

Fishing Effort Reduction in the Florida Spiny Lobster Fishery

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ABSTRACT

The State of Florida implemented a lobster trap certificate program in 1992. The program is designed to reverse the trend towards increasing trap numbers and limit overcapitalization in the fishery. The goals of the program are to increase trap efficiency, minimize environmental damage, and reduce conflicts with recreational boaters. The program's two major components are a trap allocation and a variable trap reduction schedule. The specific details of the trap allocation procedure and the theory supporting the trap reduction schedule will be explained in context with historical trends in the fishery and recent technological innovations.

FISHERY TRENDS

Spiny lobster landings in Florida have become disassociated with the number of traps used in the fishery. Lobster landings increased rapidly in the 1960s and mid 1970s, and continued to increase, although at a slower rate and with considerable cyclic variation, into the 1990s (Figure 1a). Landings from international waters were excluded using data from Labisky et al. (1980) to facilitate an examination of Florida's fishery. The rapid increase in landings in the 1960s and the mid 1970s was associated with over a 400% increase in the number of traps from less than 100,000 to approximately 400,000 (Figure 1b). The continued increase in the number of traps to a high of 939,000 by 1991 was associated with a slight increase in landings, but the landings trend continued to increase as the number of traps declined to 606,190 by 1995. The decline in the number of traps was mandated by the trap certificate program.

Concurrent with the rapid increase in the number of traps was a decrease in the length of the fishing season fishers choose to deploy their traps. Approximately one-third of the traps are removed by the end of December, the fifth month of the fishing season (Figure 2). The percentage of landings each month declines more precipitously. Approximately 80% of the landings occur prior to December, in years when over 347,000 traps were in use in the fishery (Figure 3). It is important to note that the rapid expansion of trap numbers in the mid 70s resulted in only one observation with fishing effort between 265,000 and 455,000 traps. The decline in catch rate associated with this increase in the number of traps would probably be gradual and subject to considerable variation dependent upon fishing conditions and lobster abundance.

Increased lobster landings appear to be the result of technological

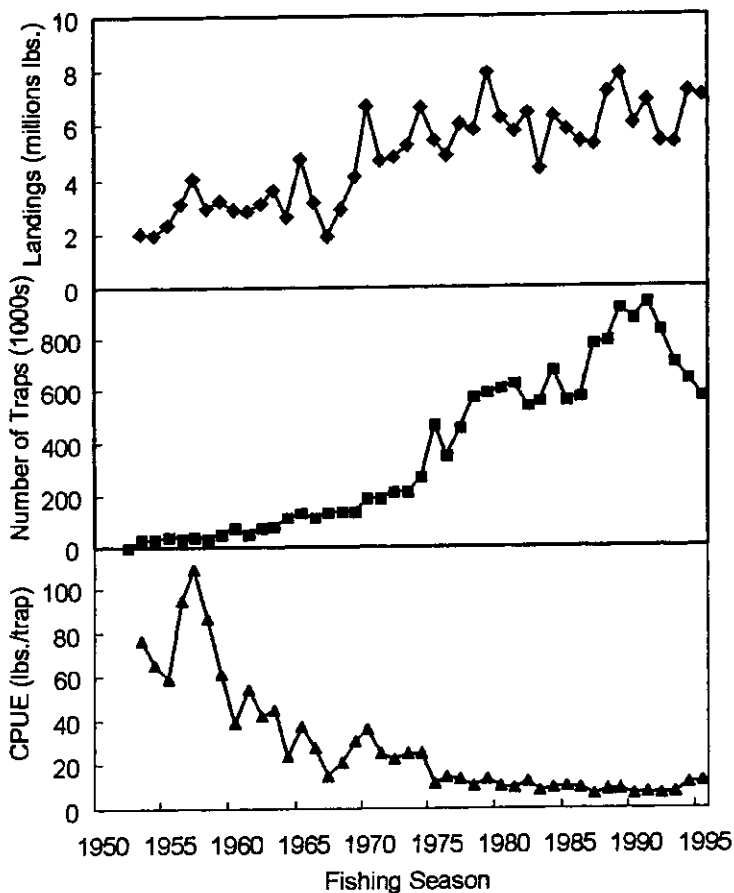


Figure 1. A) Spiny lobster commercial landings from Florida. Lobster harvested in international waters were excluded (Labisky et al. 1980). B) Number of traps in the Florida spiny lobster fishery. Thirty-eight thousand traps estimated in use in international waters were excluded between 1964 and 1976 (Labisky et al. 1980). C) Catch per unit effort (CPUE) derived from landings reports and trap estimates in this figure.

