

# 2018 Lionfish Summit

## Executive Summary



**October 2-4, 2018**

**Cocoa Beach, Florida**

Hosted by the Florida Fish and Wildlife  
Conservation Commission

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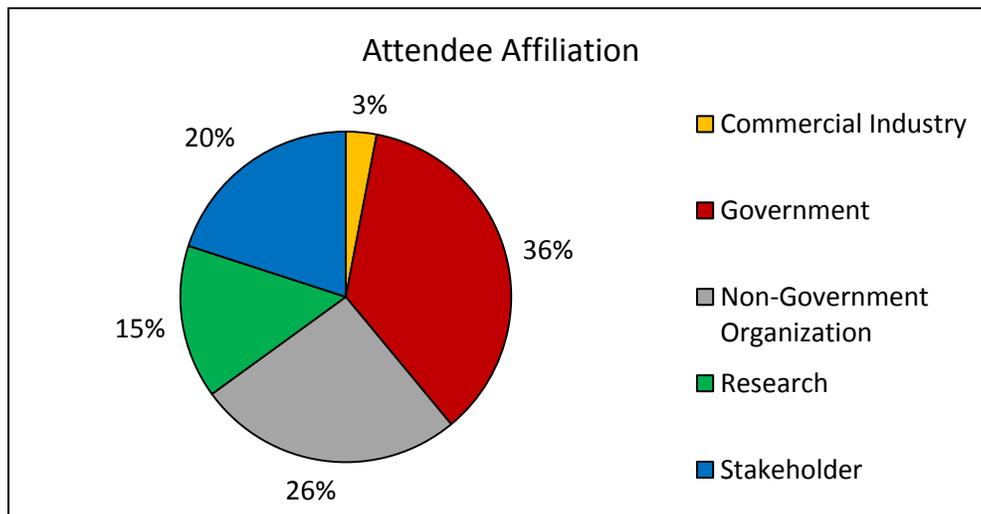
## Media and Resources

- For a copy of the Complete Lionfish Summit Report, contact [Lionfish@MyFWC.com](mailto:Lionfish@MyFWC.com).
- View photos in the [Lionfish Summit Flickr album](#).
- Live video footage broadcast by the Florida Channel:
  - [10/02/18 Florida Fish and Wildlife Conservation Commission Lionfish Summit](#)
  - [10/03/18 Florida Fish and Wildlife Conservation Commission Lionfish Summit Part 1](#)
  - [10/03/18 Florida Fish and Wildlife Conservation Commission Lionfish Summit Part 2](#)
- Video recordings of the oral presentations are available upon request by contacting [Lionfish@MyFWC.com](mailto:Lionfish@MyFWC.com).
- Visit [MyFWC.com/Lionfish](http://MyFWC.com/Lionfish) or [FWCReefRangers.com](http://FWCReefRangers.com) for agency information and lionfish resources.
- Additional questions? Contact the Division of Marine Fisheries Management at 850-487-0554.

## Introduction

The Florida Fish and Wildlife Conservation Commission (FWC) hosted the second Lionfish Summit at the Hilton Oceanfront in Cocoa Beach, Florida on October 2-4, 2018. The goal of the 2018 Lionfish Summit was to assess the efficacy of current research, management, control, and outreach efforts; prioritize areas for future lionfish control; and improve collaboration among multiple agencies and geographic locations. The event contributes to the agency invasive lionfish mission statement: the FWC will minimize the adverse impacts of lionfish in Florida through prevention, detection, and control by applying agency resources; providing leadership through guidance, planning, and coordination; and empowering stakeholders and partners.

