

Conehead Termite Mitigation Final Report

Project Narrative

Period of Performance - September 1, 2018 to November 30, 2019

FAIN# - AP18PPQS&T00C115

I. Introduction

The only known populations of invasive, nonnative conehead termites, *Nasutitermes corniger*, in the United States have been found in the cities of Pompano Beach and Dania Beach in Broward County, Florida. The Florida Department of Agriculture and Consumer Services (FDACS) is implementing a science-based, proven effective mitigation program, with the goal of eradication, to prevent this destructive pest termite from becoming permanently established and spreading further in the United States.

Conehead termites infest and damage a wide variety of commercial crops in their native range—the Caribbean, Central America, and South America. That damage provides an urgent warning about the destructive potential of this termite to commercial groves and crops such as sugarcane should conehead termites reach agricultural areas where this termite could survive, including Florida, Georgia, the Gulf Coast, Texas, and California.

In addition to fruit trees, landscape materials, and structures, conehead termites have infested an extensive array of Florida native plants in Broward County including gumbo limbo, live oak, red mangrove, and buttonwood trees, and Fakahatchee grass. If allowed to spread, this invasive species would thus have consequential impacts on landscapes and natural areas such as local parks, preserves, wildlife management areas, Big Cypress National Preserve, and Everglades National Park.

On September 1, 2018, FDACS executed a Cooperative Agreement with the United States Department of Agriculture, Animal and Plant Health Inspection Service for Fiscal Year 2018 funding for the Conehead Termite Mitigation Project. This report details actions taken by FDACS during the fifteen-month period of performance of the grant.

This USDA grant came at a critical time in this project, after previous mitigation efforts had suppressed the invasive conehead termite infestation from over 90 properties in two south Florida locations to a single known remaining infested, extraordinarily complex with overgrowth and vegetative debris 3.5 acre property in Pompano Beach. By the end of the grant period even that final known infestation was ‘quiet,’ meaning no live conehead termites found since June 2019. Funding from this grant advanced the eradication effort significantly, as detailed below.

II. Project Summary

- Hires of two new OPS Environmental Specialists 1 (ES 1) expanded critical survey power to check high priority properties such as green waste disposal facilities, green waste generators, and agricultural sites in Broward County.
- A total of 1,210 surveys were completed at high, medium, and low risk properties, green waste facilities, and agricultural sites.
- Five treatment events occurred at the single known remaining infested property in Pompano Beach.
- 19 outreach events were conducted to educate the public to help find possible not-yet-discovered colonies.
- Site cleanups were performed at the single heavily infested 3.5-acre property in Pompano Beach and two previously infested properties in Dania Beach. Site cleanups are critical for effective conehead



termite control in that removing dead vegetation and thick litter layers as well as trash debris provides improved access for visual surveys and IPM treatments, and eliminates termite foraging resources and harborage.

- Properties located within ¼ mile of all known previous conehead termite activity were surveyed to address potential population spread resulting from alate flight. Approximately 1,006 total properties were surveyed in Dania Beach and Pompano Beach.
- Project modifications and IPM strategies employed during site cleanups minimized risk of spread to other locations and reduced overall project costs. Retaining cut and collected vegetative debris onsite immensely reduced the risk of transporting conehead termites to new locations. Chipping cut tree branches, trunks, and roots; dead palm trunks and fronds; and Brazilian pepper stumps effectively destroyed termites infesting the vegetation, significantly reducing need for pesticide applications.
- No conehead termites have been found in Pompano Beach since June 25, 2019. No conehead termites have been found in Dania Beach since August 29, 2018. While this shows the effectiveness of the control program (from 75 known properties previously infested in Dania Beach and 13 in Pompano Beach), particularly resulting from actions funded with this grant, it does not secure eradication because young colonies take time to grow their population to the size where they begin building the visible nest carton and transportation tunnels. Continued surveys are therefore essential to monitor for emerging young colonies that could fuel a resurgence.
- All milestones established in the Cooperative Agreement Work Plan were met or exceeded.

