



This document summarizes the Florida Fish and Wildlife Conservation Commission's (FWC) recent, ongoing, and planned future efforts to combat Florida's lionfish invasion, as well as a series of three draft rule amendments to decrease the likelihood of additional lionfish releases and reduce regulatory barriers to lionfish harvest. The first proposed rule would modify FWC's Diving rule (68B-4.012, Florida Administrative Code (FAC)) and Lionfish rule (68B-5.006, FAC) to create an exception allowing persons diving by means of a rebreather to harvest lionfish. Second, a new rule would be created (68B-20.004, Exception to Statewide Spearfishing Prohibitions) to allow the Executive Director or his designee to issue permits to tournaments or other approved organized events for the purposes of harvesting lionfish or other non-native invasive species using spearfishing gears in areas where spearfishing is prohibited. This rule will also be referenced in 68B-20.003, FAC. Lastly, a new rule (68-5.005, FAC) would also be created in the FWC non-native species regulations and referenced in 68B-5.006, FAC, to prohibit the importation and aquaculture of lionfish in Florida.

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## Lionfish in Florida

- Exotic invasive species
- Represent a significant threat to native species and ecosystems
- First reported near Dania Beach in 1985
- Additional reports from Florida and Bermuda in the 1990's
- Population spread rapidly after 2000
- Currently distributed throughout the U.S. Southeast coast, Bermuda, Bahamas, Caribbean, South America, and the Gulf of Mexico



Red lionfish and devil firefish, collectively known as lionfish, are exotic, invasive species native to the Indo-Pacific region. Lionfish compete with and prey upon native fish and invertebrates and therefore represent a significant threat to native species and ecosystems. The first reported sighting of lionfish in the northwest Atlantic occurred off Dania Beach, Florida, in 1985. During the 1990's, there were four more reports from South Florida, and a single report from Bermuda. After 2000, reports of lionfish rapidly increased throughout the eastern United States, Bahamas, Caribbean Sea, and the Gulf of Mexico, beginning off the Carolinas and southeast Florida and then spreading to the Bahamas and other nearby Caribbean islands. By 2009, lionfish had invaded the Florida Keys. Rapid expansion throughout Florida has subsequently occurred in the last 5 years. Lionfish currently occur along the eastern coast of the United States from Massachusetts to Florida, in Bermuda, throughout the Caribbean, and in the Gulf of Mexico.

## Outlook

- Complete eradication of lionfish is unlikely
  - Population is widespread throughout the Atlantic, Gulf of Mexico, and Caribbean
  - Lionfish found in deep water are difficult to harvest
  - Deepwater lionfish repopulate shallow reefs
- Localized removal efforts can significantly reduce densities
- Harvest by divers is currently the primary means of lionfish removal
  - Spears and hand-held nets
- Other means of removal include bycatch in other fisheries



Photo by Bob Cox



Unfortunately, it is highly unlikely that lionfish will be completely eradicated from Florida waters. The population has spread throughout the Atlantic, Gulf of Mexico, and Caribbean. In addition to their widespread distribution in the region, lionfish can also inhabit very deep water where they are extremely difficult to harvest and these deepwater lionfish are capable of repopulating the shallow water reefs. However localized harvest efforts have been shown to significantly reduce the densities of lionfish on shallow water reefs, and research has indicated that reducing densities below a threshold level can benefit individual reefs. Therefore, facilitating and encouraging localized harvest efforts can help control the populations and reduce negative impacts to Florida's marine ecosystems. Since lionfish are not commonly caught on hook-and-line, harvest by divers is currently the primary means of removal. The gears most commonly used for harvesting lionfish are spears and hand-held nets. In addition, lionfish have also been caught as bycatch by other fisheries, including in lobster traps.

## FWC Research

- Recreational lobster harvest surveys to gather information on lionfish encounters
  - Proportion of respondents observing lionfish increased from 2010-2011 then stabilized
  - Number of lobster fishermen that kill/remove lionfish increased from 2010-2013
- Recent research on mercury content of lionfish
- Study recolonization rates and species abundance and diversity after removal
- Tagging and acoustic tracking/video monitoring to observe behavior and movement
- Fishery independent trawl and camera surveys in the Gulf of Mexico
  - Identified presence in deepwater habitats



The FWC has several recent and ongoing research projects related to lionfish. Recreational spiny lobster fishermen often harvest lobsters while diving on reefs, a habitat that also holds large numbers of lionfish. Because recreational lobster fishermen are likely to encounter lionfish while diving, these divers represent a valuable data source for encounters with the species. The FWC has been conducting annual surveys of recreational lobster fishermen since 1991. Since 2010, these surveys have included questions about encounters with lionfish. The survey results indicated that the number of recreational lobster fishers that observed lionfish increased from 2010 to 2011 and then stabilized while the proportion of respondents who killed and/or removed lionfish increased every year from 2010 to 2013. In addition, a majority of survey respondents were aware of recent FWC rule changes regarding lionfish harvest. This indicates that outreach efforts have been successful in educating the public about the lionfish issue and the importance of their harvest and removal.

