

Post-Delisting Monitoring Plan

for

**Florida Golden Aster
(*Chrysopsis floridana*)**



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I. Introduction of the Post Delisting Monitoring Plan

Post-delisting monitoring is a requirement of the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq.*). Section 4(g)(1) requires the U.S. Fish and Wildlife Service (Service) to:

“implement a system in cooperation with the States to monitor effectively, for not less than five years, the status of all species which have recovered to the point at which the measures provided pursuant to this Act are no longer necessary.”

The purpose of this Post-Delisting Monitoring (PDM) Plan (Plan) is to verify that *Chrysopsis floridana* (Florida Golden Aster) remains secure from the risk of extinction after it has been removed from the protections of the Act. The Service prepared this Plan to detect substantial declines in *C. floridana* occurrences with reasonable certainty. The primary goal of PDM is to assess the delisted species to ensure the status does not deteriorate, and if a substantial decline in populations resiliency or an increase in threats is detected, to enact measures to halt the decline so that re-proposing the species as endangered or threatened is not warranted. The Plan was developed to ensure consistent reporting and as a coordinating mechanism with the following conservation lands entities where populations occur: Southwest Florida Water Management District, Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, city of St. Petersburg, and Hillsborough, Manatee and Pinellas counties.

Chrysopsis floridana occurs on conservation lands and private lands throughout five counties in west-central peninsular Florida. The Service, in conjunction with The Florida Forest Service, agency conservation land managers, and private researchers (depending on availability and funding) who have monitored or conducted research on populations, will continue to monitor populations and assess habitat conditions on publicly managed conservation lands for a minimum of five years post-delisting. The Florida Forest Service will utilize section 6 funding to coordinate and conduct PDM in conjunction with other stakeholders. Hillsborough County and the city of St. Petersburg actively monitor the majority of the populations on their conservation lands and account for over 10 populations. Monitoring data provided from these entities will be incorporated along with supplemental monitoring of their sites where needed.

II. Review Summary

The draft PDM plan was made available as part of the [Regulations.gov](https://www.regulations.gov) docket materials published with the proposed rule to remove *Chrysopsis floridana* from the list of threatened and endangered species (Service 2021). The Service did not receive any public comments related to the draft PDM plan.

In addition to being available for public comment, the draft Plan was peer reviewed in June 2021. We asked for comments on whether we assembled the best available scientific and commercial information, if our analysis of this information was correct and properly applied, and if the reviewer could identify any additional new information related to the monitoring

that has not been considered. Additionally, as part of the peer review process, the Service evaluated the potential for conflicts of interest with the subject species. We incorporated comments from the peer reviewers as appropriate. Peer review was requested from the individuals below.

- Michael Jenkins, Biologist, Florida Forest Service, Florida Department of Agriculture and Consumer Services*
- Hanna Rosner-Katz, Botanist, Florida Natural Areas Inventory*
- Pam Leasure, Environmental Program Manager, Pinellas County Parks and Conservation Resources

* Individuals that responded to the peer review request are noted with an asterisk.

III. Species Status at the Time of Delisting

A. Demographic Parameters

Chrysopsis floridana is a short-lived perennial (~3-5 years) herb flowering in late November and December and shedding seeds from December through January. This plant can spread vegetatively by forming new leaf clusters at the ends of rhizomes, but reproduction is primarily by seed. The entire genus has an out-crossing breeding system (self-incompatibility) consequently preventing self-fertilization (Wunderlin et al. 1981).