III. Progress Achieved in Accomplishing Goals

Project Goal 1 – Enhance Detection Capabilities by Increasing the Number of Surveys Performed

During the period of performance, 1,172 surveys were performed at high, medium, and low risk properties. Surveys of 34 green waste facilities and green waste generators were completed. Three pretreatment delineation surveys were conducted, all on the same 3.5-acre property in Pompano Beach. This property is the only location where conehead termites were found during the grant’s period of performance; it was heavily infested.

Surveys Conducted During Grant Period of Performance				
Survey Type	Description	Conducted	Total Conducted	Project Milestone
High	Properties with live coneheads within past year or at high risk for resurgences	58	166	144
Medium	Previously positive but no conehead activity within past year	108		
Low	Properties located within ¼ mile of sites with previous or current conehead activity	1006	1040	800
Green Waste Facilities	Operations processing, transferring, or accepting cellulose debris for disposal	23		
Green Waste Generators	Operations generating and transporting cellulose debris	11		
Agricultural Site	Agricultural sites located within 1 mile of previously positive properties	7	All	All
	Agricultural sites located outside 1 mile of previously positive properties	8		
Pretreatment Delineation	Properties surveyed prior to treatment events to mark active areas	3	All	All
Total		1224		

Risk-Based Surveys:

During the period supported by this grant, 20 properties were listed as high risk along with 70 categorized as medium risk. High risk properties are surveyed every 4 months; medium and low risk properties are

surveyed once a year. High and medium risk properties are monitored for resurgence of conehead termites that may have survived previous treatments as well as new young colonies 'emerging' with visible tunnels /nests. Low risk properties are surveyed annually to monitor for new colonies that may have spread through alate flight.

Staff Additions:

Prior to FDACS obtaining this grant, due to staff time limitations, the only sites surveyed were high, medium, and low risk previously infested / proximate properties (i.e. only the first three categories in above Table). Surveying at the required risk-based frequency was not feasible. Addition of two OPS Environmental Specialist 1 positions supported by the grant resulted in a significant increase in the number, type, and frequency of surveys accomplished.



Conehead Termite Program team in Pompano Beach

Project Goal 2 – Minimization of Pest Spread Risk Through Surveys and Education

Surveys of green waste facilities, green waste generators, and agricultural sites in Broward County were made feasible by the staffing addition of two OPS ES1 positions.

Green Waste Facility Surveys:

Green waste is waste material containing wood or cellulose that has the potential to be infested with conehead termites including cut tree branches and vegetation waste, construction/demolition debris, landscape timbers, pallets, furniture, etc. Green waste facilities are sites that process, transfer, and/or receive green waste for final disposal including landscape vegetation disposal areas, commercial waste transfer sites, residential bulk waste drop off locations, and municipal and private landfills.

It is critical to inspect green waste facilities because the risk of transporting conehead termites via disposal of infested green waste was documented in Florida in 2016. In that case a previously-unknown population of conehead termites, proven related to the Dania Beach population through genetic analysis, was discovered infesting vegetation at a trash transfer facility in Pompano Beach that receives green waste from Dania Beach. Surveying facilities where green waste from known infested properties is transported to in southeast Florida has been a high priority for the conehead termite program but was not previously feasible due to staffing.

To initiate the green waste surveys, waste receiving facilities were located by contacting representatives from the 31 cities in Broward County to determine where the waste generated in the city is disposed. Not only was each green waste site surveyed, but properties adjacent to the facility were surveyed because conehead termites can migrate to nearby areas from transported infested waste. Time required to survey

green waste sites depended on their size. Landfills and properties adjacent to them took longest, typically many days; whereas the waste transfer stations and adjacent properties were usually completed in one day.