The Summit was facilitated by Dr. James Perran Ross from Rocky Point Consulting. Dr. Ross' expertise in facilitation, strategic development, and conflict resolution on wildlife management topics, conservation planning and policy was vital in the execution of a successful event. The Summit was attended by 121 people and participants were primarily affiliated with one of the following categories: commercial industry, government, non-government organization, research, or unaffiliated stakeholder (Figure A). The Summit featured a total of 36 presentations, including 22 oral presentations and 14 poster presentations. Invited oral and poster presentations were categorized into one of three themes: Policy and Regulation, Control Efforts/Research and Monitoring, or Outreach and Education. The presentations served to inform participants of the current efforts throughout Florida and the invaded region.



**Figure A.** Affiliations of the 121 people that attended the 2018 Lionfish Summit.

Following the welcome address by Jim Estes (FWC) and the keynote presentation by William Patterson (University of Florida (UF)), the Summit proceeded with oral presentations and panel discussions for each of the three themes. Poster presentations were featured during the Lionfish Social held the first evening. The final day consisted of three independently-facilitated discussion groups for each theme of the Summit, with stakeholders assigned to a group based on their interests and expertise. Each group was presented with two questions to guide the discussion and tasked to develop and prioritize potential action items for each. The following report represents an Executive Summary of the 2018 Lionfish Summit and its outcomes.

## **Theme I: Policy and Regulations**

The policy and regulations theme reviewed processes and management actions implemented by state and federal agencies to address the lionfish invasion and mitigate their impacts on native species and habitats. Oral presentations were given by Kali Spurgin (FWC), Dr. Stephen Gittings (NOAA), and Kelli O'Donnell (NOAA). Panel members included Heather Blough (NOAA), Daniel Ellinor (FWC), Dr. Stephen Gittings, and Kelli O'Donnell.

State and federal agencies have sought to remove potential barriers for lionfish harvest by adopting policies that encourage involvement and make it easier for stakeholders to understand and contribute to removal efforts. At the state level, the FWC's goal to encourage removal efforts was addressed by removing the requirement to possess a recreational saltwater fishing license when harvesting lionfish with approved or lionfish-specific gear, removing the recreational default bag limit, and allowing scuba divers using a rebreather apparatus to harvest lionfish. The FWC has also implemented various incentive programs that include prizes and resource-based incentives to encourage and increase lionfish removals. To supplement these changes and prevent additional release of lionfish, state regulations have been put into effect to prohibit the importation, breeding, and possession of lionfish eggs or larvae. While the harvest of lionfish and many other species remain restricted in ecologically sensitive or protected areas and areas where harvest presents a public safety concern (i.e. near fishing piers and jetties), the FWC has created a permitting system to allow for harvest of invasive lionfish in these areas within certain limitations. The FWC encourages stakeholders to provide feedback on current regulations and ways in which the state can be more effective at managing efforts and communicating information regarding invasive species to the public.

At the federal level, the National Oceanographic and Atmospheric Administration (NOAA), in partnership with the regional fishery management councils, oversees the management of marine resources from state waters to 200 nautical miles offshore. NOAA Fisheries encourages lionfish removal, but in order to protect native species and critical habitat areas, innovative harvest methods and gear testing conducted in federal waters require a federal permit as well as review and approval by the applicable Fishery Management Council. Permits include either an Exempted Fishing Permit or a Letter of Acknowledgement, which are issued to organizations and researchers to test innovative gear for lionfish harvest, such as modified lobster traps. The majority of deep-water habitat existing beyond recreational diving depths (>130') are under federal waters jurisdiction, therefore the partnership between state and federal agencies is crucial for the development and successful implementation of innovative harvest methods across depths and management boundaries.

The 2018 Summit provided an opportunity for agencies to share updates on regulatory and policy changes implemented since the 2013 Summit. The facilitated breakout sessions afforded stakeholders an opportunity to voice their opinions related to current regulations and potential regulatory changes in the future.

### **Discussion Group Results**

The Policy and Regulations discussion group consisted of 6 participants and included researchers, resource managers, and stakeholders. Each discussion group had a facilitator and notetaker.

