

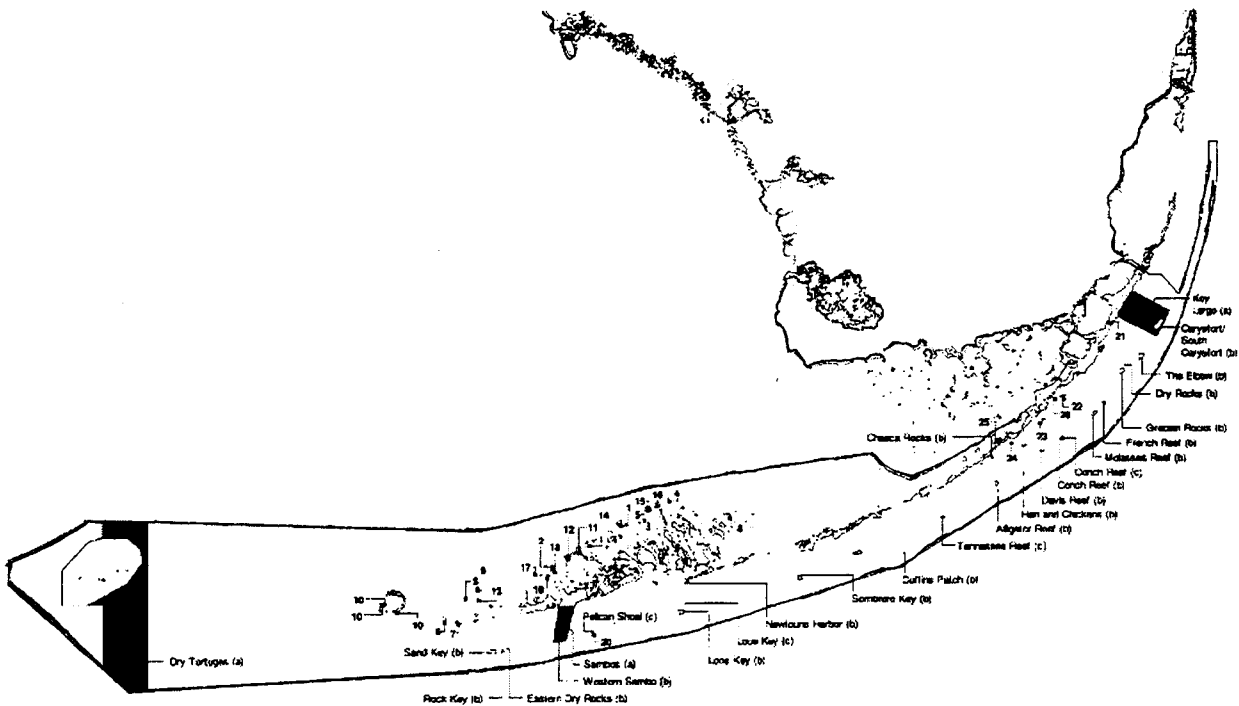
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Commercial Fishers' Perceptions of Marine Reserves for the Florida Keys National Marine Sanctuary

by

J. Walter Milon, Daniel O. Suman, Manoj Shivlani and Kathryn A. Cochran





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**COMMERCIAL FISHERS' PERCEPTIONS OF
MARINE RESERVES FOR THE
FLORIDA KEYS NATIONAL MARINE SANCTUARY**

by

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EXECUTIVE SUMMARY

The marine environment of the Florida Keys supports unique biological communities and attracts millions of visitors each year. National concerns about the sustainability of the Key's environment prompted the U.S. Congress to enact the 1990 Florida Keys National Marine Sanctuary Act (Public Law 101-605). The Act authorized the National Oceanic and Atmospheric Administration (NOAA) to develop a comprehensive management plan to protect a 2,800 square nautical mile area in the southernmost reaches of Florida defined as the Florida Keys National Marine Sanctuary (FKNMS).

In March 1995, the NOAA published a Draft Management Plan for the FKNMS that included provisions for three "replenishment reserve" areas (Key Largo (8,000 hectares), Sambos (3,000 hectares), and Dry Tortugas (38,000 hectares)) and nineteen smaller Sanctuary Preservation Areas. These areas were designed to protect important biological habitat and enhance fishery stocks by prohibiting consumptive activities such as fishing and salvaging. Proponents of marine reserves cite various benefits including biodiversity protection, recreation, scientific research, and cultural preservation. Reserves could also enhance fishery stocks by increasing spawning potential and increase total catch through spillover effects.

This report presents the results of a survey in the Florida Keys of commercial fishers' perceptions and attitudes about NOAA's Draft Management Plan and the proposed replenishment reserves. Personal interviews were conducted with 337 fishers to identify fishing effort and catch (by species) within the FKNMS, participation in the Plan development process, and perceptions and attitudes.

Survey respondents indicated that a major portion of their total catch was harvested within the boundaries of the FKNMS. For the total sample, over 85 percent of spiny lobster catch, 92 percent of reef fish catch, and all of the tropical fish and sponges catch were caught in the FKNMS. Stone crabs, mackerels, and other pelagic species were generally harvested outside the FKNMS boundaries.

About 50 percent of the respondents had participated, in some way, in the FKNMS Plan development process. A large majority believed that newspapers, local organizations, and other fishers were the most useful sources of information about the Plan.

On the effects of the proposed reserves, a large majority did not believe that stocks of commercially important species such as spiny lobster and reef fish would increase *outside* the reserves and the effects on specific stocks within the Keys would be insignificant. Most believed that the primary effect would be to conserve and protect corals, fishes, and other marine life *within* the boundaries of each reserve. Based on these perceptions, respondents were nearly unanimous in their opinion that commercial and recreational fishers *would not* be the primary beneficiaries of the proposed reserves and that there *would not* be a positive long-term effect on the economy in the Keys. Recreational divers were generally perceived as the primary beneficiaries; only a small minority of respondents viewed the proposed reserves as an effective way to reduce user conflicts or to restore coral reefs.

These concerns about the proposed reserves were consistent with the finding that a large majority of respondents rejected the idea of establishing reserves anywhere in the Florida Keys. Although one-fourth of the sample did express some support for reserves somewhere in the Keys, support declined when specific locations for a reserve were cited. Over three-fourths of the respondents stated they *did not* support establishing the FKNMS. Overall, the survey results suggested strong differences in expectations between commercial fishers in the Keys and advocates of marine reserves for fisheries management.

The Final Management Plan for the FKNMS, released by NOAA in September 1996, contained modifications reflecting commercial fishers' concerns. In the Final Plan, the Key Largo reserve was dropped and the Dry Tortugas reserve was deferred for two years. Also, the term "replenishment reserve" was changed to "ecological reserve" to emphasize that the purpose of reserves was to restore natural ecosystem dynamics and habitat rather than to enhance fishery stocks.

The final version of the Plan was published in the *Federal Register* in June 1997 and contained provisions requested by the Governor of Florida to evaluate the effects of the marine reserves. An integral part of this evaluation should include an assessment of whether commercial fishers' perceptions of reserves change over time to provide an understanding of the impacts on the commercial fishing industry in the Keys.

COMMERCIAL FISHERS' PERCEPTIONS OF MARINE RESERVES FOR THE FLORIDA KEYS NATIONAL MARINE SANCTUARY

by

J. Walter Milon, Daniel O. Suman, Manoj Shivlani and Kathryn A. Cochran*

1. Introduction

The coral reefs and tropical marine environment of the Florida Keys support rich biological communities and attract millions of visitors each year (Leeworthy). After a series of natural and human-induced events raised national concerns about the sustainability of the Keys' environment, the U.S. Congress and President Bush approved in 1990 the Florida Keys National Marine Sanctuary and Protection Act (Public Law 101-605).¹ The Sanctuary stretches 200 miles from north of the John Pennekamp Coral Reef State Park in the upper Keys to west of the Dry Tortugas. It encompasses 2,800 square nautical miles and is the second largest marine sanctuary in the U.S.

The Act authorized the National Oceanic and Atmospheric Administration (NOAA) to develop a comprehensive management plan to protect the Sanctuary's resources. In March 1995, the NOAA published a Draft Management Plan (U.S. Department of Commerce 1995) that included ten action plans designed to manage and protect the natural and historic resources of the Sanctuary. Included among these action plans were proposals to "zone" specific marine areas. These zones would create *marine reserves* to protect important biological areas such as coral reefs by prohibiting consumptive activities such as commercial and recreational fishing and salvaging.²

The Draft Management Plan included three areas designated "replenishment reserves" to provide natural spawning, nursery, and residence habitat for species associated with coral

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¹Suman provides a review of events and controversies prior to the Act.

²A copy of the regulations governing these reserves in the Draft Management Plan is provided in Appendix B.

reefs and to protect ecosystem functions in contiguous habitats (U.S. Department of Commerce 1995, Vol. I pp. 46). The names and areas for these reserves (U.S. Department of Commerce 1995, Vol. I, pp. 264) were:

Key Largo	8,000 hectares
Sambos	3,000 hectares
Dry Tortugas	38,000 hectares

In addition, the Plan proposed 19 "Sanctuary Preservation Areas" (SPAs) to protect shallow, heavily used coral reefs and minimize user conflicts. The total area encompassed by the SPAs was 1.55 hectares (U.S. Department of Commerce 1995, Vol. I, pp. 265).

The Draft Plan also included Wildlife Management Areas, Existing Management Areas, and Special-Use Areas. These areas were not expected to have significant impacts on any user groups and are not discussed in this report. For more detail on these areas, see U.S. Department of Commerce 1996, Volume I, pp. 255-309.

A map from the Draft Plan showing the location of the reserves and SPAs is provided as Figure 1. The combined areas of the reserves and SPAs would be approximately five percent of the 9,515 km² within the Sanctuary (U.S. Department of Commerce 1995, Vol. I, pp. 264).

One of the activities that would be impacted by the proposed replenishment reserves and SPAs is commercial fishing. In 1995, the Florida Keys (Monroe County) had the largest and most valuable shellfish and finfish landings in Florida, accounting for \$68.9 million in dockside value (Florida Department of Environmental Protection). A large portion of this total value was comprised of spiny lobster and finfish such as groupers and snappers that are highly dependent on coral reef habitats. In the short run, it would be expected that harvesting restrictions would reduce commercial fishery landings in the Florida Keys. However, proponents of marine reserves argue that, in the long run, reserves will enhance total fishery stocks leading to increased landings (Ballantine; Plan Development Team).

