DRAFT OPTIONS PAPER

Spiny Lobster Amendment 6

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1.0 PROPOSED ACTIONS

ACTION 1. Delegate management of the spiny lobster resource to the State of Florida.

ACTION 2. Delegate certain operational aspects of the fishery off Florida to the State of Florida with the agreement of the Gulf and South Atlantic Fishery management Councils and the State of Florida.

ACTION 3. Modify the current tailing requirements.

ACTION 4. Modify the regulations regarding possession and handling of short lobsters.

ACTION 5. Update the FMP management protocol to track changes in Florida's management process.

ACTION 6. Annual Catch Limits (ACLs), management measures to limit sectors to their Annual Catch Targets (ACTs), & Accountability Measures (AMs).

ACTION 7. Limit trapping in certain areas to address Endangered Species Act (ESA) concerns for stag horn and elk horn corals.

Background

The ACL final rule indicates that for species not undergoing overfishing, the mechanisms and values for ACLs and AMs must be specified in FMPs, FMP amendments, implementing regulations, or annual specifications beginning in 2011 (see Section(2)(A) in the center column on page 3211). To meet this requirement it has been determined that the Councils must complete the amendment, submit the amendment for formal review, and have regulations implemented during the August 6, 2011/March 31, 2012 fishing year.

Species in the fishery and in the fishery management unit are:

2.1 Fishery

The spiny lobster fishery consists of the spiny lobster, Panulirus argus, and other incidental species of spiny lobster (spotted spiny lobster, Panulirus guttatus; Smooth tail lobster, Panulirus laevicauda; Spanish lobster, Scyllarides aequinoctialis and Scyllarides nodifer) which inhabit or migrate through the coastal waters of and the fishery conservation zone (FCZ) of the Gulf of Mexico and the South Atlantic Fishery Management Council areas and which are pursued by commercial and recreational fishermen.

2.2 Management Unit

The management unit for which federal regulations will be implemented shall be the species Panulirus argus in the FCZ within the jurisdiction of the Gulf of Mexico and South Atlantic Councils.

The ACL final rule states (see Section (d), third column, near the bottom on page 3204): "As a default, all stocks in an FMP are considered to be "in the fishery," unless they are identified as EC species (see Section 600.310(d)(5)) through an FMP amendment process." ACLs and AMs (and other actions) are required for all species "in the fishery"; ACLs and AMs (and other actions) are not required EC species. The Councils have been advised that "in the fishery" refers to species "in the fishery management unit" only.

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2.0 NEED FOR ACTION

Revisions to the Magnuson-Stevens Act in 2006 require that by 2010, Fishery Management Plans (FMPs) for fisheries determined by the Secretary to be subject to overfishing must establish a mechanism for specifying Annual Catch Limits (ACLs) at a level that prevents overfishing and does not exceed the recommendations of the respective Council's Scientific and Statistical Committee (SSC) or other established peer review processes. These Fishery Management Plans (FMPs) also are required to establish within this time frame measures to ensure accountability. Accountability measures (AMs) are management controls that ensure that the Annual Catch Limits (ACLs) are not exceeded; examples include corrective measures if overages occur and implementation of an in-season monitoring program. By 2011, Fishery Management Plans (FMPs) for all other fisheries, except fisheries for species with annual life cycles, must meet these requirements.

No species in the Spiny Lobster FMP is undergoing overfishing. The Gulf of Mexico and South Atlantic Fishery Management Councils will meet the 2011 deadline by preparing Joint Amendment 6 to the Spiny Lobster FMP.

The Council is considering modifying regulations in the Spiny Lobster Fishery Management Plan (FMP). The Council believes that two Federal regulations, the allowance of tailing and the 50-short rule, may be causing unnecessary detrimental impacts to the resource. Under certain situations, lobster tails may be separated from the body onboard a fishing vessel. This allowance makes it difficult to determine if hooks and spears were used to harvest the resource and could result in adverse impacts to the resource such as harvesting berried females which would negatively impact spawning and recruitment. In order to further conserve the resource, the Council is considering regulations that would require lobsters to be landed whole.

In addition, up to 50 spiny lobsters under the minimum size limit may be retained aboard the vessel provided they are held in a live well aboard a vessel. When in a trap, such juveniles or "short" lobsters are used to attract other lobsters for harvest. This regulation increases the fishing mortality on juvenile lobsters and may facilitate their illegal trade. The Council is considering modifying and/or prohibiting possession and use of shorts as attractants.

Fishermen in areas north of Florida on the east coast are allowed to harvest two lobsters per person for either commercial or recreational purposes year-round; harvest of egg-bearing (berried) lobsters is prohibited. The Council scoped potential modifications to

the allowable take to address concerns raised by commercial fishermen but has eliminated this action from detailed consideration (Appendix A).

The Spiny Lobster Fishery Management Plan (FMP) contains a process for the State of Florida to propose modifications to regulations. This process is now outdated and needs to be updated. In addition, the Council is considering delegating management authority to the State of Florida given that virtually all of the harvest occurs in waters off of Florida.

Action 1 would delegate management of all of most of the spiny lobster fishery to the State of Florida. Under this action, the rest of the actions may not be necessary.

Action 2 would expand the items that the State of Florida may change in the management program.

Action 3 would address concerns about removing the tail from lobsters while on-board vessels.

Action 4 would evaluate issues concerning use of short lobsters as attractants.

Action 5 would update the management protocol to recognize name changes in the State of Florida and bring the protocol into conformance with the Reauthorized-MSA.

Action 6 would meet the new requirements for Annual Catch Limits (ACLs) and Accountability Measures (AMs) as specified in the Reauthorized-MSA.

Action 7 would address ESA concerns for stag horn and elk horn corals.

3.0 DESCRIPTION OF ACTIONS AND ALTERNATIVES

3.1 ACTION 1. Delegate management of the spiny lobster resource to the State of Florida.

The spiny lobster fishery occurs mainly of the State of Florida and most of the harvest occurs in the waters off Monroe County, Florida. There is a recreational fishery off North Carolina, South Carolina, and Georgia. Delegating management of the spiny lobster resource to the State of Florida would require the Councils to withdraw the Spiny Lobster FMP. Fishermen would only be under one management body and not three as is currently the case; the Federal National Standards would no longer apply.

Alternative 1. No action. Do not delegate the Spiny Lobster FMP to the State of Florida.

Alternative 2. Withdraw the Federal Spiny Lobster FMP and delegate management to the State of Florida.

Alternative 3. Withdraw the Federal Spiny Lobster FMP off Florida and the Gulf of Mexico and delegate management to the State of Florida. Continue Federal management off North Carolina, South Carolina, and Florida.

Others???

Questions:

1. Would Florida regulations apply to non-Florida registered vessels in the EEZ off Florida?
2. If the FMP was delegated to the State of Florida, would the state management plan need to specify Annual Catch Limits (ACLs) and other MSA-required values?
3. Is the State of Florida willing to manage the spiny lobster fishery in Federal waters?
4. Other issues/questions?

3.2 ACTION 2. Delegate certain operational aspects of the fishery off Florida to the State of Florida with the agreement of the Gulf and South Atlantic Fishery management Councils and the State of Florida.

Instead of delegating all management of the fishery to the State of Florida, it is possible to expand the current framework procedure to allow the State of Florida to modify certain aspects of the regulations.

Alternative 1. No action. Do not modify the existing items that can be change through the framework.

Alternative 2. Delegate certain operational aspects of the fishery off Florida to the State of Florida with the agreement of the Gulf and South Atlantic Fishery management Councils and the State of Florida. The following 10 items are under consideration for potential delegation:

Examples of items could include:

1. *Numerical specification of ACL and breakdown into sector-specific ACLs based on the definitions included in the amendment to the Spiny Lobster FMP.*
2. *Commercial quotas and recreational allocations based on the allocations specified in the amendment to the Spiny Lobster FMP.*
3. *Size limit modifications.*
4. *Bag limit modifications.*
5. *Trip limits.*
6. *Modifications to the length of the season.*
7. *Application of the AMs including closing the fishery when a sector reaches its quota and/or allocation.*
8. *Rules and regulations for possession of traps including gear marking, tagging, etc.*
9. *Data collection and reporting requirements.*
10. *Closed areas – this may be difficult and Florida might need to have NMFS prepare an Environmental Assessment.*

Others???

Questions:

1. Are there other items that should be included?

3.3 ACTION 3. Modify the current tailing requirements.

Originally the State of Florida issued tailing permits to vessels that made multi-day trips to allow them to remove the tails from whole lobsters to improve the storage quality and allow more lobsters to be packed on a boat. When this was adopted into the Federal FMP, no limits were placed on who was able to get a permit to tail lobsters. This result in some law enforcement issues related to not spearing lobsters and lobsters that meet the minimum carapace length.

Alternative 1. No action. Continue to allow – "The possession aboard a fishing vessel of a separated spiny lobster tail in or from the EEZ is authorized only when the possession is incidental to fishing exclusively in the EEZ on a trip of 48 hours or more and a Federal tail-separation permit specified in Section 640.4(a) (2) has been issued to and is on board the vessel."

Alternative 2. Do not allow tailing; this would require all lobsters to be landed whole. This would help prevent the use of hooks and spears to harvest lobsters.

Others???

Questions:

1. Are there other alternatives that should be evaluated?

3.4 ACTION 4. Modify the regulations regarding possession and handling of short lobsters.

Alternative 1. No action. Continue to allow – "A live spiny lobster under the minimum size limit specified in paragraph (b)(1) of this section that is harvested in the EEZ by a trap may be retained aboard the harvesting vessel for future use as an attractant in a trap provided it is held in a live well aboard the vessel. No more than fifty undersize spiny lobsters, or* one per trap aboard the vessel, whichever is greater, may be retained aboard for use as attractants. The live well must provide a minimum of ¾ gallons (1.7 liters) of seawater per spiny lobster. An undersized spiny lobster so retained must be released to the water alive and unharmed immediately upon leaving the trap lines and prior to one hour after official sunset each day."
*[**Note**: After the March Council meeting, a question about whether the "or" should have been "and" was raised. The Spiny Lobster Regulations are included as **Attachment 3** and show "or".]

Alternative 2. Prohibit possession and use of shorts as attractants

Others??

Questions:

1. Are there other alternatives that should be evaluated?

3.5 ACTION 5. Update the FMP management protocol to track changes in Florida's management process.

Alternative 1. No action. Do not update the FMP management protocol. This would leave the current out-dated process in place.

Alternative 2. Modify the process to reflect the changes in the State of Florida.

Others??

Questions:

1. Are there other alternatives that should be evaluated?

3.6 ACTION 6. Annual Catch Limits (ACLs), Allocations, Annual Catch Targets (ACTs), management measures to limit sectors to their Annual Catch Targets (ACTs), & Accountability Measures (AMs).

Beginning January 1, 2011 the Councils must specify annual catch limits for spiny lobster that will prevent overfishing. This will need to be done in conjunction with the State of Florida.

The following list of items, as they apply to species not undergoing overfishing, will be evaluated and specified for species in the spiny lobster fishery management unit.

1. Annual Catch Limits
2. Allocations by Sector (recreational and commercial; recreational, commercial trapping, and commercial diving; others?)
3. Annual Catch Targets (optional)
4. Regulations to limit total mortality (landings and discards) to the Annual Catch Target. Management regulations may include, but are not limited to, the following:
    a) Commercial quotas and recreational allocations
    b) Trip limits
    c) Vessel limits
    d) Size limits
    e) Bag limits
    f) Closed areas
    g) Closed seasons
    h) Permit endorsements
5. Accountability Measures

Questions:

1. Should we wait for the results of the Stock Assessment Update in mid to late 2010 to develop options?

3.7 ACTION 7. Limit trapping in certain areas to address Endangered Species Act (ESA) concerns for stag horn and elk horn corals.

The SERO is preparing options for consideration.

Alternative 1. No action. Do not limit trapping in certain areas to address ESA concerns for stag horn and elk horn corals which would leave the current regulations in place.

Alternative 2. Prohibit trapping in certain areas (Council to Specify).

Others??

Questions:

1. How should hook-and-line fishing be regulated?
2. How should anchoring be regulated?

4.0 BACKGROUND

4.1 Affected Environment

The following information is taken directly from the Spiny Lobster Import Amendment:

5.1 Physical Environment

The Caribbean Sea is an interior sea formed by a series of basins lying to the east of Central America and separated from the North American Basin of the Atlantic by an island arc 2,500 nautical miles long which joins the Florida Peninsula to the north coast of Venezuela. This arc is demarcated by the Greater Antilles (Cuba, Jamaica, Hispaniola, and Puerto Rico) and the Lesser Antilles (the Virgin Islands, Guadeloupe, Martinique, St. Lucia, Barbados, and Trinidad).

Contained between the 10^{th} and 30^{th} degrees of north latitude, this interior sea has an elliptical form. The long northwest-southeast axis is 2,200 nautical miles and the short axis is 900 nautical miles. The total area of the Caribbean Basin is 4,320,000 km^2, divided into two unequal parts: 1) the Gulf of Mexico (1,700,000 km^2) and 2) the Caribbean Sea (2,600,000 km^2); separated by the Yucatan Peninsula and Cuba between which flows the Yucatan Channel (60 nautical miles wide and 2000 m deep).

The Gulf of Mexico is a simple depression including an extended peripheral continental shelf representing more than one-third of the surface area of the Gulf, and a central basin whose maximum depth is 3800 m. The continental shelf is rich in oil-bearing strata. The Gulf of Mexico opens on the North American Basin by the single opening of the Straits of Florida, between the tip of Florida, the north coast of Cuba, and the Bahamas Archipelago. The width of the channel is 30-50 nautical miles and its greatest depth is 800 m.

As a seismic and volcanic region, the Caribbean has a much more complex topography and has numerous openings into the North American Basin. The Jamaican Ridge, running from Cape Gracias a Dios to Jamaica and Hispaniola, divides the Caribbean into two sections-one in the northwest, the other southeast, communicating across a 1500 m sill which is 20 nautical miles wide at 100m. The northwest basin is itself divided in two by the Cayman Ridge, which from the southwest point of Cuba runs toward, without reaching it, the Gulf of Honduras. Between the Gulf of Mexico and the Cayman Ridge lies the Yucatan Basin, of which the central part is 4700 m deep. At its western extremity it communicates freely at depth of more than 5000 m with the second basin, the Cayman Basin. In the eastern part of the Cayman Basin, between the southwest point of Cuba and against the Cayman Ridge lies a narrow trench 7680 m deep.

The southeast basin, more extensive than the northwest, is in turn subdivided into three by two ridges (Beata and the Aves), having a mostly north-south orientation, parallel to the general direction of the Lesser Antilles. Between the Jamaica and Beata Ridges lies the Colombian Basin, more than 4000 m deep. Between the Beata and Aves Ridges is the Venezuelan Basin which has depths between 4000 and 5000 m; and the Grenada Basin, with a depth of more than 3000 m, is held between the Aves Ridge and the chain of the Lesser Antilles. Because the Beata Ridge does not reach the north coast of Colombia, the Colombian and Venezuelan Basins exchange freely at depths of 1600 m. The main exchanges between the Caribbean and the North American Basin are: 1) the Windward Passage between the southeast of Cuba and the northwest part of Haiti, with a depth of 1650 m and a width of 12 nautical miles; and 2) the Anegada Passage, prolonged by the Virgin Islands Passage, with a depth of 1800 m and a length of 8 nautical miles, enabling the Atlantic to communicate with the Venezuelan Basin.

The channels between the islands of the Lesser Antilles are all of the order of a depth of 1000 m. Outside of the Greater Antilles chain, to the north of Puerto Rico and Hispaniola, lies the Puerto Rico trough, which has a maximum depth of 8648 m. This maximum depth is found no more than 200 km from a peak in Hispaniola, which reaches 3175 m for a relief of about 11,823 m in less than 200 km.

The Caribbean Basin is entirely in the tropical Atlantic. The mean annual temperature is near 25° C and seasonal variations are small. The winds, the eastern sector predominating, are tied to the trade wind system of the Northern Hemisphere. In the Gulf of Mexico in winter there is a rather marked northern component. Precipitation is 500 mm annually in the east and southeast Caribbean, 500-1000 mm annually over the Gulf of Mexico, and 2000 mm annually in the southwest part of the Caribbean (Tchernia 1980).

5.2 Biological Environment

5.2.1 Spiny Lobster (*Panulirus* argus)

The Caribbean spiny lobster (*P. argus*) populates the western Atlantic Ocean, Caribbean Sea, and Gulf of Mexico ranging from Bermuda down to Brazil (Herrnkind 1980; Figure 5.2.1). Distribution and dispersal of *P. argus* is determined by the long planktonic larval phase, called the puerulus, during which time the infant lobsters are carried by the currents until they become large enough to settle to the bottom (Davis and Dodrill 1989). As the lobsters begin metamorphosis from puerulus to the juvenile form, the ability to swim increases and they move into shallow, near shore environments to grow and develop.

Figure 5.2.1. Distribution of spiny lobster (*P. argus*)

Young benthic stages of *P. argus* will typically inhabit branched clumps of red algae (*Laurencia sp.*), mangrove roots, seagrass banks, or sponges where they feed on invertebrates found within the microhabitat. In contrast to the social behavior of their older counterparts, the juvenile lobsters are solitary and exhibit aggressive behavior to ensure they remain solitary. The inhabitation of macroalgae by the juvenile lobsters provides protection to the vulnerable individuals from predators while providing easy access to food sources (Marx and Herrnkind 1985).

Individuals two to four years old exhibit nomadic behavior emigrating out of the shallows and moving to deeper, offshore reef environments. Once in the adult phase, Caribbean spiny lobsters are thigmotactic and tend to enter social living arrangements aggregating in enclosed dens. Shelter environments may include natural holes in a reef, rocky outcrops, or artificially created environments (Lipcius and Cobb 1994).

As adults in the offshore environment, Caribbean spiny lobsters support commercial, recreational, and artisanal fisheries throughout their geographic range (Davis and Dodrill 1989). Given the wide distribution of *Panulirus argus* from Bermuda down to Brazil, it is hard to determine a definitive stock structure for this species. There are a multitude of currents and other factors that influence the movement of water throughout the range of *P. argus*. The long duration that lobsters spend in the larval stage, traveling by the currents severely impairs the ability of scientists to determine a stock structure. More recent work with DNA may be useful in determining some sort of stock structure for the Caribbean spiny lobster (Lipcius and Cobb, 1994), however the extensive larval phase may also limit this tool as it takes few successful migrants to homogenize the gene pool (Silberman and Walsh 1994). Studies have also shown that the presence of local gyres or loop currents in certain locations could influence the retention of locally spawned larvae. In addition, benthic structures such as coral reef may

disturb the flow of water and lead to the settlement of larvae in a particular location (Lee, et al. 1994).

The general anatomy of *Panulirus argus* conforms to the typical decapod body plan consisting of five cephalic and eight thoracic segments fused together to form the cephalothorax. The carapace, a hard shield- like structure, protects this portion of the body and is often the part of the lobster measured and used as a standard to determine organism length. All the segments bear paired appendages that serve in locomotion, sensory, or both (Phillips, Cobb and George, 1980). From the head of the lobster, the appendages are ordered starting with the first antennae, second antennae, mandibles, first maxillae, and second maxillae. There are five pairs of walking legs called pereiopods and a six-segmented tail. The antennae function primarily to obtain sensory information by chemoreception, as do the dactyls of the walking legs and the mouthparts involved in handling food. Lobsters have great visual ability, achieved through the use of their paired, lateral compound eyes. In addition, highly distributed superficial hairs detect water movements (Ache and Macmillan, 1980).

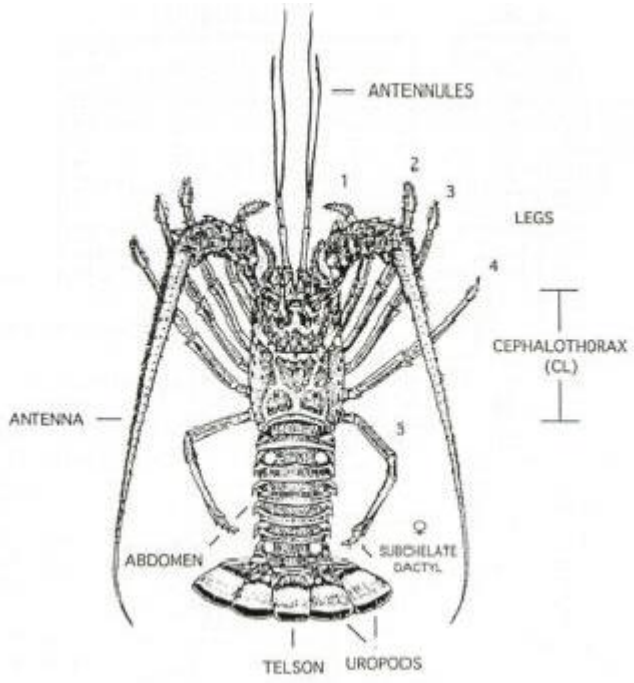

Figure 5.2.2: Morphology of *Panulirus argus* (Lipcius and Cobb, 1994).

Gills are the main organs used by lobsters for respiration. The rate of oxygen consumption in *P. argus* is dependent upon the temperature, the degree of crowding within the den, feeding and size of the lobster; oxygen consumption is not determined by the concentration of the oxygen in the water as some studies show that oxygen uptake remained the same in both hypoxic and aerated water (Phillips, Cobb and George, 1980).

Food Habits

Once *P. argus* settles out from the planktonic phase and enters the seagrass and macroalgae nursery habitat, their diet consists of small gastropod mollusks, isopods, amphipods and ostracods, most of which can be found in or within close proximity to the lobster's algal shelter. Studies suggest that as the abundance of food declines in and around their algae habitat, lobsters forage more frequently and thus have more frequent contact with conspecifics. Aggressive behavior in the juvenile lobsters, which at this time live solitarily, has been observed as a means of enforcing territoriality. The consequence of increased aggressive interactions as well as a declining food source is thought to induce the nomadic emigration from the algal nursery environment to off shore reef environments (Marx and Herrnkind, 1985).

During the adult and juvenile phases, the Caribbean spiny lobster will rest in shelters during daylight hours and emerge in the evening to forage for food. Adult lobsters are key predators in many benthic habitats with their diets consisting of slow-moving or stationary bottom-dwelling invertebrates including sea urchins, mussels, gastropods, clams and snails (Lipcius and Cobb, 1994). Juvenile lobsters also forage at night and will eat a similar diet of invertebrates, only smaller individual prey. During feeding, prey organisms are seized and maneuvered using the anterior periopods or maxillipeds, while the mandibles carry out mechanical digestion and are capable of crushing hard mollusk shell (Herrnkind, et. al. 1975). Little is known about the dietary requirements of the larval phase, plankton sized lobsters.

Larger animals such as sharks and finfish frequently prey upon adult Caribbean spiny lobsters. Studies indicate that Caribbean spiny lobsters are highly selective of the dens they choose to live in and the location of these crevices. Their evening movements away from and subsequent return to their dens illustrates the spatial orientation they have to their immediate habitats (Herrnkind, 1980).

Reproduction

Reproduction in the Caribbean spiny lobster occurs almost exclusively in the deep reef environment once mature individuals have made the permanent transition from the shallow seagrass nursery to the ocean coral reef system. Spawning season is in the spring and summer, however autumnal reproduction has been known to occur in some situations (Kanciruk and Herrnkind, 1976). The gestation period for eggs is about a month. Eggs are orange when they are fresh and brown when they are close to hatching. Studies have found that the initiation of spawning is related to water temperature with an optimal water temperature for mating of 24 degrees centigrade (Lyons, et. al., 1981).

Reproductive fecundity is dependent upon the size of the individual as well as the geographic area in which the lobster lives. Reproductive efficiency for a given size in a given area can be determined using the relationship between fecundity and carapace length. A study conducted in South Florida found that differences exist between the fecundity/carapace length relationships of individuals living in the Dry Tortugas from individuals living in the Upper and Middle Florida Keys. Based on data provided from each location, an Index of Reproductive Potential was calculated using the model developed by Kanciruk and Herrnkind (1976):

Index = (A x B x C)/D
Where:
A = number of females in size class/total females
B = propensity of size class to carry eggs
C = egg carrying capacity of size class female
D = constant (31.27) – present to set the 76-80 mm size class index to 100 as the standard.

Choice of mate is determined by the female as well as inter-male aggression, where larger males will prevent a smaller male from courting a female (Lipcius and Cobb, 1994).

