Application Submission date:	TBD
Name, and contact details of certification body requesting a temporary derogation:	Rainforest Alliance C/O Jamie Overton 233 Broadway, 28th Floor New York, NY 10279 USA 802-923-3765
Active ingredient for which a derogation is being requested:	Fipronil®
Trade name and formulation type of the pesticide:	PTM SC®Insecticide 5-amino-1(2,6-dichloro4-(trifluromethyl)Phenyl)-4-((1,R,S)-trifluromethly)sulfinyl)-1-H-pyrazole-e-carbonitrile (9.1% Al)
Method of application and application equipment:	Application is through fog injection directly below ground-line using an Injection Wand. Controlled applications to occur through direct injection into mound entrances.
Common and scientific name of the pest species:	Common Names: Texas Town Ant, Leaf Cutting Ant, Texas Leaf Cutting Ant Scientific Name: *Atta texana* (Buckley)
Name and FSC certification codes of certificate holders[3] requesting a temporary derogation. Please indicate scale category and whether it qualifies as SLIMF.	Martin Timberlands, LLC dba RoyOMartin Alexandria, Louisiana, USA RA-FM/CoC-000-186
Scope for which a temporary derogation is being requested:	Martin Timberlands, LLC dba RoyOMartin ownership in Louisiana, USA. Approximately 182,000 hectares
Type of forest, species and expected forest area where use of the HHP in intended:	Artificially regenerated pine stands recently replanted with Southern Pine *Pinus*(sp.) seedlings

Part 2: SPECIFIC INFORMATION

1 Demonstrated Need
a) Please describe briefly the silvicultural system (methods for site preparation, practices for harvesting, regeneration, time between rotations) in the MU(s) included in the scope of the requested derogation. Artificially Regenerated Pine Plantation (Commercial)- normally an even-aged class of Pinus (sp) established either by direct seeding or planting of seedlings (manually or machine) with sources being nursery stock or manually extracted seed. Naturally Regenerated Pine Plantation (Commercial)- typically an uneven-aged class of Pinus (sp) which do not

have characteristics of natural stands established by (1) seed tree harvest leaving those source trees with desired traits; (2) acres with natural source surrounding and dissemination of seed by the wind or; (3) by renewal harvesting and associated mechanical soil scarification and seed dissemination.

Methods for site preparation: Incorporate both mechanical and chemical methods. Mechanical methods include shear and pile, and sub-soiling. Shear and piling is necessary on tracts that have heavy logging debris that needs to be removed to improve planter access. Sub-soiling generally involves three techniques; a deep rip to form a gentle bed, bedding with interior two discs operational to form a more substantial bed, and bedding with the two outside discs operational to help in dispersal of heavy debris.

Practices for harvesting: Incorporate the common tree harvesting equipment skidders and saw-head machines. Skidders move the cut stems from the stumps to the landing area. The stems could be de-limbed before skidding or skidded with limbs to the landing for subsequent de-limbing and bucking; whereas saw-head machines do the actual felling of the trees. Other specialized equipment may also be utilized.

Regeneration: Indirect stocking (leaving seed source with desirable traits); direct stocking (dispersing seeds and seedlings mechanically or by hand directly into the ground)

Rotations: 28-35 years (Pine Plantations)

b) Please describe the Integrated Pest Management (IPM) system in place, including the plan to monitor the distribution and density of the targeted pest organisms in the MU(s).

RoyOMartin's IPMS indicates but is not limited to the use chemical pesticide application where it is warranted. Other aspects of the IPMS include the non-use of chemical site prep and or banding for herbaceous weed control. Also the use of PTM® treated containerized seedlings have been implemented with good success. In areas of highest infestation (hotspots) Fipernil (PTM®) is used to control Texas Leaf Cutting Ant populations.

- Fipronil (PTM®) use is restricted to avoid possible migration to water areas and with human skin contact.

Fipronil® is labeled and used for the control of the Texas Leaf Cutting Ant, commonly known as the Town Ant which causes defoliation of newly planted pine seedlings and any other foliage within its colony range. RoyOMartin is currently operating with an FSC derogation for Fipronil® due to expire in April, 2017.

Per the requirements of the current Fipronil® derogation, the following outline current actions, trials or investigations:

- Critical Density: Taken on a tract by tract and infestation by infestation occurrence as each colony is different as each infested area.
- Reduced use due to effectiveness of original treatments
- Only infested areas are treated, spot basis not broadcast
- No repeated use as of yet
- Records kept and monitoring commenced regarding location, sizes, expansion, control or lack thereof of Fipronil® spot treatments.

No complaints, evidence, resultant, etc. that treatments have been harmful to environment and use is in compliance with State regulations and applied by a certified applicator.

