Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Giant African Snail Cooperative Eradication Program in Florida

Final Environmental Assessment

May 2024

Agency Contact:
Melinda Sullivan
National Policy Manager
Plant Protection and Quarantine
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4700 River Road
Riverdale, MD 20737

Table of Contents

List of Tables and Figures

List of Abbreviations and Acronyms

A	Acre
a.i.	Active ingredient
APHIS	Animal and Plant Health Inspection Service
CC	Climate change
CDC	Centers for Disease Control
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DPS	Distinct population segment
EA	Environmental assessment
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
FDACS	Florida Department of Agriculture and Consumer Services
fl.	Fluid
GAS	Giant African snail
HUD	U.S. Department of Housing and Urban Development
Koc	Soil adsorption coefficient
lb	Pound
LC_{50}	Lethal concentration at which 50% of treated population dies
LD_{50}	Lethal dose at which 50% of treated population dies
mi^2	Square miles
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
oz	Ounces
PPE	Personal protective equipment
Reg. No.	Registration number
SLN	Special local needs (label type)
spp.	Species (plural)
ssp.	Subspecies
T&E	Threatened and Endangered
UF IFAS	University of Florida, Institute of Food and Agricultural Sciences
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
µg	microgram

I. Introduction

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) in cooperation with the Florida Department of Agriculture and Consumer Services (FDACS) is considering options for a statewide program to eradicate giant African snails[1] [*Lissachatina fulica* (Bowdich)[2], (Achatinidae)] in Florida wherever they are found. The giant African snail (GAS[3]) (Figure 1) has been discovered in the New Port Richey (Pasco County), Fort Myers (Lee County), and Miramar (Broward County) areas. The proposed program will be similar to the 2011-2021 South Florida Cooperative Snail Eradication Program that started and eradicated an outbreak of GAS in Miami-Dade and Broward Counties in September 2021 (FDACS 2024) and a similar program in recent infestations in Lee and Pasco Counties (USDA APHIS 2023e) and Broward County (USDA APHIS 2023d).

Figure 1. A giant African snail (*Lissachatina achatina*) (USGS 2015).

The GAS (Figure 1) is listed as number two of the 100 worst invasive species in the world (Lowe et al. 2000; Luque et al. 2014; ISSG 2023). It has been introduced accidentally or purposefully to countries where it has been kept as a pet, served as a food delicacy, or used for medicinal purposes, religious ceremonies, and scientific research. If introduced, it has the potential to be a significant pest to agricultural crops and be an intermediate host for the rat lungworm (*Angiostrongylus cantonensis*) and other parasites that can infect humans, pets, and livestock (Venette and Larson 2004; USDA APHIS 2018). In the United States, GAS occurs in Hawaii,

[1] Some authors/documents/labels consider *L. fulica* to be the giant African land snail when the genus changed.
[2] Formerly *Achatina fulica*
[3] GAS will be used for plural – giant African snails – in the EA and not GASs.

but it is illegal to import or possess this mollusk anywhere else in the contiguous United States without a permit.

GAS vary in phenotype (shell and body flesh color). Shell color has ranged from light to dark brown across the sites in Florida where GAS has been detected. GAS populations previously eradicated from Broward and Miami-Dade Counties in southern Florida had grayish-brown flesh. The GAS detected in west central Florida, in contrast, had milky white flesh (FDACS 2024), suggesting the source population in Pasco County came from elsewhere. Typically, albino GAS are the most common in captivity. The current Broward and Lee County GAS look similar to the Miami-Dade County GAS, but it is unknown where they originated.

An adult GAS can grow to a diameter of 3 to 8 inches or more in length, making it one of the largest of all extant land snails. Breeding begins at about 6-8 months of age and with each mating, one GAS can produce 100 to 500 viable eggs. GAS can reproduce several more times without mating again. They can generate clutches of eggs every 2 to 3 months (USDA APHIS 2018). GAS are hermaphroditic (both sexes on one individual) and can lay dormant for several months at a time (Capinera 2021).

In general, GAS live 3-5 years in the wild and 5-6 years in captivity. Typically, the GAS has a daytime resting site and moves at night to feed, depositing a trail of mucus (slime) along the way. They avoid sunlight and seek shaded, sheltered resting locations with high humidity. They can climb trees and walls and may travel up to 50 feet in a single night (USDA APHIS 2018; Capinera 2021). Transport of this pest over greater distances generally occurs through the human-assisted movement of nursery stock, soil, landscape material, and other objects where they can hide or attach.

GAS is one of the most damaging land snails, consuming at least 500 different plant species (USDA APHIS 2018). Their varied diet includes many food crops including cabbage, citrus, peanut, peas, carrots, lettuce, melons, and others and non-food crops such as cotton, rubber trees, and ornamentals such as marigolds and rainbow eucalyptus (UF IFAS 2011). They also feed on lichens, fungi, algae, and leaf litter, and to obtain calcium on animal bones, seashells, stucco, plaster, and limestone concrete. GAS can be a nuisance leaving slime trails and potentially causing traffic accidents, multiply rapidly, create a foul stench when large numbers die, and collect on houses, destroying the whitewashed siding (Sarma et al. 2015). Calcium carbonate from decaying GAS shells neutralizes more acidic soils as garden plants grow best in slightly acidic to neutral soils (Mead 1973; Poucher 1975; Smith and Fowler 2003; State of New South Wales).

GAS has been eradicated twice in Florida. The first detection was in 1969; the associated infestation was eradicated in 1975. In 1966, a boy carried three GAS in his pocket when he traveled from Hawaii. They were released into a Miami garden. It cost the State of Florida one million dollars (U.S.) and took ten years to eradicate the resulting outbreak in Miami-Dade County.

The most recent eradication of GAS was in 2021 from a detection in 2011 in Miami-Dade and Broward Counties. Eradicating GAS infestations is a slow, methodical process. The 2011 GAS

outbreak in Miami-Dade and Broward Counties took 10 years and cost $23 million to eradicate (USDA APHIS 2023a). The last live GAS in Florida in this outbreak was collected in Miami-Dade County in December 2017 (FDACS 2024).

On June 2, 2023, a population of GAS was found in Miramar, Broward County, a new population not associated with the prior infestation. In June and December 2022, FDACS confirmed the detection of GAS in the New Port Richey area of Pasco County and along a stretch of the south bank of the Caloosahatchee River in Lee County (FDACS 2024), respectively. USDA APHIS confirmed the identifications of these populations. FDACS set up local surveillance, enacted quarantines, and began treatments to eradicate GAS. FDACS treats properties with a metaldehyde-based molluscicide (granular or liquid formulations). The formulation is labeled by the U.S. Environmental Protection Agency (USEPA) for residential use (FDACS 2024). USDA APHIS has assisted in these outbreaks by providing detector dogs, training for canines and canine handlers, investigative resources, and funding for control efforts.

In October 2022, FDACS confirmed the presence of rat lungworm in the GAS population infesting Pasco County (FDACS 2024). The rat lungworm causes eosinophilic meningitis[4] in humans and is prevalent in Southeast Asia and tropical Pacific islands (CDC 2020). The recognized distribution of the parasite has been increasing over time and infections have been identified in other areas, including Africa, the Caribbean, and the United States.

Quarantines have been set up in Broward, Lee, and Pasco Counties (maps given in Appendix A). Under the quarantines, it is unlawful to move GAS or regulated articles, including but not limited to, plants, plant parts, plants in soil, soil, yard waste, debris, compost, or building materials, within, through or from a quarantine area without a compliance agreement (FDACS 2024).

- FDACS identified 13 stock dealers and 12 nurseries inside the Pasco County quarantine boundary. Within the “core area” (a 200-yard radius centering on each confirmed GAS find), four stock dealers and one nursery were identified. It is still unknown how the site became infested. So far, GAS have only been found in residential areas as of November 2023. Extensive surveys of nurseries and agricultural production facilities within the Pasco County quarantine continue to be negative for GAS.

- FDACS identified four stock dealers and two nurseries inside the Lee County quarantine boundary but none within the core area. It is still unknown how the site became infested. So far only residential areas have been affected; as of November 2023, extensive surveys of nurseries and agricultural production facilities within the Lee County quarantine continue to be negative for GAS.

- On June 2, 2023, the presence of GAS was detected in Broward County. FDACS identified five stock dealers and one nursery inside the quarantine area for Broward County boundary but none are within the core areas. It is still unknown how the site became infested. As of November 2023, no further live GAS have been detected.

[4] Eosinophilic meningitis is a rare form of meningitis. Meningitis is inflammation of the fluid and membranes, the meninges, in the brain and spinal cord. Eosinophilic meningitis generally develops from certain parasites that normally infect animals. It is rare in people but risk depends on where they live, travel, or work.

It is anticipated that GAS detections in Florida will continue, but it is unknown where and when these will occur. Prior GAS detections illustrate their sporadic nature and geographic scope.

A. Purpose and Need

The State of Florida has requested federal resources to help control GAS outbreaks in affected counties. An uncontrolled population of GAS could cause extensive damage to the state's tropical and subtropical environments and residential ornamental plants and landscaping. Florida crops may also be at risk if GAS infestations spread beyond residential areas.

The proposed cooperative Program is needed to eradicate GAS infestations in Florida and reduce the potential for the GAS to spread elsewhere. Regions outside of Broward, Lee, and Pasco Counties could become infested since people can unknowingly transfer GAS, snails and eggs, from one location to another. GAS thrive in forest edges, modified forests, and plantation habitats (Smith and Fowler 2003). In countries where GAS are established, the most severe infestations tend to be in disturbed areas including residential and croplands, forest edges, shorelines, and along roadways (Numazawa et al. 1988). GAS are now found on all continents except Antarctica. In North America, GAS populations could survive the climate in non-mountainous regions of the following states: Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Texas, New Mexico, Arizona, California, and potentially parts of Oregon and Washington (Figure 2).

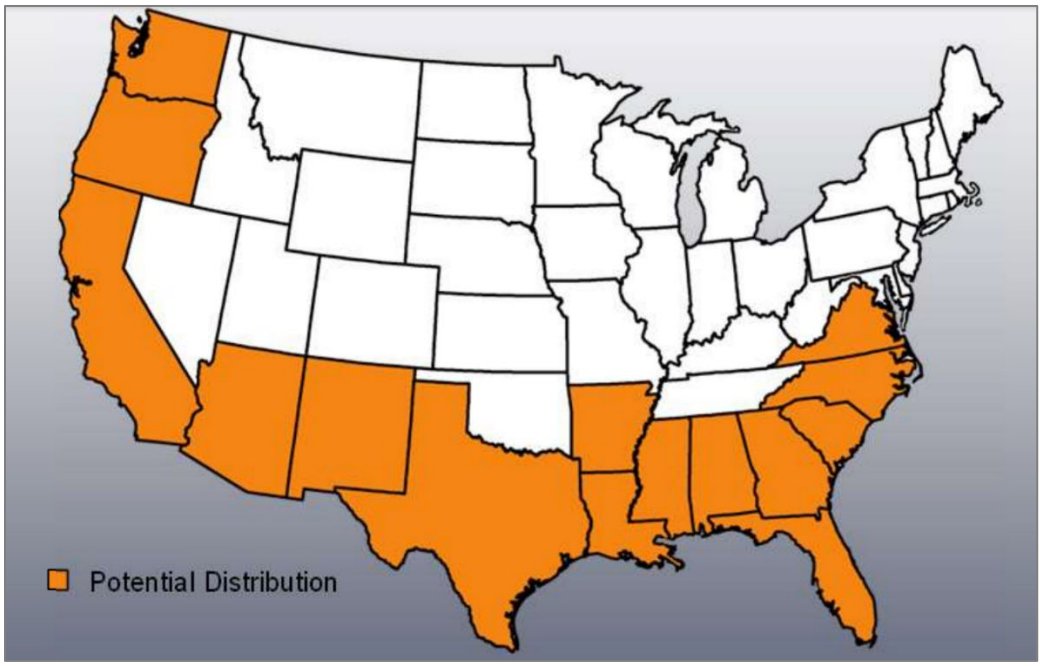


Figure 2. Potential distribution of GAS in the United States (Stocks et al. 2022).

To protect Florida agriculture and the human environment, USDA APHIS in cooperation with FDACS, proposes to implement an eradication program ("Program") throughout Florida where

any new infestation occurs. USDA APHIS would help undertake a Program like the ones implemented for Broward and Miami-Dade Counties (USDA APHIS 2021) which successfully eradicated a GAS infestation detected in 2011, and the 2022 outbreaks in Lee and Pasco Counties, as well as the 2023 infestation in Broward County, where eradication is underway. Under the Program, USDA APHIS and FDACS personnel and cooperators would survey properties to delimit the infestation, conduct physical removal of GAS using detector dogs, visual inspections, or possibly placing traps, remove debris within the core areas, and apply the pesticide (molluscicide) metaldehyde, as appropriate. Pesticides that the Program uses, namely metaldehyde, are formulated for residential or agricultural settings.

B. Regulatory Considerations

This document is an environmental assessment (EA) that USDA APHIS prepared to determine potential impacts from federal support of GAS eradication activities in Florida. USDA APHIS considers many laws and regulations while planning a pest response program[5].

USDA APHIS has prepared this EA to comply with the provisions of the National Environmental Policy Act of 1969 (NEPA) (42 USC §§ 4321 et seq.) as prescribed in implementing regulations adopted by the President's Council on Environmental Quality (CEQ) (40 CFR parts 1500-1508), USDA's NEPA regulations at 7 CFR part 1b, and APHIS' NEPA implementing procedures (7 CFR part 372) for the purpose of evaluating the potential effects of the proposed action on the human environment (40 CFR § 1508.1(m)).