<i>Surveyed Green Waste Facilities During Grant Period of Performance</i>			
Facility Name	Facility Type	Location	Date Surveyed
Southern Waste Systems	Commercial Waste Transfer Station	Davie	10/10/2019
Waste Connections - Deerfield Beach Transfer Station	Commercial Waste Transfer Station	Deerfield Beach	8/5/2019
Waste Connections - Pembroke Park Transfer Station	Commercial Waste Transfer Station	Hallandale Beach	8/6/2019
Waste Management - Sun 2 C&D Recycling Facility	Commercial Waste Transfer Station	Pompano Beach	6/20/2019
Waste Management- Sun 14 C&D Recycling Facility	Commercial Waste Transfer Station	Davie	6/26/2019
Wheelabrator South Broward	Incinerator	Davie	10/11/2019
Broward County Southwest Regional Landfill	Landfill	Southwest Ranches	8/22/2019
Waste Management Monarch Hill Landfill	Landfill	Pompano Beach	8/8/2019
A & D Landscaping	Landscape Waste Disposal	Southwest Ranches	10/21/2019
Brightview Landscape Services	Landscape Waste Disposal	Dania Beach	10/3/2019
Bushel Stop	Landscape Waste Disposal	Pembroke Pines	10/16/2019
Bushel Stop	Landscape Waste Disposal	Delray Beach	11/10/2019
Bushel Stop	Landscape Waste Disposal	Lake Worth	11/10/2019
Florida Paradise Landscaping	Landscape Waste Disposal	Southwest Ranches	10/16/2019
Organically Yours Farms and Gardens	Landscape Waste Disposal	Southwest Ranches	10/21/2019
Prestige Growers	Landscape Waste Disposal	Davie	10/1/2019
Runway Growers	Landscape Waste Disposal	Ft. Lauderdale	10/3/2019
Margate Public Works	Municipal Waste Disposal	Margate	10/14/2019
Reuters Recycling	Recycling Facility	Pembroke Pines	10/17/2019
Broward County Central HHW Drop-Off Station	Residential Bulk Waste Transfer Station	Davie	6/19/2019
Broward County North HHW Drop-Off Station	Residential Bulk Waste Transfer Station	Pompano Beach	6/13/2019
Broward County South HHW Drop-Off Station	Residential Bulk Waste Transfer Station	West Park	6/19/2019
Deerfield Beach Solid Waste	Residential Bulk Waste Transfer Station	Deerfield Beach	10/10/2019

As listed in the above table, 23 green waste facilities were surveyed during the period of performance of this grant; no signs of conehead termites were found.

Green waste generators are those that collect and transport green waste for disposal including landscapers, tree trimmers, and property management companies. Green waste generators were located by driving through residential neighborhoods near previously infested areas.

Agricultural Site Surveys:

Another high priority concern for the conehead termite program was infestation risk at the numerous agricultural sites located within flight or local transport distance of previously infested properties. It was imperative that those commercial agriculture operations, particularly those growing and selling woody vegetation and trees, be inspected. Those monitoring visits were accomplished due to funding from this grant.

One of the milestones for this project was to complete surveys at agricultural sites located within ½ mile of properties that have had conehead termites on them at some point in the past. In order to further reduce the risk of agricultural sites becoming infested with conehead termites, the survey area was expanded out to one mile from previously positive sites.

To identify the agricultural sites, the FDACS Division of Plant Industry's (DPI) agriculture site permitting database was reviewed and addresses of sites meeting the one-mile criteria were obtained. Also, driving surveys were conducted in the areas to locate other sites not on the DPI database. Seven sites meeting the one-mile setback were identified.



Agricultural sites, predominantly plant nurseries, located outside the one-mile criteria were also surveyed during the grant. During green waste generator surveys, landscapers identified these sites as the disposal location for their landscaping waste.

A total of 15 agricultural sites were visited during the period of performance of the grant, 7 of those were within the one-mile criteria. During the visits, growers were educated on how to identify and where to report a conehead termite infestation and on-site vegetation was surveyed to confirm the absence of conehead termites. No conehead termites were found during the agricultural site surveys.

Project Goal 3 – Enhanced Control Program for Mitigating the Conehead Termite

Overall Program Goals for Contractual Work:

The purpose of the invasive conehead termite program's enhanced control initiative is to mitigate infestations in complex vegetation through cleanup of high-risk properties. Clearing dense overgrowth and termite food / harborage increases access for thorough surveys and treatments, depletes conehead habitat, and substantially reduces time and resources required to suppress and monitor conehead termites.

Prior to receiving this year of USDA funding, protocol regarding high risk properties centered on FDACS staff surveying for living conehead termites, locating termite tunnels and nests, and treating populations when a volunteer pest control applicator was available.

