

## SPREAD OF THE NON-NATIVE GINGER-LEAF MORNING-GLORY, *IPOMOEA ASARIFOLIA*, IN SOUTH FLORIDA

JAMES K. WETTERER  
Wilkes Honors College  
Florida Atlantic University  
5353 Parkside Drive  
Jupiter, Florida 33458  
wetterer@fau.edu

### ABSTRACT

The ginger-leaf morning-glory, *Ipomoea asarifolia*, has a widespread distribution in seasonally-flooded wetland areas both in the Paleotropics and Neotropics, although its original native range is uncertain. It is commonly used in traditional medicine, but is also known as a weedy species that can grow to high densities and poison grazing livestock. The first record of *I. asarifolia* in the continental United States was found in Miramar, Broward County, Florida in 1994. All published records of this species in the United States come from this single population. Here, I report populations of *I. asarifolia* at four other sites in South Florida: Atlantic Ridge Preserve State Park (Martin County), Cypress Creek Natural Area (Martin and Palm Beach counties), the C-11 Impoundment Area in Weston (Broward County), and Sandhill Crane Park / Savannas Preserve State Park (St. Lucie County). Whereas most invasive plants tend to spread primarily in human-disturbed environments, it is concerning that *I. asarifolia* is thriving in relatively intact, managed natural areas in South Florida. The impact of *I. asarifolia* on native plant and animal species at these sites is unknown. Spread of this species to areas of livestock grazing in South Florida could become a serious agricultural and economic problem.

The ginger-leaf morning-glory, *Ipomoea asarifolia* (Desr.) Roem. & Schult. (Convolvulaceae), has a widespread distribution in both the Paleotropics and Neotropics (Burks and Austin 1999). *Ipomoea asarifolia* is a vine that typically grows along the ground in seasonally-flooded wetland areas (Figs. 1–5). Burks and Austin (1999) reported the first record of *I. asarifolia* in the continental United States, growing in Miramar, Broward County, Florida in 1994. Currently, all vouchered records of this species in US come from this one population, collected in 1994, 1996, and 1999 (listed in Burks and Austin 1999). Burks and Austin (1999) warned: "Given the spreading habit of this species, its apparent preference for wetlands, its adaptability to disturbance, its recognition as a weed in some locales, and our experience with the Florida population, we view this introduction with alarm and will continue to monitor its occurrence. Steps are immediately being taken to confine any excavated fill to the current site and to plan a control effort." Here, I report populations of *I. asarifolia* growing at four other sites in South Florida: Atlantic Ridge Preserve State Park ("Atlantic Ridge") in Martin County, Cypress Creek Natural Area ("Cypress Creek") straddling the border of Martin and Palm Beach counties, the C-11 Impoundment Area in Weston, Broward County, and Sandhill Crane Park / Savannas Preserve State Park in Port St Lucie, St. Lucie County.

Due to the bioactive properties of its anti-herbivore chemical defenses, *Ipomoea asarifolia* is commonly used in traditional medicine to treat a great variety of ailments, including syphilis, guinea-worm, malaria, rheumatism, fever, gastrointestinal problems, liver disease, and diabetes (see references in Aliyu et al. 2011; Thangaraj et al. 2015; Adoho et al. 2021; Chiroma et al. 2022). Numerous studies have documented medicinal efficacy of compounds extracted from *I. asarifolia* leaves (e.g., de Souza Lima et al. 2014; Alkali et al. 2015; Furtado et al. 2016; Chiroma et al. 2022). Among the bioactive chemicals found in *I. asarifolia* are ergoline alkaloids produced through a symbiosis with the fungus *Periglandula ipomoeae* U. Steiner, E. Leistner et Schardl (Clavicipitaceae) (Steiner et al. 2011; Olanant et al. 2022). Ergoline alkaloid derivatives are the basis of numerous drugs for treating

chronic disorders such as migraines and Parkinson's disease (Olaranont et al. 2022). Les (2017) wrote that *I. asarifolia* "contains acylated anthocyanins and the ergoline alkaloids chanoclavine I, ergine, ergobalansinine, and lysergic acid  $\alpha$ -hydroxyethylamide (LSH). Chanoclavine I and ergine induce hallucinogenic and psychotomimetic effects. LSH is similar chemically to the hallucinogenic drug LSD, and although it remains clinically untested, it is suspected to have similar effects on humans. However, the plants have strong antioxidant properties and the aqueous extracts exhibit significant analgesic and anti-inflammatory properties."