USDA APHIS has the responsibility for taking actions to exclude, eradicate, and control plant pests under the Plant Protection Act of 2000 (7 USC 7701 et seq.). Achatinine snails including GAS are specifically prohibited for both interstate movement and importation into the United States and regulated by USDA APHIS. The proposed action will eliminate an infestation of GAS, an invasive mollusk pest that consumes a wide variety of plant species found in Florida agricultural regions and ecosystems.

[5] Laws and regulations that were deemed relevant to the proposed Program are listed in Appendix C.

II. Alternatives

USDA APHIS compared various action alternatives and selected two for further consideration: the No Action Alternative and the Preferred Alternative (Eradication). Both are reasonable alternatives in that they are each technically and economically feasible. However, the No Action alternative may not meet the purpose and need of the proposed action, nor fulfill the agency's regulatory requirements. Potential impacts from their implementation are discussed in Chapter III, the environmental consequences section of this document.

This chapter also lists action alternatives not analyzed in Chapter III. These alternatives are not technically or economically feasible for USDA APHIS, or do not meet the agency's goal of eradication of GAS from Florida and its mission to prevent invasive species introduction to sensitive areas of the United States.

A. No Action Alternative

The No Action Alternative is the *status quo*, a continuation of the state and local actions that are already being taken to eradicate GAS in Broward, Lee, and Pasco Counties and not being taken elsewhere in Florida. Under the No Action Alternative, USDA APHIS would continue to participate in the three infestations in Broward (USDA APHIS 2023d), and Lee and Pasco Counties (USDA APHIS 2023e) actions covered under previous NEPA decisions but would not participate in future eradication efforts for GAS populations discovered elsewhere. Non-federal entities, such as FDACS, Florida landowners, or commercial growers, could conduct control measures on their own without assistance from USDA APHIS for new detections. Since USDA APHIS would not provide resources or take other actions during future outbreaks, eradication of the GAS in Florida would likely depend on the effectiveness of the response of FDACS and private entities.

B. Preferred Alternative (Eradication)

A statewide GAS Eradication Program is proposed for Florida (the Preferred Alternative) anywhere a GAS population is detected, a cooperative effort between USDA APHIS and FDACS with help from Florida commercial crop producers. Under the preferred alternative, Program personnel would survey properties to delimit newly detected GAS infestation with detector dogs and visual inspections, and possibly snail traps, physically removing any GAS found, and applying the pesticide (molluscicide) metaldehyde as necessary. Additionally, debris would be removed from core areas, a 200-yard radius centering on each confirmed GAS find, to minimize habitat for them.

FDACS has active GAS quarantines in Broward, Lee, and Pasco Counties where the Program would continue to conduct eradication activities. Surveillance may occur anywhere in these Counties. Under the preferred alternative, the quarantine area may expand or a new quarantine

may be established if a GAS is found in Florida outside the boundary of an active quarantine area.

Program personnel conduct surveys anytime, daytime or nighttime, but are typically conducted when GAS are most active in cooler damp temperatures especially following rain or in early morning hours. The Program uses visual inspection and canine detection to survey for GAS. The survey boundary is a 200-yard circle centering on a confirmed GAS find. In addition, the Program may place "*stop sale/hold"* orders on nurseries that have a positive find. Plant nurseries enter into compliance agreements with the Program that include specific survey and control requirements to ensure their plant material is GAS-free prior to movement off the premises. The Program may use molluscicide treatments as allowed to reduce GAS in the survey area.

Regular and extensive hand picking is effective in reducing adult numbers, but the small size of eggs and juveniles (neonates) makes it difficult to see and remove all GAS. However, when done in combination with other control methods, particularly in newly infested areas, hand-removal contributes to eradication efforts. GAS collected are frozen or immersed in alcohol or boiling water to dispose of them.

Metaldehyde is a commonly used molluscicide that has a wide variety of agricultural and non-agricultural uses. Formulations vary (Table 1), but applications are typically made with lures or food incorporated into a granule or as a liquid sprayed onto soil or some plants. Slugs, snails, and other gastropods that encounter the treatment are exposed to metaldehyde through ingestion or absorption. Metaldehyde disrupts the mucus-secreting cells in the animal, which results in dehydration and eventual death.

The Program would provide multiple metaldehyde treatment options for eradicating GAS infestations. The Program follows label instructions on application rates and frequency as well as any restrictions. Table 1 lists the product name, application rate, application frequency, and application method the Program proposes to use. ORCAL Slug and Snail Bait 3.25% and Deadline® Ornamental 4% contain a bittering agent to reduce the chance of incidental exposure to birds and mammals, as well as domestic pets. ORCAL Slug-Fest® 25% and Durham® Metaldehyde Granules 7.5% are applied by hand as targeted treatments. ORCAL Slug and Snail Bait and Deadline Ornamental 4% can be applied with a broadcast spreader.

The Program creates a treatment grid based on properties with a positive snail detection. Properties adjoining and adjacent to positive properties are included in the treatment grid. All greenspace on positive and negative properties in a treatment grid would receive a broadcast treatment of ORCAL Slug and Snail Bait or Deadline Ornamental at the label rates. In addition to the broadcast treatment, on positive properties the Program would make an application of Slug-Fest or Durham at the site of the GAS find, applying the product within one foot of the site. The Program applies a second treatment of metaldehyde to the properties within the treatment grid at least 14 or 21 days after the first application or according to label treatment schedules. A 10-foot treatment buffer from aquatic areas is followed for metaldehyde granular and liquid treatments. In buffer areas, the Program will use visual detection and detector dogs with physical removal to treat GAS infestations.

Table 1. Metaldehyde formulations the Program proposes to use for GAS eradication.

Product	Application rate	Frequency	Property status for properties other than plant nurseries	Application method
Deadline® Ornamental (Alternative brand name Deadline T&O) 4%, pellet with bittering agent Bitrex USEPA Reg. No. 5481-511 FL SLN No. 140001[a]	2 lb a.i./acre (A)	As needed	Positive or negative - Use to treat snail positive, adjoining, and adjacent properties	Apply using a hand-held spreader The Program would use this pesticide as a second choice to ORCAL Slug and Snail Bait, which also contains a bittering agent
Durham® Metaldehyde Granules 7.5% metaldehyde USEPA Reg. No. 5481-103	2 lb a.i./A Applications are made within 1-foot of a GAS find.	As needed but no more than 6 applications/ year	Positive - Used in infested areas where the Program collected GAS and egg laying likely occurred	Targeted broadcast by hand in areas where GAS are detected Used to target infested small areas and areas difficult to reach with the preferred pellet formulations. The granules are sand core granules coated with the metaldehyde.
ORCAL® Slug and Snail Bait 3.25% metaldehyde, with bittering agent (bitrex) Sublabel A – Agricultural Label Sublabel B – Residential Label USEPA Reg. No. 71096-7	Sublabel A: 2 lb a.i./A Sublabel B: between 18 to 20 pellets per linear foot depending on use site	Sublabel A: As needed but no more than 6 applications/ year Sublabel B: 2 to 6 times/year, depending on use site	Positive or negative - Use to treat snail positive, adjoining, and adjacent properties	Broadcast using a hand-held spreader The Program prefers this pesticide for broadcast applications, because it has a bittering agent and would use this more widely than other Program pesticides
ORCAL® Slug-Fest All Weather Formula, 25% metaldehyde, liquid USEPA Reg. No. 71096-4 FL SLN No. 140005	118 fl. oz per treated acre (2 lb a.i. /A) For use in traps, mix 5 to 10 fl. oz with 10 gallons of water and fill the bottom of each trap with up to one-inch of pre-moistened soil and then apply the Slug-Fest solution to the soil until moist. Applications are within 1-foot of a snail find.	As needed but no more than 6 applications per year	Positive Used in infested areas where the Program collected snails and egg laying likely occurred Positive or negative when used in snail traps	Targeted spray in areas where snails are detected using backpack sprayer or hand-pulled tank sprayer Used to target small, infested areas or in areas difficult to reach with the preferred pellet formulations. Used in gastropod traps (SLN) to aid in the detection of snails. Place traps in wet shady areas at a minimum of 3 feet apart in areas specified on the SLN label

[a] The Deadline SLN No. FL-140001 is labeled for use in Broward, Lee, Miami-Dade Lee, and Pasco Counties.

SLN – Special Local Needs label a.i. – active ingredient A – acre lb – pound oz - ounce

The Program does not anticipate using snail traps but may if they are needed to aid in the detection of the GAS. If used, traps contain a food attractive to GAS such as fermenting yeast, flour dough, or a synthetic lure which is topped with 1-inch of metaldehyde-treated soil. The Program would mix 5 to 10 fluid ounces of ORCAL Slug-Fest with 10 gallons of water and adds this dilution to the soil in the trap until the soil is moistened. The traps are placed in wet, shady areas at a minimum of three feet apart in areas known to have infestations as well as in areas to confirm control measures were successful. Traps containing metaldehyde could be used in commercial nurseries but not in residential areas. The overall length of time a snail trap would be used at a site varies with the risk associated with that location.

Traps could be used in an area for at least 6 months after the last detection of a GAS. The Program would try to service the traps daily to allow for immediate response to the presence of a GAS. The synthetic lure remains attractive to snails for 10 days with the Program replacing the attractive food and lure more frequently, preferably daily, due to secondary invaders such as flies and the tendency for the lure to dry out. The Program replaces the metaldehyde-treated soil regularly or the trap when the trap is saturated with snails, following label instructions. The Program uses traps only in areas specified on labels (Table 1).

Prior to treatment with metaldehyde, the Program would obtain signed consent forms from residents or landowners. The Program provides residents or landowners with a 24-hour notice that treatment will occur. Once treated, the Program gives residents and landowners a notice with the date and time the treatment occurred and the time they can reenter the treated area. The metaldehyde reentry time is 12 hours; a reentry time is not associated with snail traps.

Pesticide treatments may continue for two to four years. After termination of eradication treatments, the area will be monitored according to the plan that outlines the procedures for the eradication to ensure that the GAS has been eradicated.

C. Alternatives Considered but Not Further Analyzed

A few alternatives were considered but dropped from further analysis because they would not satisfy the regulatory obligations of USDA APHIS.

1. No Federal Program Alternative

Under the No Federal Program Alternative, neither USDA APHIS nor any other federal agency would assist with Florida's GAS eradication program. This alternative is similar to the No Action Alternative because FDACS or private entities would have to conduct GAS removal activities without federal funding or other assistance from USDA APHIS, the agency responsible for plant pests. Without federal resources and coordination, there is a substantially higher likelihood that GAS could start to populate additional areas in Florida. This alternative does not comply with the Plant Protection Act of 2000, whereby Congress articulated that federal agencies take steps to stop dissemination of plant pests within the United States, or with Executive Order (EO) 13112, which orders federal agencies to minimize problems from invasive

species introduction. This is not a viable alternative to meet the requirement for USDA APHIS to act regarding the control of GAS in the United States.

2. Physical Removal Only Alternative

The public may voice concerns regarding Program methods used to control GAS, particularly the use of pesticides such as the metaldehyde formulations. Program use of detector dogs and visual detection with hand capture and removal of debris may reduce populations but is unlikely to eliminate GAS eggs and neonates (young larvae). Metaldehyde is the best molluscicide currently available for this and can be used in treatments and traps (traps have not been used by the Program, thus far). If an infestation becomes established, GAS could spread throughout Florida, especially much of the southern half of the state where ideal climate conditions exists for this species. A Program that targets the different life stages and habitats of GAS is necessary to ensure eradication of the infestations within Florida. Thus, eliminating the primary method, a molluscicide, for GAS will not be considered for further analysis.

3. Consulting Alternative

This alternative would allow UDSA APHIS to provide FDACS and others with technical assistance only to help them resolve GAS infestations wherever found. This would be counter to the Plant Protection Act of 2000 whereby Congress articulated that USDA APHIS take steps to protect plants and halt dissemination of plant pests within the United States. Also, under EO 13112 on invasive species, USDA APHIS is tasked with minimizing problems from invasive species including their introduction and control. A consulting alternative does not meet the federal need for action regarding the eradication of this invasive pest.

III. Potential Environmental Consequences

GAS can flourish in Florida's tropical and subtropical climates and could spread elsewhere if left unabated. The state contains mixed residential areas, state and county parks, commercial, industrial, and agricultural production including plant nurseries. Florida, the southeastern most state, is bordered by Georgia and Alabama to the north and northwest, respectively. It is surrounded by the Gulf of Mexico and Atlantic Ocean on the west and east, respectively. Florida is 65,758 miles square (mi^2), equaling 53,625 mi^2 of land and 12,133 mi^2 of water. Tourism, agriculture, international trade, and water recreation and fishing are some of Florida's largest economic drivers. There are 9.7 million acres dedicated to agriculture in Florida, totaling up to nearly $7.5 billion in revenue (USDA NASS 2017). Population (21.5 million) statistics for Florida are:

- About 401 residents per mi^2.
- About 52% white, 25% Latino or Hispanic, 17% Black or African American, 3% Asian, and 3% other.
- About 89% have a high school or higher degree by 25 years of age or higher.
- The median household income is $61,777.
- The poverty rate is 12.7%, which is slightly higher than the national average of 11.5%.

Residents should not be impacted by GAS treatments when USEPA label directions, which protect against harms to human health, are followed. Some minority populations, including rural agricultural producing populations and populations who are already below the poverty line, could benefit from GAS control. Florida's minority populations, particularly Black and Hispanic, are higher than the national average and impacts of treatments or no treatments in this EA are considered to their populations.

Florida agriculture is important to the economy of the state. Florida provides 73% of the U.S. value of Valencia oranges, 42% of all oranges, 36% of sweet corn, and many other commodities. Data about local agricultural production, obtained from the most recent census of agriculture (USDA NASS 2017), is provided in Table 2. Agricultural crops can be severely impacted by GAS and, therefore, impacts of eradication treatments or no treatments in this EA are considered for Florida agriculture.