Over several years, much progress was made to suppress conehead populations, but several multi-hectare properties remained densely infested because the landscape and vegetation were exceptionally complex. Systematically finding and treating conehead termites was inefficient and difficult due to access and abundant termite resources. Employing contractual funding provided by this grant, efforts focused on improving access for inspectors and treatment rigs, and diminishing persistent termite food and harborage on these troublesome properties to eliminate (at least as of this writing) termites from the properties.

Contractual work under this grant took place on three sites in Broward County, Florida—one large (3.5 acre) property in Pompano Beach and two smaller (0.75 acres combined) properties in Dania Beach.

Site Cleanup in Pompano Beach:

Beginning in April 2019 and completed in November 2019 a multi-stage vegetation clearing operation took place at the single remaining, heavily infested property in Pompano Beach. This 3.5-acre vacant parcel borders commercial warehouses, a school bus training facility, and canals. Given the restricted access of its location, the property, owned by the Broward County School Board, had been neglected for many years. When conehead termites were first discovered at this site by FDACS in 2016, the property was impenetrable due to exceptionally dense invasive hardwood vegetation, predominantly Brazilian pepper trees.

In 2017 the conehead program, assisted by Florida's Forest Service and the Broward County Water Management Division, cleared some portions of the trees to enable preliminary surveys and treatments. However, given the complexity of the terrain (including a pond and several long, deep ditches lined by dense Brazilian pepper trees), comprehensive surveys and treatments were impossible, and large conehead termite nests persisted. Using the resources provided by this grant, nearly all remaining invasive hardwoods and the termite habitat they provided have been cut and chipped on-site, resulting in dramatic depletion of conehead termite activity.

The USDA funded contractual work on this property took place in six stages over the course of seven months and employed multiple contractors. The stages included mowing the previously-cleared areas and weed-whacking around trees and fence posts; hand collection and chipping of large dead branches on the ground from previous Florida Forest Service tree shredding; cutting and chipping large Brazilian pepper

trees; grinding tree stumps; shredding dead palm trunks and fronds; and a final follow-up mowing and weed-whacking of the finished landscape to maintain visibility for near-future surveys.



Collecting ground debris for chipping



Shredding dead palm trees

All woody and other large cellulose debris that was collected throughout property clearing was either pulverized in place (e.g. stump grinding) or chipped on-site using equipment that created small chips. Small chip size was critical in order to destroy conehead termites in the vegetative material. Chips were piled on the property for approximately five months to allow the heat of composting to kill any termites that survived the chipping process. In November 2019 the piles of chips were spread out onto the property. Handling the debris in this manner eliminated possible transport of conehead termites by disposing debris off the property, and reduced project costs for fumigation, collection, transport, and landfill disposal of material. FDACS staff worked closely with the contractors to ensure compliance with risk-based program goals designed uniquely for this project, including appropriate chip size, temporary on-site storage locations, and particularly that no vegetation was removed from the property.



Specified chip size to kill conehead termites



Spreading piled chips on property

The contractual work facilitated improved termite surveying and treatments of all remaining identified termite nests and foraging locations. The site cleanup also enabled inspection of the remaining native vegetation and greatly reduced the number of person hours required to complete those surveys. Finally, it motivated, and made practical, the long-term ability of the property owner to mow and maintain the parcel for surveying ease and it reduced food and habitation for conehead termites in the coming years.



Stages of vegetative cleanup and tree removal in Pompano Beach, FL. The yellow star marks the same tree for spatial reference.

Site Cleanups in Dania Beach:

In late May 2019, a vegetation management contractor cleaned two neighboring properties in Dania Beach. Both properties are vacant residential land covering a total of about 0.75 acres. Each property was previously heavily infested with conehead termites (first discovered in 2015) but follow-up surveys and treatments were impossible due to dense overgrowth.

The landscape contractor cleared vegetation including ground litter cleanup, tree trimming, weed-whacking, and vine removal. All collected cellulose debris was chipped on site and spread across the properties to eliminate the potential of termite spread due to transport via off-site disposal. After the properties were cleaned, three conehead termite surveys were conducted on each of these properties over a six-month period. Because of the recent vegetation clearing, all surveys were thorough; no visible conehead termite activity was found.