As stated above the RoyOMartin Companies are operating under a derogation from the Forest Stewardship Council for the use of the highly hazardous chemical known as Fipronil®. At this point in time, Fipronil is the only alternative available to the forestry community and labeled as such for the control of the Texas Leaf Cutting Ant, commonly known as the Town Ant. The range of this invasive insect is increasing to the East, and the infestation continues to intensify. Therefore, the anticipation is that over the near-term, the use of Fipronil® will increase. Future reductions in use will depend on the development of an effective alternative whether by

chemical, biological or mechanical means. The current strategy for the RoyOMartin Companies is to make directed applications, not broadcast, on sites with the most intense infestations where our newly planted seedlings are most at risk. In the absence of this treatment, the ants will defoliate and kill the newly planted trees resulting in plantation failure, the loss of the regeneration investment and the need to replant.

c) Please indicate the thresholds above which, the damages caused by the targeted pest organisms are classified as severe and how they have been established.

RoyOMartin will classify damages as severe based off the same seedlings per acre (SPA) used in acceptability of planting (50% or less)

d) **Please indicate the population size of the targeted pest organism in the MU(s).**
RoyOMartin uses a mounds per acre/hectare to monitor the population size of Texas Leaf Cutting Ants in the MU. Based off of the most current data there are ≈11.69 mounds/ha present in the MU.

e) **(Fill in only if you represent a large-scale MU)**
Please indicate the conclusions of the comparative Cost/Benefit Analysis of using the requested pesticide versus other non-highly hazardous control alternatives,
The cost – benefit analysis shall include, at minimum, the following scenarios:

- **no action vs. remedial control (short-term)**
- **no action vs. preventive practices (long-term)**

<u>Comparative Cost/Benefit Analysis</u>

Presently, in this area of the United States, there are only two chemicals labelled for the control of the Texas Leaf Cutting Ant (Atta texana), those being Amdro Ant Block® and PTM®. "According to the Texas forest Service tests, the active ingredient in Amdro Ant Block®, hydramethynon is about 30% effective in eliminating colonies with a single application" This suggests that in order to completely control a colony, application of no less than three treatments of Amdro ant Block® would be required. Adding to the Amdro® ant Block issue, is the requirements for soil moisture, spacing from the mound, days on the surface and shelf life of the chemical, making it necessary to strive to make sure all requirements for application are met in order to produce the best result. The second labelled product, PTM® contains the active ingredient Fipronil®, also on the FSC highly- hazardous list. The product PTM® was originally formulated for use with pine tip moths in pine regenerations, however, additional results shows an optimum response for the control of the Texas Leaf Cutting Ant (Atta texana).
PTM® is a one-time application, done by insertion of a ground wand into the entrances of a mound, the wand penetrating 3 inches and dispersing a small amount of the solution. There are no requirements for moisture, surface activity, shelf life and the normal application is only one. The main factor in the success of the Fipronil® in the PTM product is the fog like penetration rather than the bait being carried into the colony by workers. All visible mound entrances are treated, making sure not to exceed the manufacturer's limit of 21 fluid ounces/acre.

The cost benefit of the use of Fipronil® and the PTM® products simply stated include a one-time application, direct mound treatment rather than a broadcast over the surface, aerosol rather than granules, below ground treatment rather than surface, fewer requirements for success of the chemical, thus reduced treatment applications and the relative safety of the active ingredient as it can be purchased off the shelf in some products for dog and cat treatments of fleas and ticks.
Targeted treatments would not be intended to completely remove the pest insect but rather remove the insect mound and activity from areas of newly-regenerated pine regenerations such that they are completely

defoliated, die and additional regeneration costs are incurred.
Simply stated, in areas of infestation, the cost of using the PTM product does not justify non-use as there would be increased regeneration, cost of additional regenerations, cost of additional regeneration contracting and additional administration. Treatment of the PTM could be within days of regeneration and still be effective and residual.
Using immediate past costs on regeneration and regenerations, it is estimated that regeneration destroyed by the Texas Town Ant would approximate *$187.75* acre for labor, regenerations and any additional site prep needed. Using current costs assigned to PTM and the anticipated labor cost to apply it, the cost per acre is approximately *$19.00* acre. Of course, if the acres are not replanted the same year, the loss of growth for those additional years must be entered into the calculation

Additional cost breakdown attached, see ***Appendix D:*** *Cost Benefit Analysis*

f) **(Fill in only if you represent a large-scale MU)**
Please provide a review carried out by independent experts of the Cost/Benefit Analysis in e).

In process.

g) **(Fill in only if you represent a medium or small-scale MU)**
Please describe possible non HHP alternatives to the use of the requested HHP and explain why they are not considered feasible to control the targeted pest organisms.

NA

h) Please include an estimate of the amount of area over which the pesticide is to be applied and how much of the pesticide is expected to be used annually.