Table 2. Agricultural production in Florida during 2017 (USDA NASS 2017).

NASS Census Categories	Florida Statewide
Market Value of Agricultural Products Sold, U.S. dollars	Total (crops, livestock, poultry, etc.): $7,357,343,000 Crops Only - $5,704,533,000
Land in Farms, acres	9,731,731 A
Agricultural Producers (Data collected for a maximum of 4 producers per farm.)	Total – 79, 993 (Male- 47,272 : Female- 32,661) Aged 65 or older – 28,920 By Race • American Indian/ Alaska Native – 453 • Asian - 958 • Black or African American – 1,615 • Native Hawaiian/ Pacific Islander - 93 • White – 45, 056 • Two or more races - 606 • Hispanic/Latino/Spanish origin – 5,267

A. Impacts Considered in This Chapter

This chapter focuses on the potential environmental consequences associated with the two alternatives. The No Action Alternative is used as the baseline and compared to the potential impacts of the Preferred Alternative. The potential impacts may be direct, indirect, and of short or long duration. Impacts may also be either beneficial or adverse. Reasonably foreseeable effects on the human environment are identified. Overarching impact categories include:

- Impacts on environmental quality.
- Impacts to ecological resources.
- Impacts to human health and safety.

B. Impacts Not Discussed in Depth

Air quality, soil quality, water quality, and climate change are not discussed in depth in this document because USDA APHIS reviewed a similar program targeting horntail snail (*Macrochlamys indica*) in south Florida (USDA APHIS 2022) and pertinent information has been incorporated by reference into this EA. APHIS expects that the proposed activities for the No Action and Preferred Alternatives for this Program will have minimal to no impacts if the eradication treatment protocols are followed. Adverse impacts to environmental quality are not anticipated because of the prescribed use patterns for metaldehyde, as well as its environmental fate:

- The use of a granular formulation and large coarse droplets in the spot liquid applications along with a lack of volatility of metaldehyde assures that air quality will not be impacted in the treatment areas. Metaldehyde is stable to hydrolysis and photolysis but shows degradation in the presence of microbes with a reported aerobic soil metabolism half-life in soil of 67 days. Degradation by microbial processes is also supported by field data that demonstrates a half-life of metaldehyde of less than 15 days in water and sediment (Calumpang et al. 1995; Bieri 2003; Austrian Agency for Health and Food Safety 2016; Thomas 2016; Thomas et al. 2017). The primary degradation products of metaldehyde are acetaldehyde and carbon dioxide which have been shown to represent 11 and 74%, respectively, of the parent in laboratory studies (USEPA 2006). Metaldehyde may impact some soil dwelling invertebrates after repeated use in the same area, but due to the limited areas of treatment and selective toxicity, impacts are not expected to be widespread or affect other soil dwelling invertebrates. Metaldehyde has a solubility of 200 mg/L with a range of adsorption coefficient (Koc) values of 57 to 173. Koc values determine how mobile a pesticide may be in soil. The higher the Koc value the more likely it is to bind to soil and not occur in solution in runoff. The Koc values reported for metaldehyde suggest some mobility in soil. Metaldehyde is expected to be moderately persistent with an aerobic half-life of 67 days and an anaerobic half-life typically greater than 200 days (USEPA 2006; 2020). Degradation is much slower under anaerobic conditions with half-lives typically greater than 200 days (USEPA 2006).

- Label restrictions prohibit applications to water and granular formulations minimize the likelihood of runoff. Drift and runoff potential from spot liquid applications is also expected to be low since a large coarse droplet size will be used and all liquid applications will be made by hand to targeted spots (1-foot around a snail find) under vegetated areas. The potential for runoff to occur from applications to treat the GAS will further be reduced by treatment restrictions for the Program that require a 10-foot application buffer from all waterbodies.

- Greenhouse gas emissions and potential contribution to global climate change are expected to be minor. The Program's use of fossil fuels in vehicles for travel to and from treatment sites would be minimal for both the No Action and Proposed Action Alternatives.

C. Impacts Under the No Action Alternative

The No Action Alternative consists of the actions previously conducted by USDA APHIS to eradicate the GAS in Florida, with no participation by USDA APHIS in future GAS programs in Florida. Effective September 30, 2021, USDA APHIS declared eradication and ended its GAS quarantines in Broward and Miami-Dade Counties after USDA APHIS and FDACS found GAS-free for three consecutive years (USDA APHIS 2021). Newer outbreaks in Broward, Lee, and Pasco Counties would continue until these populations are eradicated.

While non-federal entities may take control actions on their own, without USDA APHIS participation, the GAS population would likely continue to increase and spread as people

inadvertently move GAS life stages in soil, stone, plants, plant debris, and other material. With limited state funding for GAS management, the population could spread outside of its current range in Broward, Lee, and Pasco Counties and expand to other areas of Florida and the United States (Appendix A) or a new population could be brought to Florida from elsewhere.

Eradication efforts by FDACS, other agencies, and the private sector in Florida would likely involve applications of metaldehyde, visual and canine detection along with hand removal, surveillance, and restricted host movement. Debris is also collected around positive finds to reduce habitat for GAS. The most likely impact to human health and the environment under this alternative would be from uncoordinated or illegal applications of metaldehyde and other pesticides, and improper GAS handling and disposal. Appropriate personal protective equipment (PPE) such as latex gloves are worn to ensure disease such as rat lungworm is not transferred to personnel.

Under the no action alternative, USDA APHIS would not directly impact air, water, soil, nontarget species, human health, ecosystems, historic, cultural, and other resources in GAS eradication areas. However, the lack of federal participation in Florida's GAS eradication efforts could indirectly support GAS population establishment in Florida, damaging the local ecology, economy, and quality of life.

- Ecological resources include plant and animal species and the habitats where they live and include protected species. The GAS would be expected to damage susceptible native vegetation, including rare species, if populations become sufficiently high. It is expected to cause damage to commercial agricultural crops and horticultural plants.

    - The range of plant species consumed by GAS is broad (Appendix C) but GAS will eat anything in their path including discarded plant material, stucco, detritus, and organic waste. The GAS is not known to feed on any of the federally listed threatened and endangered (T&E) plant species in Florida identified in Appendix D, but it is possible.

    - Approximately 100 native snail and slug species, and about 40 introduced exotic species make up the land gastropods in Florida (Garofalo et al. 2001). Most of the 140 species are less than ½-inch long. A tree snail species, the Manatee snail (*Drymaeus dormani*), is considered beneficial by citrus growers because it clears algae and mold from the leaves (Garofalo et al. 2001). The invasive GAS will compete for resources with native snails. It is anticipated that pesticide applications would increase over the long term if GAS populations increased and spread. In addition to increased pesticide loading, it is possible that pesticides that pose a higher comparative risk to human health and the environment than metaldehyde that the Program proposes to use under the preferred alternative will be used to remove GAS if they become more abundant.

    - Actions by FDACS and potentially others would not likely impact bird and mammal habitat directly, but eliminating GAS infestations could be beneficial to the environment, especially plants that it consumes or damages. It is possible that

migratory birds could be disturbed by actions to eliminate GAS by USDA APHIS personnel coming and going from infested areas where birds may be present and inadvertently scaring them. However, this work would be of short duration and not likely to disrupt nesting or cause any impacts other than short term disturbance (cite the NEPA documents that covered this issue).

- Currently, the GAS infestations are found mostly in residential settings where plant loss would be confined to landscape and garden plants. The Program has found GAS in several plant nurseries. Expansion of GAS to other areas in Florida could pose a threat to agriculture. Commercial producers with GAS in their agricultural and nursery crops may experience loss of market share, loss of property, increase in control costs, and compromised mental and physical health from increased stress.

- Homeowners might experience property damage and loss of landscape plants and could incur costs should they chose to treat GAS with commercially available products.

D. Impacts Under the Preferred Alternative

This section considers the potential environmental consequences for the preferred alternative by summarizing information associated with environmental quality, ecological resources, and human health and safety in the proposed Program area (any part or all of the State of Florida). APHIS has determined that the specific location of a GAS population in Florida is unlikely to alter potential direct or indirect impacts to the human environment from them.

1. Environmental Quality

Hand removal of snails will not impact air, soil, or water resources. The most frequent types of ground disturbance would be from vehicles and Program personnel walking to conduct Program activities. Many of the activities associated with the Program may result in temporary soil surface disturbance or compaction. Since the GAS currently occurs in highly disturbed areas where soil quality is already impacted by human activities, the Program in these areas will have negligible negative impacts.

Vehicle emissions associated with getting to and from project sites would be minor relative to the ongoing and future emissions from urbanization, highway traffic, and agricultural production. Future actions that could increase emissions (e.g., housing developments and road expansions leading to more traffic) are difficult to quantify because emissions from mobile sources are subject to changing fuel mileage and emissions standards and regulations. Nevertheless, the additional contribution from implementing the preferred alternative statewide would remain minor.

Impacts from Program use of metaldehyde to air, soil and water quality are not anticipated from the Program's use pattern of the molluscicide and its environmental fate. Metaldehyde is stable

to hydrolysis (chemical breakdown from chemical reaction with water) and photolysis (chemical breakdown from reaction to light) and was discussed in Section III.B.

Label restrictions prohibiting applications to water and granular formulation will reduce the likelihood of runoff. Drift and runoff potential from spot liquid applications is expected to be low since a large coarse droplet size will be used and all liquid applications will be made by hand to targeted spots (1-foot around a snail find) under vegetated areas. The potential for runoff to occur from applications to treat the GAS will further be reduced by treatment restrictions for the Program that require a 10-foot no-application buffer from all water bodies. This 10-foot no-application buffer would also apply to snail traps if used, which reduces the likelihood the traps dislodge into water bodies during extreme rain events. Metaldehyde runoff from snail traps is also unlikely as the metaldehyde-treated soil is contained within the trap and does not contact the ground; the traps are placed under vegetation, which provides some protection from rain events. The use of a granular formulation and large coarse droplets in the spot liquid applications along with a lack of volatility of metaldehyde suggests that air quality will not be impacted in the treatment areas.

2. Ecological Resources

Metaldehyde is moderately toxic to mammals and birds (USEPA 2020); the Program prefers to use metaldehyde formulations that contain a bittering agent to reduce the palatability of metaldehyde to nontarget species. This provides some deterrence to nontarget wildlife, as do the targeted application methods. Exposure and risk to domestic animals is discussed below under Human Health and Safety.

Impacts to some soil dwelling terrestrial invertebrates could occur; however, these effects would be localized to the areas of treatment, and specific to those invertebrates that would be attracted to the treatment lure or food. Risk to insects such as sensitive lepidopterans is not anticipated because the product is not applied to foliage as a spray where most lepidopterans forage and could be exposed. In addition, the materials in the formulation that are attractive to the GAS are not components that would typically attract lepidopteran insects. Metaldehyde is practically nontoxic to the adult honeybee for both the acute oral (LD_{50}>87 micrograms (µg) a.i./bee) and contact exposure (48 hr LC_{50}>113 µg a.i./bee) (USEPA 2020). The Program expects minimal exposure to bees based on its use pattern of soil applications (no foliar applications).

In aquatic systems, fish and aquatic invertebrates show low sensitivity to metaldehyde (USEPA 2020). The lack of toxicity has also been demonstrated in field studies where metaldehyde has been used to treat aquaculture ponds for invasive snails (Calumpang et al. 1995; Borlongan and Coloso 1996; Coloso et al. 1998). Label restrictions regarding metaldehyde applications near water include the requirement of a 10-foot application buffer from aquatic resources, reducing the potential for exposure and results in a very low probability for any adverse effects to aquatic organisms. The spot applications and trap placements would also adhere to the 10-foot application buffer from aquatic resources, and with conservative estimates of residues, is not expected to result in impacts to aquatic biota. The bittering agent, denatonium benzoate, appears to have low toxicity to fish.

a) Migratory Bird Treaty Act

While GAS eradication activities may temporarily disturb migratory birds, USDA APHIS expects this disturbance to be negligible. Some examples of anticipated disturbance associated with Program activities includes the use of vehicles and human noise. However, GAS infestations, thus far, have been found in urban profile, highly developed areas where disturbance of migratory birds from Program activities would be minimal. In other areas, disturbance would be of short duration and birds would resume activities following the disturbance if it was sufficient enough to disturb them.

Metaldehyde treatments will not result in significant adverse direct or indirect impacts to migratory birds. Metaldehyde has moderate toxicity to birds. The selective nature of the metaldehyde formulation as well as the localized treatment areas would result in low direct risk to terrestrial insectivores. The Program prefers to use metaldehyde formulations that contain a bittering agent, which may reduce exposure of birds by reducing the palatability of the product.

b) Bald and Golden Eagle Protection Act

If bald or golden eagles were discovered near a Program area, the State agency responsible for the area would contact the U.S. Fish and Wildlife Service (USFWS) and implement recommendations for avoiding disturbance at nest sites such as conducting all activities at night. For bald eagles, USDA APHIS would follow guidance as provided in the National Bald Eagle Management Guidelines (USFWS 2007). These guidelines include a 330 to 660-foot buffer from an active nest, depending on the visibility and level of activity near the nest. USDA APHIS expects pesticide exposure to terrestrial and aquatic nontarget organisms to be negligible, and subsequently, the potential for risk of eagles to Program pesticides is very low. USDA APHIS expects disturbance from other activities such as survey or accessing treatment sites to be negligible.

c) Endangered Species Act

USDA APHIS consults with USFWS under Section 7 of the Endangered Species Act (ESA) on the effects of Program activities to federally listed T&E species in Florida. USDA APHIS submitted a biological assessment to the USFWS November 2023 and will abide by any determinations that USFWS makes in the ESA Section 7 consultation (USDA APHIS 2023c). USDA APHIS determined that the Program's surveys or use of handpicking GAS, detector dogs, metaldehyde, and papaya oil attractant would have no effect on most listed T&E species in Florida (Appendix D). However, we have determined that the Program may affect but is not likely to adversely affect eight species (Table 3; Appendix D – Table D-1). USDA APHIS determined that the program's use of metaldehyde may affect but is not likely to adversely affect the Key deer, Everglade snail kite, Audubon's crested caracara, Florida scrub-jay, Florida grasshopper sparrow, Florida Keys mole skink, blue-tailed mole skink, eastern indigo snake, and Stock Island snail primarily from consuming treated granules (deer, jay, and sparrow, and possibly the reptiles and snail) or treated snails and other invertebrates that died from toxic

doses. T&E reptiles could be exposed dermally if they entered a treatment area but would not likely receive a toxic dose. However, it is expected that these pathways would not provide enough toxicant to have more than a minor effect on these species. The reptiles also could lose prey sources in treatment areas but this would likely have a negligible effect, if any. The other methods used by the Program are anticipated to have no effect on T&E species.