Because the public's interest in consuming lionfish continues to increase, a recent Fish and Wildlife Research Institute (FWRI) research project quantified mercury levels in these fish. This study found that mercury levels in the lionfish currently found off Florida's coast contained lower levels of mercury than many other popular food fishes.

The FWRI is also conducting lionfish research to learn more about the behavior of these invasive species. Ongoing studies are assessing lionfish recolonization rates following removal efforts, as well as changes in predator and prey species abundance and diversity at the study locations. Acoustic tracking and video monitoring is also being conducted to examine behavior and patterns of movement.

Finally, fishery independent trawl surveys and camera surveys of fish traps used for scientific monitoring are also being used to document the presence and spread of lionfish in Florida's Gulf of Mexico waters. This ongoing work documented the spread of lionfish through Gulf waters via spread in deepwater habitats followed by invasion of the nearshore areas where they were also documented by divers.

## Recent FWC Efforts

### Management/Rulemaking

- FWC Lionfish Team – staff from across the agency
- Waived license requirements for harvest by specific gears
- Removed the bag limit for recreational and commercial fishermen
- Removal of Collier County spearfishing ban

### Outreach/Collaboration

- Cooperating with other Gulf Coast states, REEF, Sea Grant, and other organizations
- Online and print publications
- New budget request submitted to facilitate additional outreach efforts for 2014-2015
- Non-native species roundups and pet amnesty events
- Outreach and social media
- FWC Lionfish Summit 2013



The FWC has been using a broad suite of management strategies to address the lionfish problem. Due to the continued expansion of lionfish throughout Florida's waters, the FWC Lionfish Team, formed from staff across the agency, was prompted in 2012 to explore additional management options. Beginning in 2012, the FWC also waived license requirements for the harvest of lionfish when using a hand held net, pole spear, Hawaiian sling, or any other spearing device designed and marketed for the harvest of lionfish. The purpose of this rule was to encourage divers who don't recreationally fish to participate in lionfish removal. At the same time, all recreational and commercial lionfish bag limits were eliminated by clearly stating in rule that the 100-pounds recreational limit set by Florida Statutes did not apply to lionfish. In 2013, spearfishing prohibitions in Collier County were also repealed in response to the first documented lionfish sighting in that area.

In addition to easing the burden of regulatory measures on those wanting to participate in removal efforts, the FWC has also been cooperating with other agencies and organizations, as well as other Gulf states, on lionfish removal and control efforts and combating the lionfish invasion through outreach and education efforts. To promote public awareness of the problems associated with the lionfish invasion, lionfish were featured on the cover of the January, 2013 Florida Saltwater Recreational Fishing Regulations. In addition, recent issues of the regulations magazine have included articles dedicated to informing the public about Florida's lionfish problem. The FWC also developed an educational brochure offered on MyFWC.com to educate stakeholders about the issue and how they can help. A new budget request has also been submitted to facilitate coordinated agency outreach efforts for the 2014 - 2015 fiscal year. Other outreach efforts have included booths at seafood festivals and other public events, non-native species roundups, pet amnesty events, and social media outreach and events using Twitter and Facebook, including a "Twitter chat" with staff fielding stakeholders questions and presenting facts about lionfish. Finally, in October of 2013 the lionfish team planned and hosted a Lionfish Summit.

## FWC Lionfish Summit 2013

### Purpose

- To develop a collaborative framework between scientists, managers, and stakeholders for lionfish management
- Identify research gaps
- Further encourage development of a lionfish food market

### Outcomes

- 127 attendees – wide variety of ideas
- Examine potential incentive programs
- Develop a formal lionfish management plan
- Relax area-specific spearfishing regulations
- Consider development of a directed trap areas with high densities
- Create a vehicle license tag with funds going to lionfish control
- Continue research to fill information gaps



The FWC hosted the Lionfish Summit in Cocoa Beach last fall to develop a collaborative framework between scientists, managers, and stakeholders for future strategies to address lionfish control, and identify research gaps. As part of the summit, FWC and the Wildlife Foundation of Florida also hosted a lionfish tasting event to help further develop a food market and encourage participants to view lionfish as a food fish by giving them ideas about how to prepare it.

