



This document summarizes the Florida Fish and Wildlife Conservation Commission’s (FWC) efforts to address the presence of nonnative lionfish in Florida waters, reduce impacts to our natural resources, and educate the public on how they can participate in lionfish control.

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Photo by Jason Arnold

Lionfish in Florida

Found in most Florida waters

- Population explosion in recent years

Highly successful invader

- Broad range of habitat utilization
- No known natural predators in FL
- Rapid reproduction
- **Eradication is unlikely**

The issue

- Disrupts ecosystem balance
 - Preys upon ecologically important native reef species
 - Competes for food with ecologically and economically important species



Lionfish sightings in Florida date back to 1985. Since their first sighting in the Florida Keys in 2009, lionfish populations have exploded throughout the Keys and other Florida waters and the Caribbean. They are also expanding across the entire Gulf of Mexico and as far north as Rhode Island in the Atlantic Ocean. Currently, lionfish have been found in most waters off the Florida coast.

Lionfish are successful invaders because they are highly adaptable to a broad range of environments, have no natural controls (i.e., diseases or parasites) or predators in Florida, and reproduce rapidly. Due to their adaptability and reproductive capacity, eradication of lionfish from Florida waters is unlikely.

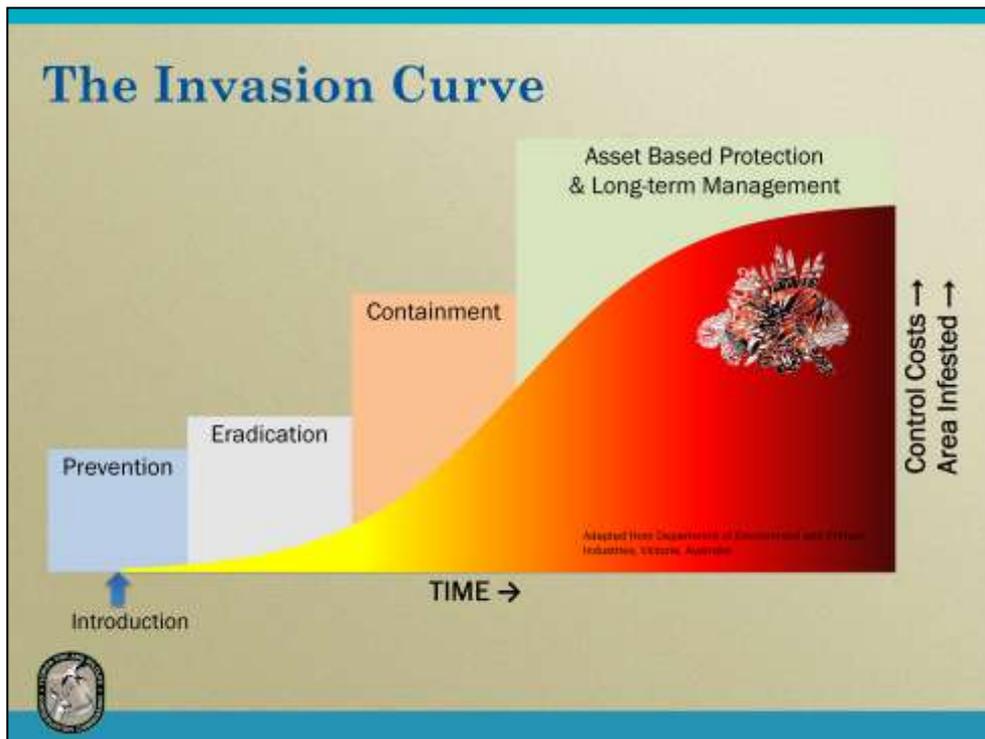
When established, lionfish disrupt the natural balance of the ecosystem being invaded. They prey on native juvenile reef fish, such as snapper and grouper, and have been shown to negatively effect recruitment of these small fish to patch reefs. Lionfish also prey upon herbivorous fish that are essential to keep the algae in coral reef systems from overgrowing corals.

FWC Strategic Initiatives

- Running the Business
- Imperiled Species Management Plan
- Expand Participation in Conservation
- Conservation through Innovation
- **Conflict Wildlife**
- Boating as a Gateway to Conservation and the Outdoors



As part of its strategic plan, FWC has identified key areas to focus its resources. Lionfish relate to the conflict wildlife strategic initiative. This initiative seeks to ensure continued support and appreciation for fish and wildlife by implementing an integrated programmatic approach across FWC to minimize adverse impacts associated with native and non-native fish, wildlife, and plants. Successful efforts related to wildlife conflict will minimize human health, safety, environmental, social, and economic impacts.



