

This document summarizes a draft rule amendment for sea cucumbers, which are regulated under the Florida Fish and Wildlife Conservation Commission's (FWC) Marine Life rule, 68B-42, Florida Administrative Code (FAC). Staff is recommending regulatory changes requested by the commercial marine life fishery that would implement a commercial trip limit for sea cucumbers in response to concerns that a developing export market may lead to over exploitation. The draft rule amendment would create a commercial daily vessel limit of 200 sea cucumbers.

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Marine Life Fishery

- Non-lethal harvest of saltwater fish, invertebrates, and plants – primarily for the aquarium trade
 - Organisms must be landed live and are typically sold to wholesalers, retailers, and aquarium owners
- In the U.S., collection of many species is limited to Florida and Hawaii
- In Florida, most specimens come from Monroe, Miami-Dade, Broward, and Palm Beach Counties
- Commercial fishery is a limited access program with roughly 160 participants



Sea cucumbers are regulated as a marine life species. The term marine life refers to tropical ornamental species that are typically collected for live display in private and public aquaria. These species, including saltwater fish, invertebrates, and plants, are harvested by both recreational and commercial anglers using non-lethal methods, using gears such as hand-held nets or as bycatch in traps and trawls. All marine life species are required to be landed alive and those collected by members of the commercial fishery are typically sold to wholesalers, retailers, and owners of public or private aquariums. Within the U.S., this fishery is relatively unique to Florida with many of the targeted species collected only from Florida and Hawaii. The commercial fishery in Florida is conducted primarily from Monroe County to Palm Beach County.

The commercial marine life fishery is subject to a limited entry program. Commercial collectors are required to hold a marine life (ML) endorsement in order to harvest or sell any marine life species. Currently, there are roughly 160 ML endorsement holders, including those who directly target marine life species and those licensed to retain marine life species taken as bycatch in other fisheries.

Sea Cucumbers

- Invertebrates
- Sedentary deposit feeders
- Reside in seagrass beds, lagoons, and nearshore reefs
- Vulnerable to overfishing
 - Easily located and collected
 - Late reproductive age (at least 2 years)
 - Broadcast spawning – successful reproduction requires dense populations
- When depleted, recovery takes decades
- Small commercial fishery in FL Keys for live aquarium trade
- Globally, highly valuable in food trade in Asian markets
 - Staff has confirmed that an exporter is established in the Keys



Sea cucumbers are sedentary marine invertebrates that inhabit shallow water habitats in the Florida Keys, residing in seagrass beds, lagoons, and nearshore reefs. They are vulnerable to overfishing because their visibility and sedentary nature make them easy to locate and collect, and because of their life history characteristics, including late reproductive age (at least 2 years), long life span (up to 15 years), and spawning behavior. Sea cucumbers are broadcast spawners, meaning they release their sperm and egg out into the water column. This spawning technique requires dense populations in order to be successful because adequate numbers of sperm and egg must be released in the same vicinity at the same time in order for sufficient levels of fertilization to occur. This spawning behavior also contributes to slow recovery times once the populations become depleted. In the case of sea cucumbers, recovery can take decades.

Currently, there is a small commercial fishery for sea cucumbers in Florida, primarily in the Keys. While the Florida fishery has historically targeted them only for sale into the aquarium trade, they are commonly targeted elsewhere in the world as a food product because of their high value in Asian markets. Staff has confirmed that at least one exporter has established a processing facility in the Keys and is recruiting harvesters to supply his export business.

Market Value of Sea Cucumbers

Live Aquarium Trade

- Market value around \$1.00 per individual for live animals



Photo by Don DeMaria

Food Trade

- Highly variable depending on species
 - \$0.05 – \$3.00 per individual
 - Florida fishers reportedly getting around \$1.00 each
- As a final processed product, some species are sold for up to \$200 per pound
- Market Driving Force: exploitation and depletions near Asia driving value higher with increasing opportunities found in areas farther away



Sea cucumbers are of modest value in the live aquarium trade, with values averaging one dollar per sea cucumber in Florida. In the food trade however, the market value is highly variable, and ranges from five cents to three dollars, depending on the species. Collectors in Florida are currently receiving around one dollar per sea cucumber, the same as they receive for those sold into the aquarium trade. However, they are much more valuable once they have been dried and processed, with some species found in Japan bringing in up to \$200 per pound processed. According to the Food and Agriculture Organization of the United Nations (FAO), the market driving force for sea cucumbers is the exploitation and depletion of stocks near Asia, with increasing opportunities found in areas farther away where stocks have not yet been exploited.

