

Proposed Fisheries Management for Caribbean Spiny Lobster in the US Caribbean: Minimum Size for Imports

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ABSTRACT

Caribbean spiny lobster, *Panulirus argus*, is a common member of the Caribbean reef community and forms the basis for one of the most important fisheries in the area. The United States (U.S.) receives over 90 percent of the exports from central and South American countries and spiny lobster is considered an important product for major dealers and distributors. In many instances, imports are undersized based on size limits established in the U.S. and/or in the country of origin. DNA analysis indicates a single stock structure for the Caribbean spiny lobster (Lipcius and Cobb, 1994; Silberman and Walsh 1994) throughout its range, and thus proper management for resource sustainability is imperative. If the importation of undersized lobsters is allowed to continue, such a practice could potentially impact the reproductive potential of the species, recreational and commercial fishing success, market availability, and the ability to enforce regulations designed to protect the sustainability of the resource. This situation is an important concern for U.S. Southeast Regional Management Councils, responsible for managing the Caribbean spiny lobster resource. Many Caribbean and Central and South American nations share these concerns, and scientific evidence suggests that larvae from one area or region within this species' range may contribute to stock recruitment in other areas or regions.

The Caribbean Fishery Management Council (Council) has expressed intent to amend its Spiny Lobster Fishery Management Plan (FMP) to consider application of a minimum size limit on imported spiny lobster. NOAA Fisheries Service believes that potential revisions to the Gulf of Mexico and South Atlantic Spiny Lobster FMP should be addressed concurrently. After conferring with the Gulf of Mexico Fishery Management Council and South Atlantic Fishery Management Council, the U.S. Secretary of Commerce designated the Council as the administrative lead to address spiny lobster issues. Thus, the Council will prepare one document that contains an amendment to the Caribbean Spiny Lobster FMP and also an amendment to the Gulf and South Atlantic Spiny Lobster FMP. Given the scientific, international trade, and enforcement issues associated with this action, an opportunity to review potential alternatives under consideration and supporting analyses, is imperative. Proper coordination among all parties will help to ensure that issues are addressed early on in the FMP amendment process.

KEY WORDS: US Caribbean, fisheries management, spiny lobster.

Gerencia propuesta de las industrias pesqueras para la langosta espinosa del Caribe en los E.E.U.U. el Caribe: Tamaño mínimo para las importaciones

La langosta espinosa del Caribe, *Panulirus argus*, es un miembro común de la comunidad del Caribe del filón y forma la base para una de las industrias pesqueras más importantes del área. Los Estados Unidos (los E.E.U.U.) recibe sobre 90 por ciento de las exportaciones de central y los países suramericanos y la langosta espinosa se considera un producto importante para los distribuidores y las distribuidores importantes. En muchos casos, las importaciones son de tamaño insuficiente basadas en los límites del tamaño establecidos en los E.E.U.U. y/o en el país de origen. El análisis de la DNA indica una sola estructura común para la langosta espinosa del Caribe a través de su gama, y la gerencia apropiada para el sustainability del recurso es así imprescindible. Si de la importación de langostas de tamaño insuficiente se permite para continuar, tal práctica podría potencialmente afectar el potencial reproductivo del éxito de la especie, recreacional y profesional de la pesca, de la disponibilidad del mercado, y de la capacidad de hacer cumplir las regulaciones diseñadas para proteger el sustainability del recurso. Esta situación es una preocupación importante por los consejos regionales surorientales de la gerencia de E.E.U.U., responsable de manejar el recurso del Caribe de la langosta espinosa. Muchas naciones del Caribe y centrales y suramericanas comparten estas preocupaciones, y la evidencia científica sugiere que las larvas a partir de una área o región dentro de esta gama de las especies puedan contribuir al reclutamiento común en otras áreas o regiones.

El consejo del Caribe de la gerencia de la industria pesquera (consejo) ha expresado intento para enmendar su plan de la gerencia de la industria pesquera de la langosta espinosa (FMP) para considerar el uso de un límite mínimo del tamaño en la langosta espinosa importada. El servicio de las industrias pesqueras de NOAA cree que las revisiones potenciales a y la enmienda del Golfo y al sur la langosta espinosa Atlántica FMP se deben tratar concurrentemente. Después de conferir con el Golfo del consejo de la gerencia de la industria pesquera de México y del consejo Atlántico del sur de la gerencia de la industria pesquera, la secretaria de E.E.U.U. del comercio señaló a consejo como el administrativo conduce para tratar ediciones de la langosta espinosa. Así, el consejo elaborará un documento que contenga una enmienda a la langosta espinosa del Caribe FMP y también una enmienda al Golfo y al sur a la langosta espinosa Atlántica FMP. Dado el científico, el comercio internacional, y ediciones de la aplicación se asociaron a esta acción, una oportunidad de repasar alternativas potenciales bajo consideración y el soporte de análisis, es imprescindible. La coordinación apropiada entre todos los partidos ayudará a asegurarse de que las ediciones están tratadas temprano encendido en el proceso de la enmienda de FMP.