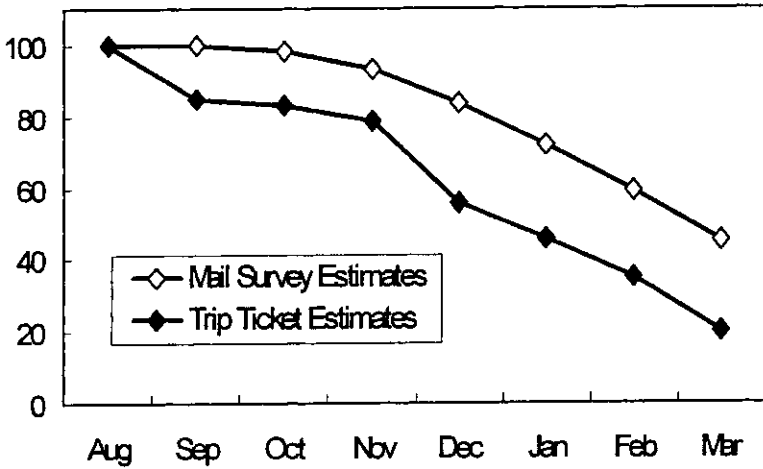


Figure 2. Percent of lobster traps fishing each month of the fishing season. Trip ticket estimates are derived from the Florida Marine Fisheries Trip Tickets and mail survey estimates are described in Hunt et al. 1994.

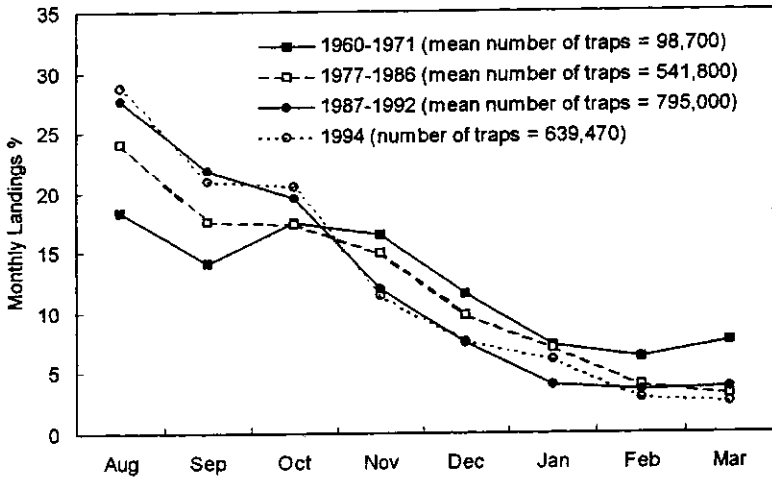


Figure 3. Percentage of lobster landed each month for years with similar numbers of lobster traps. The mean number of traps is reported for each group of years. Values for 1994 are shown separately for comparative purposes.

innovations in lobster fishing. Improved navigational and depth finding equipment allows fishers to operate farther from shore and identify potential fishing grounds more accurately. The extent to which the fishery is operating in new fishing grounds is unknown. Marine Fisheries Trip Ticket Records recorded area fished for less than 50% of the total landings in the 1994-95 fishing season (FDEP, unpubl. data). Existing records estimate the Tortugas fishery comprises 16% of the total landings. These estimates probably under represent the extent of the Tortugas fishery because of the historic reporting biases in the Key West area.

Lobster landings may have also benefitted from improvements in handling sublegal lobster since the 1987-88 fishing season. Fishers in Florida prefer to place two or three sublegal lobster in traps as attractants to improve the efficiency of their lobster traps. Mortality of these attractants is detrimental to future landings. The mandatory use of live wells to hold sublegal lobster was estimated to improve landings by up to 17% if trap numbers remained at 500,000 (Lyons and Hunt, 1992). Landings records prior to 1987 averaged 5.9 million pounds compared to 6.3 million pounds since the introduction of live wells. Increased landings after 1987 can not be directly attributed to the use of live wells because of cyclic variations in lobster abundance.

Slight increases in landings and the cyclic variations in lobster abundance have not prevented the decline in catch-per-unit-effort (CPUE) from approximately 14 lbs/trap in the mid 1970s to a low of 6.4 lbs/trap in 1992 (Figure 1c). CPUE was approaching the point where expenses associated with trap fishing equaled the value of the catch. The \$20.8 million ex-vessel value spiny lobster fishery (Harper, 1995) was on the verge of being unprofitable. Trap reduction efforts in 1993 and 1994 combined with the high landings to return CPUE to 11.3 lbs/trap in 1994.