Marine reserves can enhance total fishery stocks by increasing spawning potential through increased population abundance and size structure (Bohnsack and Ault). Total catch can increase through a spillover effect whereby fish and other organisms emigrate over a

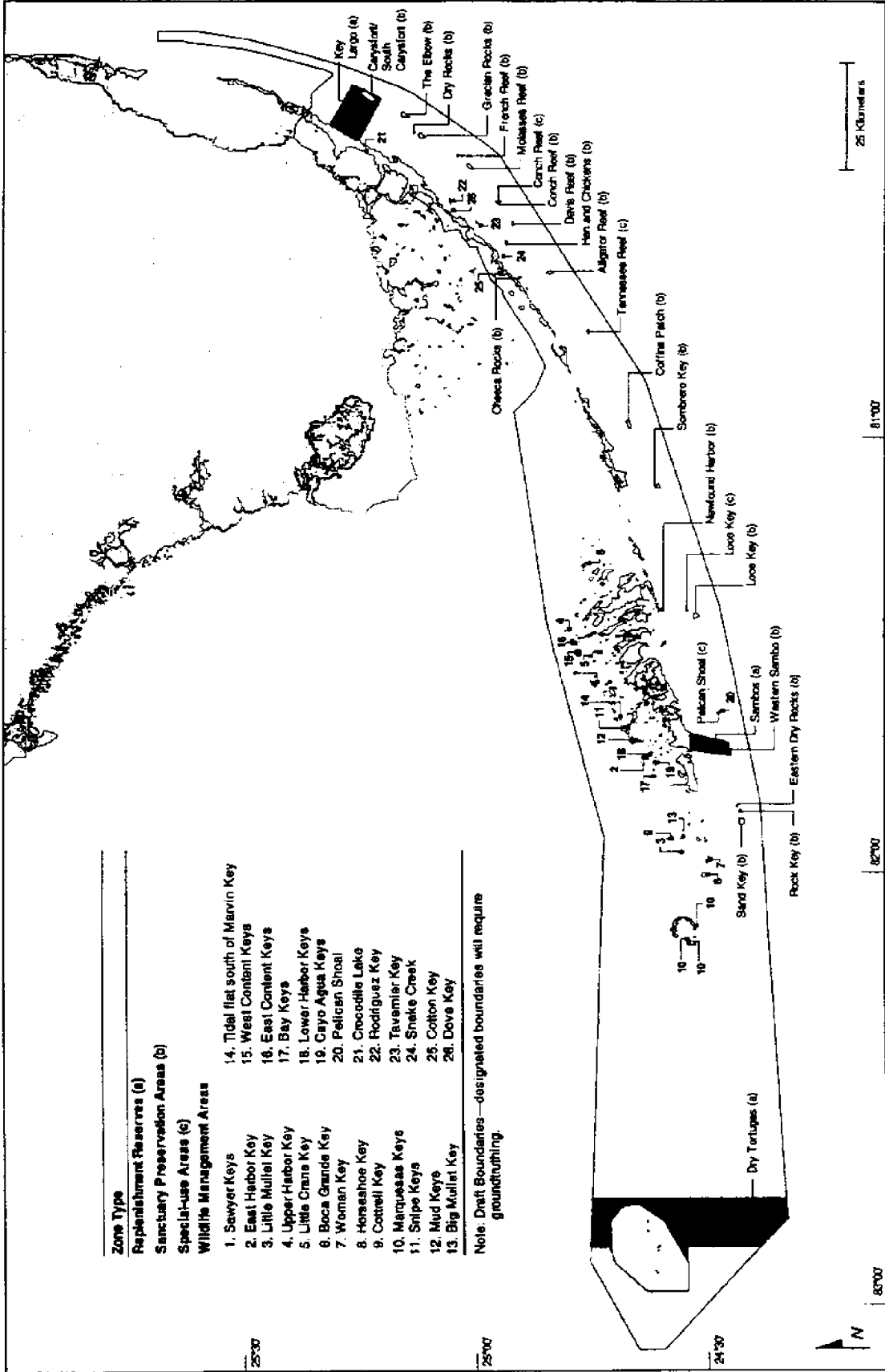


Figure 1. Location of Proposed Replenishment Reserves, Sanctuary Preservation Areas, and Other Zones in the Draft Management Plan (U.S. Department of Commerce 1996, Vol. II, pp. 137).

reserve boundary into a fishing area. The export of larvae from a reserve may enhance recruitment into regional fishery stocks. Also, marine reserves may provide a variety of other benefits including biodiversity protection, recreation, scientific research, and cultural preservation (Hoagland et al.; Jones; Norse).

Previous studies on the impact of marine reserves focused primarily on their biological consequences (e.g. Carr and Reed; Dugan and Davis; Polacheck; Rowley). An equally important yet relatively neglected topic is the social and economic impact of reserves on commercial and recreational user groups and the general public. Wolfenden et al. used a general population survey to evaluate support for marine reserves in New Zealand. The study concluded that a sizable majority supported the concept of marine reserves but support decreased the closer a proposed reserve area was to a respondent's residence. This is the classic NIMBY (Not In My Backyard) response to new land uses that individuals perceive as undesirable. Bohnsack (1993), drawing on anecdotal information from areas with established marine reserves, has hypothesized that attitudes and perceptions about marine reserves will change from initial disapproval to approval as the effects of a reserve are observed by users.

The purpose of this report is to present the results of a survey of commercial fishers in Monroe County during the latter part of 1995 and early 1996. The survey measured commercial fishers' perceptions and attitudes about the Draft Management Plan for the Florida Keys National Marine Sanctuary (FKNMS) and, in particular, proposed areas for replenishment reserves. Section 2 provides a brief overview of the Plan development process. Section 3 describes the questionnaire and survey methods used in personal interviews with 337 commercial fishers based in the Upper, Middle and Lower Keys. A socioeconomic profile of the interviewees includes descriptive information on personal characteristics (e.g. age, ethnicity, and education) for the total sample and by region within the Keys. Section 4 provides an analysis of reported fishing effort and catch (by species) within specific areas encompassed by the Sanctuary as well as activity reported in the designated reserve areas. Section 5 summarizes respondents' perceptions of the Sanctuary Management Plan development process in terms of their participation in the process and the usefulness of the information provided. Section 6 reports respondents' expectations about the effects and benefits of the Sanctuary zones and their level of support for the zones. Finally, Section 7

provides a summary of commercial fishers' responses to the proposed reserves from this survey. We conclude with a short postscript on the fate of the proposed reserves in the Final Sanctuary Management Plan.

2. Sanctuary Management Plan Development³

The Florida Keys National Marine Sanctuary and Protection Act of 1990 mandated that the NOAA develop a comprehensive management plan for the Sanctuary in coordination with federal, state and local government officials and a public advisory council (Suman). This was a complex undertaking due to the lack of coordination among federal, state and local agencies in the Florida Keys prior to the plan development process (Bohnsack; Suman). To combat this lack of coordination, the NOAA developed the plan using principles of integrated coastal management (Ehler and Basta) and consultative management (McCay and Jentoft) which sought to encourage direct participation of managers, planners, scientists, and the public throughout the planning process. Before a comprehensive plan could be developed, the NOAA had to identify the issues affecting the natural and cultural resources of the Sanctuary. The first official forums used to identify these issues were six public scoping meetings conducted in Florida and one in Washington, D.C. between April and May 1991. These meetings were designed to collect input on the scope of problems affecting the health of the region. The issues focused on water quality, physical impacts to marine habitats, the need for long-term research, declines in the abundance and health of marine resources, and the protection of cultural and historic resources. Prior to and during the meetings, the NOAA distributed questionnaires to the participants in order to identify and rank the issues. Written comments addressing the issues were also sought from the public. The process led to the identification of four priority issues: declining water quality, physical injury to resources, decline of marine resources, and user conflicts.

After the scoping meetings, the Core Group, comprising representatives from federal, state, and county agencies, was created to review the priority issues and oversee the development and implementation of the Sanctuary Management Plan (Suman, pp. 296-299). The Group reviewed more detailed issues which were combined to represent six major issue areas: boating, commercial and recreational fishing, recreation, land use, and water quality. For each issue, the Group determined the major impacts, causes, data requirements, data sources, and the lead agency to oversee the acquisition of data. Next, the issues and the data

³Parts of this section are based on information provided in Volume II, pp. 113-138, U.S. Department of Commerce 1996.

requirements were reviewed by resource managers and scientists, user groups, environmental groups, and other interested citizens. A series of technical workshops were also held in Miami and the Keys to further refine the issues between July 1991 and August 1992.

The Core Group continued to focus the formulation of the management strategies by developing description statements for the major issues. The issues were again regrouped to include: boating, commercial and recreational fishing, recreation and cultural/historical resources, land use, and water quality. These served as the framework for the Sanctuary Management Plan. Each description statement identified activities that may affect the quality and/or quantity of resources within the Sanctuary, and the problems that may arise from multiple-use conflicts. Each description also included a discussion of potential impacts to the habitat, species, users, and water quality.

The next phase in the Management Plan development process was the identification of strategies to implement the plan. The first work session on strategy development was in early 1992. The work session involved federal, state and local agency managers and scientists with Sanctuary management interests. The public was invited to attend as an observer. The session was divided into two parts: strategy identification and description, and strategy characterization. During the strategy characterization meetings, participants described the impacts the strategies might have if implemented. From the first work session a set of strategy description sheets were developed along with a set of impact characterizations for all high-priority strategies. The strategies were entered into a database and a list of strategies organized by issue and priority was produced. Throughout the management plan development process, these strategies were continuously revised and refined with additional comments from the Core Group, the Sanctuary Advisory Council (SAC), and the public. The SAC was created in 1992 as required by the 1990 Act to ensure public input into the Management Plan and to advise and assist the NOAA with the Plan's implementation. The SAC was a key factor in the planning process because it provided a linkage to the user communities including the dive industry, environmental groups, and commercial and recreational fishers (Suman, pp. 297).

The next phase in the management plan development process was formulation of a series of management alternatives and inclusion of the strategies in these alternatives. This was carried out in accordance with the requirements of the National Environmental Policy Act

of 1969 (NEPA) which was part of the Sanctuary's environmental impact assessment process. The Core Group developed management alternatives over the course of several working sessions. Input was also provided by public and private interests including agencies and departments of the federal, state, and Monroe County governments; national, state and local non-governmental organizations; industry and trade groups; the SAC; and the citizens of Monroe County.

The Group established five management alternatives representing different levels of regulatory control over Sanctuary resources and restrictions on use. Alternative I was the most restrictive and Alternative V (No Action) the least restrictive. Strategies were not exclusive to one management alternative; strategies included in Alternative IV were also represented in Alternatives II and III. Alternatives I and V were eliminated during the evaluation process because they would not adequately achieve the environmental and economic requirements set out in the 1990 Act. Alternative III was selected as the Preferred Management Alternative to achieve the proper balance of resource protection and facilitate compatible uses. The process used to select the Preferred Alternative involved the consideration of recommendations by the SAC, the Core Group, and the public.

A Draft Management Plan containing the Preferred Alternative III and Environmental Impact Statement for the FKNMS emerged in March 1995. A nine month public review of the Plan commenced in April 1995 when it was presented before a SAC meeting. The Draft Plan included ten action plans on channel marking, education, enforcement, mooring buoys, regulation, research and monitoring, submerged cultural resources, volunteers, water quality, and zoning. Info-Expos were conducted by NOAA staff in the Upper, Middle and Lower Keys which were designed to both provide information about the Plan and answer the public's questions. The SAC also established ten working groups, one for each action plan, to assist in public review of the Draft Plan. The purpose of these groups was to broaden public participation and input. There were also six public hearings held in Miami, Key Largo, Marathon, Key West, St. Petersburg, and Silver Spring, Maryland to review the draft. Over 6,400 statements with public comment on the Draft Plan were received during the nine month review period (U.S. Department of Commerce 1996, Vol.I, p. 9).

In September 1996, a Final Management Plan was released with major modifications to Preferred Alternative III to reflect public comments. The Final Plan was sent to Governor

Lawton Chiles and the Florida Cabinet for approval as required by the 1990 Act. Specific changes to the Plan approved by the Governor and Cabinet will be discussed in the final section of this report.

