

Socioeconomic Effects of the Florida Net Ban in Monroe County

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Introduction

In November 1994, 2.8 million Floridians voted to enact Amendment 3¹ and effectively eliminated the use of gill and other entangling nets within inshore state waters (Barnes 1995). Commonly referred to as the net ban, Amendment 3 affected thousands of commercial fishers across the state of Florida, who were forced to fish further offshore, invest in other fisheries, or abandon fishing altogether. The Interagency Task Force on the Net Fishing Ban estimated that the total cost of the ban was \$55 million, and that it directly affected about 10,000 individuals (Wadlow 1995).

While the effects of the net ban are evident in central and western Florida, where a majority of inshore users primarily targeted single species, the effects of the amendment are less clear in the Florida Keys. Highly diversified and spread across the Gulf of Mexico, Florida Bay, and the South Atlantic, commercial fishers in Monroe County have traditionally targeted a variety of species such as spiny lobster and stone crab, and fished a host of locations to sustain their income (Milon *et al.* 1997). To understand the economic and social effect the net ban has had on the region, research

¹The Florida Conservation Association (FCA) initiated a drive in 1992 to ban gill and other entangling nets from within inshore waters. The group obtained the more than required 430,000 signatures, or the number equal to 8 percent of the number of votes cast in Florida's preceding presidential election, for the amendment to be placed on the November 1994 ballot. Almost 72 percent of the electorate voted in favor of Amendment 3, and the net ban was implemented on July 1, 1995 (Barnes 1995).

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must determine the extent to which the amendment has displaced net fishers into other fully exploited fisheries. The focus should include fish houses as well, which previously relied on net-caught species and are now forced to substitute alternate or imported species.

This study assesses the effects of the net ban on fish houses and net fishers in the Florida Keys. Those effects can be compared to consensus fisheries management objectives: stock enhancement; reduction of excess effort; coordination with other ongoing management programs; and notions of fairness, such as seniority in use (Anderson 1986).

First, the study estimates the extent to which fish houses have diversified into other supply sources, including shifts to alternate and imported species. Second, we identify and characterize the net fishers in the region, determine the economic costs of diversification into other fisheries, calculate the catch-per-unit-effort (CPUE) profiles in net and other fisheries, and assess net fishers' views on the net ban process and outcomes. We argue that the net ban, while effective in reducing catch in the major net fisheries of the region, was redundant since a majority of the net-caught species in the Florida Keys were previously regulated under other management programs. In addition, the implementation of the net ban may only have displaced effort into other, already exploited fisheries.

Methodology

We contacted fish house personnel from each of the 30 fish houses in the region and surveyed them on the effects of the net ban. We limited the survey to the fish houses that sold net-caught fish prior to the net ban, and we conducted interviews only with fish house owners or managers, on site and in person. The survey instrument contained questions on the products carried in the fish houses, reliance on particular species, and the number of net fishers who supplied the fish houses both before and after the net ban. Fish house surveys lasted an average of 20 minutes, although most were 15 minutes or less. We identified and surveyed 12 fish houses that carried net-caught fish prior to the net ban.

The fish houses reported that 67 net fishers supplied them in 1994.² The number of net fishers declined to 30 in 1996; thus, 55 percent of the net fishers in the Florida Keys left the fishing industry in the year following the net ban. We contacted and interviewed all 30 fishers in person. The survey contained four major sections: demographic information; investment information; catch profiles;

and perceptions. The investment information and catch profiles sections solicited information from prior to the net ban (1994) and following the net ban (1996). Net fisher surveys, unlike the fish house surveys, were exhaustive. The interview sessions ran from a minimum of 20 minutes to over three hours. The average duration was 45 minutes.

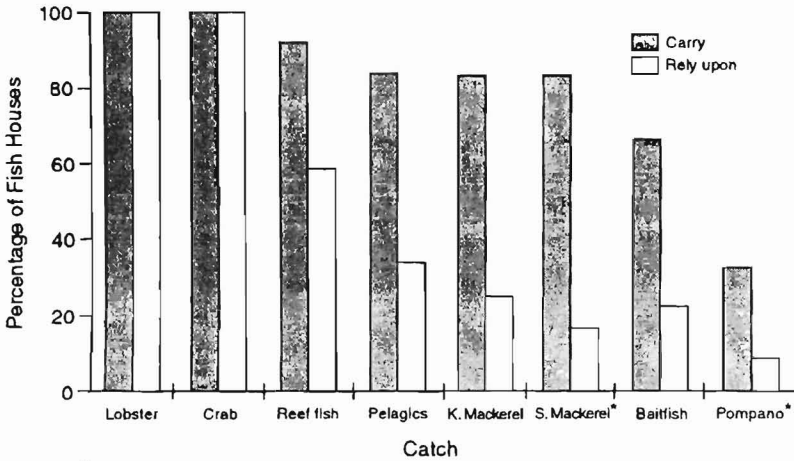
We compiled survey profiles from each interview, and we created separate databases for the fish house personnel and net fisher surveys. Thus, both qualitative and quantitative information was collected from the fieldwork. We developed the surveys between July-August 1997, conducting the fish house field surveys from August through December 1997. The net fisher field surveys commenced in September 1997 and ended in February 1998. For a description and copies of the fish house and net fisher surveys, refer to the following web site: www.rsmas.miami.edu/divs/netban.pdf.