IMPLEMENTATION OF THE TRAP CERTIFICATE PROGRAM

The spiny lobster trap certificate law and its amendments were established in 1992 (Florida Statutes, 1992). The law established an individual transferable certificate which allows the use of one trap per certificate. Each fisher is issued one plastic tag per certificate which must be attached to each lobster trap. The transfer of certificates amongst fishes is allowed. Revenues to support the program are generated by certificate renewal fees, certificate transfer fees, and a certificate surcharge. Renewal fees were originally \$.50 per certificate and are currently \$.75 per certificate. Renewal fees will continue to increase as trap numbers are reduced to maintain stable funding for the program. A \$2.00 transfer fee is assessed for each certificate that is sold on the open market. Certificates that were originally issued to a fisher through the certificate allocation process are subject to a 25% surcharge in addition to normal transfer fees when the certificates are sold. This is a one-time surcharge; therefore, certificates that have

been previously transferred are not subject to this surcharge. Transfer fees and surcharges are intended to cover administrative costs and to recover an equitable resource rent (Hunt, 1994).

The distribution of trap certificates involved an initial allocation and review by a Trap Certificate Advisory and Appeals Board. The initial allocation of certificates was based on a fisher's highest landings in one of three benchmark fishing seasons divided by a catch per trap coefficient. The catch per trap coefficient was determined by dividing the highest benchmark landings year for the fishery, 7.65 million lbs, by the 700,000 traps available to the allocation process. This resulted in a catch per trap coefficient of 10.93. A minimum and maximum allocation of 10 and 2743 certificates was set per fisherman. Fisher's are also limited from controlling either directly or indirectly more than 1.5% of the total available certificates. The Trap Certificate Advisory and Appeals Board advises the Department of Environmental Protection on disputes concerning the initial allocation of certificates to fishers. The board was allocated an additional 125,000 certificates to settle these disputes.

The trap reduction program is administered by the Florida Marine Fisheries Commission. One of the Commission's responsibilities is to reduce conflicts between commercial fishing gear and recreational boaters, while maintaining or maximizing annual yield. The current annual yield appears to reflect the maximum sustainable yield for the fishery. The Commission is using a series of trap reductions, not to exceed 10% per year, to accomplish this goal.

RESULTS OF TRAP REDUCTIONS

The lobster trap reduction program is fulfilling and exceeding the technical objectives of the program. The number of traps has been reduced, total landings are high, CPUE is increasing and the number of boats participating in the fishery has not declined substantially. Despite the apparent success of the program, fishers perception of the program is overwhelmingly negative. Fishers are opposed to trap fees, restrictions on the number of traps, perceive that enforcement of the program is inadequate, and in general do not want government involvement in their affairs.

Landings during the first two full years of the trap reduction program are variable, but within the historic range. CPUE is increasing (Figure 1c), despite landings below average in 1993. The large increase in CPUE in 1994 occurred in part because of the apparent naturally high cyclic landings. These landings were the third highest since modernization and expansion of the fishery in the mid 70s (Figure 1a).

Confinement induced mortality of sublegal lobsters used as attractants remains the single largest impediment to the fishery (Lyons and Kennedy, 1981; Kennedy, 1982; Hunt and Lyons, 1986; Hunt et al. 1986). Lobster trap efficiency is greatly improved by the presence of conspecifics in traps (Heatwole et al.

1988; Ehrhardt et al. 1991). The degree of attractant mortality is highly contested amongst fishers and managers, but regardless of the mortality rate, any impact to lobsters that are only days, or at the most months, away from legal size will reduce yearly landings. The current reduction of 400,000 traps should reduce the number of sublegal lobster confined in traps and subsequently reduce sublegal lobster mortality.

The trap reduction program in combination with restricted species status (Florida Statutes, 1992) for the spiny lobster is reducing the number of commercial license holders, but it is not reducing the number of commercial fishing boats. This apparent disparity exists because prior to 1992, the majority of commercial lobster license holders were recreational divers desiring to exceed the recreational harvest limits. This created a difficult regulatory situation. The average commercial lobster fisher had no economic interest in maintaining a stable fishery, because they were not generating and income from the fishery. Current regulations are reducing the number of these recreational divers possessing commercial licenses, but not affecting the number of commercial fishing boats (Figure 4). Stable fishing boat numbers indicates that the trap certificate program is not eliminating fishers whose primary livelihood is commercial fishing.

Reducing the number of traps in the fishery will at some point decrease the percentage of lobsters harvested early in the fishing season. Since 1960, the number of traps used on Florida's west coast can be divided into three major categories based on time periods when the number of traps were relatively similar (Figure 3). The slowed rate of harvest was evident between 1960 and 1974 when trap numbers varied between 55,000 and 172,000. Harvest rates were high early in the fishing season for both ranges of trap numbers, 315,000 to 655,000 between 1975 and 1986, and 737,000 to 857,000 between 1987 and 1992. Recent trap reductions did not reduce the rate of harvest in 1994. Harvest rates between 1960 and 1974 include years before the fishery was fully exploited and may not be directly comparable to later years.

