



# The Lionfish Invasion



Florida Fish and Wildlife Conservation Commission  
Division of Marine Fisheries Management

# What is an Invasive Species?

- An organism brought to a new region by people
- Causes negative impacts like introducing diseases or preying on native species

## Examples:

Burmese Python



Hydrilla



Kudzu



# Invasive vs. Nonnative

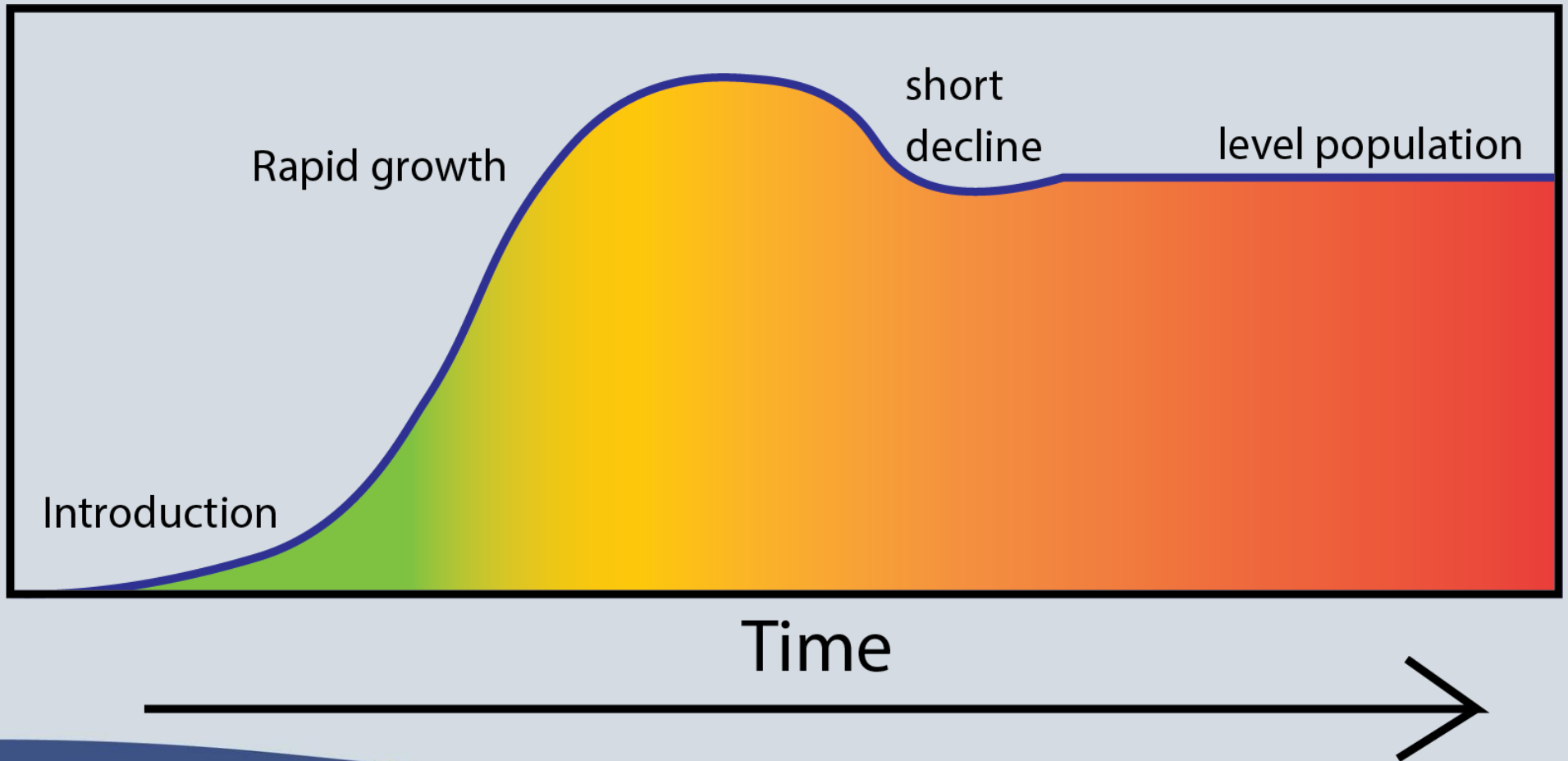
- Both are organisms outside their native habitat
- **Nonnative**: not established or does not have negative impacts
- **Invasive**: established and has negative impacts