Fish House Results

Half the fish houses affected by the net ban in the Florida Keys are located in the Lower Keys, primarily in Key West/Stock Island. The Middle and Upper Keys each have 25 percent of the fish houses affected. Three quarters of the fish houses have been in Monroe County for 11 years or more, and half for more than 20 years. As Figure 1 demonstrates, all of the fish houses surveyed sell spiny lobster (*Panulirus argus*) and stone crab (*Menippe mercenaria*). Greater than 90 percent carry reef fish, and over two thirds carry king mackerel (*Scomberomorus cavalla*), offshore pelagic species, and baitfish (including ballyhoo (*Hemiramphus spp.*) and others. Fish house personnel reported which catch was most important to their livelihoods, or that upon which they relied. Refer to Figure 1 for the relative importance of individual catches as determined by the percentage of fish houses that reported them as such. The fish houses most heavily rely on spiny lobster, stone crab, and reef fish, which support over 58 percent or more of the producers. Prior to the net ban, all the fish houses carried Spanish mackerel (*Scomberomorus*

²We could not utilize the Florida Saltwater Products License (SPL) list to identify net fishers in Monroe County because the list does not differentiate net fishers from other license holders. Moreover, contacting each fish house provided us with a complete list of available net fishers, as opposed to those that may have left the region after the passage of the amendment.

Figure 1
Categories of Catch and Their Importance



*Refers to species affected by the net ban.

maculatus), 67 percent carried pompano (*Trachinotus carolinus*), 58 percent carried baitfish, and 33 percent carried mullet (*Mugil spp.*). Since the net ban, 83 percent carry Spanish mackerel, 33 percent carry pompano, 67 percent carry baitfish, and no fish houses carry mullet. Although a similar percentage of fish houses carried net-caught fish both prior to and following the net ban, notably they do not rely heavily on them. For instance, even though 83 percent of the fish houses reported still carrying Spanish mackerel, only 17 percent rely on the species. Similarly, only 25 percent of the fish houses rely on baitfish even though 67 percent carry this type fish. These percentages demonstrate that while these fish houses still sell net-caught species, they can no longer depend on their supply.

Net fishers who continue to supply these fish houses with net-caught fish have moved to more effort-intensive methods. Over 58 percent of net fishers now net in offshore waters, and half of them use hook-and-line. Only 8 percent of net fishers supplying these fish houses use alternative gear, such as smaller, legal nets, and that practice is limited to baitfishing. To supplement the product lost because of the net ban, 25 percent of the fish houses have turned to imports. Half of the fish houses no longer consistently carry net-

caught fish. However, despite the shortage of such fish, less than half (42 percent) of the fish house personnel have observed an increase in their selling price. A majority claims that price for them has either remained the same or actually decreased, due primarily to market demand. As supply became erratic following the net ban, fish houses shifted to other fish.

Most fish house personnel, or 58 percent, do not believe that the net ban has increased fish stocks, and 67 percent disagree that it has decreased by catch. Many respondents disputed the ecological effects of the net ban, arguing that net fishing in the Florida Keys never depleted inshore stocks and only rarely contained by catch. Instead, they believe that net fishers are among the most selective commercial users, especially since their nets can be easily destroyed by marine mammals or turtles.

Net Fisher Results

General and demographic information Most of the net fishers we surveyed were older than 40 years (72 percent) and Anglo-American. Only 10 percent were Hispanic/Cuban fishers, even though greater diversity in the general fisheries of the region exists (Milon *et al.* 1997). Greater than half of the fishers surveyed had been net fishing in the Florida Keys for more than 20 years, and 20 percent had net fished less than 10 years.