PALABRAS CLAVES: Los E.E.U.U. el Caribe, gerencia de las industrias pesqueras, langosta espinosa

INTRODUCTION

There are about 45 species of spiny lobster species (commonly called rock lobster) in the family Palinuridae throughout the world with several occurring in the Caribbean basin. The Caribbean spiny lobster (*Panulirus argus*), or Florida spiny lobster, comprises 95 percent of the lobster harvested and marketed in the Caribbean basin countries (i.e., Florida, Central America (Atlantic side), Bahamas, and Brazil). The color pattern of *P. argus* consists of a series of symmetrical spots on the tail segments and unique markings on the tail fins and make it morphologically distinguishable from other species.

The Caribbean spiny lobster (*P. argus*) has a relatively long planktonic larval phase (i.e., the puerulus stage) and are widely dispersed by ocean currents before they settle and recruit to a specific habitat. The long larval duration for spiny lobsters accounts for connectivity from their source areas to their settlement areas. Recruitment is dependent on environmental conditions, such as temperature and salinity, and on the availability of spawning adults, which is influenced by fishery factors, such as fishing pressure and minimum size limit compliance. These fishery factors can be affected by having an adequate regulatory program to protect spiny lobster (e.g., size limits and protections for berried females) and having adequate enforcement of the program. Studies also have shown local gyres or loop currents in certain locations could influence the retention of locally spawned larvae. In addition, benthic structures such as coral reefs may disturb the flow of water and lead to the settlement of larvae in a particular location (Lee *et al.* 1994).

Most of the Caribbean spiny lobster research has been conducted on the Florida population, but the interconnectivity issue also has been studied in the Caribbean region and is recognized and discussed in the Caribbean Fishery Management Council's (CFMC) Spiny Lobster Fishery Management Plan (FMP). Caribbean spiny lobster ranges throughout the western Atlantic Ocean from North Carolina to Brazil, including Bermuda, the Bahamas, and all of the Caribbean and Central American areas in between (Hernkind 1980). DNA analysis indicates a single stock structure for the Caribbean spiny lobster (Lipcius and Cobb 1994, Silberman and Walsh 1994) throughout its range.

Some Caribbean spiny lobster fisheries managed by other countries (i.e., Brazil, Nicaragua, and Ecuador) are reportedly heavily exploited. These countries export millions of pounds of lobsters to the United States that are at or below their mean size at reproduction. The potential for overfishing the Caribbean spiny lobster is relatively high because a lucrative market exists for all sizes of this species. Approximately 90 percent of the Caribbean spiny lobster harvested by foreign fisheries managed by Central and South America countries is imported to the United States.

Limiting Caribbean spiny lobster imports to a uniform minimum size that protects juvenile spiny lobsters would help stabilize the reproductive potential of the Caribbean spiny lobster by reducing the amount of juvenile spiny lobster mortality in foreign fisheries. The 7.6 cm (3 inch) carapace length (CL) minimum size limit restriction (and conversions thereof) on imports that has been proposed by the three regional Fishery Management Councils and NOAA Fisheries Service would provide about 50 percent of spiny lobsters the opportunity to spawn at least once before they can be landed by a fishery (Lyons *et al.* 1981), thus increasing the probability of dispersal of Caribbean spiny lobster larvae throughout the species' range.

Restructuring U.S. importation laws to protect juvenile lobsters will severely limit, if not eliminate, the market for harvested undersized lobster. This is expected to serve as an incentive for countries that do not currently have such measures to implement consistent size limits in order to protect juvenile lobster. A uniform minimum size for spiny lobsters imported to the U.S. would assist law enforcement officers in restricting illegal product in the market. The "big four" exporters to the United States are the Bahamas, Brazil, Honduras, and Nicaragua. All these countries have some form of minimal size limit for the Caribbean spiny lobster, but unfortunately this size limit is not standardized. Furthermore, exporting countries do not have the law enforcement resources to effectively monitor shipments to the United States.