The Summit was attended by 127 people, who provided a wide variety of ideas on how to combat the lionfish problem. Suggestions included incentive programs, the development of a formal statewide management plan for lionfish, relaxing spearfishing regulations around piers and jetties, considering the development of a directed trap fishery, and creating a vehicle license tag with funds going to lionfish control efforts. Stakeholders also identified research needs, which included research on spawning behavior, effort required for effective lionfish control, the effects of lionfish invasion on estuaries, lionfish specific baits for hook-and-line fishers, and continuing work on lionfish specific traps. In addition, participants identified the need for additional non-regulatory outreach measures, such as improved materials on social media sites.

The remainder of the presentation will focus on how staff is implementing some of these and other ideas for addressing the lionfish problem.

## Suggested Management Approach

### Regulatory Measures

- Curtail the introduction of new lionfish
- Facilitate removal and localized population control

### Non-Regulatory Strategies

- Development of a FWC Lionfish Control and Action Plan
- Provide education on the issue of lionfish and how the public can help
- Encourage stakeholder involvement and provide incentives where feasible



This presentation explores two parallel, simultaneous approaches to reducing lionfish impacts in Florida: regulatory measures and non-regulatory strategies. Regulatory measures would be used to curtail the introduction of new lionfish, facilitate the removal of existing lionfish, and encourage localized population control. Non-regulatory strategies would include the development of a FWC Lionfish Control and Action Plan, continuing to inform stakeholders about the lionfish issue, and focusing on ways that the public can get involved. The control and action plan will be developed in response to stakeholder requests for a formal management plan, but will focus on actions that can be taken by the state and/or the public to address lionfish issues. Staff is also continuing to explore appropriate, feasible opportunities for providing incentives to improve the effectiveness of FWC's lionfish management program.

## Curtail the Introduction of Lionfish

Prevent the introduction of additional lionfish into Florida waters

- Prohibit the importation of live lionfish
- Prohibit aquaculture of lionfish

*Staff is currently working with the Legislature on a bill in aid of these initiatives*



The recommended regulatory measures would begin by curtailing the opportunities for further introductions of lionfish. Current rules already prohibit the release of non-native species like lionfish into Florida's waters. However, the rules would be strengthened by prohibiting the importation of additional live lionfish and the aquaculture of lionfish. These measures would eliminate the influx of additional lionfish from the native range and prevent introductions or accidental releases of additional individuals and species potentially associated with importation and aquaculture activities. Staff has coordinated with the Florida Department of Agriculture and Consumer Services to facilitate implementation of the prohibition on aquaculture and is currently working with the Legislature on a bill that will support these initiatives.

## Curtail Introduction (continued)

### Prohibiting Live Imports

- Limit further introductions
- Prevent introduction of other lionfish species
- Allow continued live harvest/sale of Florida-caught lionfish
- Create additional demand for Florida-caught fish

### Prohibiting Aquaculture

- Prevent development of lionfish aquaculture in Florida
- Eliminate the potential for large-scale accidental aquaculture-related releases



Prohibiting import of live lionfish would limit further introductions of the two species of lionfish already found in the waters of Florida and prevent the introduction of other lionfish species, not yet found in Florida waters. This would be accomplished without preventing individuals wishing to collect live lionfish for their own personal aquaria from continuing to do so, as long as the fish were taken from the waters off Florida. Prohibiting importation of live lionfish would also mean that any lionfish sold into the aquarium trade here in Florida must be collected off Florida. This has the potential to create a higher demand in Florida for Florida-caught fish, which could drive up the price and create a greater incentive for commercial harvesters to remove them.

There are not currently any aquaculture facilities that culture lionfish. Prohibiting aquaculture now will prevent future development and eliminate the possibility that aquaculture activities could lead to a large-scale accidental release of these damaging species.

## Eliminating Regulatory Barriers – Part 1

### Allow the harvest of lionfish when diving with a rebreather

- Harvest of marine organisms while diving on a rebreather is prohibited in state waters
- Increasing number of divers using rebreathers for deep or extended dives
- Provide opportunities for additional lionfish harvest



Photo by Bob Cox



The remaining recommendations for regulatory action would be aimed at removing existing barriers to lionfish removal. Increasing numbers of divers are using rebreathers when diving in Florida's variety of marine habitats. These devices allow divers to make deeper and longer dives. In addition, rebreathers produce fewer bubbles that potentially scare fish. The harvest of marine organisms while diving on a rebreather in state waters is currently prohibited; however, the activity is legal for the harvest of many species in federal waters of the Atlantic and the Gulf of Mexico. Recreational divers who encounter lionfish while diving with a rebreather have requested an exception from the harvest prohibitions to aid in removal efforts. Allowing lionfish harvest by divers using a rebreather in state waters would provide additional opportunities for divers to remove invasive lionfish from locations not frequented by most spearfishers.