# Invasion Trend

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# Marine Invasions

- 41 nonnative marine fishes in Florida, *only 5 have become established*
  - USGS non-indigenous aquatic species database 2019



- **Lionfish have become successfully established in nonnative range and are classified as the worst marine invasion to date**



# Lionfish

## (*Pterois volitans* & *P. miles*)

- Tropical predatory fish from Indo-Pacific region
- Introduced by an aquarium release in 1980's
- Established in western Atlantic Ocean, Caribbean Sea, and Gulf of Mexico
- Density and biomass exceed that in their native range





1985



1990





1995



2000

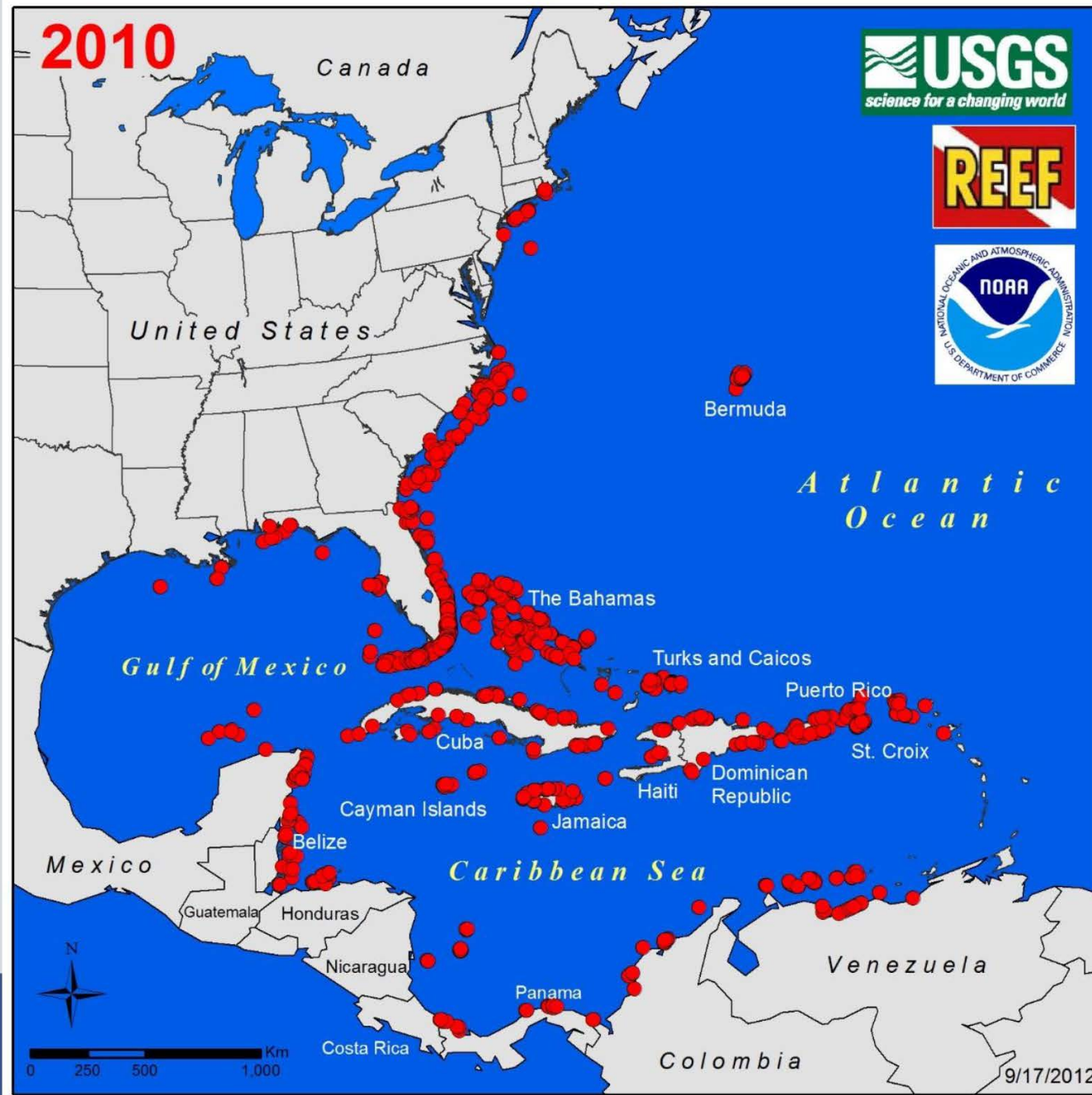


2005





2010

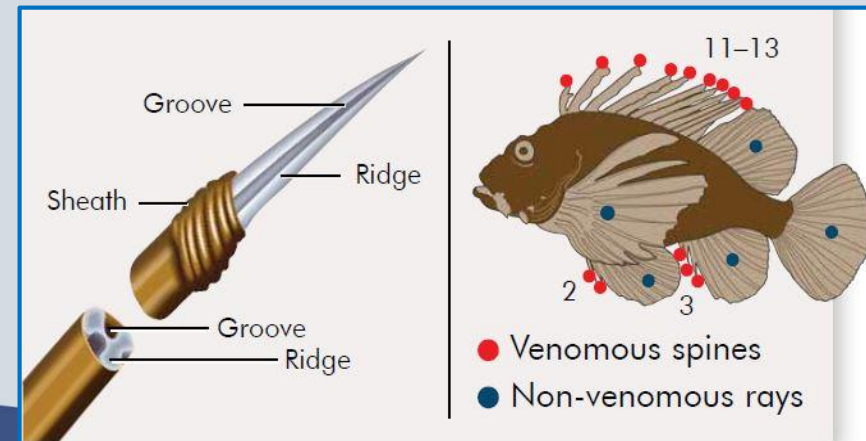


2018



# Invasive Characteristics

- Wide range of habitat use – natural and artificial, 1 – 1,000 ft. depths, tolerate temperatures as low as 50°F, salinities as low as 4 ppt (sea water is 35 ppt)
- Sexually mature at 1 year; spawn frequently (every 4 days); up to 30,000 eggs/spawn
- Consume economically & ecologically-important species; over 90 different species found in stomach; swallow prey over half body size
- 18 venomous spines; neuromuscular toxin; treatment: apply heat
- Unique coloration – native predators do not recognize as prey