- Annual area of which pesticide is to be applied equals ≈ 325ha
- Annual amount of pesticide to be used equals ≈ 4L
- Actual area of which pesticide is to be applied will be significantly lower as the application will be mound by mound and not a broadcast application.

i) **(Fill in only if you are applying for the renewal of a derogation)**
Please attach a report on the implementation of the IPM system during the previous derogation period, covering at minimum: See Martin Timberland's Fipronil Derogation Report

- **Brief description of the silvicultural system in the MU(s) included in the scope of the requested derogation.**
- **A list of the monitored pest organisms.**
- **The results of the annual monitoring of the target species in relation to the defined thresholds.**
- **Quantitative data of the use of 'highly hazardous' pesticides per year for the full period of the existing derogation, areas of application and application method.**
- **A description of the programs that have been implemented to investigate, research, identify and test alternatives to the 'highly hazardous' pesticide, and the results.**

See ***Appendix A:*** *Martin Timberlands, LLC Fipronil Report*

2. Specified measures to prevent, minimize and mitigate impacts

a) Please describe the best management practices (BMP) that will be implemented in the MU(s) to prevent, minimize and mitigate negative social and environmental impacts of the application of HHPs during the requested derogation period, covering at minimum: application method, water courses, land use or terrain and weather conditions.

- Application method- wand, direct injection into individual mounds
- Application of HHPs only during dry weather conditions and away from all stream side management zones.
- HHPs will only be applied in artificially regenerated pine plantations, excluding low lying areas.
- Efforts are made to reduce the amount of erosive runoff via water bars, rolling dips, and erosion barriers.

b) Please describe personal protective equipment's (PPE) for workers handling with HHP.
All applicators are required to wear snake leggings, safety glasses, boots, and protective gloves.

c) (Fill in only if you represent a large or medium-scale MU)
Please describe the training program on the use of the PPE and the application of the HHP that will be implemented in the requested derogation period.

All RoyOMartin personnel go through formal and informal training on the use of PPE including topics such as proper fit and placement. All RoyOMartin employees are required to attend a formal PPE training session including instructional videos with a questionnaire. After completion the employee signs documentation verifying completion of training. Informal training takes place on the job site and is administered by a certified private pesticide applicator.

All RoyOMartin personnel that apply HHPs are given instructions on proper application procedures. These instructions include proper PPE use, mixing procedures, and application procedures. Applicators are also required to keep a copy of the safety data sheet on their persons and first aid kits in the event that an accident occurs.

d) (Fill in only if you represent a large-scale MUs and you are applying for the renewal of a derogation) Please indicate the conclusions of the environmental and social impact assessment related to the use of HHP occurred during the previous derogation period.

Over the course of our current derogation RoyOMartin has observed no evidence of environmental or social impact. This conclusion was reached as the result of numerous field trials and through constant communication with local community members and forest workers living around and operating within the certified management unit. During the current derogation period, RoyOMartin has abided by all state, local, and federal regulations as they pertain to the use of Fipronil®.

e) Additional information (Eg: insurance providing coverages for pesticides related damage to environmental values and human health, etc.)

NA

3. Program to identify, investigate, and test alternatives to the 'highly hazardous' pesticide (including preventive silvicultural measures)

a) (Fill in only if you represent a large-scale MU)
Please describe the research program (individually or in collaboration with other research agencies/institutions or commercial enterprises) and/or field trials of alternative non-chemical or less hazardous methods of pest management that have been planned for the requested derogation period, including devoted resources and expected timelines.

The resources devoted to R&D include contact initiated with Dr. Kulhavy at Stephen F. Austin University, a leading researcher in this field. Contact also with Dr. Ron Billings Director of the TAMU Forest Service, Forest Pest Management Cooperative and with Linda Benedict, Associate Director and Professor, LSU AgCenter. Other research includes increasing the size of Amdro pellets, however Amdro is very moisture-dependent. RoyOMartin also plans on utilizing PTM Insecticide™ treaded seedlings and testing a less concentrated mix for Town Ant control.

- Expected timelines Investigation has revealed no specific timelines which researchers are willing to share either by constraint of their respective co-ops or funding.
- Results from on-going field trials with alternatives same as above
- Relevant supporting studies, investigation revealed no other serious research being done other than by above mentioned individual and state forest service.

b) (Fill in only if you represent a medium-scale MU)
Please describe how you will support and/or be involved in a research program from research agencies/institutions (e.g. universities) or commercial enterprises in the requested derogation period, including devoted resources and expected timelines.

NA

c) (Fill in only if you represent a small-scale MU)
Please describe the program to exchange information related to pesticides use with other forest managers, to contact research institutions and/or search in alternative databases that will be implemented in the requested derogation period.

NA

d) (Fill in only if you are applying for the renewal of a derogation)
Please describe the programs that have been implemented to investigate, research, identify and test alternatives to the requested 'highly hazardous' pesticide, and the results.

Investigation and research into identifying and testing alternatives have included testing chemicals that are not on FSC's HHP list such as Amdro®. The active ingredient in Amdro® Ant Bait is Hydramethylnon (CAS No. 67485-29-4) 0.88% by weight. Although this ingredient is not currently listed on FSC's highly hazardous list, research suggest that only about 30% control can be achieved with several applications. These results are not acceptable economically or silviculturally. Other alternatives that RoyOMartin has tried include no chemical site prep and banding for competition control. The ideal behind this process is to leave other vegetation on the site as to negate some of the damages to our pine seedlings. These methods are not ideal silvicultural practices and proved to be limited in success in protecting newly- planted pine plantations, as the ants seem to defoliate all vegetation within their colony range and show no preference for a particular species. Furthermore RoyOMartin has also implemented the use of seedlings treated with PTM Insecticide™ directly from the nursery. This has been very successful and drastically reduces the amount of chemical treatment to a particular site. Unfortunately the cost is about 20% more than an untreated seedling, making this treatment unfeasible to apply across the entire land base. RoyOMartin is continually monitoring all available research into alternatives as well as taking a trial and error approach to managing Town Ant populations on its property.