## Eliminating Regulatory Barriers – Part 2

Allow the Executive Director or his designee to issue permits to events for the use of spearing gears (in areas where spearfishing is otherwise prohibited by FWC rules) to remove lionfish or other non-native invasive species.

- Lionfish tournaments operating in areas where spearfishing is prohibited by rule
- Recently handled via an Executive Order
  - Permit would be more appropriate
- A permit facilitates removal while limiting impacts to public safety



Photo by Jason Arnold



Spearfishing prohibitions are in effect in a variety of places around the state in order to reduce user conflicts and maximize public safety. Because spearing is among the most effective strategies for harvesting lionfish, these areas can act as lionfish havens. On Sept. 14, 2013, and again on February 13, 2014, lionfish tournaments were held in Key Largo. Current rules prohibit all spearfishing in the Upper Keys and in state parks. The tournament organizer, Reef Environmental Education Foundation (REEF), requested that participants be allowed to spear lionfish during the tournament in these areas normally closed to spearing. The Florida Keys National Marine Sanctuary and John Pennekamp State Park issued permits to allow the participants to spear lionfish in park waters during the event, but FWC approval was also needed to authorize the activity in state waters.

Staff evaluated these requests and felt they represented excellent opportunities to safely facilitate lionfish removal. In the absence of a permitting rule, Executive Orders (EO) were issued to allow tournament participants to spear lionfish in these areas during the tournament. EO's are generally issued as a rapid regulatory response mechanism to address pressing matters in fishery or wildlife conservation. Issuing a permit would be a more appropriate means, rather than an EO, to allow for this type of time-limited activity carried out by relatively few members of the public during a tournament or other organized event.

Thus, as an additional means to remove regulatory barriers to lionfish harvest, the second regulatory measure being recommended would create a permit that allows event participants to use spearing gears to harvest lionfish or other approved non-native species in areas where spearfishing is otherwise restricted. The permitting system being recommended would allow the FWC to relax area-specific spearfishing regulations under specific approved circumstances while continuing to ensure safeguards on public safety remain in place.

## Ongoing Non-regulatory Strategies

- Coordination on a national level
- Outreach
  - Web pages dedicated to lionfish issues
  - Marketing programs to encourage public participation
  - FWC-designed t-shirts distributed as an incentive to participate in lionfish removal efforts
  - Sponsoring lionfish derbies
  - Attendance at seafood festivals and events
  - Development of a Lionfish Reporting App



In addition to the regulatory changes being proposed, staff continues to use a wide variety of non-regulatory and outreach strategies to combat the lionfish invasion. These strategies include coordination with other states on a national lionfish management plan. The FWC has also developed web pages dedicated to keeping the public informed on current lionfish information and issues. Marketing incentives have also been created, including the development of FWC-designed shirts for distribution to members of the public who participate in lionfish removal efforts. Other ongoing strategies include sponsoring lionfish derbies and attending other public events, including seafood festivals to spread the agency message about the importance of public involvement in the effort to control lionfish. Staff is also developing a lionfish app where the public will be able report lionfish harvest. Finally, staff is continuing to identify and implement additional measures to help combat the spread of lionfish and problems associated with the lionfish invasion.

## Next Steps

- Development of an FWC Lionfish Control and Action Plan
- Pursue a grant to research additional incentive programs
- Continue coordinating with Gulf Coast states on the development of a national management plan
- Identify additional opportunities to remove regulatory impediments to lionfish control efforts
- Continue conducting lionfish research
- Coordinate with universities, other research institutions, and stakeholders to identify potential management options



Photo by Carol Cox



To further improve FWC's efforts toward managing Florida's lionfish problem, staff plans to continue to identify and implement strategies to address the lionfish issue. Future planned steps include the development of a FWC Lionfish Control and Action Plan. This plan will be developed in response to stakeholder requests for a formal management plan, but will focus on actions that can be taken by the state and/or the public to address lionfish control. In addition, the FWC's Exotic Species section is currently pursuing a grant to study additional incentive programs that could be used to encourage public involvement in lionfish removal. The FWC will also continue to coordinate with the Gulf Coast states on the development of a national management plan for lionfish, and staff will continue to identify regulatory impediments to lionfish harvest and control that can be removed. The agency will also continue to conduct lionfish research, and additional potential management options will be identified through coordination with universities, research institutions, and stakeholders.