Females mate only once during a season, while males can fertilize multiple females. During mating, the male will flick his antennules over the anterior of the female and scrape at her with the third walking legs. The male follows the female around continually trying to lift the female up and embrace her. This pattern continues until the female acquiesces and they each stand on their walking legs while the male deposits the spermatophore mass on the female sternum (Atema and Cobb, 1980). Females bearing eggs will usually live in solitary dens and infrequently forage for food (Lyons, et. al., 1981). Large adult females will produce more broods, as well as spawn eggs earlier in the reproductive period than younger females since younger individuals molt earlier in the reproductive period.

Growth and Molting

The life cycle of the Caribbean spiny lobster provides larvae with the potential to travel long distances for periods ranging from a few months to almost two years. During this time, the larval lobsters remain near the surface of the water. Maximum potential dispersal distances differ from one region to another and are primarily dependent on the currents in the area. A gyre in an area where lobster eggs have hatched may keep the larva in the same geographic area, however most of the time the larva are transported out of the area, sometimes hundreds of miles (Lee, et. al., 1994). Once the planktonic lobsters reach about 35 mm they are large enough to settle down as post larval pueruli in shallow benthic environments to grow. Growth in juveniles is rapid with most reaching a carapace length of 60-70 mm within about two years

(Herrnkind, 1980). Once the lobsters reach about 70 mm and begin to sexually mature, the young *P. argus* emigrate from the nursery to deeper offshore reef environments.

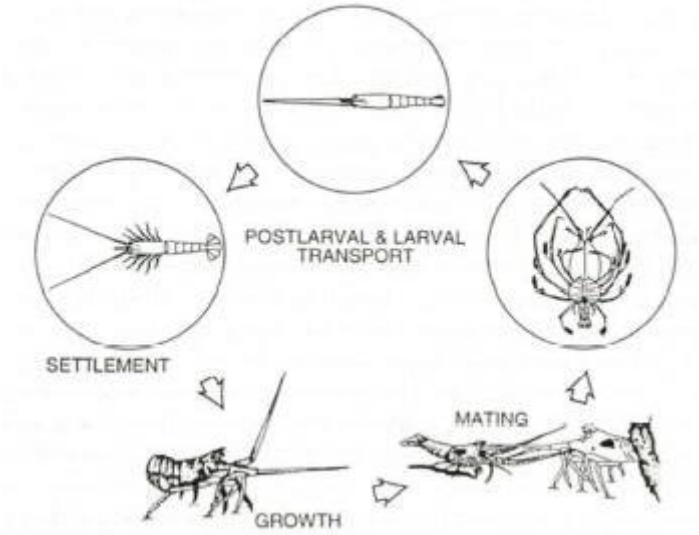

Figure 5.2.3: The Life Cycle of *Panulirus argus* (Lipcius and Cobb, 1994).

Physical growth of lobsters is achieved through molting. A thorough understanding of the molt cycle of the Caribbean spiny lobster is an important component to the management of this fishery because the catchability and captive behavior of crustaceans is directly related to the animal's proximity to molting. The molt cycle begins with the intermolt period, the time when a new cuticle is being created, tissue growth is rapid and the lobster actively forages. This period of time culminates in ecdysis, which is shedding the old cuticle or molting (Lipcius and Herrnkind, 1982).

Molting occurs primarily at night. Possible reasons for nocturnal ecdysis include decreasing the risk of cannibalism by other members of this gregarious species, and decreasing diurnal predation risks. The first action to occur during molting is the rupture of the thoracoabdominal membrane followed by a rising of the dorsal part of the
cephalothorax; this action frees the eyes, bases of antennae and antennules. A series of peristaltic contractions causes the removal of the abdomen from the old cuticle, while writhing motions free the cephalothorax and attached structures. A few final wriggles and contractions terminating in a tail flip completely segregates the lobster from its old cuticle. Once molted, the lobster seeks immediate shelter, as they are especially vulnerable until their new cuticle becomes hardened (Lipcius and Herrnkind, 1982). For adult lobsters, molts average about two and a half times each year. The entire molting event takes approximately ten minutes. The new exoskeleton will take about 12 days from the start of the molt to harden such that it cannot be dented; however the shell is not completely formed until the 28th day (Williams, 1984).

Studies found that feeding rates significantly increase in the time preceding a molt to accommodate the increasing metabolic needs associated with new cuticle formation. About a week before ecdysis, daily food intake for the Caribbean spiny lobster decreases rapidly, in correlation with a reduction in demanding activities such as locomotion and foraging. In the few days before and the time during ecdysis, feeding ceases altogether and the lobster becomes socially reclusive. Within a week of the molting event, *P. argus* will display maximal feeding, foraging and locomotor activity rates to accommodate for the active tissue growth that occurs (Lipcius and Herrnkind, 1982). The dramatic swings in feeding and foraging behavior associated with the molting cycle influences the success of fishermen when capturing this species. The highest catchability of spiny lobster is expected immediately following molting because lobsters are actively foraging at this time and are therefore more likely to accept bait. Conversely, the lowest catachability of spiny lobster is expected before molting when foraging decreases and the lobster becomes less mobile (Lipcius and Herrnkind, 1982).

Growth and Mortality Rates

Despite the wide body of literature on this species, limited information is available on the growth and aging of the Caribbean spiny lobster due in part to the molting habits of lobsters interfering with tagging efforts. Consequently, length data, which is substantially easier and less costly to collect, has been the dominant source of information used to estimate growth in *P. argus.* The limited quantitative information that exists on growth for this species at various locations has been compiled in a doctoral thesis by Jaime Manuel Gonzalez-Cano (1991) and was graphed below using the von Bertalanffy growth model.

L = Linf [1-e(-k(t-to))]
Where:
L = length of the organism at time t
Linf = asymptotic average length achieved
K = growth rate with units 1/time
To = time when the length of the organism would be zero

As with any fished population, especially one with poor aging information, natural mortality rates for Caribbean spiny lobster populations have been difficult to isolate from fished rates of mortality.

Locomotion and Migration

The Caribbean spiny lobster achieves locomotion by using the five pairs of walking legs attached to the cephalothorax and can swim (backward) for brief periods using its tail for propulsion (Lipcius and Cobb, 1994). Patterns of movement in *Panulirus argus* fall into the following

categories: homing, nomadism and migration. Throughout most of their life, *P. argus* is a shelter dweller during the day and forages at night. Evening movements within the home range are directed; lobsters are apparently aware of their location at all times and can find the way back to the den of origin even if detours are caused by predators or divers. Nomadism is the movement that occurs in juvenile lobsters away from the nursery habitat and to the offshore reefs. Migration is the direct movement of an entire population or sub-population over a long distance for a given period of time (Herrnkind, 1980).

Mass movements (2-60 individuals) of Caribbean spiny lobsters occur annually throughout the geographic range of the species and are dependent on latitude and climactic factors. Observed locations for the migration include Bermuda in October, the
Bahamas and Florida in late October and early November, and the Yucatan and Belize in December (Herrnkind, 1985). This mass migratory behavior is thought to have evolved in response to deteriorating conditions that resulted from the periods of glaciations that occurred over the past several 100,000 years. Thus, the migration and queuing behavior became specialized by the natural selection on individuals of the harsh winters during periods of glaciations. Gonads during the migration in the fall are inactive, as they don't begin to mature until the late winter (Herrnkind, 1985).

The first autumn storm in the tropics usually brings a severe drop in water temperature of about five degrees centigrade, as well as high northerly winds of up to 40 km/h and large sea swells. The shallow regions that the lobsters exploit during the summer months become turbid and cold, initiating the diurnal migration of thousands of lobsters to evade these conditions. The Caribbean spiny lobster is highly susceptible to severe winter cooling and will exhibit reduced feeding and locomotion at temperatures 12-14 degrees centigrade; molting individuals usually perish under these conditions. According to
Herrnkind (1985), the behavioral changes observed in *P. argus* as well as the known biological information about the species lends credence to the idea that individuals migrate to evade the stresses of the cold and turbidity in the winter.

Caribbean spiny lobster initiate the migratory behavior by queuing, the single file formation of migrating individuals initiated by visual or tactile stimuli. Queuing is maintained by establishing contact between the antennules of one individual and anterior walking legs of another. Biologically, the queuing behavior is an important hydrodynamic drag reduction technique for the migration of individuals over long distances (Bill and Herrnkind, 1976). Studies done by tagging individuals found that during the migration, individuals tended to move distances of 30-50 km (Herrnkind, 1985).

Migratory movement lasts for variable periods of time and is believed to be dependent on the total number of migratory lobsters. One study in the Bahamas in 1971 found the migration to

take six hours while another study in the same location in 1969 found the migration to take five days. It is thought that the more lobsters present, the longer the migration will last in order to avoid over crowding of shelters at their final destination (Kanciruk and Herrnkind, 1978). Once individuals reach sheltered habitats located in deeper water, such as a deep reef site, the migratory queuing behavior ends and the lobsters disperse.

5.2.2 Protected Species

There are 32 different species of marine mammals that may occur in the EEZ of the Gulf of Mexico, South Atlantic, and Caribbean. All 32 species are protected under the MMPA and six are also listed as endangered under the ESA (i.e., sperm, sei, fin, blue, humpback and North Atlantic right whales). There are no known interactions between spiny lobster fisheries and marine mammals. Other species protected under the ESA occurring in the Gulf of Mexico, South Atlantic, and Caribbean include five species of sea turtle (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); the smalltooth sawfish, and two *Acropora* coral species (elkhorn [*Acropora palmata*] and staghorn [*A. cervicornis*]). A discussion of these species is below. Designated critical habitat for the North Atlantic right whale also occurs within the South Atlantic region. Critical habitat has been designated for green, hawksbill, and leatherback sea turtles in the Caribbean region, however, 99% or more of these areas are contained within state waters.

5.2.2.1 ESA-Listed Sea Turtles

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the South Atlantic. The following sections are a brief overview of the general life history characteristics of the sea turtles found in the South Atlantic region. Several volumes exist that cover more thoroughly the biology and ecology of these species (i.e., Lutz and Musick (eds.) 1997, Lutz et al. (eds.) 2002).

Green sea turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987, Walker 1994). Pelagic stage green sea turtles are thought to be carnivorous. Stomach samples of these animals found ctenophores and pelagic snails (Frick 1976, Hughes 1974). At approximately 20 to 25 cm carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also know to consume jellyfish, salps, and sponges (Bjornal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving range of green sea turtles is estimated at 110 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft.) (Walker 1994). The

time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994).

The **hawksbill's** pelagic stage lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm in straight carapace length (Meylan 1988, Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Little is known about the diet of pelagic stage hawksbills. Adult foraging typically occurs over coral reefs, although other hard-bottom communities and mangrove-fringed areas are occupied occasionally. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998). The hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcerous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely dives last about 56 minutes (Hughes 1974).

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987, Ogren 1989). Once the juveniles reach approximately 20 cm carapace length they move to relatively shallow (less than 50m) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridleys feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridleys most routinely make dives of 50 m or less (Soma 1985, Byles 1988). Their maximum diving range is unknown. Depending on the life stage a Kemp's ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985, Mendonca and Pritchard 1986, Byles 1988). Kemp's ridleys may also spend as much as 96% of their time underwater (Soma 1985, Byles 1988).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. However, they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1000 m (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (Eckert et al. 1986). Dive times range from a

maximum of 37 minutes to more routine dives of 4 to 14.5 minutes (Standora et al. 1984, Eckert et al. 1986, Eckert et al. 1989, Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora et al. 1984).

Loggerhead hatchlings forage in the open ocean and are often associated with Sargassum rafts (Hughes 1974, Carr 1987, Walker 1994, Bolten and Balazs 1995). The pelagic stage of these sea turtles are known to eat a wide range of things including salps, jellyfish, amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic (Witzell 2002). Here they forage over hard- and soft-bottom habitats (Carr 1986). Benthic foraging loggerheads eat a variety of invertebrates with crabs and mollusks being an important prey source (Burke et al. 1993). Estimates of the maximum diving depths of loggerheads ranges from 211 m to 233 m (692-764ft.) (Thayer et al. 1984, Limpus and Nichols 1988). The lengths of loggerhead dives are frequently between 17 and 30 minutes (Thayer et al. 1984, Limpus and Nichols 1988, Limpus and Nichols 1994, Lanyan et al. 1989) and they may spend anywhere from 80 to 94% of their time submerged (Limpus and Nichols 1994, Lanyan et al. 1989).

5.2.2.2 ESA-Listed Marine Fish

The historical range of the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off of North Carolina in 1999 (Schwartz 2003) and the other off Georgia 2002 [Burgess unpublished data]). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 m (Bigelow and Schroeder 1953, Adams and Wilson 1995), while mature animals occur in waters in excess of 100 meters (Simpfendorfer pers comm. 2006). Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1937, Bigelow and Schroeder 1953).

5.2.2.3 ESA-Listed Marine Invertebrates

Elkhorn (*Acropora palmata)* and staghorn (*A. cervicornis*) coral were listed as threatened under the ESA on May 9, 2006. The Atlantic *Acropora* Status Review (*Acropora* Biological Review Team

2005) presents a summary of published literature and other currently available scientific information regarding the biology and status of both these species.

Elkhorn and **staghorn** corals are two of the major reef-building corals in the wider Caribbean. In the Gulf of Mexico, South Atlantic, and Caribbean they are found most commonly in the Florida Keys and U.S. Virgin Islands, though colonies exist in Puerto Rico and Flower Gardens National Marine Sanctuary in the Gulf of Mexico. The depth range for these species ranges from <1 m to 60 m. The optimal depth range for elkhorn is considered to be 1 to 5 m depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 m (Goreau and Goreau 1973).

All Atlantic *Acropora* species (including elkhorn and staghorn coral) are considered to be environmentally sensitive, requiring relatively clear, well-circulated water (Jaap et al. 1989). Optimal water temperatures for elkhorn and staghorn coral range from 25° to 29°C (Ghiold and Smith 1990, Williams and Bunkley-Williams 1990). Both species are almost entirely dependent upon sunlight for nourishment, contrasting the massive, boulder-shaped species in the region (Porter 1976, Lewis 1977) that are more dependent on zooplankton. Thus, Atlantic *Acropora* species are much more susceptible to increases in water turbidity than some other coral species.

Fertilization and development of elkhorn and staghorn corals is exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae (Bak et al. 1977, Sammarco 1980, Rylaarsdam 1983). Unlike most other coral larvae, elkhorn and staghorn planulae appear to prefer to settle on upper, exposed surfaces, rather than in dark or cryptic ones (Szmant and Miller 2006), at least in a laboratory setting. Studies of elkhorn and staghorn corals indicated that larger colonies of both species[1] had higher fertility rates than smaller colonies (Soong and Lang 1992).

5.3 Description of the Economic and Social Environment

5.3.1 Introduction

In September 2006, the Working Group on Caribbean spiny lobster of the Western Central Atlantic Fishery Commission (WECAFC) met in Merida, Mexico, to attend the Regional Workshop on the Assessment and Management of Caribbean Spiny Lobster. The primary objective of the workshop was to "review and update the status of Caribbean spiny lobster resource at national and regional levels to seek regional agreement on strategies to address management problems" (WECAFC 2007, p. 2). At the workshop were representatives from The Bahamas, Belize, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, France (Martinique and Guadeloupe), Haiti,

Honduras, Jamaica, Mexico, Nicaragua, the Turks and Caicos Islands, United States of America (also representing Puerto Rico and the U.S. Virgin Islands), and Venezuela, as well as the Caribbean Fishery Management Council (CFMC) and Caribbean Regional Fishery Mechanism (CRFM). The estimated status of the national populations of Caribbean spiny lobster of the participating countries is presented in the Table 5.3.1.

In keeping with the recommendation to allow about 50 percent of the stock to reach maturity, the national representatives at the workshop agreed to a minimum harvest size of 74 mm (2.91 inches) cephalothorax length. Nations with minimum size limits greater than 76 mm were encouraged to retain the larger minimum size limits because of the additional conservation and economic benefits they provide.

Table 5.3.1. Estimated status of national populations of Caribbean spiny lobster of participating countries. *Source*: WECAFC 2007).

Status of Stock	Countries
Under-exploited	Venezuela (some areas)
Fully-exploited or stable	Antigua & Barbuda, Belize, Costa Rica, Cuba, Mexico, Puerto Rico & U.S. Virgin Islands, Turks & Caicos, USA (Florida), Venezuela (some areas)
Over-exploited	Nicaragua, Jamaica, Dominican Republic, Brazil, Colombia, Honduras
Unknown	Bahamas, Guadeloupe, Haiti, Martinique, other Less Antilles countries

5.3.2. Global Commercial Production of Lobster & Caribbean Spiny Lobster

Since 1962, average annual global harvest of Caribbean spiny lobster has been less than such harvest for American and rock lobster (*Jasus* spp.). See Table 5.3.2. Annual global production of Caribbean spiny lobster averages about 54 percent of all spiny lobster production (*Panulirus* spp. and *Palinurus* spp.) and about 17 percent of global production of all lobster.

Table 5.3.2. Global Production of Lobster, including Caribbean Spiny Lobster (CSL), 1962 through 2003. *Source*: FAO Fishstats, reported landings.

	Metric Tons Landed									
Year	CSL (Panulirus argus)	Spiny Lob (Panulirus & Palinurus).	Am Lob (Homarus americanus)	Eur Lob (Homarus gammanus)	Rock Lob. (Jasus)	Norway Lob (Nephrops norvegicus)	Other Lob	Total Lob	% CSL of Total Lob	% CLS of Spiny Lob
1962	16,324	34,859	34,479	3,100	26,700	23,500	0	122,638	13.31%	46.83%
1963	15,426	33,591	33,833	2,600	25,600	27,700	0	123,324	12.51%	45.92%
1964	15,347	32,050	32,915	4,800	30,100	29,900	0	129,765	11.83%	47.88%
1965	18,658	35,876	32,119	2,500	30,400	28,300	0	129,195	14.44%	52.01%
1966	17,827	35,449	30,400	2,300	32,800	30,700	100	131,749	13.53%	50.29%
1967	16,502	34,506	28,029	2,300	28,900	31,100	100	124,935	13.21%	47.82%
1968	19,497	37,939	31,755	2,300	33,600	33,000	100	138,694	14.06%	51.39%
1969	25,239	42,979	33,513	2,000	26,200	37,600	100	142,392	17.73%	58.72%
1970	25,400	43,949	33,100	2,172	24,400	35,716	1,801	141,138	18.00%	57.79%
1971	24,500	44,445	32,600	2,307	20,856	37,574	1,702	139,484	17.56%	55.12%
1972	25,600	48,931	29,700	2,108	20,457	42,010	1,802	145,008	17.65%	52.32%
1973	25,500	47,016	29,200	1,915	20,062	42,025	1,602	141,820	17.98%	54.24%
1974	28,759	50,459	27,203	1,889	19,548	37,916	1,831	138,846	20.71%	56.99%
1975	26,184	49,866	31,185	1,864	17,044	41,293	1,855	143,107	18.30%	52.51%
1976	24,573	52,586	30,308	1,885	16,667	43,314	1,795	146,555	16.77%	46.73%
1977	24,449	49,755	32,215	1,950	16,823	44,666	3,315	148,724	16.44%	49.14%
1978	30,020	54,979	34,790	1,810	17,123	45,947	2,750	157,399	19.07%	54.60%
1979	32,855	58,778	38,447	1,739	17,459	45,625	2,491	164,539	19.97%	55.90%
1980	29,165	54,860	36,851	1,844	17,288	44,271	1,683	156,797	18.60%	53.16%
1981	29,353	52,845	38,703	1,844	18,863	47,193	2,143	161,591	18.16%	55.55%
1982	29,655	51,016	40,698	2,041	17,663	50,146	1,856	163,420	18.15%	58.13%
1983	28,704	52,820	47,707	2,287	17,501	54,008	1,230	175,553	16.35%	54.34%
1984	34,820	58,167	48,637	2,442	18,571	53,531	1,708	183,056	19.02%	59.86%
1985	36,994	62,128	53,574	2,229	18,971	61,724	2,220	200,846	18.42%	59.54%
1986	34,637	63,503	58,861	1,971	16,937	58,832	2,419	202,523	17.10%	54.54%
1987	33,303	61,380	60,095	2,285	17,650	60,826	2,821	205,057	16.24%	54.26%
1988	32,535	63,640	62,576	2,575	17,132	61,566	2,395	209,884	15.50%	51.12%
1989	34,340	65,886	67,964	2,916	12,176	56,699	3,014	208,655	16.46%	52.12%
1990	32,881	62,327	75,534	2,823	11,308	56,162	3,446	211,600	15.54%	52.76%
1991	40,240	66,666	77,222	2,527	9,119	57,708	3,244	216,486	18.59%	60.36%
1992	36,805	65,502	67,134	2,259	11,366	55,825	3,796	205,882	17.88%	56.19%
1993	36,206	62,439	66,552	2,276	11,418	59,238	4,695	206,618	17.52%	57.99%
1994	39,066	65,953	71,663	2,851	10,627	61,468	4,726	217,288	17.98%	59.23%
1995	39,833	65,359	70,631	2,981	11,266	63,774	5,863	219,874	18.12%	60.94%
1996	38,468	62,826	71,866	2,589	10,625	58,990	6,055	212,951	18.06%	61.23%
1997	36,756	69,990	78,146	3,219	12,582	61,596	7,848	233,381	15.75%	52.52%
1998	34,165	61,887	77,155	2,933	10,227	57,379	7,545	217,126	15.74%	55.21%
1999	38,098	66,051	83,105	3,285	10,396	61,770	3,995	228,602	16.67%	57.68%
2000	37,631	69,134	83,062	2,600	10,280	56,628	5,892	227,596	16.53%	54.43%

Year	Metric Tons Landed								% CSL of Total Lob	% CLS of Spiny Lob
	CSL (Panulirus argus)	Spiny Lob (Panulirus & Palinurus).	Am Lob (Homarus americanus)	Eur Lob (Homarus gammanus)	Rock Lob. (Jasus)	Norway Lob (Nephrops norvegicus)	Other Lob	Total Lob		
2001	31,863	62,144	83,803	2,781	9,944	56,317	6,760	221,749	14.37%	51.27%
2002	38,344	64,952	82,422	2,727	10,672	57,228	6,882	224,883	17.05%	59.03%
2003	33,327	64,545	83,682	2,801	10,741	55,210	7,095	224,074	14.87%	51.63%
Ave	*29,758*	*54,382*	*51,510*	*2,443*	*17,811*	*48,238*	*2,873*	*177,257*	*16.71%*	*54.27%*

According to the Food and Agriculture Organization of the United Nations (FAO), world capture of Caribbean spiny lobster has greatly increased from 1950 through 2005, starting at a low of 2,957 metric tons in 1950 to 35,540 metric tons in 2005 (http://www.fao.org/fishery/species/3445). Twice annual global production has exceeded 40,000 metric tons; and since 1984, annual global production has varied between 30,000 and 41,000 metric tons. See Figure 5.3.2.

Among the countries that harvested Caribbean spiny lobster from 1996 through 2005 and reported those landings to the FAO, the Bahamas had the largest average annual landings, followed by Cuba, Brazil, Nicaragua, and the United States. See Figure 5.3.3 and Table 5.3.3. U.S. imports of frozen spiny lobster represented an average of 87 percent of reported annual Caribbean spiny lobster landings from countries other than the U.S. and Cuba. See Figure 5.3.4.

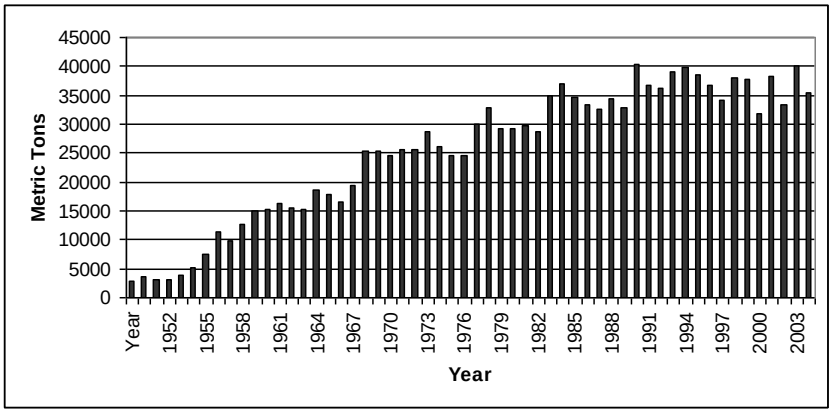

Figure 5.3.2. World Capture of Caribbean Spiny Lobster. *Source*: FAO Fishstats data.