4. Stakeholder consultation

Currently In Process will be updated upon finalization of the stakeholder consultation process.

5.Certification Body Evaluation of the compliance with the requirements of the previous derogation approval
(To be filled in by the certification body only in renewal applications)

a) Please confirm if during the previous derogation period the applicant has identified and located on maps the streams, rivers, lakes and other water zones, as well as buffer zones and other sensitive areas (e.g. groundwater zone providing water for public consumption, natural reserves, conservation zones and protection areas for rare and threatened species, or habitat with biodiversity refuge.

During annual on-site evaluations records of chemical application were reviewed during the previous derogation period including written chemical plans. These plans include potential hazards, environmental risks and treatment area maps with all riparian areas, sensitive areas, and buffers present. Past interviews with licensed chemical applicators and Martin Timberlands staff confirmed that tight controls are in place for chemical use on certified land.

b) Please confirm if during the previous derogation period the applicant has effectively implemented control measures to prevent, minimize and mitigate negative social and environmental impacts associated with the use of the 'highly hazardous' pesticides.

Martin Timberland's written chemical plans include potential hazards, environmental risks and treatment area maps. Interviews with applicators and staff confirmed that tight controls are in place for chemical use on FME lands. Chemical applications are routinely assessed for effectiveness and future management decisions are based on those results to prevent, minimize and mitigate negative social and environmental impacts associated with the use of Fipronil.

c) Please confirm if during the previous derogation period workers dealing with HHP were provided with appropriate training on the use of the PPE and the application of the HHP.

Martin Timberlands uses only licensed contractors for applying chemicals including Fipronil. Contracts are in place that stipulate the required training of personnel applying HHP, this includes proper use of PPE training. Training records, contracts, and written chemical plans were reviewed during annual to confirm proper training and application of the HHP occur.

d) Please confirm if during the previous derogation period workers dealing with HHP were provided with appropriate personal protective equipment (PPE) and the use of them was enforced.

Martin Timberlands uses only licensed contractors for applying chemicals including Fipronil. Interviews with contractors and observations of Fipronil application on-site confirm that appropriate personal protective equipment and proper use of PPE was occurring and enforced by Martin Timberlands during annual surveillance audits and the subsequent reassessment.

e) Please confirm if the applicant has implemented all the conditions set by the Pesticides Committee as part of the derogation approval.

Martin Timberlands implemented all the condition set by the Pesticides Committee as part of the derogation approval, this was verified annually via interviews, records review, and on-site observations during annual surveillance audits and the subsequent reassessment.

APPENDIX A: Martin Timberland's Fipronil Derogation Report

Description of Silvicultural Systems

Artificially Regenerated Pine Plantation (Commercial) - normally an even aged class of Pinus (sp) established either by direct seeding or planting of seedlings (manually or machine) with sources being nursery stock or manually extracted seed.

Naturally Regenerated Pine Plantation (Commercial)- typically an un-even aged class of Pinus (sp) which do not have characteristics of natural stands established by (1) seed tree harvest leaving those source trees with desired traits; (2) acres with natural source surrounding and dissemination of seed by the wind or; (3) by renewal harvesting and associated mechanical soil scarification and seed dissemination.

Methods for site preparation: Incorporate both mechanical and chemical methods. Mechanical methods include shear and pile, and sub-soiling. Shear and piling is necessary on tracts that have heavy logging debris that needs to be removed to improve planter access. Sub-soiling generally involves three techniques; a deep rip to form a gentle bed, bedding with interior two discs operational to form a more substantial bed, and bedding with the two outside discs operational to help in dispersal of heavy debris.

Practices for harvesting: Incorporate the common tree harvesting equipment skidders and saw-head machines. Skidders move the cut stems from the stumps to the landing area. The stems could be de-limbed before skidding or skidded with limbs to the landing for subsequent de-limbing and bucking; whereas saw-head machines do the actual felling of the trees. Other specialized equipment may also be utilized.

Regeneration: Indirect stocking (leaving seed source with desirable traits); direct stocking (dispersing seeds and seedlings mechanically or by hand directly into the ground)

Rotations: 28-35 years (Pine Plantations)

Monitored Pest Species

Texas Leaf Cutting Ant (*Atta texana. Buckley)*

Results of Monitoring & Quantitative Report of Fipronil Usage

Martin will classify damages as severe based off the same SPA used in acceptability of planting (50% or less).

Upon discovery of an infestation of Texas Leaf Cutting Ants, RoyOMartin employees assess any damages that have occurred due to the infestation and the size and scope of the infestation. Following the initial assessment, a decision will be made on whether or not to treat the infestation. If the colony is treated, the applicator will calculate the volume of chemical used to treat the colony and how many mounds where treated. A second assessment will be made about one week following the application of Fipronil, to determine the effectiveness of the treatment.