## Proposed Draft Rules

### 68-5.005 Lionfish (NEW)

- *Prohibit the importation of live lionfish and the aquaculture of lionfish in Florida*

### 68B-4.012 Diving: Powerheads and Rebreathers, Use to Harvest Fish in State Waters Prohibited; Definition; Spearfishing Marine Species in Fresh Water Prohibited

- *Allow divers using rebreathers to harvest lionfish*

### 68B-5.006 Lionfish

- *Modify language to specifically allow divers using rebreathers to harvest lionfish and reference rule 68B-4.012*
- *Reference new rules in 68-5 prohibiting importation and aquaculture*



In order to support the discussed non-regulatory strategies by removing regulatory barriers and preventing the introduction of additional lionfish, the proposed draft rules would create rule 68-5.005, FAC (Lionfish) in the Non-Native Species chapter of FWC rules to prohibit the importation of live lionfish and to prohibit the aquaculture of lionfish in Florida. The proposed rule changes would also modify rule 68B-4.012, FAC (Diving: Powerheads and Rebreathers, Use to Harvest Fish in State Waters Prohibited; Definition; Spearfishing Marine Species in Fresh Water Prohibited) to create an exception to the prohibition on harvesting marine organisms while diving with a rebreather for the harvest of lionfish. Rule 68B-5.006, FAC (Lionfish) would also be modified to allow divers operating with a rebreather to harvest lionfish, and reference the exception in rule 68B-4.012, FAC, described above. The rule would also be modified to reference the new rules in 68-5, which prohibit the importation and aquaculture of live lionfish.

## Proposed Draft Rules - Spearfishing

### 68B-20.004 Exception to Statewide Spearfishing Prohibitions (NEW)

- *Allow the Executive Director or his designee to issue permits to events for the use of spearing gears (in areas where spearfishing is otherwise prohibited by FWC rules) to remove lionfish or other non-native invasive species.*

### 68B-20.003 Spearfishing, Statewide Regulation; Prohibition Against Powerheads, Bangsticks, and Rebreathers; Repeal of Certain Special Acts

- *Create a reference to the new rule that provides an exception to statewide spearfishing prohibitions*



Photo by Bob Cox



The proposed draft rules would also create 68B-20.004, FAC (Exception to Statewide Spearfishing Prohibitions) to allow the Executive Director or his designee to issue permits to authorized events to allow the harvest lionfish and other non-native invasive species by spearfishing in areas where spearfishing is prohibited. In addition, 68B-20.003, FAC (Spearfishing, Statewide Regulation; Prohibition Against Powerheads, Bangsticks, and Rebreathers; Repeal of Certain Special Acts) would be modified to create a reference to the new rule providing an exception to the statewide spearfishing prohibitions.

## Staff Recommendation

### Approve the proposed draft rules

- Prohibit the importation of live lionfish and lionfish aquaculture
- Allow persons diving by means of a rebreather to harvest and possess lionfish
- Allow the Executive Director or his designee to issue permits to events for the use of spearing gears (in areas where spearfishing is otherwise prohibited by FWC rules) to remove lionfish or other non-native invasive species.

Direct staff to continue to work with our partners and stakeholders to find ways for FWC to encourage and facilitate lionfish control

*If approved and directed, return for final public hearing at June 2014 Commission meeting*



Staff recommends approving the proposed draft rules that prohibit the importation of live lionfish and the development of lionfish aquaculture in Florida, allow persons diving by means of a rebreather to harvest and possess lionfish, and allow the Executive Director to issue permits to events in order to allow the use of spearfishing gears in areas where the activity is prohibited to remove lionfish or other non-native invasive species.

Staff also recommends the Commission direct staff to continue to work with partners and stakeholders to find additional ways to encourage and facilitate lionfish control and removal.

If approved and directed, staff will return for a final public hearing in June.

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



## Cooperation with Parks

- Florida Department of Environmental Protection (FDEP) and the National Park Service (NPS) have regulations specific to parks
- Staff has coordinated with FDEP, NPS, and the Florida Keys National Marine Sanctuary on the development of the proposed rules
  - Park permits would still be required in addition to the Saltwater Harvest Exception Permit when harvesting from these areas



In addition to FWC rules, the Florida Department of Environment Protection (FDEP) and the National Park Service (NPS) also have rules regulating the harvest of marine organisms within the boundaries of their parks. Staff has coordinated with the FDEP, NPS, and the Florida Keys National Marine Sanctuary on the development of the proposed rules. If approved, staff would work with permit applicants and the entities above to make sure permit holders operating within the boundaries of a state or federal park also receive any required permits from the relevant parks before harvesting marine organisms in those locations.