3. Survey Methodology and Respondent Profile

Questionnaire Design and Sample Selection

During the early part of 1995 the research team met with commercial fishers, representatives of Monroe County Commercial Fishermen, Inc., and the Florida Sea Grant extension agent in Key West. These discussions focused on the feasibility of eliciting detailed landings and financial information from commercial fishers in Monroe County and their perceptions of the Draft Management Plan. The research team decided that the complexity and sensitive nature of these topics required personal interviews with fishers. The team developed a draft questionnaire and made revisions based on comments from these individuals and field tests of the survey instrument. A copy of the final questionnaire is included in Appendix A to this report.

The 1994-1995 Saltwater Products License (SPL) file maintained by the Florida Department of Environmental Protection (FDEP) was used as the sample frame for the survey. Under Florida law, any person who wishes to sell fish or shellfish products must have a SPL. The file obtained from FDEP contained 2,430 SPL holders who reside in Monroe County. Of this total 1,438 (59.2 percent) reported on the SPL application form they were full-time fishers and 992 (40.8 percent) reported they were part-time fishers.

To evaluate the effects of location on perceptions of the Sanctuary Management Plan, SPL holders were classified into Upper, Middle, and Lower Keys groups based on their reported zip code. The cities and zip codes included in each regional group were:

Upper Keys -- Long Key (33001), Plantation (33036), Key Largo (33037),
and Tavernier (33070)

Middle Keys -- Marathon (33050), Marathon Shores (33051), and Key
Colony Beach (33052)

Lower Keys -- Key West (33040-42), Big Pine Key (33043), Summerland
Key (33044), and Ramrod Key (33045)

The number of SPLs by region within Monroe County is presented in the following tabulation. Commercial fishers who may fish in waters around the Florida Keys but who reside elsewhere were not included in this sample frame.

REGION	FULL-TIME	PART-TIME	TOTAL
Upper Keys	288	261	549
Middle Keys	423	228	651
Lower Keys	727	503	1,230
TOTAL	1,438	992	2,430

Based on a total of 2,430 SPL holders, a randomized sample size of 332 interviews was selected to achieve a sampling error of plus or minus 10 percent for the total sample. This total sample was then stratified into regional and full-/part-time status. This resulted in the following sample subgroup quotas for each region:

REGION	FULL-TIME	PART-TIME	TOTAL
Upper Keys	41	36	77
Middle Keys	58	31	89
Lower Keys	98	68	166
TOTAL	197	135	332

A total of 337 interviews were completed of which 199 (59.0 percent) were full-time and 138 (41.0 percent) were part-time fishers. Interviews were conducted during the latter part of 1995 and early 1996.

Contacts with full-time fishers to set-up interviews were initially attempted by telephone based on information from the SPL file. This approach was not successful because the license holder could not be contacted or he/she was wary of agreeing to meet for an interview. Therefore, other approaches were utilized: major fish houses in the Florida Keys were contacted and informed of the study and they in turn identified potential interviewees; commercial fishing organization representatives identified potential interviews; the Florida Sea Grant extension agent in Key West and other governmental representatives identified potential interviewees; the study team attended the various Sanctuary and related governmental meetings to establish contacts; and, the commercial docks in the various regions were visited periodically. Typically the best time for interviews was during the late afternoons when fishers returned from their trips. Efforts were made to avoid bias in the selection of

interviewees by describing the survey as a general purpose survey about commercial fishing in Monroe County and by avoiding individuals who directly approached the survey team to be interviewed. Also, the regional stratification helped to minimize the effects of particular organizations or outspoken individuals in specific areas.

For part-time fishers, telephone contacts were used almost exclusively to solicit interviews. Many part-time SPL holders were not affiliated with a particular fish house and several docked out of their homes.

The survey was administered in Spanish for Spanish-speaking fishers. Several fishers, particularly those in the Key West/Stock Island area, spoke only Spanish.

During the initial phase of interviews, interviewers noted that most of the interviewees knew about the Sanctuary Management Plan and the proposed reserves and SPAs, but many did not know the specific boundaries. Therefore, a one page fact sheet was used in the interviews which described the zoning strategy and contained a map of the proposed replenishment reserves and SPAs. The fact sheet contained only information directly from the Sanctuary Draft Management Plan on the locations and regulations for each type of zone.

Socioeconomic Profile of Respondents

Socioeconomic characteristics for respondents are presented in Table 3-1. The information is presented for the total sample and for the three regions described previously. The number of usable responses for each question from the total sample is indicated in parentheses (n=) next to each characteristic.

The results in Table 3-1 indicate that about one-third of the total sample was between 41 to 50 years old and over 70 percent of the sample was over 40 years old. While there is some variation in the age distributions across the regions, the differences are relatively minor. More than 80 percent of the sample fished in Monroe County for at least 5 years suggesting that they had the opportunity to observe the Sanctuary Management Plan development process since the Sanctuary was first established in 1990. Also, the majority of the sample fished in Monroe County for at least 10 years suggesting many had long-standing ties to the local fishing industry.

More than 80 percent of the sample indicated they were Anglo-American. The second largest ethnic group was Hispanic with 18.2 percent of the total sample. The Hispanic population, however, tends to be concentrated in the Middle and Lower Keys.

Membership in various local professional and social organizations was limited. Table 3-1 shows that less than one-fourth of the sample belonged to Monroe County Commercial Fishermen, Inc. (MCCF) and the Organized Fishermen of Florida (OFF). Since some respondents may belong to more than one group, the percentage of the total sample in commercial fishing organizations was not large. There was some variation across the regions, however. The MCCF was the most common membership group in the Lower Keys while membership was split between MCCF and OFF in the Middle Keys. Very few respondents in the Upper Keys were members of either MCCF or OFF. The Conch Coalition and Victims of NOAA, organizations opposed to the Sanctuary, accounted for less than one-fifth of the total interviewees. Similarly, membership in environmental organizations was relatively low with the highest involvement in the Upper Keys.

For the total sample, about 61 percent of income was derived from fishing. The percentage was slightly lower in the Upper Keys at 57.0 percent while the Lower Keys was higher at 62.3 percent. This reflects, in part, the higher percentage of full-time fishers in the Lower Keys.

The average reported replacement value of a commercial fisher's vessel and equipment for the total sample was \$121,165. The replacement value of vessels and equipment in the Upper Keys was lower at \$64,572 while the average value in the Lower Keys was \$138,549. This reflects differences in the proportion of full- and part-time fishers in the Upper versus the Lower Keys and the fact that many fishers in the Lower Keys travel longer distances from shore and stay out longer to fish in the Marquesas Keys and Dry Tortugas areas (see Figure 1).

Table 3-1. Socioeconomic Profile of Respondents in the Total Sample and by Region¹

Variable	Total Sample	REGION		
		Upper Keys	Middle Keys	Lower Keys
AGE OF FISHERS (n=333)				
18-30	10.5%	15.6%	12.3%	8.0%
31-40	18.6%	15.6%	23.0%	16.0%
41-50	30.3%	24.4%	30.3%	32.5%
51-60	23.4%	22.2%	23.0%	23.9%
over 60	17.1%	22.2%	11.5%	19.6%
YEARS FISHING IN MONROE COUNTY (n=329)				
1-5	17.0%	11.2%	16.5%	19.0%
6-10	22.5%	36.6%	25.4%	16.6%
11-20	31.0%	24.6%	29.5%	33.7%
21 or more	29.5%	27.6%	28.6%	30.7%
ETHNIC GROUP (n=336)				
Anglo-American	80.1%	93.4%	82.3%	74.8%
Hispanic	18.2%	6.6%	15.3%	23.9%
African-American	0.9%	0%	0.8%	1.2%
Other	0.9%	0%	1.6%	0%
FAMILY SIZE (n=329)				
Myself	18.8%	24.6%	20.7%	16.2%
2	43.2%	41.0%	46.3%	42.3%
3	15.8%	17.9%	9.0%	20.4%
4 or more	22.2%	17.9%	24.0%	21.1%
MEMBERSHIP IN ORGANIZATIONS (n=331)				
Victims of NOAA	4.2%	2.2%	1.7%	6.1%
Conch Coalition	16.9%	26.7%	18.2%	12.3%
OFF	19.0%	8.9%	28.9%	14.1%
MCCF	24.2%	2.2%	28.1%	26.4%
Environmental Group	6.9%	8.9%	8.3%	5.5%
PERCENT OF INCOME FROM FISHING (n=303)				
	61.0% (42.97) ²	57.0% (44.50)	61.3% (41.14)	62.3% (43.87)
REPLACEMENT VALUE OF VESSEL AND EQUIPMENT (n=306)				
	\$121,165 (304,839) ²	\$64,572 (114,821)	\$118,134 (122,986)	\$138,549 (413,249)

¹Percentages across regions may not add up to percentage for the total sample because respondents who lived outside Monroe County were omitted.

² Standard deviation in parentheses.

4. Fishing Effort and Catch Profile

Total Effort and Catch by Region

Catch information at the individual vessel level is typically not available from state or federal catch monitoring statistics. Similarly, catch data are only reported for large geographic areas making it difficult to determine how dependent fishers may be on certain fishing areas. Their perceptions of marine reserves may be influenced by this dependence. To address these data deficiencies, interviewees were asked to report their 1994 levels of effort and catch for specific species and defined geographic areas.

Table 4-1 presents reported results for fishing effort by species for the total sample based on the regional sample stratification described above. The number of respondents (n=) indicates the number of interviewees who reported fishing for that species in 1994. Fishing effort was highest in the crustacean fisheries, with the exception of shrimp. An average of 80 trips per fisher was reported for spiny lobster and 59 trips for stone crabs. Effort in the shrimp fishery was comparatively low with an average 17 trips per fisher for the total sample. This reflects the fact that shrimp harvesting in the Keys is highly seasonal with peak production occurring in the winter months. Shrimp vessels often come from other ports to fish in the Keys and hence do not have a permanent residence in Monroe County. Also, shrimp harvested in the Keys are landed at other Florida ports such as Ft. Myers and Tampa. Thus, the levels of effort for shrimp reflected in this sample do not represent the full level of effort occurring in the Keys.

The regional breakdown in Table 4-1 shows that effort for stone crab was highest in the Middle Keys. This indicates the dependence of this fishery on the area surrounding Florida Bay. Effort in the spiny lobster fishery was highest in the Upper and Middle Keys although this may be somewhat misleading since fishers in the Lower Keys may take more multi-day trips.

The highest average level of effort per respondent was reported in the tropical fish and sponges fishery with an average of 88 trips per fisher. Because collected fish and marine life specimens are highly perishable, there is a need for frequent trips. The number of participants in this fishery, however, was low relative to the number of fishers for other species.

In the reef fish fishery, the average number of trips was higher in the Upper and Middle Keys. The fewer trips in the Lower Keys may once again reflect multi-day trips.

The mackerel fishery had one of the lowest overall levels of effort with an average 31 trips reported. This reflects in part the seasonal nature of the mackerel fishery. Effort in the Upper Keys was substantially higher with an average 94 trips per fisher but this involved only a few fishers.

Fishing effort for other species, which may include dolphin, sharks, and swordfish, was also a significant component of total effort across all three regions. This component of effort was highest in the Upper Keys with an average of 76 trips per fisher and lowest in the Middle Keys.