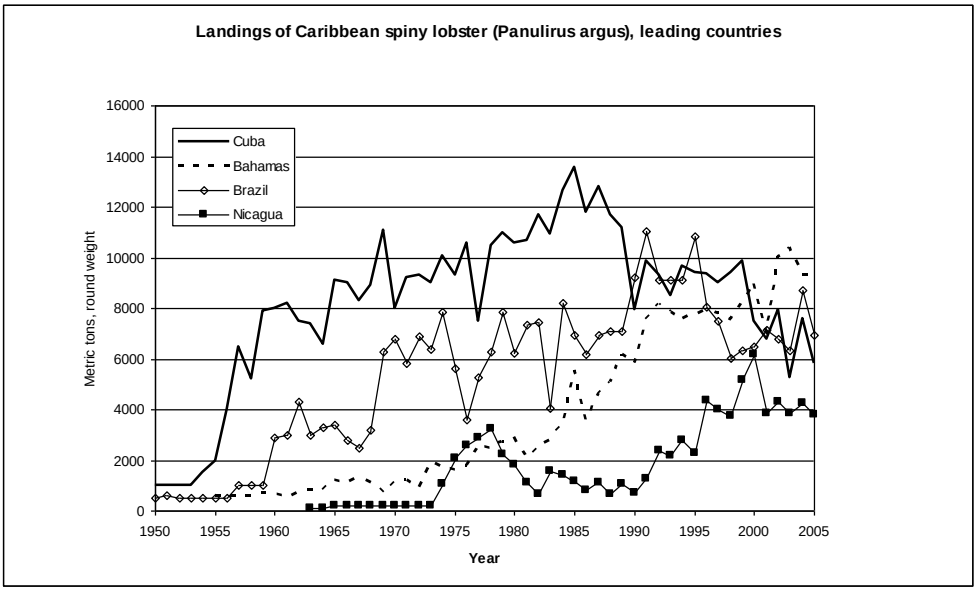

Figure 5.3.3. Top 4 Producers of Caribbean Spiny Lobster, 1950 – 2005. *Source*: FAO Fishstats.

Table 5.3.3. Reported Landings of Caribbean Spiny Lobster, Metric Tons, 1996 – 2005.[2] *Source*: FAO Fishstats.

Country	10-yr Ave	% Total
Anguilla	60	0.16%
Antigua and Barbuda	254	0.69%
Bahamas	8,660	23.61%
Belize	496	1.35%
Bermuda	28	0.08%
Brazil	7,022	19.14%
British Virgin Islands	57	0.16%
Colombia	439	1.20%
Costa Rica	111	0.30%
Cuba	7,859	21.43%
Dominican Republic	1,089	2.97%
Grenada	31	0.08%
Haiti	499	1.36%
Honduras	1,054	2.87%
Jamaica	373	1.02%
Martinique	156	0.43%
Mexico	797	2.17%
Nicaragua	4,350	11.86%
Puerto Rico	183	0.50%
Saint Kitts and Nevis	25	0.07%
Trinidad and Tobago	7	0.02%
Turks and Caicos Is.	269	0.73%

[2] Panama was among the countries that did not report its landings.

Country	10-yr Ave	% Total
USA	2,308	6.29%
US Virgin Islands	106	0.29%
Venezuela, Boliv Rep of	507	1.38%
Total	36,681	100.00%
Total, excluding USA	34,373	
Total, ex. USA & Cuba	26,514	
U.S. imports froz spiny	22,982	86.68%

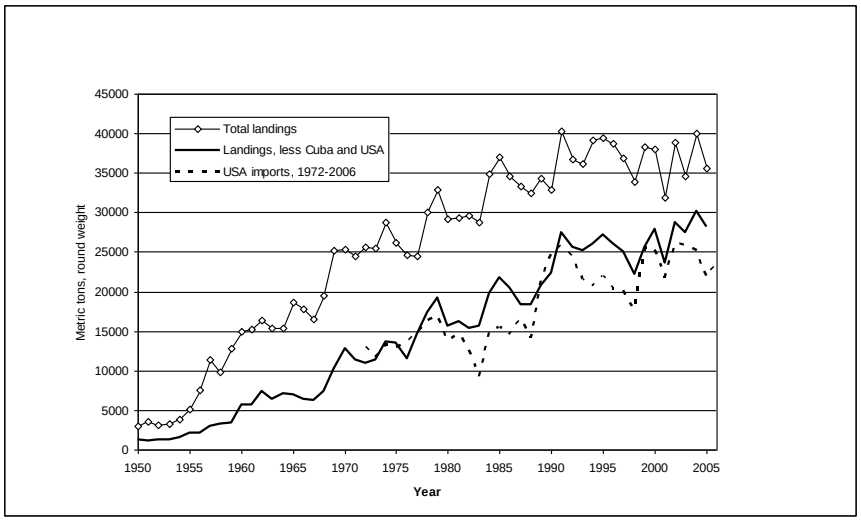

Figure 5.3.4. Global Landings of Caribbean Spiny Lobster and U.S. Imports of Frozen Spiny Lobster. Source: FAO Fishstats.

In 2003, the top five countries with landings of *Panulirus*, *Palinurus*, and *Janus* species were Australia (21.83 percent), The Bahamas (13.78 percent), which combined to produce approximately 35 percent of the world metric ton capture, Indonesia (8.80 percent), Brazil (8.27 percent), and Cuba (8.16 percent) (FAO Fishstats).

Five species of lobster are both commercially and recreationally harvested in U.S. waters. These species are: American lobster (*Homarus americanus*), California spiny lobster (*Panulirus interruptus*), Caribbean spiny lobster (*Panulirus argus*), banded or Hawaiian spiny lobster (*Panulirus marginatus*), and Spanish slipper lobster (*Scyllarides aequinoctialis*). The American lobster is a "true" lobster, whereas the others are members of the spiny/rock lobster group. In the southeast, spotted lobster[3] (*Panulirus guttatus*), ridged slipper lobster (*Scyllarides nodifer*), and smooth tail lobster (*Panulirus laevicauda*) are taken by recreational fishermen only. Since

[3] *Panulirus guttatus* is also called a spotted spiny lobster, Guinea lobster, rock lobster, and spotted crawfish.

2000, commercial landings of Hawaiian spiny lobster, which is also known as banded spiny lobster (*Panulirus marginatus*), have declined from 10,394 pounds in 2000 to 4,870 pounds in 2004.

All of the domestic catch of California spiny lobster is taken in California; however, most of the catch has been marketed in Asia and France because dealers from foreign markets have paid lobster fishers prices ranging from $6.75 to $8.00 per pound (California Department of Fish & Game, 2003; Cascorbi, 2004).[4] However, since 2000, California lobster fishers have attempted to reestablish domestic markets for California spiny lobster because of depressed overseas markets.

From 1962 through 2003, continental U.S. commercial landings of Caribbean spiny lobster have ranged from a low of 1,424 metric tons in 1962 to a high of 5,358 metric tons in 1972. See Table 4. Since 1992, an average of 2,626 metric tons has been landed in the continental U.S. annually. Puerto Rico had no reported commercial landings of Caribbean spiny lobster from 1962 through 1998 and the U.S. Virgin Islands had no such landings from 1962 through 1974. Prior to 1999, over 95 percent of commercial landings occurred in the contiguous U.S.; however, since 1999 landings in Puerto Rico have increased resulting in its productive share rising from zero up to a high of over 10 percent in 2001. See Table 5.3.4.

Commercial landings of Caribbean spiny lobster in the contiguous United States have been reported in Alabama, Georgia, Florida, Mississippi, South Carolina, and Texas since 1962; however, Florida dominates. In 35 of the 45 years from 1962 through 2006, Florida landings accounted for all of the annual commercial landings; and in each of the other 10 years, annual landings in Florida represented at least 94 percent of the total pounds commercially landed that year. This explains why the species is also called the Florida spiny lobster. See Table 5.3.5.

Table 5.3.4. U.S., U.S. Virgin Islands and P.R. Commercial Production of Caribbean Spiny Lobster, 1962 – 2003. *Source*: FAO Fishstats.

Year	Metric Tons			Pounds			% of Landings		
	US	USVI	PR	US	USVI	PR	US	USVI	PR
1962	1,424	0	0	3,139,383	0	0	100.00%	0.00%	0.00%
1963	1,626	0	0	3,584,717	0	0	100.00%	0.00%	0.00%
1964	1,647	0	0	3,631,014	0	0	100.00%	0.00%	0.00%
1965	2,608	0	0	5,749,657	0	0	100.00%	0.00%	0.00%
1966	2,427	0	0	5,350,620	0	0	100.00%	0.00%	0.00%
1967	2,002	0	0	4,413,655	0	0	100.00%	0.00%	0.00%
1968	3,247	0	0	7,158,411	0	0	100.00%	0.00%	0.00%
1969	3,839	0	0	8,463,548	0	0	100.00%	0.00%	0.00%

[4] The species is also harvested along Mexico's west coast; however, most of the catch occurs in California.

Year	Metric Tons			Pounds			% of Landings		
	US	USVI	PR	US	USVI	PR	US	USVI	PR
1970	4,600	0	0	10,141,266	0	0	100.00%	0.00%	0.00%
1971	3,900	0	0	8,598,030	0	0	100.00%	0.00%	0.00%
1972	5,400	0	0	11,904,964	0	0	100.00%	0.00%	0.00%
1973	5,100	0	0	11,243,577	0	0	100.00%	0.00%	0.00%
1974	4,938	0	0	10,886,428	0	0	100.00%	0.00%	0.00%
1975	3,363	22	0	7,414,147	48,502	0	99.35%	0.65%	0.00%
1976	2,430	39	0	5,357,234	85,980	0	98.42%	1.58%	0.00%
1977	2,318	59	0	5,110,316	130,073	0	97.52%	2.48%	0.00%
1978	2,080	71	0	4,585,616	156,528	0	96.70%	3.30%	0.00%
1979	2,699	74	0	5,950,277	163,142	0	97.33%	2.67%	0.00%
1980	2,959	49	0	6,523,479	108,027	0	98.37%	1.63%	0.00%
1981	2,463	42	0	5,429,986	92,594	0	98.32%	1.68%	0.00%
1982	2,649	58	0	5,840,046	127,868	0	97.86%	2.14%	0.00%
1983	2,053	29	0	4,526,091	63,934	0	98.61%	1.39%	0.00%
1984	2,369	35	0	5,222,752	77,162	0	98.54%	1.46%	0.00%
1985	1,667	35	0	3,675,107	77,162	0	97.94%	2.06%	0.00%
1986	2,362	54	0	5,207,320	119,050	0	97.76%	2.24%	0.00%
1987	2,169	30	0	4,781,827	66,139	0	98.64%	1.36%	0.00%
1988	2,438	48	0	5,374,871	105,822	0	98.07%	1.93%	0.00%
1989	2,438	57	0	5,374,871	125,664	0	97.72%	2.28%	0.00%
1990	2,606	60	0	5,745,248	132,277	0	97.75%	2.25%	0.00%
1991	2,878	74	0	6,344,905	163,142	0	97.49%	2.51%	0.00%
1992	1,792	*70*	0	3,950,684	154,324	0	96.24%	3.76%	0.00%
1993	2,548	*70*	0	5,617,379	154,324	0	97.33%	2.67%	0.00%
1994	3,420	*70*	0	7,539,811	154,324	0	97.99%	2.01%	0.00%
1995	2,934	*80*	0	6,468,364	176,370	0	97.35%	2.65%	0.00%
1996	3,373	*80*	0	7,436,193	176,370	0	97.68%	2.32%	0.00%
1997	2,783	*80*	0	6,135,466	176,370	0	97.21%	2.79%	0.00%
1998	2,343	*90*	0	5,165,432	198,416	0	96.30%	3.70%	0.00%
1999	2,749	*94*	209	6,060,509	207,235	460,766	90.07%	3.08%	6.85%
2000	2,571	*100*	212	5,668,086	220,462	467,380	89.18%	3.47%	7.35%
2001	1,527	*110*	190	3,366,459	242,509	418,878	83.58%	6.02%	10.40%
2002	2,047	*120*	158	4,512,863	264,555	348,330	88.04%	5.16%	6.80%
2003	1,887	130	196	4,160,124	286,601	432,106	85.27%	5.87%	8.86%

Table 5.3.5. Commercial Landings of Caribbean Spiny Lobster, 1962 – 2006, in Pounds. *Source*: NMFS Accumulated Landings System.

Year	Pounds Landed by State						TOTAL
	FL	GA	MS	AL	SC	TX	
1962	3,107,000	32,200	0	0	0	0	3,139,200
1963	3,585,200	0	0	0	0	0	3,585,200
1964	3,631,100	0	0	0	0	0	3,631,100
1965	5,714,100	35,000	0	0	0	0	5,749,100
1966	5,350,200	0	0	0	0	0	5,350,200
1967	4,413,600	0	0	0	0	0	4,413,600
1968	6,154,900	1,004,200	0	0	0	0	7,159,100
1969	7,581,200	882,200	0	0	0	0	8,463,400
1970	9,869,500	0	212,700	0	33,000	0	10,115,200
1971	8,206,000	0	373,500	132,600	0	0	8,712,100
1972	11,416,800	0	191,000	39,000	165,100	0	11,811,900
1973	11,171,700	0	21,000	1,500	0	0	11,194,200
1974	10,882,600	0	0	800	0	0	10,883,400
1975	7,408,400	0	0	100	0	0	7,408,500
1976	5,345,600	0	0	0	0	0	5,345,600
1977	6,344,100	0	0	0	0	0	6,344,100
1978	5,601,903	0	0	0	0	0	5,601,903
1979	7,828,269	0	0	0	0	0	7,828,269
1980	6,694,842	0	0	0	0	0	6,694,842
1981	5,894,005	0	0	0	0	0	5,894,005
1982	6,496,804	0	0	0	0	0	6,496,804
1983	4,317,000	0	0	0	0	0	4,317,000
1984	6,251,917	0	0	0	0	0	6,251,917
1985	5,739,393	0	0	0	0	0	5,739,393
1986	5,006,704	0	0	0	0	0	5,006,704
1987	6,082,439	0	0	1,141	0	67	6,083,647
1988	6,308,430	0	0	0	0	0	6,308,430
1989	7,673,159	0	0	0	0	0	7,673,159
1990	5,986,170	0	0	0	0	0	5,986,170
1991	7,022,809	0	0	0	0	0	7,022,809
1992	4,486,421	0	0	0	0	0	4,486,421
1993	5,378,807	0	0	0	0	0	5,378,807
1994	7,104,204	0	0	0	0	0	7,104,204
1995	7,023,938	0	0	0	0	0	7,023,938
1996	7,868,547	0	0	0	0	0	7,868,547
1997	7,107,518	0	0	0	0	0	7,107,518
1998	5,829,132	0	0	0	0	0	5,829,132
1999	7,529,605	0	0	0	0	0	7,529,605
2000	5,772,670	0	0	0	0	0	5,772,670
2001	3,411,253	0	0	0	0	0	3,411,253
2002	4,484,598	0	0	0	0	0	4,484,598
2003	4,269,831	0	0	0	0	0	4,269,831
2004	5,006,383	0	0	0	0	0	5,006,383

Year	Pounds Landed by State						TOTAL
	FL	GA	MS	AL	SC	TX	
2005	3,369,856	0	0	0	0	0	3,369,856
2006	4,773,995	0	0	0	0	0	4,773,995

The commercial value of a Caribbean spiny lobster is found entirely in its tail. As such, most international trade of the species has been in frozen lobster tails. However, whole cooked frozen lobsters, live lobsters, and meat are traded as well. Although there is a small live market in the U.S., most is sold as frozen tails. Spiny lobsters imported into the U.S. that originate from the Caribbean basin are typically tailed, sorted by weight, packed in 10-pound boxes, and shipped frozen to the U.S. for consumption. Size is the critical element in the pricing of lobster tails. Caribbean lobster tails are sorted by the industry into the following sizes: 4 oz, 5 oz, 6 oz, 7 oz, 8 oz, 9 oz, 10 oz, 11 oz, 12 – 14 oz, 14 – 16 oz, 16 – 20 oz, and 20 – 24 oz. A 5-oz tail weighs from 4.5 to 5.4 oz, while a 6-oz tail weighs from 5.5 to 6.4 oz.

The Harmonized Commodity Description and Code System (HS) defines rock lobster as lobster within the family *Palinuridae*, which includes *Jasus* species (spp.), *Justitia* spp., *Linuparus* spp., *Palinurus* spp., *Palinustus* spp., *Panulirus* spp., *Projasus* spp., and *Puerulus* spp. The experiences of NOAA law enforcement officers suggest that boxes of frozen lobster that originate from the Caribbean basin are almost exclusively Caribbean spiny lobster (*Panulirus argus*) tails, with the exception being boxes from shipped from Brazil. Brazil also exports Brazilian spiny lobster (*Panulirus lauvicauda*), and some shipments have contained both Caribbean and Brazilian spiny lobsters. The Government of Brazil is acting to implement a rule that would not allow the two species to be exported in the same box.

Caribbean spiny lobster, Cape rock lobster (*Jasus lalandii*) and Australian spiny lobster (*Panulirus cygnus*) make up most, but not all, of the spiny and rock lobster found on the U.S. mainland market. California spiny lobster makes up about 2 percent of U.S. landings of spiny lobster. From 1997 through 2006 imports of spiny lobster have comprised more than 90 percent of U.S. supply. See Table 5.3.6.

Table 5.3.6. U.S. Supply of Spiny Lobsters, 1997 – 2006. *Source*: Fisheries of the United States 2006.

Year	U.S. Commercial Landings, in lbs	Imports(1), in lbs	Total, in lbs	Exports(2), in lbs	Total Supply, in lbs	Imports as % Supply	Net Imports, in lbs
	Round weight						
1997	7,240,000	74,120,000	81,360,000	5,842,000	75,518,000	91.10%	68,278,000
1998	5,935,000	95,801,000	101,736,000	1,802,000	99,934,000	94.17%	93,999,000
1999	6,692,000	86,240,000	92,932,000	2,346,000	90,586,000	92.80%	83,894,000
2000	6,463,000	94,433,000	100,896,000	1,571,000	99,325,000	93.59%	92,862,000
2001	4,082,000	76,667,000	80,749,000	2,158,000	78,591,000	94.94%	74,509,000
2002	5,188,000	86,923,000	92,111,000	4,890,000	87,221,000	94.37%	82,033,000
2003	4,863,000	94,423,000	99,286,000	6,047,000	93,239,000	95.10%	88,376,000
2004	5,938,000	94,720,000	100,658,000	7,506,000	93,152,000	94.10%	87,214,000
2005	4,144,000	86,987,000	91,131,000	7,766,000	83,365,000	95.45%	79,221,000
2006	5,605,000	85,752,000	91,357,000	14,670,000	76,687,000	93.86%	71,082,000

From 2002 through 2007, total U.S. imports of frozen rock lobster and other sea crawfish (*Palinurus* spp., *Panulirus* spp. and *Jasus* spp.) averaged 12,374.2 metric tons with a value of about $355.5 million, annually.[5] The top 5 countries of origin of those imports by volume (metric tons) are Brazil, The Bahamas, Australia, Honduras and Nicaragua, who collectively represent about 68 percent of the total volume of those imports. See Table 5.3.7. Those same countries account for about 78 percent of the total dollar value of those imports. Of the top 10 countries of origin by volume of frozen rock lobster and other sea crawfish imports, 6 of those countries (Brazil, The Bahamas, Honduras, Nicaragua, Colombia and Belize) export Caribbean spiny lobster to the U.S.

Rock lobster and other sea crawfish are also imported not frozen; however, frozen imports dominate. From 2002 through 2007, U.S. imports of not frozen rock lobster (HS 0036210000) averaged 164 metric tons with a value of $2.9 million annually, as compared with about 12,372 metric tons with a value of $355.5 million for frozen. The top five countries of origin during those years by volume were Mexico (122 metric tons), Australia (10 metric tons), Peoples Republic of China (5.5 metric tons), Taiwan (4.6 metric tons), and the United Kingdom (3.3 metric tons). Mexico is exporting increasing numbers of live Caribbean spiny lobster, and it is assumed that the bulk of its exports of not frozen rock lobster are these live specimens.

[5] Harmonized import code HS 03 includes fish, crustaceans, mollusks, and aquatic invertebrates. HS 0306 includes crustaceans only. HS 030611000 includes rock lobster and other sea crawfish, frozen. HS 0306210000 includes rock lobster and other sea crawfish, not frozen.

Table 5.3.7. Top 20 Countries of Origin for Imports of Frozen Rock Lobster and Other Sea Crawfish (HS 0036110000), 6-Year Average, 2002 – 2007. Source: U.S. Customs Data.

Trading Partner	MT	% Total	Combined %	1000s $	% Value	Combined %
BRAZIL	2,926.6	23.65%	23.65%	75,739	21.30%	21.30%
BAHAMAS, THE	1,518.1	12.27%	35.92%	50,135	14.10%	35.41%
AUSTRALIA(*)	1,492.6	12.06%	47.99%	64,635	18.18%	53.59%
HONDURAS	1,281.4	10.36%	58.34%	42,124	11.85%	65.44%
NICARAGUA	1,239.2	10.02%	68.36%	39,101	11.00%	76.44%
CHINA, PEOPLES REPUB	626.6	5.06%	73.42%	3,741	1.05%	77.49%
SOUTH AFRICA, REPUBL	520.6	4.21%	77.63%	16,250	4.57%	82.06%
UNITED ARAB EMIRATES	484.0	3.91%	81.54%	10,374	2.92%	84.98%
COLOMBIA	320.2	2.59%	84.13%	8,700	2.45%	87.43%
BELIZE	222.3	1.80%	85.93%	7,488	2.11%	89.53%
MEXICO	194.1	1.57%	87.50%	6,039	1.70%	91.23%
OMAN	190.8	1.54%	89.04%	4,329	1.22%	92.45%
THAILAND	184.9	1.49%	90.53%	2,486	0.70%	93.15%
TAIWAN	133.0	1.07%	91.61%	1,771	0.50%	93.65%
PANAMA	131.7	1.06%	92.67%	2,615	0.74%	94.38%
NEW ZEALAND(*)	118.5	0.96%	93.63%	3,175	0.89%	95.27%
JAMAICA	113.3	0.92%	94.55%	3,496	0.98%	96.26%
DOMINICAN REPUBLIC	85.5	0.69%	95.24%	1,803	0.51%	96.76%
CHILE	67.7	0.55%	95.78%	979	0.28%	97.04%
SPAIN	66.1	0.53%	96.32%	494	0.14%	97.18%

*: denotes a country that is a summarization of its component countries. Australia(*) includes Australia, Christmas Island, Cocos (Keeling) Island, Heard Island and McDon, and Norfolk Island. New Zealand(*) includes Cook Islands, New Zealand, Niue, and Tokelau.

5.3.3 Federal Management of Caribbean Spiny Lobster under the MSA

The Caribbean spiny lobster in the U.S. Exclusive Economic Zone (EEZ) of the Atlantic Ocean and Gulf of Mexico is jointly managed by the South Atlantic and Gulf of Mexico Fishery Management Councils through the Fishery Management Plan for Spiny Lobster (Spiny Lobster FMP) in the Gulf of Mexico and South Atlantic. In the U.S. EEZ of the Caribbean Sea surrounding Puerto Rico and the U.S. Virgin Islands, the resource is managed by the Caribbean Fishery Management Council (Caribbean FMC) through its Spiny Lobster FMP. In the Gulf and South Atlantic, the commercial fishery and, to a large extent, the recreational fishery occurs off South Florida, primarily in the Florida Keys. In order to streamline a management process that involves both state and federal jurisdictions, the Gulf and South Atlantic Spiny Lobster FMP basically extends the Florida Fish and Wildlife Commission's rules regulating the state fishery to the southeastern U.S. EEZ from North Carolina to Texas.

The Gulf and South Atlantic Spiny Lobster FMP was implemented on July 26, 1982 (47 *Federal Register (FR)* 29203). The FMP, for the most part, extended Florida's rules of regulating the fishery to the EEZ throughout the range of the fishery; and since 1982, it has been amended seven times.