The group was presented with two topics for discussion:

1. *What current state and federal policies and regulations are effectively encouraging or discouraging lionfish removal?*
2. *Identify modifications to state and/or federal policies and regulations that will effectively advance lionfish removal and control.*

The information below consists of all recorded recommendations and action items identified by stakeholders for current and future lionfish policy and regulation initiatives:

**Session 1:** What current state and federal policies and regulations are effectively encouraging or discouraging lionfish removal?

**Effective efforts:**

- State incentive programs (i.e. Lionfish Challenge).
- Removal of bag limit, recreational license requirement, season, and size restriction.
- Use of federal permits for removals in otherwise prohibited areas.
- Tournament support and media promotion of these events.
- Staff assistance in navigating permit process without the need for legal counsel.
- Adaptive management strategy of the state’s rules and regulations for lionfish.

**Ineffective efforts and identified areas of improvement:**

- Increase outreach on the permitting process for removals at the state and federal level.
- Consensus on the definitions of federal regulations.
- Improve communication and flexibility between state and federal agencies on managing lionfish harvest and research permits.
- Simplify the rules for harvesting in sanctuaries.
- Expedite the federal permitting process.

**Session 2:** Identify modifications to state and/or federal policies and regulations that will effectively advance lionfish removal and control.

Six people voted. Total number of stakeholder votes in parentheses and ranked from highest to lowest priority based on results.

1. FWC staff provide updates about lionfish at the Diving Equipment and Marketing Association’s annual conference. (6)
2. Communicate with and involve the hotel and restaurant association in lionfish events. (6)
3. Target workshops for fishermen to learn about commercially harvesting lionfish. (6)
4. Increase stakeholder involvement in regional council meetings to inform councils on lionfish issues. (6)
5. Create a joint lionfish task force with state and federal agency staff to address expediting rule and permitting issues. (5)
6. Identify special circumstances that qualify for emergency response exemptions. (5)
7. Open communication between legal counsels to create consensus. (5)
8. Mail flyers to commercial and recreational fishermen regarding lionfish licensing and permitting options. (5)

9. Receive direction from agency leadership to address lionfish issues as a priority with more state agencies inviting involvement of federal agencies. (5)
10. Invite regional fisheries management councils to attend lionfish summits and workshops. (5)
11. Creation of a regular allowance or permit for divers to remove lionfish from federal and state restricted areas. (5)
12. Increase outreach to lionfish harvesters concerning commercial fishing rules such as trip ticket submissions and product handling safety. (5)
13. Exclude lionfish from normal permitting process for nonnative species emergency response. (4)
14. Target outreach to dive shops, Saltwater Products License applicants, new and renewing license holders. (3)
15. Provide financial incentives for technology advances. (1)
16. Provide workshops to clarify legal definitions and consolidation of state and federal regulations. (1)
17. Implement a state rule to require a diver to report and/or remove a nonnative species, if observed. (0)

## Theme II: Control Efforts/Research and Monitoring

The control efforts/research and monitoring theme encompassed a very broad range of topics, including various programs and initiatives to control lionfish populations, current research advancements, the efficiency of monitoring and removal efforts, and identifying priority areas to direct future work. Oral presentations were given by David Chagaris (UF), Michelle Johnston (NOAA), Christopher Stallings (University of South Florida), Kristen Dahl (UF), Holden Harris (UF), Alli Candelmo (Reef Environmental Education Foundation), Eric Johnson (University of North Florida), Amanda Tyler-Jedlund (FWC), Kate Galloway (Florida Atlantic University), and Mohammad Shamim Ahasan (UF). Panel members included Lad Akins (Blue Earth Conservation), David Chagaris, Eric Johnson, William Patterson (UF), Christopher Stallings, and Hanna Tillotson (FWC).