Table 3. Threatened and endangered species in Florida receiving a "May Effect, Not Likely to Adversely Affect" Determination.

Group	Species	Scientific Name
Mammals	Key Deer	*Odocoileus virginianus clavium*
Bird	Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*
	Audubon's Crested Caracara [FL DPS]	*Polyborus plancus audubonii*
	Florida Scrub-Jay	*Aphelocoma coerulescens*
	Florida Grasshopper Sparrow	*Ammodramus savannarum floridanus*
Reptile	Florida Keys Mole Skink	*Eumeces egregius egregius*
	Blue-Tailed Mole Skink	*Eumeces egregius lividus*
	Eastern Indigo Snake	*Drymarchon couperi*
Mollusk	Stock Island Tree Snail	*Orthalicus reses (not incl. nesodryas)*

DPS = Distinct Population Segment

USDA APHIS implements a 10-foot no-application buffer from water resources in each metaldehyde treatment area. Program personnel must take care not to remove native snails. Workers must be able to recognize native snail species before performing any hand removal of GAS. Broadcast application of molluscicides and use of traps will not be used in habitats for at-risk snail species.

USDA APHIS did not consult with the National Marine Fisheries Service (NMFS), the agency responsible for marine T&E species, because it was determined that the Program would have no effect on these species (USDA APHIS 2023b).

3. Human Health and Safety

USDA APHIS and FDACS will invite residents who have hypersensitivity to any of the Program treatments to contact the Program to arrange for alternate methods of GAS trapping and eradication. The presence of the GAS could result in additional pesticide applications in residential, commercial, and other locations if GAS populations increase and spread. In addition to increased pesticide loading there is the potential for non-Program use of other pesticides that pose a higher comparative risk to human health and the environment than the prescribed metaldehyde treatments.

The Program applies pesticides in a way that minimizes significant exposure to people. USDA APHIS personnel and contractors are required to comply with all USEPA use requirements and meet all recommendations for PPE during pesticide application. Adherence to label requirements and additional Program measures designed to reduce exposure to workers (e.g., PPE requirements include long-sleeved shirt and long pants and shoes plus socks) and the public (e.g.,

mitigations to protect water sources and to limit spray drift, and restricted-entry intervals) result in low health risk to all human population segments from Program use of pesticides. USDA APHIS does not anticipate the metaldehyde formulations proposed for use in this Program would persist in the environment or bioaccumulate. USDA APHIS also used metaldehyde to eradicate the invasive horntail snail in February 2022 from four Florida counties (USDA APHIS 2022). The lack of significant routes of exposure to human health and the environment suggest additive or synergistic impacts from metaldehyde use did not occur in the USDA APHIS horntail snail program and would not occur in the proposed Program targeting GAS.

Metaldehyde is moderately toxic to mammals with an acute median lethality value of 283 milligrams/kilogram in rats. Dermal and inhalation toxicity is very low with median lethality values greater than the highest test concentration (USEPA 2006). Longer term exposure to metaldehyde results in a no observable effect level of ten milligrams/kilogram or higher, with the liver being the primary organ where effects have been noted. Developmental toxicity has not been observed in dosing studies at relevant doses; however, there is data to suggest that metaldehyde may be neurotoxic and potentially carcinogenic based on the presence of benign liver tumors in long term studies (USEPA 2006). Available data on acute effects for the proposed formulations demonstrate equivalent or less toxicity to mammals.

Dietary exposure and risk from the proposed use of metaldehyde is expected to be low for all population segments. The population segment with the highest probability of exposure is children who may consume metaldehyde treated material or soil. However, adherence to label language, notification of treatment to property owners, and the use of formulations with a bittering agent will reduce the potential for exposure and reduce the risk to children.

The Program notifies landowners and residents prior to treatment and provides information cards with the date and time the treatment occurred and a reminder of the 12-hour reentry period. Worker exposure and risk is expected to be low based on the toxicity of metaldehyde, the Program method of application, and adherence to label language designed to minimize exposure of humans (USEPA 2006).

Metaldehyde granular formulations contain common food materials that may be attractive to pets such as dogs. If consumed in enough quantities, adverse effects are expected (Richardson et al. 2003). Most of the reported cases involved ingestion of metaldehyde after applications to yards and gardens (not Program applications) or from the animal opening or tearing the packaging to access the product. The requirement for additional precautionary label language is designed to reduce risk of domestic pet exposure to metaldehyde USEPA (2007). Adherence to all precautionary label language, notification to landowners regarding treatments, and the use of bittering agent in some formulations will reduce the potential for adverse effects to domestic pets where metaldehyde may be used.

FDACS monitors reports of pesticide poisoning and no reports of poisoning incidents from metaldehyde have been made for any of its use cases, including its use in their GAS eradication Program which has used metaldehyde since 2013. Their Program gives residents and landowners a notice with the date and time the treatment occurred and the time they can reenter the treated

area, which is 12 hours after treatment. This reentry period reduces exposure to domestic animals and would be followed by USDA APHIS as well.

a) Minority Populations, Low-Income Populations, Racial Equity, Support for Underserved Communities, Protection of Children from Environmental Health Risks and Safety Risks

Florida has diverse demographics (Table 4) and potentially vulnerable or underserved populations that could be affected by the proposed action. Underserved or disadvantaged groups within Florida may experience a higher risk of poverty, social exclusion, discrimination, and associated violence than the general population. These underserved groups include, but may not be limited to, minorities, transient people, rural communities, people with disabilities, the elderly, and children. If GAS infestations expand beyond current outbreaks, socioeconomics and equity for disadvantaged Floridians is considered in APHIS program activities to ensure compliance with relevant environmental statutes (Appendix C) including but not limited to EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; EO 13045: Protection of Children from Environmental Health Risks and Safety Risks; EO 13166: Improving Access to Services for Persons with Limited English Proficiency; EO 13985: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government; and EO 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All.

Nationally, African Americans and Mexican Americans living in poverty have higher levels of pesticide biomarkers in their blood or urine compared to non-Hispanic whites. Pesticide exposure disparities are also evident among women of color compared to white women, with the greatest disparity observed in biomarkers of pesticide exposure. Mexican Americans and African American women above 40 have higher levels of certain legacy pesticides in their bodies than white women. The costs and disease burden associated with organophosphate pesticide exposure disproportionately affect non-Hispanic Black and Mexican American individuals compared to non-Hispanic whites. This information illustrates the concern of organophosphates, but metaldehyde is not one. A national analysis of Centers for Disease Control (CDC) data revealed that Mexican Americans and non-Hispanic Blacks had higher concentrations of most pesticides and metabolites compared to non-Hispanic whites (Donley et al. 2022).

In the state of Florida, environmental justice concerns related to pesticide exposure are particularly pronounced, impacting Hispanic and Black populations disproportionately. The agricultural sector, a significant source of employment for these communities, places farmworkers at the forefront of these challenges. Farmworkers, predominantly comprising Hispanic and Black individuals, face heightened health risks due to constant exposure to a diverse range of chemical pesticides. Studies conducted in Florida have unveiled concerning findings, showcasing elevated levels of urinary pesticide metabolites in Hispanic and Haitian female farmworkers when compared to national averages. This not only highlights the immediate risks faced by these workers but also emphasizes the potential long-term consequences of sustained exposure (Donley et al. 2022).

The disparities extend beyond the confines of the workplace with pesticides and their metabolites detected in the homes of farmworkers. This poses a dual challenge, impacting both occupational and non-occupational exposures for these vulnerable populations.

Table 4. Selected demographic information (USCB 2023).

U.S. Census Categories	Florida
Population estimated, July 1, 2022	22,244,823
Population, Census, April 1, 2020	21,538,187
Persons 5 years and younger	5.0%
Persons 18 years and younger	19.3%
Persons 65 years and older	21.6%
Females	50.8%
Hispanic/Latino	27.1%
Black or African American alone	17.0%
American Indian and Alaska Native alone	0.5%
Asian alone	3.1%
Native Hawaiian/Other Pacific Islander alone	0.1%
Two or more Races	2.4%
Has disability, under age 65 years	8.7%
No health insurance, under age 65 years	13.9%
Population in poverty	12.7%
English not spoken at home, aged 5 years+	29.8%
High school graduate or higher, aged 25 years+	89.0%
Bachelor's degree or higher, aged 25 years+	31.5%

Program actions that are vital to sustaining the social and economic wellbeing of affected communities, and which "*assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings*" (42 USC 4331, Section 101(a)(b)) are considered. This analysis helps APHIS determine if its action in the program area would have disproportionate and adverse environmental impacts to low-income, minority, disabled, or Tribal populations (i.e., "environmental justice" or "EJ" impacts). Demographic data for Florida (USCB 2023) indicates that disadvantaged communities are present in Florida and must be considered in any Program activities.

It should be noted that USDA APHIS proposes to target GAS wherever they are found and take action to stop infestations. Due to human vulnerability to certain parasites, such as the rat lungworm found in the Pasco County population of GAS, human health and safety would be protected by eliminating every GAS outbreak.

The GAS consumes a wide range of plants (Appendix B) and can cause damage to commercial crops and ornamental plants. Under the preferred alternative, eradication efforts involve survey of landscapes on public and private properties and treatment of areas where the GAS is found. Implementation of the preferred alternative is expected to prevent GAS from becoming established in Florida with an overall benefit to the human environment, protecting host plants and promoting environmental equity.

The Program's goal is the safe eradication of GAS infestations; this involves working with local communities to inform them about GAS, its impacts, and the approaches the Program uses to control snail populations. Federal agencies are directed under EO 14096 to ensure that the public, including members of communities with environmental justice concerns, receives timely information about releases of toxic chemicals that may affect them or their health, and safety measures available to address chemical applications. USDA APHIS requires that its pest control programs keep the public informed of eradication activities to avoid adverse impacts to children, the elderly, the poor, minorities, disabled, people lacking sufficient education or grasp of English to understand the Program, and other vulnerable groups.

- The Program and local authorities will communicate with residents and property owners before, during, and after planned activities, in English, Spanish, or other language as appropriate and necessary. Any communication barriers will be bridged through all available means to ensure residents understand when treatments will occur and what activities may be done to help eradicate GAS.

- Before the Program treats a site, it notifies property owners and residents where treatments could occur and when a site will be safe for re-entry. The notification process and information provided by the Program regarding reducing exposure to treatments, and the use of bittering agents in granular formulations of metaldehyde, will ensure that human health exposure and risk will be minimized, including minority and low-income populations and underserved communities.

Based on the analysis of available toxicity data and the potential for exposure, the human health and environmental risk from the proposed applications are minimal and are not expected to have disproportionate and adverse effects to any minority or low-income families. No disproportionate risks to children are anticipated from the Program's use of metaldehyde formulations to eradicate GAS. The pesticides proposed for Program use will not be used on commercial crops or food items, so no dietary exposure is expected. However, oral intake could occur through deliberate or accidental ingestion of metaldehyde granules or treated soil. Sharing the Program's treatment schedule with homeowners and residents helps prevent this type of exposure to children and adults with pica disorders. Additionally, USDA APHIS prescribes metaldehyde formulations that contain a bittering agent designed to deter ingestion by humans and other nontarget species.

Another aspect of environmental justice is the socioeconomic effects of GAS infestations on the human population. USDA APHIS personnel eliminate GAS wherever they are found and work with the landowners no matter their ethnicity, language, or income. Communication barriers are bridged through all available means to ensure residents know when treatments will occur and what activities may be done to help eradicate GAS. Eradication treatment could save ornamental plantings in residential areas as well as vegetation in agricultural and natural areas, which could be beneficial for all communities. Thus, it is believed that treatments will have no effect on environmental justice populations.

4. Tribal, Historical, and Cultural Resources

Depending on the location of the proposed action the Program may consult with the following nine federally recognized Tribal governments (HUD 2024):

- The Alabama-Coushatta Tribe of Texas
- The Choctaw Nation of Oklahoma
- The Coushatta Tribe of Louisiana
- The Miccosukee Tribe of Indians of Florida
- The Mississippi Band of Choctaw Indians
- The Muscogee (Creek) Nation
- The Poarch Band of Creek Indians
- The Seminole Nation of Oklahoma
- The Seminole Tribe of Florida

These Tribal governments have ancestral lands throughout the southeastern United States. Two Tribes currently reside and have tribal lands in the state: the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida. Although the Alabama-Coushatta Tribe of Texas, Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Muscogee Creek Nation, the Poarch Band of Creek Indians, the Seminole Nation of Oklahoma, and the Mississippi Band of Choctaw Indians do not currently have reservation lands in the state, they once inhabited the area now designated as Florida and have a direct historical and cultural association with the state. They are culturally affiliated with the State of Florida.