The Gulf and South Atlantic Spiny Lobster FMP was first amended on July 15, 1987 (52 *FR* 22659) with certain rules deferred and implemented on May 11, 1998 (53 *FR* 17196) and on July 30, 1990 (55 *FR* 26448). This amendment (Amendment 1) updated the rules to be more compatible with Florida law. Amendment 1 required a commercial permit, limited possession of undersized lobsters as attractants, required a live well, modified recreational possession and seasonal regulations, modified closed season regulations, required the immediate release of egg-bearing lobsters, modified the minimum size limit, required a permit to separate the tail at sea and prohibited possession or stripping of egg-bearing slipper lobsters.

Amendment 2 was approved on October 27, 1989 (54 *FR* 48059) and provided a regulatory amendment procedure for instituting future compatible state and federal rules without amending the Spiny Lobster FMP to ensure federal-state compatibility. Amendment 2 modified the problems/issues and objectives of the FMP, modified the statement of optimum yield, established a protocol and procedure for an enhanced cooperative management system, and added to the vessel safety and habitat sections of the FMP.

Amendment 3 was implemented on March 25, 1991 (56 *FR* 12357) and contained provisions for adding a scientifically measurable definition of overfishing; an action plan to prevent overfishing, should it occur, as required by the National Standards of the Magnuson-Stevens Fisheries Conservation and Management Act (50 *CFR* Part 600); and the requirement for collection of fees for the administrative cost of issuing permits.

The first Regulatory Amendment to the Spiny Lobster FMP was implemented on December 30, 1992 (Regulatory Amendment 1). Regulatory Amendment 1 addressed: 1) the extension of the Florida spiny lobster trap certificate system for reducing the number of traps in federal waters off Florida, 2) the revision of the FMP's commercial permitting requirements, 3) the limitation of the number of live undersize lobster used as attractants for baiting traps, 4) the specification of gear allowed for commercial fishing in the U.S. EEZ off Florida, 5) the specification of the possession limit of spiny lobsters by persons diving at night, 6) the requirement of lobsters harvested by divers to be measured without removing from the water, and 7) the specification of uniform trap and buoy numbers for federal waters off Florida. All of these changes were implemented through the framework procedure of the FMP as established by Amendment 2.

The second Regulatory Amendment (Regulatory Amendment 2) was approved in March 1993 and implemented in August 1993 (58 *FR* 38978). Regulatory Amendment 2 addressed: 1) a

change in the days for the special recreational season in federal waters off Florida, 2) a prohibition on night-time harvest off Monroe County, Florida, during that season, 3) specifies allowable gear during that season, and 4) provides for different bag limits during that season off the Florida Keys and federal waters off other areas of Florida.

Amendment 4 was implemented on September 13, 1995 (60 *FR* 41828). It provided a bag limit of 2 lobsters per day for all fishers in federal waters off North Carolina, South Carolina, and Georgia (50 *CFR* §640.23).

Amendment 5 of the Spiny Lobster FMP was part of the Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region, which the National Marine Fisheries Service (NMFS) approved on June 3, 1999. Amendment 6 was part of the Comprehensive Amendment Addressing Sustainable Fishery Act Definitions and Other Required Provisions in FMPs of the South Atlantic Region. NMFS approved the Comprehensive Amendment in October 1998 and it was implemented on December 2, 1999 (64 *FR* 59126). Similarly, the Gulf of Mexico Fishery Management Council developed Generic Amendments to address Essential Fish Habitat and Sustainable Fishery Act. The former described the distribution and relative abundance of juvenile and adult spiny lobster for offshore, near-shore, and estuarine habitats of the Gulf; and the latter updated the description of the spiny lobster fisheries and provided fishing community assessment information for Monroe County, Florida.

Amendment 7 was implemented under a Generic Amendment that created the two Tortugas Marine Reserves: Tortugas North (120 square nautical miles) and Tortugas South (60 square nautical miles). This amendment prohibits fishing for or possession of spiny lobster in either of the two reserves. It was implemented on July 19, 2002 (67 *FR* 47467).

Currently, harvest or possession of spiny lobsters in the U.S. South Atlantic EEZ is regulated in 50 CFR 640. According to 50 CFR 640.4, anyone who sells, trades, or barters or attempts to sell, trade, or barter spiny lobster that was harvested or possessed in the EEZ off Florida, or harvested in the EEZ other than off Florida and landed in Florida must have licenses and certificates specified to be a commercial harvester, as defined in Rule 46-24.002(a), Florida Administrative Code. Similarly, any person who sells, trades, or barters or attempts to sell, trade, or barter a Caribbean spiny lobster harvest in the U.S. EEZ other than off Florida, a Federal vessel permit must be issued and on board the harvesting vessel (50 CFR §640.4(a)(1)(ii)).

The commercial and recreational fishing season for spiny lobster in the EEZ off Florida and the EEZ off the Gulf States, other than Florida, begins on August 6 and ends on March 31 (50 CFR §640.20(b)). No person may possess a Caribbean spiny lobster in or from the Gulf and South Atlantic EEZ with a carapace length of 3.0 inches (7.62 cm) or less or a separated tail with a

length less than 5.5 inches (13.97 cm) (50 CFR §640.21(b)). Current regulation prohibits the possession of a spiny lobster or parts thereof in or from the Gulf and South Atlantic EEZ from which the eggs, swimmerettes or pleopods have been removed (50 CFR §640.21(a)); and requires any berried spiny lobster to be returned immediately to the water (50 CFR §640.7(g)).

The Caribbean Fishery Management Council manages the Caribbean spiny lobster fishery in the U.S. Caribbean EEZ and territorial seas of Puerto Rico and the U.S. Virgin Islands through the FMP for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands. The Caribbean Spiny Lobster FMP was implemented in 1985. The associated regulations include that no person may possess a Caribbean spiny lobster in or from the Caribbean EEZ with a carapace length less than 3.5 inches (8.9 cm) (50 CFR §622.37(b)).

On July 26, 2007, a Notice of Intent was published in the *Federal Register* (72 *FR* 41063) announcing the Caribbean Fishery Management Council's intent to prepare a draft environmental impact statement to describe and analyze management alternatives to be included in an amendment to its Spiny Lobster FMP and the Gulf and South Atlantic Spiny Lobster FMP. The Caribbean, Gulf and South Atlantic Fishery Management Councils have expressed concern about the effects of imports of spiny lobster that are smaller than the size limits in the U.S. spiny lobster FMPs. In many instances, imports are also undersized based on size limits established in the country of origin. The Caribbean FMC has expressed intent to amend its Spiny Lobster FMP of a minimum size limit on imported spiny lobster. NOAA Fisheries believes amendment of the Gulf and South Atlantic Spiny Lobster FMP should be addressed concurrently.

5.3.4 Other Federal Laws and Regulations that Protect Spiny Lobster

Lacey Act

The Lacey Act, as amended in 1981 (16 USC §§ 3372 et seq.) prohibits any person from importing, exporting, transporting, selling, receiving, acquiring, or purchasing in interstate or foreign commerce any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any state or in violation of any foreign law. For example, it is a violation of the Lacey Act to import Caribbean spiny lobster that is in violation of the exporting country's minimum harvest-size standard. Many of the countries that harvest Caribbean spiny lobster have minimum harvest size standards. See Table 5.3.8.

NOAA's Office of Law Enforcement, Southeast Region, has made several significant Lacey Act cases against individuals involved in importing undersized lobsters from Honduras, Nicaragua, The Bahamas, and Brazil.

In July 2003, a Miami man pleaded guilty to importing more than $2.8 million worth of undersized spiny lobster from Nicaragua. The man and others illegally shipped into the U.S. about 190,000 pounds of frozen spiny lobsters below Nicaragua's minimum legal size of 5 ounces (Associated Press July 3, 2003).

Table 5.3.8. Minimum Size Restrictions of Caribbean Spiny Lobster for Harvesting Countries. *Source*: FAO.

Country	Carapace Length	Tail Length	Tail Weight	Total Weight	Total Length	CRFM Member	% 2003 World Harvest	Agreed to 74 mm (2.91 in.) cephalothorax length*
Anguilla	95 mm					Yes	0.18	
Antigua and Barbuda						Yes	0.73	
Bahamas	82.5 mm[a]	5.5 in. or 139.7 mm				Yes	31.14	Yes
Barbados						Yes	0.00	
Belize	76.2 mm or 3 in.	113 mm[a]	4 oz.			Yes	1.63	Yes
Bermuda	3 5/8 in. or 92 mm		12 oz. or 340 g			No	0.09	
Brazil	75 mm[a]	130 mm[a]					16.02	Yes
British Virgin Islands	3.5 in.			1 lb.		Yes	0.01	
Colombia-San Andres	80.1 mm[a,c]	140 mm[a]				No	0.8	Yes
Colombia-Guajira	68.9 mm[a]	210 mm[a]		385 g[a]		No		
Costa Rica						No	0.08	Yes
Cayman						No	0.00	
Cuba	69 mm[a]	150 mm[a]			210 mm[a]		15.80	Yes
Dominica						Yes	0.00	
Dominican Republic	80.5 mm[a]	120 mm[a,b]			240 mm[a]	No	2.41	Yes
Grenada	3.7 in.					Yes	0.08	
Guadaleupe						No	0.00	
Gautemala						No	0.00	
Guyana						Yes	0.00	
Haiti						Yes	0.60	Yes
Honduras	80.1mm[a]	145 mm[a]	142 g[a]			No	3.06	Yes
Jamaica	7.62 cm or 3 in.					Yes	1.50	Yes
Martinque						No	0.57	Yes
Mexico	74.6 mm[a]	135 mm[a]			223 mm[a]	No	3.15	Yes
Monserrat						Yes	0.00	
Nicaragua	75 mm[a]	135 mm[a]	142 g[a]		230 mm[a]	No	11.56	Yes
Panama						No	0.00	
Puerto Rico	3.5 in.					No	0.59	Yes
St. Kitts & Nevis	9.5 cm or 3.75 in.					Yes	0.03	
St. Lucia	95[a]		340 g[a]			Yes	0.00	
Saint Vincent and the Grenadines	95 mm or 3.75 in.			1.5 lb.	9 in.	Yes	0.00	
Turks and Caicos	3.57 in. or 83		7 oz. or			Yes	0.74	Yes

Country	Carapace Length	Tail Length	Tail Weight	Total Weight	Total Length	CRFM Member	% 2003 World Harvest	Agreed to 74 mm (2.91 in.) cephalothorax length*
	mm		142 g					
Trinidad and Tobago						Yes	0.01	
USA (Florida)	3 in. or 76 mm	5.5 in.				No	5.66	Yes
U.S. Virgin Islands	3.5 in.					No	0.39	Yes
Venezuela	120 mm[a]			900 - 1,000 g[a]		No	3.18	Yes

a: FAO Fisheries Report No. 715, page 257.

b: Without telson.

c: Converted from another measurement.

*: At the September 2006 Regional Workshop on the Assessment and Management of Caribbean Spiny Lobster of the Working Group on Caribbean spiny lobster of the WECAFC.

In December 2003, a Norfolk, Virginia-based seafood company and its vice president pleaded guilty in federal court in Miami to conspiracy to import more than $2 million worth of undersized spiny lobster from Nicaragua to the United States. The company purposely mislabeled boxes of frozen undersized lobster to conceal that the boxes held 2-, 3-, and 4-ounce tails, all of which were below Nicaragua's legal 5-ounce limit for lobster processing and trade (South Florida Business Journal, December 15, 2003).

In May 2006, Winn-Dixie, Inc. pleaded guilty to illegal possession, transportation, and sale of undersized Caribbean spiny lobster contrary to Florida laws and regulations and the Lacey Act. On October 29, 2002, Winn-Dixie received a shipment at one of its Florida facilities of about 6,000 pounds of Caribbean spiny lobster imported from Brazil that it purchased through a broker in Illinois. It was determined that about 4,600 pounds of lobster tail failed to meet Florida and Brazil size standards (States News Service; May 22, 2006).

Florida Keys National Marine Sanctuary and Protection Act

In November 1990, Congress passed the Florida Keys National Marine Sanctuary and Protection Act that established the Florida Keys National Marine Sanctuary (FKNMS) (Pub.L 101-605).[6] The FKNMS is comprised of 9,660 square kilometers (about 2,900 square nautical miles) of coastal waters off the Florida Keys. It extends approximately 220 miles southwest of the southern tip of the Florida peninsula and includes the world's third largest coral barrier reef. Within the Sanctuary are 24 no-take zones. Fifty-eight percent of the Sanctuary resides in Florida waters and 42 percent is in federal waters. Both NOAA and the State of Florida manage the Sanctuary.

[6] The National Marine Sanctuary System was created in 1972. Two areas in the Florida Keys were designated as sanctuaries, the first in 1975 and the second in 1981. These areas were included in the Florida Keys National Marine Sanctuary in November 1990.

The waters of the FKNMS are within the jurisdiction of both the South Atlantic and Gulf of Mexico fishery management councils.

Biscayne Bay National Park

Originally established as a national monument by Congress in 1968, Biscayne Bay National Park was re-designated as a national park in 1980. The Park's purpose is to preserve and protect its rare combination of terrestrial and aquatic natural resources. The Park includes approximately 173,000 acres in Miami-Dade County, and is about 22 miles long. The park extends from shore about 14 miles to the 60-foot contour and contains about 72,000 acres of coral reefs. Under existing Supervisor's rules for the Park, several areas are closed year-round to public entry to protect sensitive resources and wildlife. This also means not taking Caribbean spiny lobster in those areas.

Buck Island Reef National Monument

Buck Island Reef National Monument (Buck Island NM) in St. Croix was established in 1961 and expanded more than twenty times in size in 2001, from 880 acres to over 19,000 acres. Its area is mostly underwater and it encompasses 7 percent of the shelf around St. Croix. Federal regulation prohibits the harvest or collection of Caribbean spiny lobster within the boundaries of the national monument (36 CFR § 7.73(a)).
Virgin Islands Coral Reef National Monument (Virgin Islands NM) in St. John was established in 2001 and its area encompasses 3 percent of the St. John/St. Thomas shelf. Harvest or collection of Caribbean spiny lobster is prohibited (36 CFR § 7.46(a)). The National Park Service manages both of these national monuments.

Virgin Islands National Park

Virgin Islands National Park on St. John was established by Congress in 1956 and today is managed by the National Park Service. It comprises more than half of the island of St. John and almost 9 square miles of water surrounding the island. Virgin Islands National Park attracts almost one million visitors a year, most of them arriving on cruise ships or smaller boats. Caribbean spiny lobster may be taken by hand or hand held hook within the park (36 CFR § 7.74(e)(3)).

Dry Tortugas National Park

The Dry Tortugas National Park was established by Congress in 1992 (Public Law 102-525). Possession of Caribbean spiny lobster is prohibited within boundaries of the park unless the individual took the lobster outside the park waters and the person in possession has proper

State/Federal licenses and permits (36 CFR § 7.27(b)(4)(i)). The presence of lobster aboard a vessel in park waters, while one or more persons from such vessel are overboard constitutes prima facie evidence that the lobsters were harvested from park waters in violation of the above regulation.

Past Federal Actions

Indirect, but related, past federal actions that greatly affected the Caribbean spiny lobster fishery were the Migration and Refugee Assistance Act of 1962 and Cuban Refugee Adjustment Act of 1966. The Migration and Refugee Assistance Act authorized assistance to or in behalf of refugees in the United States, which included business loans. The Cuban Refugee Adjustment Act adjusted the status of Cuban refugees to that of lawful permanent residents, which enabled them to acquire commercial fishing vessels.[7] According to Moe (1991), many of the 300,000 Cubans who fled Cuba used those government loans to obtain boats to fish lobster in Bahamian waters.[8] When Bahamian waters were closed to U.S. fishermen, those lobster fishermen moved their operations into U.S. waters.

5.3.5 State & Territory Spiny Lobster Laws and Fisheries Histories

5.3.5.1 Florida

Up until the twentieth century, landings of spiny lobster were low because the fishery was largely a bait fishery that supported Florida's finfish industry (Labisky et al., 1980).[9] However, at the turn of the century a spiny lobster commercial fishery began to develop due to the construction of the Overseas Railroad in 1912, which allowed dealers to ship spiny lobsters to northern hotels and restaurants (ibid., p. 30). The first legislation enacted by the State of Florida (State) to conserve the supply of spiny lobster in response to the growing commercial retail trade was in 1919 when it implemented a seasonal closure from March 1 to June 1, but which allowed the taking of lobster for research, fish bait, or propagation throughout the year. Two years later the closed season was changed to March 21 to June 21.

In the nineteenth century and up until the early twentieth century, spiny lobsters were typically harvested in shallow waters of Key West with cast nets, gill nets, haul seines, and grains (Labisky

[7] As of August 1, 1966, there were 165,000 refugees from Cuba in the U.S. without legal permanent resident status (Immigration Information, vol. 19, Interim Decision #3069).

[8] The Bartlett Act of 1964 excluded foreign fishing vessels from fishing within the United States's territorial sea, which was defined as all ocean waters within 3 miles from the coast of the United States, its territories and possessions and the Commonwealth of Puerto Rico" (Public Law 88-308). Two years later Congress passed the Contiguous Fisheries Zone Act (Public Law 89-658), which created a 9-mile contiguous zone extending out from the 3-mile limit from which foreign fishing vessels would be excluded.

[9] According to Moe (1991, p. 39), spiny lobsters are "excellent bait for large snapper and grouper".

et al., 1980). Continuous increases in commercial demand in the early 1900s, however, stimulated expansion of the fishery so that by 1922 the primary fishing grounds extended from the shallow waters surrounding Key West to a "25-mile linear zone that encompassed the southern shores of the lower Florida Keys and the shallow Atlantic reef area both east and west of Key West" (Labisky et al., 1980). The expansion of the fishery into deeper waters necessitated gear changes from cast nets, gill nets, haul seines and grains to increasing use of bully nets and wire traps.

From 1925-26 to 1927-28 total landings increased from 88,000 pounds to 873,000 pounds, an almost 900 percent increase. The State amended its lobster regulations in 1929 to increase the length of the closed season from three to four months (March 21 to July 21) and set, for the first time, a minimum legal size limit, which was one pound (Labisky *et* al., 1980; Prochaska and Baarda, 1975).

Despite declines in landings and prices per pound during the 1930s, the development of deep-freeze processing techniques enabled further expansion of the commercial retail market for spiny lobster in the 1940s. From 1940 to 1949 total commercial landings increased from 0.4 million pounds to 3.58 million pounds and price per pound increased from $0.07 to $0.22. By the 1940s, the most popular commercial fishing gears were wooden slat-traps, bully nets, and ice-can traps in that order. Slat-traps were used primarily in deeper waters "associated with the offshore reef on the Atlantic side of the Keys; bully nets were used in the shallow waters of Florida Bay; and … ice cans were used in shallow inshore waters" (Labisky *et* al., 1980, p. 33). Traps were still pulled by hand, however, which limited their numbers and use in deep waters (Moe, 1991). Also in the 1940s, there was an increase in imports of spiny lobster tails from the Caribbean, South Africa, and Australia (Labisky *et* al., 1980).

The south Florida spiny lobster fishery continued to grow in the 1950s. From 1952 to 1959 the number of boats/vessels in the fishery expanded from 102 to 254; the price per pound increased from $0.18 per pound in 1950 to $0.30 per pound in 1959; the number of traps increased from 17,000 in 1951 to approximately 52,000 in 1959; and commercial landings increased from 1.56 million pounds in 1950 to 3.18 million pounds in 1959.[10] With that growth came more State action to protect the supply of spiny lobster. In 1953, the Florida Legislature changed the timing of the closed season from the period of March 21 to July 21 to the period of April 15 to August 15, and redefined the legal size limit from one pound to a minimum tail size of 6 inches; however, in 1955, it reestablished the closed season from March 31 to August 1 (Labisky et al.,

[10] According to Labisky et al., there were 376 boats/vessels in 1950 and 319 boats/vessels in 1951 that were engaged in spiny lobster fishing. It is unclear why the number of boats/vessels fell to 102 in 1952, or if the 1950 and 1951 figures are questionable estimates. A boat is a watercraft with carrying capacity less than 5 tons, whereas a vessel is a watercraft with a carrying capacity of 5 tons or greater.

1980). In 1954, the State began to require lobster permits and fishers to report the number of traps fished (Florida Marine Fisheries Commission, December 5, 1991).

Moe (1991) notes three developments in the 1950s that had a significant impact on the spiny lobster fishery. First, the development of skin and SCUBA diving, especially around the Florida Keys, provided easy opportunities to hunt lobster with spear guns, which was legal at that time. Second, the development of hydraulic systems to haul traps eventually eliminated pulling traps in by hand. Third, lobster fishers began to keep 2 or 3 undersized lobsters, known as "shorts", in traps as attractants because the use of shorts increased catches significantly.[11] In a short period of time, "every fisherman used shorts whenever possible as well as the standard cowhide bait" (Moe, 1991, p. 385.).

According to Labisky *et al*., the south Florida spiny lobster fishery radically changed in the1960s with the influx of thousands of Cubans into the country. Many of the approximately 300,000 Cuban immigrants obtained U.S. government loans and bought boats to fish for lobster in Bahamian waters (Moe, 1991; Labisky *et al*., 1980). Most of these immigrants' boats were Miami based. In 1975 when Bahamian waters were closed to foreign fishing, these Miami-based boats began to fish locally.

The first gear restriction occurred in 1965, which specified the types of gear that could be used to harvest lobster (Prochaska and Baarda, 1975; Williams, 1976). Wood traps could be used, provided that they were not greater than 3 x 2 x 2 feet or the equivalent in cubic feet.[12] Permit numbers had to be placed permanently on each trap or other device used to catch lobsters, as well as on the buoy that was used to mark the traps (Prochaska and Baarda, 1975). Also, traps and buoys had to be color-coded; and up to 20 traps could be attached to a trot-line. That same year the State set the minimum carapace size to 3 inches and minimum tail measurement to 5.5 inches.

In 1968 the minimum carapace length was reduced to 3 inches. About the same time, the fishery in the Florida Keys had expanded from the Key West area to the middle keys (FWRI 2007). A 1969 act allowed a 6-inch minimum on tails separated under special permit.

[11] Experiments have shown that traps baited with short lobsters catch approximately three times more lobster than traps baited with any other method (Moe, 1991; Heatwole *et al*., 1988).

[12] As stated by Prochaska and Baarda (p. 26): The 1965 law "requires that the constructed traps be of wood slats so that when a trap is lost it will be broken up with time and thus will not continue to catch lobsters which would then be lost for both breeding stock or human consumption. The wood slat traps can be protected on the sides by reinforcement with 16 gauge, one inch poultry wire, though the bottom and top cannot be so reinforced. Partial wire reinforcing is allowed to protect the trap from the 'ravages of turtles'. Ice cans, drums and other similar devices are permitted provided that they are not equipped with grains, spears, grabs, hooks or similar devices."

In 1971, the State changed its regulations to establish a $50 permit fee and allow landings of spiny lobsters harvested from international waters during the State's closed season (Labisky *et al*., 1980). By this time there were increasing conflicts between commercial fishers and recreational divers who harvested spiny lobster, so in 1975 the State enacted legislation that created the special 2-day sport season that is scheduled the last consecutive Wednesday and Thursday of July each year, one week before the start of the commercial season. During the special 2-day sport season, recreational lobster fishers are allowed up to 6 lobsters per person per day in the Monroe County and Biscayne Bay National Park and up to 12 lobsters per person per day in other areas of the state. The bag limit during the regular lobster-fishing season is 6 lobsters per person per day, or 24 per boat per day, whichever is greater.[13]

The Florida Marine Fisheries Commission (FMFC) adopted its first fisheries management plan (FMP) for spiny lobster on July 2, 1987. For the most part, the management plan continued existing practices; however, among the new requirements was the provision of having on board live wells with re-circulating water when transporting short lobsters (Florida Marine Fisheries Commission (FMFC), December 5, 1991). In 1988, a three-year moratorium on the issue of new permits was established in an effort to limit total commercial effort. In July 1990, the FMP was amended, and among its changes was the designation of spiny lobster as a restricted species (RSE) after July 1993. The following year the Florida legislature enacted laws, which prohibited the FMFC from adopting rules that would prohibit the possession of undersized lobsters or require traps to have escape gaps before April 1998.

In 1991, Florida instituted a recreational spiny lobster license (also known as a crawfish permit), which was purchased as an additional endorsement to the state's recreational saltwater fishing license. Also that year the State began to use two annual mail surveys of persons with a lobster license/permit to estimate the number and landings of lobsters harvested by recreational fishers who take lobsters during the special 2-day sport season and from opening day to the first Monday in September of the regular fishing season.[14]

The number of traps increased greatly from the mid 1970s through the 1980s, rising from 219,100 in 1970 to 979,766 in 1991. This rapid growth resulted in increased user conflicts on the water, excessive mortality of shorts, declining yield per trap, and concerns about trap debris (FFWCC 2007). See Figure 5.3.5.