The Lower and Middle Keys net fishers comprised a majority, or 97 percent, of the sample. Almost 57 percent were based in the Key West/Stock Island area and Big Pine Key. Another 37 percent of the respondents were from the Middle Keys island of Marathon. Only 6 percent were from the Upper Keys. The skewed distribution of net fishers in the Lower and Middle Keys is attributable to the net fishing grounds in those regions. Everglades National Park represented the only shallow area suitable for net fishing in the Upper Keys and was closed to commercial fishing in 1986 (MFC 1993).

1994 vs. 1996 investments in fishery gear and maintenance Net fishers changed a majority of their investment profiles following the net ban, indicating a shift of effort into other fully exploited fisheries. The total value of vessel investment in the fishery declined from over \$3 million in 1994 to just over \$2.6 million in 1996. Three respondents each reported selling one of their vessels in that time period. The average value of vessels decreased from 1994 to 1996 as well, declining 14.3 percent in that period.

Table 1
1994 versus 1996 Investments

Investment	1994 average cost	1996 average cost	Percent change
1.Vessel(s)	106,603	91,413	-14.3
2.Net(s)	53,779	42,135	-21.7
3.Lobster traps	18,390	21,007	+14.2
4.Stone crab traps	20,611	24,082	+16.8
5.Hook-and-line gear	1,228	1,133	-7.7

Table 2
1994 versus 1996 Gear Totals

Gear	1994 average total	1996 average total	Percent change
1.Net(s)	7.9	5.7	-27.8
2.Lobster traps	1,103	1,189	+7.8
3.Stone crab traps	1,377	1,491	+8.3

Table 3
1994 versus 1996 Maintenance Costs

Maintenance	1994 average cost	1996 average cost	Percent change
1.Dockage	3,662	3,647	-0.4
2.Vessel maintenance	10,759	12,654	+17.6
3.Net maintenance	4,992	4,213	-15.6
4.Trap maintenance	5,786	8,892	+53.7

Changes in gear investments depended on the gear type and the catch targeted. As expected, the average number of nets and net costs declined from 1994 to 1996. Fishers held a total of 120 nets in 1996, compared to 231 in 1994. Similarly, the average investment in nets declined from \$53,779 in 1994 to \$42,135 in 1996. Interestingly, a majority of the respondents, or 63 percent, did not sell their nets as part of the net buy-back program (Barnes, 1995; Kahn, 1995). Instead, they allowed the nets to decay in storage areas and lots, arguing that they would rather have their nets "rot" than sell them to the government for a low value.

The number of net fishers from the sample in the spiny lobster fishery declined from 83 percent in 1994 to 77 percent in 1996. However, the average number of trap investments and traps increased by 14.2 percent and 7.8 percent. Therefore, net fishers did invest moderately in the lobster industry following the net ban. Their entrance into the fishery may, however, have been impeded by the limited-entry structure of the Spiny Lobster Trap Certificate Program (Milon *et al.* 1998; Hunt 1994). Also, since trap certificate prices have increased substantially (from \$2-5 in 1992 to over \$50 in 1997) since the program's inception in 1991 (Milon *et al.* 1998; Shivlani and Milon, 1998), the moderate increase in traps may represent a much higher investment than indicated by the changes in trap counts.

Unlike the spiny lobster fishery, the number of net fishers involved in the stone crab industry did not decrease following the net ban. However, the percentage did not increase either, due primarily to a Marine Fisheries Commission moratorium placed on stone crab licenses in 1995 (Florida Statutes 370.13 (6) (a)). Over 83 percent of the sample fished for stone crab in 1994 and 1996. But, the average number of traps increased by 8.3 percent during that time, and the average investment in the fishery increased by almost 17 percent. Therefore, although no new net fishers entered the stone crab industry, those that fished stone crab prior to the net ban considerably increased their effort in the fishery.

Finally, maintenance costs changed after the net ban. In 1994, the respondents spent an average of almost \$5,000 on net maintenance. That average total dropped by 16 percent in 1996, to \$4,213. Conversely, the average for trap maintenance increased by almost 54 percent from 1994 to 1996. Although costs such as vessel maintenance may not demonstrate the shifts in costs since the net ban, the trap and net maintenance costs do suggest that net fishers have transferred their efforts into traps since the net ban.

1994 vs. 1996 catch profiles Catch profiles changed for several after the net ban. Refer to Table 4 for poundage totals for individual fisheries. Trap fishery totals were similar between 1994 and 1996, although the catch-per-unit-effort (CPUE) did decline in both the lobster and stone crab fisheries. Also, no major changes occurred in the catch profiles of reef fish, pelagics, or king mackerel. King mackerel catch declined from 565,500 pounds in 1994 to 412,500 in 1996; however, that was due to the fishery closing after reaching total allowable catch (MSAP, 1998).

