depressed ex-vessel prices, might be adversely affected. Finally, businesses that sell equipment and otherwise help fishers compete in the race for red snapper might be harmed.

Recommendations

A healthy Gulf of Mexico red snapper stock will better maintain the ecological integrity of the Gulf and provide a higher level of economic benefits to fishers and to society than an overexploited fishery. The following recommendations for improved management of the Gulf of Mexico reef fish fishery are aimed towards stock recovery. We hope that the National Research Council's IFQ Committee, Council members, reef fish fishers, and others interested in the Gulf of Mexico reef fish fishery management will consider these recommendations.

Manage the Gulf of Mexico reef fish fishery as a single, multi-species fishery stock.

Individual species in the reef fish fishery, such as red snapper, vermilion snapper, and groupers are part of a multi-species complex. Consequently, management of one species affects other species. For example, a large directed fishery for vermilion snapper has developed as a result of limitations

placed on red snapper landings. The Council should amend the “Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico” to manage the reef fish fishery as a single stock.

Manage the Gulf of Mexico reef fish fishery under a comprehensive ITQ program. The reef fish fishery should be managed under a reef fish ITQ program. Based on the red snapper ITQ proposal, the Council should develop an ITQ program that includes each species harvested in the reef fish complex. A reef fish ITQ would avoid the creation of derby fisheries, minimize the destructive effects of by-catch, and increase the returns from fishing by allowing fishers to reduce costs and sell their entire catch. Records to determine the initial ITQ allocation must be accurate and verifiable.

The Council should develop a management plan to address the problems of catch-and-release fishing and the potential creation of a recreational derby. The recreational sector, which is allocated 49% of the TAC for red snapper and has chronic overruns (see Figure 2), adversely impacts red snapper stocks. A quota and closure for this sector implemented in 1997 will help to resolve the overrun problem. However, this fishery may develop problems associated with a derby as a result. Furthermore, this sector also has a high level of “catch-and-release” fishing. Red snapper that are thrown back, and those that die after being released are not accounted for in recreational harvest data. As a result, total harvest data may be inaccurate.

Implement Gulf shrimp fishery by-catch reduction strategies. The 1997 red snapper stock assessment states that the red snapper by-catch mortality in the Gulf shrimp fishery may have a more negative impact on the long-term recovery of the stock than the directed fishery itself. The Council should ensure that all regulations to reduce by-catch mortality, including the use of by-catch reduction devices, are enforced and carefully monitored.

Investigate the potential of no-take marine reserves. The Council should investigate the potential of no-take marine reserves to help rebuild and maintain red snapper stocks. The characteristics that make red snapper and many other reef fish vulnerable to overfishing – sedentary nature, geographically restricted movements, long-lived, and low natural mortality – are the same characteristics that may permit the population to begin recovery in no-take marine reserves. The establishment of no-take marine reserves has resulted in increased reef fish

(including snapper and grouper species) landings where they were established with community support and adequate enforcement. No-take marine reserves should be established to protect both large and highly fecund individuals and juveniles from fishing pressure. In evaluating no-take marine reserves, the Council should develop an estimate of the total area that would be required to aid in stock recovery, determine which habitats (including natural and man-made) should be included, evaluate enforcement options, and gain both fisher and community support.

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EXHIBIT B

The Times-Picayune
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QUOTAS MIGHT SAVE BOTH FISH AND FISHERS

By JOHN McQUAID Staff writer

OCEAN CITY, MD. For years, surf clam fisherman Mike Garvilla was forced to shuffle paperwork under a bewildering array of regulations designed to protect the species from overfishing.

Government agents told him which days and which hours he could fish, often regardless of the weather. Competition forced him to range far up the coast for days at a time.

But six years ago, Garvilla, 36, became a rare phenomenon in these days of vanishing fish and eroding fishing jobs: a happy fisherman.

Now he fishes whenever and wherever he wants. He takes his boat, the Betty C. II, about 15 miles due east of Ocean City - an easy two-hour trip. He drops the stern-mounted, 22-foot dredge with a built-in hydraulic pump, blasts clams out of the sand and into the metal cage, then hauls them to the surface with electric winches. He's back by mid-afternoon.

"It's a completely different situation," he said. "We have our freedom, and it feels good for a change."

Garvilla is part of a management experiment that could revolutionize fishing around the world by establishing property rights for fishers over the animals they catch for the first time in history.

The program, proposed for the Gulf of Mexico red snapper, is called an Individual Transferable Quota. It would assign each certified fisher a share of the year's preset total catch. He could fish any time he wanted to fill that quota, or sell or lease his share to someone else.

The change would be this century's version of fencing the open range -- a government-sanctioned takeover of an open resource -- all in the name of saving it.

The theory is alluring: Giving fishers a direct financial stake in the resource would encourage conservation and end the mad rush to outfish rivals, a competition that has depleted many fish populations.

But the reality would mean painful trade-offs.

"There is a tradition of wanting all fisheries to have open access. That's a cultural thing," said Carolyn Creed, a fishery anthropologist who co-authored a Rutgers University study of the

several ITQ programs, including surf clams. "But the history of open access is pretty grim. So we're forced into the hard choices."