Throughout the last decade, an increasing amount of research has focused on the impacts of the invasive lionfish on native species and habitats and the efficiency of removal and control efforts. Lionfish will likely never be eradicated from the western Atlantic Ocean, Caribbean Sea and Gulf of Mexico. Highly-focused research, monitoring, and control efforts are a top priority to implement effective lionfish control strategies and minimize adverse impacts. Due to limited resources such as funding, skilled lionfish harvesters, and the ability of lionfish to inhabit depths beyond the range of the current most-effective removal strategies (i.e. divers using spearfishing equipment), there is an increasing need to identify critical habitats for priority removal efforts and to develop more-efficient removal methods. Funding from private organizations and state and federal governments have allowed for an increase in the quality and quantity of research projects on invasive lionfish throughout their invaded range, however gaps remain in the research that can be applied to improve management strategies.

### Discussion Group Results

The Control Efforts/Research and Monitoring discussion group consisted of 30 participants and included researchers, commercial harvesters, non-profit and private organizations, local and state resource managers, dive shop owners, concerned stakeholders and industry professionals. Each discussion group had a facilitator and notetaker.

The group was presented with two topics for discussion:

1. *Identify current control efforts that are effectively encouraging or discouraging lionfish removal; and identify current research initiatives that are effectively advancing lionfish control efforts.*
2. *Identify and develop control programs and/or research projects that will effectively advance lionfish removal and control.*

Participants listed action items pertaining to the two topics (above) for the control efforts theme as well as for the research and monitoring theme and then categorized the action item as one of the following:

- [W] = action item is **working**
- [WA] = action item is **working with adjustments**
- [F] = action item for **future** work

The information below consists of all recorded recommendations and action items identified by stakeholders for current and future lionfish control efforts and research and monitoring initiatives:

## **Control Efforts**

### **Action item is working**

1. Control efforts (and general lionfish removal culture) in the Florida Keys.

### **Action item is working with adjustments**

1. Control efforts focused regionally and by water depth.
2. Develop comprehensive report of statewide control efforts, to include the following:
  - a. Database of participants.
  - b. Standardize control efforts and data collection.
  - c. Expand use of existing Gulf and Caribbean Fisheries Institute (GCFI) Portal for public reporting.
3. FWC Reef Rangers "Adopt-A-Reef" Program
  - a. Improve access of reefs and maps for harvesters to direct focal removal efforts.
  - b. Validate artificial reef locations to improve accuracy.
  - c. Identify preferred habitat for lionfish populations (and include with reef information) to direct focal removal efforts.
4. Lionfish tournaments
  - a. Optimize regionally.
  - b. Conduct commercial tournaments or have an alumni division.
  - c. Increase registration fees.
  - d. Need for consistent recreational harvesters and participation.
  - e. Encourage involvement with various incentive programs during tournament.
  - f. Ensure legal commercial harvest and sale of lionfish by participants.
  - g. Increase prize or award for harvesting small lionfish.
  - h. Provide training for recreational harvesters becoming involved in commercial market.
5. Commercial market
  - a. Increase price per pound of lionfish for wholesale market (provide a state subsidy).
  - b. Encourage the removal of all sizes of lionfish by creating a state subsidy.
  - c. Provide commercial market education in various outreach initiatives (for example: Saltwater Angler magazine and publications).
6. FWC Lionfish Harvest Charter Program
  - a. Increase program advertisement.
  - b. Increase vendor qualifications.
  - c. Return to initial goal of encouraging new divers to become lionfish harvesters.

### **Action item for future work**

1. Commercial market
  - a. Lionfish harvester training – use a mentor or team approach.
  - b. Develop new markets.
  - c. Promote use of small lionfish.
2. Identify incentives for different demographics and target those stakeholder groups efficiently.

## **Research and Monitoring**

**Action item is working**

1. Ongoing research on the effects of lionfish on native species and habitats throughout invaded range.

**Action item is working with adjustments**

1. Research and development of innovative harvest gear testing and lionfish traps.
2. Efficacy of human control efforts.
3. Accuracy of available data of population estimates on artificial reef habitats.
4. Maintain accurate information on state and federal permitting and gear-testing process on websites and in media.