Importance of Florida's Sea Cucumbers

Economic Value

- Prior to 2012, fishery valued at approximately \$14,000 per year for Florida's commercial marine life industry
- Landings jumped in 2013 with value escalating to \$37,000 by July



Photo by Ken Nedimyer

Ecological Value

- Important for nutrient cycling in otherwise nutrient-poor tropical reefs
- Recycle nutrients to make them available to sea grasses
- Oxygenate sediments with burying behaviors
- Removal of sea cucumbers may lead to development of unwanted algal mats



Florida's commercial sea cucumber fishery has historically been a low-value fishery, averaging \$14,000 per year for ML endorsement holders prior to 2012. However, landings have jumped dramatically in 2013. The value of landings through July of this year is \$37,000, which is nearly three times the previous average for an entire year.

In addition to their economic value, sea cucumbers play a very important role in South Florida marine ecosystems. These animals are important for nutrient cycling in otherwise nutrient-poor tropical reefs. They also make nutrients available to sea grasses by recycling nutrients that have been deposited in the sediment. Sea cucumbers also help to oxygenate the sediments for other bottom-dwelling organisms by burying themselves. Laboratory experiments have demonstrated that removing sea cucumbers can lead to the development of unwanted algal mats on the sediment which further limit the availability of oxygen.

Current Florida Regulations

- All marine life species must be transported and landed alive

Recreational

- Recreational fishing license
- Bag limit: 5 of each species per day, included in the 20-organism aggregate bag limit for all marine life species

Commercial

- Commercial saltwater products license (SPL) with a marine life (ML) endorsement
- **Trip limit: none**



Photo by Dan DeMentis



Like all marine life species, sea cucumbers harvested either commercially or recreationally must be transported and landed alive.

Current recreational regulations for sea cucumbers include a bag limit of five of each species per person per day, which is included in the marine life aggregate bag limit of 20 organisms that applies to all marine life species. Commercial harvest requires a commercial Saltwater Products License (SPL) with a restricted species (RS) and ML endorsements. There is no commercial bag limit or trip limit for sea cucumbers.

Industry Concerns

- Traditionally harvested in Florida in small numbers for the live aquarium trade
- Marine life fishermen approached by a processor wanting to purchase high numbers for export to China
 - Highly valued in Asian markets for their medicinal and nutritional qualities
 - Dried and sold by the gram, primarily in Hong Kong
 - Cuban fishery harvested over 3 million sea cucumbers in the first two years
- Lack of commercial trip limit may allow overexploitation in Florida

Trip limit has been requested by industry due to concern about potential over-exploitation



Photo by Alan Nadimyer

Although sea cucumbers are traditionally harvested in Florida for the aquarium trade, members of the commercial marine life fishery began expressing concerns about potential unsustainable expansion of the fishery after several members of the industry were approached by a processor wanting to acquire large numbers for export to China. Sea cucumbers are highly valued in Asian markets due to their nutritional and medicinal qualities. Once harvested, sea cucumbers destined for this market are dried and sold by the gram, with almost all of them imported directly into Hong Kong for further Asian distribution. A food fishery that was established in Cuba in 1999 harvested over 3 million sea cucumbers in the first two years of the fishery, with only 12 boats in operation, before steep declines in the catch led to a series of management measure to ensure the sustainability of the fishery.

The primary concern from the marine life industry is the lack of a commercial trip limit for sea cucumbers, which may allow rapid, over-exploitation to occur in Florida. Due to these concerns, a commercial trip limit has been requested by the Florida Marine Life Association (FMLA), the official industry organization for ML endorsement holders.