Table 4
1994 versus 1996 Catch and User Totals

Fishery	Total Catch*		CPUE**		USER TOTAL	
	1994	1996	1994	1996	1994	1996
1. Lobster	464,200	428,900	16.8	15.7	23	22
2. Stone crab	128,400	113,000	4.2	3.4	21	17
3. Reef fish	37,250	41,750	142.2	203.7	10	8
4. Pelagics***	8,500	6,000	146.6	222.2	4	2
5. King mackerel	565,500	412,500	5,707	4,532.9	12	13
6. Spanish mackerel	1,171,600	41,000	3,376	1,138.9	18	5
7. Baitfish	1,729,700	501,700	2,089	2,866.9	10	3
8. Pompano	99,800	16,500	397.6	311.3	11	3

*Total catch estimated in number of pounds.

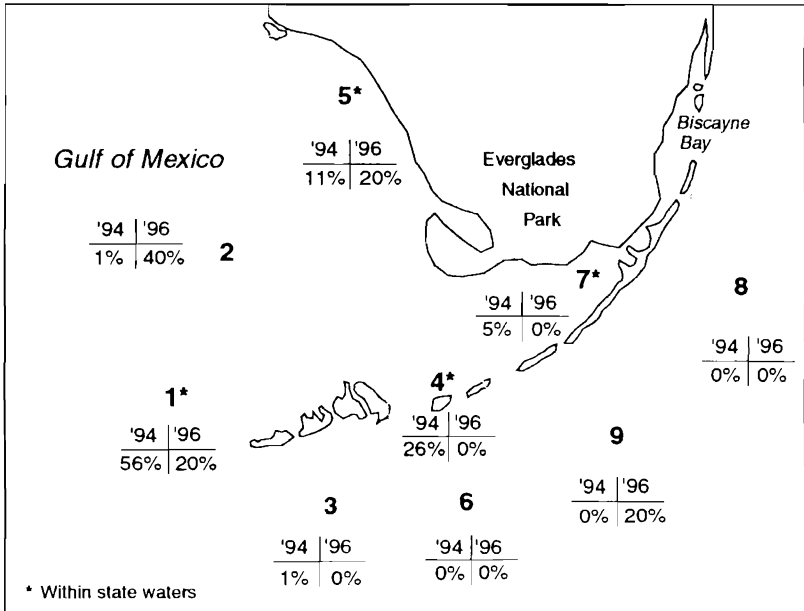
**CPUE for lobster and stone crab fisheries refers to pounds per trap per season; all other CPUE estimates are based on the number of pounds landed per trip.

***Pelagics refers to offshore species, such as dolphin (*Coryphaena hippurus*), cobia (*Rachycentron candum*), and tunas.

The harvest of all inshore net fish declined considerably after the net ban. The baitfish 1996 total declined to less than a third of the 1994 total, and the number of fishers in the sector decreased from 10 to 3. Three fishers landed only 16,500 pounds of pompano in 1996, compared to the 99,800 pounds landed by 11 fishers in 1994. However, the most precipitous decline was observed in Spanish mackerel landings. Harvest plummeted to 41,000 pounds in 1996, from almost 1.2 million pounds in 1994. Of the 18 users in the fishery in 1994, only 5 fished Spanish mackerel in 1996. In 1995-96, the total allowable catch for Spanish mackerel in the Gulf of Mexico was 8.6 million pounds (MSAP 1998). Commercial landings that year approximated less than 1.1 million pounds, down from 2.5 million pounds in 1994-95 (the year prior to the net ban). Total catch of the Gulf stock of Spanish mackerel in 1995-96 was only 2.65 million pounds.

Because the ban relegated net fishers from inshore waters, the respondents who did net fish in 1996 did so in federal waters. As Figure 2 demonstrates, more than half of the Spanish mackerel landed in 1994 was caught within state waters west of Marathon. Net fishers also harvested a significant percentage within state waters in the Middle Keys. Since the net-ban, the effort has shifted primarily to federal waters in the Gulf of Mexico. Unlike in 1994, fishers could not