Additionally, RoyOMartin keeps records of its Fipronil usage as well as where and when treatments take place. In ***Appendix B****: Fipronil Usage History*, data is arranged in the following format; Date (date treatment took place), Logging Unit (location of TLCA colony), Number of Mounds (number mounds treated), Ounces of Chemical (ounces of mixed chemical), Milliliters of Fipronil (mL. of PTM insecticide 9% Fipronil). In ***Appendix C:*** *Town Ant Monitoring*, data is arranged simply by location of the TLCA colony and the number of mounds treated within that colony.

Detailed report attached to application
See ***Appendix B****: Fipronil Usage History &* ***Appendix C****: Town Ant Monitoring*

Alternative Programs

Nature of research and development (R&D) on alternative pest management regimes in the short, medium and longer-term research plan covering the 5 year derogation period and including:
The resources devoted to R&D Contact initiated with Dr. Kulhavy at Stephen F. Austin University, a leading researcher in this field. No response as of yet. Contact also with Dr. Ron Billings Director of the TAMU Forest Service, Forest Pest Management Cooperative and with Linda Benedict, Associate Director and Professor, LSU AgCenter. Other research includes increasing the size of Amdro pellets, however Amdro is very moisture dependent.

- Expected timelines Investigation has revealed no specific timelines which researchers are willing to share either by constraint of their respective co-ops or funding.

- Results from on-going field trials with alternatives same as above
  Relevant supporting studies, investigation revealed no other serious research being done other than by above mentioned individual and state forest service.

As the certificate holder is not a research oriented operation, it does not possess the in house expertise to conduct such listed research, but makes every effort to cooperate with and investigate projects with coops and other interested land owners who may be affected. The maker of chemical has been contacted for soil reaction, etc. due to application procedure. As this chemical is also being tested for termiticide, and with regulatory regulations imposed, that data is considered proprietary at this time by manufacturer.

A list of all registered pesticides available for the control of the targeted pest species include Amdro® Ant Bait and PTM Insecticide™.

The active ingredient in Amdro® Ant Bait is Hydramethylnon (CAS No. 67485-29-4) 0.88% by weight. Although this ingredient is not currently listed on FSC's highly hazardous list, research suggest that only about 37% control can be achieved with several applications. These results are not acceptable economically or silviculturally. Other alternatives that Martin has tried include no chemical site prep and banding for competition control. The ideal behind this process is to leave other vegetation on the site as to negate some of the damages to our pine seedlings. These methods are not ideal silvicultural practices and proved to be limited in success in protecting newly planted pine plantations, as the ants seem to defoliate all vegetation within their colony range and show no preference for a particular species. Furthermore Martin has also implemented the use of seedlings treated with PTM Insecticide™ directly from the nursery. This has been very successful and drastically reduces the amount of chemical treatment to a particular site. Unfortunately the cost is about 20% more than an untreated

seedling, making this treatment unfeasible to apply across the entire land base. Martin is continually monitoring all available research into alternatives as well as taking a trial and error approach to managing Town Ant populations on its property.

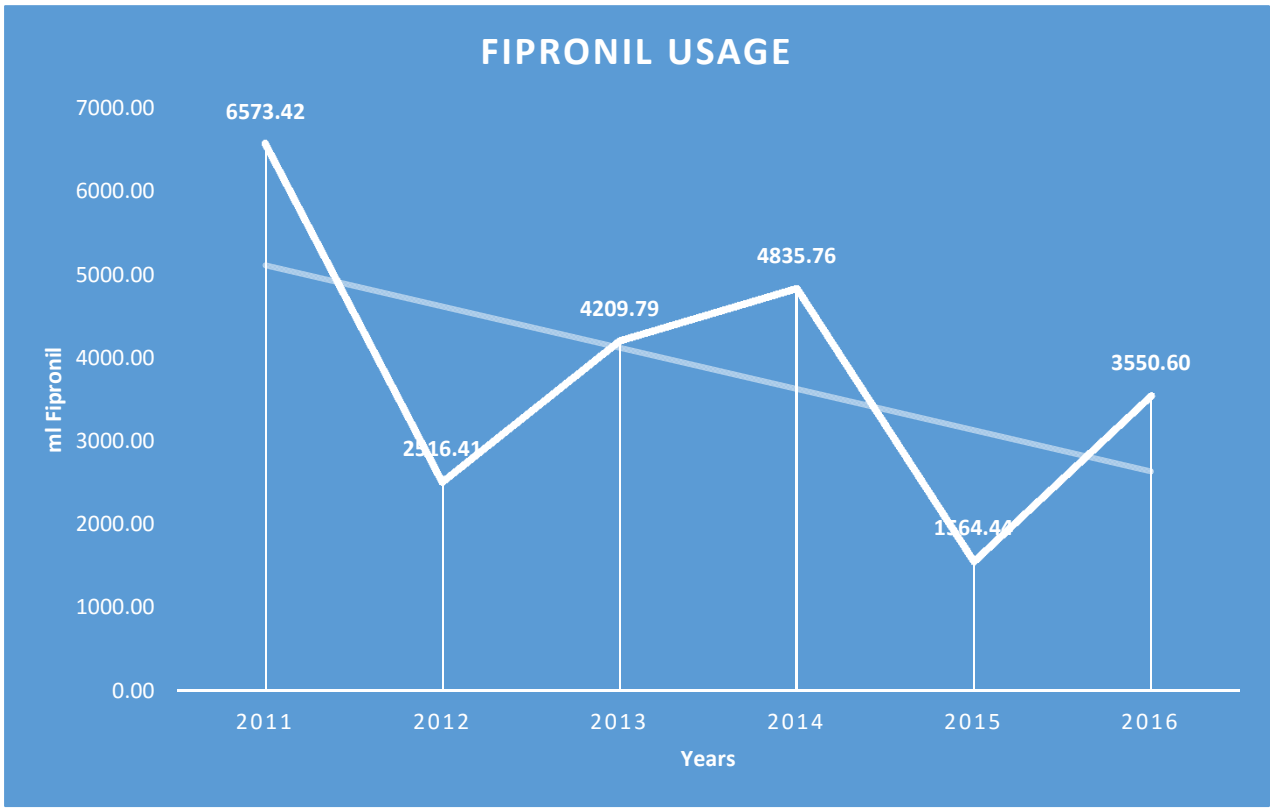
Amdro® Ant Bait Study
http://ir4.rutgers.edu/FoodUse/PerfData/2611.pdf