*Ipomoea asarifolia* is also known as a weedy species that can grow to high densities, and can poison grazing animals (e.g., Tortelli et al. 2008; Carvalho de Lucena et al. 2014; Silva Filho et al. 2019). For example, at a commercial farm in Brazil, Carvalho de Lucena et al. (2014) found that *I. asarifolia* "constituted the majority of the green forage available" during the dry season, and that tremorgenic toxins from the plants eaten by sheep were passed in their milk, poisoning their young. Carvalho de Lucena et al. (2014) observed that "all intoxicated lambs had similar clinical signs characterized initially by mild muscle tremors, especially of the head and neck and lateral swaying of the head. When forced to move they showed ataxia with abduction and rigidity of limbs. These clinical signs worsened during the first week when the lambs would usually fall, sometimes into unusual positions, and have great difficulty in righting themselves." Pessoa et al. (2014) reported that in Northeast Brazil, *Ipomoea asarifolia* is the plant that causes the highest number of poisonings in ruminants, though it is usually not fatal.

The original native range of *Ipomoea asarifolia* is uncertain. The French botanist Louis Auguste Joseph Desrousseaux (1792) described *Convolvulus asarifolius* (= *I. asarifolia*) from specimens that Mr. Roussillon brought from Senegal, where it grows naturally. Austin (2005), however, "hypothesized that *I. asarifolia* was originally native to southern India, and the early Europeans visiting the region spread the species around the world because of its various medicinal uses." Other researchers consider this species to be native to South America (e.g., de Souza Lima et al. 2014). Wood et al. (2020) wrote that *I. asarifolia* belonged to a small clade of four species (*Ipomoea procurrens* Meisn., *Ipomoea paludicola* J.R.I. Wood & Scotland, and *Ipomoea leptophylla* Torr. (all native to the New World) that "can be recognized by their very unequal, transversely muricate sepals" (see Fig. 3). Phylogenetic analyses indicate that *I. asarifolia* formed a clade with *I. procurrens* and *I. paludicola* (both native to the Neotropics from southern Mexico to South America), while *I. leptophylla* (native to North America) was more distantly related (Muñoz-Rodríguez et al. 2019; the *Ipomoea* Project: vms034.plants.ox.ac.uk/ipomoea.php). Currently, Plants of the World Online (POWO 2024) considers *I. asarifolia* native to the Afrotropic, Indomalay, and Neotropic bioregions.

In Florida, the closest relative of *Ipomoea asarifolia* is the beach morning glory, *Ipomoea pes-caprae* (L.) R.Br. (Miller et al. 1999). Burks and Austin (1999) wrote: "*I. asarifolia* resembles *I. pes-caprae* in habit, flower color, and general leaf form; however, the former is a species of freshwater habitats whereas the latter is confined to saline conditions near seacoasts. Also, *I. asarifolia* never has the emarginate to bilobed leaf apex characteristic of *I. pes-caprae*. Diagnostic characters for identifying *I. asarifolia* in the field include its habit of horizontal stems and alternate, smooth, dark-green, cordate leaves, these often with purplish venation and with tips obtuse to mucronulate. The stems, whether clambering or horizontal, may have small, sparse, fleshy trichomes. The plant's showy morning-glory flowers have a campanulate to funnelform corolla of deep rose-lavender with a purple throat."

Many authors use the common name "ginger-leaf morning-glory" for *Ipomoea asarifolia* (e.g., Silva Filho et al. 2019; Adoho et al. 2021). In his original description, Desrousseaux (1792) referred to *I. asarifolia* with the common name "Liseron à feuilles d'Asaret," meaning "morning-glory with asaret-like leaves," and *asarifolia* can be translated as "asaret-leaf." Asaret is the French common name for *Asarum* spp., known in English as wild gingers. *Asarum* spp. produce rhizomes that taste and smell similar to roots of true gingers (*Zingiber* spp.), but the two genera are not at all closely related.

## METHODS

On 12 February 2023, I photographed a vine growing at the edge of a wetland area in Atlantic Ridge Preserve State Park ("Atlantic Ridge") and posted the photos to the iNaturalist website ([inaturalist.org/observations/148624781](https://www.inaturalist.org/observations/148624781)). I tentatively identified the vine as *Ipomoea asarifolia*, based on comparison with photographs of a flowering vine in Cypress Creek Natural Area ("Cypress Creek") posted to iNaturalist on 13 November 2022 by T. Denham and identified by J. Horn, a botanist at Florida Gulf Coast University ([inaturalist.org/observations/141939644](https://www.inaturalist.org/observations/141939644)). Horn (pers. comm.) verified this initial identification using the Atlas of Florida Plants website (Wunderlin et al. 2024) and the Flora of the Southeastern United States (Weakley and Southeastern Flora Team 2022). Subsequently, I photographed this species when encountering it on hikes in and around these two preserves. In addition, I went through iNaturalist observations in South Florida, looking for and identifying additional records of *I. asarifolia*.

