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Giant African Snail Cooperative Eradication Program

Miami-Dade County, Florida

Environmental Assessment Supplement, September 2012

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I. Introduction

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), in cooperation with the Florida Department of Agriculture and Consumer Services (FDACS), is conducting a program to eradicate the giant African snail (GAS), *Lissachatina* (*Achatina*) *fulica*, in Miami-Dade County, Florida. GAS is a large, African terrestrial snail in the family Achatinidae. It has been introduced purposefully and accidentally to many parts of the world for medicinal purposes, food (escargot), as pets, and for research purposes. Where it is introduced, it has the potential to be a significant pest of agricultural crops and can serve as an intermediate host for the rat lungworm (Venette and Larson, 2004). As a result, this species has been listed as one of the 100 worst invasive species in the world (Lowe et al., 2000).

A. Background

On September 8, 2011, GAS was confirmed in the Coral Gables area of Miami-Dade County, Florida. As of September 6, 2012, more than 81,000 snails have been collected, with more than 54,000 properties surveyed and 19,204 properties treated with iron phosphate bait. It is still unknown how or when the snails entered the United States or how the area became infested. Since the initial detection, APHIS has actively worked with the FDACS to conduct survey, regulatory, control, and outreach activities. While residential areas have been affected, to date, extensive surveys of nurseries and agricultural production facilities within the infested areas have been negative for GAS. See Appendix A for a map of the currently infested areas in Miami-Dade County.

In October 2011, an environmental assessment (EA) was prepared for the program to eradicate GAS from Miami-Dade County in Florida (USDA, APHIS, 2011). This EA is incorporated by reference into this document and is available at http://www.aphis.usda.gov/plant_health/ea/gas.shtml. The EA analyzed alternatives consisting of (1) no APHIS action other than to continue to prohibit the importation and interstate movement of GAS, and confiscate it where discovered, and (2) the preferred alternative, where APHIS would work cooperatively with FDACS to eradicate this exotic snail from Miami-Dade County, Florida. The EA described the effects of GAS on the environment and analyzed the impacts of the use of a molluscicide, iron phosphate, in conjunction with physical removal for eradication of GAS. APHIS issued a finding of no significant impact (FONSI) dated October 7, 2011, concluding that implementation of the program would not significantly impact the quality of the human environment. This FONSI is available at http://www.aphis.usda.gov/plant_health/ea/gas.shtml.

B. Purpose and Need

APHIS has the responsibility for taking actions to exclude, eradicate, and/or control plant pests under the Plant Protection Act of 2000 (7 United States Code (U.S.C.) 7701 et seq.). APHIS, in cooperation with the FDACS, is proposing to add the molluscicide boric acid to the program to eradicate the GAS from Miami-Dade County, Florida.

The purpose of this action is to increase the efficacy of the GAS eradication program which currently uses the molluscicide iron phosphate. Molluscide trials (choice tests) conducted by FDACS have shown that over all three life stages (neonate, juvenile and adult), iron phosphate had a mortality rate of only 49 percent. Thus, there is a need to add boric acid to the program to achieve a higher mortality rate and more rapidly eradicate GAS from Miami-Dade County. It is expected that GAS that ingest iron phosphate and do not die from it may then feed on the boric acid resulting in greater efficacy. An additional benefit is that the formulation of boric acid proposed for use in the program is not very susceptible to mold and will remain attractive to GAS for a longer period of time in the field compared to iron phosphate.

This environmental assessment (EA) has been prepared consistent with the National Environmental Policy Act of 1969 (NEPA) and APHIS' NEPA implementing procedures (7 Code of Federal Regulations (CFR) part 372) for the purpose of evaluating how the proposed action, if implemented, may affect the quality of the human environment.

II. Alternatives

This EA analyzes the potential environmental consequences associated with no action and the proposed action to add boric acid as a control method to the GAS eradication program. Two alternatives are being considered: (1) no action by APHIS to add boric acid to the program, and (2) the preferred alternative, to add boric acid as a treatment to eradicate GAS from Miami-Dade County in Florida.

A. No Action

Under the no action alternative, APHIS would continue the current GAS eradication program without adding boric acid as a treatment option for the program. The GAS eradication program is a cooperative effort between APHIS and FDACS, and uses a molluscide that contains iron phosphate as the active ingredient. A formulation available for use is Sluggo®-AG which contains 1.0% iron phosphate and a slug and snail bait attractant in the form of wheat gluten. After eating the bait, snails stop feeding immediately because the iron phosphate interferes with calcium metabolism in their gut. Snails die three to six days later.