Texas Leaf Cutting Ant Destruction
http://scholarworks.sfasu.edu/cgi/viewcontent.cgi?article=1280&context=forestry
http://scholarworks.sfasu.edu/cgi/viewcontent.cgi?article=1416&context=forestry

Fipronil Effectiveness
https://fpmc.tamu.edu/public/Grosman-etal_02_LCA.pdf

APPENDIX B: FIPRONIL USAGE

Total Fipronil r	2011	2012	2013	2014	2015	2016
ml	6573.42	2516.41	4209.79	4835.76	1564.44	3550.60
L	6.57	2.52	4.21	4.84	1.56	3.55



Date:	Logging Unit	# of mounds:	oz of chemical	mL Fipronil
11/3/2011	12055-1	302.83	5.2	153.78
11/3/2011	12055-2	302.83	5.2	153.78
11/3/2011	12055-3	302.83	5.2	153.78
11/3/2011	12055-5	302.83	5.2	153.78
11/3/2011	12055-7	302.83	5.2	153.78
11/3/2011	12056-3	302.83	5.2	153.78
11/9/2011	12055-1	514.82	8.84	261.43
11/9/2011	12055-2	514.82	8.84	261.43
11/9/2011	12055-3	514.82	8.84	261.43
11/9/2011	12055-5	514.82	8.84	261.43
11/9/2011	12055-7	514.82	8.84	261.43
11/10/2011	12055-1	499.67	8.58	253.74
11/10/2011	12055-2	499.67	8.58	253.74
11/10/2011	12055-3	499.67	8.58	253.74
11/10/2011	12055-5	499.67	8.58	253.74
11/10/2011	12055-7	499.67	8.58	253.74
11/23/2011	12035-1	454.25	7.8	230.67
11/23/2011	12035-3	454.25	7.8	230.67
11/23/2011	12035-40	454.25	7.8	230.67
11/23/2011	12040-2	454.25	7.8	230.67
11/23/2011	12078-5	454.25	7.8	230.67
12/1/2011	12118-2	416.39	7.15	211.45
12/1/2011	12105-1	416.39	7.15	211.45
12/1/2011	12090-1	416.39	7.15	211.45
12/1/2011	12090-2	416.39	7.15	211.45
12/23/2011	12079-2	352.80	6.058	179.16
12/23/2011	12079-31	352.80	6.058	179.16
12/23/2011	12078-5	352.80	6.058	179.16
12/28/2011	12079-2	264.98	4.55	134.56
12/28/2011	12079-31	264.98	4.55	134.56
12/28/2011	12090-1	264.98	4.55	134.56
12/28/2011	12090-2	264.98	4.55	134.56
	Total	**12944.58**	**222.27**	**6573.42**

Date:	Logging Unit	# of mounds:	oz of chemical	mL Fipronil
3/12/2012	45223-1	291.19	5	147.87
3/12/2012	45210-1	116.47	2	59.15
3/13/2012	45410-1	757.08	13	384.46
3/13/2012	45204-1	873.56	15	443.60
1/12/2012	12090-1,3	722.14	12.4	366.71
1/19/2012	19614-1	270.80	4.65	137.52
2/2/2012	13097-1	228.29	3.92	115.93
2/2/2012	19422-1	228.29	3.92	115.93
7/17/2012	12043-2	163.06	2.8	82.81
7/18/2012	12047-2	489.19	8.4	248.42
7/19/2012	19422-2	815.32	14	414.03
	Total	**4955.39**	**85.09**	**2516.41**