I followed up on an iNaturalist observation of *Ipomoea asarifolia* from the C-11 Impoundment Area in Weston, Broward County ([inaturalist.org/observations/131107040](https://www.inaturalist.org/observations/131107040); C. Deal; 16 August 2022) that was originally misidentified as *I. pes-caprae*. In June and July 2024, I searched for additional *I. asarifolia* specimens in the area. The hydrology of this area is currently being altered by the US Army Corps of Engineers as part of the Broward County Water Preserve Areas (BCWPA) Project in order to retain water in the wetland basin until it can be discharged into the C-11 canal without negatively affecting water quality in the Everglades or flood protection for the town of Weston (Taylor et al. 2021). Both Cypress Creek and the C-11 Impoundment Area are administered by the South Florida Water Management District.

On 18 October 2024, I found a population of *Ipomoea asarifolia* in wetlands along the boundary of Sandhill Crane Park and Savannas Preserve State Park in Port St Lucie, St. Lucie County. I returned to document the spread of this species in this area. Many of the plants were in bloom, making the vines easier to find at a distance. I could see plants growing on the property of Port St. Lucie High School (PSLHS). On 31 October 2024, M. Mimnaugh, a science teacher at PSLHS, went with three students, K. Denman, R. Mimnaugh, and A. Rodriguez, to document *I. asarifolia* on the PSLHS campus.

Observations were mapped using Google Earth. The area of the minimum convex polygon (MCP) occupied by each population was calculated by drawing the smallest polygon around observation points with all interior angles  $<180^\circ$ . Voucher specimens will be deposited at the University of Florida Herbarium (FLAS), Gainesville.

## RESULTS

In addition to the original Miramar population of *Ipomoea asarifolia*, I mapped a total of 289 iNaturalist observations (264 by me, 18 by the PSLHS group, and seven by others) at four sites in South Florida (Figs. 6–10): Atlantic Ridge and adjacent undeveloped areas in The Retreat at Seabrook, a housing development that almost bisects the park (Fig. 7;  $n = 113$ ; MCP = 4.7 km<sup>2</sup>), Cypress Creek (Fig. 8;  $n = 77$ ; MCP = 5.1 km<sup>2</sup>), Weston (Fig. 9;  $n = 42$ ; MCP = 0.6 km<sup>2</sup>), Port St. Lucie (Fig. 10;  $n = 55$ ; MCP = 0.03 km<sup>2</sup>). The *I. asarifolia* population in the C-11 Impoundment Area is probably spread over a larger area than where I observed the plant during three short visits. Land clearing activity in the C-11 Impoundment Area is planned for 2025 (E. Caneja, pers. comm.) may greatly affect the distribution of *I. asarifolia*. The St. Lucie County population currently appears to cover only a relatively small area on either side of a road under construction in Savannas Preserve State Park on the western edge of a vast interconnected network of wetlands (Fig. 10).

In addition to observations by T. Denham, C. Deal, and the PSLHS group above, there are six *Ipomoea asarifolia* observations from Florida on iNaturalist posted by other people, all from Cypress Creek:

inaturalist.org/observations/72824185; B. Corder; 22 December 2019  
 inaturalist.org/observations/171848078; S. Fahey; 8 July 2023  
 inaturalist.org/observations/219351192; A. Cunningham; 30 May 2024  
 inaturalist.org/observations/223397403; M. Green; 17 June 2024  
 inaturalist.org/observations/248766525; A. Cunningham; 23 October 2024

## DISCUSSION

Most invasive plant species tend to spread primarily in human-disturbed environments. Burks and Austin (1999) reported *Ipomoea asarifolia* growing in an area of Broward County that was in the process of being developed. Burks and Austin (1999) wrote that in 1999, "the population extends about 800 m along Dykes Road and as far as 300 m westward from it, between Silver Shores and Miramar Parkway. It does not appear to have been carried east of Dykes Road or south of Miramar Parkway." This 0.24 km<sup>2</sup> area is now within the gated communities of Silver Shores and Silver Isles. In these neighborhoods, like much of the developed land in South Florida, areas that formerly were seasonally flooded have been converted into high and dry homesteads separated by canals and retention ponds. Land bordering the canals and ponds are mowed right to the water's edge. I searched the publicly accessible parts of these neighborhoods, but found no *I. asarifolia*.