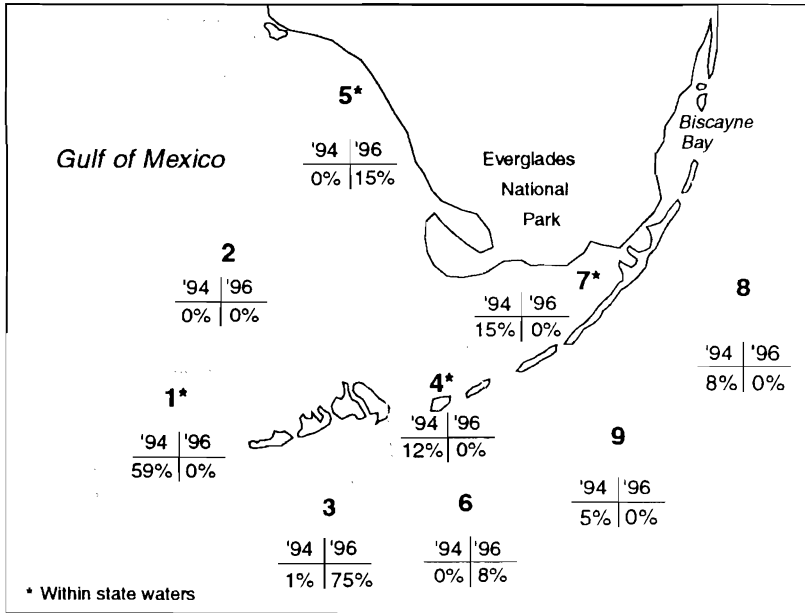
Figure 2
Percentage of Spanish Mackerel Catch
1994 and 1996



target inshore Middle Keys waters. Figure 3 shows that the respondents targeted baitfish, harvested only with nets, almost exclusively in state waters in 1994. After the net ban, fishers moved into offshore waters both north into the Gulf of Mexico and south into the Atlantic Ocean. Finally, pompano catch patterns (Figure 4), which were primarily inshore in 1994, shifted offshore after the net ban.

Fishers' shift to other areas and gear has meant either higher operating costs or declining catch. Interestingly, the only net fishery in which operating costs have increased since the net ban has been the baitfish industry. Trip costs have increased in that fishery from an average of \$94.5 per trip in 1994 to \$147.3 per trip in 1996. Operating costs have not increased in the Spanish mackerel (\$263.9/trip in 1994 versus \$226/trip in 1996) and pompano (\$159.6/trip in 1994 versus \$121.3/trip in 1996) fisheries. However, a major reason for lower operating costs in these fisheries is due to fewer mates employed per trip. Several mackerel fishers explained that they no

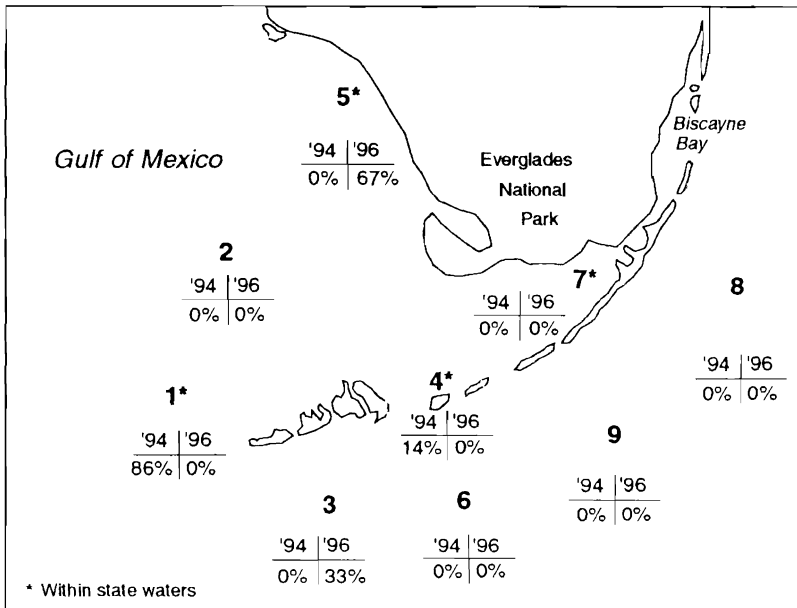
Figure 3
Percentage of Bait Fish Catch
1994 and 1996



longer take 4 or 5 mates on Spanish mackerel trips because of the erratic supply in offshore waters; this greatly lowers operating costs but also affects the ability of the fishers to harvest large totals. Also, trip costs are lower in these fisheries because more fishers now utilize other, cheaper gear to target their catch, including hook and line gear. Even though the operating costs of fishing alternate gear and utilizing less labor are lower, these changes have not improved the overall CPUE.

Fishers's perceptions on the net ban process and its outcome in the Florida Keys The net fishers surveyed were generally disappointed with the net ban process, and particularly with the perceived negative or indifferent role the state and local governments played in the process. Over 93 percent of the respondents disagreed that the MFC or the Department of Environmental Protection assisted net fishers during the net ban process, and 70 percent disagreed that local government agencies in Monroe County did so. The only group that

Figure 4
Percentage of Pompano Catch
1994 and 1996



the respondents agreed assisted them were commercial fishing organizations (76 percent). Most respondents, over 70 percent, also agreed that the government agencies did not provide their group a way to participate in the process. As mentioned previously, a majority of the net fishers did not sell their nets, as 93 percent of them believed that the net buy-back program did not provide fair market value.