[13] Recreational fishers are not allowed to use traps to capture lobster. Bully nets and diving (breath-hold, SCUBA, or hookah) are the only legal recreational fishing methods.

[14] The survey of recreational fishers who harvest during the regular fishing season focuses on the first month of the season because the majority of fishing effort occurs during the first month of the season (Sharp *et al*., 2005).

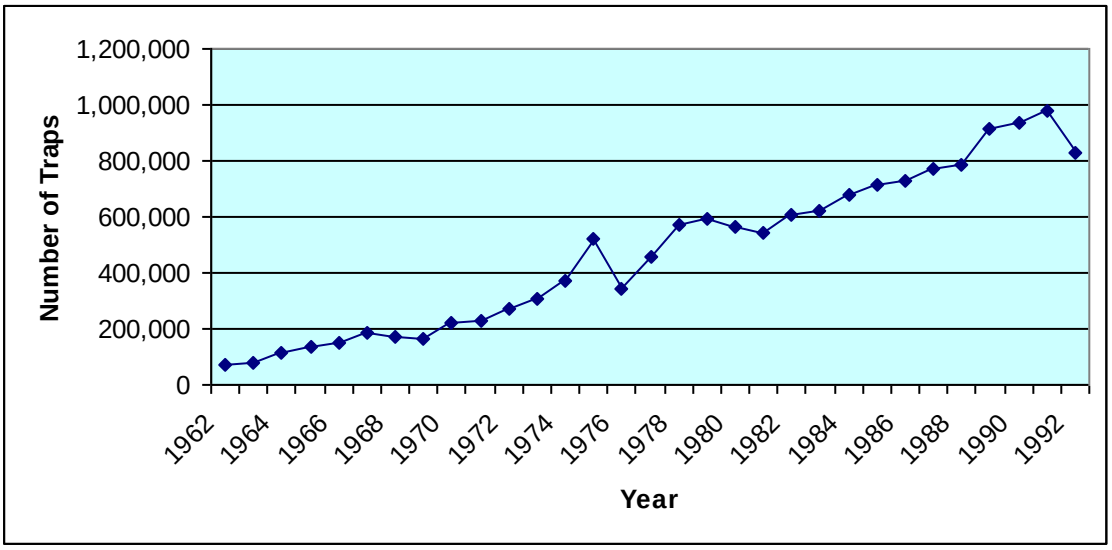

Figure 5.3.5. Annual Numbers of Traps, 1962 – 1993.

In 1992, Florida implemented the spiny lobster Trap Certificate Program (TCP), which regulated the total number of traps by requiring a certificate for each trap and setting a limit on the number of certificates. When first implemented, the initial certificate allocation was based on the trap use that had been reported for the three preceding years (Larkin and Milon).

The FFMFC is authorized to reduce the total number of certificates by decreasing the number of each individual's traps by no more than 10 percent annually. In 1993, Caribbean spiny lobster fishermen set 704,234 traps. That same year, the Florida Fish and Wildlife Commission (FFWCC) implemented the Lobster Trap Certificate Program to reduce the number of lobster traps allowed in the fishery. Since the initial allocation of certificates, the Florida Fish and Wildlife Conservation Commission (FFWCC or FWC) has decreased the number of certificates four times at 10 percent reductions: 1994, 1995, 1996, and 1999. In 2001, the FFWCC set the target number of spiny lobster traps at 400,000 and implemented a 4 percent annual reduction in traps. The FFWCC suspended the annual trap reduction in 2003; nonetheless, the program has resulted in a significant reduction in the annual numbers of traps set. During the 2005 - 2006 season, 497,042 trap tag certificates were issued; followed by 473,943 for the 2006 - 2007 season and as of December 21, 2007, there were a total of 475,320 trap tag certificates for the 2007 - 2008 season.

No one who owns one or more lobster trap certificates can be issued a commercial dive permit (68B-24.0055(2)(b)). As of January 1, 2005, and until January 1, 2010, no new commercial dive permits will be issued and no commercial dive permit will be renewed or replaced except those that were active during the 2004 – 2006 fishing season. Existing permits may only be issued to a single saltwater products license with a valid crawfish endorsement and a valid restricted

species endorsement (68B-24.005(2)(c)). Failure to renew the commercial dive permit by September 30 of each year results in forfeiture of the permit.

A crawfish endorsement or crawfish license, also known as a trap number, is required for any person to use traps to harvest spiny lobster or take spiny lobster in commercial quantities (68B-24.0055(1)). The number of Crawfish Endorsements issued has declined since the 1998 -1999 season. See Figure 5.3.6. The number of individuals holding Crawfish Endorsements has also declined. During the 2005 – 2006 season, there were 1,402 endorsement holders, followed by 1,303 for 2006 – 2007, and as of December 1, 2007, there were 1,241 endorsement holders for the 2007 – 2008 season.

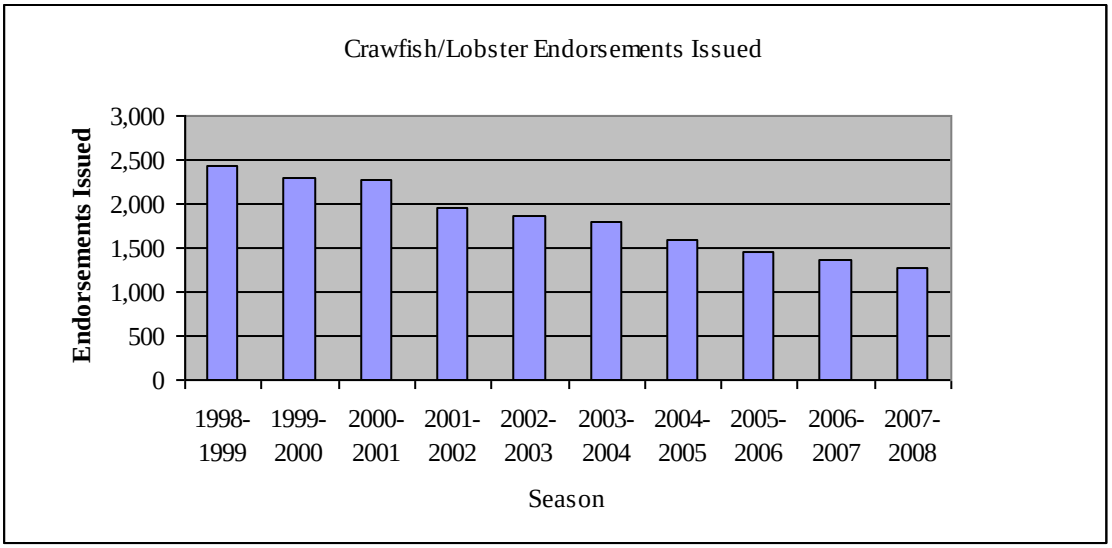

Figure 5.3.6. Number of Crawfish/Lobster Endorsements Issued. Source: Florida Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

On August 5, 1994, the Special Recreational Crawfish License (SRCL) was issued after the implementation of the commercial spiny lobster trap certificate program (68B-24.0035, Florida Administrative Code). The SRCL was intended to reduce the adverse impact on recreational fishers who were commercially licensed and using traps, but were prohibited from using lobster traps because they did not meet the qualifications that were established from the commercial lobster trap certificate program.[15] SRCLs are not issued to persons who did not possess a crawfish trap number (Crawfish Endorsement) and a Saltwater Products License during the 1993 – 1994 license year (68B-24.0035(2)(b), F.A.C.). No person issued a SRCL may also possess a Crawfish Endorsement. An SRCL is not valid unless the holder also possesses a valid Recreational Crawfish Permit required by Section 372.57(8)(d), Florida Statutes. Moreover, if

[15] A commercial license was/is required because traps were/are not legally acceptable gear in the recreational spiny lobster fishery.

the SRCL is not renewed every year, the holder loses the license. The SRCL applies to recreational fishers in state, not federal, waters, and does not permit harvesting lobsters during the 2-day sport season. License holders are required to file quarterly reports with the Florida Fish and Wildlife Conservation Commission detailing the amount of spiny lobster harvested in the previous quarter together with the amount harvested by other recreational harvesters aboard the license holder's vessel (68B-24.0035(2)(e), F.A.C.).

The number of SRCLs has declined since the 1998 – 1999 season. See Figure 5.3.7. Beginning with the 2012 – 2013 license year and every year thereafter, no SRCL will be issued or renewed (68B-24.0035(2)(g), F.A.C.).

Figure 5.3.7. Number of Special Recreational Crawfish Licenses, 1998 – 1999 to 2007 – 2008 season. Source: Florida Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

Currently, Florida law requires anyone who commercially harvests or sells spiny lobster to have a Saltwater Products License (SPL).[16] An SPL may be issued in the name of an individual or a valid vessel registration number issued in the name of the licensed applicant. The State also requires anyone who sells spiny lobster to have a Restricted Species Endorsement (RS) and Crawfish Endorsement.[17]

[16] A Saltwater Products License (SPL) is required to harvest saltwater species in excess of the recreational bag limits, with the intent to sell, or with certain gears. For species that have no established bag limit, the bag limit is 100 pounds or 2 fish per person per day or whichever is greater.

[17] Species designated as Restricted include African pompano, amberjack, black drum, black (striped) mullet, bluefish, blue crab, clams (Brevard County only), crawfish/lobster, cobia, Florida pompano, flounder, grouper, hogfish, king mackerel, permit, red porgy, cobia, sea bass, sheepshead, shrimp, snapper, Spanish mackerel, spotted sea trout, stone crab, triggerfish, tripletail, and tropical marine fish and plants including ornamental sponges.

Spiny lobster harvested in Florida waters must remain in a whole condition while on or below state waters and the practice of separating the tail from the body is prohibited (68B-24.003(4)). Possession of spiny lobster tails that have been separated lobster tails on or below state waters is prohibited unless the spiny lobster is being imported pursuant to 68B-24.0045, F.A.C., or were harvested outside state waters and the separation was pursuant to a federal permit allowing such separation. If tails are separated from the body, tails must be at least 5.5 inches in length,[18] otherwise, if whole, the carapace must be greater than 3 inches long (68B-24.003(1), F.A.C.).

In Florida, the harvest or possession of egg-bearing spiny lobster is prohibited and any egg-bearing lobster found in traps must be immediately returned to the water free, alive and unharmed (68B-24.007 *F.A.C.*). The practice of stripping or otherwise molesting egg-bearing spiny lobster in order to remove the eggs is prohibited and the possession of spiny lobster or spiny lobster tails from which the eggs, swimmerets or pleopods have been removed or stripped is prohibited (68B-24.007 *F.A.C.*).

Possession of undersized lobster is prohibited, except in the spiny lobster trap fishery, where fishermen use undersized lobsters to attract legally sized ones.[19] Allowable gears are traps, hand-held net, hoop net (diameter no larger than 10 feet), bully net (diameter no larger than 3 feet), and by diving. The vessel limit for harvest with a bully net is 250 lobsters per vessel per day, for the trap fishery there is no bag or trip limit, and limits for the dive fishery are regional. Additional restrictions and requirements depend on the method of harvest.

For those in the spiny lobster trap fishery, trap certificates and tags are required for all traps. A tag must be securely attached to each trap; spiny lobster trap specifications and trap, buoy, and vessel marking requirements apply; and traps, buoys, and vessels must display the Crawfish endorsement.[20] Florida law authorizes FWC to retrieve traps left in the water after the close of the season and fines the traps' owners to cover the costs of retrieving the traps.
All vessels used by persons commercially harvesting lobster by diving, scuba, or snorkel must display the Commercial Dive Permit on the vessel SPL. A person with a Commercial Dive Permit cannot have a trap certificate. After January 1, 2005, no diver permits were issued, renewed or

[18] No less than 5.5 inches not including any protruding muscle tissue.
[19] A person aboard a vessel with a Crawfish endorsement and trap certificates may harvest and possess while on the water 50 undersized spiny lobster (shorts) and one short per trap aboard the boat. Shorts must be released alive and unharmed upon leaving trap lines.
[20] Traps must be constructed of wood or plastic and be no larger than 3 feet by 2 feet or the volumetric equivalent (12 cubic feet) with the entrance located on top of the trap. Each plastic trap must have a degradable panel. Traps must be baited and placed in the water beginning August 1. Traps may be worked during daylight hours only. Traps may not be placed within 100 feet of the intercoastal waterway or any bridge or seawall. Traps must be removed from the water by April 5 each year. Harvest is prohibited in designated areas of John Pennekamp Coral Reef State Park.

replaced except those that were active in 2004-05. Dive permits that are not renewed by September 30 of each year are forfeited. A 250-lobster daily vessel limit applies in Broward, Dade, Monroe, Collier, and Lee counties and adjoining federal waters.[21]

The commercial CSL and regular recreational CSL season starts on August 6 and ends on March 31 (68B-24.005(1). No person can harvest, attempt to harvest, or have in his possession, regardless or where taken, any spiny lobster during the closed season of April 1 through August 5 of each year, except during the 2-day sport season, for storage and distribution of lawfully possessed inventory stocks or by special permit issued by the Florida Fish and Wildlife Conservation Commission (68B-24.005(1)). During the 2-day sport season no person can harvest spiny lobster by any means other than by diving or with the use of a bully net or hoop net.

A Wholesale Dealer License is required for any person, firm or corporation that sells spiny lobster to any person, firm, or corporation except to the consumer and who may buy spiny lobster from any person pursuant to section 370.06(2) of the Florida Statutes or any licensed wholesale dealer.

Each spiny lobster imported into Florida must comply with the minimum size requirements and the prohibitions relating to eggbearing spiny lobster (68B-24.0045(3) F.A.C.). During the open season (August 6 through March 31), a person may possess wrung spiny lobster tails or possess spiny lobster in excess of the bag limit while on state waters if such person also possesses appropriate receipt(s), bill(s) of sale, or bill(s) of lading to show that the spiny lobster were purchased in a foreign country and are entering the state in international commerce (68B-24.0045(1)).

5.3.5.1.2 Florida County Ordinances

Zoning laws have indirectly affected the spiny lobster fishery in south Florida. In August 1986, Monroe County changed its zoning laws by implementing the Monroe County Land Use Plan (Plan). Under the Plan, commercial fishers must store, build, repair, and dip traps in industrial or commercially zoned areas, within areas designated as commercial fishing villages or in areas termed specific fishing districts (Johnson & Orbach, 1990).[22] Prior to the zoning change, fishers could store and work on traps on residential property. Under Article V, Section 9.5 – 143(f) of

[21] Divers must permanently and conspicuously display a 'divers down flag' placard on the vessel and affix the Commercial Dive Permit to the diagonal stripe with 10-inch numbers visible from the air and 4-inch numbers visible from the water. Harvest from artificial habitat is prohibited. Divers must possess a carapace measuring device and measure lobster in the water. The use of bleach or chemical solutions or simultaneous possession of spiny lobster and any plastic container capable of ejecting liquid is prohibited.

[22] Traps used to be dipped in recycled oil to protect them from the marine environment. However, that practice was prohibited beginning in 1995. Now fishermen soak traps in a brine solution to extend the life of their traps.

the Monroe County Ordinances, where a nonconforming use of land or structure is discontinued or abandoned for 6 months or 1 year in the case of stored lobster traps, then such use may not be reestablished or resumed, and subsequent use must conform to provisions detailed in the chapter of the ordinances.

5.3.5.2 Puerto Rico

Puerto Rico law requires commercial lobster fishermen to have a Common Lobster Fishing Permit (12 L.P.R.A § 25e(b)(2)). Regulation 6768, Article 8(o) states no person can fish, possess, sell or offer for sale the common lobster (P. argus) with a carapace length less than 3.5 inches."

Most spiny lobster are taken by scuba diving and fish pots. See Table 5.3.9.

Table 5.3.9. Puerto Rico Commercial Lobster Fishery Gear Types. *Source*: SEDAR 2005.

Gear Type	Landings (1000s lbs)	Percent
Scuba Diving	2,110.40	43.3
Fish Pot	1,859.00	38.1
Lobster Pot	442.7	9.1
Trammel Net	162.2	3.3
Bottom Line	78.7	1.6
Spear Fishing	77.4	1.6
Skin Diving	58.3	1.2
Gill Net	52.6	1.1
Other	34	0.7

5.3.5.3 U.S. Virgin Islands

Title 12, Chapter 9A, §319(b) of the Virgin Islands Code (V.I.C.) states "No person, firm, or corporation shall take or have in his possession at any time, regardless of where taken, any spiny lobster (crawfish or crayfish) of the species Panulirus Argus unless such spiny lobster … shall have a carapace length of more than three and one-half (3 ½) inches." According to 12 V.I.C. §319(c), lobsters must remain in a whole condition at all times while being transferred on, above or below the waters of the territory and the practice of wringing or separating the tail from the body is prohibited on the waters of the territory.

Egg-bearing lobsters of any species shall not be taken, possessed or sold at any time, except that egg-bearing lobsters may be returned to pots and traps in which they have been captured, provided such egg-bearing lobsters are returned to such pots or traps in a live or unharmed condition, are provided with adequate food, and are immediately returned into the water (12

V.I.C. §319(c)). Such egg-bearing lobsters as are returned to pots or traps as aforementioned, shall not be taken or possessed or sold until the eggs have been naturally released into the water; provided they are of at least the minimum size forth in §319(b). The practice of stripping, shaving, scraping, clipping, or otherwise molesting egg-bearing lobsters in order to remove the eggs is prohibited (12 V.I.C. §319(e)).

It is unlawful for any person to spear, hook or otherwise impale any lobster in the process of capture. Lobsters may only be captured by hand, snare, pot or trap, so that short or egg-bearing lobsters may be released unharmed or returned to the pot or trap as permitted (12 V.I.C. §319(f)). The great majority of spiny lobster landings are taken by scuba gear and traps and lines. See Table 5.3.10.

Table 5.3.10. U.S. Virgin Islands Spiny Lobster Percent Landings by Gear Category, 1994 – 2003. *Source*: SEDAR 2005.

Gear Type	Percent Reported Landings
Scuba	61.51
Traps/Lines	33.23
Free Diving	2.24
Gillnets	1.16
Seine Nets	0.46
Scuba/Free Diving	0.31
Unknown	0.29
Line Fishing	0.24

Title 12, Chapter 9A, §324 of the V.I.C. states that no person shall sell, or represent for the purpose of sale, in any form, any seafood as local or native seafood unless the same shall have been originally caught or taken in this territory; nor shall any person so sell, or represent for the purpose of sale, in any form, any crustacean as local or native lobster unless the same is the species known as *Panulirus argus*; nor shall any person so sell, or represent for the purpose of sale, in any form, any meat as local or native lobster meat unless such meat is wholly from crustaceans of *Panulirus argus*.

5.3.6 Foreign Laws and International Agreements

On August 1, 1975, the Commonwealth of The Bahamas enacted a law that declared spiny lobster a creature of its Continental Shelf, which is similar to the U.S. law (16 U.S.C. 1857(2)(B)) that considers American lobster a part of our Continental Shelf (Vanderbilt Television News Archive, September 11, 1975). Consequently, Bahamian territorial waters were closed to U.S.

spiny lobster fishers on and after that date. The closure had a dramatic impact on landings of spiny lobster in the southeast: pounds landed in 1975 were 32 percent less than the previous year's landings, and pounds landed in 1976 were 28 percent less than 1975 landings. [23] In Florida, pounds landed on the east coast in 1975 were 44 percent less than pounds landed in 1974, and pounds landed in 1976 were about 57 percent less than pounds landed in 1975.[24] Pounds of spiny lobster landed on the west coast declined from approximately 6.7 million in 1974 to about 4.4 million in 1976. East coast Florida fishers have landed less spiny lobster annually since the closure of Bahamian waters in 1975; however, landings on the west coast of the state have exceeded those landed in 1974, before the closure, for four years. To mitigate the losses caused by the closure of Bahamian waters, domestic fishers began to increase the number of traps after 1975 (Shivlani & Milon, 2000).

In 1972, the Treaty between the Government of the United States of America and the Government of the Republic of Colombia Concerning the Status of Quita Sueño, Roncador and Serrana was signed, which allowed U.S. fishing vessels to operate in Colombian waters. As a result of that treaty, U.S. vessels fishing in Colombian Treaty Waters are prohibited from possessing Caribbean spiny lobster smaller than 5.5 inches (19.97 cm) tail length (50 CFR 300.126(m)). Also, a berried (egg-bearing) spiny lobster caught in treaty waters cannot be retained on board, and a berried lobster may not be stripped, scraped, shaved, clipped or in any manner molested to remove the eggs (50 *CFR* §300.132).

In an international fishery like that of spiny lobster, "consensus" on addressing concerns is important, as are U.S. efforts to engage other countries in negotiations/agreements. FAO/WECAFC has organized five workshops on spiny lobster in cooperation with most regional agencies and institutions, dealing with various projects: Belize City, Belize (1997); Merida, Mexico (1998, 2000, and 2006); and Havana, Cuba (2002). A representative from the Caribbean Council attended all the workshops. A staff member of NOAA Fisheries Service's Southeast Region attended the 2006 workshop in Merida.

The participating countries of the September 2006 workshop of the Working Group on Caribbean spiny lobster of the WECAFC agreed that there were management problems across the region, which included growth of fishing effort; weak enforcement and compliance; illegal, unreported and unregulated fishing; increasing use of artificial habitats (casitas); conflicts between trap fishers and dive fishers; open access fisheries; and reports that in some Central

[23] According to Labisky et al. (1980), less than half of the spiny lobster landed was harvested in domestic waters and most of the foreign catch was taken from Bahamian waters. Noetzel & Wojnowski report that in 1973, about one-fifth of landings on Florida's west coast came from spiny lobsters that were harvested in Caribbean waters off the coasts of Nicaragua and Honduras (1975, p. 25). According to Williams (1975), the closing of Bahamian waters to U.S. spiny lobster fishers represented a loss of approximately 90 percent of foreign water landings.

[24] On the east coast of Florida, 4,147,200 pounds were landed in 1974; 2,319,300 pounds were landed in 1975; and 987,300 pounds were landed in 1976.

American countries of leaving lobster traps in the water during the countries' closed seasons. The countries also agreed that countries that did not have a minimum harvest-size in their regulations that is equal to or greater than 74 millimeters carapace-length should make efforts to do so (WECAFC 2007, p. 3).

The WECAFC member countries who attended the Merida Workshop in 2007 agreed. According to the United Nations' Food and Agricultural Organization (FAO), Belize, Bermuda, Colombia, Guyana, and Jamaica did not have minimum size-regulations as of December 31, 2007.

5.3.7 Florida Commercial and Recreational Harvest

Caribbean spiny lobsters are harvested by both commercial and recreational fishermen. Florida law allows commercial fishermen to harvest spiny lobster by diving or using wooden, plastic or metal traps, or bully or hoop nets (68B-24.006(1)); however, wooden traps are the most popular gear type.[25] These traps are weighted with cement and include a self-deteriorating escape panel that degrades over time. Fishermen commonly string traps along a trap line, with each end of the trap line marked by a buoy. All traps must be removed by April 5 of each year (68B-24.005(4) F.A.C.). Strong coastal storms can damage and destroy the traps.

The predominant gear type used to catch spiny lobster in Florida is a pot or trap. From 1997 through 2006, about 90 percent of annual total state landings have been caught in pots and traps. See Figure 5.3.8. Diving is the second most popular gear type and takes about 9 percent of the total pounds landed annually.

[25] A bully net used to directly harvest spiny lobster can not have a diameter greater than 3 feet and similarly, a hoop net can not have a diameter larger than 10 feet (68B-24.007(5)). Spiny lobster taken by the use of any non-hand-held net or trawl as incidental bycatch of legally harvested targeted species is allowed if the combined whole weight of all spiny lobster does not exceed 5 percent of the total whole weight of all species legally possessed at the time.