The rate lobster are harvested has important implications on total harvest. Delaying the lobster harvest will allow additional time for lobster to grow. If natural mortality rates are low and the number of lobster available to the fishery does not decrease, increased lobster size will increase total landings. A 1 mm increase in the carapace length of the average lobster landed in Florida from 85mm to 86 mm will increase an individual lobsters weight from 509 g (1.12 lbs) to 526 g (1.16 lbs) (Matthews, et al. 2003). This represents over a 200,000 lb increase in total landings based on the average 5.9 million lb of lobster landed each year.

The rate lobster are harvested also has important implications on the ability of individual fishers to participate effectively in South Florida's many fisheries. Some South Florida fishers participate in several fisheries on a seasonal basis.

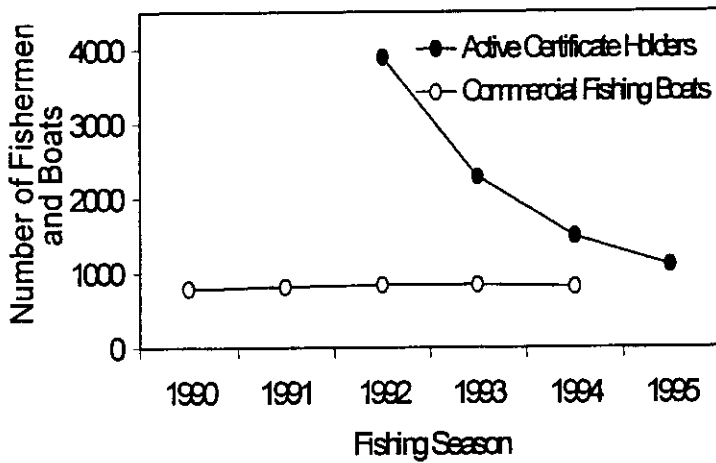


Figure 4. Number of commercial spiny lobster license holders with active trap certificates (FDEP unpubl. data), and the number of commercial lobster fishing vessels (Harper, 1995).

Lobster season begins in August and harvest declines precipitously by November (Figure 3), stone crab season begins in October and harvest declines rapidly by January (Bolden, 1994), and several finfish species are targeted during the remainder of the year. If the effective lobster fishing season is extended fishers participating in multiple fisheries will be negatively impacted, but small fishers which are less apt to participate in other fisheries and fish for lobster the entire season should benefit.

During each year of the trap certificate program we poled all fishers with over 100 trap certificates. In 1993 over 42% of fishers surveyed disliked the trap allocation and 9% disliked the concept of future traps reductions. An additional 20% of fishers did not express their opinion of the program. By 1994, 48% of fishers disliked the program, and an additional 20% were opposed to future traps reductions (Hunt et al. 1994). Despite extensive public outreach efforts and improved landings during the 1994-95 fishing season, fishers acceptance of the certificate program has declined. Many of the reservations concerning the trap certificate program were founded in fishers beliefs that they were deceived at the onset of the program and that trap reductions would continue indefinitely with no regard for the welfare of the commercial fisher (Hunt et al. 1994).

Additional problems arose as fishers with reduced trap numbers have increased their effort in other fisheries. Between 1985 and 1991 the number of stone crab traps remained stable at approximately 600,000 traps. In the 1992 fishing season, the number of traps in the stone crab fishery increased to 730,000 (Bolden, 1994). Continued increases in the number of stone crab traps are expected. Fishers displaced from the lobster fishery may also resort to stealing lobster from other fishers' traps. Reports from fishers indicate that the number of traps molested by other fishers has increased. Quantification of trap molestation rates is difficult, but the perceived lack of enforcement of regulations prohibiting trap molestation increases fishers dissatisfaction with the trap certificate program.

CONCLUSIONS

The Lobster Trap Certificate Program is meeting and exceeding the technical and scientific expectations of the program. The single largest obstacle in the trap reduction program is over, the allocation of trap certificates to individual fishers. Fishing effort is restricted and no rapid increases in effort are possible. The fishery is currently stable; although, improvements in trap efficiency are still possible and trap induced sublethal lobster mortality is a concern.

Conflicts still exist between recreational boaters and commercial lobster trappers. Some of this conflict is direct as both groups compete to harvest lobster, but many conflicts occur because of recreational boats and trap ropes can not occupy the same space at the same time. These considerations are social and

political, not technical or economic in nature, because they involve considerations of equity and fairness. In a similar fashion, the conflict between the environment and commercial lobster trappers is principally unquantified, so many of these considerations become social and political in nature also. Science can not resolve the basic differences between recreational boaters and commercial trappers nor does adequate information exist to establish the exact impact of a trap on the environment, so progress should be made to reduce these conflicts while giving equitable consideration to the opinions and desires of all parties involved.

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