Table 4-1: Profile of Respondents' Fishing Effort (Average Number of Trips) by Species for the Total Sample and by Region

Species Group	Total Sample	REGION		
		Upper Keys	Middle Keys	Lower Keys
Stone Crabs	59.09 (45.85) ¹ n=99	41.11 (37.31) n=9	68.06 (49.62) n=52	51.08 (40.21) n=38
Lobster	79.75 (59.45) n=140	102.86 (67.70) n=14	91.24 (60.51) n=59	64.81 (53.64) n=67
Shrimp	16.56 (8.92) n=18	16.00 (0) n=1	12.00 (8.49) n=2	17.20 (9.38) n=15
Reef Fish	43.55 (49.56) n=119	67.14 (63.36) n=14	51.63 (49.66) n=41	33.22 (43.95) n=64
Mackerel	31.09 (44.79) n=66	93.75 (112.05) n=4	25.95 (19.59) n=22	27.65 (41.73) n=40
Tropical Fish & Sponges	88.00 (93.51) n=13	122.50 (49.24) n=4	162.00 (195.16) n=2	47.14 (73.22) n=7
Other Species	55.97 (70.76) n=110	76.32 (84.15) n=25	48.08 (59.46) n=52	53.00 (75.34) n=33

¹Standard deviation in parentheses

While levels of fishing effort are indicative of total fishing activity, levels of average annual total catch reflect differences in productivity across the Florida Keys. Table 4-2 shows the average total catch by species reported by respondents. Results are presented by region.

Average total catch of spiny lobster reported for 1994 was highest in the Lower Keys. Respondents reported average landings of 18,779 pounds in the Lower Keys compared to 13,450 pounds in the Upper Keys and 16,635 pounds in the Middle Keys. Given the large variation in catch by region, these differences are not statistically significant.

Stone crab catch also showed differences across regions. While the average catch for the total sample was 7,183 pounds, the highest stone crab catch occurred in the Middle Keys where an average of 8,816 pounds was landed. In the Lower Keys, an average of 6,254 pounds was landed.

The shrimp fishery was heavily concentrated in the Lower Keys where an average of 71,887 pounds were reported while there were no reported landings of shrimp in the Upper Keys. For the reasons cited above, these figures for the shrimp fishery should be viewed with caution since they may not fully reflect catch by region in the fishery.

The most similar pattern of catch across the three regions occurred in the reef fish fishery. Average total catch for the sample was 7,861 pounds with the highest average catch of 8,427 pounds in the Lower Keys and the lowest catch of 7,169 pounds in the Upper Keys. This pattern across the three regions may reflect a relative lack of seasonality for reef fish and a relatively even distribution of reef fish species across the Florida Keys marine environment.

For mackerels, the highest total catch occurred in the Lower Keys where 10,141 pounds was landed on average compared to 8,764 pounds landed for the total sample. Total catch for tropical fish and sponges was highest in the Upper Keys where an average 31,667 pounds was landed compared to 11,705 pounds landed for the total sample. Average total catch for other species equaled 12,628 pounds for the total sample with the highest average total catch occurring in the Upper Keys.

Table 4-2: Profile of Respondents' Average Total Catch in Pounds by Species and Region

Species Group	Total Sample	REGION		
		Upper Keys	Middle Keys	Lower Keys
Stone Crabs	7,182.54 (7,959.96) ¹ n=102	1,122.22 (1,020.76) n=9	8,815.82 (9,740.81) n=55	6,253.921 (15,934.17) n=38
Lobster	17,353.19 (17,980.91) n=141	13,450 (12,718.96) n=14	16,635.25 (16,772.51) n=59	18,779.71 (19,873.60) n=68
Shrimp	67,011.76 (83,787.54) n=17	0	30,600.00 (41,577.88) n=2	71,866.67 (87,664.84) n=15
Reef Fish	7,861.35 (12,580.98) n=119	7,168.75 (9,028.90) n=16	7,217.95 (14,308.09) n=39	8,426.56 (12,363.96) n=64
Mackerel	8,764.62 (14,500.88) n=65	5,425.00 (8,476.79) n=4	6,931.82 (7,788.05) n=22	10,141.03 (17,603.78) n=39
Tropical Fish & Sponges	11,705 (19,233.45) n=12	31,666.67 (34,034.30) n=3	7,880.00 (2,998.13) n=2	4,242.86 (4,638.20) n=7
Other Species	12,628.32 (35,044.44) n=101	21,907.00 (66,025.96) n=20	12,352.04 (25,428.75) n=49	7,252.19 (14,248.70) n=32

¹Standard deviation in parentheses

Effort and Catch by Fishing Areas

To provide more detailed analysis, respondents were also asked to report total effort and catch for each species group for the six fishing areas shown in Figure 2. The map in figure 2 was used in the interview process to aid in identifying the fishing areas. Areas 2, 3, and 5 are within the Sanctuary boundaries.

Catch of specific species was somewhat concentrated in certain areas of the six defined for this study. Table 4-3 shows that more than 62 percent of the stone crab catch occurred in Area 1. This suggests that the area west of Florida Bay was the primary fishing ground for stone crabs. This area is not included in the Sanctuary.

On the other hand, catch of spiny lobsters was concentrated in Areas 2 and 3 indicating that the majority of catch occurred in the Middle and Lower Keys. For the sample as a

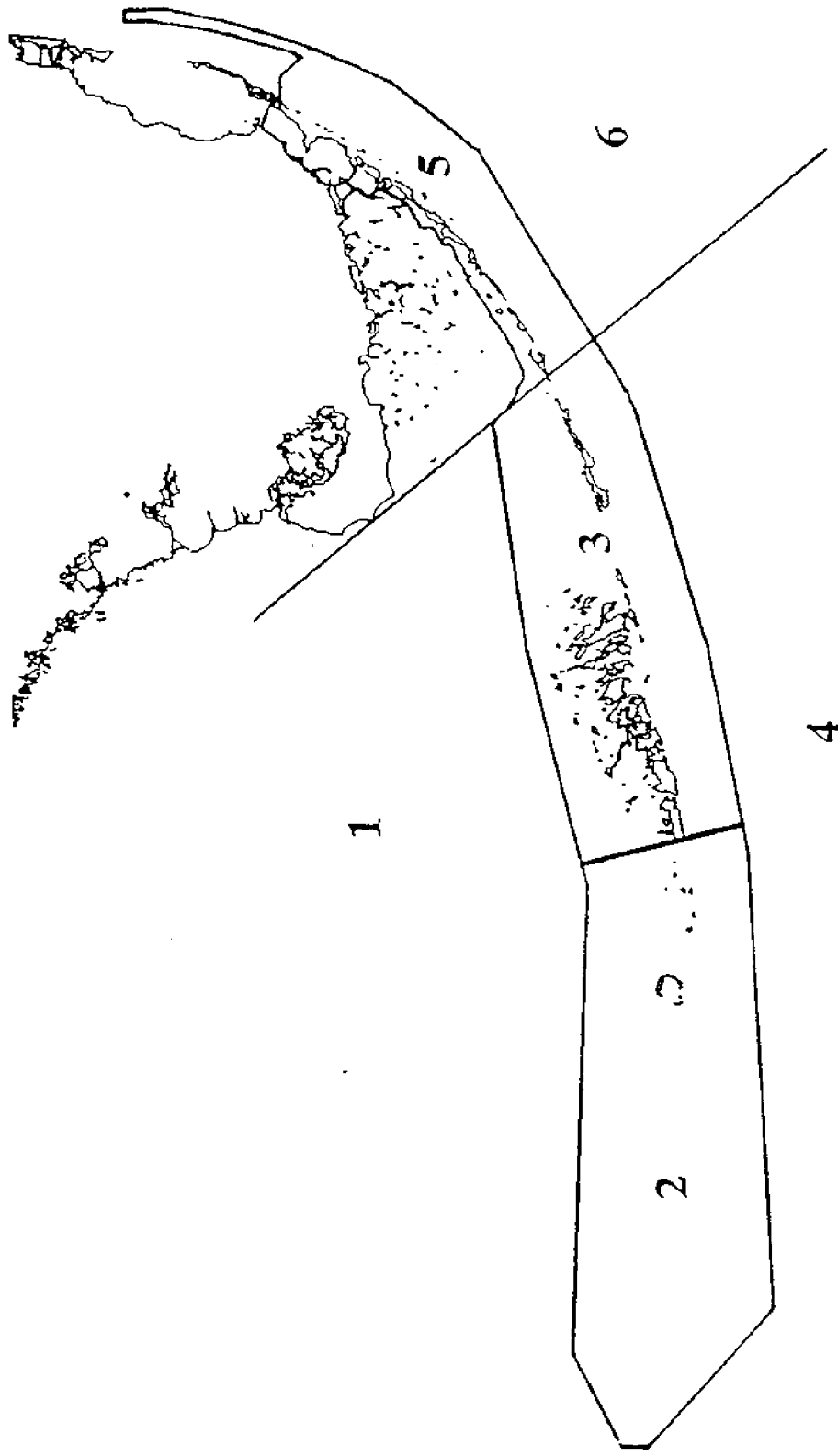


Figure 2. Fishing Areas Used for the Survey.

whole, 85.1 percent of the total catch of spiny lobster was harvested within the Sanctuary (Areas 2, 3, and 5). A little more than half of the shrimp catch was concentrated in the Lower Keys and the Dry Tortugas. Sixty-seven percent of reef fish catch occurred in Area 2. Tropical fish and sponges were caught predominately in Areas 3 and 5. Thus, fishers for most of the major species groups in the Keys were fishing within the boundaries of the Sanctuary.

Table 4-3. Distribution of Catch (by percent of Total Catch) by Species Across Fishing Areas for the Total Sample

Species Group	FISHING AREAS					
	1	2	3	4	5	6
Stone Crabs	62.66%	1.56%	33.06%	0	2.71%	0
Lobsters	14.36%	28.03%	45.57%	0.41%	11.53%	0.10%
Shrimp	37.44%	39.13%	11.39%	1.08%	0.88%	0
Reef Fish	5.49%	67.65%	15.23%	1.80%	9.21%	0.63%
Mackerels	50.03%	26.66%	18.23%	0.45%	4.60%	0.04%
Tropical Fish & Sponges	0.00	12.15%	25.21%	0	62.65%	0
Other Species	3.0%	7.31%	12.22%	30.52%	17.82%	29.34%

Catch by fishing area is also reported using the regional breakdown of the Keys described in Section 3. Beginning first in the Upper Keys, Table 4-4 shows about 79 percent of stone crabs were caught in Area 5 by fishers from the Upper Keys. Almost all spiny lobsters were caught in Area 5 and about half of the reef fish catch occurred in this area. Most of the tropical fish and sponges and other species were caught in Area 5. No shrimp catch by fishers in the Upper Keys was reported. Table 4-4 also shows that there were some fishers who fished for mackerels in Area 2. About 44 percent of the reef fish were captured in Area 2 by fishers from the Upper Keys.

