Invasive Lionfish Control and Management: Myths Dispelled and Lessons Learned

El Invasivo Pez León Control y Manejo: Mitos Disipados y Lecciones Aprendidas

Contrôle Lionfish Envahissantes et Gestion: Mythes Dissipés et Leçons Apprises

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ABSTRACT

This year marks over fifteen years since the first record of lionfish was reported in the Atlantic Ocean. Many lessons have been learned and best practices identified for lionfish control and management. Over the years, a few myths and inaccuracies have surfaced and as time progresses more lessons will be learned. Spreading of incorrect information through formal and informal channels can hamper efforts to minimize lionfish impacts. Examples of common myths include the origin of the lionfish introduction in the Atlantic, the mechanics of envenomation, the toxicity of lionfish venom to native species and humans, and options for control. We also present a synopsis of initiatives aimed at bringing coordination to managing lionfish in the Caribbean. Some of these initiatives include development of a regional lionfish committee, publication of a manual of best practices, issuance of a regional advisory, and development of a regional strategy.

KEY WORDS: lionfish, invasive species

LIONFISH MYTH #1: LIONFISH ARE SUPERNATURAL

As with most invasive species, in efforts to communicate the urgency and scale of impact lionfish have been portrayed as supernatural beings capable of causing massive destruction to planet earth. From catchy headlines (e.g., "*Lionfish invasion threatens life in the Atlantic Ocean"*, Yahoo News, 2009) to enhanced graphics portraying lionfish as a ravenous fish species (Figure 1), the intent is to communicate the extreme impacts of lionfish to the biodiversity of Atlantic reef communities. While trying to communicate this problem, however, it is imperative that researchers remain on solid ground regarding the facts about lionfish and the perceived and real ecological and economic impacts.

Figure 1. Depiction of a supernatural lionfish. Photo credit Worth1000.com.

Lionfish are a fish, and like any other teleost fish, are bound by intrinsic biological rates. Lionfish are likely to grow at similar rates, consume similar amounts of diet, feed in similar ways as other akin scorpaenid fishes either in their native range or in the Atlantic. We can expect the biological rates of lionfish, like any other invasive species, to reflect the opportunity of open niches and density independence. These temporary unrestricted rates should not be confused with abnormally high biological rates, but yet a reflection of the environmental conditions which will eventually be controlled by density dependence. Undoubtedly, the uniqueness of lionfish among Atlantic scorpaenids makes them stand out. Their behaviour, body morphology, and higher densities are much different than any native scorpaenids. This different, however, is merely a reflection of biology that existed before the lionfish introduction. It is the geography, niche space, and density independence that has changed, not the animal.

LIONFISH MYTH #2: THE LIONFISH INVASION HAS PEAKED

The peak of the lionfish invasion may not occur for decades (Figure 2). The invasion will peak when spawning stock biomass reaches its highest level. Given that the Gulf of Mexico was only recently invaded (2009) and has only in the last couple of years began seeing densities of lionfish similar to the Southeast U.S. and Caribbean, it will be many years before lionfish reach their highest biomass. Given the connectivity of the region, the pelagic nature of lionfish eggs and larvae, and the expansive reef habitats, lionfish biomass will continue to grow. Alarmingly, the most recent ocean basin invaded, the Gulf of Mexico, may contain some of the highest biomass levels of lionfish given the number of artificial structures (oil rigs and pipeline — Figure 3) . Lionfish have demonstrated a strong affinity for artificial structures, especially those with high relief.

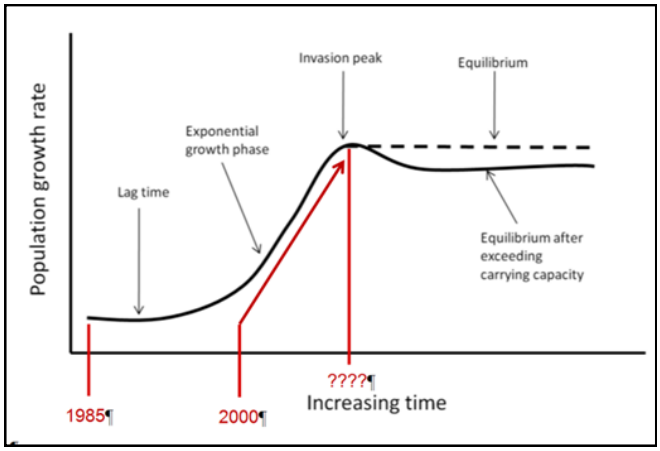

Figure 2. Invasive species population growth curve. Adapted from Morris (2012) to include approximate timelines of the lionfish invasion.

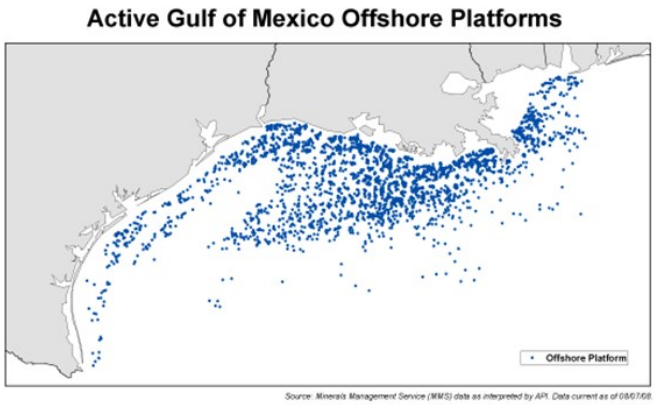

Figure 3. Locations of oil platforms in the Gulf of Mexico. Oil platforms are prime lionfish habits. Credit: Minerals Management Service, 2008.

Figure 4. Lionfish derbies are providing significant lionfish removals throughout the region.

MYTH #3. LIONFISH CONTROL IS NOT POSSIBLE

Lionfish eradication is (likely) not possible, but lionfish control is happening every day. Lionfish control is dependent on the defined management area and the available resources. Great examples of lionfish control efforts are being documented from lionfish derbies (Figure 4) which are removing thousands of lionfish a weekend to marine protected area control plans that focus removals throughout the year. The question that managers have to ask pertains more to where to control lionfish rather than if to control lionfish. More control efforts are desperately needed in marine protected areas and other areas of conservation around the region. Reef managers are now faced with the reality of invasive control as a significant component of management plans. As lionfish impacts to reef communities are realized, areas where lionfish densities remain low due to culling efforts are critical "control" areas that will provide important comparisons for documenting the impacts of lionfish on reef communities.