**Action item for future work**

1. Investigate regional differences in lionfish abundance. Is this due to natural variations or control efforts?
2. Investigate potential control mechanisms (human and biological); invest in cause and effect research.
3. Projected lionfish populations and effects in future models.
4. Improve accuracy and reporting of commercial lionfish sales and trip ticket reporting system.
5. Lionfish-specific fish-aggregation devices (FAD).
6. Identify research gaps and support research to guide control efforts:
  - a. Reproductive behavior.
  - b. Source and sink populations.
  - c. Life history strategies; spawning behavior (focal habitat and movement strategies).
  - d. Ecosystem and population model validation.
  - e. Net ecological effects of harvest and potential increased productivity.
  - f. Data collection at tournaments (standardize across organizations and regions).
  - g. Investigate economic risk assessments and develop impact statements.

## Theme III: Outreach and Education

The outreach and education theme discussed the various methods that are used to ensure accurate, consistent, and updated messaging within schools, the commercial seafood industry, and recreational diving community. Outreach and educational tools are key components to obtain and maintain control of an invasive species because it is the mechanism by which the public is inspired to act. The Summit featured seven presentations by representatives from research, private, and non-profit organizations, the seafood industry, and government agencies. The presentations showcased current efforts, successes, and future strategies for outreach and education initiatives throughout the invaded range. Presentations were given by David Ventura (Whole Foods Market), Brady Hale (Texas Lionfish Control Unit), Kendra Cope (Indian River County), LeRoy Creswell (Florida Sea Grant), Stacy Frank and Jim Hart (Lionfish University), Jeff Eble (University of West Florida), and Gretchen Goodbody-Gringley (Bermuda Institute of Ocean Sciences). Panel members included Kendra Cope, Gretchen Goodbody-Gringley, Brady Hale, Rick O'Connor (Florida Sea Grant), Alan Peirce (FWC), and David Ventura.

### Discussion Group Results

The Outreach and Education discussion group consisted of 14 participants and included local and state resource managers, non-profit organizations, dive shop owners, marine science researchers, educators, a screenwriter, and concerned stakeholders. Each discussion group had a facilitator and notetaker.

The group was presented with two topics for discussion:

1. *Identify current outreach and educational initiatives that effectively advance lionfish awareness and stakeholder engagement.*
2. *Identify and develop (current/future) outreach and educational programs that will effectively advance lionfish awareness and stakeholder engagement.*

The information below consists of all recorded recommendations and results of stakeholder prioritization for current and future lionfish outreach and education initiatives:

**Session 1:** Identify *current* outreach and educational initiatives that effectively advance lionfish awareness and stakeholder engagement.

- Continue to grow and improve on Florida's Lionfish Removal and Awareness Day by expanding efforts to large events across Florida and other Atlantic and Gulf states.
- Involve K-12, undergraduate and graduate students in lionfish tournaments.
- Expand participation in the Harvest Charter Reimbursement Program through outreach and regionalization.
- The Lionfish Challenge has been a successful incentive program, but may be nearing its maximum, effective potential.
- Increase and improve the communication process including increased advertising efforts, expanding social media, coupling research and outreach initiatives, and using local businesses/organizations across the state.
- Increased lionfish tournament duration and/or geographic locations to account for marine conditions and weather, which may limit diving activities.

- Expand participation in Lionfish Educational Exhibit Program through outreach and addition of incentives.
- Expand and implement “Lionfish: Classroom Invasion!” program on a larger scale.
- Use technology to amplify reach of current programs and maximize their effects.
- Continue to provide Dive in Day (DEMA) outreach and networking opportunities for local organizations.
- Facilitate pairing of “Become the Predator” workshops with themed dive clubs.
- Identify a clear message and specific calls to action for each FWC Lionfish program.
- Incorporate more interactive activities at “Be the Predator!” booth: such as a live lionfish or videos of live lionfish.
- Use “Be the Predator” as a brand and incorporate into all outreach efforts and programs.