The United States imports millions of dollars of undersized lobster each year. Historically, most of these imports go undetected because of the enforcement loopholes that existed for international poachers. These loopholes include:

- i) The lack of a U.S. minimal size limit that is applicable for all imports;
- ii) The use of secretive codes to disguise the undersized lobster tail shipments;
- iii) The increased use of "trans-shipments through countries of convenience" (i.e. shipping illegal product thru countries that have weaker lobster laws and changing the country of origin to avoid investigators); and
- iv) Shipping the illegal tails to U.S. ports, where inspectors are not as savvy to the lobster smuggling issues.

NOAA's Office of Law Enforcement, Southeast Region, has made several significant Lacey Act cases involving undersized lobster (w/ Honduras, Nicaragua, Bahamas, and an ongoing one with Brazil). These cases typically are criminal and are rather complex in nature due to the need for cooperation with foreign governments, poorly written foreign laws, and the millions of dollars of illegal proceeds. A U.S. minimum size restriction applicable to spiny lobster imports would greatly assist law enforcement and federal prosecutors to stem the illegal and

profitable flow of undersized imports into the U.S. markets.

NOAA's Office of Law Enforcement strongly recommends an import restriction include a minimum size limit that utilizes a tail weight measured in ounces (using carapace and tail length conversions). All spiny lobsters will be required to be landed with the shell attached. The import size limit will be converted to a minimum weight limit range (in ounces and grams), noting that Florida Fish and Wildlife Commission scientists have published conversion tables that could be used to determine the most applicable length and weight requirements. The implementation of a minimum weight in ounces is critical for NOAA law enforcement as the seafood industry, processes, packs, ships, exports, imports, and sells lobster tails by weight. In addition, U.S. Customs' entry documents and the seafood industry's sales, storage and bills of lading documents typically include the tail weights (in ounces), making this measurement an effective enforcement tool to track undersized lobster, even after it enters the U.S. port.

Regulatory actions taken by Fishery Management Councils and the state of Florida in the southeast region of the U.S. indicate broad support for a minimum size landing limit restriction on Caribbean spiny lobster imports. Since 2003, an effort has been underway to establish a U.S. minimal size limit that would be applicable to spiny lobster imports. This effort has been supported by the U.S. Department of Justice, NOAA's Office of Law Enforcement, Southeast Region, three regional Fishery Management Councils and, recently, by some leading seafood industry corporations, which realize the spiny lobster fishery is being decimated throughout the Caribbean basin.

International

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 2006 Merida workshop was divided into two parts. The first part occurred September 19 - 27, and was attended by senior scientists from lobster producing nations. The second part occurred September 28 - 29, and was attended by senior fishery managers, senior scientists, representatives from the fishing and processing industry, and selected lobster importers. The objectives of the workshop were to review and update the assessments of the status of Caribbean spiny lobster at national and regional levels and to consider the current levels of exploitation and recent trends in the fishery, and to evaluate the nature and

severity of current problems in the fishery, including the number of undersized lobster being caught and exported.

The workshop sought regional agreement by senior fishery managers on strategies to address problems and to ensure optimal and sustainable use of the resource. Senior scientists and senior decision makers of the following lobster producing nations participated in the workshop: Antigua and Barbuda, Bahamas, Belize, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, France on behalf of Guadeloupe and Martinique, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Turks and Caicos, United States, and Venezuela. The senior fishery managers carefully considered and adopted the report of the senior scientists. In keeping with the recommendation to allow about 50 percent of the stock to reach maturity, the national representatives 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. In addition to the minimum size limit, it was agreed that managing fishing mortality also is necessary to achieve sustainable use of the resource. It was further agreed that countries that already have minimum size limits in place should take action to implement and enforce them effectively to reduce the currently high catches of juveniles in order to protect and allow the species to rebuild throughout its range.

More recently, at a Regional workshop on the lobster fisheries in Central America held in Managua, Nicaragua, December 10-11, 2007, sponsored by OSPESCA, the delegates representing Central American fishery management agencies, artisanal fishers, industry, and other institutions developed an 18 point workshop accord, which addressed, among other things, a minimum harvest size for lobster tails of 140 mm (5.5 inches). The accord also recognized industry practices and determined for commercial purposes, each box must have an average tail weight of five ounces with a range of 4.5 to 5.5 ounces.