Sea Cucumber Food Fisheries – Worldwide

- Most international sea cucumber fisheries deemed unsustainable by the FAO
 - Typically boom-and-bust
 - Most fisheries are either fully depleted (20%) or otherwise overexploited (52%)
 - Extinctions from overfishing reported from Indo-Pacific Region
 - Complete ban on harvest implemented in many tropical fisheries due to overharvest
- Severe population crashes due to overfishing in high profile conservation sites such as the Great Barrier Reef and Galapagos Islands National Park
 - No signs of recovery at these sites

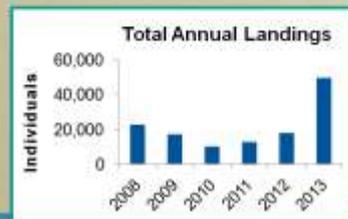
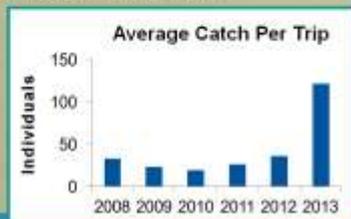


Photo by Don DeMaria

Many of the sea cucumber fisheries that have developed around the world have done so in the absence of regulation, resulting in a series of boom-and-bust fisheries. The FAO has determined that most of the sea cucumber fisheries worldwide are unsustainable. Worldwide, 20% of the sea cucumber fisheries have been deemed fully depleted, with an additional 52% deemed overexploited. Extinctions of some species from overfishing have been reported from the Indo-Pacific region, and complete bans on sea cucumber harvest due to population collapse have been implemented in many tropical fisheries including Costa Rica, Ecuador, India, France, Panama, Papua New Guinea, Solomon Islands, Tanzania, Tonga, Vanuatu, and Venezuela. There have also been severe population crashes recorded in high profile conservation sites such as the Great Barrier Reef and Galapagos Islands National Park due to overfishing, with no signs of recovery at these sites.

Sea Cucumber Fishery – Florida

- Traditionally a small fishery
 - Annual landings around 16,000 sea cucumbers
 - Average catch rate of 28 sea cucumbers per trip
- Industry began expressing concern in 2012
- June 2012 Commission meeting – staff committed to monitor the fishery for changes
- Through June of 2013, annual landings tripled to over 49,000 sea cucumbers with an average catch rate of 122 individuals per trip



Traditionally, Florida's sea cucumber fishery has been small, with annual landings around 16,000 sea cucumbers and an average catch rate of 28 sea cucumbers per trip. But in 2012, industry began expressing concerns about potential future overexploitation. At that time, the landings data did not indicate any increase in harvest of sea cucumbers or any discernible change in fishery practices. But because of industry concerns, staff requested public comment on the status of the commercial fishery prior to the last round of marine life regulatory changes in 2012. However, at the June 2012 Commission meeting staff committed to closely monitor the fishery and work with the industry to implement additional regulations if needed. Since that time, staff has been closely monitoring the commercial landings, and in the first half of 2013, the landings have more than tripled the previous annual average with over 49,000 sea cucumbers landed by June, and a catch rate of approximately 122 sea cucumbers per trip.

Public Input

- 2012: Marine Life workshops throughout South Florida
 - ML endorsement holders reported being approached by exporters
 - Requests for commercial trip limits
- 2013: South Florida workshops
 - Concern about declining populations
 - Local markets developing for export to China
- ML endorsement holders email survey
 - Suggested daily vessel limits ranging from 10–400 individuals
- Florida Marine Life Association (FMLA)
 - Requested a daily vessel limit of 200 sea cucumbers



Photo by Don DeMans



Since 2012, public workshops have been conducted in which staff has heard of recent concerns within the sea cucumber fishery. Prior to the marine life rulemaking in 2012, workshops were held in Tallahassee (statewide by phone), Bradenton, West Palm Beach, Key Colony Beach, and Key West. In 2013, the South Florida workshops jointly conducted by the FWC and the Gulf of Mexico and South Atlantic Fishery Management Councils were held in Dania Beach, Key Largo, Key Colony Beach, Key West, and Marco Island. Stakeholders within the marine life industry voiced concerns at these workshops about potentially declining populations and the local development of an export market.

Based on the increasing landings and the continued concerns of the industry, staff conducted an email survey of all ML endorsement holders. Of those that responded to the survey, nearly all supported commercial limits on the fishery, trip limit suggestions ranging from 10 to 400 sea cucumbers per vessel per day. The official industry organization, the FMLA, also held a meeting recently, in part to discuss potential commercial trip limits for sea cucumbers. The FMLA has requested a daily commercial vessel limit of 200 sea cucumbers.