This slide illustrates an invasion curve as it relates to the establishment of nonnative species in a new location. The greater the infested area, the less likely the species can be eradicated and costs to manage the invasive species increases.

Preventing the release and establishment of nonnative wildlife is key. However, once species have spread, they enter the “red zone” of high population numbers that require intensive eradication efforts and associated funding. In Florida, lionfish are in the red zone.

Looking at the invasion curve in a more general manner, it can be difficult to determine when an invasive species becomes conflict wildlife. The point on the curve where lionfish were considered conflict wildlife depends on one’s perspective, and the threshold for this distinction is not dependent on population size. The conflict could have started the first time a diver was stung on a reef by a lionfish, or maybe it was when a visual change in species diversity was noticed by an individual at an area they were visiting.

At this point on the invasion curve, the FWC and those we serve are concerned about the potential impacts of lionfish. These concerns relate to the ecological effects of lionfish on reef and marine diversity and the economic effects of lionfish due to declines in the numbers of other fish available for harvest and detrimental impacts on tourism. FWC is developing a comprehensive plan to control the lionfish population and minimize these effects.

FWC Leadership – Lionfish Management

Removing lionfish

- Modifying regulations to encourage harvest
- Supporting and sponsoring removal efforts
- Developing coordinated state and national action plans

Educating the public

- Outreach and Education
- Social Media

Involving the public and stakeholders

- Creating Partnerships
- Supporting Innovation
- Reef Guardians™
- Lionfish Awareness Event



FWC is leading the coordination and management of lionfish control efforts in the state of Florida. The agency is focusing on three key areas: removing lionfish, educating the public about lionfish, and involving the public and stakeholders in lionfish control and removal. This presentation will discuss these three areas in more detail, including modifying regulations, removal efforts, action plans, public outreach and education, social media endeavors, stakeholder partnerships, supporting innovative lionfish removal techniques, and a new program called Reef Guardians™ with a statewide lionfish awareness event to introduce it.

Removing Lionfish

GOAL: Tailor regulations to encourage lionfish harvest

Accomplished

- Recreational fishing requirement waived when using specific gears to harvest lionfish
- No bag limit for lionfish harvest
- Allowed rebreathers when harvesting lionfish
- Created a permit for tournaments/events allowing spearing in prohibited areas
- Prohibited aquaculture
- Prohibited live imports

In the works

- Allow lionfish caught during tournaments to be donated to wholesale dealers



Over the last few years, FWC has been paving the way to facilitate the removal of lionfish by increasing opportunities for harvesters in the following ways: waiving the recreational fishing license requirement when using a pole spear, Hawaiian sling, hand held net, or any other spearing device designed and marketed exclusively for lionfish and establishing a no bag limit policy for recreational or commercial harvest. Proper licenses are still required to harvest lionfish using all other legal gears such as hook and line and as commercial bycatch. Also, persons diving with a rebreather are now allowed to harvest lionfish, and the Executive Director can now issue permits for the harvest of lionfish and other nonnative species using spearing gear in areas where spearfishing is prohibited.

FWC staff worked with the Division of Aquaculture at the Florida Department of Agriculture and Consumer Services to coordinate implementation of a prohibition on breeding lionfish and cultivating eggs or larvae in captivity. Measures have also been put in place to curtail new introductions of lionfish by prohibiting the import of any species of lionfish into the state of Florida.

FWC is continuing to find innovative ways to further encourage the removal of lionfish. At the February 2015 Commission meeting, FWC will consider a draft rule to create a permit allowing lionfish caught during a tournament or derby to be donated to an authorized wholesale dealer. Proceeds earned from the donated lionfish can either be donated to a charity or be paid directly to the tournament. This will provide better reporting on trip tickets for donated tournament caught fish and allow for more accurate tracking of lionfish. This permit will also ensure that quality control measures are taken by tournament anglers to properly ice the fish.