Management History

Gulf of Mexico and South Atlantic — The original Fishery Management Plan (FMP) from the Gulf of Mexico and South Atlantic Fishery Management Councils was written in 1982. It states "The Fishery Conservation and Management Act requires that stocks be managed throughout their range to the extent practicable" and "There may be a relationship between spiny lobster stocks in the Caribbean, South Atlantic and Gulf of Mexico regions" (GMFMC and SAFMC 1982). A definition of the fishery is also provided:

"The spiny lobster fishery consists of the spiny lobster, *Panulirus argus*, and other incidental species of spiny lobster (spotted

spiny lobster, *P. guttatus*; smooth tail lobster *P. laevicauda*; Spanish lobster, *Scyllarides aequinoctialis* and *S. nodifer*), which inhabit or migrate through the coastal waters of and the Fishery Conservation Zone (now known as the exclusive economic zone (EEZ)) of the Gulf of Mexico and South Atlantic Fishery Management Council areas and which are pursued by commercial and recreational fishermen” (GMFMC and SAFMC 1982).

The original FMP analyzed several different potential minimum sizes, ranging from 2.75 to greater than 3 inches CL. Ultimately, the smaller minimum sizes were not used for biological reasons, meaning they would not protect the spawning stock. The larger sizes were deemed to cost the fishery too much economically and socially, therefore, the 3 inch CL was chosen.

In multiple places within the FMP, the importation of undersized lobster was noted as a concern. Under the description of alternative optimum yields it was noted:

“The characteristics of demand for lobster indicate preferences for the smaller-sized animals; in fact, market forces would endanger spiny lobster stocks because the greatest preference in the New York wholesale market is for animals less than 3.0 inches CL, sizes at which reproduction has not yet occurred. (All of these smaller-sized lobster are imported)” (GMFMC and SAFMC 1982).

Further, under the possible alternatives that were not preferred, a prohibition on the import of undersized spiny lobster is listed. The rationale for not proposing the ban was two-fold. First, there was concern that changes in the import market, which supplies approximately 90% of the lobsters consumed in the United States, could have significant effects on the price-size relationship, though the magnitude of the change on the retail market could not be estimated. Second, the nations harvesting Caribbean spiny lobster were uncomfortable about the impact of import restrictions on international relationships (GMFMC and SAFMC 1982). Since the 1980’s the FMP has been amended consistent with new requirements of the Magnuson-Stevens Act, but those amendments have not affected the Caribbean nations regarding the minimum import size for spiny lobster.

Caribbean — The original FMP for the Caribbean was written in 1981 (CFMC 1981). It acknowledges the need to manage spiny lobster throughout its range and interrelated stocks could be managed as a unit or in close coordination. The plan further acknowledges that “conclusive data regarding genetics between various geographic areas...not available...establishment of an

international coalition will eventually be necessary to effectively manage this migratory species throughout its range” (CFMC 1981). The plan addresses only the species *P. argus* where it is limited to the geological platforms of Puerto Rico and the Virgin Islands essentially inside the 100-fathom isobath. It continues “these shelf areas include not only the Commonwealth of Puerto Rico and the territory of the Virgin Islands, but also the entire chain of the British Virgin Islands. The lobster population recognizes none of these political entities or the limits of territorial seas” (CFMC 1981).

The stock unit is defined as:

“The question of whether or not biologically distinct stocks of *P. argus* may be identified is not resolved. For purposes of this plan three biological assessment areas (distinguished by their user groups and geography) were assumed; (1) Puerto Rico, (2) St. Thomas and St. John, and (3) St. Croix. A single optimum yield is established. There is nominally one species and the source(s) of recruitment are not verified” (Section 4.2)”.

The original FMP analyzed several different potential minimum sizes, ranging from 2.75 to greater than 3.5 inches CL. As in the Gulf and S. Atlantic FMP, the smaller minimum sizes were eliminated because they would not protect the spawning stock. The larger sizes were deemed to cost the fishery too much economically and socially, therefore, the 3.5 inch CL was chosen. Similar to the Gulf and South Atlantic FMP, the Caribbean FMP mentions the use of an import ban of undersized lobster as a method to improve the stocks status. Under “Recommendations to the Secretary of Commerce” the FMP states:

“It is recommended that the Secretary of Commerce undertake whatever action may be necessary and appropriate to immediately prohibit the importation into the U.S. Virgin Islands and Puerto Rico of undersized (less than 3.5 inches CL) or berried spiny lobsters and of spiny lobster tails of less than 6 oz. total weight” (Section 5.1).

Foreign and U.S. scientists and fisheries managers all concur the Caribbean spiny lobster is fully exploited or over-exploited in much of its range (Cochrane and Chakalall 2001). Spiny lobsters are being harvested below the respective Continental and Caribbean U.S. minimum size limits and below the size at first maturity; this is adversely impacting recruitment throughout Florida and the Caribbean because of the distribution and dispersal of larvae during their long larval phase. A reduction of effort on undersized lobster and more comprehensive enforce-

ment would increase spawning stock biomass and increase potential yield. The lobster seafood industry has even recognized this fact and has asked respective governments to address the harvest and exportation of undersized lobster tails to the United States.