**Session 2:** Identify and develop *future* outreach and educational programs that will effectively advance lionfish awareness and stakeholder engagement (13 total people voted, each participant was able to cast 2 votes). Total number of stakeholder votes in parentheses and ranked from highest to lowest priority based on results.

1. Host a National Lionfish Summit that includes the Caribbean. (8)
2. Create lionfish tech-based children’s games such as mobile apps or video games. (6)
3. Attend the Florida Science Teachers Association and Florida Marine Science Educator’s Association conferences and involve groups in outreach initiatives. (5)
4. Improve upon existing and create additional lionfish Public Service Announcements. (3)
5. Create generic educational materials for local businesses and organizations to use on their website and in stores. (3)
6. Create a webpage on FWC website with all lionfish outreach materials and list of available grants for invasive species. (2)
7. Create a lionfish documentary to be used in schools, at outreach events, and public forums.
8. Work with industry experts to create a lionfish reality series with a catchy title, such as “Invader Haters” to increase outreach.
9. Implement lionfish educational activities across Florida that coincide with the National Invasive Species Awareness Week.
10. Add lionfish education to existing successful education programs, such as FWC’s “Wear It” life jacket program.
11. Create K-12 lionfish labs and/or curriculum, similar to [Ocearch](#) educational materials.
12. Include information for locations to harvest lionfish and links to purchase lionfish gear from FWC’s website (for example: to [lionfish.co](#) website).
13. Expand the use of technology to include lionfish apps and video games to target younger stakeholders.

## iClicker Survey Results

During the final day of the 2018 Lionfish Summit, FWC staff gathered stakeholder input on elements related to each of the three themes using an electronic response program, the iClicker. Participants had the opportunity to provide feedback on priority issues while remaining anonymous through the use of an electronic remote system. In addition to creating an environment for participants to give their unbiased opinion, the iClicker program allows the FWC to more efficiently track and analyze stakeholder feedback.

Fifty-one attendees participated in the iClicker session. Participants were asked to respond to 28 multiple choice questions. The iClicker questions were designed to gather valuable information such as demographics of attendees as well as feedback on the status of policy and regulation, perceived efficacy of current FWC programs, identify focus areas for future research and control efforts, and to determine the best method for marketing and increasing awareness.

Participants were first prompted to rank their level of agreement or disagreement with statements on the efficacy of current state and federal regulations in supporting removal efforts. Sixty-seven percent of attendees felt that adjustments should be made to the state's no-spearfishing regulations to create exemptions for non-native removals. Over 50% of respondents favored modifications to the commercial harvest, regulations, and licensing requirements, and 80% of participants indicated a high interest in clarifying the state and federal permit processes for the research and development of innovative harvest methods.

Participants were asked to evaluate FWC's control programs by ranking the program's effectiveness based on the following criteria: number of lionfish removed, diver involvement, and expenditure of state resources. The following percentage of participants rated each program as effective: Lionfish Challenge (68%), FWC-sponsored "Become the Predator" excursions (50%), Tournament Assistance Program (81%), tagging component of the Lionfish Challenge (35%), Harvest Charter Reimbursement Program (32%), and Reef Rangers "adopt-a-reef" program (34%).

Participants were asked to evaluate FWC's outreach and educational programs by ranking their effectiveness based on the following criteria: increasing public awareness, stakeholder engagement, and expenditure of state resources. The following percentage of participants rated each program as effective: Lionfish Educational Exhibit Program (70%), Classroom Invasion program (83%), "Be the Predator" outreach and education booth (82%), and "Become the Predator" workshops (75%).

Participants were asked to identify research areas that are of highest priority for further investigation. Innovative harvest methods were identified as a high priority from 80% of participants, followed by ecological impacts (64%), economic impacts (52%), reproduction (48%), and population estimates (41%).