Proposed Draft Rule

68B-42.006 Commercial Season, Harvest Limits

- *Establish a commercial daily trip limit and vessel limit of 200 individual sea cucumbers*
- Will not impede current practices of the fishery for the aquarium trade
- Proactive measure to ensure any food fishery that develops will be sustainable
- Prevent depletion of these ecologically important animals



Photo by Dorit Dekker

The draft rule amendment would establish a commercial trip limit of 200 individual sea cucumbers per person per day, as well as a daily vessel limit of 200 sea cucumbers, inclusive of all sea cucumber species. The proposed rule would allow the traditional fishery that supplies sea cucumbers to the aquarium trade to continue operate under its current practices. Additionally, the trip limit would be a proactive measure to help ensure that the food fishery, if it continues to develop, will be sustainable and prevent depletion of these ecologically important animals.

Staff Recommendation

Approve the proposed draft rule

- *Establish a commercial daily trip limit and vessel limit of 200 individual sea cucumbers*

If approved and directed, return for final public hearing at the February 2014 Commission meeting



Staff recommends approving the proposed draft rule establishing a commercial daily trip and vessel limit of 200 sea cucumbers. If approved and directed, staff recommends returning for a final public hearing at the February 2014 Commission meeting.

The following slides are considered back up material and are not anticipated to be part of the actual presentation to the Commission



Suggested Management from FAO

Top recommended management strategies

- Limited access – already accomplished via ML
- Adaptive management – start with conservative harvest limits and allow fishery to expand under close watch
 - Best option when lacking information or when fishery is new or expanding
 - Proactive
 - Successful in British Columbia fishery



Through workshops involving experts from around the world, the FAO has published many technical papers and management guidelines on the management of sea cucumbers. The FAO recommends managing sea cucumbers through limited access, which the ML endorsement already accomplishes, and adaptive management. Through adaptive management, fisheries managers can start with a conservative catch quota and allow fishery to expand under close monitoring. This strategy is suggested as the best option when lacking information to construct maximum sustainable yield (MSY), or when the fishery is new or expanding, both of which apply to the Florida sea cucumber fishery. This strategy has been successfully applied to the sea cucumber fishery of British Columbia.

Additional Strategy for Monitoring the Fishery

- Staff included a question about trip ticket reporting in the email survey of ML holders earlier this year
 - Broad support for implementing species-specific reporting codes
 - FMLA requested a separate trip ticket code for sea cucumbers destined for the food market to facilitate separate management strategies for that aspect of the fishery
- Division of Marine Fisheries Management staff will work with FWC's research staff and the industry in the near future to implement additional reporting codes for this fishery



Photo by Stan DeMena

In addition to questions about the status of the sea cucumber fishery and support for new commercial harvest limits, staff included a question about trip ticket reporting codes for this fishery in the email survey that was distributed to ML endorsement holders earlier this year. There was broad support from individual marine life collectors and from the FMLA for addition trip ticket reporting codes for this fishery. Currently there is only one species-specific reporting code for sea cucumbers, with all other species lumped into a single reporting code. In addition to species-specific codes, the FMLA suggested additional codes for sea cucumbers supplied to the food market. There is currently a single trip ticket code for sea cucumbers harvested for this purpose, but no landings have been reported under that code in recent years.

In order to gather more information about the species composition of the harvest in the commercial fishery, Division of Marine Fisheries Management staff will work with research staff at the Fish and Wildlife Research Institute and the industry to implement additional trip ticket codes for this fishery and provide the fishery with the information needed to facilitate species identification and accurate reporting.

Nearby Sea Cucumber Food Fisheries

Export markets driving harvest of high numbers from nearby areas



Photo by Don DeMaria

Mexico

- Exports over 300 tons to Hong Kong annually
- Targets many species also found in Florida
- Harvest of one species banned after just 4 years due to it becoming "endangered"

Cuba

- Millions of individuals exported to Hong Kong annually
- Targets chocolate chip sea cucumber, a common species in Florida

British Columbia

- Exports over 800 tons to Hong Kong annually

United States (Washington, Oregon, California, Alaska, and Maine)

- Total exports to China range from 4 to 10,000 tons annually



This slide summarizes the characteristics of several of the sea cucumber fisheries operating in regions within relatively close proximity to Florida that supply large numbers of sea cucumbers to food-based export markets.