¹Fully exploited means the act of employing to the greatest possible advantage; over-exploited means exploited to the point of diminishing returns

DISCUSSION

Recognizing the positive biological and socio-economic impacts of imposing a minimum size for Caribbean spiny lobster entering the U.S., the three southeast regional Fishery Management Councils (Gulf, South Atlantic, and Caribbean) recommended such measures to be approved by the Secretary of Commerce in September 2008. The management alternatives considered for improving the spiny lobster stock status are divided into two actions. The first action examines various morphometric values that imported spiny lobster would be required to meet. The morphometric values in Action 1 provide an easily measurable requirement that can be used by fishermen, importers, and law enforcement to ensure compliance. The second action examines other import restrictions, which will further protect the spiny lobster stock and close any potential loopholes that may be exploited in an effort to circumvent minimum size restrictions.

Action 1: Minimum Size Limits for Spiny Lobster (*Panulirus argus*) Imported into the United States

A. Alternative 1 (No Action Alternative) – Do not establish minimum size limit restrictions on spiny lobster imported into the U.S.

Under the no action alternative, imports would be subject to the management and regulations of the exporting country and violations of those regulations would be pursued through the Lacey Act.

B. Alternative 2 (Preferred) – No person would be allowed to import a spiny lobster (*Panulirus argus*), as follows:

1. Any spiny lobster of less than 5 ounces tail weight (5 ounces is defined as a tail that weighs 4.2 – 5.4 ounces). If the imported product does not meet this minimum weight requirement, the person importing the lobster can demonstrate compliance by showing that the product imported satisfies the tail length requirement, or that it was harvested from an animal that satisfied the minimum carapace length requirement of:
 - a. Greater than 7.62 cm (3.0 inches) carapace length if the animal is whole.
 - b. Greater than or equal to 13.97 cm (5.5 inches) tail length if only the tail is present.

2. *In Puerto Rico and the U.S. Virgin Islands:* Any spiny lobster of less than 6.0 ounces tail weight (6 ounces is defined as a tail that weighs 5.9 – 6.4 ounces). If the imported product does not meet this minimum weight requirement, the person importing the lobster can demonstrate compliance by showing that the product imported satisfies the tail length requirement, or that it was harvested from an animal that satisfied the minimum carapace length requirement of:
 - a. Greater than or equal to 8.89 cm (3.5 inches) carapace length if the animal is whole.
 - b. Greater than or equal to 15.75 cm (6.2 inches) tail length if only the tail is present.

- C. Alternative 3 – No person would be allowed to import into the U.S., including Puerto Rico and the U.S. Virgin Islands, any spiny lobster (*Panulirus argus*) of less than 5 ounces tail weight (5 ounces is defined as a tail that weighs 4.2 – 5.4 ounces). If the imported product does not meet this minimum weight requirement, the person importing the lobster can demonstrate compliance by showing that the product imported satisfies the tail length requirement, or that it was harvested from an animal that satisfied the minimum carapace length requirement of:
 - a. Greater than 7.62 cm (3.0 inches) carapace length if the animal is whole.
 - b. Greater than or equal to 13.97 cm (5.5 inches) tail length if only the tail is present.

Comparison of Action 1 Alternatives

Fisheries for spiny lobster (*P. argus*) exist throughout its range in the Caribbean and tropical western Atlantic. The Western Central Atlantic Fishery Commission (WECAFC) held workshops in 2000 and 2002 regarding the management of the spiny lobster fisheries in the WECAFC region and the scientific committee from that workshop concluded that spiny lobster are fully exploited to over-exploited throughout its entire range. [NOTE: WECAFC is part of the Food and Agriculture Organization (FAO) and was established pursuant to FAO's Constitution. It is advisory only and has no regulatory powers, unlike other Regional Fisheries Management Organizations such as the International Commission for the Conservation of Atlantic Tunas (ICCAT).]

Several genetic studies have been conducted on spiny lobster in the Caribbean since the 1990s. The consensus from these experiments is that the spiny lobster population appears to be interconnected throughout the Caribbean with the possibility of a semi-isolated subpopulation in part of Brazil. Despite the somewhat limited information

regarding the Caribbean as a whole, based on scientific studies, the U.S. population is very likely dependent on recruitment from other areas (Lyons *et al.* 1981, Acosta *et al.* 1997).