Removing Lionfish – continued

GOAL: Sponsor and support lionfish removal efforts

Accomplished and ongoing

- Sponsor and support lionfish derbies statewide
 - Encourage localized lionfish control

In the works

- Lionfish Derby Workshop
 - Review and improve derby processes
 - Develop a coordinated calendar of derbies



FWC has and will continue to sponsor and support lionfish derbies, which are the primary means of localized lionfish control. Derbies are single day competitions that promote the removal of significant numbers of lionfish from local areas.

FWC is working to ensure that these derbies are more effective on a statewide basis by holding a Lionfish Derby Workshop in St. Pete Beach in January of 2015. This meeting will gather lionfish derby organizers from across the state to discuss 2014 derby results, successes, lessons learned, and advice for new derbies. A central calendar of all derbies planned for 2015 will also be compiled and maintained by FWC to avoid overlapping events and to encourage collaboration between various organizations.

Removing Lionfish – continued

GOAL: Develop coordinated plans for lionfish removal

Accomplished

- Integral role in developing the National Lionfish Control Plan

In the works

- Development of an FWC Lionfish Control and Action Plan



FWC coordinated with the other Gulf Coast states to develop a national management plan for lionfish. The vision of the National Invasive Lionfish Prevention and Management Plan is to serve as a guide to the Aquatic Nuisance Species Task Force (ANSTF) and other interested parties involved in managing lionfish and natural resources in U.S. waters. The ANSTF is responsible for coordination of national efforts to prevent the introduction and spread of aquatic invasive species, including the development of management plans for specific high-risk invasive species.

To improve FWC's efforts toward managing Florida's lionfish problem, the agency will continue to identify and implement strategies to address the lionfish issue. An FWC Lionfish Control and Action Plan is being developed in response to stakeholder requests for a formal management plan, and will focus on actions that can be taken by the state and/or the public to address lionfish control.

Educating the Public – Outreach and Education

Lionfish Awareness Funding: \$259,852

- Appropriated by 2014 Legislature to increase awareness about:
 - Invasive lionfish and their potential impacts to our ecosystem
 - Proper handling and removal efforts
 - Using lionfish as an example of the potential for other nonnative species to invade Florida's marine environment



The Florida Legislature appropriated \$259,852 to FWC for the 2014-2015 fiscal year to raise awareness of invasive lionfish and other marine non-native invasive species. Specifically, the funding is being used by the FWC Lionfish Outreach Team to educate the public about lionfish and how they impact the marine ecosystem, how to safely handle lionfish and properly remove them from the environment, and use lionfish as a case study to encourage the public to be more attentive to the potential for other nonnative species of marine organisms to establish themselves in Florida waters.

Educating the Public – Outreach Events

Goal: Educate the public about the existence and severity of the lionfish invasion, and safe removal and handling techniques

Accomplished and ongoing

- Attend lionfish/spearfishing tournaments and festivals
- Give oral presentations
- Hold lionfish workshops
 - Demonstrations on safe handling and fillet procedures
 - Public can:
 - Request in-person FWC demonstration
 - View demonstration video online



To accomplish these goals, FWC has been able to continue and even increase its efforts in reaching the public on these issues with the Lionfish Outreach Team attending tournaments and festivals and giving presentations to raise public awareness about the lionfish problem. Interactions with the public at these events have revealed that 65% of those asked have never heard of a lionfish. Thus, this education is critical for the long term control of lionfish as public participation is an essential component.

FWC's Lionfish Outreach Team also conducts workshops demonstrating safe handling of lionfish and how to properly prepare lionfish for consumption. These workshops are conducted upon request for groups of ten or more people and help build diver confidence on how to safely harvest, handle, and fillet the fish. As an alternative to a live demonstration, an online video is available on the FWC website for those that wish to learn individually.

Educating the Public- Social Media

Goal: Use social media to promote lionfish outreach

Accomplished and ongoing

- Facebook, Twitter, and Google+ posts
 - Facebook post featured “Lionfish Huntress” Rachel Bowman
- Twitter “Hidden Cash” lionfish T-shirt contest



Recently, FWC has successfully promoted the lionfish issue on agency social media pages. A Facebook post in September about stakeholder Rachel Bowman’s efforts to control the lionfish population reached almost 150,000 people. FWC has also promoted the lionfish issue via other social media efforts including hosting two live Twitter chats that engaged the public to ask questions about the lionfish issue and directly interact with agency staff, and creating several Facebook, Twitter, and Google+ posts.