Table 4-4. Distribution of Catch (by percent of Total Catch) by Species Across Fishing Areas for Respondents in the Upper Keys

Species Group	FISHING AREAS					
	1	2	3	4	5	6
Stone Crabs	21.29%	0	0	0	78.71%	0
Lobsters	0	0	0	0	98.65%	1.35%
Shrimp	0	0	0	0	0	0
Reef Fish	0	43.99%	1.74%	0	53.52%	0.74%
Mackerels	0	82.95%	0	0	16.13%	0.92%
Tropical Fish & Sponges	0	6.32%	6.32%	0	87.36%	0
Other Species	0	0.11%	0	2.20%	77.91%	14.55%

Fishers in the Middle Keys reported a somewhat wider distribution of catch by area. Table 4-5 shows that the majority of stone crabs were caught in Area 1 (about 74 percent) and Area 3 (about 25 percent). Spiny lobsters were mostly caught in Areas 1 and 3. Shrimp fleets operating out of the Middle Keys mostly fished for shrimp in Area 1. Most of the reef fish catch by fishers in the Middle Keys occurred in Areas 2 and 3. Mackerel catch was distributed across several areas with slightly higher catch in Areas 2 and 3. Tropical fish and sponges catch by respondents in the Middle Keys were evenly distributed across zones 2, 3, and 5. Most of the other species were caught in Areas 5 and 6. This reflects the fact that the other species group includes mostly pelagic species.

Table 4-5. Distribution of Catch (by percent of Total Catch) by Species Across Fishing Areas for Respondents in the Middle Keys

Species Group	FISHING AREAS					
	1	2	3	4	5	6
Stone Crabs	73.64%	0.00	24.46%	0.00	1.90%	0.00
Lobsters	20.30%	0.05%	69.85%	0.00	9.80%	0.00
Shrimp	98.04%	0.00	1.96%	0.00	0.00	0.00
Reef Fish	6.83%	58.77%	22.06%	1.78%	8.79%	1.78%
Mackerels	10.62%	30.65%	43.84%	0.00	14.89%	0.00
Tropical Fish & Sponges	0.00	36.55%	31.73%	0.00	31.72%	0.00
Other Species	2.11%	4.13%	13.73%	51.74%	2.56%	25.73%

Table 4-6 shows that fishers originating from the Lower Keys focused most of their effort in Areas 1, 2, and 3. For example, about 66 percent of stone crab catch was reported in Area 3 and 27 percent in Area 1. More than half the lobster catch occurred in Area 2 with about 34 percent of the total catch in Area 3. For shrimp, most of the respondents were operating in Areas 1 and 2. The majority of reef fish were caught in Area 2 and mackerel catches occurred mostly in Areas 1 and 2. Area 3 was the primary site for tropical fish and sponge catches by respondents in the Lower Keys. Catch of other species was widely distributed across Areas 1 through 4.

Table 4-6. Distribution of Catch (by percent of Total Catch) by Species Across Fishing Areas for Respondents in the Lower Keys.

Species Group	FISHING AREAS					
	1	2	3	4	5	6
Stone Crabs	27.03%	7.19%	65.78%	0	0	0
Lobsters	11.92%	53.67%	33.63%	0.78%	0	0
Shrimp	38.45%	36.90%	11.92%	1.14%	0.93%	0
Reef Fish	5.96%	77.32%	14.53%	2.19%	0	0
Mackerels	67.96%	22.04%	9.35%	0.65%	0	0
Tropical Fish & Sponges	0	17.85%	82.15%	0	0	0
Other Species	10.78%	29.20%	31.37%	28.66%	0	0

5. Perceptions of the Sanctuary Management Plan Process

To identify the various sources of information about the Sanctuary Management Plan that may have shaped commercial fishers's perceptions and opinions, interviewees were asked what sources they used to obtain information and which were most useful. More than one source could be identified. The majority of respondents indicated that they relied heavily on the media and personal contacts as primary sources of information. As shown in Table 5-1, 75 percent of the total sample reported they obtained their information from newspapers and 66.4 percent relied on information via rumors or the grapevine. About one-third of the total sample relied on information provided by the NOAA, including NOAA personnel, public meetings sponsored by NOAA, and NOAA literature. Approximately one-fourth of the total sample referred to the NOAA Comprehensive Management Plan as a source of information about the proposed sanctuary zones. One-third of the total sample also cited special interest groups such as the Conch Coalition, Victims of NOAA, and commercial fishing organizations as sources of information. A similar pattern was evident across the three regions except that respondents in the Lower Keys had the least contact with NOAA sources.

Table 5-2 provides information about how the respondents rated the usefulness of the various sources of information. For the total sample, 27 percent reported that newspapers were the most useful sources of information followed by personal contacts at 24 percent, and commercial fishing organizations at 23 percent. In terms of information supplied by NOAA, 13 percent of all respondents rated the NOAA Comprehensive Plan and NOAA public meetings as most useful. Citizens groups like the Conch Coalition and Victims of NOAA were rated about the same as these NOAA sources. On the other hand, NOAA personnel and other NOAA literature were cited as useful sources of information by relatively few respondents. A small number of fishers (7.4 percent) rated the Sea Grant Extension Service as most useful. Table 5-2 also shows a similar pattern of responses occurred across the three regions. The primary exception was that respondents in the Middle and Lower Keys more frequently cited commercial fishing organizations (MCCF and OFF) as the most useful sources of information.

Table 5-1. Sources of Information About Proposed Sanctuary Zones for the Total Sample and by Region

Sources of Information	Total Sample	REGION		
		Upper Keys	Middle Keys	Lower Keys
National Oceanic and Atmospheric Administration (NOAA) Personnel	22.6%	34.8%	25.2%	17.2%
NOAA Comprehensive Management Plan	35.4%	39.1%	40.7%	30.7%
Other NOAA Literature	28.9%	32.6%	33.3%	24.5%
NOAA Public Meetings	37.5%	54.4%	39.8%	31.3%
Newspapers	75.0%	84.8%	80.5%	68.1%
TV/Radio	45.5%	54.4%	46.3%	42.3%
Conch Coalition/Victims of NOAA	33.3%	37.0%	37.4%	29.5%
Commercial Fishing Organizations	36.3%	19.6%	49.6%	30.7%
Environmental Organization Literature	7.4%	8.7%	9.8%	4.9%
Government Fisheries Scientists	15.5%	13.0%	15.5%	16.1%
Sea Grant Extension Service	15.2%	0%	16.3%	18.4%
Rumors or Grapevine	66.4%	69.6%	70.7%	62.6%
Don't know about Proposed Sanctuary Zone	7.1%	2.2%	8.9%	6.8%

Table 5-2. Most Useful Sources of Information About Proposed Sanctuary Zones for the Total Sample and by Region

Sources of Information	Total Sample	REGION		
		Upper Keys	Middle Keys	Lower Keys
National Oceanic and Atmospheric Administration (NOAA) Personnel	5.1%	15.2%	4.1%	3.1%
NOAA Comprehensive Management Plan	13.1%	23.9%	13.0%	9.8%
Other NOAA Literature	6.8%	10.9%	9.8%	3.7%
NOAA Public Meetings	13.7%	23.9%	18.9%	7.4%
Newspapers	27.2%	37.0%	28.9%	23.0%
TV/Radio	7.1%	10.9%	5.7%	6.8%
Conch Coalition/Victims of NOAA	13.1%	15.2%	14.6%	11.0%
Commercial Fishing Organizations	22.6%	6.5%	30.9%	20.9%
Environmental Organization Literature	1.5%	0%	2.4%	1.2%
Government Fisheries Scientists	2.7%	4.4%	2.4%	2.5%
Sea Grant Extension Service	7.4%	15.2%	4.1%	3.1%
Rumors or Grapevine	23.5%	34.8%	16.3%	25.8%
Don't know about Proposed Sanctuary Zones	6.8%	2.2%	8.1%	6.8%

Interviewees were also asked about their participation in the various activities related to development of the Draft Management Plan (see Section 2). Table 5-3 indicates that less than half the sample participated in any of these activities. Approximately one-half of the total sample had read the Sanctuary Management Plan and 44 percent participated in NOAA-sponsored public workshops, hearings, and/or meetings. About 43 percent of the total sample read other NOAA literature about the Plan. About one-quarter of the total sample attended Sanctuary Advisory Council meetings. The level of participation in all activities across the three regions was generally highest in the Upper Keys and lowest in the Lower Keys.

Table 5-3. Participation in Activities Related to Development of the Management Plan for Total Sample and by Region

Activities	Total Sample	REGION		
		Upper Keys	Middle Keys	Lower Keys
Sanctuary Advisory Council (SAC) Meetings	25.3%	43.5%	29.3%	17.2%
NOAA-sponsored public workshops/hearings/meetings	44.0%	58.7%	46.3%	38.0%
Info Expos	9.5%	23.9%	11.4%	4.3%
Visits to any FKNMS offices	16.4%	39.1%	17.1%	9.8%
Letter Writing to FKNMS/NOAA	16.1%	19.6%	18.7%	12.9%
Read Sanctuary Management Plan	48.2%	60.9%	54.5%	40.5%
Read NOAA Literature	42.6%	47.8%	52.9%	33.7%
Town Meetings with Government Officials	27.4%	43.5%	32.5%	19.6%

Finally, respondents evaluated the quality of information provided by NOAA about the Plan and the proposed zones. Respondents were asked to agree (strongly or moderately) or disagree (strongly or moderately) with three statements about the NOAA information. Table 5-4 shows respondents who were familiar with the NOAA information generally disagreed that it provided everything they needed to know. More than one-fourth strongly disagreed and 11 percent moderately disagreed with the statement that the Sanctuary Comprehensive Management Plan contained everything they needed to know about the plan. A similar percentage of the total sample disagreed strongly to moderately that NOAA information about the sanctuary zones contained everything they needed to know about the zones. When asked if NOAA information helped them understand the positive and negative effects of the sanctuary zones, nearly 30 percent of the total sample strongly disagreed. For all three questions, however, it should be noted that nearly one-half of the respondents did not use or receive information from NOAA (see also Table 5-1). No regional breakdown is provided because there were no significant differences in responses across the regions.

Table 5-4. Evaluation of Information Provided by NOAA for Total Sample

Question	Strongly Agree	Moderately Agree	Neutral	Moderately Disagree	Strongly Disagree	Don't Know ¹	Average Response ²
Information provided by NOAA about the Sanctuary Management Plan contains everything you need to know about the Plan.	2.1%	7.5%	5.1%	11.3%	26.9%	47.2%	4.0
Information provided by NOAA about the sanctuary zones contains everything you need to know about the sanctuary zones.	3.6%	7.8%	4.8%	11.1%	26.7%	45.9%	3.9
Information provided by NOAA about the sanctuary zones helped you understand the positive and negative effects of sanctuary zones.	2.7%	7.5%	5.4%	8.4%	29.7%	46.2%	4.0

¹Includes respondents who did not use or receive information from NOAA.

²Strongly agree = 1, strongly disagree = 5.

6. Expectations About the Effects and Benefits of Sanctuary Zones

As discussed in the Introduction, one of the stated purposes of the zoning plan, in particular the replenishment reserves, was to enhance fishery stocks. To evaluate commercial fishers' perceptions of the effects of the zones, respondents were asked to agree (strongly or moderately) or disagree (strongly or moderately) with a series of statements about the likely effects of the zones on different species in the Keys' marine environment. The results in Table 6-1 show that the majority of respondents moderately to strongly agreed that the main purpose of the sanctuary zones was to conserve and protect corals, fish and other marine life *within* the boundaries of the zones. Also, nearly half of the respondents agreed that the purpose of the sanctuary zones was to increase overall stocks and biomass *within* the boundaries of the zones.