The species occurs in open, white sandy soils of Florida scrub (sclerophyllous oak or rosemary, with or without sand pine) and the adjacent ecotone of sandhill communities (Service 1988) in Hardee, Highlands, Hillsborough, Manatee, and Pinellas counties. Like many scrub endemics, *C. floridana* is associated with soil disturbance, which is important for regeneration. Previous *C. floridana* studies have demonstrated that seedling emergence was favored by disturbed soils, by the absence of a litter layer and by their combination (Lambert and Menges 1996). These disturbances often provide the appropriate conditions by breaking seed dormancy, burying seeds at appropriate depths, triggering a release of nitrates within the soils, and reducing litter to expose bare soil (Lambert and Menges 1996, St. John 1987). Fire also appeared to promote flowering in the Lambert and Menges study. The authors also noted increasing mortality and variable recruitment within fire-suppressed sites as the canopy closure increases. Lower light conditions could induce additional stress on the plants by affecting their vegetative growth and reproduction. Additionally, the seeds of *C. floridana* have a pappus (tuft of hairs) of capillary bristles that aids with its dispersal away from the parent plant by enabling it to be dragged along the ground or lifted up into the air and transported by wind. Wind dispersal is most effective in open areas and only minimally effective in closed canopied systems (Burrows 1986).

B. Discussion of Populations

On May 16, 1986, the Service published a final rule in the Federal Register (51 FR 17974) listing the *C. floridana* as endangered due to the destruction and modification of habitat. When the species was listed, nine populations were known to occur on private lands at five locations in southeastern Hillsborough County (Wunderlin et al. 1981). Currently over 30 populations of *C. floridana* occur range-wide. Of these, over 20 populations occur on 21 protected conservation lands.

Open habitat must be maintained by prescribed burning or mechanical treatment. All populations will need continual habitat management to maintain the open, early successional vegetative conditions required by the species for its lifecycle described previously. Many details about the habitat requirements (at every scale, landscape to microhabitat) and demography are not yet known, although a range-wide study was conducted to gain a better understanding of these aspects of *C. floridana* biology.

The Service assessed current resilience of populations based on population size, habitat protection, and habitat area available. Large populations are more resilient, in that they are better able to withstand demographic, environmental, and anthropogenic stochastic events. Habitat protection was used as a proxy for habitat management, under the assumption that populations on protected conservation lands will continue to receive adequate habitat management (openness maintained) than those on private lands. A basic habitat model was constructed from the current state of knowledge about the species biology and needs to calculate the amount of available habitat for each population to occupy, expanded its range as new habitat becomes suitable, or migrate as current habitat becomes less suitable. Based on our resilience classification strategy, 7 populations are very highly resilient, 11 are highly resilient, 6 are moderately resilient, and 6 populations have low resilience.

The vast majority of highly and very highly resilient populations occur in the central portion of the species range in Hillsborough and Manatee Counties (13 populations), with 3 such populations farther west in Pinellas County, and 2 such populations farther east in Hardee and Highlands Counties. A baseline of all the populations is documented in the most recent species 5-year review and the species status assessment. Table 1 is a list of the conservation lands where *C. floridana* populations are present.

Table 1. Summary of *C. floridana* populations on conservation lands considered protected. When present, the numbers in parenthesis after the site location include population element occurrence (EO) number first followed by either Florida natural Areas Inventory (non-italics) or Bok Tower Gardens identifier (in italics). Information also includes origin (natural or introduced) and an asterisk to denote population resiliency category. Florida Element Occurrence data from State Natural Heritage (NatureServe Biotics) database, (FNAI, FLEO, 2016).

Site Location and Population (EO #)	County	Ownership	Origin (First Observed)
Paynes Creek Historic State Park ***	Hardee	FDEP	Introduced 2011
Highlands Hammock State Park **	Highlands	FDEP	Natural 1986
Alafia River State Park **	Hillsborough	FDEP	Introduced 1986, 1987
Alafia Scrub Preserve (36; 85) ***	Hillsborough	HC	Natural 2006
Balm Boyette Scrub Preserve (39) (41) ***	Hillsborough	HC	Natural 2006, 2006
Balm Scrub Preserve (40) (42; 84) ***	Hillsborough	HC	Natural 2006, 2006
Bell Creek Preserve (28; 12) ****	Hillsborough	HC	Natural 2004
Bullfrog Creek Scrub Preserve (30; 135) **	Hillsborough	FWC	Natural 2004
Golden Aster Scrub Preserve (9; 127) (38; 127) ****	Hillsborough	HC	Natural 1998, 2006
Little Manatee River State Park (31; 44, 86, 164) ****	Hillsborough	FDEP	Natural 1998, 2006
Rhodine Scrub Preserve (2; 126) ****	Hillsborough	HC	Natural 1976
Sun City Heritage Park Addition ***	Hillsborough	HC	Natural 1990