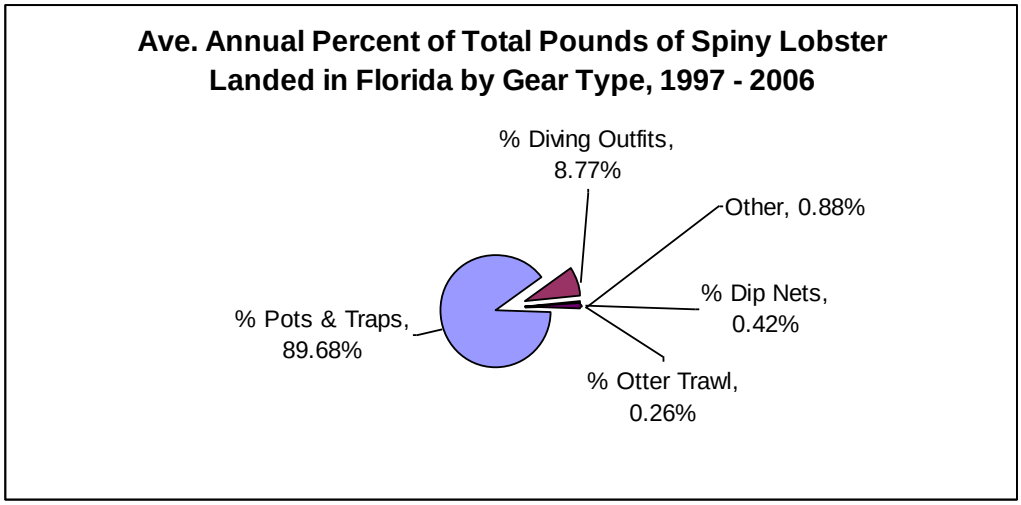

Figure 5.3.8. Average Annual Percent of Total Pounds of Spiny Lobster Landed in Florida by Gear Type, 1997 – 2006. *Source*: National Marine Fisheries Service, Accumulated Landings System.

Commercial fishermen use live undersized CSL, commonly known as "shorts", instead of cowhide or fish heads as bait to attract CSL into their traps. Florida law allows the holder of a valid Crawfish Endorsement, lobster trap certificates, and valid saltwater products license to harvest and possess, while on the water, undersized spiny lobster not exceeding 50 per boat and 1 per trap aboard each boat is used exclusively for luring, decoying, or otherwise attracting noncaptive spiny lobster into traps. Such undersized spiny lobster must be kept alive while in possession, in a shaded continuously circulating live well with a pump capacity to totally replace the water at least every 8 minutes and large enough to provide at least 0.75 gallon of seawater per lobster (68B-24.003(3) F.A.C.).

Usually each season's landings peak in August then sharply decrease thereafter. See Figure 5.3.9. Effort and landings also decrease after the opening of the stone crab claw fishery on October 5 (FWRI 2007).[26] See Figure 5.3.10.

[26] Stone crab was originally a bycatch caught in spiny lobster traps; however, in the 1970s, it became a fishery. Today, many spiny lobster fishermen are also stone crab fishermen as well.

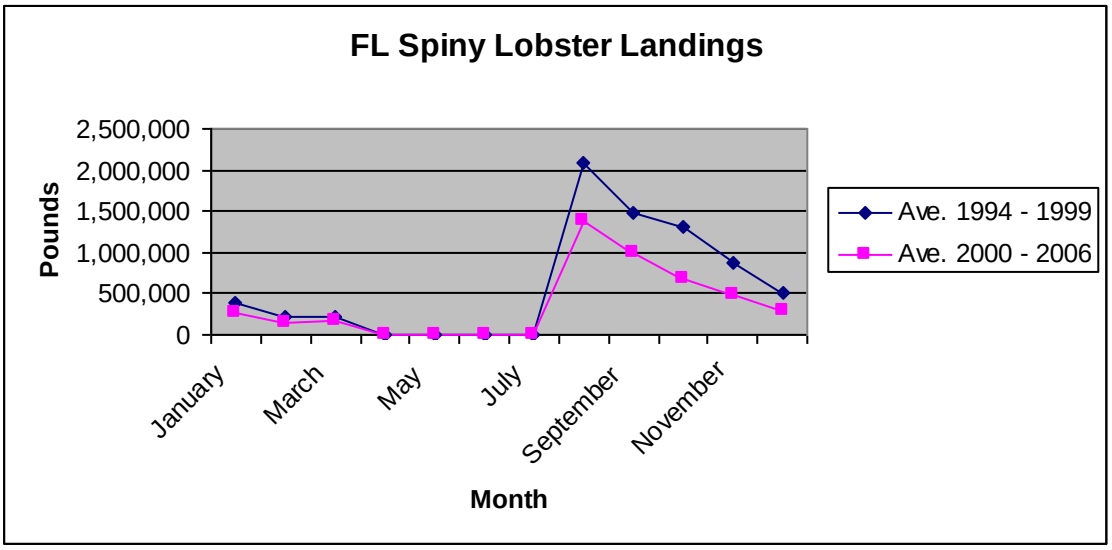

Figure 5.3.9. Florida Landings of Spiny Lobster, 1994 – 2006. *Source*: Florida Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

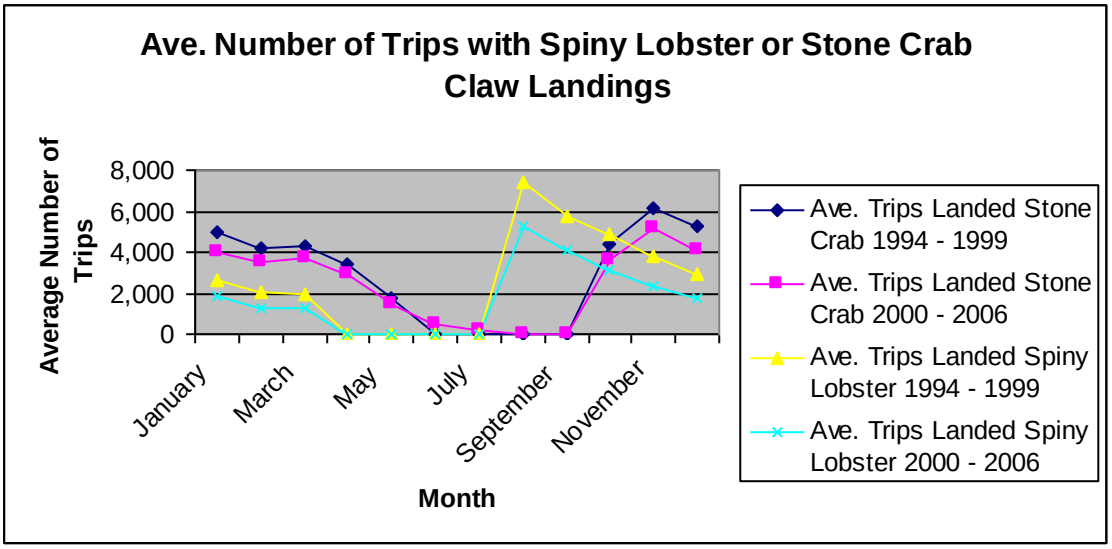

Figure 5.3.10. Average Number of Monthly Trips that Landed Either Spiny Lobster or Stone Crab Claws, 1994 – 1999 and 2000 – 2006. *Source*: Florida Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

During the 2-day sport season, no person can harvest spiny lobster by any means other than by diving or using a bully net or hoop net (68B-24.005 F.A.C.)).

Bully and hoop nets and diving (breath-hold, scuba, or hookah) are the only legal recreational fishing methods (Recreational fishermen primarily dive to harvest the species; however, they also use bully nets and hoop nets). A bully net is a circular frame attached at right angles to the end of a pole and that supports a conical bag of webbing. The webbing is usually held up by

means of a cord, which is released when the net is dropped over a lobster. A hoop net is a frame, circular or otherwise, that supports a shallow bag of webbing and is suspended by a line and bridles. The net is baited and lowered to the ocean bottom, to be raised rapidly at a later time to prevent the escape of the lobster.

It is estimated that the numbers of lobsters landed by recreational fishers represent an average of 23 percent of the total annual recreational and commercial numbers landed from the 1978-79 through 2003-04 fishing seasons. See Table 5.3.11.

Table 5.3.11. Florida Landings of Caribbean Spiny lobster, 1978-79 through 2003-2004 Fishing Seasons. *Source*: Florida Fish & Wildlife Conservation Commission.

Fishing Season	Rec. Landings	Com. Landings	Bait Landings	Total Landings	% Rec	% Comm	% Bait
1978-79	1,032,818	4,712,160	1,489,053	7,234,031	14.28%	65.14%	20.58%
1979-80	1,332,146	6,384,958	1,766,902	9,484,006	14.05%	67.32%	18.63%
1980-81	1,653,054	5,074,434	1,450,653	8,178,141	20.21%	62.05%	17.74%
1981-82	1,438,200	4,673,563	1,389,579	7,501,342	19.17%	62.30%	18.52%
1982-83	1,487,598	5,192,189	1,440,506	8,120,293	18.32%	63.94%	17.74%
1983-84	1,114,641	3,516,013	1,205,460	5,836,114	19.10%	60.25%	20.66%
1984-85	1,218,015	5,077,610	1,458,513	7,754,138	15.71%	65.48%	18.81%
1985-86	1,176,734	4,586,067	932,611	6,695,412	17.58%	68.50%	13.93%
1986-87	1,098,768	3,955,795	1,321,591	6,376,154	17.23%	62.04%	20.73%
1987-88	1,305,427	4,657,778	521,939	6,485,144	20.13%	71.82%	8.05%
1988-89	1,743,948	6,381,104	499,015	8,624,067	20.22%	73.99%	5.79%
1989-90	1,718,020	6,650,042	587,191	8,955,253	19.18%	74.26%	6.56%
1990-91	1,496,810	5,154,258	1,061,504	7,712,572	19.41%	66.83%	13.76%
1991-92	1,990,623	5,784,865	662,668	8,438,156	23.59%	68.56%	7.85%
1992-93	1,242,648	4,567,343	565,406	6,375,397	19.49%	71.64%	8.87%
1993-94	1,787,054	4,662,274	422,617	6,871,945	26.01%	67.85%	6.15%
1994-95	1,751,298	6,229,495	492,439	8,473,232	20.67%	73.52%	5.81%
1995-96	1,673,330	5,666,412	513,035	7,852,777	21.31%	72.16%	6.53%
1996-97	1,778,889	6,646,664	583,692	9,009,245	19.75%	73.78%	6.48%
1997-98	2,186,058	6,796,320	621,140	9,603,518	22.76%	70.77%	6.47%
1998-99	1,185,036	4,522,375	275,976	5,983,387	19.81%	75.58%	4.61%
1999-00	2,292,304	6,581,944	498,148	9,372,396	24.46%	70.23%	5.32%
2000-01	1,848,447	4,469,964	423,038	6,741,449	27.42%	66.31%	6.28%
2001-02	1,091,022	2,307,262	323,096	3,721,380	29.32%	62.00%	8.68%
2002-03	1,223,197	3,818,081	347,857	5,389,135	22.70%	70.85%	6.45%
2003-04	1,142,960	3,419,929	329,668	4,892,557	23.36%	69.90%	6.74%

The Florida Department of Environmental Protection (FDEP) has conducted annual mail surveys of recreational lobster fishers for the two-day sport season and the first month of the regular

season since 1991 in order to estimate recreational lobster harvest and fisher participation (FDEP, 1996). Since 1985, recreational fishers have taken an average of approximately 1.5 million spiny lobsters annually through Labor Day. Statewide recreational landings for the most recent available survey that was conducted in 2006 were estimated to be 947,353 pounds (FWRI 2007). That estimate was 36 percent lower than the average landings in the previous available five years, from 2000 through 2004, and was 37 percent lower than the available historic average landings from 1992 through 2006.

5.3.8 Florida Counties with Commercial Landings of Spiny Lobster

5.3.8.1 Introduction

Seven counties account for about 99.5 percent of Florida's annual commercial landings of Caribbean spiny lobster, with Monroe County dominating by taking about 90 percent of the landings year after year. See Table 5.3.12. Both Monroe and Dade (Miami-Dade) Counties combined account for about 96 percent of the state's annual commercial landings. According to the FWRI (2007), most of the lobsters landed outside Monroe and Dade Counties from 1992 though 2006 were caught in the Keys and sold to wholesale dealers operating in Palm Beach County.

Table 5.3.12. Top 7 Counties in Commercial Landings of Caribbean Spiny Lobster, 1994 – 2006. Source: FL Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

County	Ave. Annual CSL Landings	Portion of Ave. Annual FL CSL Landings	Combined Portions of FL Landings
Monroe	5,070,122	89.658%	89.6584%
Dade	366,385	6.479%	96.1375%
Palm Beach	69,507	1.229%	97.3666%
Broward	46,460	0.822%	98.1882%
Collier	34,981	0.619%	98.8068%
Brevard	20,837	0.368%	99.1753%
Duval	17,067	0.302%	99.4771%

The number of lobster/crawfish licenses has been in decline in Florida since fiscal year 1998-1999.[27] See Figure 5.3.11.

[27] The fiscal year is from July 30 to June 1.

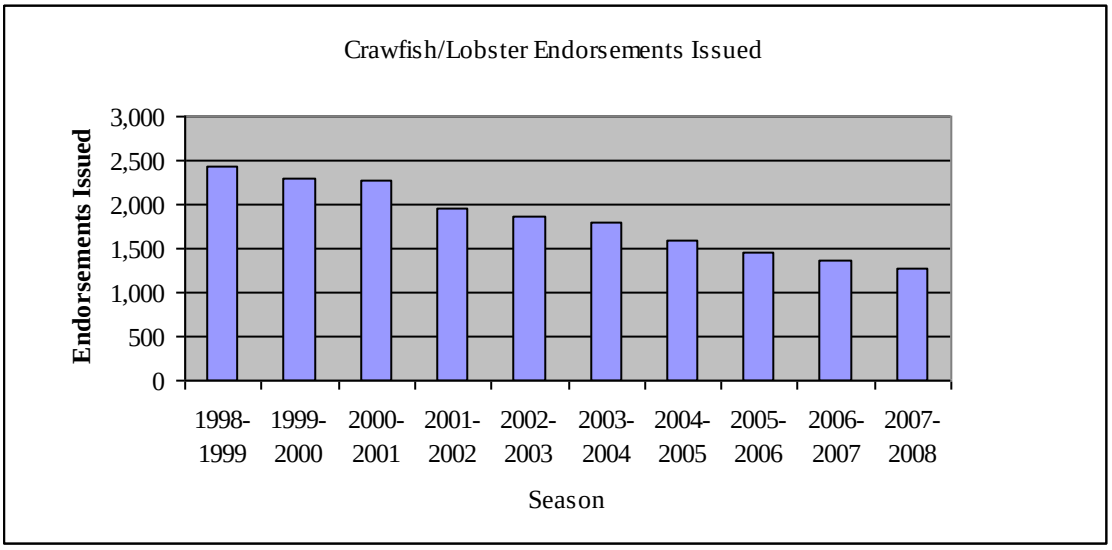

Figure 5.3.11. Florida Lobster/Crawfish License Endorsements Issued. Source: Florida Fish & Wildlife Commission.

5.3.8.2 Monroe County

Monroe County leads the state in landings of Caribbean spiny lobster year after year. From 1994 through 2006 Monroe County led the state in commercial landings of Caribbean spiny lobster, averaging about 90 percent of the state's commercial landings each year. See Table 5.3.13.

Table 5.3.13. Monroe County Commercial Landings of Caribbean Spiny Lobster. *Source*: FL Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

Year	County CSL Landings (lbs)	FL CSL Landings (lbs)	Portion of FL Landings
1994	6,239,090	7,087,357	88.03%
1995	6,245,472	7,001,661	89.20%
1996	7,138,859	7,865,678	90.76%
1997	6,461,282	7,107,684	90.91%
1998	5,268,000	5,831,407	90.34%
1999	6,794,915	7,578,321	89.66%
2000	5,114,237	5,763,470	88.74%
2001	2,904,035	3,405,509	85.27%
2002	4,035,905	4,483,426	90.02%
2003	3,855,401	4,268,277	90.33%
2004	4,500,913	4,983,400	90.32%
2005	3,026,574	3,365,221	89.94%

2006	4,326,907	4,755,048	91.00%
Average	*5,070,122.31*	*5,653,573.77*	*89.58%*

Over 78 percent of the state's trap-tag certificates are held by individuals in Monroe County. See Table 5.3.14.

Table 5.3.14. Monroe County Trap Tag Certificates and Endorsement Figures, as of December 31, 2007. *Source*: FL Fish and Wildlife Commission.

2006			
	County	State	% State
Endorcement Holders	695	1,402	49.57%
Endorcement Accounts	403	615	65.53%
Endorcements Issued	826	1,638	50.43%
Revenue Collected	$94,300	$182,050	51.80%
Trap Tag Certificates	380,237	485,709	78.28%

2007			
	County	State	% State
Endorcement Holders	632	1,303	48.50%
Endorcement Accounts	365	582	62.71%
Endorcements Issued	751	1,512	49.67%
Revenue Collected	$85,575	$167,700	51.03%
Trap Tag Certificates	369,780	473,943	78.02%

2008			
	County	State	% State
Endorcement Holders	623	1,241	50.20%
Endorcement Accounts	353	550	64.18%
Endorcements Issued	739	1,443	51.21%
Revenue Collected	$84,200	$160,200	52.56%
Trap Tag Certificates	371,780	475,320	78.22%

The number of crawfish/lobster license holders has declined steadily since the 1998-99 season, and the 651 license holders for the 2006-07 season represents a 43 percent decline since the 1998-99 season. See Table 5.3.15.

Table 5.3.15. Monroe County Crawfish/Lobster License Holders. *Source*: FL Fish and Wildlife Commission.

Monroe County	
Season	License Holders
1998 - 1999	1,137
1999 - 2000	1,091
2000 - 2001	1,056
2001 - 2002	923
2002 - 2003	883
2003 - 2004	850

2004 - 2005	783
2005 - 2006	703
2006 - 2007	651
2007 - 2008	640

Wholesale seafood dealers in the county have not similarly declined. See Table 5.3.16.

Table 5.3.16 Monroe County Wholesale Seafood Dealers. *Source*: FL Fish and Wildlife Commission.

Season	Wholesale Dealers
1998 - 1999	104
1999 - 2000	110
2000 - 2001	107
2001 - 2002	107
2002 - 2003	110
2003 - 2004	117
2004 - 2005	116
2005 - 2006	116
2006 - 2007	105
2007 - 2008	106

The recreational spiny lobster fishery is very important to the County as well. In 2003, recreational landings of Caribbean spiny lobster were about 1.1 million pounds, and sales of recreational lobster fishing permits exceed 100,000 annually. Sharp *et al*. (2005) estimate approximately $24 million was spent on recreational lobster fishing in the Florida Keys from the opening of the recreational season through the first Monday in September in 2001. Recreational fishers who resided outside the Keys accounted for about $22 million (92 percent) of that $24 million spent on recreational lobster fishing in the Keys. In addition to the regular recreational season there is the Special Two-Day Sport Season, which occurs on the last consecutive Wednesday and Thursday in July. Those two days are the busiest boating days of the year in the County. From the 1993 through 2001 Special Two-Day Sport Seasons, the average annual number of spiny lobsters caught in Monroe County represented about 66 percent of the annual statewide total. The number of special recreational crawfish (spiny lobster) permits has increased since the 1998 – 1999 season.

Monroe County is the southernmost county in Florida and the United States. See Figure 5.3.11. It has a total area of 9,679 km^2 (3,737 square miles), with 2,582 km^2 being land and the remaining 7,097 km^2 (about 73 percent) being water (U.S. Census Bureau). See Figure 2-6. The County is made up of the Florida Keys and portions of Big Cypress National Preserve and Everglades National Park. The Florida Keys are a series of islands that extend over 220 miles in length and make up the third largest barrier reef ecosystem in the world and the only one of its kind in the country. The State of Florida has designated the Florida Keys as an Area of Critical

State Concern to protect the area's ecologically richness, culturally significance, and environmentally sensitive nature (Florida Statute 1986; Florida Administrative Code §28-29, 1975). Over 60 percent of the Keys land mass is owned by the government and the vast majority of public land has been set aside for conservation. The County has only one highway, U.S. Highway 1, which is also called the Overseas Highway. Commercial activities and residential development are mostly concentrated along that route (National Research Council, 2002). Among the County's cities are Key West, Key Largo, Big Pine Key, Marathon and Plantation Key.

Figure 5.3.12. Monroe County. *Image Source*: Wikipedia.

More than 99.9 percent of the County's population lives on the Florida Keys. According to U.S. Census Bureau estimates, the population of the County fell 6.1 percent from April 1, 2000 to July 1, 2006, with approximately 74,737 people in 2006. During that period, there was a natural increase in population of 195 (4,642 births less 4,447 deaths) coupled with a net out-migration of 4,668 persons leaving the county (2,612 net international migration less 7,280 net internal out-migration). The number of housing units increased from 51,617 in 2000 to 52,911 in 2005, an increase of 2.5 percent. Median household income in 2004 was $42,195 and 9.2 percent of the persons in the county lived below poverty, in comparison to the statewide median household income of $40,900 and poverty rate of 11.9 percent.

Tourism is the largest sector in the county. There are more establishments in the Retail Trade (NAICS 44) and Accommodation & Food Services (NAICS 72) sectors than any other sectors, and these two sectors employ the most persons. In 2005, 35 percent of the county's employees were in Accommodation & Food Services and 21 percent in Retail Trade. See Table 5.3.17. Of the employer establishments in the Accommodation (NAICS 721) subsector, 164 (or 91) percent were in Traveler Accommodation (NAICS 7211) and 14 (or 8 percent) were in RV Parks & Recreational Camps (NAICS 7212). Similarly, of the nonemployer firms in the Accommodation subsector, 83 (or 87 percent) were in Traveler Accommodation and 4 (or 4 percent) were in RV Parks & Recreational Camps.

Table 5.3.16. 2005 Nonemployer and Employer Business Statistics, Monroe County. *Source*: U.S. Census, 2005 County Business Patterns and Nonemployer Statistics.

NAICS Code	Industry Code Description	Non-Employer Firms	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees	Annual Payroll ($1,000)
11	Forestry, fishing, hunting & ag. support	992	34,476	16	20 - 99	*
21	Mining	5	160	1	0 - 19	*
22	Utilities	9	1,254	2	100 - 249	*
23	Construction	1,177	82,123	359	1,693	55,733
31	Manufac-turing	107	5,337	80	338	9,652
42	Wholesale trade	136	15,495	112	480	18,964
44	Retail trade	601	44,847	723	6,422	145,298
48	Trans. & warehousing	393	19,220	141	942	25,076
51	Information	91	3,781	53	504	21,220
52	Finance & insurance	301	28,942	152	953	38,252
53	Real estate & rental & leasing	1,766	154,010	355	1,031	30,557
54	Professional, sci. & tech. services	1,219	68,691	334	1,320	51,592
55	Management of comps. & enterprises	0	0	6	91	5,136
56	Admin, support, waste mgt, remediation services	895	33,503	192	796	21,627
61	Ed. services	104	2,520	33	222	6,860
62	Health care & social assistance	421	21,970	214	2,373	97,625
71	Arts, entertain-ment & recreation	866	41,944	135	1,103	24,086
72	Accommoda-tion & food services	255	41,226	523	10,852	210,466

NAICS Code	Industry Code Description	Non-Employer Firms	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees	Annual Payroll ($1,000)
81	Other services (except public adm.)	1,362	43,583	308	1,331	29,204
99	Unclassified establish-ments	0	0	7	0 - 19	*
	TOTAL	10,700	643,082	3,746	30,631	
* : Stated as zero in 2005 County Business Patterns.						

The Monroe County Tourist Development Council estimates more than 3.49 million people visited the County in 2003 and 3.2 million visited the Florida Keys in 2006. Of visitors surveyed from March 2005 through February 2006, 80 percent were in the Florida Keys for recreation or vacation purposes. Of those surveyed, about 84 percent reported beach activities, 75 percent viewing wildlife, 57 percent diving and snorkeling, and 30 percent fishing as activities they participated in during their visit (Monroe County Tourist Development Council, Visitor Profile Survey). See Table 5.3.17.

Table 5.3.17. Recreational Activities of Florida Keys Visitors, March 2005 – February 2006. *Source*: Monroe County Tourist Development Council, Visitor Profile Survey.

Recreational Activity	Frequency	Percent of Responses	Percent of Cases
Diving	548	3.2	18
Snorkeling	1,171	6.8	38.6
Fishing	913	5.3	30.1
Viewing Wildlife	2,260	13.1	74.5
Boating	1,390	8.1	45.8
Beach Activities	2,547	14.8	83.9
Dine Out/Night Life	2,879	16.7	94.9
Museums/Historic Areas	1,659	9.6	54.7
Sightseeing & Attractions	2,727	15.8	89.9
Cultural Events	1,170	6.8	38.5
Total	17,264	100	

In 2002, there were 42 business establishments in the Charter-Fishing and Party-Fishing-Boats subsector (NAICS 4872102) with total annual revenue of about $5.5 million and 73 employees (U.S. Census, 2002 Transportation and Warehousing Subject Series). That same year there were 23 establishments in the Excursion-and Sightseeing-Boats subsector (NAICS 4872101) with total annual revenue of $17.3 million and 224 employees.