The alternatives in Action 1, other than the status quo, are intended to eliminate the U.S. market for undersize spiny lobster (the largest market) and provide an incentive for foreign nations to implement conservation standards which will improve the status of the spiny lobster stock in the U.S. and throughout the Caribbean. The most effective means for creating this incentive is to improve law enforcement (LE) capabilities for preventing undersized lobster from being imported to the United States. By implementing an import restriction on size, LE will have a better tool for tracking shipments of undersized lobster and developing cases against suspected importers. Under existing laws (most notably the Lacey Act), LE must develop an extensive record and work in coordination with foreign nations when attempting to develop a case against an importer. This is often a very complicated and difficult process to coordinate. By changing the domestic laws to place conservation standards on imported lobster, management actions can protect lobster stocks, as well as provide more capability for LE officials to deter the importation of undersized lobster.

Due to the complexity of the spiny lobster industry and the high volume of international trade, the alternatives provide a number of means for determining whether an individual lobster is indeed undersized. **Alternatives 2** and **3** are structured the same, but alter the minimum size depending on the location of importation (i.e., into the U.S. or the U.S. Caribbean). Table 1 lists each alternative and the associated minimum possession limits for the alternative. The multiple minimum size morphometrics (i.e., carapace length, tail length, and tail weight) provided in each alternative are intended to provide an understandable and practical size restriction for each component of the industry. For example, the use of carapace length (CL) is currently what fishermen, while at sea, use to verify if an individual lobster is indeed legal. Tail length (TL) is used by some fishermen while at sea; for example, Gulf of Mexico and South Atlantic fishermen in the EEZ who possess a tailing permit. The tail weight (TW) is used by processors, importers, and exporters. Law enforcement agents would use CL and TL for inspections at sea and dockside as is the current practice, while TW would be used in examining imports if either **Alternative 2** or **Alternative 3** were chosen.

The intent of this management action is to utilize the tail weight in deterring under-sized lobster imports as that is the unit of measure the industry utilizes as it markets, imports, stores, transports, and sells this product. However, if the imported product does not meet the minimum weight requirement, the person importing the lobster can demonstrate compliance by showing that the product imported satisfies the equivalent tail length requirement, or that it was harvested from an animal that satisfied the equivalent minimum carapace length requirement. Spiny lobster is rarely, if ever, imported or marketed in the U.S. as a whole animal, but instead as frozen tails. Standard industry practice for overseas spiny lobster processing is to separate, sort, and box the tails by their tail weight prior to shipping. In addition, U.S. Customs' entry documents and the seafood industry's sales, storage and bills of lading documents typically include the tail weights (in ounces), making this measurement an effective enforcement tool to track undersized lobster, even after it enters the U.S. port. It is estimated over 99% of spiny lobster product enters the U.S. in this fashion (P. Raymond, NOAA OLE Pers. comm.).

Additionally, there was a December 2007 workshop with delegates from Central American fishery management agencies, artisanal fishers, and industry held in Managua, Nicaragua (OSPESCA). The delegates developed an 18 point workshop accord which contained recommendations for minimum conservation standards including a minimum harvest size for tails of 140 mm and a minimum tail weight of 4.5 ounces. For the commercial industry, this translates into each shipping box having an average tail weight of 5 ounces with a range from 4.5 to 5.5 ounces.

However, the 4.5 ounce tail weight recommendation was not based on scientific conversions from the recommended 140 mm tail length, but was instead based on industry practice of sorting and shipping. Tables 2 and 3 provide conversions from carapace length to tail length and tail weight based on Matthews *et al.* (2003). An examination of the 140 mm (5.5 inch) tail length recommendation shows it is derived from one standard deviation of the mean for a 7.62 cm (3.0 inch) carapace length animal (Table 3). Therefore, if a tail length recommendation is based on one set of scientific standards, all conversions from the carapace length should be based on that same standard. Therefore, the appropriate tail weight to be used for a 7.62 cm (3.0 inch) carapace length animal would be a

Table 1. Alternatives with respective morphometric requirements for spiny lobster importation.

Alternative	Carapace Length	Tail Length	Tail Weight/ Industry Allowances
1	N/A	N/A	N/A
2	> 7.62 cm U.S.; ≥ 8.89 cm inches in the Caribbean	≥ 13.97 cm U.S.; ≥ 15.75 cm Caribbean	≥ 4.2 oz U.S.; ≥ 5.9 oz Caribbean/ U.S - 5 oz weights = 4.2 - 5.4 oz; Caribbean - 6 oz weights = 5.9 - 6.4 oz. ≥ 4.2 oz/
3	> 7.62 cm	≥ 13.97 cm	5 oz weights = 4.2 - 5.4 oz

4.15 ounce tail weight (Table 3). This, like the tail length recommendation is based on one standard deviation from the mean for the measurements of a 7.62 cm (3.0 inch) carapace length animal. For the purpose of simplifying this requirement, the weight has been rounded to one decimal place to make the requirement a 4.2 ounce tail weight. For imports to the U.S. Caribbean, similar conversions from an 8.89 cm (3.5 inch) CL animal yield a minimum TW of 5.9 ounces and a TL of 15.75 cm (6.2 inches) (Table 3).