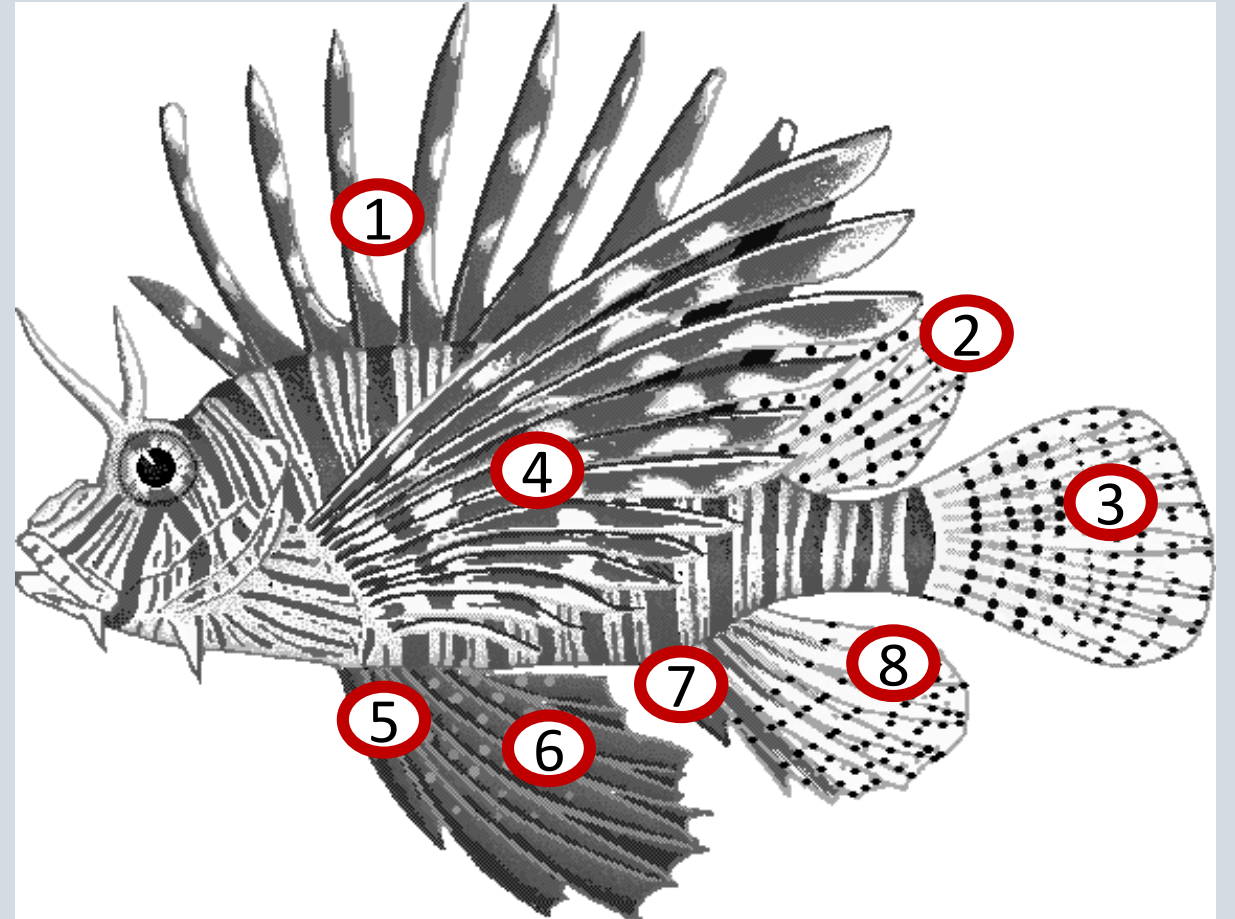




# Anatomical Terms

**Dorsal**

1. Dorsal Spines
2. Dorsal Fin
3. Caudal Fin
4. Pectoral Fin
5. Pelvic Spines
6. Pelvic Fin
7. Anal Spines
8. Anal Fin



**Ventral**



# Venomous vs. Poisonous

- Poisonous – a toxin ingested, inhaled, or absorbed through skin
- Venomous – a venom injected through a bite or sting
- Lionfish are venomous NOT poisonous





# Lionfish Diet

- **Economically important species**

- Fish: groupers, snappers, baitfish



- Invertebrates: shrimp, crabs, lobster





# Lionfish Diet

- **Ecologically important species**

- Cleaners: maintain health of reef fish by consuming parasites



- Grazers: maintain health of coral reefs by consuming algae



# Effects on Native Ecosystems



- Opportunistic generalists
  - Consume over 90 different species of native fish and invertebrate species
- Reduce recruitment and prey biomass:
  - More than 2 times the reduction in juvenile recruitment than native predators
  - 65% reduction in prey biomass (Green et al. 2012)





# Effects on Native Ecosystems

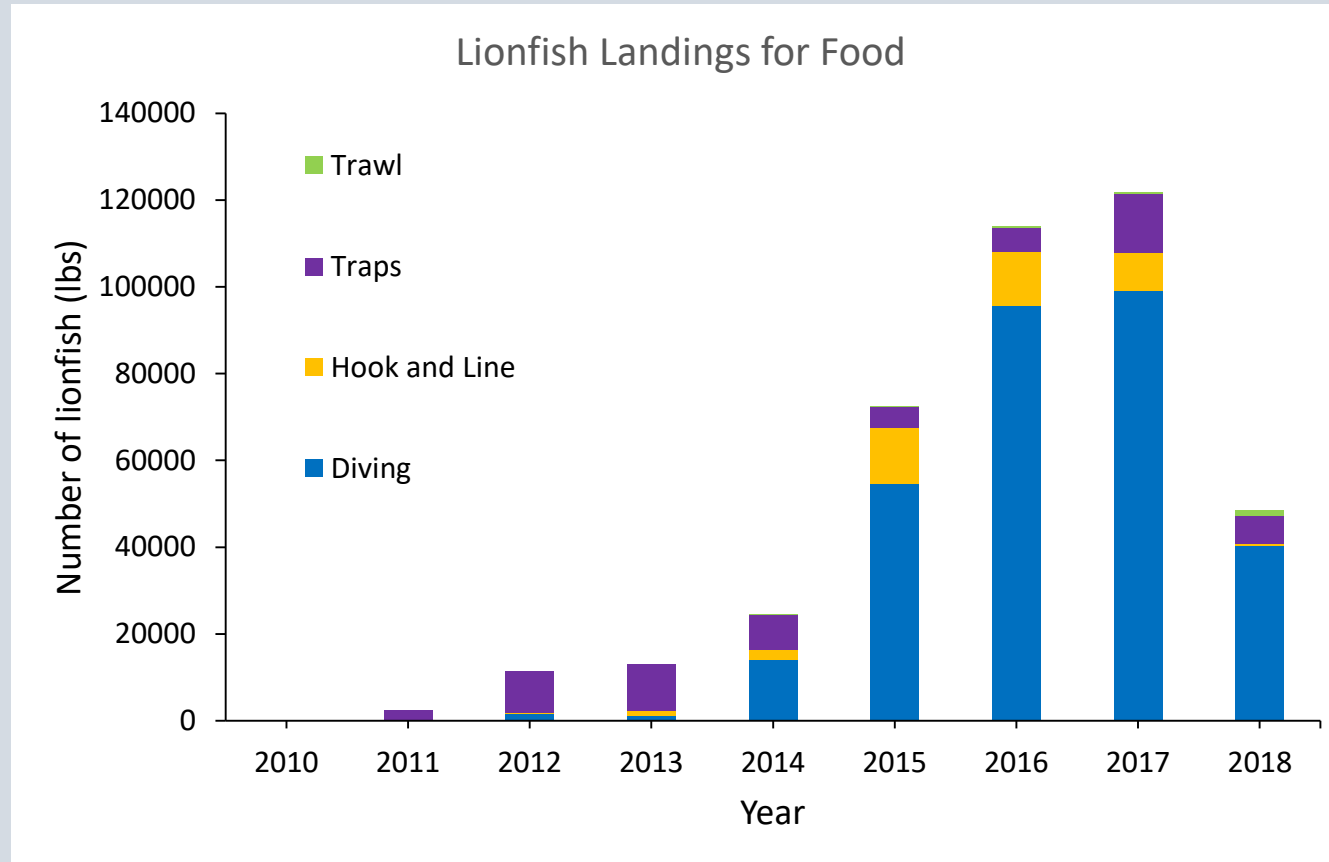


- Absence of natural control mechanism
- Non-consumptive effects:
  - Competition with larger predators for habitat and prey
  - Habitat degradation
- **Humans are only known predator**