To date, no GAS detections have occurred on, or adjacent to, Tribal property in the State of Florida. Under the Preferred Alternative, USDA APHIS will contact potentially affected Tribes to initiate a dialogue regarding proposed activities to eradicate the GAS if its range expands into or near Tribal property. If USDA APHIS personnel discover any archaeological Tribal resources, they will notify the appropriate Tribal and local authorities.

Under the Preferred Alternative USDA APHIS will also initiate consultation as appropriate with the Florida State Historic Preservation Officer. The National Register of Historic Places lists 1,905 properties within Florida; these include some districts and archeological sites but most (1,279) are buildings (NPS 2024). The Register lists the following areas of significance for these properties: agriculture; archeology; architecture; art; Black history and culture; commerce; community planning and development; education; entertainment and recreation; ethnic heritage; exploration and settlement; health and medicine; historic, nonaboriginal, aboriginal, and prehistoric; industry; industry; invention; literature; maritime history; military; politics and government; religion; science; social history; and transportation.

Based on the criteria defined in Section 106 of the National Historic Preservation Act for what constitutes an adverse effect, the proposed Program will not have any adverse effects on historic or cultural sites in Florida. Pesticide treatments will not be applied to historic buildings, and other anticipated Program actions (e.g., survey, trapping, and hand removal of snails) will not directly affect the buildings or their properties. The use of metaldehyde on historic properties may temporarily alter public accessibility due to the prescribed 12-hour delayed reentry period. If this occurs, APHIS will first contact the Florida State Historic Preservation Office and the manager of the property. If APHIS discovers there are unanticipated effects on any registered

historic or Tribal property, the property owner and the Florida State Historic Preservation Office and, as appropriate, the Florida Tribal Historic Preservation Officer will be immediately informed, and the program will cease its treatment application at that location until both APHIS and the Florida State or Tribal Historic Preservation Office agree to an appropriate solution.

IV. Listing of Agencies Consulted

Environmental and Risk Analysis Services
Policy and Program Development
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4700 River Road, Unit 149
Riverdale, MD 20737

Plant Protection and Quarantine
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4700 River Road
Riverdale, MD 20737

State Plant Health Director
Plant Protection and Quarantine
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
8100 NW 15th Place
Gainesville, FL 32606

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

Florida Department of Agriculture and Consumer Services
Department of Plant Industry
The Doyle Conner Building
1911 SW 34th Street
Gainesville, FL 32608

V. Literature Cited

Austrian Agency for Health and Food Safety. 2016. *CLH report Metaldehyde: Proposal for Harmonised Classification and Labelling. AGES, Based on Regulation (EC) No 1272/2008 (CLP Regulation), Annex VI, Part 2*. Accessed March 26, 2024 from https://echa.europa.eu/documents/10162/decc57ea-e2d1-6668-6fbe-35b44d0a00ac.

Bieri, M. 2003. *The environmental profile of metaldehyde. Pages 255–260 in I. F. Henderson, editor. Slugs and snails. World Agriculture, British Crop Protection Council, Symposium Proceedings*. 80.

Borlongan, I. G., and Coloso, R. M. 1996. *Use of metaldehyde as a molluscicide in milkfish ponds*.in BCPC Symposium Proceedings No. 66: Slug and snail pests in agriculture.

Calumpang, S. M. F., Medina, M. J. B., Tejada, A. W., and Medina, J. R. 1995. *Environmental impact of two molluscicides: niclosamide and metaldehyde in a rice paddy ecosystem*. Bull. Environ. Contam. Toxicol, 55:494–501.

Capinera, J. L. 2021. *Giant African Land Snail in Florida*. Publication ENY-512 by the Entomology and Nematology Department, UF/IFAS Extension. Revised February 2021:2.

CDC. 2020. *Parasite – Angiostrongyliasis (also known as Angiostongylus infection).* Centers for Disease Control and Prevention. . Accessed March 26, 2024 from https://www.cdc.gov/parasites/angiostrongylus/index.html.

Coloso, R. M., Borlongan, I. G., and Blum, R. A. 1998. *Use of metaldehyde as a molluscicide in semi-commercial and commercial milkfish ponds*. Crop Protection:669–674.

Donley, N., Bullard, R. D., and Economos, J. 2022. *Pesticides and environmental injustice in the USA: root causes, current regulatory reinforcement and a path forward*. BMC Public Health, 22. Accessed March 26, 2024 from https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-022-13057-4#citeas.

FDACS. 2024. *Giant African Land Snail.* Florida Department of Agriculture and Consumer Services. Accessed March 26, 2024 from https://www.fdacs.gov/Agriculture-Industry/Pests-and-Diseases/Plant-Pests-and-Diseases/Invasive-Mollusks/Giant-African-Land-Snail.

Garofalo, J. F., Weissling, T., Duke, E. R., Vedaee, J., and Bishop, L. 2001. *Snail and slug management in South Florida*. Miami-Dade County/University of Florida Cooperative Extension Service.

HUD. 2024. *Search results from the Tribal Directory Assessment Tool (TDAT) via the U.S. Department of Housing and Urban Development's eGIS platform.* U.S. Department of Housing and Urban Development. Accessed March 26, 2024 from https://egis.hud.gov/tdat.

ISSG. 2023. *Global Invasive Species Database.* Invasive Species Specialist Group. Accessed March 26, 2024.

Lowe, S., Browne, M., Boudjelas, S., and De Poorter, M. 2000. *100 of the World's Worst Invasive Alien Species A selection from the Global Invasive Species Database.* Invasive Species Specialist Group (ISSG), Species Survival Commission (SSC), World Conservation Union (IUCN). Accessed March 26, 2024 from https://portals.iucn.org/library/sites/library/files/documents/2000-126.pdf

Luque, G. M., Bellard, C., Bertelsmeier, C., Bonnaud, E., Genovesi, e. a., P., Simberloff, D., and Courchamp., F. 2014. *The 100 of the world's worst invasive alien species*. Biological Invasions, 16:981-985. Accessed March 26, 2024 from https://link.springer.com/article/10.1007/s10530-013-0561-5.

Mead, A. R. 1973. *A prognosis in the spread of the giant African snail to continental United States*. Malacologia, 14:427.

NPS. 2024. *Spreadsheet of NRHP properties*. Accessed March 26, 2024 from https://www.nps.gov/subjects/nationalregister/data-downloads.htm.

Numazawa, K., Koyano, S., Takeda, N., and Takayanagi, H. 1988. *Distribution and abundance of the giant African snail, Achatina fulica Ferussac (Pulmonata: Achatinidae), in two islands, Chichijima and Hahajima, of the Ogasawara (Bonin) Islands*. Japanese Journal of Applied Entomology and Zoology, 32:176−181.

Poucher, C. 1975. *Eradication of the Giant African Snail in Florida*. Proceedings of the Florida State Horticultural Society, 88: 523–524.

Richardson, J. A., Welch, S. L., Gwaltney-Brant, S. M., Huffman, J. D., and Rosendale, M. E. 2003. *Metaldehyde toxicosis in dogs*. Comp Cont Educ Pract, 25:376-380.

Sarma, R. R., Munsi, M., and Ananthram, A. N. 2015. *Effect of climate change on invasion risk of giant African snail (Achatina fulica Ferussac, 1821: Achatinadae) in India*. PloS One 10. Accessed March 26, 2024 from www.ncbi.nlm.nih.gov/pmc/articles/PMC4664396/.

Smith, J. W., and Fowler, G. 2003. *Pathway Risk Assessment for Achatinidae with emphasis on the Giant African Land Snail Achatina fulica (Bowdich) and Limicolaria aurora (Jay) from the Caribbean and Brazil, with comments on related taxa Achatina achatina (Linne), and Archachatina marginata (Swainson) intercepted by Plant Protection and Quarantine (PPQ)*.

State of New South Wales. 2015. *Giant African snail*. Accessed November 29, 2023 from https://www.dpi.nsw.gov.au/biosecurity/plant/insect-pests-and-plant-diseases/giant-african-snail#:~:text=Distribution.

Stocks, S., White-McLean, J., Whilby, L., McAmis, S., and Hodges, A. 2022. *The Giant African Land Snail (Lissachatina fulica)*.

Thomas, J. C. 2016. *The molecular basis for the degradation of metaldehyde*. PhD Thesis, Univ. of York, UK. Accessed March 26, 2024 from https://etheses.whiterose.ac.uk/16946/8/JCThomas%20biotic%20deg%20of%20metaldehyde%20FINAL2.2.pdf.

Thomas, J. C., Helgason, T., Sinclair, C. J., and Moir, J. W. B. 2017. *Isolation and characterization of metaldehyde degrading bacteria from domestic soils.* Microbial Biotechnology. Accessed November 29, 2023 from https://doi.org/10.1111/1751-7915.12719.

UF IFAS. 2011. *Giant African Land Snail (GALS) aka Giant African Snail (GAS) (Liss)Achatina fulica (Férussac 1821)*.25. Accessed March 26, 2024 from https://sfyl.ifas.ufl.edu/media/sfylifasufledu/miami-dade/documents/nursery-production/GALS-ID.pdf.

USCB. 2023. *Quick facts for Florida.* U.S. Census Bureau. Accessed November 29, 2023 from https://www.census.gov/quickfacts/fact/table/FLUS/RH125222.

USDA APHIS. 2018. *Pest Alert: Giant African Snails. Publication APHIS 81-35-009. Slightly revised May 2018.* U.S. Department of Agriculture, Animal and Plant Health Inspection Service.

USDA APHIS. 2021. *APHIS Declares Eradication of the GiantAfrican Snail (Lissachatina fulica, formally Achatina fulica) and Removes All Quarantine Areas in Florida. Declaration DA-2021-37.* U.S. Department of Agriculture, Animal and Plant Health Inspection Services.

USDA APHIS. 2022. *Horntail Snail Cooperative Eradication Program in Broward, Collier, Miami-Dade and Palm Beach Counties, Florida. Final Environmental Assessment, Finding of No Significance.* U.S. Department of Agriculture, Animal and Plant Health Inspection Services.

USDA APHIS. 2023a. *Adaptive and Damaging Giant African Snail Activity Sheet, Publication APHIS-23-004.* U.S. Department of Agriculture, Animal and Plant Health Inspection Services. Accessed March 26, 2024 from https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases/giant-african-snail/mollusks.

USDA APHIS. 2023b. *Biological Assessment for African Land Snail Eradication Program in Florida, No Effect Determination, National Marine Fisheries Service Listed Species.* U.S. Department of Agriculture, Animal and Plant Health Inspection Service.14 pp.

USDA APHIS. 2023c. *Biological Assessment for the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Qurantine African Land Snail Eradication Program in Florida.* U.S. Department of Agriculture, Animal and Plant Health Inspection Service. 284 pp.

USDA APHIS. 2023d. *Categorical Exclusion for Giant African Snail Surveys, Quarantine, and Eradication in Broward County, FL.* U.S. Department of Agriculture, Animal and Plant Health Inspection Service.

USDA APHIS. 2023e. *Giant African Snail Cooperative Eradication Program in Lee and Pasco Counties, Florida. Final Environmental Assessment and Finding of No Significant Impact.* Accessed March 26, 2024 from https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/ea/giant-african-snail-environmental-assessments.

USDA NASS. 2017. *Census of Agriculture County Profiles: Lee County, Florida; Pasco County, Florida.* U.S. Deparment of Agriculture, National Agricultural Statistics Service Information.

USEPA. 2006. *Reregistration Eligibility Decision for Metaldehyde List A Case No. 0576* U.S. Environmental Protection Agency. Accessed March 26, 2024.

USEPA. 2007. *Amendment to metaldehyde: Reregistration eligibility decision (RED).* U.S. Environmental Protection Agency.

USEPA. 2020. *Metaldehyde: Draft Ecological Risk Assessment for Registration Review.* U.S. Environmental Protection Agency, Office of Chemical Safety and Pollution Prevention.