Therefore, in an effort to accommodate industry practices this management action defines the 5 ounce tail as ranging from 4.2 to 5.4 ounces and a 6 ounce tail as ranging from 5.9 to 6.4 ounces. This allows industry to maintain their sorting and packaging practices while instituting the minimum tail weight conservation standard based on scientific conversions.

The use of this scientific standard has already been applied in the current regulations for the Gulf and South Atlantic joint FMP for spiny lobster. The Gulf and South Atlantic FMP allows lobsters to be tailed while at sea if the vessel has the appropriate tailing permit. The minimum size for tails to be legal is 5.5 inches, which is derived from one standard deviation of tail length for a 7.62 cm (3.0 inch) carapace length animal (Table 3). Using the one standard deviation approach, it is expected that 84.13% of all 7.62 cm (3.0 inch) carapace length animals would be legal based on their tail length and tail weight measurements at 13.97 cm (5.5 inches) and 4.2 ounces, respectively.

Alternative 1 would not establish restrictions on spiny lobster imports. **Alternative 2** would require all imported lobster to have a TW of 4.2 ounces or greater if imported to the U.S.; for those lobsters imported to the U.S. Caribbean, a lobster must have a TW of 5.9 ounces or greater.

Because weighing tails at sea is difficult, fishermen would continue to use the CL and TL measurements as appropriate for their region or country to ensure compliance with the legal requirements. Law enforcement officials would have the ability to use those same measurements for at sea and dockside enforcement while utilizing the appropriate TW measurement for enforcement of imported lobster tails. Due to the scientific variation of lobster tail weight, an importer may demonstrate compliance with the minimum conservation standards by providing documentation that an animal that does not meet the TW requirement meets the TL or CL measurement.

Alternative 3 would require all imported lobster to have a TW of 4.2 ounces or greater regardless of the port of entry into the U.S. This alternative would function similarly to **Alternative 2** with fishermen using the CL and TL measurements and LE utilizing those measurements plus the TW. However, there is some concern in the U.S. Caribbean that there may be a loss of the conservation standards with the use of this single size approach. The U.S. Caribbean has a more restrictive conservation standard on spiny lobster (i.e., a minimum landing size of 8.89 cm (3.5 inches)) than does the continental U.S. The loss in conservation would be seen through the creation of a loophole where products may be claimed as imports even if they are not in an effort to circumvent local laws. Similarly, law enforcement may lose some of its ability in enforcing local laws because of the allowance of smaller lobster through the import market. In weighing these differences between **Alternative 2** and **Alternative 3**, it appears that requiring imports to meet the minimum conservation standards of the domestic port of entry would provide more benefits than one standard set of standards. Therefore, **Alternative 2** would be more beneficial than **Alternative 1** or **Alternative 3**.

Table 2. CL and average TL and TW conversions (metric and English conversions; Matthews *et al.* 2003)

Carapace length (mm)	Tail weight (g)	Tail length (mm)	Carapace length (in)	Tail weight (oz)	Tail length (in)
76.2	122.8	142.5	3.00	4.34	5.61
82.6	153.5	153.4	3.25	5.42	6.04
88.9	188.0	164.2	3.50	6.64	6.46

Table 3. CL measurements with converted TL and TW for animals minus 1 SD (metric and English conversions; Matthews *et al.* 2003)

Carapace length (mm)	Tail weight (g)	Tail length (mm)	Carapace length (in)	Tail weight (oz)	Tail length (in)
76.2	117.6	139.9	3.00	4.15	5.51
82.6	143.2	149.6	3.25	5.06	5.89
88.9	168.3	158.4	3.50	5.94	6.24

Action 2: Implement Other Import Restrictions on Spiny Lobster

Alternative 1 (No Action Alternative) – Do not have other restrictions on the importation of spiny lobster.

Under the no action alternative for Action 2, imports would be subject to the management and regulations of the exporting country and violations of those regulations would be pursued through the Lacey Act.