If it's widely implemented as some experts predict, ITQs would transform commercial fishing in the Gulf into something unrecognizable. Only certified "professional" fishers could work. The lucky ones, however, would probably be better off.

Creating property rights over fish would turn fishing into something closer to farming, with the crop effectively owned by the people who bring it in.

ITQs are supposed to bring the free market to bear on fishing fleets, where normal market forces have been distorted by subsidies, overinvestment and the unconventional economics of a resource owned by no one.

In some places, they have had positive results. New Zealand has ITQs for 32 species of fish, part of a coordinated fishery development and management program. Fishing employment and ownership of quota shares has risen in the past 10 years, cutting against the trend of economic collapse elsewhere in the world.

ITQs address the problem of overbuilt fleets by strictly limiting who may fish - usually those with a documented history of catching the fish being regulated.

Managers assign a fraction of an annual quota to each fisher -- or in some cases, each boat or fishing enterprise. The fisher must stop once the quota is reached.

That eliminates the short seasons and derby fishing found in many fisheries, including the red snapper. Instead of seeing prices drop when everyone sells their catch at once during a derby, landings would be spread over time and the price would remain stable.

Finally, the T in ITQ means they can be transferred, creating a marketplace for the shares, a policy designed to consolidate them in the most economically efficient hands.

Transferability would accelerate the slow shakeout of boats and employment occurring around the world, almost instantly creating winners and losers. And in many places, the losers would greatly outnumber the winners.

Revealing experiment

The surf clam fishery was ideal for the ITQ experiment in ways many others are not. Surf clams are a small fishery. Boats sell only to a few companies that make processed fish products. The fleet size -- about 135 boats -- made it easier to arrive at a consensus among boat owners.

Still, its lessons are dramatic.

Before the ITQ system took effect, the fleet was in bad shape.

"Expenses had gone up, the fleet had become old, boats were unsafe, they'd lost people at sea. There was a knowledge that as things stood, many were going to go out of business. It just wasn't working," Creed said.

With an overall catch capped to preserve the stock, boats could fish only once every two weeks, for six hours. In Garvilla's case, it was every other Tuesday, from 8 a.m. to 2 p.m.

If the weather on the designated day was bad, fishers could make it up the next day. But if bad weather continued, they had to wait another two weeks. That, and other mishaps such as engine trouble, often left them losing money.

When the ITQ program started in 1990, after a period of meetings and consensus-building among the boat owners and managers of the Mid-Atlantic Fishery Management Council, most boat owners ended up with small quotas.

"I did not have enough allocation to make a living at it," said Joe Garvilla, Mike's father, who owns the Betty C. II along with his son. "If the quota is divided up properly at first, everybody is going to be unhappy. So when you come up with an ITQ plan, you've either got to buy or sell."

Over the next five years, the fleet size dropped by about 100 boats as their owners sold or leased their shares. Most of the boats ended up junked.

Many people lost their jobs when companies and individuals consolidated their shares, though the number of jobs was shrinking even before the program began.

But ITQs also provide a means for struggling boat owners to get out, something not easily accomplished before.

"It allows them to leave the fishery with some resources," said Rutgers fishery anthropologist Bonnie McCay, who collaborated on the ITQ study with Creed. "If you quit farming you can sell the farm and move to Florida. In fishing, that's not the case because your boat has depreciated."

With the experimental system, fishers have their quotas to sell.

But ITQs have sparked bitter opposition. Opponents say transferability would allow large entities to come in and dominate small operators - in effect eliminating the freedom that defines fishing, turning fishers into little better than sharecroppers.

Even before the ITQ process started, big companies combining all the elements of seafood production - fishing, processing and marketing -- dominated the surf clam fishery. ITQs accelerated the process.

Without limits on shares, critics say, ITQs could allow companies to corner a market and set the price, leaving consumers at their mercy. Proponents say the rules can be written to prevent concentrating too many shares in too few hands.

Managers like the quota system because it's simpler than the current snarl of regulations.

But whether it promotes conservation is unclear. McCay and Creed's study, for example, showed that in one Canadian fleet, it tended to increase the capture of bigger fish to ensure the largest profit margin -- a practice that removes the best breeders from a stock.

And under the U.S. system, the overall quotas would still be set by the regional Fishery Management Councils, which have often caved in to industry pressure to relax or delay conservation measures.

Meanwhile, Congress has gotten jittery on the issue. It appears poised to put off new ITQ programs for five years so they can be studied further, which may increase pressure on fish stocks.

"There will be a mad rush by assorted fishing interests to acquire catch histories during the period of the moratorium so that they will be in a position to claim shares when it ends," said international fishery consultant Francis Christy, who is credited with introducing ITQs. "It will be the trumpet call for the start of a massive derby."

ITQ proponents say it's transferability that makes the system work. Without it, they say, there is no way to consolidate shares, but also no incentive -- and perhaps no way -- for small operators to make their enterprises more profitable or even to get out of the business.

"Without transferability, this is a crock," said Louisiana red snapper fisher Ron Anderson, who supports the ITQ snapper program, which was set to start this year but is now in political limbo.