A trending Twitter campaign called “Hidden Cash” involves strangers hiding sums of money in various towns across the United States and tweeting a photo of the hiding location. Members of the public are then tasked with finding the hidden money. In June, FWC played off the popularity of this idea by creating its own “Hidden T-shirt” Twitter campaign, hiding lionfish T-shirts in various cities across Florida and tweeting about them until they were found by members of the public.

Educating the Public - Report Florida Lionfish App

- Unveiled May 28 during live Twitter chat
- Downloaded by over 2,500 people
- Data submitted by over 300 people
- First 250 users received T-shirts
- Several updates implemented since release including:
 - Interactive map
 - Ability to post on social media
 - Additional data fields
 - Data sharing with USGS



Another valuable tool developed by FWC to educate the public and promote lionfish outreach is the Report Florida Lionfish app. This is an interactive smart phone app for Apple and Android products that allows users to submit lionfish data. It was unveiled during a live Twitter chat on May 28th, and since then the app has been downloaded by more than 2,500 people and more than 300 people have successfully submitted their data via the app or a form on the FWC website.

As an incentive, the first 250 people to successfully use the app to submit their data received a Lionfish Control Team T-shirt with a logo that comes to life with the assistance of a smart phone.

The app is continuing to grow and was recently updated to include an interactive map, available via the app and the FWC website, that can pinpoint artificial reef sites, lionfish sightings, removals, and more. This data will aid divers in determining which coordinates to visit based on numbers of lionfish, relative location, and time of last visit. Several other features were updated based on user comments that make the app easier to use including the addition of several new fields for data entry such as a largest and smallest lionfish caught entry field.

Data is shared with the US Geological Survey, which keeps a database of all lionfish reports throughout the invaded range.

Educating the Public – Evaluating Outreach Efforts

In the works

- **Cornell University**
 - Evaluate message effectiveness
 - Increase message potential
- **University of Florida**
 - Compare pre- and post-campaign public awareness and understanding of lionfish issue
 - Determine effectiveness of FWC outreach efforts



FWC is working with researchers at Cornell University and the University of Florida on two projects to give us a better understanding about lionfish messaging and awareness and assess the efficacy of our efforts as we strive to continually improve our outreach.

Cornell University is conducting research on lionfish messaging. The purpose of this research is to evaluate the effectiveness of the current messaging, determine the most effective messaging when attempting to avoid and/or manage negative interactions, and to improve the effectiveness of those messages. Cornell is also conducting similar research on coyotes, another type of conflict wildlife.

University of Florida researchers are working to determine what the current level of awareness is on the lionfish issue and will conduct a second survey late next year to determine if outreach efforts have successfully generated increased awareness as well as inspired people to action.

Involving the Public and Stakeholders – Partnerships

Goal: Encourage statewide public involvement in a long-term lionfish control initiative

Accomplished

- Lionfish Summit
 - October 2013
 - More than 100 stakeholders, researchers, and educators attended
 - Generated ideas and suggestions for lionfish control
 - Many have already been implemented by FWC



FWC organized and hosted a Lionfish Summit in October of 2013 that was attended by 127 people. The goal of this summit was to develop a collaborative framework for partnering with the public and stakeholders on future lionfish management that includes identification of research priorities, management actions and outreach initiatives. In order to accomplish this goal, researchers, managers and marine resource user groups involved in lionfish control activities were invited to provide oral and poster presentations at the Summit in an effort to inform participants of the work being done in Florida and elsewhere on lionfish. After these presentations, participants were asked to review and provide comment on the desired future conditions for lionfish in Florida. FWC also sought and received participant input on needs for lionfish research and management actions to support the desired future conditions through a series of facilitated discussions. Participants generated potential actions in a series of sessions that were ranked by stakeholders as to their relative importance. These actions were categorized as research, policy and regulations, control strategies, education and outreach, and other actions. Since the Lionfish Summit, FWC has implemented many ideas for lionfish control and outreach that came from the event, including allowing divers using rebreathers to harvest lionfish, creating a permit system to allow divers to spear and remove lionfish in areas where spearing is not allowed, eliminating the importation of live lionfish, and developing a formal lionfish management plan. Other top suggestions made at the Summit include trap research and development as well as identifying sites for targeted removal efforts.



As a result of the Lionfish Summit and other efforts, FWC is proud to partner with these groups in addressing lionfish control and management.