Leeworthy and Wiley (2002) estimate for the time period of June 2000 through May 2001, the general visitor population spent over 12.1 million person days in Monroe County.
Over 80 percent of those who visit the Keys arrive by automobile. From March 2005 to February 2006, 82 percent of those who visited the Keys arrived by automobile, 16 percent by air, and 2 percent by other means (Monroe County Tourist Development Council, Visitor Profile Survey). The Port of Key West is a small port; however, it serves cruise ships with itineraries in the Eastern and Western Caribbean and the Bahamas. The Key West Chamber of Commerce estimates 881,183 cruise passenger arrivals in the Port of Key West in 2006, up from 656,866 in 2000 (**www.keywestchamber.org/cominfo/trends.pdf**). In 2006, imports with a value of $36,283 and exports with a value of $11.7 million transited through the Port of Key West. There are two commercial airports in the Florida Keys: Key West International Airport and Florida Keys Marathon Airport. Key West International Airport had 276,154 arrivals in 2006, up from 275,386 in 2000 and remains the Keys primary airport for commercial activity. At present, only one commercial carrier, Delta Airlines, serves the Marathon Airport, and on July 13, 2007, the airline announced that it was suspending flights to the airport.

Fishing is another sector that is important to the Monroe County economy. In 2005, there were 971 nonemployer firms with annual receipts of $34.5 million in the fishing sector (NAICS 1141), which represent 9.1 percent of all nonemployer firms and 5.4 percent of annual receipts for all nonemployer firms in the County that year.

5.3.8.3 Dade (Miami-Dade) County

Dade County ranks second in the state in commercial landings of Caribbean spiny lobster, averaging over 6 percent of Florida's annual landings, and the two counties combined produce 96 percent of the state's commercial landings. See Table 5.3.18. Over 15 percent of FL trap-tag certificates are held by individuals in Dade County. See Table 5.3.19.

Table 5.3.18. Dade County Landings of Caribbean Spiny Lobster, 1994 – 2006. Source: FL Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

Year	County CSL Landings (lbs)	FL CSL Landings (lbs)	County Portion of FL Landings
1994	611,769	7,087,357	8.63%
1995	511,983	7,001,661	7.31%
1996	456,166	7,865,678	5.80%
1997	429,838	7,107,684	6.05%
1998	377,816	5,831,407	6.48%
1999	512,157	7,578,321	6.76%
2000	328,144	5,763,470	5.69%
2001	215,947	3,405,509	6.34%
2002	242,047	4,483,426	5.40%

2003	273,557	4,268,277	6.41%
2004	329,370	4,983,400	6.61%
2005	197,510	3,365,221	5.87%
2006	276,701	4,755,048	5.82%
Average	*366,385.00*	*5,653,573.77*	*6.40%*

Table 5.3.19. Dade County Trap Tag Certificates and Endorcements, 2006 – 2008.

2006			
	County	State	% State
Endorcement Holders	217	1,402	15.48%
Endorcement Accounts	112	615	18.21%
Endorcements Issued	255	1,638	15.57%
Revenue Collected	$28,850	$182,050	15.85%
Trap Tag Certificates	71,087	485,709	14.64%

2007			
	County	State	% State
Endorcement Holders	219	1,303	16.81%
Endorcement Accounts	118	582	20.27%
Endorcements Issued	253	1,512	16.73%
Revenue Collected	$28,500	$167,700	16.99%
Trap Tag Certificates	74,166	473,943	15.65%

2008			
	County	State	% State
Endorcement Holders	207	1,241	16.68%
Endorcement Accounts	105	550	19.09%
Endorcements Issued	246	1,443	17.05%
Revenue Collected	$27,525	$160,200	17.18%
Trap Tag Certificates	78,472	475,320	16.51%

Dade County has a total area of 6,297 km^2 (2,431 square miles), with 5,040 km^2 being land and the remaining 1,257 km^2 (about 20 percent) being water (U.S. Census Bureau). Most of the area of water is Biscayne Bay, and another significant portion is adjacent waters of the Atlantic Ocean. Among its cities are Miami, Miami Beach, Coral Gables, and Key Biscayne. See Figure 5.3.11.

Figure 5.3.11. Dade County. *Image Source*: Wikipedia.

Dade County is the most populous county in Florida and the 8th most populous county in the nation. According to U.S. Census Bureau estimates, the population of the County grew 6.6 percent from April 1, 2000 to July 1, 2006, with approximately 2.4 million people in 2006. During that same period, the natural increase in population was 87,668 (204,079 births less 116,411 deaths) and net migration was 66,896 (257,492 net international migration less the 190,596 net internal out-migration). The number of housing units also increased from 852,414 in 2000 to 928,715 in 2005, an increase of about 9 percent. Median household income in 2004 was $34,682 and 17.1 percent of the persons in the county lived below poverty, in comparison to the statewide median household income of $40,900 and poverty rate of 11.9 percent.

Tourism is an important sector to the County economy and is the largest sector of Miami's economy. According to the Greater Miami Convention and Visitors Bureau, in 2007, 12 million overnight visitors spent $17.1 billion, an increase of $1.7 billion since 2005. Overnight visitors generated an economic impact of $13.9 billion. The Dante B. Fascell Port of Miami-Dade ranks as the world's busiest cruise/passenger port in the world. In 2006, over 3.7 million cruise passengers passed through and over 9 million tons of cargo transited through the port (Port of Miami). The combination of cruise and cargo activity supports about 98,000 jobs and generates an economic impact of $12 billion. Miami International Airport (MIA) handled 32.5 million passengers in 2006 (MIA website). Among U.S. airports, MIA ranks first in international freight, third in international passengers, and fourth in total freight.

In 2005, the County had 381 employer establishments in the industry subsector Traveler Accommodation (NAICS 7211) with 25,226 employees; 12 employer establishments in RV (Recreational Vehicle) Parks and Recreational Camps with 39 employees (U.S. Census Bureau, 2005 County Business Patterns). That same year there were 290 non-employer firms in Traveler Accommodation with annual sales of about $27.7 million and 14 non-employer firms in RV Parks & Recreational Parks with annual sales of $284,000 in the County (U.S. Census, 2005 Nonemployer Statistics). See Table 18. The largest sector by number of employees is Retail

Trade (NAICS 44), which is followed by Health Care & Social Assistance (NAICS 62), Administrative and Support and Waste Management and Remediative Services (NAICS 56), Professional, Scientific & Technical Services (NAICS 54), and so on. See Table 5.3.20. Among nonemployers, the largest sector is Real Estate and Rental and Leasing (NAICS 53), which is followed by Professional, Scientific & Technical Services, Other Services (Except Public Administration), Construction, and so forth. See Table 5.3.21.

Table 5.3.20. 2005 Nonemployer and Employer Construction Statistics, Dade County. *Source*: U.S. Census Bureau, 2005 County Business Patterns and Nonemployer Statistics.

Industry Code	Industry Code Description	Non-Employer Firms	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees
23	Construction	30,690	1,165,256	4,618	38,417
236	Construction of buildings	5,622	290,129	1,317	10,422
2361	Residential construction	4,601	240,578	1,054	6,278
2362	Nonresiden-tial construc.	1,021	49,551	263	4,124
237	Heavy and civil engineering construction	630	28,338	374	4,800
2371	Utility system construction	121	3,664	65	974
2372	Land subdivision	92	9,868	223	1,017
2373	Highway, street, and bridge construction	85	2,879	58	2,452
2379	Other heavy and civil engineering construction	332	11,927	28	357
23799	Other heavy and civil engineering construction	332	11,927	28	357
238	Specialty trade contractors	24,438	846,789	2,927	23,195

Table 5.3.21. 2005 Nonemployer and Employer Business Statistics, Miami-Dade County. *Source*: U.S. Census, 2005 County Business Patterns and Nonemployer Statistics.

NAICS Code	Industry Code Description	Non-Employer Firms	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees	Annual Payroll ($1,000)
11	Forestry, fishing, hunting & ag. support	1,015	38,961	35	500 - 999	
21	Mining	38	2,187	29	1,073	62,003
22	Utilities	274	3,944	29	2,500 - 4,999	
23	Construction	30,690	1,165,256	4,618	38,417	1,482,470
31	Manufac-turing	3,669	212,073	2,378	46,621	1,561,117
42	Wholesale trade	7,658	814,973	8,514	67,342	2,884,026
44	Retail trade	16,420	765,506	10,335	118,182	2,870,980
48	Trans. & warehousing	23,596	1,000,767	2,725	51,193	1,936,735
51	Information	3,457	152,330	1,444	21,956	1,283,285
52	Finance & insurance	9,005	561,580	4,728	47,057	2,889,919
53	Real estate & rental & leasing	33,897	2,666,341	4,950	23,462	1,055,582
54	Professional, scientific & tech. serv.	31,153	1,381,648	11,047	60,355	3,488,485
55	Management of comps. & enterprises	0	0	291	17,005	1,311,656
56	Admin, support, waste mgt, remediation services	29,597	550,415	3,489	76,326	2,301,355
61	Ed. services	3,719	63,432	727	28,162	1,019,920
62	Health care & social assistance	26,415	905,533	7,715	114,198	4,439,517
71	Arts, entertain-ment & recreation	8,962	280,307	971	12,553	378,867
72	Accommoda-tion & food	3,906	208,302	4,188	89,680	1,506,700

NAICS Code	Industry Code Description	Non-Employer Firms	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees	Annual Payroll ($1,000)
	services					
81	Other services (except public adm.)	62,985	1,270,636	5,895	38,989	884,694
99	Unclassified establish-ments	0	0	158	100 - 249	
	TOTAL	296,456	12,044,191	74,266	858,080	
*:	Zero in 2005 County Business Patterns					

5.3.8.4. Palm Beach County

Palm Beach County ranks third in the state's commercial landings of Caribbean spiny lobster, averaging over 1 percent of FL's landings. See Table 5.3.22.

Table 5.3.22. Palm Beach County Commercial Landings of Caribbean Spiny Lobster, 1994 – 2006. *Source*: FL Fish and Wildlife Conservation Commission, Marine Fisheries Information System.

Year	County CSL Landings (lbs)	FL CSL Landings (lbs)	County Portion of FL Landings
1994	73,037	7,087,357	1.03%
1995	72,546	7,001,661	1.04%
1996	77,906	7,865,678	0.99%
1997	61,941	7,107,684	0.87%
1998	66,251	5,831,407	1.14%
1999	94,843	7,578,321	1.25%
2000	115,767	5,763,470	2.01%
2001	64,776	3,405,509	1.90%
2002	51,519	4,483,426	1.15%
2003	51,009	4,268,277	1.20%
2004	56,652	4,983,400	1.14%
2005	54,297	3,365,221	1.61%
2006	63,052	4,755,048	1.33%
Average	*69,507.38*	*5,653,573.77*	*1.28%*

Palm Beach County is the largest county in the state by size with a total area of 6,181 km^2 (2,386 squared miles), with 5,113 km^2 being land and the remaining 1,068 km^2 (about 17.3 percent) being water, much of which is in the Atlantic Ocean and Lake Okeechobee (U.S. Census Bureau). It has 47 miles of coastline. See Figure 5.3.12.

Figure 5.3.12. Palm Beach County, Florida. *Image Source*: Wikipedia.

The U.S. Census Bureau estimates the population of Palm Beach County grew over 12 percent from 2000 to 2005, with approximately 1.27 million people in 2005. The County's population growth has been dominated by in-migration from other parts of the country. From April 1, 2000 to July 1, 2006, it is estimated that there was a natural increase in the population of 6,431 (91,093 births less 88,806 deaths) and net migration of 139,754 (50,948 from net international migration plus 88,806 from net internal migration). Much of the population growth is attributable to the County being a popular destination for retirees. About 21 percent of the County's population was 65 years and over in 2005, as compared to that age group representing about 12 percent of the U.S. population and approximately 17 percent of Florida's population that year. Accompanying the increase in population has been an increase in employment. From 2000 to 2004, there was an increase of 77,553 full- and part-time jobs (U.S. Bureau of Economic Analysis). The increases in population and employment have generated increases in demand for homes, commercial and institutional buildings, and infrastructure. Median household income in the county in 2004 was $44,186 and 10.1 percent lived below poverty, as compared to the statewide median household income of $40,900 and poverty rate of 11.9 percent.

The three major multi-billion dollar industries in the county are tourism, construction, and agriculture, with tourism being number one (Palm Beach County government website, www.pbc.com/publicaffairs/facts1.htm). In 2004, over 7.2 million people visited the county, which supported $1.51 billion in wages and 7 percent of the jobs and generated an economic impact of $2.83 billion (Palm Beach County Tourist Development Council).[28]

[28] A hotel visitor survey has found that the climate/weather, beaches/ocean, and beautiful area are what visitors like best about Palm Beach County (Palm Beach County Tourist Development Council).

In 2005, the top three industrial sectors by number of employees were Retail Trade (NAICS 44), Health Care & Social Assistance (NAICS 62), and Accommodation & Food Services (NAICS 72), the latter being a principal component of tourism. See Table 5.3.23. In 2005, the County had 154 employer establishments in the industry subsector Traveler Accommodation (NAICS 7211) with 5,000 to 9,999 employees; 14 employer establishments in RV (Recreational Vehicle) Parks and Recreational Camps with 63 employees (U.S. Census Bureau, 2005 County Business Patterns). See Table 21. That same year there were 229 non-employer firms in Traveler Accommodation with annual sales of about $27.3 million and 10 non-employer firms in RV Parks & Recreational Parks with annual sales of over $1 million in the County (U.S. Census, 2005 Nonemployer Statistics). Other important industrial sectors of the County economy include Professional, Scientific & Technical Services (NAICS 54), Retail Trade (NAICS 44), and Health Care and Social Assistance (NAICS 62).

Table 5.3.23. 2005 Nonemployer Firms and Employer Establishments, Palm Beach County. *Source*: U.S. Census Bureau, 2005 County Business Patterns and Nonemployer Statistics.

NAICS Code	Industry Code Description	Non-Employer Establish-ments	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees	Annual Payroll ($1,000)
11	Forestry, fishing, hunting & agricultural support	636	27,851	78	1,398	20,666
21	Mining	18	1,971	24	234	12,828
22	Utilities	48	1,813	30	3,969	412,927
23	Construction	10,593	688,604	4,266	37,576	1,544,242
31	Manufacturing	1,221	74,104	975	15,769	753,088
42	Wholesale trade	2,793	251,624	2,436	19,902	1,052,622
44	Retail trade	7,849	453,732	5,458	73,486	1,831,500
48	Transportation & warehousing	4,172	215,349	773	8,935	326,350
51	Information	1,577	83,540	738	15,530	770,340
52	Finance & insurance	7,523	603,238	3,175	25,748	1,934,633
53	Real estate & rental & leasing	21,153	1,774,645	2,766	14,731	636,205
54	Professional, scientific & technical services	17,586	946,661	6,746	36,406	2,206,725
55	Management of companies & enterprises	0	0	217	16,799	1,268,578
56	Admin, support, waste mgt, remediation services	9,542	291,528	3,000	43,417	1,316,027
61	Educational services	2,106	43,080	469	9,864	301,140
62	Health care & social assistance	9,958	367,559	4,511	65,692	2,630,989

71	Arts, entertainment & recreation	4,906	189,810	796	16,627	453,617
72	Accommodation & food services	1,462	121,315	2,478	54,686	853,655
81	Other services (except public adm.)	16,293	554,540	3,625	23,587	564,578
99	Unclassified establishments	0	0	87	115	2,561
	TOTAL	119,436	6,690,964	42,648	484,471	18,893,271

5.3.8.5. Broward County

Broward County ranks fourth in annual landings of Caribbean spiny lobster. From 1994 through 2006 its landings represented 0.81 percent of the average annual landings during those years. County landings have dropped since reaching a peak of over 57,000 pounds in 2000. See Table 5.3.24.

Table 5.3.24. Broward County Landings of Caribbean Spiny Lobster, in Pounds, 1994 – 2006. Source: FFWCC.

Year	Spiny Lob	State Total Lbs	% of State Pounds
1994	67,891	7,087,357	0.96%
1995	71,723	7,001,661	1.02%
1996	94,219	7,865,678	1.20%
1997	56,600	7,107,684	0.80%
1998	43,121	5,831,407	0.74%
1999	50,921	7,578,321	0.67%
2000	53,619	5,763,470	0.93%
2001	57,617	3,405,509	1.69%
2002	25,394	4,483,426	0.57%
2003	16,711	4,268,277	0.39%
2004	28,664	4,983,400	0.58%
2005	21,067	3,365,221	0.63%
2006	16,435	4,755,048	0.35%
Average	46,460.15	*5,653,573.77*	*0.81%*

Broward County has a total area of 3,418 km^2 (1,320 square miles), with 3,122 km^2 being land and the remaining 296 km^2 (about 9 percent) being water (U.S. Census Bureau). Approximately 64 percent of the county's total area lies within the Everglades conservation area, and development is restricted to 410 square miles (Broward County Planning Services Division). Major Cities include Coral Springs, Fort Lauderdale, Hollywood and Pembroke Pines. See Figure 5.3.13.

Figure 5.3.13. Broward County. *Image Source*: Wikipedia.

Broward County is the second most populated county in Florida and is the 15th most populous county in the nation. According to U.S. Census Bureau estimates, the population of Broward County grew 10.1 percent from April 1, 2000 to July 1, 2006, with approximately 1.79 million people in 2006. During that same period, the natural increase in population was 43,623 (142,787 births less 99,164 deaths) and net migration was 120,768 (100,986 net international migration plus 19,782 net internal migration), for a total increase of 164,391 people. The increase in population has resulted in increased demand for homes, retail and commercial buildings and infrastructure. Housing units increased from 741,043 in 2000 to 790,308 in 2005, an increase of less than 7 percent (U.S. Census). Median household income in the county in 2004 was $43,136 in 2004 and 11.6 percent of the persons in the county lived below poverty, as compared to the statewide median household income of $40,900 and the poverty rate of 11.9 percent.

Service industries and retail trade dominate the county's economic environment. In 2005, there were more establishments in the Professional, Scientific & Technical Services sector (NAICS 54) than any other sector, and there were more paid employees in Retail Trade than any other sector. See Table 5.3.25.

Tourism's contribution is significant. In 2005, the county had a record of over 10 million visitors, a 6.3 percent increase from 2004 (Broward County Department of Urban Planning and Redevelopment, 2006). Tourism generates more than $8.4 billion and employs more than 112,000 people in the county. In 2005, Fort Lauderdale-Hollywood International Airport's over 22 million passengers broke the previous year's record of travelers passing through the facility.

In 2005, the County had 344 employer establishments in the industry subsector Traveler Accommodation (NAICS 7211) with 10,000 to 24,999 employees; 15 employer establishments in RV Parks and Recreational Camps (NAICS 7212) with 20 to 99 employees (U.S. Census Bureau, 2005 County Business Patterns). That same year there were 318 non-employer firms in Traveler Accommodation with annual sales of about $23.8 million and 17 non-employer firms in RV Parks

& Recreational Parks with annual sales of $486,000 in the County (U.S. Census, 2005 Nonemployer Statistics).

Table 5.3.24. 2005 Nonemployer and Employer Business Statistics, Broward County. *Source*: U.S. Census, 2005 County Business Patterns and Nonemployer Statistics.

NAICS Code	Industry Code Description	Non-Employer Firms	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees	Annual Payroll ($1,000)
11	Forestry, fishing, hunting & agricultural support	467	20,022	50	100 - 249	*
21	Mining	18	2,536	9	133	11,972
22	Utilities	87	4,369	26	500 - 999	*
23	Construction	15,482	824,796	4,729	45,489	1,915,366
31	Manufacturing	1,791	118,443	1,679	29,655	1,160,990
42	Wholesale trade	4,383	439,736	4,710	41,514	1,976,541
44	Retail trade	11,293	579,188	7,374	102,197	2,625,584
48	Transportation & warehousing	7,821	382,114	1,346	21,480	811,196
51	Information	2,504	106,506	1,117	19,503	1,123,875
52	Finance & insurance	7,825	487,869	3,969	40,480	2,335,984
53	Real estate & rental & leasing	25,240	1,843,848	3,670	18,422	704,456
54	Professional, scientific & technical services	22,385	1,035,758	9,187	41,852	2,212,225
55	Management of comps. & enterprises	0	0	273	10,999	983,114
56	Admin, support, waste mgt, remediation services	14,601	386,155	3,869	65,367	1,833,766
61	Ed. services	2,782	55,593	603	15,046	450,758
62	Health care & social assistance	17,572	544,595	5,496	84,111	3,212,404
71	Arts, entertainment & recreation	6,714	222,151	960	9,728	316,824

NAICS Code	Industry Code Description	Non-Employer Firms	Non-Employer Receipts ($1,000)	Employer Establish-ments	No. of Employees	Annual Payroll ($1,000)
72	Accommodation & food services	2,312	155,492	3,568	68,512	1,016,954
81	Other services (except public adm.)	27,791	808,376	4,847	30,422	753,542
99	Unclassified establish- ments	0	0	140	176	4,134
	TOTAL	171,068	8,017,547	57,622	646,067	23,509,177
*:	Zero in 2005 County Business Patterns					

Port Everglades infuses more than $2.4 billion annually to the county's economy (ibid). It handles about 4 million cruise passengers and over 26 million tons of cargo annually, and nearly 6,400 cargo and cruise ships call at the port each year (ibid). According to Broward County Department of Urban Planning and Redevelopment, Port Everglades has been ranked as one of the five fastest growing container ports among the nation's 20 largest seaports. It handles more than 22.1 percent of the entire state of Florida's waterborne imports and exports.

Fishing is another sector that is important to the Broward County economy, and coral reefs are important habitat for species targeted by commercial and recreational fishermen. In 2002, there were 26 business establishments in the charter-fishing-&-party-fishing-boat subsector (NAICS 4872102) in the County (2002 Economic Census, Transportation and Warehousing Subject Series).

5.3.11 Hurricanes

Hurricanes can have both positive and negative economic impacts on spiny lobster fishermen, especially those that use traps. The beneficial impact is that a hurricane can cause lobsters to move and go into traps and nets, which increases landings. However, the negative impacts include damages to and losses of traps, other gear, and vessels and associated losses of landings and revenues.[29]

On September 25, 1998, Hurricane Georges struck Florida with reported maximum sustained winds of approximately 95 miles per hour with gusts up to 115 miles per hour and an approximate storm surge of up to seven (7) feet. Several counties had widespread damage, including Monroe County (Wetherell). One of the worst hurricane seasons on record was the 2005 season. Of those that hit the coast of Florida, the four of Dennis (July), Katrina (August), Rita (September), and Wilma (October) had a significant adverse impact on spiny lobster trap fishers. According to a May 1, 2006, article at *keysnews.com*, Florida Keys lobster trap fishermen "reported losing up to 70 percent of their traps in the four hurricanes that skirted the Keys in 2005. Officials have estimated that the hurricanes cost lobster fishermen $35 million in lost traps and catch" (O'Hara, May 1, 2006). In April 2006, the Florida Hurricane Relief Fund, which was established in 2004, gave $0.5 million to the Florida Keys Commercial Fishermen's Association (Association) to help lobster and stone crab fishers in Monroe and Miami-Dade counties replace traps lost to the 2005 hurricane season. According to the Association's executive director, the money will be equally distributed among the fishermen who apply for aid (ibid).[30]

5.4 Administrative Environment

5.4.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, an area extending 200 nautical miles from the seaward boundary of each of the coastal states, and authority over US anadromous species and continental shelf resources that occur beyond the EEZ.

[29] Traps are not insurable.

[30] To prove eligibility, a commercial lobster and stone crab fishermen "must show tax receipts for the past several years and documents showing their landings" (O'Hara, May 1, 2006).

Responsibility for federal fishery management decision-making is divided between the Secretary and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement proposed plans and amendments after ensuring management measures are consistent with the Magnuson-Stevens Act and with other applicable laws summarized in Section 10. In most cases, the Secretary has delegated this authority to NMFS.