Sluggo®-AG is a pellet that is applied with a broadcast spreader, such as would be used to apply grass seed or fertilizer, in a 200-yard radius from GAS finds. The bait is applied evenly at approximately 20–44 pounds per acre, or 0.5–1 pound per 1,000 square feet. The bait is reapplied at least every two weeks. Treatments will be applied year-round. A 10-foot treatment buffer from aquatic areas has been observed.

Prior to treatment signed consent forms will be obtained from residents/homeowners. Homeowners will be provided with a notice that treatment will occur within the next 24 hours. Once treated, a treatment notice of date and time treatment occurred will be provided and homeowners/residents may then enter the treated area.

Hand picking of snails will also continue as part of the eradication program. Regular and extensive hand picking is effective in reducing snail numbers when done in combination with other control methods, particularly in newly infested areas (USDA, APHIS, 2005). Snails may be disposed of by freezing or immersion in boiling water or alcohol.

Iron phosphate treatments may continue for two to four years. After termination of eradication treatments, the area will be monitored for another one to two years to ensure that the GAS has been eradicated.

B. Preferred Alternative

Under the preferred alternative, APHIS and FDCAS would continue to conduct the GAS eradication program as described under the no action alternative but would add a molluscicide that contains boric acid as the active ingredient to the program. Boric acid is part of a group of boron containing pesticides that have insecticidal, molluscicidal, fungicidal, and herbicidal properties. After ingestion, boron impacts digestion by interfering with enzymes that aid in energy production, eventually resulting in starvation.

Boric acid is used in a variety of agricultural and non-agricultural applications, such as residential, commercial, medical, veterinary, and industrial uses. It is available in a variety of formulations but the proposed use in the GAS program is a granular formulation that is applied using a broadcast spreader. The formulation proposed for use, NiBan®, contains 5% orthoboric acid. The remaining ingredients in the bait include corn grit and food grade additives to attract targeted pest species to ingest the bait. To control snails, the bait is applied evenly to soil at a rate of 6 ounces per 100 square feet, no more than once every 4 to 6 weeks. Treatments will be applied year-round. As with iron phosphate bait, a 10-foot treatment buffer from aquatic areas will be observed.

III. Affected Environment

The affected environment in Miami-Dade County, Florida has been described in the October 2011 EA (USDA, APHIS, 2011) and is the same for this proposed action. See Appendix A for a map of the currently infested areas of Miami-Dade County.

IV. Environmental Impacts

A. No Action

The environmental impacts of the current GAS eradication program, including human health risk, ecological risk, and impacts on environmental quality from program activities were described in the October 2011 EA (USDA, APHIS, 2011) and are not repeated in this document.

B. Preferred Alternative

The environmental impacts of adding boric acid to the GAS eradication program are discussed below. All other impacts of the current eradication program were discussed in the October 2011 EA (USDA, APHIS, 2011).

1. Human Health Risk

The formulation proposed for use in the GAS program, NiBan®, is considered practically non-toxic to mammals whether by ingestion or dermal exposure. Available data show that median lethality values are greater than the highest concentration tested and that the formulated material is not a skin irritant (Nisus, 1997). Longer term studies of the active ingredient, boric acid, demonstrate sublethal effects at doses that would not be anticipated in the proposed use for this program. Boric acid is not considered to be carcinogenic or mutagenic (EPA, 1994; EPA, 2006). The most sensitive endpoints in subchronic and longer term studies among different mammal test species are reproductive effects. These

effects are observed primarily in males where impacts to testes have been noted in the low part per million (ppm) range (EPA, 2006). Developmental effects in rats fed boric acid during gestation have also been observed, with lowest observable effect levels ranging from approximately 13 milligrams per kilogram per day (mg/kg/day) to 90 mg/kg/day (EPA, 2006; Allen et al., 1995; Price et al., 1996).

Dietary exposure and risk from the proposed use of boric acid is expected to be very low for all population segments. Worker exposure and risk will be low due to the low toxicity of boric acid, the method of application, and adherence to label language designed to minimize exposure. Exposure and risk to residents within the area of treatment is also expected to be very low. No uses will occur on food crops and all residents will be notifed 24 hours prior to treatment with guidance on how to avoid exposure to bait applications. The only possibility for oral exposure would be through the direct ingestion of the granules or treated soil. The risk from direct ingestion of granules would be low because of the very low toxicity of boric acid and the small amount of boric acid within each granule that would require large amounts to be consumed before any effects would be observed.