Alate Trapping:

Since conehead termite flight season is typically early May, alate (flying reproductive) trapping efforts commenced in mid-April 2019 at the heavily infested property in Pompano Beach. A priority for the program is to destroy all nests before reproductive termite offspring disperse to potentially infest new properties. However, before the grant-funded site cleanup took place at the Pompano Beach property, the vegetative overgrowth limited survey access, increasing the potential for mature nests to thrive undetected.

Jackson traps were deployed in trees within and around the Pompano Beach infestation. Traps were initially hung on April 25 and checked weekly. Traps were removed when FDACS staff and the program's science advisor felt that the risk for flight was over. No conehead termite alates were found during this

trapping effort, offering support although not proof that alate flights did not occur there during the 2019 season.



Alate trapping in Pompano Beach



Jackson trap

IPM Treatments:

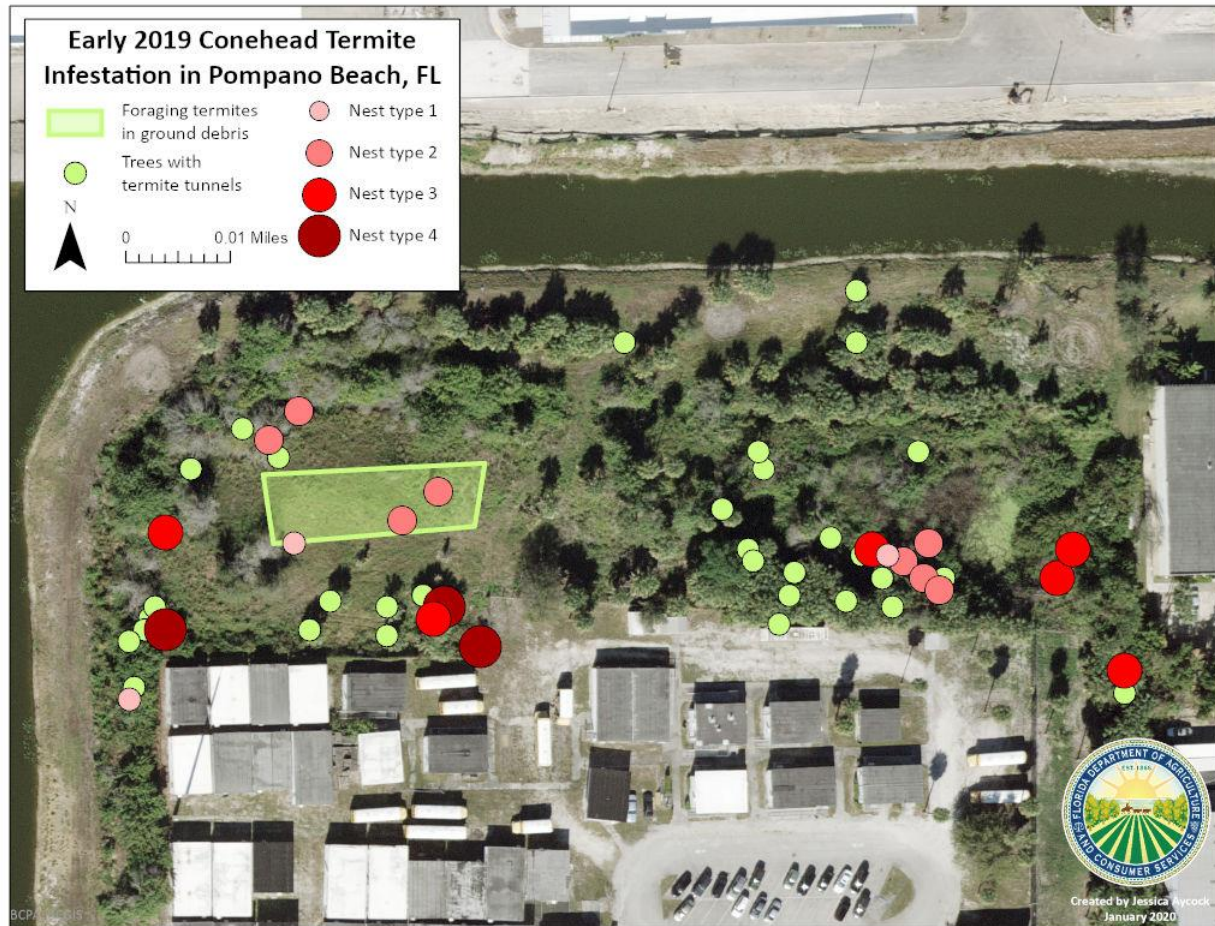
IPM treatments were conducted on five days during this grant. All treatments occurred at the single active location in Pompano Beach. Conehead termite treatments implemented include:

- Nest destruction – The conehead termite nest is removed from the substrate upon which it is attached (tree, bush, root, etc.) and placed at the base of the substrate. The nest is then physically smashed so that it disintegrates into tiny pieces. The majority of conehead termites in the nest are killed by this smashing. The disintegrated nest material and termites are then sprayed with termiticide.
- Nest footprints – To address fleeing reproductives, the entire perimeter of where the nest sat and, if applicable, the base of the host substrate is treated with termiticide.
- Tunnel soil perimeter treatment – The soil surrounding the perimeter of the tree, fencepost, or other isolated unit hosting the active tunnel is treated with termiticide.
- Active foraging areas – Conehead termites active in layers of leaf litter, branches, or wood on the ground are treated with termiticide.

IPM Treatments Conducted During Grant Period of Performance	
Date	Purpose
3/11/2019	Destroyed 7 nests, treated nest footprints and perimeters of trees with tunnels
3/22/2019	Hung aboveground stations on 4 trees with internal activity not reachable by normal treatments
4/23/2019	Destroyed 13 nests, treated nest footprints and perimeters of trees with tunnels, and treated infested ground vegetation
6/25/2019	Treated ground vegetation
9/24/2019	Treated ground vegetation

Efficacy and Success of Site Cleanups:

Prior to the USDA grant, from April 2016 through April 2018, nine termiticide treatment events took place at the property in Pompano Beach, yet heavy conehead termite activity persisted, as evidenced by the destruction of 88 nests in mid-2018. At the start of this grant and as shown on the following map and table, 20 active conehead nests, numerous trees with tunnels, and a large area of ground foragers were found on the Pompano Beach property (possibly more existed but were not located due to dense vegetation).



Nest Type	Description	Number
1	No globular carton, but eggs, larvae, or nymphs present	3
2	Globular nest less than 3" diameter	8
3	Globular nest between 3" and 10" diameter	6
4	Globular nest larger than 10" diameter	3
Total		20

Given favorable conditions for the infestation to continue prior to remediation actions supported by this grant, it would have taken many more years to control the population at this property and prevent alate dispersal infesting nearby properties. With the grant funding, however, trees harboring infestations were destroyed and vegetation cleanup allowed for thorough treatment events, silencing the large population on this property in eight months.

After termite harborage and foraging resources were removed with the grant's contractual funding, no conehead termites have been found, confirming efficacy of site cleanups. Because young conehead termite colonies hide within wood, surveillance of previously active properties must continue, but the present result – made possible in large part by this USDA funding – represents an immense leap forward in the invasive conehead termite eradication program.

Additionally, having a pest control operator under contract using the grant funding, versus finding a volunteer to treat and then waiting for free time on their calendar, improved mitigation efficiency by eliminating the termites before their populations grew and spread to new locations.

Project Goal 4 – Increased Detection Capabilities Through an Outreach Program

While two populations of conehead termites are known in Broward County, infestations may exist in other areas of the state. To assist in locating colonies in Broward County or beyond, FDACS has implemented an outreach program to educate residents, pest control operators, natural resource managers and others on how to identify and where to report a possible conehead termite infestation.