The respondents did participate in a variety of ways to prevent the passage of the net ban, including by writing letters to government officials (53 percent), contributing funds to fishing organizations (67 percent), attending net ban meetings (80 percent), campaigning within the community (67 percent), and voting on the amendment (90 percent). They also remained informed during the process, receiving information mainly from fishing organizations (67 percent), fish houses (57 percent), newspapers (63 percent), and from within the fishing community (53 percent). Only a minority of the respondents, 33 percent, reported receiving information from government fishery

agencies. The high percentages on the levels of participation and types of information suggest that net fishers in the Florida Keys were aware of the net ban amendment and did attempt to prevent its passage. Many fishers claimed that they campaigned actively within the community, picketing along popular streets and outside government agencies. Others stated that they attended various meetings across the State, and that they corresponded frequently with government officials, commercial fishing organizations, and recreational fishing groups. However, despite their efforts, the net ban amendment passed overwhelmingly in Monroe County, where 71 percent of the electorate voted in favor of the ban (Lipuma and Meltzoff 1997).

Almost 97 percent of the net fishers did not believe that the net ban was passed due to declining inshore fish stocks, and 83 percent agreed that the amendment will not increase such stocks in the Florida Keys. They perceived the net ban as a way to re-allocate resources to the recreational sector, as over half of the respondents felt that re-allocation was the ban's primary purpose. Sixty percent believed that the recreational fishing group will be the ban's primary beneficiary. Since the net ban, most fishers (80 percent) agreed that imported, rather than alternate, species have compensated for product that were previously harvested locally.

Over a third, or 37 percent, of the fishers surveyed no longer net fish, and 50 percent of the sample reported moving further offshore to net in federal waters. Over three quarters of the respondents, or 77 percent, have moved or intensified their efforts in other fisheries, particularly stone crab and spiny lobster. Ten percent of the sample has taken up other activities to supplement their fishing income, such as seasonal, land-based jobs. In 1994, net fishing accounted for an average of 42 percent of the fishers's income. Since the net ban, that average dropped to 11 percent.

Regarding enforcement, more than half of the fishers surveyed believe that some of the previous net fishers illegally net fish in the Florida Keys. Most fishers (43 percent) also concede that it is likely that a person net fishing illegally would be apprehended by the authorities. However, enforcement is a major issue, as 60 percent of the respondents agree that illegal activities have increased since the net ban.

Existing Fishery Management Plans, Regulations, and Closed Areas

To be most effective in improving stocks while minimizing fishers' sacrifices, the net ban should have been coordinated with, and built

upon the experience of, ongoing management programs. Unfortunately, that was not the case.

A variety of authorities govern fisheries management in the Florida Keys, including the state MFC, two federal fishery management councils, three national parks, and three national marine sanctuaries. The MFC and the fishery management councils jointly manage the Spanish mackerel stocks. Since the fishery's decline in the 1980's, the groups have implemented regulations to improve stocks. These included a 3.5 inch minimum net mesh size, implemented in 1985, and subsequent quota limits (Marston and Nelson 1994). By 1994, the spawning stock ratio (SPR), used to determine the health of a fishery, was over 40 percent, up from a low of 10 percent in 1985. Commercial catch in both the Gulf of Mexico and South Atlantic fisheries has been under the allocation totals since the 1989-90 season. In the season following the net ban, the South Atlantic and Gulf of Mexico combined commercial harvest was 2.55 million pounds (MSAP 1998). The total allowable catch for the commercial sector that season was 8.69 million pounds.

The MFC also manages pompano and related species (Florida Administrative Code, Chapter 46-35). Although there are no commercial bag limits on pompano, the harvest of the species has declined considerably since the net ban. In 1990, Florida's commercial landings were over 964,000 pounds (Personal communication, NMFS, Fisheries Statistics and Economics Division). In 1996, the landings totaled only 270,000 pounds. Many recreational fishers argue that the net ban has increased stocks of pompano, which were otherwise decimated by commercial netting (Thoemke 1997), although without scientific evidence. In the Florida Keys, net fishers reported that pompano is primarily a migratory species present within inshore areas only during the winter (DeMaria 1996). They did not rely on pompano as a primary target and would readily have accepted bag or trip limits, instead of a gear ban (Personal communication, A. Iarocci, MCCF).