It is unknown how *Ipomoea asarifolia* was first introduced to any of the sites where it has been found in Florida. *Ipomoea asarifolia* produces pods with 3–4 seeds (Ogunwenmo 2006; Fig. 4). I could find no information on seed dispersal for this species. *Ipomoea asarifolia* seedlings <20 cm tall were common at all four sites where I found it (e.g., see Fig. 5). The seeds of three beach-dwelling *Ipomoea* species, *Ipomoea violacea* L., *Ipomoea imperati* (Vahl) Griseb., and *I. pes-caprae*, are buoyant and can spread by floating in salt water for long periods (Guppy 1917; Miryeganeh et al. 2014). Similarly, the freshwater *Ipomoea aquatica* Forssk. seeds can disperse floating in water (Austin 2007). If the same is true for *I. asarifolia*, this could explain the local spread of the observed populations through seasonally-flooded areas, but not how any of these widely separated populations started. It seems unlikely that *I. asarifolia* seeds stuck to the feathers of waterbirds and were carried by the birds to from site to site. Alternatively, it may be that people brought *I. asarifolia* to Florida and planted it as an ornamental or for traditional medicinal uses, but it escaped from the gardens. The most likely possibility seems to be that *I. asarifolia* seeds were accidentally introduced to the sites in the fill material used to elevate and stabilize roads to prevent vehicles from getting mired in seasonally-flooded areas.

Although Burks and Austin (1999) wrote that they planned to continue to monitor the occurrence of *Ipomoea asarifolia* in Florida, I found no follow-up information. It seems likely that there are some, and perhaps many additional undocumented populations of *I. asarifolia* in South Florida, particularly in other parts of watersheds connected to those of the four known extant populations. Such populations could easily go unnoticed when the *I. asarifolia* plants have no flowers in bloom.

Whether *Ipomoea asarifolia* is having a significant impact on native plant and animal species in South Florida is unknown and deserves attention. Native South Florida plants that depend on seasonally-flooded habitats might be most impacted. The four populations of *I. asarifolia* that I documented in South Florida are thriving in managed preserve areas. In some seasonally-flooded parts of all four sites, *I. asarifolia* was a dominant plant (e.g., see Fig. 2). Many native plant species in South Florida depend on seasonally-flooded wetlands. Zahina et al. (2007) divided vegetation communities for the pre-development landscape of South Florida into 27 categories based in part on hydrology, including 16 communities with seasonal flooding lasting at least one month per year. Conservation efforts that restore seasonal flooding to drained areas of South Florida, beneficial to many native plants, might also promote the increased spread of *I. asarifolia*. In addition, spread of *I. asarifolia* to areas of livestock grazing in South Florida could become a serious agricultural and economic problem.

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Figure 1. *Ipomoea asarifolia* in Atlantic Ridge Preserve State Park (20 October 2023; J.K. Wetterer; [inaturalist.org/observations/188291189](https://inaturalist.org/observations/188291189)).





Figure 2. *Ipomoea asarifolia* in a seasonally flooded area of Atlantic Ridge Preserve State Park (13 June 2024; J.K. Wetterer; [inaturalist.org/observations/222498869](https://inaturalist.org/observations/222498869)).





Figure 3. *Ipomoea asarifolia* flower close-up, showing unequal sepals, in Atlantic Ridge Preserve State Park (17 June 2024; J.K. Wetterer; [inaturalist.org/observations/223381174](https://inaturalist.org/observations/223381174)).



Figure 4. *Ipomoea asarifolia* Seeds and seed pods, from the C-11 Impoundment Area (22 June 2024; J.K. Wetterer; [inaturalist.org/observations/224472124](https://inaturalist.org/observations/224472124)).





Figure 5. *Ipomoea asarifolia* seedlings in a seasonally flooded part of Cypress Creek Natural Area (16 June 2024; J.K. Wetterer; [inaturalist.org/observations/223196414](https://inaturalist.org/observations/223196414)).