2. Ecological Risk

Boric acid is considered practically non-toxic to most non-target organisms based on available acute toxicity data. Toxicity to mammals and birds is considered low with acute bird median lethality values greater than the highest test concentration based on studies submitted for registration (EPA, 2012). Conservative estimates of exposure for birds and mammals that would ingest terrestrial invertebrates that have consumed boric acid would not result in direct risk to those populations. The low toxicity of boric acid and selective nature of the formulation along with the localized treatment areas would result in low direct risk to terrestrial invertebrates. Risks to domestic animals such as dogs and cats are also expected to be low based on the low toxicity of boric acid and notification process to homeowners regarding treatment. Indirect impacts to birds and mammals that depend on terrestrial invertebrate prey are also not anticipated because treatments are localized, typically occurring in residential/developed settings, and would be much less than the foraging areas for most terrestrial vertebrates. In addition, boric acid is selective for certain invertebrates and other prey would be available in the small areas where boric acid treatments would occur.

Impacts to pollinators, such as honey bees, are also low with toxicity values greater than 100 micrograms per bee, suggesting that boric acid is practically non-toxic to honey bees. Impacts to ants, crickets, silverfish, and cockroaches would be anticipated in the areas of treatment because the product is effective against those types of invertebrates. However, these effects would be localized to the areas of treatment, and specific to

those invertebrates that would be attracted to the bait. Risk to insects such as sensitive lepidopterans (i.e., moths and butterflies) would not be anticipated because the product is not applied to foliage as a spray where most lepidopterans forage and could be exposed. Applications occur directly to the ground by hand using a granular formulation; therefore, drift onto foliage where lepidopterans forage is not anticipated to occur. In addition, the materials in the formulation that are attractive to the pest species are not components that would typically attract lepidopteran insects.

In aquatic systems, fish and aquatic invertebrates show low sensitivity to boric acid with acute median lethality values of greater than 100 milligrams per liter (mg/L), or ppm, for a variety of test species. Acute sublethal impacts have been observed at concentrations ranging in the low ppm (Howe, 1998; EPA, 2012). Chronic toxicity to aquatic invertebrates and amphibians demonstrate no observable effect concentrations in the low ppm range (EPA, 2012: Fort et al., 2001; Howe, 1998). Indirect effects to aquatic organisms that could feed on treated prey are not anticipated due to the low toxicity of boric acid to aquatic invertebrates, the label restrictions reducing exposure, and the lack of bioaccumulation that would be expected in aquatic organisms if exposure did occur (Butterwick et al., 1989). Label restrictions regarding applications near water, and the program requirement for a 10-foot application buffer from aquatic resources, reduces the potential for exposure, and results in a very low probability for any adverse effects to aquatic organisms. Conservative estimates of exposure in shallow waterbodies (i.e., 0.3 meter depth) demonstrate that potential boric acid residues would be two orders of magnitude below acute effect levels for fish and aquatic invertebrates and well below acute and chronic sublethal effect levels for both groups.

3. Environ-mental Quality

Impacts to air, soil, and water quality are not anticipated because of the use pattern of boric acid in the program and its environmental fate. Boric acid contains boron, a naturally occurring element that serves as a micronutrient in soil and also occurs in fresh and salt water. Concentrations in soil vary but can range from 50 to 150 ppm while freshwater and saltwater concentrations range from one part per trillion to 4.5 ppm with saltwater typically having the higher background concentrations (EPA, 1994; Howe, 1998). Boric acid is highly soluble in water (13,000 mg/liter) and not expected to bind to soil or sediment which could result in runoff to receiving waterbodies (EPA, 1994; Howe, 1998). Label restrictions prohibiting applications to water, as well as the weather resistant granular formulation, will reduce the likelihood of runoff. The potential for runoff to occur from applications to treat GAS will further be reduced by treatment restrictions for the program that require a 10-foot application buffer from all waterbodies. The use of a granular

formulation, reducing the potential for drift, and lack of volatility of boric acid suggests that air quality will not be impacted in the treatment areas.