<i>Conehead Termite Outreach Implemented During Grant Period of Performance</i>		
Event	Date	Groups Reached
Presentation at Lake Park Library	10/9/2018	General public – Palm Beach County
Links Uploaded to ECISMA ¹ Website	10/30/2018	Natural resource managers and interested public – National Park Service, South FL Water Management District, etc.
DPI ² New Inspector Training	11/8/2018	South Florida agricultural plant inspectors
Table at Broward County Fair	11/24/2018	General public
Table at Tropical Plant Industry Exhibition	1/16/2019	Nursery growers and landscapers in South Florida
In Your Backyard Radio Show Interview	2/5/2019	Homeowners, gardeners, and landscapers in central Florida
2019 Expanded Survey	3 days in Feb. 2019	Homeowners & businessowners near high risk properties in Dania Beach and Pompano Beach
West Palm Beach Spring Home Show	2/22 to 2/24/2019	Homeowners and gardeners in Palm Beach County
Table at LIAF ³ Annual Seminar	4/10/2019	Landscape inspectors, arborists, code inspectors
Poster at FDACS Forum	5/8/2019	FDACS employees, scientists, interested public
Presentation at LIAF Monthly Meeting	5/30/2019	Landscape inspectors, arborists, code inspectors
DPI Facebook Post	7/10/2019	DPI Facebook page followers
DPI Twitter Tweet	7/10/2019	DPI Twitter account followers
Presentation at ECISMA Annual Seminar	7/18/2019	Natural resource managers
Cutters Edge IHeartRadio Show Interview	9/1/2019	Homeowners, gardeners, landscapers
Be on the Lookout Email	9/6/2019	Certified Pest Control Operators & Pest Management Companies in Palm Beach County
Presentation @ Lake Park Library	10/8/2019	Pest Management Professionals
Conehead Termite Featured Creature	11/21/2019	Approved for publication on UF-IFAS ⁴ Featured Creatures public website
Article in ENGLA ⁵ Newsletter	11/25/2019	Agricultural plant growers & landscapers

¹ Everglades Cooperative Invasive Species Management Area

² FDACS Division of Plant Industry

³ Landscape Inspector's Association of Florida

⁴ University of Florida, Institute of Food and Agricultural Sciences

⁵ Florida Nursery, Growers and Landscape Association

The above 19 outreach events exceeded the target milestone of 12 established in the Work Plan of this grant. Although it was not possible to determine the number of individuals listening to the two radio show interviews, over 17,600 people were reached through the other 17 events.

Events listed above do not include additional conehead termite outreach conducted by outside entities who partnered with FDACS, including members of the Invasive Conehead Termite IPM Working Group and the National Scientific Advisory Committee for the Invasive Conehead Termite Program.

IV. Difficulties Encountered

Delay in hiring two OPS ES1 staff: No viable candidates were produced from the initial position advertisement which contributed to the delay in bringing the two OPS ESIs onboard. The positions were first advertised on October 5, 2018. Five applicants were interviewed through November 6. Only one candidate was chosen from the five but withdrew due to accepting another position. The positions were readvertised on November 16 and a much-improved pool of candidates applied. Seven applicants were interviewed through December 13. However, due to the delay in funding resulting from the federal government shutdown, the positions were not filled until March 1, 2019, significantly reducing survey power during the first six months of the grant.

Retention: One of two OPS ES1s who started on March 1 resigned on March 29 to accept another position. The next highest-ranking applicant from the earlier hiring event was offered and accepted the position, joining the program on April 26, 2019.

Federal government shutdown: In addition to suspending hire of the two OPS ES1s, the federal government shutdown delayed termiticide treatments of the infested property in Pompano Beach, and site preparation/cleanup actions at the three high risk properties. State spending under the grant was on hold pending approval of the federal budget. The shutdown commenced on December 22, 2018 and the federal budget was signed on February 15, 2019, resulting in an almost two-month delay in grant expenditures.

Honeybee nests: The presence of very large wild honeybee nests delayed tree removal work at the infested property in Pompano Beach. An apiarist visited the property three times to remove two nests and an accumulation of residual bees that returned after the second nest was removed.

Hurricane Dorian: Hurricane Dorian delayed site cleanup work at the property in Pompano Beach. The contractors' time was preempted by tree trimming before the storm and post-hurricane cleanups at other locations.