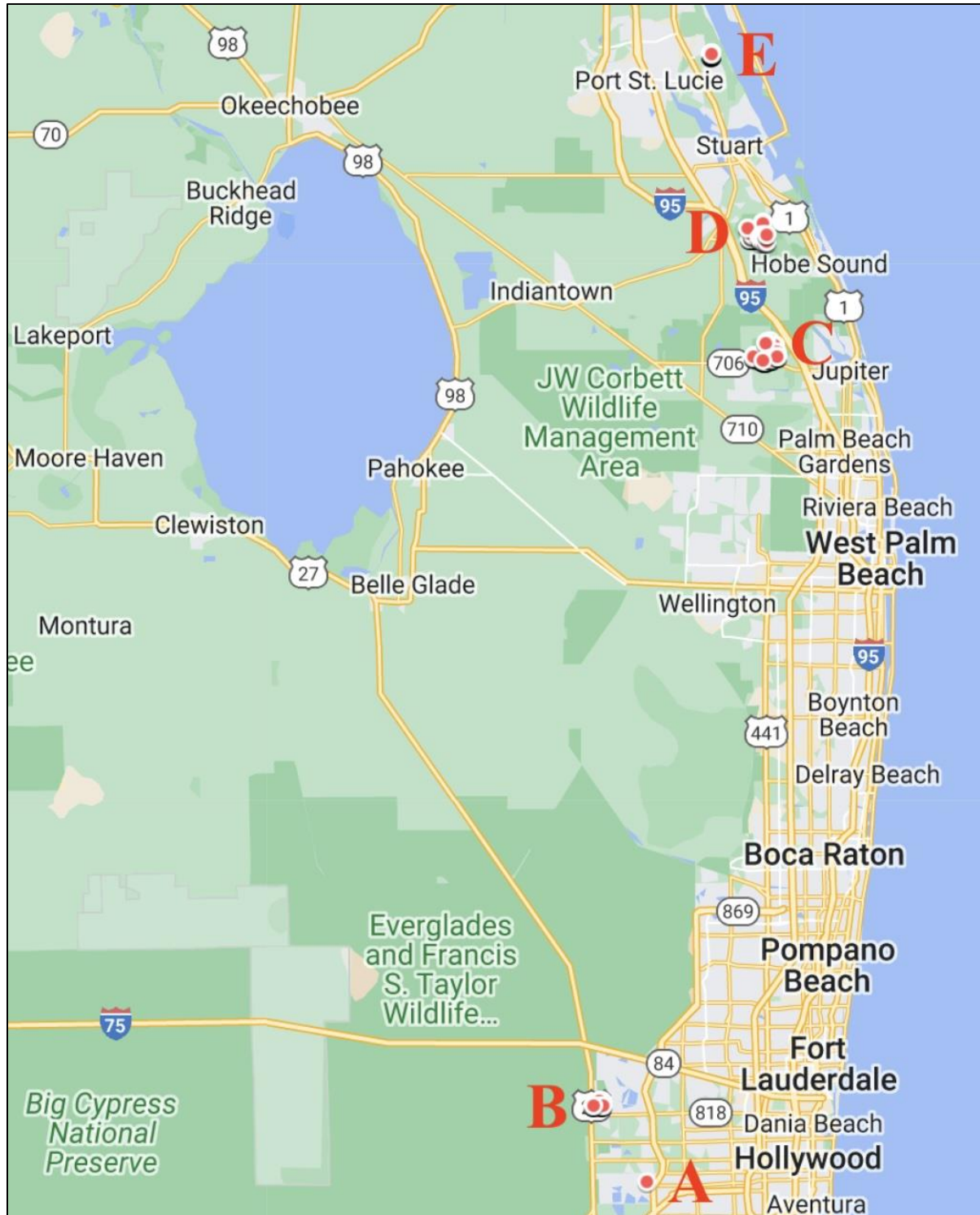


Figure 6. *Ipomoea asarifolia* observations in Miramar (A), the C-11 Impoundment Area (B), Cypress Creek Natural Area (C), Atlantic Ridge Preserve State Park (D), and Port St. Lucie (E). Map made using Google Earth.

