

South Florida Ecosystem Restoration Task Force

Invasive Exotic Species Strategic Action Framework

Long-term Management Case Study: Lionfish

Lionfish, predatory reef fish with venomous spines native to the Indo-Pacific, have invaded and established breeding populations in the waters off Florida. Since first observed off Florida in the 1980s, two lionfish species (*Pterois volitans* and *Pterois miles*) have populated the Caribbean, Gulf of Mexico, the Southeastern U.S. coastline, and the Bermuda coastline. Lionfish pose a threat to the integrity of the food web and are capable of impacting commercial fisheries, tourism, and overall coral reef health. Affecting a vast area and crossing geopolitical boundaries, continued interagency and partner collaboration and coordination are key to successful management of this invasive marine species.

Challenges to Long-term Management

Lionfish, a popular marine aquarium fish, represent the first invasive marine fish species establishing itself in the Western North Atlantic/Caribbean. The first lionfish sighting in the U.S. was in 1985, however, it wasn't until the early 2000s that they became established in the South Atlantic and 2010 when they became established in the Gulf of Mexico. As of May 20, 2020, the established range for invasive lionfish spans from Venezuela to North Carolina, however, lionfish sightings have been as far north as Massachusetts and as far south as Brazil. Lionfish can withstand low salinity and a wide range of temperatures for long periods of time, which may result in more sightings within the Everglades region. Lionfish have already been found in the more brackish waters of the Loxahatchee River, St. Lucie River, some inland canals, the Florida Intercoastal Waterway, and Florida Bay within Everglades National Park.

Lionfish have few predators and represent a threat to native fish species, many of which have economic importance, in addition to those that have ecological importance by helping keep our reefs clean, allowing for coral recruitment. Lionfish also reproduce rapidly. Sexually mature within one year, lionfish can spawn as often as every four days, year-round, with a larval sac that floats on the currents and can survive approximately one

month. Combatting this ever-growing invasion requires effective interagency coordination and multiple management approaches.

Management Strategies

Removal studies have shown that regular, targeted removals of lionfish are successful. Fortunately, while having venom in their spine, lionfish are not poisonous to eat, providing another avenue for removal. Current management strategies include strengthening (and easing some) regulations, targeted removal, and public engagement.

Prevention Through Regulation

- Strengthening regulations on importation and breeding: In 2014, the Florida Fish and Wildlife Conservation Commission (FWC) prohibited the importation of live lionfish into Florida, the intentional breeding of lionfish in captivity in Florida, and the

An Invasion Below

Since first observed in the 1980s, two predatory species of lionfish have populated the Caribbean, Gulf of Mexico, the Southeastern US coastline, and the Bermuda coastline.



Photo: Cory Walter, Mote Marine Laboratory.

harvest or possession of lionfish eggs or larvae in Florida for any purpose other than destruction. Two lionfish have since been surrendered to the FWC Exotic Pet Amnesty Program.

- Easing of state and federal regulations to allow more lionfish harvesting. Some of these measures include the State of Florida removing size and bag limits for recreational or commercial harvest and the National Oceanic and Atmospheric Administration (NOAA) Office of National Marine Sanctuaries (ONMS) issuing permits to allow spears in sanctuary no-fishing zones to specifically harvest lionfish.

Response and Control Plans

- Multiple plans have been developed to address lionfish, including the Intergovernmental Aquatic Nuisance Species Task Force National Invasive Lionfish Prevention and Management Plan, FWC's Lionfish Control Plan, NOAA's ONMS Lionfish Response Plan, and NOAA's Invasive Lionfish Action Plan.

Control Tools and Long-Term Management

- Targeted removal efforts are conducted by the National Park Service (NPS), FWC, NOAA ONMS, and Mote Marine Laboratory.
- The commercial and recreational harvest of lionfish is ongoing, encouraged by the "Eat 'em to Beat 'em" campaign.
- Lionfish derbies and tournaments are conducted by multiple agencies and entities. The FWC provides monetary assistance for tournaments that remove lionfish.
- Removal Incentive Programs: FWC "pays back" charter fishermen and/or dive shop expenses for trips that are specifically completed as lionfish harvest and education trips. FWC also allows an additional spiny lobster over the recreational season bag limit if 10 or more lionfish have also been removed.

Research Support

- Many federal and state grants provide for lionfish research.
- Lionfish specific trap development research ongoing.

Juvenile Lionfish

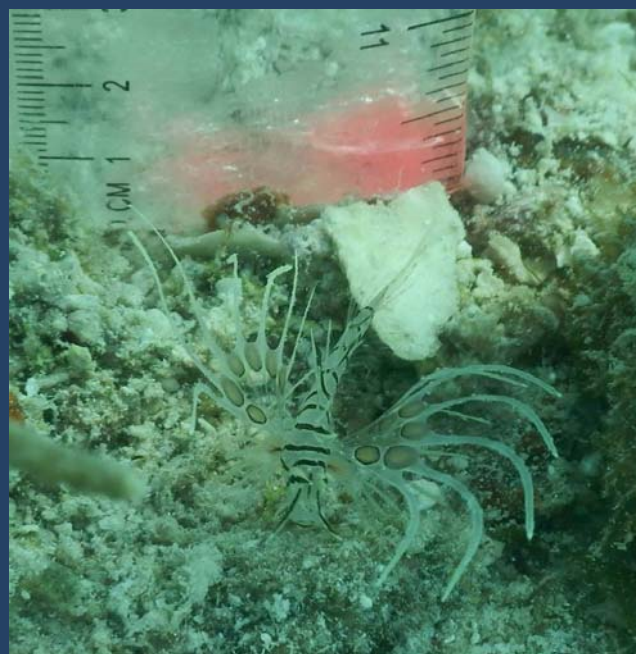


Photo: Kelli O'Donnell, NOAA Fisheries.

- NOAA Fisheries and ONMS completed a Programmatic Environmental Assessment in 2018 that allows for the testing of various trap types and design modifications across multiple areas to determine their effectiveness at catching lionfish in the Gulf of Mexico and South Atlantic, including within the Florida Keys National Marine Sanctuary.

Public Engagement and Targeted Recreational Removal Efforts

- The FWC and other agencies conduct public outreach and recreational removal events targeting lionfish. These include FWC's Lionfish Removal and Awareness Day, Lionfish Challenge, "Become the Predator" workshops, Lionfish Classroom Invasion, Reef Rangers program, and Lionfish Summit Workshops. The NOAA ONMS also hosts a Lionfish Invitational.
- Citizen scientists are also engaged in reporting lionfish sightings to the US Geological Survey, NPS, and FWC.