C. Cumulative Impacts/Threatened and Endangered Species/Other Considerations

1. Cumulative Impacts

Cumulative impacts from the proposed use of boric acid are not anticipated for human health and the environment. Boric acid is used in a variety of applications so there are uses already occurring within Miami-Dade County. The proposed use of boric acid would result in an overall increase of this pesticide in the county but it would be incrementally minor since applications are proposed in localized core areas where GAS has been detected. The potential for cumulative impacts in Miami-Dade County would be very low based on the low risk of boric acid to non-target organisms, the localized use of the material, and program requirements such as notification to residents and other restrictions such as application buffer zones from aquatic sites, which collectively minimize the risk to human health and/or the environment. The cumulative impact from using iron phosphate and boric acid together in certain core areas is also not expected to result in significant cumulative impacts. Iron and boron occur naturally in soils in these areas and the additional contribution of both minerals is minor. No data suggest that exposure to both materials would result in synergistic impacts to human health or other non-target organisms if exposure to both materials were to occur. The proposed use of boric acid in this program is as an alternative bait for snails that may avoid iron phosphate bait over time. Its use could result in increased efficacy and may decrease the overall number of treatments of both products to achieve eradication.

2. Endangered Species Act

Section 7 of the Endangered Species Act and its implementing regulations require Federal agencies to ensure their actions are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat. APHIS updated the original biological assessment to include an evaluation of the ecological risks from the proposed use of boric acid, and consulted with the U.S. Fish and Wildlife Service in Vero Beach, Florida (South Florida Ecological Services Office) regarding the proposed changes to the eradication program. APHIS determined that boric acid may affect, but is not likely to adversely affect the endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*) and its critical habitat, the threatened Eastern indigo snake (*Drymarchon corais couperi*), and the threatened Stock Island tree snail (*Orthalicus reses*). APHIS received a concurrence letter dated August 15, 2012. APHIS also determined that the addition of boric acid would have no effect on other federally listed species in Miami-Dade County.

3. EO 12898

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," focuses Federal attention on the environmental and human health conditions of minority and low-income communities, and promotes community access to public information and public participation in matters relating to human health and the environment. This EO requires Federal agencies to conduct their programs, policies, and activities that substantially affect human health or the environment in a manner so as not to exclude persons and populations from participation in or benefiting from such programs. It also enforces existing statutes to prevent minority and low-income communities from being subjected to disproportionately high or adverse human health or environmental effects. Based on the analysis of available toxicity data for boric acid and the potential for exposure, the human health and environmental risk from the proposed applications are minimal and not expected to have disproportionate adverse effects to any minority or low-income family.

4. EO 13045

EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks," acknowledges that children, as compared to adults, may suffer disproportionately from environmental health and safety risks because of developmental stage, greater metabolic activity levels, and behavior patterns. This EO (to the extent permitted by law and consistent with the agency's mission) requires each Federal agency to identify, assess, and address environmental health risks and safety risks that may disproportionately affect children. Treatments for GAS do not include applications to commercial food items therefore no dietary exposure is expected. Oral ingestion could occur through the ingestion of granules or treated soil. Proper notification to homeowners regarding when applications occur will reduce this exposure potential. In cases where a child could consume soil from treated areas in a residential application, the low toxicity of boric acid suggests that children would not be able to consume enough treated soil within a reasonable time frame to reach a dose where adverse impacts could occur. Therefore, no disproportionate risks to children are anticipated as a consequence of applying boric acid to eradicate GAS.

5. EO 13175

EO 13175, "Consultation and Coordination with Indian Tribal Governments," was issued to ensure that there would be "meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications….". The Seminole and Miccosukee Tribes are in south Florida; however no GAS detections have occurred on, or adjacent to, tribal property with the addition of the new core area. APHIS will contact the tribes to initiate a dialogue regarding proposed activities to eradicate the GAS in the event that the range of the snail expands.

6. National Historic Preservation Act

APHIS has considered potential impacts under Section 106 of the National Historic Preservation Act. Section 106 requires federal agencies to consider the impacts of their actions on historic properties. Approximately 170 historic properties exist within Miami-Dade County, with a majority of these sites being structures. Based on the criteria defined in Section 106 of what constitutes an adverse effect, the proposed addition of boric acid to the program will not have a negative impact to historic or cultural sites but will provide beneficial impacts due to the protection from damage and nuisance that can occur from GAS infestations.