The Councils are responsible for fishery resources in federal waters of their respective regions. These waters extend to 200 nautical miles offshore from the nine-mile seaward boundary of the states of Florida Texas and the territory of Puerto Rico, and the three-mile seaward boundary of the Atlantic side of Florida and the states of Alabama, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and the territory of the USVI.

The Councils consist of voting members: public members appointed by the Secretary; one each from the fishery agencies of the state or territory, and one from NMFS. The public is also involved in the fishery management process through participation on advisory panels and through council meetings that, with few exceptions for discussing personnel matters and litigation, are open to the public. The regulatory process is also in accordance with the Administrative Procedures Act, in the form of "notice and comment" rulemaking, which provides extensive opportunity for public scrutiny and comment, and requires consideration of and response to those comments.

Regulations contained within FMPs are enforced through actions of the NOAA's Office of Law Enforcement, the USCG, and various state authorities. To better coordinate enforcement activities, federal and state enforcement agencies have developed cooperative agreements to enforce the Magnuson-Stevens Act.

5.4.2 State Fishery Management

The purpose of state/territory representation at the council level is to ensure state/territory participation in federal fishery management decision-making and to promote the development of compatible regulations in state/territory and federal waters. The state and territorial governments have the authority to manage their respective state/territorial fisheries. Each of the states and territories exercises legislative and regulatory authority over their states'/territories' natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states'/territories' natural resources, all states/territories cooperate with numerous state/territory and federal regulatory agencies when managing marine resources.

9.0 OTHER APPLICABLE LAWS

The MSFCMA (16 U.S.C. 1801 et seq.) provides the authority for U.S. fishery management. But fishery management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems within which those fisheries are conducted. Major laws affecting federal fishery management decision making are summarized below.

9.1 Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NOAA Fisheries is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it takes effect.

9.2 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq.) encourages state and federal cooperation in the development of plans that manage the use of natural coastal habitats, as well as the fish and wildlife those habitats support. When proposing an action determined to directly affect coastal resources managed under an approved coastal zone management program, NOAA Fisheries is required to provide the relevant state agency with a determination that the proposed action is consistent with the enforceable policies of the approved program to the maximum extent practicable at least 90 days before taking final action.

9.3 Information Quality Act

The Data Quality Act (DQA) (Public Law 106-443), which took effect October 1, 2002, requires the government for the first time to set standards for the quality of scientific information and statistics used and disseminated by federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions).

Specifically, the Act directs the Office of Management and Budget (OMB) to issue government wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." Such guidelines have been issued, directing all federal agencies to create and issue agency-specific standards to 1) ensure Information Quality and develop a pre-dissemination review process; 2) establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and 3) report periodically to OMB on the number and nature of complaints received.

Scientific information and data are key components of FMPs and amendments and the use of best available information is the second national standard under the MSFCMA. To be consistent with the Act, FMPs and amendments must be based on the best information available, properly reference all supporting materials and data, and should be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data should also undergo quality control prior to being used by the agency.

9.4 Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 U.S.C. Section 1531 et seq.) requires that federal agencies use their authorities to conserve endangered and threatened species, and that they ensure actions they authorize, fund, or carry out are not likely to harm the continued existence of those species or the habitat designated to be critical to their survival and recovery. The ESA requires NOAA Fisheries, when proposing a fishery action that "may affect" critical habitat or endangered or threatened species, to consult with the appropriate administrative agency (itself for most marine species, the U.S. Fish and Wildlife Service for all remaining species) to determine the potential impacts of the proposed action. Consultations are concluded informally when proposed actions "may affect but are not likely to adversely affect" endangered or threatened species or designated critical habitat. Formal consultations, resulting in a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" endangered or threatened species or designated critical habitat. If jeopardy or adverse modification is found, the consulting agency is required to suggest reasonable and prudent alternatives.

On April 28, 1989, NOAA Fisheries Southeast Region (SERO) completed a formal consultation, including a Biological Opinion (Opinion), on the effects of commercial fishing activities in the Southeast Region on threatened and endangered species. The Opinion concluded that the Gulf of Mexico and South Atlantic spiny lobster fishery was likely to adversely affect, but not jeopardize the continued existence of ESA-listed sea turtles. Subsequent, informal consultations on the continued authorization of the fishery determined it was not likely to adversely affect ESA-listed species. The impacts of the Caribbean spiny lobster fishery on ESA-listed species were last evaluated in a formal consultation, concluded on May 19, 2005. The opinion concluded that Caribbean spiny lobster fishing was likely to adversely affect, but not jeopardize the continued existence of ESA-listed sea turtles.

As provided in 50 CFR 402.16, reinitiation of formal consultation is required when discretionary involvement or control over the action has been retained (or is authorized by law) and: (1) the amount or extent of the incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the agency action is subsequently modified in a manner that causes

an effect to the listed species or critical habitat not previously considered; or (4) if a new species is listed or critical habitat designated that may be affected by the identified action.

Since the completion of the most recent formal consultations on these fisheries, two species of *Acropora* coral have been listed under the ESA, and may be affected by spiny lobster fishing. Additionally, new information is available revealing effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered. Accordingly, NOAA Fisheries Office of Sustainable Fisheries has requested initiation of a Section 7 consultation with the SERO's Protected Resources Division for this amendment. NOAA Fisheries anticipates completion of the consultations on the Gulf of Mexico/South Atlantic and Caribbean spiny lobster fisheries prior to Secretarial review and approval of the fishery plan amendments for the spiny lobster fisheries.

9.5 Rivers and Harbors Act of 1899

The Rivers and Harbors Act was created in 1899 to prevent navigable waters of the United States from being obstructed. Section 10 of the Act requires that anyone wishing to dredge, fill, or build a structure in any navigable water and associated wetlands obtain a permit from the ACOE. An activity affecting wetlands may require a Section 404 and Section 10 permit, thus both sections are often included together in a permit notice. When these activities are permitted, and there is direct loss of submerged habitat, such as seagrasses, then mitigation is often required to compensate for this loss.

9.6 Clean Water Act

In 1972, Congress passed the Clean Water Act (CWA) - also known as the Water Pollution Prevention and Control Act - to protect the quality of the nation's waterways including oceans, lakes, rivers and streams, aquifers, coastal areas, and aquatic resources. The law sets out broad rules for protecting the waters of the United States; Sections 404 and 401 apply directly to waters and aquatic resources protection.

Section 404 of the Clean Water Act (often referred to as "Section 404" or simply "404") forbids the unpermitted "discharge of dredge or fill material" into waters of the United States. Section 404 does not regulate every activity in aquatic resources or coastal areas, but requires anyone seeking to fill any area to first obtain a permit from the Army Corps of Engineers (ACOE). Constructing bridges, causeways, piers, port expansion, or any other construction or development activity along a waterway or in aquatic resources generally requires a 404 permit. When a fill project is permitted, there may be mitigation required to replace lost aquatic resources.

Section 401 of the Clean Water Act requires that an applicant for a Section 404 permit obtain a certificate from their state's environmental regulatory agency (if the state has delegated such authority to the agency) that the activity will not negatively impact water quality. This permit

process is supposed to prevent the discharge of pollutants (pesticides, heavy metals, hydrocarbons) or sediments into waters, which may be above acceptable levels, because decreased water quality may endanger the health of the people, fish, and wildlife. However, acceptable pollutant levels have not been established for many aquatic resources, which make it difficult for state agencies to fully assess a project's impact on water quality.

9.7 National Marine Sanctuaries Act

Under the National Marine Sanctuaries Act (NMSA) (also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972), as amended, the Secretary of Commerce is authorized to designate National Marine Sanctuaries to protect distinctive natural and cultural resources whose protection and beneficial use requires comprehensive planning and management. The National Marine Sanctuaries are administered by NOAA's National Ocean Service. The Act provides authority for comprehensive and coordinated conservation and management of these marine areas. The National Marine Sanctuary System currently comprises 13 sanctuaries around the country, including sites in American Samoa and Hawaii. These sites include significant coral reef and kelp forest habitats, and breeding and feeding grounds of whales, sea lions, sharks, and sea turtles. A complete listing of the current sanctuaries and information about their location, size, characteristics, and affected fisheries can be found at http://www.sanctuaries.nos.noaa.gov/oms/oms.html.

9.8 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act protects the quality of the aquatic environment needed for fish and wildlife resources. The Act requires consultation with the Fish and Wildlife Service and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency (except TVA) under a Federal permit or license. NOAA Fisheries was brought into the process later, as these responsibilities were carried over, during the reorganization process that created NOAA. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources", and to ensure that the environmental value of a body of water or wetland is taken into account in the decision-making process during permit application reviews. Consultation is most often (but not exclusively) initiated when water resource agencies send the FWS or NOAA Fisheries a public notice of a Section 404 permit. FWS or NOAA Fisheries may file comments on the permit stating concerns about the negative impact the activity will have on the environment, and suggest measures to reduce the impact.

9.9 Executive Orders

9.9.1 E.O. 12114: Environmental Assessment of Actions Abroad

The purpose of this Executive Order is to enable responsible officials of Federal agencies having ultimate responsibility for authorizing and approving actions encompassed by this Order to be

informed of pertinent environmental considerations and to take such considerations into account, with other pertinent considerations of national policy, in making decisions regarding such actions. While based on independent authority, this Order furthers the purpose of the National Environmental Policy Act and the Marine Protection Research and Sanctuaries Act and the Deepwater Port Act consistent with the foreign policy and national security policy of the United States, and represents the United States government's exclusive and complete determination of the procedural and other actions to be taken by Federal agencies to further the purpose of the National Environmental Policy Act, with respect to the environment outside the United States, its territories and possessions.

Agencies in their procedures shall establish procedures by which their officers having ultimate responsibility for authority and approving actions in one of the following categories encompassed by this Order, take into consideration in making decisions concerning such actions, a document described in Section 2-4(a):
(a) major Federal actions significantly affecting the environment of the global commons outside the jurisdiction of any nation (e.g., the oceans or Antarctica);
(b) major Federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action;
(c) major Federal actions significantly affecting the environment of a foreign nation which provide to that nation:

(1) a product, or physical project producing a principal product or an emission or effluent, which is prohibited or strictly regulated by Federal law in the United States because its toxic effects on the environment create a serious public health risk; or
(2) a physical project which in the United States is prohibited or strictly regulated by Federal law to protect the environment against radioactive substances.

(d) major Federal actions outside the United States, its territories and possessions which significantly affect natural or ecological resources of global importance designated for protection under this subsection by the President, or, in the case of such a resource protected by international agreement binding on the United States, by the Secretary of State. Recommendations to the President under this subsection shall be accompanied by the views of the Council on Environmental Quality and the Secretary of State.

The purpose of this amendment/EIS is to increase the spawning biomass of the spiny lobster population in the waters of the Caribbean and tropical western Atlantic (the oceans). It has been determined in section 6 there will be significant biological affects in a positive form; and as indicated numerous times throughout the document, the restrictions considered in this document were developed in accordance with a number of international agreements and accords passed by foreign nations.

9.9.2 E.O. 12866: Regulatory Planning and Review

Executive Order 12866: Regulatory Planning and Review, signed in 1993, requires federal agencies to assess the costs and benefits of their proposed regulations, including distributional impacts, and to select alternatives that maximize net benefits to society. To comply with E.O. 12866, NOAA Fisheries prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that either implement a new fishery management plan or significantly amend an existing plan. RIRs provide a comprehensive analysis of the costs and benefits to society associated with proposed regulatory actions, the problems and policy objectives prompting the regulatory proposals, and the major alternatives that could be used to solve the problems. The reviews also serve as the basis for the agency's determinations as to whether proposed regulations are a "significant regulatory action" under the criteria provided in E.O. 12866 and whether proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the RFA. A regulation is significant if it is likely to result in an annual effect on the economy of at least $100,000,000 or has other major economic effects.

9.9.3 E.O. 12630: Takings

The Executive Order on Government Actions and Interference with Constitutionally Protected Property Rights, which became effective March 18, 1988, requires that each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. Management measures limiting fishing seasons, areas, quotas, fish size limits, and bag limits do not appear to have any taking implications. There is a takings implication if a fishing gear is prohibited, because fishermen who desire to leave a fishery might be unable to sell their investment, or if a fisherman is prohibited by federal action from exercising property rights granted by a state.

9.9.4 E.O. 13089: Coral Reef Protection

The Executive Order on Coral Reef Protection (June 11, 1998) requires federal agencies whose actions may affect U.S. coral reef ecosystems to identify those actions, utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and, to the extent permitted by law, ensure that actions they authorize, fund or carry out not degrade the condition of that ecosystem. By definition, a U.S. coral reef ecosystem means those species, habitats, and other national resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., federal, state, territorial, or commonwealth waters).

9.9.5 E.O. 13112: Invasive Species

The Executive Order requires agencies to use authorities to prevent introduction of invasive species, respond to and control invasions in a cost effective and environmentally sound manner, and to provide for restoration of native species and habitat conditions in ecosystems that have been invaded. Further, agencies shall not authorize, fund, or carry out actions that are likely to

cause or promote the introduction or spread of invasive species in the U.S. or elsewhere unless a determination is made that the benefits of such actions clearly outweigh the potential harm; and that all feasible and prudent measures to minimize the risk of harm will be taken in conjunction with the actions. The actions undertaken in this amendment will not introduce, authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere.

9.9.6 E.O. 13132: Federalism

The Executive Order on federalism requires agencies in formulating and implementing policies that have federalism implications, to be guided by the fundamental federalism principles. The Order serves to guarantee the division of governmental responsibilities between the national government and the states that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people. This Order is relevant to FMPs and amendment given the overlapping authorities of NOAA Fisheries, the states, and local authorities in managing coastal resources, including fisheries, an the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate state, tribes and local entities (international too). The proposed management measures in this Amendment to the Spiny Lobster FMPs of the Caribbean and the South Atlantic/Gulf of Mexico have been developed with the local, federal and international officials.

9.9.7 E.O. 13141: Environmental Review of Trade Agreements

This Executive Order requires the U.S. Trade Representative, through the interagency Trade Policy Staff to conduct environmental reviews of three of the most common agreements: comprehensive multilateral trade rounds, bilateral or multilateral free-trade agreements, and major new trade liberalization agreements in natural resource sectors. Although the procedures for environmental impact assessment in Executive Order 13141 are not subject to NEPA, they follow similar guidelines. Understanding the importance of this E.O. in relation to this Amendment/EIS, NOAA Fisheries Service has made a concerted effort to involve the USTR and other agencies involved with trade negotiations to inform them of the intention of the actions being undertaken by the Councils and NOAA Fisheries Service.

9.9.8 E.O. 13158: Marine Protected Areas

Executive Order 13158 (May 26, 2000) requires federal agencies to consider whether their proposed action(s) will affect any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resource within the protected area.

9.9.9 E.O. 12898: Environmental Justice

This Executive Order mandates that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high

and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. Federal agency responsibilities under this Executive Order include conducting their programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefit of, or subjecting persons to discrimination under, such, programs policies, and activities, because of their race, color, or national origin. Furthermore, each federal agency responsibility set forth under this Executive Order shall apply equally to Native American programs.

Specifically, federal agencies shall, to the maximum extent practicable; conduct human health and environmental research and analysis; collect human health and environmental data; collect, maintain and analyze information on the consumption patterns of those who principally rely on fish and/or wildlife for subsistence; allow for public participation and access to information relating to the incorporation of environmental justice principals in Federal agency programs or policies; and share information and eliminate unnecessary duplication of efforts through the use of existing data systems and cooperative agreements among Federal agencies and with State, local, and tribal governments. The proposed actions would be applied to all participants in the fishery, regardless of their race, color, national origin, or income level, and as a result are not considered discriminatory. Additionally, none of the proposed actions are expected to affect any existing subsistence consumption patterns. Therefore, no environmental justice issues are anticipated and no modifications to any proposed actions have been made to address environmental justice issues.

9.10 Marine Mammal Protection Act

The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas. It also prohibits the importing of marine mammals and marine mammal products into the United States. Under the MMPA, the Secretary of Commerce (authority delegated to NOAA Fisheries) is responsible for the conservation and management of cetaceans and pinnipeds (other than walruses). The Secretary of the Interior is responsible for walruses, sea otters, polar bears, manatees, and dugongs.

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction; development and implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries; and studies of pinniped-fishery interactions. The MMPA requires a commercial fishery to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals. Category I designates fisheries with frequent

serious injuries and mortalities incidental to commercial fishing; Category II designates fisheries with occasional serious injuries and mortalities; Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities. To legally fish in a Category I and/or II fishery, a fisherman must obtain a marine mammal authorization certificate by registering with the Marine Mammal Authorization Program (50 CFR 229.4) and accommodate an observer if requested (50 CFR 229.7(c)) and they must comply with any applicable take reduction plans.

The Caribbean spiny lobster trap/pot and Florida spiny lobster trap/pot fisheries are listed as part of a Category III fishery (72 FR 66048; November 27, 2007) because there has only been one documented interaction between these gears and marine mammals.

9.11 Paperwork Reduction Act

The Paperwork Reduction Act (PRA) of 1995 (44 U.S.C. 3501 et seq.) regulates the collection of public information by federal agencies to ensure that the public is not overburdened with information requests, that the federal government's information collection procedures are efficient, and that federal agencies adhere to appropriate rules governing the confidentiality of such information. The PRA requires NOAA Fisheries to obtain approval from the Office of Management and Budget before requesting most types of fishery information from the public. This action contains no PRA requirements.

9.12 Small Business Act

The Small Business Act of 1953, as amended, Section 8(a), 15 U.S.C. 634(b)(6), 636(j), 637(a) and (d); Public Laws 95-507 and 99-661, Section 1207; and Public Laws 100-656 and 101-37 are administered by the SBA. The objectives of the act are to foster business ownership by individuals who are both socially and economically disadvantaged; and to promote the competitive viability of such firms by providing business development assistance including, but not limited to, management and technical assistance, access to capital and other forms of financial assistance, business training and counseling, and access to sole source and limited competition federal contract opportunities, to help the firms to achieve competitive viability. Because most businesses associated with fishing are considered small businesses, NMFS, in implementing regulations, must make an assessment of how those regulations will affect small businesses. Implications to small businesses are discussed in the RIR herein (Section 7).

9.13 Magnuson-Stevens Act Essential Fish Habitat Provisions

The Magnuson-Stevens Act includes EFH requirements, and as such, each existing, and any new, FMPs must describe and identify EFH for the fishery, minimize to the extent practicable adverse effects on that EFH caused by fishing, and identify other actions to encourage the conservation and enhancement of that EFH. The Council and NMFS have determined there are no adverse effects to EFH in this amendment as discussed in the Environmental Consequences section (Section 6).

9.14 Migratory Bird Treaty Act

Under the Migratory Bird Treaty Act (MBTA), it is unlawful to pursue, hunt, take, capture, kill, possess, trade, or transport any migratory bird, or any part, nest, or egg of a migratory bird, included in treaties between the United States and Great Britain, Mexico, Japan, or the former Union of Soviet Socialists Republics, except as permitted by regulations issued by the Department of the Interior (16 U.S.C. 703-712). Violations of the MBTA carry criminal penalties; any equipment and means of transportation used in activities in violation of the MBTA may be seized by the United States government and, upon conviction, must be forfeited to it. To date, the MBTA has been applied to the territory of the United States and coastal waters extending three miles from shore. Furthermore, Executive Order 13186 (see Section 9.5.9) was issued in 2001, which directs federal agencies, including NOAA Fisheries, to take certain actions to further implement the MBTA.

9.15 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) requires federal agencies to consider the environmental and social consequences of proposed major actions, as well as alternatives to those actions, and to provide this information for public consideration and comment before selecting a final course of action. Because NOAA Fisheries Service is proposing a major fishery action that may significantly affect the quality of the human environment, NOAA Fisheries Service has prepared this EIS to comply with NEPA and its implementing regulations.

9.16 Regulatory Flexibility Act

The purpose of the Regulatory Flexibility Act (RFA 1980, 5 U.S.C. 601 et seq.) is to ensure that federal agencies consider the economic impact of their regulatory proposals on small entities, analyze effective alternatives that minimize the economic impacts on small entities, and make their analyses available for public comment. The RFA does not seek preferential treatment for small entities, require agencies to adopt regulations that impose the least burden on small entities, or mandate exemptions for small entities. Rather, it requires agencies to examine public policy issues using an analytical process that identifies, among other things, barriers to small business competitiveness and seeks a level playing field for small entities, not an unfair advantage.

After an agency determines that the RFA applies, it must decide whether to conduct a full regulatory flexibility analysis (IRFA or Final Regulatory Flexibility Analysis) or to certify that the proposed rule will not "have a significant economic impact on a substantial number of small entities. In order to make this determination, the agency conducts a threshold analysis, which has the following 5 parts: 1) Description of small entities regulated by proposed action, which includes the SBA size standard(s), or those approved by the Office of Advocacy, for purposes of the analysis and size variations among these small entities; 2) Descriptions and estimates of the economic impacts of compliance requirements on the small entities, which include reporting and recordkeeping burdens and variations of impacts among size groupings of small entities; 3)

Criteria used to determine if the economic impact is significant or not; 4) Criteria used to determine if the number of small entities that experience a significant economic impact is substantial or not; and 5) Descriptions of assumptions and uncertainties, including data used in the analysis. If the threshold analysis indicates that there will not be a significant economic impact on a substantial number of small entities, the agency can so certify.

9.17 Small Business Act

Enacted in 1953, the Small Business Act requires that agencies assist and protect small-business interests to the extent possible to preserve free competitive enterprise.

9.18 Public Law 99-659: Vessel Safety

Public Law 99-659 amended the Magnuson-Stevens Act to require that a FMP or FMP amendment must consider, and may provide for, temporary adjustments (after consultation with the U.S. Coast Guard and persons utilizing the fishery) regarding access to a fishery for vessels that would be otherwise prevented from participating in the fishery because of safety concerns related to weather or to other ocean conditions.

10.0 SOCIAL IMPACT ASSESSMENT REQUIREMENTS AND DATA ISSUES

INTRODUCTION

Mandates to conduct Social Impact Assessments come from both the National Environmental Policy Act (NEPA) and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). NEPA requires federal agencies to consider the interactions of natural and human environments by using a "...systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making" [NEPA section 102 (2) (a)]. Under the Council on Environmental Quality's (CEQ, 1986) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, a clarification of the terms "human environment" expanded the interpretation to include the relationship of people with their natural and physical environment (40 CFR 1508.14). Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects which may be direct, indirect or cumulative (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, 1994).

Recent amendments to the Magnuson-Stevens Act require FMPs address the impacts of any management measures on the participants in the affected fishery and those participants in other fisheries that may be affected directly or indirectly through the inclusion of a fishery impact statement [Magnuson-Stevens Act section 303 (a) (9)]. Most recently, with the addition of National Standard 8, FMPs must now consider the impacts upon fishing communities to the extent practicable to assure their sustained participation and minimize adverse economic impacts upon those communities [Magnuson-Stevens Act section 301 (a)

(8)]. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. With an increasing need for management action, the consequences of such changes need to be examined to minimize the negative impacts experienced by the populations concerned to the extent practicable.

DATA LIMITATIONS AND METHODS

Social impacts are generally the consequences to human populations that follow from some type of public or private action. Those consequences may include alterations to "...the ways in which people live, work or play, relate to one another, organize to meet their needs and generally cope as members of a society..." (Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, 1994:1). In addition, included under this interpretation are cultural impacts that may involve changes in values and beliefs, which affect the way people identify themselves within their occupation, communities and society in general. Social impacts analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts. Therefore, it is important that as much information as possible concerning a fishery and its participants be gathered for an assessment.

It is important to identify any foreseeable adverse effects on the human environment. With quantitative data often lacking, qualitative data can be used to provide a rough estimate of some of the impacts based on the best available science. In addition, when there is a body of empirical findings available from the social science literature, it needs to be summarized and referenced in the analyses.

SUMMARY OF SOCIAL IMPACT ASSESSMENT

Descriptions of the affected communities and expected effects of the alternatives considered in this amendment are provided in sections 5 and 6, respectively.

5.0 REFERENCES

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Appendix A. Options discussed and eliminated from detailed consideration.

1. The northern fishery

a. Continue to allow two lobsters per person recreational and commercial year-round. Note: Possession of berried lobsters is prohibited; stripping of eggs and/or clipping of fins is also prohibited.

b. Allow a larger commercial harvest.

c. Others???

MOTION: DO NOT ADDRESS ANY CHANGES TO THE NORTHERN PORTION OF THE SPINY LOBSTER FISHERY.

Rationale: