

# **Lionfish Bycatch in The Florida Lobster Fishery: First Evidence of Occurrence and Impacts**

## **La Basura del Pez León la Basura en la Pesquería de Langosta en los Cayos de la Florida: Primera Evidencia de la Ocurrencia y el Impacto**

### **Capture Accessoire de Lionfish dans la Pêche de Langoustine de la Floride: Déplacements Première Preuve de la Présence et les Impacts**

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#### **ABSTRACT**

Invasive lionfish were first documented in Florida Keys waters in 2009 and have shown a dramatic increase in distribution and abundance in a variety of habitats. Severe impacts to small-bodied reef fishes have been documented in other areas of the invaded region. Local control through diver removals has been effective at minimizing populations and impacts at shallow diving depths, but little has been done to target lionfish in deeper waters. The Florida Keys spiny lobster fishery generates approximately \$12,650,000 gross revenue per year from sales of lobster caught in traps deployed in coastal areas between depths of 15 and 190 feet. Commercial fishermen began reporting bycatch of lionfish in deep water fishing grounds in 2009. Here we examine lionfish bycatch to understand the distribution and composition of deep water populations, determine trap catch rates, and evaluate the potential impact of lionfish on the fishery. The first evidence of impacts to the commercial fishery included observing lionfish as the second most common bycatch and a reduction in lobster landings when lionfish are present in traps.

KEY WORDS: Lionfish, invasive, lobster fishery, bycatch, impacts

#### **INTRODUCTION**

The Florida Keys lobster fishery consists of approximately 128 commercial lobster vessels fishing the waters along the 200 mile length of the Keys in the South Atlantic EEZ. Between 2006 – 2010, these vessels averaged annual gross revenues of \$98,845, which corresponds to an annual value of the FL Keys lobster fishery of more than \$12.6 million. Two species of lionfish (*Pterois volitans/miles*) have recently invaded Western Atlantic waters. First reported from south Florida in 1985, lionfish have spread throughout the Caribbean and are now widely present throughout the western Atlantic from North Carolina to Venezuela including Central America and the Gulf of Mexico. Lionfish densities have been shown to be much greater in the invaded range compared to the native range and impacts to native marine systems are being realized. Control efforts are being implemented throughout the region including regular diver removal efforts via spearing and netting. In January 2009 lionfish were first reported from the Florida Keys by recreational divers. Later the same year, lobster fishermen reported the first lionfish from their traps. By 2011, thousands of pounds of lionfish were being landed as bycatch in the lobster fishery, and fishermen began reporting observations of reduced lobster catch when lionfish were present in their traps. Our work describes lionfish bycatch in the lobster fishery and the effect on lobster catch rates when lionfish are present in the traps.

#### **STUDY DESIGN**

To assess lionfish prevalence in the lobster fishery, we initiated two related efforts to survey and census lobster and lionfish catch and associated bycatch. First, we developed and distributed a logbook to 10 lobster fishers in the upper, middle, and lower Keys. Each logbook contained pre-formatted pages to record total lobster catch, lionfish catch, location and demographics of areas fished, and type of trap used. Data from log book returns are still in process of being analyzed, however, initial reports from fishermen and data from logbooks indicate minimal catches of lionfish in shallow water lobster traps.

The second effort involved observer days on a single fishing vessel operating out of the middle Florida Keys. Trapping for lobster in these depths includes the setting of small (70 cm x 50 cm x 50 cm) wood slat or wire mesh traps with a top funnel entrance. Traps are connected in strings of 20 individual traps connected by poly line with surface buoys at each end of the trap trawl. Individual traps were separated by approximately 200 m with total trawl lines covering approximately 2 – 4 km. Soak times were typically 2 – 3 weeks.

Between August 2011 and November 2012, two observers took part in 19 lobster trap retrieval days along the offshore reef tract in depths of approximately 25 m – 65 m. Typical days included retrieval of 15 – 20 trawls (300 – 400 individual traps). All lionfish captured from all traps were measured. Total trap contents were recorded from every third trap in each

trawl including identification of fish to the lowest taxon and measurements of TL to the nearest cm for bycatch and to the nearest mm for any lionfish. Corresponding data on date, location, depth, trap type, soak time, bait and weather were also recorded for each assessed trap. Data were recorded in Excel™ spreadsheets by one observer using a laptop computer, while the second observer described and conducted measurements of catch.

**RESULTS**

During the study 6,357 traps were hauled with a corresponding catch of 2,939 lionfish (Figure 1). Total length of lionfish collected was normally distributed.