Baitfish, the only other group of species affected by the net ban in the Florida Keys, are regulated under Chapter 46-50 of the Florida Administrative Code. Species such as blue runners (*Caranx crysos*) and thread herring (*Ophisthonema oglinum*) were among the most popular bait species targeted by the respondents. Florida landings of thread herring decreased from a 5.6 million pounds in 1994 to 3.8 million pounds in 1996 (Personal communication, NMFS, Fisheries Statistics and Economics Division). Another major bait species in the region was ballyhoo. Although statewide landings did

not decrease significantly following the net ban, our respondents reported losing over a third of their ballyhoo catch. Ballyhoo is also partly managed by the Florida Keys National Marine Sanctuary, which requires permits to net ballyhoo within its no-take zones (NOAA 1996).

Apart from the regulations managing each net fishery, other restrictions placed on net fishing protect individual stocks. For instance, the King mackerel fishery in state waters was limited to hook and line gear in 1984, moving net fishing for King mackerel into federal waters (Florida Administrative Code Chapter 46-12). In 1986, the MFC banned the use of stab (sink) nets to catch reef fish, which effectively eliminated snapper/grouper net fishing in the Florida Keys (Florida Administrative Code Chapter 46-14). In 1988, the state of Florida prohibited fishers carrying gill or trammel nets from possessing marlin, sailfish, or spearfish on board their vessels (Florida Administrative Code Chapter 46-33).

Furthermore, commercial fishing activities are disallowed in several parts of the Florida Keys, providing even more protection for stocks. The Dry Tortugas National Park, Everglades National Park, and Biscayne Bay National Park all restrict commercial fishing (including netting) within their boundaries. Ironically, these and all national parks allow recreational fishing. Finally, since 1997, the Florida Keys National Marine Sanctuary has excluded commercial fishing from 4,921 hectares of mostly reef habitat.

Most of the species affected by the net ban were already protected under existing management regimes. Spanish mackerel, pompano, and baitfish were all addressed under separate, MFC management plans. Other species that could be vulnerable to net fishing, such as reef fish, were also protected. Finally, the Florida Keys contains a wide spectrum of federal, state, and locally designated areas that would ensure another layer of protection. But, even with all these pre-existing measures and areas, the net ban was implemented in the Florida Keys, as in the rest of Florida, as a blanket restriction voted upon by the general public.

Conclusions

From a fishery management perspective, the net ban in the Florida Keys was inefficient as a means of restricting fishing effort and unfair in its highly selective target of fishers. Most of the species landed by nets within state waters were previously managed by government agencies, and none of the net-caught species within nearshore waters

were seriously over-exploited. In fact, net fishers harvested only Spanish mackerel and baitfish in large quantities; the other species, including pompano and mullet, were targeted according to their seasonal abundance and mostly on a subsistence basis (DeMaria 1996). The net ban reduced commercial harvest of these species (drastically in the case of Spanish mackerel), and forced remaining users into offshore waters and other fisheries. While net fishers could not enter the limited-entry, spiny lobster and stone crab fisheries, those individuals who were already participants in these fisheries generally increased their effort following the net ban. Although the overall effect of the net ban in the Florida Keys was minor, both in terms of the number of individuals affected and the amendment's economic impact, the study demonstrates that such indiscriminate gear restrictions can increase effort within the affected fisheries (by offshore fishing), displace fishers into other fisheries, and reduce local production.

A secondary effect of such restrictions that should be explored in greater detail is the reallocation of the affected fishery resources. Anecdotal reports in recreational fishing literature suggest that recreational fishers are catching more species previously caught by nets, including pompano (Stubbs 1998; Thoemke 1997). In 1994-95, commercial fishers landed 2.5 million pounds of Spanish mackerel in the Gulf of Mexico, compared to 1.6 million pounds landed by the recreational sector. Since the net ban, the recreational sector has landed more pounds of that stock than has the commercial sector. In 1996-97, recreational fishers landed well over 2 million pounds, compared to the commercial catch of only 617,000 pounds. Although stocks such as mullet have definitely improved since the net ban (Thoemke 1997), other species that were not over-fished have become less accessible to commercial fishers and more available to the recreational fishing sector.

Commercial fishing groups argued during the amendment process that the net ban was only a means by which the recreational sector intended to reallocate fishery resources (Barnes 1995). Leaders of the recreational groups countered that the ban was a resource issue, based on the protection of marine resources. However, the MFC estimated that the ban would result in a "significant reallocation of fishery resources from the nearshore net fishery to other commercial and recreational users" (MFC 1993). A report submitted to the Florida Conservation Association, the primary recreational group supporting the net ban amendment, argues that the recre-

ational use of nearshore fishery resources is more valuable than the commercial net fishery, and that should be "sufficient to justify a reallocation of common property resources to the public for recreation and tourism purposes". If the resources are simply made available to a competing user group rather than protected from over-exploitation, then decision-makers need to review the equity of such gross restrictions.