Respondents indicated, however, that the effects of the zones on specific fishery stocks within the marine environment of the Keys would be insignificant. When asked if they thought the zones would help to increase a particular fish stock (i.e. spiny lobster, reef fish, stone crab) *outside* the zones, for every stock more than half of the total sample strongly disagreed. Similarly, when asked if the main purpose of the sanctuary zones was to increase overall stocks and biomass *outside* the boundaries, more than one-half the respondents strongly disagreed. These results suggest strong differences in opinion between commercial fishers in the Keys and members of the scientific community who have advocated reserves for fisheries management.

Given these results, it is not surprising that most commercial fishers believed they would not benefit from the zones. Table 6-2 shows that over 90 percent of respondents disagreed that commercial fishers would be the primary group to benefit and 82.4 percent strongly disagreed. A majority also felt that recreational fishers would not benefit from the zones. The Draft Plan permitted no fishing by any means in the reserves and SPAs. (U.S. Department of Commerce, 1995, Vol. 1, pp. 127-129). Most commercial fishers believed that recreational divers would be the primary beneficiaries. This is consistent with the majority belief that the main purpose of the zones was to protect corals and other marine life (see Table 6-1). These concerns about the effects of the zones were not just short-term in nature. Table 6-2 also shows that more than two-thirds of the respondents disagreed that the zones would have a long-term beneficial effect on the Keys' economy. These perceptions of

the expected effects of the zones were generally consistent across the three regions in the Keys. Therefore, no regional breakdown of responses is provided.

The survey also asked respondents whether they agreed or disagreed that the sanctuary zones would produce other non-fishing related benefits. Table 6-3 shows that a large majority of commercial fishers strongly disagreed that the zones were the most effective way to reduce conflicts between user groups. Similarly, although a majority of respondents agreed that the main purpose of the sanctuary zones was to conserve the coral reefs (see Table 6-1), nearly 60 percent disagreed that the zones were the most effective way to restore the coral reefs to what they used to be. The survey did not include questions to determine whether respondents believed the reefs needed to be restored or whether they knew of a more effective alternative.

Table 6-1. Expected Effects on Marine Resource Stocks due to the Sanctuary Zones for the Total Sample

Question	Strongly Agree	Moderately Agree	Neutral	Moderately Disagree	Strongly Disagree	Don't Know	Average Response ¹
Sanctuary zones will help to increase the stock of reef fish in the Florida Keys.	8.7%	20.1%	6.9%	9.3%	50.6%	4.5%	3.8
Sanctuary zones will help to increase the stocks of spiny lobster (crawfish) in the Florida Keys.	6.3%	11.4%	6.0%	8.4%	58.1%	9.9%	4.1
Sanctuary zones will help to increase the stocks of stone crabs in the Florida Keys.	6.0%	11.4%	5.4%	5.7%	57.8%	13.8%	4.1
Sanctuary zones will help to increase the stocks of shrimp in the Florida Keys.	3.3%	5.7%	5.7%	6.3%	49.2%	29.7%	4.3
The main purpose of the sanctuary zones is to increase overall stocks (and biomass) within the boundaries of the zones.	18.3%	26.0%	5.4%	6.9%	37.7%	5.7%	3.2
The main purpose of the sanctuary zones is to increase overall stocks (and biomass) outside the boundaries of the zones.	8.7%	14.4%	6.3%	10.2%	53.3%	7.2%	3.9
The main purpose of the sanctuary zones is to conserve and protect corals, fish, and other marine life within the boundaries of the zones.	39.0%	22.0%	6.3%	3.9%	25.0%	3.9%	2.5

¹Strongly agree = 1, strongly disagree = 5.

Table 6-2. Expected Beneficiaries from the Sanctuary Zones for the Total Sample

Question	Strongly Agree	Moderately Agree	Neutral	Moderately Disagree	Strongly Disagree	Don't Know	Average Response ¹
Primary group to benefit from sanctuary zones is commercial fishers.	1.5%	3.9%	2.1%	8.0%	82.4%	2.1%	4.7
Primary group to benefit from sanctuary zones is recreational fishers.	20.5%	11.6%	6.5%	8.6%	47.9%	4.8%	3.5
Primary group to benefit from sanctuary zones is recreational divers.	49.4%	18.5%	4.5%	4.2%	15.8%	7.7%	2.1
Long-term effects of the sanctuary zones on the economy of the Keys will be positive.	6.3%	10.4%	9.3%	9.0%	59.4%	5.7%	4.1

¹Strongly agree = 1, strongly disagree = 5.

Table 6-3. Effectiveness of Sanctuary Zones to Produce Other Benefits

Question	Strongly Agree	Moderately Agree	Neutral	Moderately Disagree	Strongly Disagree	Don't Know	Average Response ¹
Sanctuary zones are the most effective way to reduce conflicts between different user groups.	4.2%	7.8%	4.8%	8.7%	65.7%	9.0%	4.4
Sanctuary zones are the most effective way of restoring the coral reefs in the Keys to what they used to be.	7.8%	12.0%	5.4%	8.7%	59.3%	6.9%	4.1

¹Strongly agree = 1, strongly disagree = 5.

Another sequence of survey questions sought to determine whether commercial fishers preferred to have zones located in a particular region in the Keys and their overall support for the zoning concept. The results in Table 6-4 show a large majority of respondents disagree with locating zones *anywhere* in the Keys. While about one-fourth of the sample did support zones somewhere in the Keys, the level of support declined whenever a specific location was suggested. Moreover, for the exact locations identified as zones in the Draft Management Plan, nearly 80 percent of the respondents strongly disagreed with these locations. Similarly, more than three-fourths of the sample did not support the establishment of the Florida Keys National Marine Sanctuary. The results in Table 6-4, combined with the earlier results in Table 6-1, clearly indicate that commercial fishers perceived very few biological or economic advantages from the zoning proposals in the Draft Plan.

Finally, the survey included a question to determine how their fellow fishers would comply with zoning restrictions in the Draft Plan. The results in Table 6-5 show that the sample was fairly evenly split on the issue of compliance. More than 56 percent of respondents believed it was not likely or not likely at all that fishers would fish inside a closed area. But, 27 percent thought it was likely and 16.5 percent thought it was somewhat likely fishers would violate the boundaries. Thus, enforcement of zoning restrictions within the Sanctuary may be a problem.

Table 6-4. Support for Establishment of Sanctuary Zones and the Sanctuary

Question	Strongly Agree	Moderately Agree	Neutral	Moderately Disagree	Strongly Disagree	Don't Know	Average Response ¹
I support the establishment of a sanctuary zone somewhere in the Upper Keys.	9.6%	13.5%	7.2%	3.3%	61.6%	4.8%	4.0
I support the establishment of a sanctuary zone somewhere in the Middle Keys.	7.5%	10.8%	5.4%	5.4%	65.7%	5.1%	4.2
I support the establishment of a sanctuary zone somewhere in the Lower Keys.	7.8%	13.8%	5.1%	3.3%	66.4%	3.6%	4.1
I support the establishment of a sanctuary zone somewhere in the Florida Keys.	11.9%	15.8%	6.5%	3.6%	60.1%	2.1%	3.9
I support establishing sanctuary zones in the exact locations proposed in the Sanctuary Comprehensive Management Plan.	2.1%	3.9%	3.6%	6.5%	79.5%	4.5%	4.6
I generally support the establishment of the Florida Keys National Marine Sanctuary.	4.2%	9.3%	6.3%	6.3%	71.8%	2.1%	4.3

¹Strongly agree = 1, strongly disagree = 5.

Table 6-5. Likelihood that Fishers Would Violate Zones if Established

Question	Very Likely	Somewhat Likely	Not Likely	Not Likely at All	Average Response ¹
If the sanctuary zones were put into effect and no commercial harvesting were allowed inside the boundaries, how likely do you think it is that fishers would still fish inside the zones and risk being caught.	27.0%	16.5%	27.0%	29.5%	2.6

¹Very likely = 1, Not likely at all = 4.

7. Summary and Discussion

Recap of the Survey Results

A survey of a representative sample of 337 commercial fishers in the Florida Keys was conducted to identify their perceptions of marine reserves as part of a management plan for the Florida Keys National Marine Sanctuary. The sample size and regional distribution was based on information from the 1994-1995 Florida Saltwater Products License data file. The surveys were conducted during the latter part of 1995 and early 1996 (after the release of the Draft Management Plan) using personal interviews.

Survey respondents indicated that a major portion of their total catch was harvested within the boundaries of the FKNMS. For the total sample, over 85 percent of spiny lobster catch, 92 percent of reef fish catch, and all of the tropical fish and sponges catch were caught in the FKNMS. Stone crabs, mackerels, and other pelagic species were generally harvested outside the FKNMS boundaries. Respondents in the Upper Keys reported the highest percentage of total catch from the FKNMS. No data were collected on catch in the reserves proposed in the Draft Management Plan.

The survey results also indicated that about half of the interviewees had participated, in some way, in the management plan development process. Many had attended NOAA sponsored meetings or read other NOAA literature related to the planning process. While most of the interviewees were aware of the proposed regulations and areas for the replenishment reserves and SPAs in the Draft Management Plan, a large majority believed that newspapers, local organizations, and other fishers were the most useful sources of information about the proposed reserves.

On issues relating to expected effects of the proposed reserves, a large majority of commercial fishers did not believe that stocks of commercially important species such as spiny lobster and reef fish would increase outside the reserves. Most believed that the primary effect would be to conserve and protect corals, fishes, and other marine life within the boundaries of each reserve. Based on these perceptions, respondents were nearly unanimous in their opinion that commercial fishers would not be the primary beneficiaries of the proposed reserves and there would not be a positive long-term effect on the economy in the Keys. A large majority also did not think other consumptive users, such as recreational fishers, would benefit from the reserves. They believed that recreational divers would be the

primary beneficiaries. Only a small minority of respondents perceived that the reserves were an effective way to reduce user conflicts or to restore the coral reefs.

Commercial fishers' perceptions that the proposed reserves would not benefit their interests was consistent with the finding that a large majority of respondents rejected the idea of establishing reserves anywhere in the Florida Keys. While about one-fourth of the respondents did express some support for reserves somewhere in the Keys, support declined when specific regions were cited for a reserve. Opposition to the reserves also apparently played an important role in over three-fourths of the respondents stating that they did not support the establishment of the Florida Keys National Marine Sanctuary.

To help the reader of this report provide some perspective on the results, some anecdotal information provided by respondents and others in the commercial fishing industry may be useful. Many commercial fishers in the Florida Keys felt that the Sanctuary Management Plan and the reserves were another in a long line of regulations intended to sharply curtail or eliminate commercial fishing in the Keys. Beginning in the late 1970s, parts of the Upper Keys in Everglades National Park and waters around the Dry Tortugas in the Lower Keys were closed to commercial (but not recreational) fishing. In 1984, the South Atlantic and Gulf of Mexico Fishery Management Councils established regulations to prohibit certain harvesting methods in coral habitat areas of particular concern and to set closed seasons for reef fish in stressed areas. In 1991, the Florida Legislature established the Spiny Lobster Trap Certificate Program to reduce total effort in the Florida spiny lobster fishery (90 percent of which is harvested in the Keys). In 1994, the citizens of Florida voted for a constitutional amendment to eliminate large-scale (commercial) fishing nets in state waters. And, throughout the 1990s the federal fishery management councils and the Florida Marine Fisheries Commission adopted various regulations to restrict harvesting practices and limit the harvests of commercially important species in the Florida Keys such as mackerels, snappers and groupers, red drum, and seatrout. In light of the historical record, it is difficult to downplay commercial fishers' concerns that a Sanctuary Management Plan which prohibits commercial (and recreational) harvesting in the reserves is another step along the path to further retrenchment in the industry.