Information collection: Obtaining municipal waste disposal practices/permissions for some of the locations in Broward County was problematic and took longer than expected. The novel circumstances presented by these 'first ever' invasive conehead termite infestations in South Florida required unique considerations by municipalities.

V. Evaluation of the Approach

- ✓ Project modifications and IPM strategies utilized during site cleanups were carefully, intentionally designed to minimize risk of spread to other properties and to reduce overall project costs. Retaining cut, collected, chipped vegetative debris on-site significantly reduced the risk of transporting conehead termites to new locations and eliminated the costs associated with offsite disposal including fumigation, collection, transportation, and landfill disposal. Chipping downed branches and tree trunks, dead palms, and Brazilian pepper stumps effectively destroyed termites infesting the vegetation, significantly reducing the need for pesticides.
- ✓ Work supported by this grant focused intensively on one heavily infested, thickly overgrown, 3.5-acre property in Pompano Beach. The fact that no live conehead termites have been found on the property for over six months confirms the effectiveness and substantial impacts of this program. In contrast, over 88 thriving conehead termite nests (many with developing alates/swarmers) along with additional sites of tunnel and litter layer activity were treated on this property the previous spring (April 2018), showing

infestation density and dispersal risk prior to implementation of this USDA grant's initiatives. The vegetation cleanup funded by this grant significantly improved the ability to find and control conehead termites, thus decreasing long-term manpower and pesticide applications required to address this extensive infestation.

- ✓ **No live conehead termites have been found in Pompano Beach since June 25, 2019. No conehead termites have been found in Dania Beach since August 29, 2018.** This shows the effectiveness and success of the control program supported by this grant. It does not, however, imply eradication since young colonies hidden within wood take time to grow their population to the size where they begin building visible nest carton and foraging tunnels that alert us to new colonies or resurgences. **Therefore, continued surveys are required to monitor for emerging young colonies.**
- ✓ FDACS continues to evaluate this project to reconfirm that it is scientifically-based and adapted to the challenges presented by this invasive pest within the Florida landscape. Modifications to treatment protocols are discussed and implemented when motivated by changing circumstances, lessons learned regarding efficacy and best practice technique adjustments, or regulatory issues. The scopes of work for contractual services were developed specifically for the complex, unusual issues presented by this pest in the South Florida environment. The targeted area of the outreach program has been expanded to all of Florida due to offshore introduction risk of this pest and because of the ease with which this adaptable termite can be spread by humans.

VI. Future Activities

As requested in FDACS's Suggestion, USDA PPA 7721 funding of this important program in fiscal year 2020 will support:

- conducting broader outreach to discover any possible new or resurging populations of conehead termites dispersed or inadvertently transported from the South Florida infestations and to raise awareness about future invasions. Media and events capable of reaching large audiences will focus on areas of Florida, Georgia, the Gulf states, and Texas where the conehead termite could survive.
- surveys at green waste facilities in South Florida that may have received conehead termite infested waste including landfills, landscape debris disposal sites, and residential bulk waste drop off locations in Miami-Dade and Palm Beach counties;
- expedited treatments of new or resurging infestations to swiftly control and minimize risk of spread by having a pest control company under contract; and
- improve locating new or resurging infestations by cleaning up vegetation and debris at high risk properties.

If FDACS does not receive outside funding for this important program, FDACS's existing Environmental Specialist 3 and Environmental Specialist 1 will continue core elements of the project including performing the most important surveys, conducting local outreach to catch not-yet-discovered colonies of conehead termites, and seeking volunteers for site cleanups, pest control services, and surveys. Complacency is not an option. The program remains in a critical phase within the limited window of opportunity to decisively eradicate this destructive invasive pest. Lessons learned from resurgence of the conehead infestation in Dania Beach following the 2006-2010 'stand down' (lack of inspections following dramatic suppression of the known population) highlights obvious risk. Remaining vigilant and aggressively on guard will ensure that the marked successes achieved to date are sustained.

The program's science advisor and staff are also drafting a manuscript detailing first actions to be taken when a new population of conehead termites is discovered. The target journal for publication is Journal of IPM, and the paper will serve as a springboard for USDA New Pest Response Guidelines for conehead termites.