V. Listing of Agencies and Persons Consulted

U.S. Department of Agriculture
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PPQ–Emergency and Domestic Programs
4700 River Road, Unit 26
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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
PPQ–Environmental Compliance
4700 River Road, Unit 150
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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental and Risk Analysis Services
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Florida Department of Agriculture and Consumer Services
Division of Plant Industry
P.O. Box 147100
Gainesville, FL 32614

U.S. Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, FL 32960

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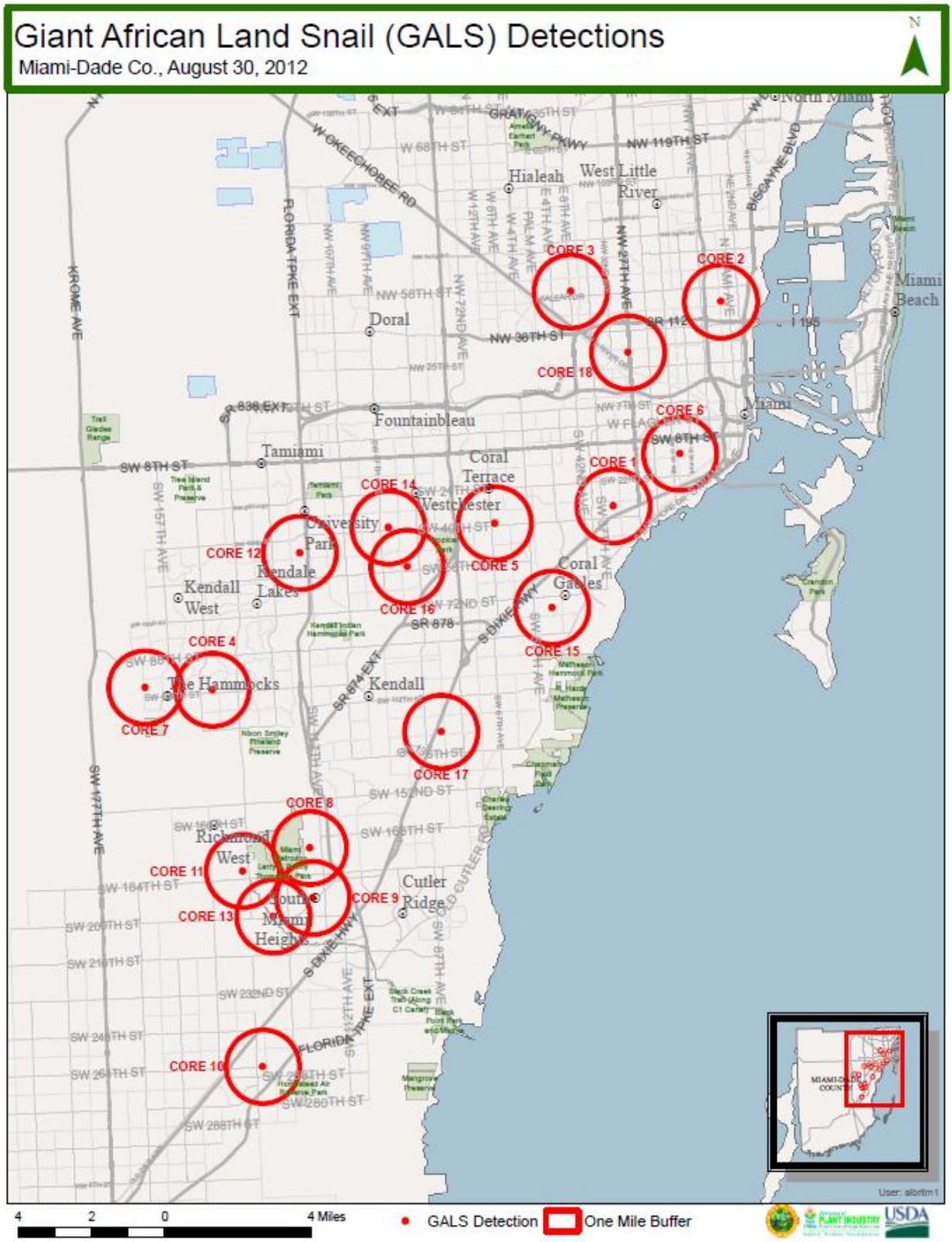
Appendix A. Map of GAS-infested area