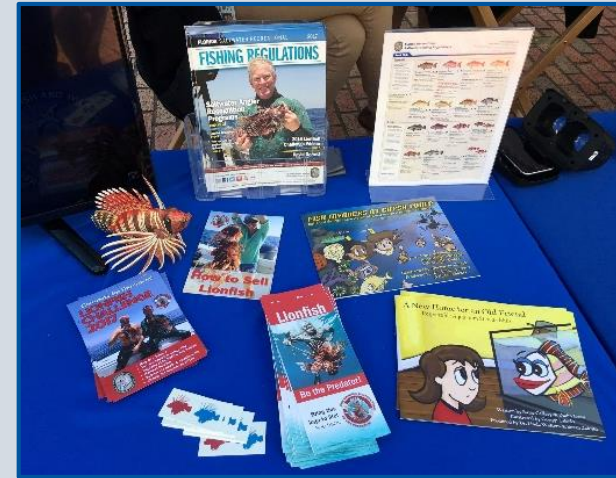


# Lionfish Landings by Gear Type



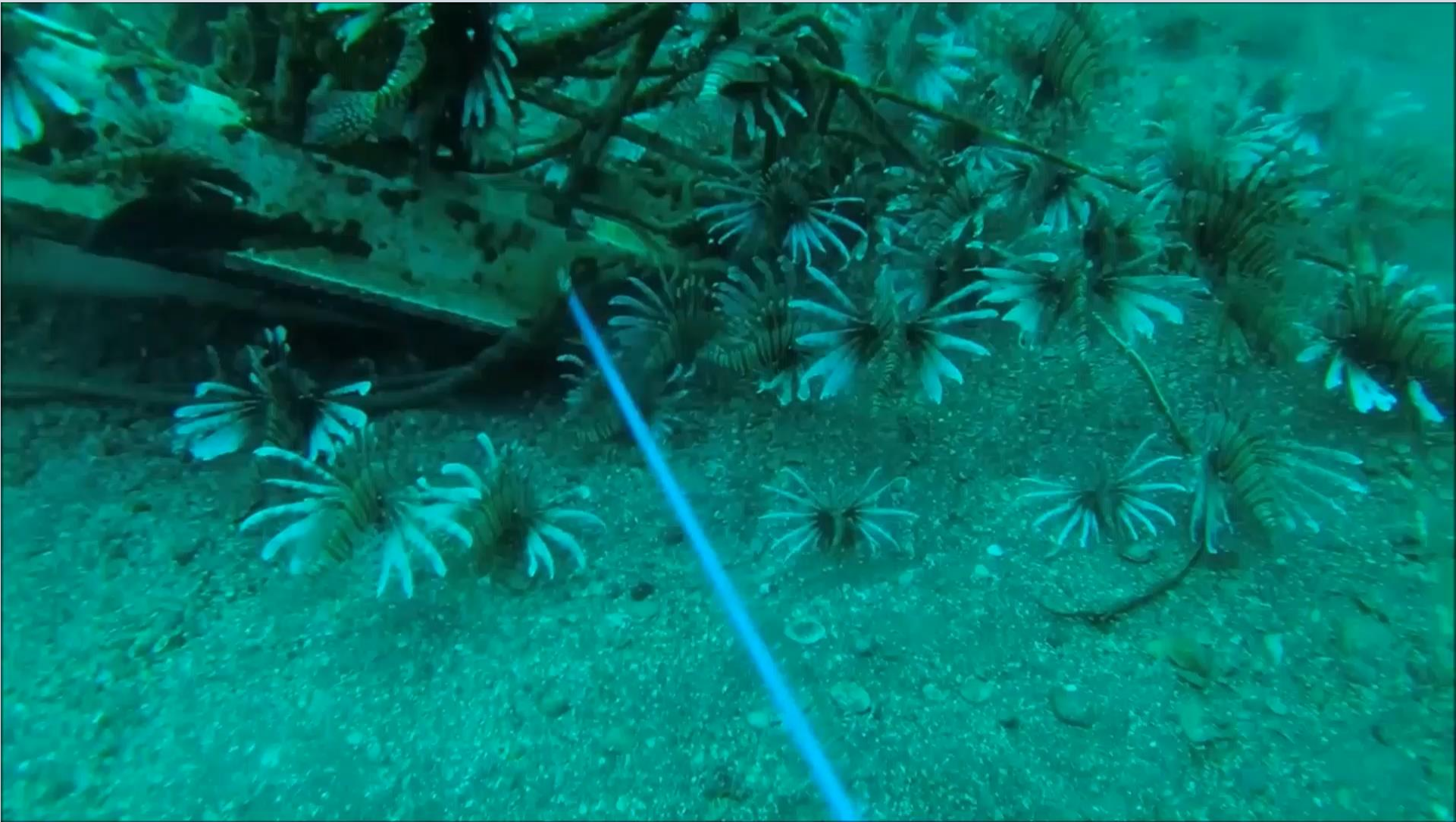
# Programs about Lionfish

- **Agency goals:** Minimize negative impacts to human health and safety, the environment, and the economy
  - Diver programs:
    - Rules that make it easy to harvest lionfish
    - Support lionfish tournaments
    - Encourage divers to harvest lionfish
    - Research new ways to catch lionfish
  - Education programs:
    - Workshops and school dissections
    - Traveling “Be the Predator” outreach booth
    - Lionfish Removal and Awareness Day
  - Promote consumption and commercial market



**From 2014-2019 FWC has tracked the removal of over 593,486 lionfish from Florida waters!**





# Questions?

Video and Diver: Meaghan Faletti