Date:	Logging Unit	# of mounds:	oz of chemical	mL Fipronil
6/13/2013	11771-2	151.42	2.6	76.89
6/13/2013	11778-1	302.83	5.2	153.78
3/26/13-4/2/	12026-1	1135.62	19.5	576.68
7/18/2013	12032-3	605.67	10.4	307.56
7/18/2013	12032-1	302.83	5.2	153.78
7/18/2013	12036-31	454.25	7.8	230.67
7/18/2013	12037-5	75.71	1.3	38.45
6/6/2013	12037-1	1173.48	20.15	595.91
4/2/2013	12047-2	757.08	13	384.46
3/26/2013	12075-6	757.08	13	384.46
7/7/2013	12076-2	75.71	1.3	38.45
7/7/2013	12078-3	227.12	3.9	115.34
4/2/13-6/6/1	12090-1	757.08	13	384.46
7/6/2013	12092-2	302.83	5.2	153.78
7/7/2013	12098-30	151.42	2.6	76.89
7/5/2013	12114-2	151.42	2.6	76.89
7/5/2013	13097-2	227.12	3.9	115.34
7/5/2013	19421-1	227.12	3.9	115.34
7/5/2013	19428-82	454.25	7.8	230.67
	Total	**8290.04**	**142.35**	**4209.79**

Date:	Logging Unit	# of mounds:	oz of chemical	mL Fipronil
	11091	20.09	0.35	10.20
	11790	172.67	2.97	87.69
	19422	144.31	2.48	73.28
	12082	43.74	0.75	22.21
	13117	42.59	0.73	21.63
	19230	53.23	0.91	27.03
	12811	102.92	1.77	52.26
	12065	14.20	0.24	7.21
	12037	100.55	1.73	51.06
	13053	57.65	0.99	29.28
	12076	49.50	0.85	25.14
	11301-1	465.90	8.00	236.59
	11301-4	4664.79	80.10	2368.84
	11301-6	465.90	8.00	236.59
	11301-32	2954.37	50.73	1500.26
	12031	170.34	2.93	86.50
	Total	**9522.74**	**163.52**	**4835.76**

Date:	Logging Un	# of mounds:	oz of chemical	mL Fipronil
2/12/2015	12055-2	302.83	4.6	136.04
3/13/2015	12055-2	151.42	2.3	68.02
3/25/2015	12055-2	302.83	4.6	136.04
4/2/2015	91920-2	302.83	4.6	136.04
4/7/2015	19428-82	151.42	2.3	68.02
4/16/2015	12050-7	302.83	4.6	136.04
4/21/2015	91920-2	151.42	2.3	68.02
4/24/2015	91920-2	302.83	4.6	136.04
8/19/2015	12031-1	302.83	4.6	136.04
10/22/2015	12119-1	302.83	4.6	136.04
10/28/2015	12047-1	302.83	4.6	136.04
12/11/2015	12119-1	529.96	8.05	238.07
12/11/2015	12098-1	75.71	1.15	34.01
	Total	**3482.58**	**52.90**	**1564.44**

Date:	Logging Unit	# of mounds:	oz of chemical	mL Fipronil
1/4/2016	11778-1	227.12	3.45	102.03
1/4/2016	19230-2	75.71	1.15	34.01
1/4/2016	12047-1	302.83	4.60	136.04
1/13/2016	12047-1	454.25	6.90	204.06
1/14/2016	12047-1	302.83	4.60	136.04
1/15/2016	12047-1	302.83	4.60	136.04
1/20/2016	13911-6	75.71	1.15	34.01
2/9/2016	12811-1	302.83	4.60	136.04
2/15/2016	12047-1	1362.75	20.70	612.17
2/16/2016	12075-30	151.42	2.30	68.02
2/17/2016	12038-1	302.83	4.60	136.04
	11301-1	625.76	10.68	315.84
	81375-30	155.49	2.67	78.96
	11360-1	777.46	13.35	394.81
	12016-6	777.46	13.35	394.81
	45214-2	621.97	10.68	315.84
	45223-2	621.97	10.68	315.84
	Total	**7441.24**	**120.06**	**3550.60**

APPENDIX C: TOWN ANT MOUND MONITORING

Logging Unit	# of mounds:
12055-1	302.83
12055-2	302.83
12055-3	302.83
12055-5	302.83
12055-7	302.83
12056-3	302.83
12055-1	514.82
12055-2	514.82
12055-3	514.82
12055-5	514.82
12055-7	514.82
12055-1	499.67
12055-2	499.67
12055-3	499.67
12055-5	499.67
12055-7	499.67
12035-1	454.25
12035-3	454.25
12035-40	454.25
12040-2	454.25
12078-5	454.25
12118-2	416.39
12105-1	416.39
12090-1	416.39
12090-2	416.39
12079-2	352.80
12079-31	352.80
12078-5	352.80
12079-2	264.98
12079-31	264.98
12090-1	264.98
12090-2	264.98
Total	**12944.58**

Logging Unit	# of mounds:
45223-1	291.19
45210-1	116.47
45410-1	757.08
45204-1	873.56
12090-1,3	722.14
19614-1	270.80
13097-1	228.29
19422-1	228.29
12043-2	163.06
12047-2	489.19
19422-2	815.32
Total	**4955.39**