References

- Anderson, L. G. (1986) *The Economics of Fisheries Management*. Baltimore, MD: Johns Hopkins University Press.
- Barnes, J. C. (1995) "Save Our Sealife or Save Our Seafood? A Case Study of Conflict in the Management of Florida's Marine Resources". In *Urban Growth and Sustainable Habitats: Case Studies of Policy Conflicts in South Florida's Coastal Environment*, ed. D. Suman, M. Shivlani, and M. Villanueva, 69-91. Miami, FL: MAF/RSMAS/ University of Miami.
- DeMaria, K. (1996) *Changes in the Florida Keys Marine Ecosystem Based upon Interviews with Experienced Residents*. Key West, FL: The Nature Conservancy.
- Ditton, R. B. (1994) *A Social and Economic Assessment of Major Restrictions on Marine Net Fishing in Florida: A Report Prepared for the Florida Conservation Association, Tallahassee, Florida*. Tallahassee, FL: Florida Conservation Association.
- Hunt, J. H. (1994) "Status of the Fishery for *Panulirus argus* in Florida", In *Spiny Lobster Management*, ed. B. F. Phillips, J. S. Cobb, and J. Kittaka, 158-167. Oxford, UK: New Fishing Books.
- Jones, R.P. (1995) *A Commentary on the Commercial Fishing Net Ban in Florida: Known as Amendment 3, Limited Marine Net Fishing, Article 10, Section 16, Florida Constitution: Enacted by Plebiscite on November 8, 1994*. Tallahassee, FL: Southeastern Fisheries Association, Inc.
- Kahn, L. (1995) "Fishers Begin to Sell Their Nets". *Keynoter*, October 11, 1995.

- Lipuma, E., and S. K. Meltzoff. (1997) "The Crosscurrents of Ethnicity and Class in the Construction of Public Policy". *American Ethnologist* 24 (1): 114-131.
- Mackerel Stock Assessment Panel (MSAP). (1998) *1998 Report of the Mackerel Stock Assessment Panel*. Tampa, FL: Gulf of Mexico Fishery Management Council.
- Marine Fisheries Commission. (1993) *A Report to the Legislature: A Study of Potential Impacts of the Save Our Sealife Net Ban Proposal*. Tallahassee, FL: MFC.
- Marston, R. Q., and R. S. Nelson. (1994) *New Directions in the Management of Florida's Marine Fisheries: A Report to the Florida Marine Fisheries Commission Following Passage of Article X, Section 16 of the Constitution of the State of Florida*. Tallahassee, FL: MFC.
- Milon, J. W., Larkin, S. L., Lee, D. J., Adams, C. M., Ehrhardt, N. M., and K. J. Quigley. In Press. *The Performance of Florida's Spiny Lobster Trap Certificate Program*. Technical Paper. Gainesville, FL: Florida Sea Grant.
- Milon, J.W., D. O. Suman, M. Shivlani & K.A. Cochran. (1997) *Commercial Fishers' Perceptions of Marine Reserves for the Florida Keys National Marine Sanctuary*. Gainesville, FL: Florida Sea Grant Technical Paper-89.
- National Oceanic and Atmospheric Administration (NOAA). (1996) *Florida Keys National Marine Sanctuary Final Management Plan/ Environmental Impact Statement: Volume I of III, Management Plan*. Washington, DC: DOC/NOAA/NOS/OCRM/SRD.
- Personal communication, A. Iarocci. Monroe County Commercial Fishermen, Inc (MCCF). March 24, 1997.
- Personal communication, National Marine Fisheries Service (NMFS), Fisheries Statistics and Economics Division. May 20, 1998.
- Shivlani, M. P., and J. W. Milon. 1998. "Socio-cultural Perceptions of Commercial Fishers on the Spiny Lobster Trap Certificate Program

in the Florida Keys". In *Proceedings of the 16th International Conference of the Coastal Society, July 12-15, 1998, Williamsburg, VA*, pp. 363-372.

Stubbs, N. (1998) "Skip 'Em Up: Pompano on the Flats". *Florida Sportsman*, February 1998: 22-29.

Thoemke, K. (1997) "Fishing for the Truth: Is Florida's Net Ban Working?". *Sport Fishing*, June 1997: 62-66.

Wadlow, K. (1995) "Estimated Net-Ban Cost: \$55 Million". *Keynote*, February 4, 1995.