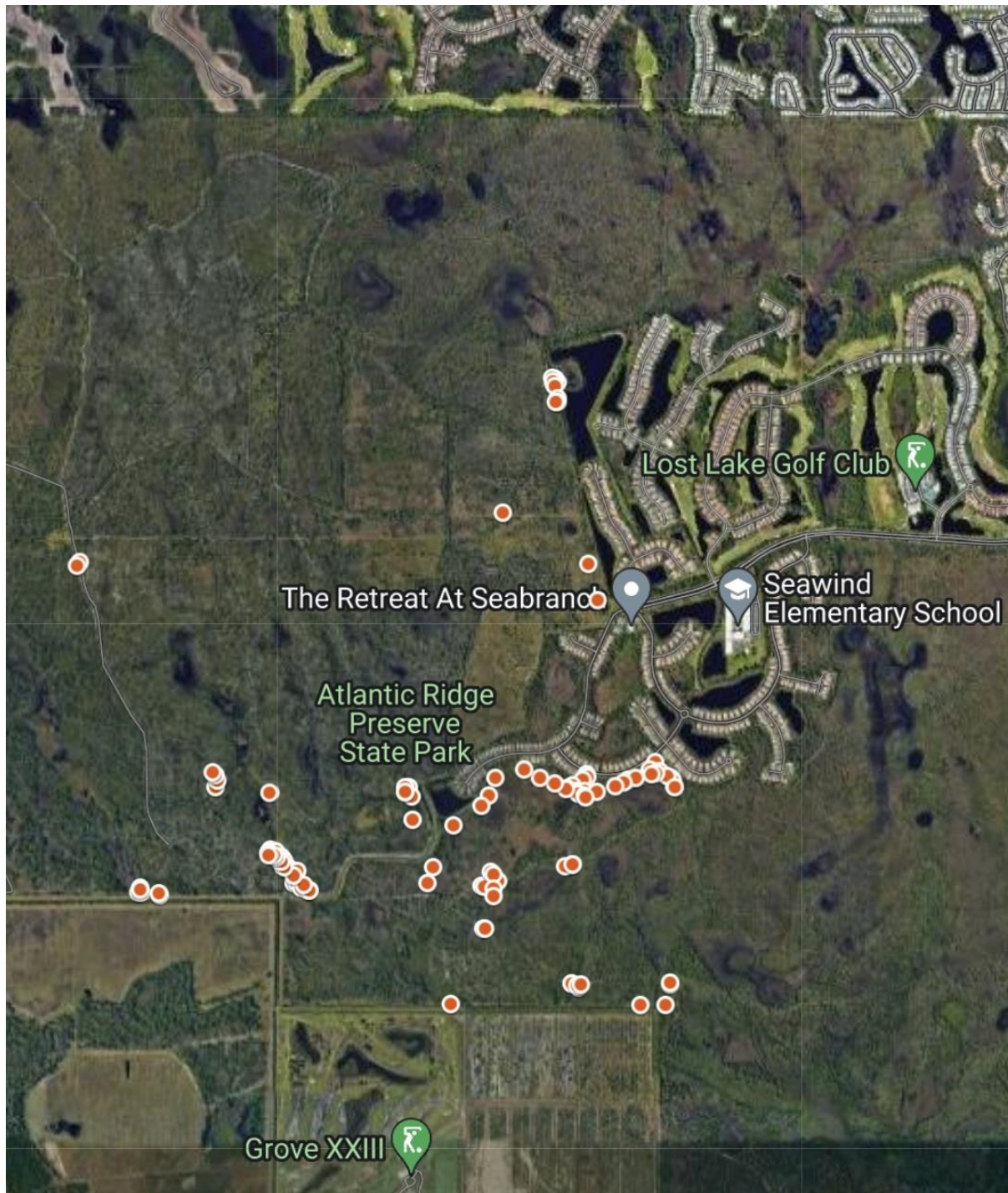


Figure 7. *Ipomoea asarifolia* observations in Atlantic Ridge Preserve State Park and adjacent parts of The Retreat development. Map made using Google Earth.