Alternative 2 - Do not allow the importation of spiny lobster tail meat which is not in whole tail form with the exoskeleton attached; and do not allow the importation of spiny lobster with eggs attached or importation of spiny lobster where the eggs, swimmerets, or pleopods have been removed or stripped.

Alternative 3 - Do not allow the importation of spiny lobster tail meat which is not in whole tail form with the exoskeleton attached

Alternative 4 - Do not allow the importation of spiny lobster with eggs attached or importation of spiny lobster where the eggs, swimmerets, or pleopods have been removed or stripped.

Comparison of Action 2 Alternatives

To better protect Caribbean spiny lobster populations other conservation measures are needed in addition to a minimum size and should address egg-bearing females and the importation of lobster meat separated from the animals' shell. If no protections are afforded to the females as they are actively reproducing, then all benefits from increasing the spawning stock biomass have been lost. The management alternatives considered in Action 2, other than the no action alternative, are designed to: 1) provide further protections to undersized lobsters, and 2) protect berried (egg-bearing) females. Both of these actions will aid in accomplishing an increase in the spawning stock biomass of the spiny lobster population.

With regards to undersized lobster, some dealers have tried to import undersized lobster tail meat by separating it from the tail in order to camouflage animal size. However, shipping documents (i.e., invoices, bills of lading, and more) obtained from LE officials are used in their investigations of undersize spiny lobster imports. On occasion, in some documents a seller inquires whether a buyer is interested in specific amounts of lobster meat. This inquiry is generally made a day or so after the seller informs the buyer of a "lot of pressure on tails under 5 oz." Likely, there was intent to circumvent the laws regarding minimum sizes for any country and to continue bringing in illegal

product regardless of how that was achieved. If any importation conservation standards are to have the desired effect, then the trade in "lobster meat" must be stopped to close the potential loophole of harvesting undersize lobster, processing it into meat, and then making it available in the market.

The protection of berried females (or those that were, prior to being stripped) is also imperative if the minimum conservation sizes are implemented in order to protect the spawning stock biomass. Action 1 will help achieve an increase in the spawning stock biomass of spiny lobsters; if no protections are afforded to the females as they are actively reproducing, then all benefits from increasing the spawning stock biomass have been lost. Therefore, the alternatives in Action 2 are supportive of those in Action 1 and will further the conservation of the spiny lobster population.

Alternative 1, No Action, would not implement any further conservation standards for imported lobster. **Alternative 2** would prohibit the importation of lobster tail meat and of berried females or any spiny lobster where it is apparent the eggs have been removed by any means. For the purposes of this action, lobster tail meat means that meat which is not in whole tail form with the exoskeleton attached or still part of a whole lobster. If this alternative is not selected, significant loopholes would exist to avoid compliance with the minimum size limit. **Alternative 2** also prohibits importation of berried females or those females who have been obviously stripped of their eggs by removing the eggs, clipping the swimmerets, or removing the pleopods. Individual animals that have been stripped of their eggs or who have had their swimmerets or pleopods removed are easily identified by law enforcement officials once the tail is thawed and the underbelly inspected (P. Raymond, NOAA OLE Pers. comm.). Thus, a restriction on their importation would further the goal of this amendment/EIS in increasing the spawning stock biomass of the spiny lobster population.

Alternatives 3 and 4 would achieve similar goals as **Alternative 2**, but not to the same extent. These two alternatives are obviously derivatives of **Alternative 2** and would implement only one or the other restriction of prohibiting lobster tail meat or berried females. While both are viable alternatives for achieving an increase in the spawning stock biomass of spiny lobster, **Alternative 3 and 4** are not as comprehensive as **Alternative 2**.

Alternative 1 would maintain the regulations that exist under the Caribbean FMP and the South Atlantic/Gulf of Mexico FMP. **Alternative 2** would require all imported lobster to comply with domestically equivalent regulations such that no berried lobsters, or stripped (clipped) lobsters or lobster meat would be allowed for importation into the U.S. **Alternative 3 and 4** are some derivation of **Alternative 2**, but not as comprehensive. Therefore, **Alternative 2** would be more beneficial than **Alternatives 3 and 4**, and all would be more beneficial than **Alternative 1** in

increasing the spawning stock biomass and protecting the spiny lobster resource.

SUMMARY

By restructuring the importation laws for lobsters smaller than the domestic size limit, it will severely limit, if not eliminate, the market for legally and illegally harvested undersized lobster. A reduction of effort and other protections for undersized lobster (tail-meat prohibition) and protection of berried (egg-bearing) females along with a more comprehensive enforcement program will increase spawning stock biomass and increase long-term potential yield in the spiny lobster fishery.

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