The Final Management Plan

A Final Management Plan was released by NOAA in September 1996. Some changes that were made in the number of reserves and the regulations governing these reserves from the Draft to the Final Plan should be noted. The text of the regulations for the reserves included in the Final Plan is provided in Appendix C.

First, the three replenishment reserves in the Draft Plan (Key Largo, Sambos, and Dry Tortugas) were reduced to one (Sambos) in the Final Plan. The Key Largo reserve was dropped “partly because it would have duplicated the protection provided by the John Pennkamp Coral Reef State Park and the Key Largo Existing Management Area” (U.S. Department of Commerce 1996, Vol III, pp. M-14). However, neither the Park nor the Management Area (the Key Largo National Marine Sanctuary) regulations prohibit commercial or recreational fishing. An additional, unstated, factor in dropping the Key Largo reserve was strong opposition from recreational fishing groups and from residents in Key Largo (Dr. James Bohnsack, National Marine Fisheries Service, personal communication). *Florida Sportsman Magazine*, a leading advocate for recreational anglers, issued a position paper in December 1995 that strongly attacked the scientific basis and regulatory need for the replenishment reserves. These concerns from the sportfishing community contributed to the Sanctuary Advisory Council’s decision to vote against including the Key Largo reserve in the Final Plan. The Dry Tortugas reserve was deferred for two years during which “NOAA will continue the process for establishing a proposed final boundary ... in coordination with the National Park Service, fishing representatives, scientists, and others to identify the appropriate final boundary for the Reserve, which may include portions of the Dry Tortugas National Park.” It was further noted that “public comments indicated that the impacts on fishers from the proposed Replenishment Reserves were greater than considered in the Draft Management Plan. ... The Key Largo and Dry Tortugas areas were not made reserves in order to minimize adverse impacts to fishers” (U.S. Department of Commerce 1996, Vol. III, pp. L-29).

Second, the term “replenishment reserves” was changed to “ecological reserves” in the Final Plan because this term “more accurately represents the purpose of this zone, that is, to restore natural ecosystem dynamics and habitat, by setting aside a portion of the coral reef environment (including seagrass beds, hardbottom, rubble habitat, patch reefs, and sand areas) that is protected from all forms of ‘harvesting’” (U.S. Department of Commerce 1996, Vol.

III, pp. L-28). This renaming and defining the purpose of the reserves is significant because it suggests the primary impacts occur within the boundaries of the reserve rather than in spillover effects to areas outside the reserves. This viewpoint is consistent with the perceptions of a large majority of the commercial fishers interviewed for this report (see Table 6-1).

Third, the number of SPAs in the Final Plan decreased from 19 to 18 and some of the regulations for activities in the SPAs were modified. Catch and release trolling was allowed in four SPAs (Conch Reef, Alligator Reef, Sombrero Reef, and Sand Key). This would “facilitate multiple uses and allow for comparisons to be made between SPAs, therefore determining the impact of catch and release trolling” (U.S. Department of Commerce 1996, Vol. III, pp. L-29). Also, baitfishing can occur in the SPAs under a permit system controlled by NOAA.

The Final Management Plan was sent to the Governor and Cabinet of Florida as required by the Florida Keys National Marine Sanctuary Act. In January and March 1997 the Governor and Cabinet raised several concerns about the Final Plan and requested additional revisions (Suman, pp. 318-319). Specific concerns were expressed about the “purpose, goals and measures of success associated with the Western Sambos Ecological Reserve” (U.S. Department of Commerce, 1997, pp. 32156). Following revisions, the Plan was approved by the Governor and Cabinet on May 13, 1997 and published in the Federal Register on June 12, 1997. One amendment requires a review of the Sanctuary regulations every five years and the regulations must be repropoed for the Governor’s review. To facilitate this review, a research plan is being developed to provide biological and socioeconomic data to compare and contrast the effects of the reserves and SPAs (Ben Haskell, NOAA, personal communication). Following up on the conjecture by Bohnsack (1993) that initial opposition to reserves will turn to approval, a useful component of these monitoring studies would be to evaluate whether commercial fishers’ perceptions of marine reserves change over time. This analysis would provide Sanctuary managers, scientists, and the public a more complete understanding of the impacts of marine reserves on the commercial fishing community in the Keys.

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APPENDIX A

COMMERCIAL FISHERMEN SURVEY INSTRUMENT

COMMERCIAL FISHERMEN SURVEY

Part I

GENERAL INFORMATION

The following questions are asked about you and the primary vessel that you use for fishing in Monroe County.

Name _____

Telephone _____

Address or Contact Site _____

Date _____

Saltwater Products License YES NO

6. Which of the following would you describe as your primary hauling port/dock?

Key West/Stock Island Summerland Key

Big Pine Key Marathon

Islamorada Key Largo

Tavernier Other _____

7. How many years have you been a commercial fisherman in Monroe County?

1 - 5 6 - 10 11 - 20 21 years or more

1. Which of the following includes your age?

18 - 30 31 - 40 41 - 50 51 - 60 over 60

2. Ethnic background?

Anglo Cuban African-American Other _____

3. How many family members do you support (including yourself)?

myself only 2 3 4 5 6 7 8

4. Are you a member of any of the following groups?

- Victims of NOAA YES NO
- Conch Coalition YES NO
- OFF YES NO
- MCCF YES NO
- an environmental group YES NO

5. What is your fish house? _____

8. Please give your BEST ESTIMATE of the replacement value for the following items used for commercial fishing in 1994.

Vessel(s) and Electronic Equipment: \$ _____

Nets: Number _____ \$ _____

Traps: Number _____ \$ _____

9. Please give your BEST ESTIMATE of the following expenses you incurred in 1994.

Docking Fees: \$ _____

Interest Payments on Vessel(s): \$ _____

Maintenance and Repairs on Vessel(s): \$ _____

Maintenance and Repairs on Nets and Traps: \$ _____

10. What approximate percentage of your income is derived from commercial fishing?
_____ %

- a. commercial fisherman
- b. charterboat
- c. part-time
- d. recreational

D. Catch Information

The following map shows the Monroe County region and 6 areas that divide the region into the Upper and Lower Keys and areas within the Florida Keys National Marine Sanctuary. Please refer to this map and use the following table to write in your BEST ESTIMATE of your TOTAL CATCH in each fishery in 1995-96 and the percent of the total catch you caught in each area.

Total Catch by Species and by Area

Fishery	Total catch in pounds	1	2	3	4	5	6	Total
Stone Crabs								100%
Lobster								100%
Shrimp								100%
Snapper/Grouper								100%
Mackerels								100%
Sharks								100%
Others								100%

Now, use the following table to write in your BEST ESTIMATE of the TOTAL NUMBER OF TRIPS in each fishery and the percent of total trips in each area.

Total Number of Trips by Species and by Area

Fishery	Total number of trips	1	2	3	4	5	6	Total
Stone Crabs								100%
Lobster								100%
Shrimp								100%
Snapper/Grouper								100%
Mackerels								100%
Sharks								100%
Others								100%

Please use the following table to write in your BEST ESTIMATE of your costs for a TYPICAL TRIP in each of the fisheries you participated in during 1995-96.

Fishery

	Stone Crabs	Lobster	Shrimp	Snapper/Grouper	Mackerels	Others
Fuel and Oil	\$	\$	\$	\$	\$	\$
Ice	\$	\$	\$	\$	\$	\$
Bait	\$	\$	\$	\$	\$	\$
Food & Supplies	\$	\$	\$	\$	\$	\$
Spotter Plane	\$	\$	\$	\$	\$	\$
Other	\$	\$	\$	\$	\$	\$
Number of Crew Members	\$	\$	\$	\$	\$	\$

Part III

PERCEPTIONS

A. INFORMATION

1. What are your sources of information about the proposed sanctuary zones (Sanctuary zones include the Replenishment Reserves and Sanctuary Preservation Areas (SPAs))?
- 1 - National Oceanic and Atmospheric Administration (NOAA) personnel
 - 2 - NOAA Comprehensive Management Plan
 - 3 - Other NOAA literature
 - 4 - NOAA public meetings
 - 5 - Newspapers
 - 6 - TV/Radio
 - 7 - Conch Coalition/Victims of NOAA
 - 8 - Commercial fishing organization literature
 - 9 - Environmental organization literature
 - 10 - Government fisheries scientists
 - 11 - Sea Grant Extension service
 - 12 - rumors, grapevine
 - 13 - I didn't know about the proposed sanctuary zones.

- For each of the following statements, please refer to the scale sheet that demonstrates levels of agreement or disagreement. Please point to your choice on the scale.
3. The information you were provided by NOAA about the Sanctuary Comprehensive Management Plan contains everything you needed to know about the plan.
- 1 2 3 4 5 I don't know
4. The information you were provided by NOAA about the sanctuary zones contains everything you needed to know about the sanctuary zones.
- 1 2 3 4 5 I don't know
5. The information provided by NOAA about the sanctuary zones has helped you understand the positive and negative effects of the sanctuary zones
- 1 2 3 4 5 I don't know

B. PROCESSES

2. Who do you feel provided you with the most useful information about the proposed sanctuary zones?
- 1 - National Oceanic and Atmospheric Administration (NOAA) personnel
 - 2 - NOAA Comprehensive Management Plan
 - 3 - Other NOAA literature
 - 4 - NOAA public meetings
 - 5 - Newspapers
 - 6 - TV/Radio
 - 7 - Conch Coalition/Victims of NOAA
 - 8 - Commercial fishing organization literature
 - 9 - Environmental organization literature
 - 10 - Government fisheries scientists
 - 11 - Sea Grant Extension service
 - 12 - rumors, grapevine
 - 13 - I don't know about the proposed sanctuary zones

6. Did you participate in any of the following activities related to the development of the Sanctuary Comprehensive Management Plan?
- 1 - frequently; 2 - occasionally; 3 - never
- Sanctuary Advisory Council (SAC) meetings
 - NOAA-sponsored public workshops/hearings/meetings
 - Info Expos
 - Visits to any FKNMS offices (in Key Largo, Marathon, Key West)
 - Letter-writing to FKNMS/NOAA
 - Read Sanctuary Comprehensive Management Plan
 - Read NOAA literature ("Sounding Lines", "Sanctuary Currents", pamphlets, etc.)
 - Town meetings with government officials (congressmen, Monroe County representatives, county commissioners, etc.)

C. OUTCOMES

7. The process of workshops and meetings used by NOAA to develop regulations for the Sanctuary has been open and fair to all groups.
 1 2 3 4 5 I don't know
8. The process used by NOAA to develop boundaries and regulations for the proposed sanctuary zones has been open and fair to all groups.
 1 2 3 4 5 I don't know
9. It really doesn't matter whether the average person participated in the workshops and meetings on the Sanctuary because the average person could not influence the decisions.
 1 2 3 4 5 I don't know
10. NOAA has not given enough consideration to local government concerns in developing regulations for the Sanctuary.
 1 2 3 4 5 I don't know
11. NOAA has not given enough consideration to individual citizen concerns in developing regulations for the Sanctuary.
 1 2 3 4 5 I don't know
12. Once the Sanctuary regulations are enacted, there will be no way that the average person can voice his/her opinion about the usefulness of the regulations.
 1 2 3 4 5 I don't know
13. The procedures that NOAA has established to deal with violations of the Sanctuary regulations are (will be) fair and just.
 1 2 3 4 5 I don't know
14. The sanctuary zones will help to increase the stocks of reef fish such as snapper and grouper in the Florida Keys
 1 2 3 4 5 I don't know
15. The sanctuary zones will help to increase the stocks of spiny lobster (crawfish) in the Florida Keys.
 1 2 3 4 5 I don't know
16. The sanctuary zones will help to increase the stocks of stone crabs in the Florida Keys.
 1 2 3 4 5 I don't know
17. The sanctuary zones will help to increase the stocks of shrimp in the Florida Keys.
 1 2 3 4 5 I don't know
18. The main purpose of the sanctuary zones is to increase overall stocks (and biomass) within the boundaries of the zones.
 1 2 3 4 5 I don't know
19. The main purpose of the sanctuary zones is to increase overall stocks (and biomass) outside the boundaries of the zones.
 1 2 3 4 5 I don't know
20. The main purpose of the sanctuary zones is to conserve and protect corals, fish, and other marine life within the boundaries of the zones.
 1 2 3 4 5 I don't know

21. The primary group that will benefit from the sanctuary zones is commercial fishermen.
- 1 2 3 4 5 I don't know
22. The primary group that will benefit from the sanctuary zones is recreational fishermen.
- 1 2 3 4 5 I don't know
23. The primary group that will benefit from the sanctuary zones is recreational divers.
- 1 2 3 4 5 I don't know
24. Sanctuary zones are the most effective way to reduce conflicts between different user groups.
- 1 2 3 4 5 I don't know
25. Sanctuary zones are the most effective way of restoring the coral reefs in the Keys to what they used to be.
- 1 2 3 4 5 I don't know
26. The long-term effects of the sanctuary zones on the economy of the Keys will be positive.
- 1 2 3 4 5 I don't know
27. I support the establishment of a sanctuary zone somewhere in the Upper Keys.
- 1 2 3 4 5 I don't know
28. I support the establishment of a sanctuary zone somewhere in the Middle Keys.
- 1 2 3 4 5 I don't know
29. I support the establishment of a sanctuary zone somewhere in the Lower Keys (and the Dry Tortugas region).
- 1 2 3 4 5 I don't know
30. I support establishing sanctuary zones somewhere in the Florida Keys.
- 1 2 3 4 5 I don't know
31. I support establishing sanctuary zones in the exact locations proposed in the Sanctuary Comprehensive Management Plan.
- 1 2 3 4 5 I don't know
32. I generally support the establishment of the Florida Keys National Marine Sanctuary.
- 1 2 3 4 5 I don't know
33. Do you fish in any of the sanctuary zones? YES NO
- IF YES, then which ones? _____
- IF YES, then what percentage of your total fishing effort (or catch) is spent in the sanctuary zones? _____%

Part IV

ENFORCEMENT

1. How many times did you see the Florida Marine Patrol (FMP) when you were fishing during the last 12 months?
of times _____
2. How many times did you see the Coast Guard when you were fishing during the last 12 months?
of times _____
3. How many patrol boats do you think that these two agencies operate in the areas where you normally fish?
of vessels _____
4. Within the last 12 months, have you been checked by the Florida Marine Patrol (FMP) or Coast Guard for compliance with fisheries regulations?
1. YES 2. NO
If YES, then how many times were you checked? # of times _____
If NO, then have you ever been checked by the Florida Marine Patrol (FMP) or Coast Guard for compliance with fisheries regulations?
1. YES 2. NO
5. Based on your own observations, how often would you say that other commercial fishermen violate fisheries regulations?
1. On almost every trip
2. On most trips
3. Occasionally, on 1 or 2 trips per year
4. Never
6. Based on your own observations, how likely would you say it is that a fisherman violating fisheries regulations would be seen or detected by the Florida Marine Patrol (FMP) or Coast Guard? Would you say:
1. Very likely
2. Not very likely
3. Not likely
4. Not likely at all
7. How likely is it that a fisherman who is violating fisheries regulations would be caught and penalized by the Florida Marine Patrol (FMP) or Coast Guard? Would you say:
1. Very likely
2. Not very likely
3. Not likely
4. Not likely at all
8. If a fisherman were caught and penalized, how likely do you think it is that this fisherman would violate fisheries regulations again. Would you say:
1. Very likely
2. Not very likely
3. Not likely
4. Not likely at all
9. If the sanctuary zones were put into effect and no commercial harvesting were allowed inside the sanctuary zone boundaries, how likely do you think it is that fishermen would still fish inside the zones and take the risk of being caught. Would you say:
1. Very likely
2. Not very likely
3. Not likely
4. Not likely at all

APPENDIX B

REGULATIONS GOVERNING USER ACTIVITIES IN SANCTUARY PRESERVATION AREAS AND REPLENISHMENT RESERVES IN THE DRAFT MANAGEMENT PLAN

(U.S. Department of Commerce 1995, Vol. 1, pp. 127-128)

(d) Sanctuary Preservation Areas and Replenishment Reserves. (1) In addition to the prohibitions set forth in § 929.6, the following activities are prohibited within the Replenishment Reserves described in Appendix IV to this part, and within the Sanctuary Preservation Areas, described in Appendix V to this part:

(i) Possessing (regardless of where taken from), moving, harvesting, removing, taking, damaging, disturbing, breaking, cutting, spearing, or otherwise injuring any coral, marine invertebrate, fish, bottom formation, algae, seagrass or other living or dead organism, including shells, or attempting any of these activities.

(ii) Fishing by any means. However, possession of gear capable of harvesting fish aboard a vessel, provided such gear is stowed away prior to entering and during transit through the zone, shall not be deemed a violation of this prohibition, and no presumption of fishing activity shall be drawn therefrom.

(iii) Touching living or dead coral, including but not limited to, standing on a living or dead coral formation.

(iv) Placing any anchor in a way that allows the anchor or any portion of the anchor apparatus (including the anchor, chain or rope) to touch living or dead coral, or any sessile organism. When anchoring dive boats, the first diver down shall inspect the anchor to ensure that it is not touching living or dead coral, and will not shift in such a way as to touch such coral or other sessile organisms. No further diving is permitted until the anchor is placed in accordance with these requirements.

(2) vessels shall use mooring buoys or anchoring areas when such facilities or areas have been designated and are available.

(3) Notwithstanding subsection (d)(1) of this section, the following activities are allowed within the Key Largo Replenishment Reserve described in Appendix IV to this part:

(i) catch-and-release fishing from the shore to a depth of 12 feet; and

(ii) harvest of spiny lobster by trap from sand or seagrass bottom habitats.

(4) The Director or designee may impose a limited access designation, or temporary area closure, within any Sanctuary Preservation Area if the Director determines that such action is reasonably necessary to allow for recovery of the living resources of such area from the adverse, cumulative effects of concentrated use;

(i) Except for passage without interruption through the area, for law enforcement or for monitoring pursuant to subparagraph (2)(iv) below, no person shall:

(A) enter a Sanctuary Preservation Area subject to a limited access designation, except by the use of such mooring buoys or anchoring areas as are designated and available for use within such area at the time of the entry; or

(B) enter a Sanctuary Preservation Area subject to a temporary area closure, during the pendency of the area closure.

(ii) In adopting any limited access designation or temporary area closure pursuant to this paragraph, the Director or designee will determine, on the basis of the best available data, information and studies, that:

(A) a concentration of use appears to be causing or contribution to significant degradation of the living resources of the area;

(B) the access restriction or temporary area closure to be imposed is reasonably necessary to allow recovery of the living resources of the area;

(iii) The Director or designee will provide for continuous monitoring of the area during the pendency of the limited access designation or temporary area closure.

(iv) The Director or designee will provide public notice of the limited access designation or temporary area closure through publishing notice in the Federal Register, and such other means as the Director or designee may deem appropriate. With respect to a temporary area closure, the Director or designee will specify the period of such closure.

APPENDIX C

REGULATIONS GOVERNING USER ACTIVITIES IN ECOLOGICAL RESERVES AND SANCTUARY PRESERVATION AREAS IN THE FINAL MANAGEMENT PLAN

(U.S. Department of Commerce 1996, Vol. 1, pp. 122-123)

(d) Ecological Reserves and Sanctuary Preservation Areas. (1) The following activities are prohibited within the Ecological Reserves described in Appendix IV to this part, and within the Sanctuary Preservation Areas, described in Appendix V to this part:

(i) Discharging or depositing any material or other matter except cooling water or engine exhaust.

(ii) Possessing, moving, harvesting, removing, taking, damaging, disturbing, breaking, cutting, spearing, or otherwise injuring any coral, marine invertebrate, fish, bottom formation, algae, seagrass or other living or dead organism, including shells, or attempting any of these activities. However, fish, invertebrates, and marine plants may be possessed aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such resources are shown not to have been harvested within, removed from, or taken within, the Ecological Reserve or Sanctuary Preservation Area, as applicable, by being stowed in a cabin, locker, or similar storage area prior to entering and during transit through such reserves or areas.

(iii) Except for catch and release fishing by trolling in the Conch Reef, Alligator Reef, Sombrero Reef, and Sand Key SPAs, fishing by any means. However, gear capable of harvesting fish may be aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such gear is not available for immediate use when entering and during transit through such Ecological Reserve or Sanctuary Preservation Area, and no presumption of fishing activity shall be drawn therefrom.

(iv) Touching living or dead coral, including but not limited to, standing on a living or dead coral formation.

(v) Placing any anchor in a way that allows the anchor or any portion of the anchor apparatus (including the anchor, chain or rope) to touch living or dead coral, or any attached organism. When anchoring dive boats, the first diver down must inspect the anchor to ensure that it is not touching living or dead coral, and will not shift in such a way as to touch such

coral or other attached organisms. No further diving shall take place until the anchor is placed in accordance with these requirements.

(vi) Anchoring instead of mooring when a mooring buoy is available or anchoring in other than a designated anchoring area when such areas have been designated and are available.

(vii) Except for passage without interruption through the area, for law enforcement purposes, or for purposes of monitoring pursuant to paragraph (d)(2), violating a temporary access restriction imposed by the Director pursuant to paragraph (d)(2).

(2) The Director may temporarily restrict access to any portion of any Sanctuary Preservation Area of Ecological Reserve if the Director, on the basis of the best available data, information and studies, determines that a concentration of use appears to be causing or contributing to significant degradation of the living resources of the area and that such action is reasonably necessary to allow or recovery of the living resources of such area. The Director will provide for continuous monitoring of the area during the pendency of the restriction. The Director will provide public notice of the restriction by publishing a notice in the Federal Register, and by such other means as the Director may deem appropriate. The Director may only restrict access to an area for a period of 60 days, with one additional 60 day renewal. The Director may restrict access to an area for a longer period pursuant to a notice and opportunity for public comment rulemaking under the Administrative Procedure Act. Such restriction will be kept to the minimum amount of area necessary to achieve the purposes thereof.