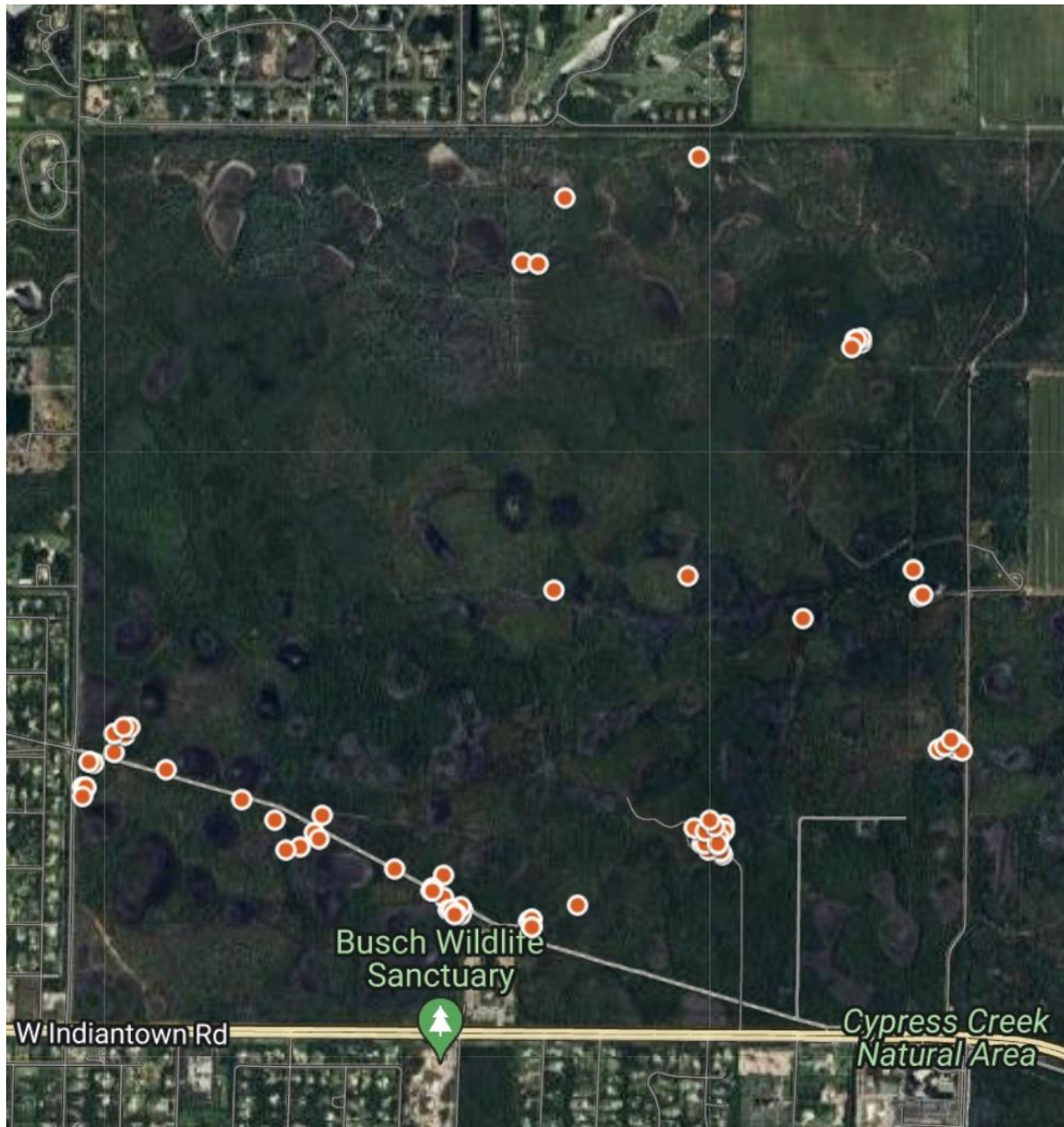


Figure 8. *Ipomoea asarifolia* observations in Cypress Creek Natural Area. Map made using Google Earth.