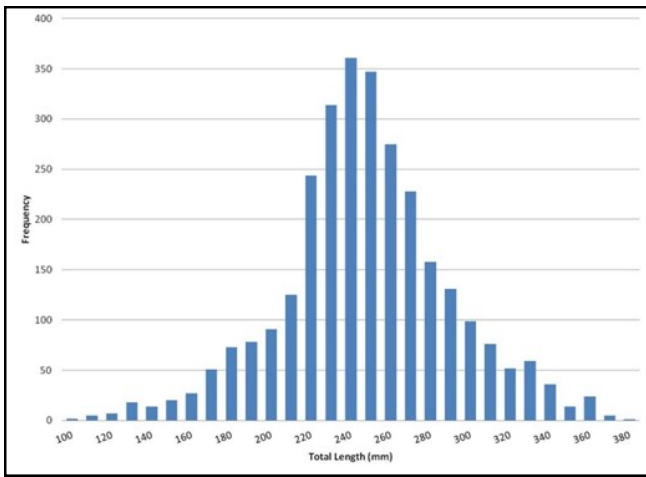


Figure 1. Lionfish size.

Assessment of catch from every third trap (n = 2,245) included 90 species of finfish with porgies and lionfish making up the majority of the bycatch (Figure 2).

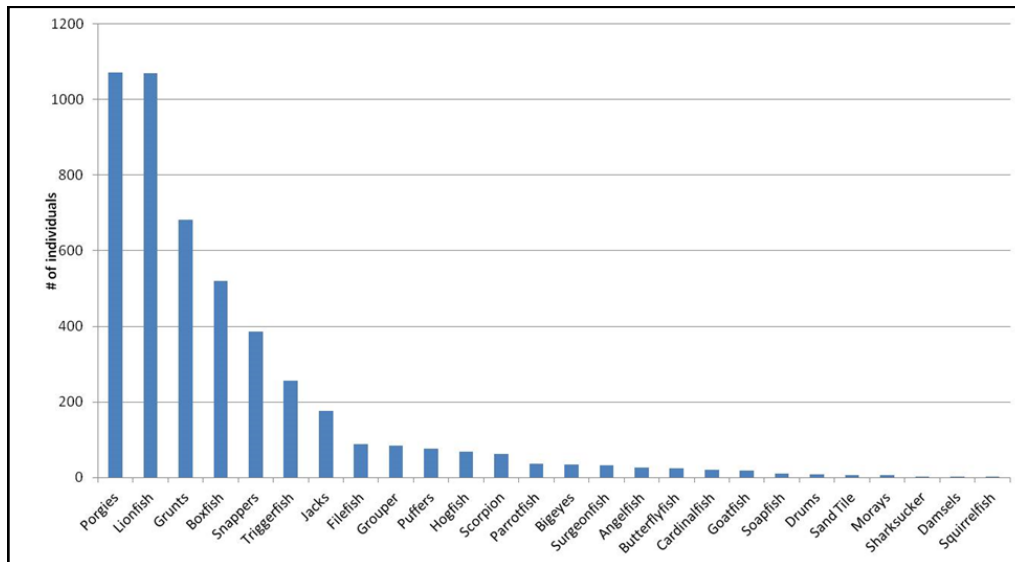


Figure 2. Total bycatch in surveyed lobster traps.

Though variable, mean lionfish size tended to increase temporally across the duration of the study (Figure 3).

**CONCLUSION**

Lionfish are a new bycatch species in the Florida lobster trap fishery and have become one of the top two most abundant finfish recorded as bycatch. The presence of lionfish in lobster traps has a negative effect on lobster catch which may result in economic hardships to the fishery. More information is needed to determine the mechanisms driving the negative relationship between lionfish and lobster, to assess the effects on overall lobster landings, and to address the differences in catch across depths and habitats.

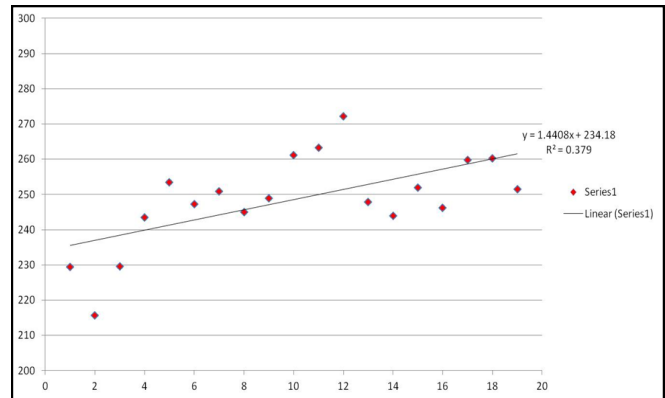


Figure 3. Size of lionfish (mm) caught in lobster traps over time (ordered trips by time; x axis).