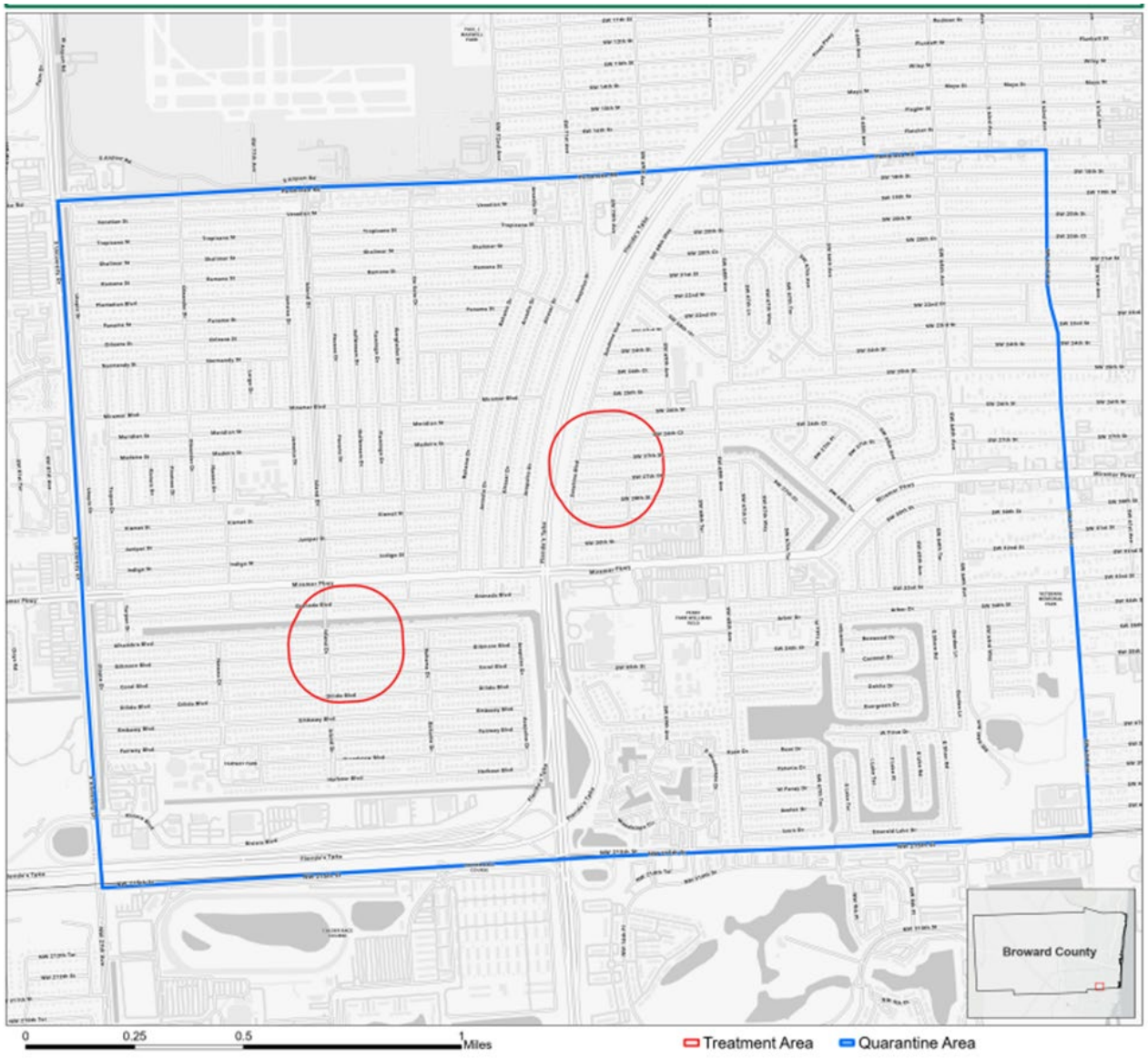
USFWS. 2007. *National Bald Eagle Management Guidelines.* U.S. Fish and Wildlife Service. Accessed March 26, 2024 from

https://www.fws.gov/sites/default/files/documents/national-bald-eagle-management-guidelines_0.pdf.

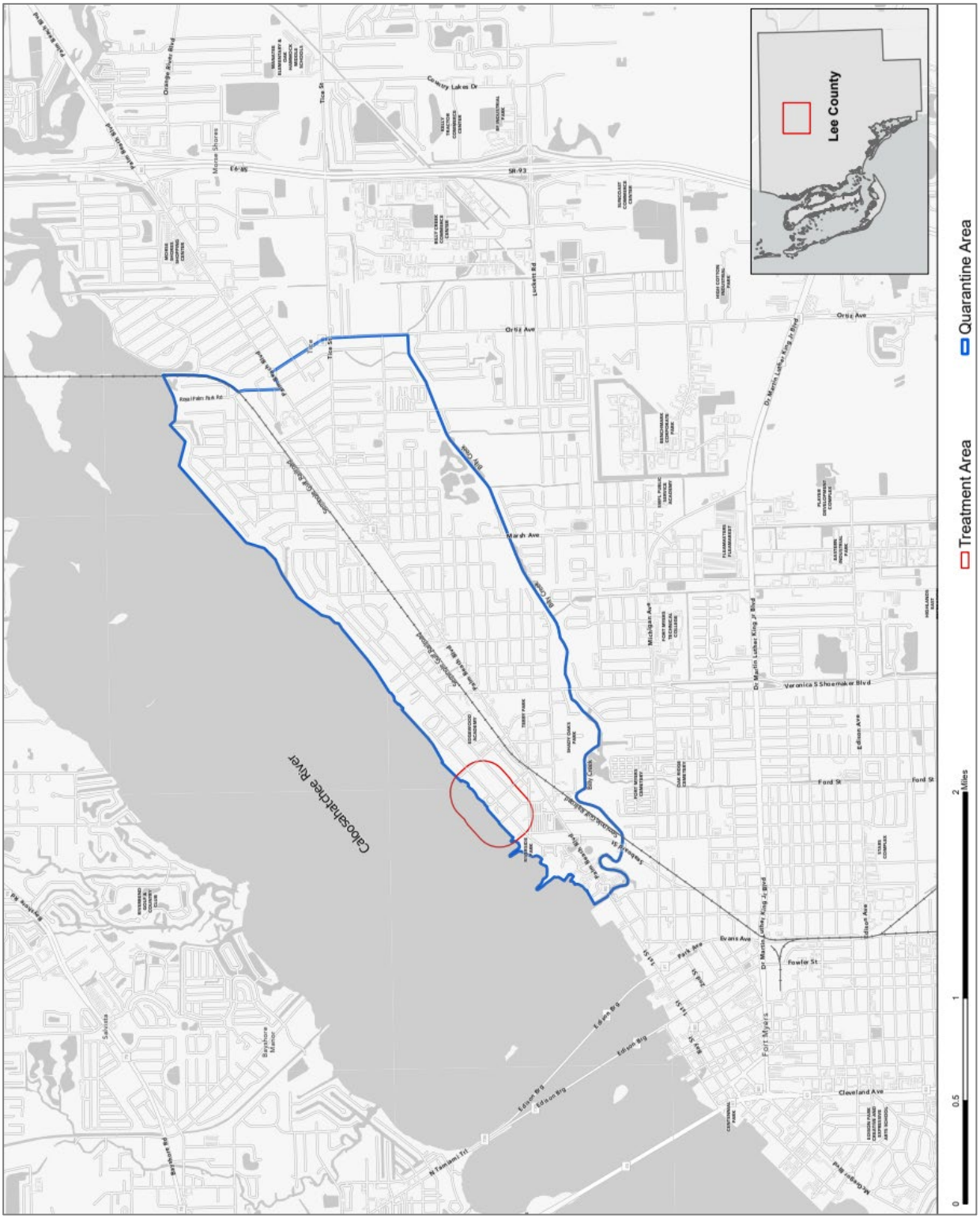
USGS. 2015. *Giant African land snail.* U.S. Department of Geological Survey Ecosystems. Accessed March 26, 2024 from https://www.usgs.gov/media/images/giant-african-land-snail.

Venette, R. C., and Larson, M. 2004. *Mini Risk Assessment, Giant African Snail, Achatina fulica Bowdich (Gastropoda: Achatinidae)*. Department of Entomology, University of Minnesota, St Paul (US).

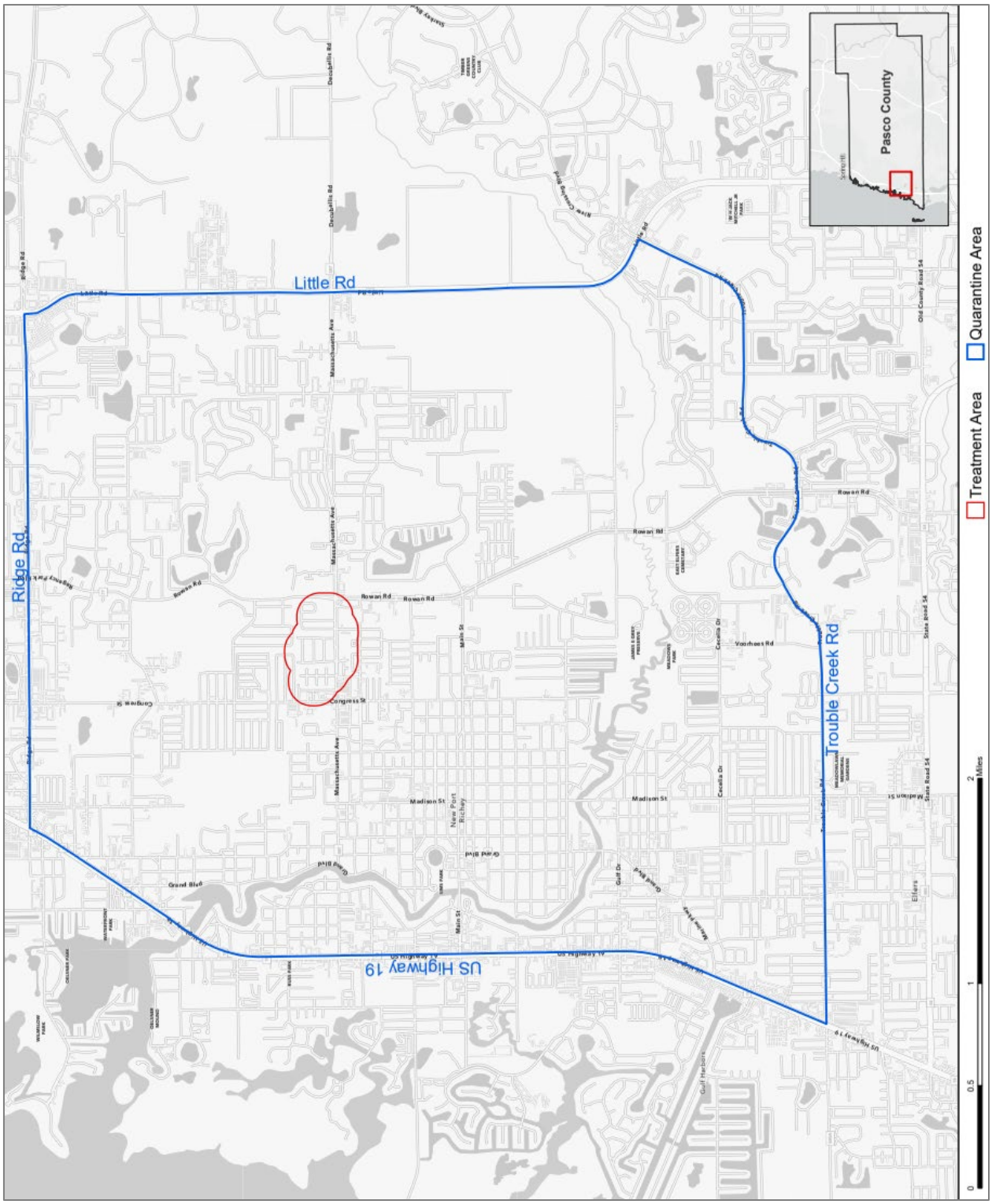
Appendix A. FDACS program maps in Broward, Lee, and Pasco Counties.



Map 1. Giant African Snail Program quarantine and treatment areas in Broward County (FDACS 2024).



Map 2. Giant African Snail Program quarantine boundary and treatment area in Lee County, FL – March 2023 (FDACS 2024).



Map 3. Giant African Snail Program quarantine boundary and treatment area in Pasco County, FL – August 2022 (FDACS 2024).

Appendix B. Plants consumed by the giant African snail.

(From (Venette and Larson 2004) (common and scientific names updated))

Common name	Scientific name
African Locust Bean	*Parkia filicoidea*
African Oil Palm	*Elaeia quineensis*
Air Potato	*Discorea bulbifera*
Aloe	*Aloe indica*
Alsophils/Tree Ferns	*Alsophila* spp.
Amaranths	*Amaranthus* spp.
Apples	*Malus* spp.
Arabian Coffee	*Coffea arabica*
Aubergine	*Solanum melongena*
Aztec Marigold	*Tagetes erecta*
Balsampear	*Momordica cochinchinensis*
Bananas/Plantains	*Musa* spp.
Basella	*Basella alba*
Bauhinia	*Bauhinia acuminate*
Beans/Wild Beans	*Phaseolus* spp.
Betel	*Piper betel*
Birds Of Paradise	*Heliconia* spp.
Bittermelon	*Momordica charantia*
Blackeyed Pea	*Vigna unguiculata*
Blimbi	*Averrhoa bilimbi*
Blue-Sages	*Eranthemum* spp.
Bluestem Clump Grasses	*Andropogon* spp.
Boatlily	*Tradascantia spathacea*
Bottle Gourd	*Lagenaria siceraria*
Bougainvillea	*Bougainvillea* spp.
Breadfruit	*Artocaropus altilis*
Brinjal	**see aubergine**
Broccoli	*Brassica oleracea* var. *botrytis*
Bulrush	*Scirpus ternatanus*
Butterfly Peas	*Centrosema* spp.
Cabbage	*Brassica oleracea* var. *capitata*
Cacao	*Theobroma cacao*
Calophyllum	*Calophyllum inophyllum*
Cannas	*Canna* spp.
Cantaloupe	*Cucumis melo* var. *dudaim*
Carambola	*Averrhoa carambola*
Carrot	*Daucus carota*
Cassava	*Manihot esculenta*
Castor	*Ricinus communis*
Cathedral Bells	*Kalanchoe pinnata*
Cauliflower	**see broccoli**
Cayenne Pepper	*Capsicum annuum*
Chandelier Plant	*Kalanchoe delagoensis*
Cherimoya	*Annona cheirimoya*
Chili Peppers	*Capsicum* spp.
Chinese Box/Orange Jasmine	*Murraya paniculata*
Chinese Chive	*Allium tuberosum*
Chrysanthemum	*Chrysanthemum coronarium* var. *coronarium*

Common name	Scientific name
Clitoria	*Clitora ternatea*
Coco Yam	*Colocasia esculenta*
Coconuts	*Cocos* spp.
Coffees	*Coffea* spp.
Columnar Cactuses	*Cereus* spp.
Cosmos	*Cosmos* spp.
Cotton	*Gossypium herbaceum*
Cowpea	*Vigna savi*
Crinums	*Crinum* spp.
Crybaby Tree	*Erythrina crist-galli*
Cucumber	*Cucumis edulis, C. sativus*
Cucurbit Climber	*Edgaria darjeelingensis*
Dahlias	*Dahlia* spp.
Dancing-Lady Orchids	*Oncidium* spp.
Devil's Tree	*Alstonia scholaris*
Dixie Rosemallow	*Hibiscus mutabilis*
Dracaenas	*Dracaena* spp.
Drum Stick	*Moringa oleifera*
Dumbcane	*Dieffenbachia sequine*
Edible Banana	*Musa acuminate*
Edward Rose	**see rose**
Elephant Yam	*Amorphophallus paeoniifolius*
Elephant's Ears	*Xanthosoma* spp.
Eranthemum	**see blue sage**
Erythrinas/Coral Trees	*Erythrina* spp.
Eucalyptuses	*Eucalyptus* spp.
False Nettles	*Boehmeria* spp.
Field Mustard	*Brassica campestris* var. *rapa*
Field Pumpkin	*Cucurbita pepo*
Fig	*Ficus hispida*
French Plantain	*Musa paradisiaca*
Garden Pea	*Pisum sativum*
Gardenia	*Gardenia angusta*
Garlic	*Allium oleraceum*
Giant Taro	*Alocasia macrorrhizos*
Ginger	*Zingiber officinale*
Globe Amaranth	*Gomphrena globosa*
Goldenshower	*Cassia fistula*
Gourds	*Cucurbita* spp.
Grape	*Vitis vinifera*
Graveyard Flower	*Plumeria acuminate*
Great Bougainvillea	*Bougainvillea spectabilis*
Green Bean/Soy Bean	*Glycine max*
Hoary Peas	*Tephrosia* spp.
Horseradish Tree	**see drum stick**
Hyacinth Bean	*Lablab purpureus*
Impatiens	*Impatiens balsamina*
Indian Bark	*Cinnamonum tamala*
Indian Lettuce	*Lactuga indica*
Indian Marigold	*Tagetes patula*
Indian Mulberry	*Morinda citrifolia*
Indina Oleander	*Nerium indicum*
Indian Shot	*Canna indica*

Common name	Scientific name
Indigos	*Indigofera* spp.
Indonesian Gum (Rainbow Eucalyptus)	*Eucalyptus deglupta*
Jackfruit	*Artocaropus heterophyllus*
Jasmine	*Jasmin sambac*
Jute	*Corchorus capsularis*
Kalanchoe	*Kalanchoe pinnatum*
Knol Kohl	*Brassica oleracea* var. *cauiorapa*
Kokko	*Albizzia lebbeck*
Kudzus	*Pueraria* spp.
Laceleafs	*Anthurium* spp.
Lady's Finger	*Abelmoschus esculentus*
Lagenarias/Bottle Gourds	*Lagenaria* spp.
Leadtrees	*Leucaena* spp.
Lemon	*Citrus lemon*
Lettuce	*Lactuca sativa*
Light-Blue Snakeweed	*Stachytarpheta jamaicensis*
Lily of the Incas/Parrot Flower	*Alstromeria psittacina*
Lime	*Citrus aurantifolia*
Lobia	**see cowpea**
Locoto	*Capsicum baccatum*
Luffa	*Luffa cylindrica*
Machete Plant	*Erythrina berteriana*
Mahogany	*Sweitenia mahogani*
Maiden Grass	*Miscanthus condensatus*
Maize	*Zea mays*
Marigold	**see Indian marigold**
Marshweeds	*Limnophila* spp.
Madagascar Periwinkle	*Lochnera rosea*
Mandarin Orange	*Citrus reticulata*
Monthan	**see banana**
Moth Orchids	*Phalaenopsis* spp.
Mulberry	*Broussonetia papyrifera*
Mung Bean	*Phaseolus aureus, Vigna radiata*
Naupakas	*Scaveola* spp.
Night Queen	*Cestrum nocturnum*
Nightshades	*Solanum* spp.
Nodeweed	*Synedrella nodiflora*
Okra	**see lady's finger**
Oleander	*Nerium oleander*
Onion	*Allium cepa*
Orange	*Citrus sinensis*
Palm Nut	*Areca catechu*
Pancratium	*Pancratium*
Papaya	*Carica papaya*
Paperflowers	**see bougainvillea**
Passionfruits/Passionflowers	*Passiflora* spp.
Patol	*Trichsanthes dioica*
Peacocksplume	*Falcataria moluccana*
Peanut	*Arachis hypogaea*
Peppers	*Piper* spp.
Periwinkle	*Catharanthus roseus*
Peruvian Groundcherry	*Physalis peruviana*
Pigweed	**see amaranth**

Common name	Scientific name
Pigeon Pea	*Cajanus cajan*
Pineapple	*Ananas comosus*
Pink Wood Sorrel	*Oxalis carymbosa*
Pipturuses	*Pipturus* spp.
Poovan	**see banana**
Potato	*Solanum tuberosum*
Potato Yam	**see air potato**
Pothos	*Epipremnum pinnatum*
Pricklypears	*Opuntia* spp.
Puni	*Basella rubra*
Purple Amaranth	*Amaranthus blitum*
Purslane	*Portulaca grandiflora*
Quickstick	*Gliricidia sepium*
Radish	*Raphanus sativus*
Rape	*Brassica napus* var. *napus*
Rape-Jasmine	*Tabernaemontana divaricata*
Rattlesnakemasters	*Eryngium* spp.
Rice	*Oryza sativa*
Robusta Coffee	*Coffea canephora*
Roses	*Rosa* spp.
Rosemallows	*Hibiscus* spp.
Rubbertree	*Hevea brasiliensis*
Sadabahar	*Lachnera rosea*
Sages	*Salvia* spp.
Sanchezia	*Sanchezia nobilis vargeta*
Sanseviera	*Sansevieria trifasciata*
Scarlet Pimpernel	*Anagallis arvensis*
Screw Pine	*Pandanus tectorius*
Sensitive Plant	*Mimosa*
Sesame	*Sesamum indicum*
Shishu	*Dalbergia sissoo*
Shoeback Plant	*Hibiscus rosasinensis*
Silktrees	*Albizzia* spp.
Sinkwa Towelsponge	*Luffa acutangula*
Slender Amaranth	*Amaranthus viridis*
Snake Gourd	*Trichosanthes anguina*
Solomon's Seal	*Polygonatum odoratum*
Sorghums/Broomcorns	*Sorghum* spp.
Soursop	*Annona muricate*
Spiderwisps	*Chleome* spp.
Spinach	*Spinacia oleracea*
Spleenwort	*Asplenium nidus*
Sponge Gourd	*Luffa aegyptiaca*
Striped Brake	*Pteris quadriaurita*
Sugarbeet	*Beta vulgaris* var. *rapa*
Sugarcanes	*Saccharum* spp.
Sunflower	*Helianthus annuus*
Swamplily	**see crinum**
Sweet Potato	*Ipomoea batatas*
Sweet Potato Cactus	**see columnar cactus**
Synedrella	**see nodeweed**
Tagar	*Valeriana officinalis*
Tahitian Spinach	*Xanthosoma braziliense*

Common name	Scientific name
Tampala	*Amaranthus tricolor*
Tapioca	**see cassava**
Taros	*Alocasia* spp.
Tea	*Camellia sinensis*
Teak	*Tectona grandis*
Theobromas	*Theobroma* spp.
Thespesias	*Thespesia* spp.
Tiplants	*Cordyline* spp.
Tobacco	*Nicotiana tabacum*
Tomato	*Solanum lycopersicum*
Towelsponges	*Luffa* spp.
Trattlepods	*Crotolaria* spp.
Treedaisy	*Montanoa hibiscifolia*
Treemelon	**see papaya**
Vanda Orchids	*Vanda* spp.
Vanillas	*Vanilla* spp.
Water Yam	*Dioscorea alata*
Watermelon	*Citrullus lanatus*
White Leadtree	*Leucaena leucocephala*
White Mulberry	*Morus alba*
Wild Peppers	*Heckeria* spp.
Wild Tantan	*Desmathus virgatus*
Winter Squash	*Cucurbita maxima*
Woman's Tongue	**see koko**
Woodnettles	*Laportea* spp.
Yams	*Colocasia* spp.
Yam Bean	*Pachyrhizus erosus*
Zinnia	*Zinnia linearis*

Appendix C. Relevant laws and policies considered in this EA.

Archaeological Resources Protection Act

- This Act secures the protection of archaeological resources and sites on public and Tribal lands. USDA APHIS is not conducting activities that will damage archaeological resources. If USDA APHIS personnel find an archaeological site, they would contact the proper authorities.

Bald and Golden Eagle Protection Act

- This Act prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs. USDA APHIS does not anticipate the take of any eagle by the Program.
- The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." USFWS further defines "disturb" as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Clean Air Act

- This Act is a comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes EPA to establish National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Air emissions from the program are anticipated to be negligible based on a few vehicles traveling short distances to infested sites.

Endangered Species Act (ESA)

- This Act is the primary federal law in the United States for protecting imperiled species.
- Section 7 of the ESA and its implementing regulations require federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. USDA APHIS abides by the results of the Section 7 consultations.

Executive Order (EO) 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations and EO 13985 - Advancing Racial Equity and Support for Underserved Communities through the Federal Government and EO 14096 - Executive Order on Revitalizing Our Nation's Commitment to Environmental Justice for All

- EO 12898 focuses federal attention on the environmental and human health effects of federal actions on minority and low-income populations and Tribal nations with the goal of achieving environmental protection for all communities. EO 12898 directs federal

agencies to: (1) identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations to the greatest extent practicable and permitted by law; (2) develop a strategy for implementing EJ; and (3) promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation.

- EO 13985 calls on agencies to advance equity "for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality" by identifying and removing systemic barriers to equal opportunity and benefits in federal policies and programs.
- EO 14096 builds on EO 12898 by expanding the definition of environmental justice (EJ), adding agency accountability measures, and emphasizing the role of the National Environmental Policy Act in evaluating EJ impacts. It requires federal agencies to create EJ strategic plans, directs research on EJ issues, expands notifications for toxic chemical releases, extends the membership of the EJ Interagency Council, and establishes the White House Office of Environmental Justice.

EO 13045 - Protection of Children from Environmental Health and Safety Risks

- This EO 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.

EO 13112 - Invasive Species and EO 13751 - Safeguarding the Nation from the Impacts of Invasive Species

- EO 13112 calls upon executive departments and federal agencies to take steps to prevent the introduction and spread of invasive species, and to support efforts to eradicate and control invasive species that are established.
- EO 13751 ensures the faithful execution of the laws of the United States of America to prevent the introduction of invasive species and provide for their control, and to minimize the economic, plant, animal, ecological and human health impacts that invasive species cause.

EO 13175 - Consultation and Coordination with Indian Tribal Governments

- This EO calls for agency communication and collaboration with Tribal officials for proposed Federal actions with potential Tribal implications. In keeping with this EO APHIS provides opportunities for Tribes to participate in policy development to the greatest extent practicable and permitted by law.

EO 13186 - Responsibilities of Federal Agencies to Protect Migratory Birds

- This EO directs Federal agencies taking actions with a measurable negative effect on migratory bird populations to develop and implement a memorandum of understanding (MOU) with the FWS which promotes the conservation of migratory bird populations. On August 2, 2012, an MOU between USDA APHIS and the FWS was signed to facilitate the implementation of this EO.

EO 13990 - Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis and EO 14008 - Tackling the Climate Crisis at Home and Abroad

- Climate change (CC) refers to long-term shifts in average weather patterns that define the Earth's local, regional, and global climates. This includes changes in average daytime and nighttime temperature, precipitation, drought periods, periodicity of tornadoes and rainfall, polar ice melting, and ocean/sea level rise. Human-produced impact on global temperature (also known as anthropogenic global warming) may be avoided or reduced by government agencies through consideration of CC during the NEPA process. Federal agencies comply with EOs 13990 and 14008 by considering:
    - the effects of CC on a proposed action,
    - the potential effects of a proposed action on CC, and
    - potential mitigation measures that could be applied to the proposed action.

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and Resource Conservation and Recovery Act

- This Act governs the sale, distribution, and use of pesticides in the United States. This Act requires such pesticides to be registered by USEPA.
    - During the registration process, USEPA prepares screening level risk assessments that evaluate a pesticide's potential for harm to humans, wildlife, fish, and plants as well as its environmental fate and potential for contamination of air, soil, and water resources.
- Registered pesticides are regulated under the Federal Insecticide, Fungicide and Rodenticide Act until disposal, after which they are regulated under Resource Conservation and Recovery Act, which ensures responsible management of hazardous waste and nonhazardous solid waste).

Migratory Bird Treaty Act

- This Act establishes a federal prohibition, unless permitted by regulations, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird or any part, nest, or egg of any such bird.

National Environmental Policy Act (NEPA)

- This Act promotes the protection and enhancement of the environment and established the President's CEQ.
- NEPA requires federal agencies to examine the reasonably foreseeable effects of a proposed action on the human environment. NEPA defines "human environment" comprehensively as the natural and physical environment and the relationship of present and future generations of Americans with that environment.
- CEQ created regulations for implementing NEPA. Because NEPA is a procedural law, CEQ requires each federal agency to write their own NEPA compliance regulations to fit their activities.

National Historic Preservation Act

- Section 106 of this Act requires federal agencies to consider the potential for impact to properties included in, or eligible for inclusion in the National Register of Historic Places through consultation with interested parties where a proposed action may occur. This includes districts, buildings, structures, sites, and landscapes.

Plant Protection Act

- This Act regulates the detection, control, eradication, suppression, prevention, or retardation of the spread of plant pests or noxious weeds necessary for the protection of the agriculture, environment, and economy of the United States.

Appendix D. Federally listed species in Florida and Program effect.

Many federally listed threatened and endangered species and subspecies are found in Florida that are listed by USFWS. Florida has 65 listed animal species (Table D-1). Of the 65 species, five are proposed species, one is a candidate species, and one is an experimental non-essential population. Two species are listed as similarity of appearance but are not discussed here. Thirty-two species have designated critical habitat and three have proposed habitat. It was determined that the Program may affect but is not likely to adversely affect eight species and would have no effect on the remaining 57 species (USDA APHIS 2023c). The Program will also have no effect on critical habitat for animals.

Table D-1. Animals listed as threatened and endangered by USFWS in Florida.

Species	Scientific Name	Status	Determination
Mammals			
Key Largo Cotton Mouse	*Peromyscus gossypinus allapaticola*	E PH	NE
Choctawhatchee Beach Mouse	*Peromyscus polionotus allophrys*	E H	NE
Southeastern Beach Mouse	*Peromyscus polionotus niveiventris*	T	NE
St. Andrew Beach Mouse	*Peromyscus polionotus peninsularis*	E H	NE
Anastasia Island Beach Mouse	*Peromyscus polionotus phasma*	E	NE
Perdido Key Beach Mouse	*Peromyscus polionotus trissyllepsis*	E H	NE
Key Largo Woodrat	*Neotoma floridana smalli*	E	NE
Florida Salt Marsh Vole	*Microtus pennsylvanicus dukecampbelli*	E	NE
Silver Rice Rat	*Oryzomys palustris natator*	E H	NE
Key Deer	*Odocoileus virginianus clavium*	E	NLAA
Lower Keys Marsh Rabbit	*Sylvilagus palustris hefneri*	E	NE
Florida Panther (Mountain Lion)	*Puma concolor coryi*	E	NE
Florida Bonneted Bat	*Eumops floridanus*	E PH	NE
Gray Bat	*Myotis grisescens*	E	NE
West Indian Manatee	*Trichechus manatus*	T H	NE
Birds			
Piping Plover	*Charadrius melodus*	T H (winter)	NE
Rufa Red Knot	*Calidris canutus rufa*	T PH	NE
Roseate Tern	*Sterna dougallii dougallii*	T	NE
Wood Stork	*Mycteria americana*	T	NE
Whooping Crane	*Grus americana*	XN (E)	NE
Eastern Black Rail	*Laterallus jamaicensis jamaicensis*	T	NE
Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*	E H	NLAA
Audubon's Crested Caracara [FL DPS]	*Polyborus plancus audubonii*	T	NLAA
Red-Cockaded Woodpecker	*Picoides borealis*	T	NE
Florida Scrub-Jay	*Aphelocoma coerulescens*	T	NLAA
Cape Sable Seaside Sparrow	*Ammodramus maritimus mirabilis*	E H	NE
Florida Grasshopper Sparrow	*Ammodramus savannarum floridanus*	E	NLAA
Reptiles			
American Crocodile	*Crocodylus acutus*	T H	NE
Alligator Snapping Turtle	*Macrochelys temminckii*	PT	NE
Suwannee Alligator Snapping Turtle	*Macrochelys suwanniensis*	PT	NE
Florida Keys Mole Skink	*Eumeces egregius egregius*	PT H	NLAA
Blue-Tailed Mole Skink	*Eumeces egregius lividus*	T	NLAA
Sand Skink	*Neoseps reynoldsi*	T	NE
Eastern Indigo Snake	*Drymarchon couperi*	T	NLAA
Short-tailed Snake	*Stilosoma extenuatum*	PT	NE
Atlantic Salt Marsh Snake	*Nerodia clarkii taeniata*	T	NE
Amphibians and Fish			

Frosted Flatwoods Salamander	*Ambystoma cingulatum*	T H	NE
Reticulated Flatwoods Salamander	*Ambystoma bishopi*	E H	NE
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	T H	NE
Mollusks			
Southern Elktoe	*Alasmidonta triangulata*	E H	NE
Fat Threeridge (Mussel)	*Amblema neislerii*	E H	NE
Chipola Slabshell	*Elliptio chipolaensis*	T H	NE
Purple Bankclimber (Mussel)	*Elliptoideus sloatianus*	T H	NE
Tapered Pigtoe	*Fusconaia burkei*	T H	NE
Narrow Pigtoe	*Fusconaia escambia*	T H	NE
Southern Sandshell	*Hamiota australis*	T H	NE
Shinyrayed Pocketbook	*Hamiota subangulata*	E H	NE
Gulf Moccasinshell	*Medionidus penicillatus*	E H	NE
Ochlockonee Moccasinshell	*Medionidus simpsonianus*	E H	NE
Suwannee Moccasinshell	*Medionidus walkeri*	T H	NE
Choctaw Bean	*Obovaria choctawensis*	E H	NE
Oval Pigtoe	*Pleurobema pyriforme*	E H	NE
Fuzzy Pigtoe	*Pleurobema strodeanum*	T H	NE
Southern Kidneyshell	*Ptychobranchus jonesi*	E H	NE
Round Ebonyshell	*Reginaia rotulata*	E H	NE
Stock Island Tree Snail	*Orthalicus reses (not incl. nesodryas)*	T	NLAA
Crustaceans			
Squirrel Chimney Cave Shrimp	*Palaemonetes cummingi*	T	NE
Panama City Crayfish	*Procambarus econfinae*	T H	NE
Miami Cave Crayfish	*Procambarus milleri*	PT	NE
Insects			
Miami Tiger Beetle	*Cicindelidia floridana*	E H	NE
Florida Leafwing Butterfly	*Anaea troglodyta floridalis*	E H	NE
Miami Blue Butterfly	*Cyclargus thomasi bethunebakeri*	E	NE
Monarch Butterfly	*Danaus plexippus*	CE	NE
Schaus Swallowtail Butterfly	*Heraclides aristodemus ponceanus*	E	NE
Bartram's Hairstreak Butterfly	*Strymon acis bartrami*	E H	NE

DPS = Distinct Population Segment
Status = E-endangered, T-threatened, C-Candidate, P-proposed, XN-experimental nonessential, H-critical habitat
Determination = NE-no effect, NLAA-may affect not likely to adversely affect

Florida also hosts 68 USFWS listed threatened and endangered species of plants (Table D-2). Of the 68 species, nine have designated critical habitat and three have proposed habitat. Of the 68 plants (Table D-2), it was determined that the Program no effect on them (USDA APHIS 2023c). The Program will also have no effect on critical habitat for these plants. If an outbreak occurs where these plants occur, it is possible that GAS could have an effect on them.

Table D-2. Plants listed as threatened and endangered by USFWS in Florida.

Species	Scientific Name	Status	Determination
Non-Flowering Plant (lichens, ferns, conifers)			
Florida Perforate Cladonia	*Cladonia perforata*	E	NE
Florida Bristle Fern	*Trichomanes punctatum floridanum*	E H	NE
Florida Torreya	*Torreya taxifolia*	E	NE
Flowering Plants (Angiosperms)			
Crenulate Lead-Plant	*Amorpha crenulata*	E	NE
Blodgett's Silverbush	*Argythamnia blodgettii*	T PH	NE
Four-Petal Pawpaw	*Asimina tetramera*	E	NE
Florida Bonamia	*Bonamia grandiflora*	T	NE
Florida Brickell-Bush	*Brickellia mosieri*	E H	NE
Brooksville Bellflower	*Campanula robinsiae*	E	NE
Golden Sedge	*Carex lutea*	E H	NE
Fragrant Prickly-Apple	*Cereus eriophorus var. fragrans*	E	NE

Big Pine Partridge Pea	*Chamaecrista lineata keyensis*	E PH	NE
Deltoid Spurge	*Chamaesyce deltoidea deltoidea*	E	NE
Pineland Sandmat	*Chamaesyce deltoidea pinetorum*	T	NE
Wedge Spurge	*Chamaesyce deltoidea serpyllum*	E PH	NE
Garber's Spurge	*Chamaesyce garberi*	T	NE
Pygmy Fringe-Tree	*Chionanthus pygmaeus*	E	NE
Cape Sable Thoroughwort	*Chromolaena frustrata*	E H	NE
Florida Golden Aster	*Chrysopsis floridana*	E	NE
Pigeon Wings	*Clitoria fragrans*	T	NE
Short-Leaved Rosemary	*Conradina brevifolia*	E	NE
Etonia Rosemary	*Conradina etonia*	E	NE
Apalachicola Rosemary	*Conradina glabra*	E	NE
Florida Semaphore Cactus	*Consolea corallicola*	E H	NE
Avon Park Harebells	*Crotalaria avonensis*	E	NE
Okeechobee Gourd	*Cucurbita okeechobeensis okeechobeensis*	E	NE
Florida Prairie-Clover	*Dalea carthagenensis floridana*	E	NE
Beautiful Pawpaw	*Deeringothamnus pulchellus*	E	NE
Rugel's Pawpaw	*Deeringothamnus rugelii*	E	NE
Garrett's Mint	*Dicerandra christmanii*	E	NE
Longspurred Mint	*Dicerandra cornutissima*	E	NE
Scrub Mint	*Dicerandra frutescens*	E	NE
Lakela's Mint	*Dicerandra immaculata*	E	NE
Florida Pineland Crabgrass	*Digitaria pauciflora*	T	NE
Scrub Buckwheat	*Eriogonum longifolium var. gnaphalifolium*	T	NE
Snakeroot	*Eryngium cuneifolium*	E	NE
Telephus Spurge	*Euphorbia telephioides*	T	NE
Small's Milkpea	*Galactia smallii*	E	NE
Harper's Beauty	*Harperocallis flava*	E	NE
Aboriginal Prickly-Apple	*Harrisia (=Cereus) aboriginum (=gracilis)*	E H	NE
Highlands Scrub Hypericum	*Hypericum cumulicola*	E	NE
Beach Jacquemontia	*Jacquemontia reclinata*	E	NE
Cooley's Water-Willow	*Justicia cooleyi*	E	NE
Scrub Blazingstar	*Liatris ohlingerae*	E	NE
Sand Flax	*Linum arenicola*	E H	NE
Carter's Small-Flowered Flax	*Linum carteri carteri*	E H	NE
Scrub Lupine	*Lupinus aridorum*	E	NE
White Birds-In-A-Nest	*Macbridea alba*	T	NE
Britton's Beargrass	*Nolina brittoniana*	E	NE
Papery Whitlow-Wort	*Paronychia chartacea*	T	NE
Key Tree Cactus	*Pilosocereus robinii*	E	NE
Godfrey's Butterwort	*Pinguicula ionantha*	T	NE
Lewton's Polygala	*Polygala lewtonii*	E	NE
Tiny Polygala	*Polygala smallii*	E	NE
Wireweed	*Polygonella basiramia*	E	NE
Sandlace	*Polygonella myriophylla*	E	NE
Scrub Plum	*Prunus geniculata*	E	NE
Chapman Rhododendron	*Rhododendron chapmanii*	E	NE
Miccosukee Gooseberry	*Ribes echinellum*	T	NE
American Chaffseed	*Schwalbea americana*	E	NE
Florida Skullcap	*Scutellaria floridana*	T	NE
Everglades Bully	*Sideroxylon reclinatum austrofloridense*	T H	NE
Fringed Campion	*Silene polypetala*	E	NE
Gentian Pinkroot	*Spigelia gentianoides*	E	NE
Cooley's Meadowrue	*Thalictrum cooleyi*	E	NE
Wide-Leaf Warea	*Warea amplexifolia*	E	NE
Carter's Mustard	*Warea carteri*	E	NE
Florida Ziziphus	*Ziziphus celata*	E	NE

Status = E-endangered, T-threatened, P-proposed, H-critical habitat
Determination = NE-no effect

Additional, Florida has 24 NMFS listed marine threatened and endangered species (Table D-3). Of the 24 species, seven have designated critical habitat and one has proposed habitat. Of the 24 species in Table D-3, five are whales, five are sea turtles, six are fish, seven are corals, and one is a mollusk. USDA APHIS has determined that the Program will have no effect on them as well as any critical habitat designated for them (USDA APHIS 2023b).

Table D-3. Marine species listed as threatened and endangered by NMFS in Florida.

Species	Scientific Name	Status	Determination
Mammals			
Fin Whale	*Balaenoptera physalus*	E	NE
Sei Whale	*Balaenoptera borealis*	E	NE
Blue Whale	*Balaenoptera musculus*	E	NE
North Atlantic Right Whale	*Eubalaena glacialis*	E H	NE
Sperm Whale	*Physeter macrocephalus*	E	NE
Reptiles			
Loggerhead Sea Turtle	*Caretta caretta*	T H	NE
Green Sea Turtle	*Chelonia mydas*	T H	NE
Leatherback Sea Turtle	*Dermochelys coriacea*	E H	NE
Hawksbill Sea Turtle	*Eretmochelys imbricata*	E H	NE
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E PH	NE
Fish			
Shortnose Sturgeon	*Acipenser brevirostrum*	E	NE
Atlantic Sturgeon	*Acipenser oxyrinchus oxyrinchus*	E H	NE
Smalltooth Sawfish	*Pristis pectinata*	E H	NE
Oceanic Whitetip Shark	*Carcharhinus longimanus*	T	NE
Giant Manta Ray	*Manta birostris*	T	NE
Nassau Grouper	*Epinephelus striatus*	T PH	NE
Corals			
Elkhorn Coral	*Acropora palmata*	PT	NE
Staghorn Coral	*Acropora cervicornis*	T	NE
Boulder Star Coral	*Orbicella annularis*	T	NE
Mountainous Star Coral	*Orbicella faveolata*	T	NE
Lobed Star Coral	*Orbicella annularis*	T	NE
Rough Cactus Coral	*Mycetophyllia ferox*	T	NE
Pillar Coral	*Dendrogyra cylindricus*	T	NE
Mollusks			
Queen Conch	*Lobatus gigas*	T	NE

Status = E-endangered, T-threatened, P-proposed, H-critical habitat
Determination = NE-no effect