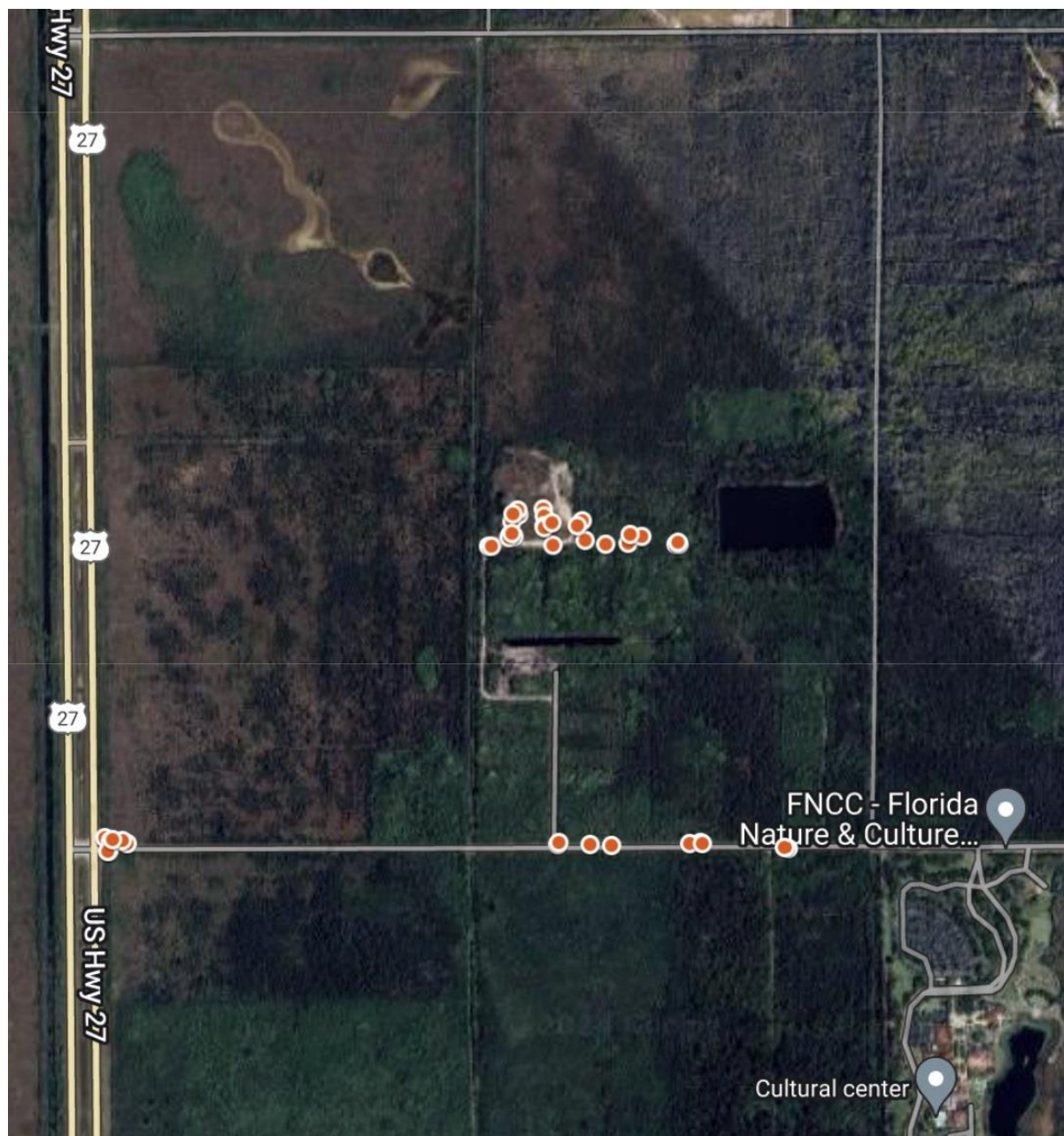


Figure 9. *Ipomoea asarifolia* observations in the C-11 Impoundment Area. The roads through this area are now closed to traffic. Map made using Google Earth.

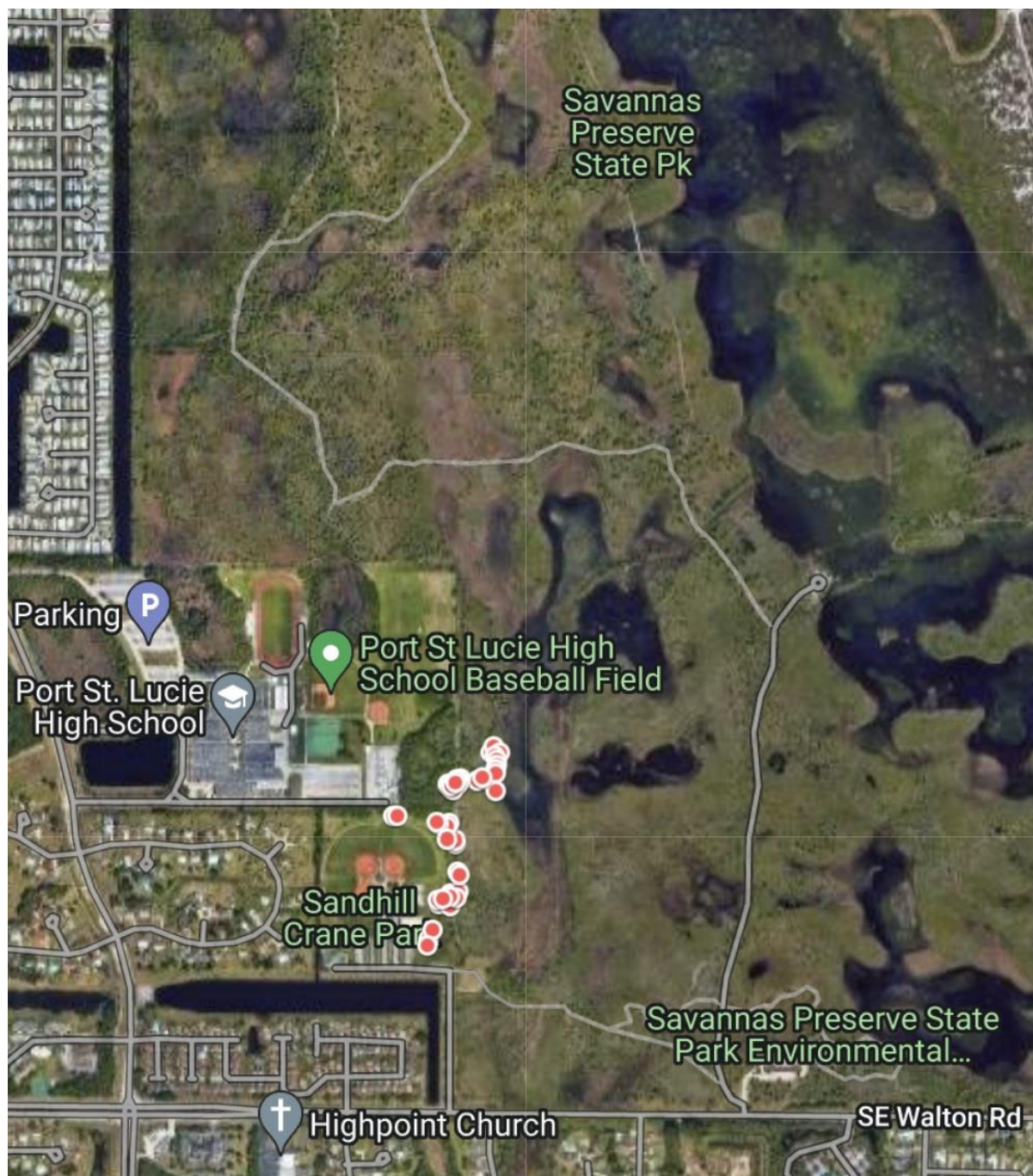


Figure 10. *Ipomoea asarifolia* observations in Port St. Lucie. Map made using Google Earth.