Lastly, 70% of respondents selected social media as the most effective advertising medium for increasing awareness about lionfish.

## Evaluations

Lionfish Summit participants were asked to complete an evaluation following the event. Of the 121 participants, 50 evaluations were submitted. The following discussion summarizes the feedback received.

Eighty-eight percent of participants believed that the Eventbrite Summit registration and event communication was effective. Most participants (97%) believed that the Summit was well facilitated and 92% felt that the format and length of the Summit was appropriate.

Ninety percent of participants felt that the panel discussions were valuable components of the event, and 94% indicated a high satisfaction with the networking opportunities that the event provided. An overwhelming 98% of participants believed that the Summit was a productive use of their time, and 83% of participants indicated that the event increased their knowledge about a subject matter that would be applicable to their future work.

Participants indicated that the panel discussions were a valuable source of information and generation of ideas; and the presence of state and federal agencies helped stakeholders clarify protocols on commercial lionfish harvest and lionfish trap testing. Participants indicated that their future actions include increasing collaboration, streamlining research strategies, and updating outreach materials. Suggestions for future events include refining the structure of discussion groups to enhance productivity; inviting additional stakeholders from the commercial fishing, outreach, and education industries as well as from other countries throughout the invaded range; and increasing the frequency of the Lionfish Summit to facilitate communication and collaboration between stakeholders.

## Future Directions

FWC Lionfish staff will consider and evaluate all recommendations made during the 2018 Lionfish Summit. Participants were provided with multiple opportunities to provide input, such as through paper evaluations, electronic response programs (iClicker), Q&A sessions following presentations, and facilitated discussions. A summary and analysis of the iClicker survey results and evaluations can be found in Appendices C and D, respectively.

In regard to policy and regulation, FWC Lionfish staff will work to improve clarity and navigation of current state and federal regulations related to recreational and commercial lionfish harvest, permit requirements for removal of lionfish in prohibited or ecologically-sensitive areas, and the use of innovative removal methods. FWC will also increase outreach to inform stakeholders of current regulations, how to navigate the commercial market, and the permit process for the testing and use of innovative harvest methods. Lastly, staff will continue to explore potential modifications to current regulations to facilitate lionfish removal from areas where spearfishing is otherwise prohibited and encourage the growth of commercial lionfish market.

FWC will continue to explore opportunities to support the research and development of innovative harvest methods, ecological and economic impacts, and the socio-economic risk assessment of lionfish. Support for lionfish removal efforts will continue through agency-administered programs such as the Lionfish Challenge and Lionfish Tournament Assistance Program. Staff will consider stakeholder recommendations to improve existing programs such as Reef Rangers and the Harvest Charter Reimbursement program to more efficiently remove lionfish and expend resources.

FWC staff will actively implement the recommendations to improve outreach efforts regarding the state and federal permitting process and navigating the commercial market. FWC will continue to prioritize statewide education and awareness through the “Be the Predator” travelling lionfish booth, “Become the Predator” workshops, and presentations. Staff will refine and enhance new programs such as the Lionfish: Classroom Invasion, which provides education to a younger audience, and the Lionfish Educational Exhibit Program, which ensures accurate messaging at public facilities to a broad audience. Lastly, staff will continue marketing awareness and FWC programs through social media and other innovative advertising tools.

The 2018 Lionfish Summit served as a valuable platform to exchange knowledge and share accomplishments within and beyond the lionfish industry. Controlling the lionfish invasion requires a sustained long-term effort by FWC and its dedicated partners. The primary objective of the FWC continues to be the pursuit of a combination of management, research, and outreach initiatives to achieve the desired future condition of lionfish in Florida as outlined in the agency’s Lionfish Control Plan. Building upon the success of efforts to control lionfish within the invaded range will require a continued collaboration among the FWC, partner agencies, non-governmental organizations, research entities, commercial industries, and dedicated stakeholders.