Involving the Public and Stakeholders – Partnerships cont.

Goal: Encourage statewide involvement in a long-term lionfish control initiative

Accomplished and ongoing

- Regional meetings with stakeholders, NGO's, and other agencies to discuss control plans and outreach
 - Panama City and South Florida

In the works

- Supporting innovative lionfish harvest methods and research



To further involve the public and stakeholders in the process, FWC set up regional meetings to prioritize its efforts. In August, staff met with stakeholders in the panhandle that are involved in lionfish control to review suggestions for lionfish outreach. FWC and meeting participants developed priorities for FWC action that included attending public events, conducting lionfish workshops, and developing the Reef Guardians program (discussed later in this presentation). Feedback from the group was positive and encouraging. An additional meeting was held in Escambia County in November, consisting of county representatives, extension agents from Florida Sea Grant, local lionfish hunters, and related organizations to discuss the status of lionfish in the region. FWC gave a presentation on outreach and education progress to date as well as future plans for the FWC Lionfish Program. Similar meetings were held in South Florida.

An additional goal identified at the 2013 Lionfish Summit was the need to develop new ways to harvest lionfish. FWC has committed to supporting innovative methods for lionfish harvest including trap research. Through our Special Activity License, we have projects under development to potentially meet these needs.

Involving the Public and Stakeholders Long Term – Reef Guardians™ Program

- Similar to “Adopt-A-Highway” program
- Divers pledge to conduct lionfish removals at local reefs of their choice
 - Develop a map of reef sites
- Participants recognized for their efforts



To promote statewide public involvement in a long-term lionfish control initiative and encourage the use of lionfish reporting systems to coordinate efforts, FWC is unveiling the Reef Guardians™ lionfish control program. This initiative is comparable to the Adopt-A-Highway Program offered by the Florida Department of Transportation where volunteers commit to litter removal from their section of the highway. Similarly, participants in the Reef Guardians™ program would pledge to protect their local reefs against the lionfish invasion and conduct lionfish removals at regularly scheduled intervals on reefs of their choice. Lionfish removal events would be reported to the FWC Report Florida Lionfish app or on the FWC website to aid in the efficiency of targeted removals. Reef Guardians™ participants will be recognized for their efforts with plaques, prizes, and recognition on social media.

Involving the Public and Stakeholders – Lionfish Awareness Event 2015

- Hosted by FWC and partners
- Spring 2015
- Pensacola, Florida
- Held in conjunction with a statewide lionfish derby
- Showcase of:
 - Research
 - Family-friendly activities
 - Live music
 - Celebrity chef lionfish tastings
 - Sign-ups for Reef Guardians™ program
 - Awards



The Reef Guardians™ program will kick-off with a lionfish awareness event in the spring of 2015 in Pensacola with regional satellite events throughout the state including the Keys. This event will coincide with a statewide lionfish derby. FWC will serve as host in partnership with the Guy Harvey Ocean Foundation. The weekend-long campaign will be a fun filled activity to encourage public involvement in lionfish control and will include family activities, live music, lionfish gear giveaways, research and educational presentations, local vendors, and lionfish tastings. Divers can sign up to be a Reef Guardian at the event, and non-divers can choose to financially support dive teams.

There will be a high level, professional awards ceremony for the derby participants, with prizes provided by sponsors for the most and largest lionfish harvested. The data collected from the derby will help FWC determine the extent of lionfish in Florida's waters and beyond.

Staff anticipates announcing the launch date of the event website during the February 2015 Commission meeting.

Next Steps

Continue to implement an integrated approach for the control of lionfish by:

- Identifying additional outreach and education opportunities
- Continuing to coordinate control efforts
- Developing an FWC Lionfish Control and Action Plan
- Modifying additional regulations
- Conducting research and developing management options

Staff will return with periodic updates on lionfish control efforts



To further improve FWC's efforts toward managing Florida's lionfish problem, staff will continue to identify and implement strategies to address the lionfish issue and minimize conflict wildlife impacts. Future steps for lionfish control include developing other outreach and education programs and an FWC Lionfish Control and Action Plan. FWC will also seek to remove or modify any additional regulatory impediments to lionfish harvest and control. The agency will also continue to conduct lionfish research and develop potential management options through coordination with universities, research institutions, and stakeholders.

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