Logging Unit	# of mounds:
11771-2	151.41632
11778-1	302.83264
12026-1	1135.6224
12032-3	605.66528
12032-1	302.83264
12036-31	454.24896
12037-5	75.70816
12037-1	1173.47648
12047-2	757.0816
12075-6	757.0816
12076-2	75.70816
12078-3	227.12448
12090-1	757.0816
12092-2	302.83264
12098-30	151.41632
12114-2	151.41632
13097-2	227.12448
19421-1	227.12448
19428-82	454.24896
Total	**8290.04352**

Logging Unit	# of mounds:
11091	20.09178092
11790	172.6728418
19422	144.3114004
12082	43.73602166
13117	42.58584
19230	53.2323
12811	102.91578
12065	14.19528
12037	100.5499
13053	57.65467569
12076	49.50148923
11301-1	465.8963692
11301-4	4664.787397
11301-6	465.8963692
11301-32	2954.365351
12031	170.34336
Total	9522.736156

Logging Unit	# of mounds:
12055-2	302.832944
12055-2	151.416472
12055-2	302.832944
91920-2	302.832944
19428-82	151.416472
12050-7	302.832944
91920-2	151.416472
91920-2	302.832944
12031-1	302.832944
12119-1	302.832944
12047-1	302.832944
12119-1	529.957652
12098-1	75.708236
Total	3482.578856

Logging Unit	# of mounds:
11778-1	227.1247081
19230-2	75.70823603
12047-1	302.8329441
12047-1	454.2494162
12047-1	302.8329441
12047-1	302.8329441
13911-6	75.70823603
12811-1	302.8329441
12047-1	1362.748249
12075-30	151.4164721
12038-1	302.8329441
11301-1	625.757
81375-30	155.4929
11360-1	777.4646
12016-6	777.4646
45214-2	621.9717
45223-2	621.9717
Total	**7441.242538**

APPENDIX D: COST BENEFIT ANALYSIS

12047 Town Ant Control - 76 acres

Actual Control Efforts			
Type	*Amount*	*Rate*	*Amount*
Man Hours	47	$20.00	$935
Runzheimer Miles	1,500	$0.26	$390
PTM Insecticide	41	$3.75	$155
		Total Cost:	**$1,480**
		Cost/acre:	**$19**

*Plus additional opportunity cost of other ROM tasks that could have been done instead of treating town ants.
**With all of these efforts, there is still a possibility that this stand will need to be replanted.

Planting PTM Seedlings			
Type	*Amount*	*Rate*	*Amount*
PTM treated containers	39,444	$0.25	$9,861
Less cost of bare root seedlings	(39,444)	$0.05	($1,814)
		Total:	**$8,047**
		Cost/acre:	**$106**

No Treatment. Just replant			
Type	*Amount*	*Rate*	*Amount*
Bare root seedlings	39,444	$0.05	$1,814
Hand Plant	76	$50.00	$3,800
Banded HWC (following ye	76	$20.00	$1,520
Bare root seedlings	39,444	$0.05	$1,814
Hand Plant	76	$50.00	$3,800
Banded HWC (following ye	76	$20.00	$1,520
		Total:	**$14,269**
		Cost/acre:	**$187.75**

No Treatment. Just replant			
Type	*Amount*	*Rate*	*Amount*
Bare root seedlings	519	$0.05	$24
Hand Plant	1	$50.00	$50
Banded HWC (following year	1	$20.00	$20
Bare root seedlings	519	$0.05	$24
Hand Plant	1	$50.00	$50
Banded HWC (following year	1	$20.00	$20
		Total:	**$188**
		Cost/acre:	**$187.75**

No Treatment. Just replant			
Type	*Amount*	*Rate*	*Amount*
Bare root seedlings	519	$0.05	$24
Hand Plant	1	$50.00	$50
Banded HWC (following year	1	$20.00	$20
Bare root seedlings	519	$0.05	$24
Hand Plant	1	$50.00	$50
Banded HWC (following year	1	$20.00	$20
		Total:	**$188**
		Cost/acre:	**$187.75**

Short Term Remedial			
Type	*Amount*	*Rate*	*Amount*
Man Hours	47	$20.00	$935
Runzheimer Miles	1,500	$0.26	$390
PTM Insecticide	41	$3.75	$155
		Total Cost:	**$1,480**
		Cost/acre:	**$19**

*Acctual cost of treating Logging unit 12047-1(76 acres) with PTM Insecticides®
*Plus additional opportunity cost of other ROM tasks that could have been done instead of treating town ants.
**With all of these efforts, there is still a possibility that this stand will need to be replanted.

Long Term Preventative Practices			
Type	*Amount*	*Rate*	*Amount*
PTM treated containerized seedli	519	$0.25	$130
Machine Plant	1	$92.65	$93
Banded HWC (following year	1	$20.00	$20
		Total:	**$222**
		Cost/acre:	**$222.40**

*Establishment cost less cost of site prep