Upper Little Manatee River Corridor Preserve ****	Hillsborough	HC	Natural 1995
Duette Preserve North, South ***	Manatee	MC	Introduced 2013, 2013
Lake Manatee State Park (16; 163) ****	Manatee	FDEP	Natural 1987
Little Manatee River Southfork East (148) ****	Manatee	SWFWMD	Introduced 2008, 2009
Little Manatee River Southfork West (148) ****	Manatee	SWFWMD	Introduced 2008, 2009
Moody Branch Mitigation Park (29; 125) ****	Manatee	MC/FWC	Natural 2004
Boyd Hill Nature Preserve (155) ***	Pinellas	CSP	Introduced 1986, 1987, 1989
Fort De Soto County Park *	Pinellas	PC	Introduced 1986, 1987, 1989
McKay Creek ***	Pinellas	PC	Introduced 2009
Weedon Island ***	Pinellas	PC	Introduced 2010

BTG – Bok Tower Gardens, **CSP** – City of St. Petersburg, **FDEP** – Florida Department of Environmental Protection, **FNAI** – Florida Natural Areas Inventory, **FWC** – Florida Fish and Wildlife Conservation Commission, **HC** – Hillsborough County, **MC** – Manatee County, **PC** – Pinellas County, **SWFWMD** – Southwest Florida Water Management District.

Population Resiliency Categories: * Low < 100 individuals, ** Moderate 100 - 500 individuals, *** High 501 - 1000, **** Very High > 1000 individuals

IV. Monitoring Methods and Locations

After the publication of a final rule to delist *C. floridana*, population monitoring will be initiated the following year in November through December. The Florida Forest Service will organize the various partners participating at the sites and also conduct monitoring events. As requested in their comments on the Plan, the creation of a team of staff and biologist from all of the land management agencies, conservation organizations, and willing individuals that can work together to maintain habitat post recovery would be essential for long-term success. This team would work cooperatively to conduct mapping, management, monitoring, and research over the years.

Monitoring will consist of documenting species presence at a minimum of 20 populations each monitoring event on the public conservation lands noted in Table 1. These will include monitoring events of the very highly resilient, highly resilient, and moderately resilient populations to compare to known population baselines. The populations selected over the five-year timeframe do not necessarily have to be the same populations monitored every event. A “core” group of seven sites spatially distributed across the species’ range will be required to be included in the monitoring events, which are the following sites: Paynes Creek Historic State Park (Hardee County), Alafia Scrub Preserve and Little Manatee River State Park (Hillsborough County), Moody Branch Mitigation Park and Little Manatee River Southfork East (Manatee County), and McKay Creek and Weedon Island (Pinellas County).

Since the species is not static on the landscape, but rather reacts to current habitat conditions (prescribed fire, wildfire, mechanical treatment, etc.) established transects will not be employed. The populations will be assessed for general spatial occurrence (estimate acreage percentage) of the suitable habitat within each conservation land and population size (estimated numbers of individuals). Habitat conditions will be described to assist with future management decisions to ensure suitable conditions remain for the species to survive and flourish. Documenting past management and future needs will be a component of the

reporting. A monitoring protocol will be developed and provided for all sites for consistent reporting among sites and years. The monitoring protocol and data sheets will be provided to all monitoring team members upon commencement of the effort.

Triggers requiring an adjustment to the monitoring protocol will be based on a discernable declining trend in the populations monitored. Thresholds will consist of a comparison of the baseline population data to observed population data and whether appropriate management is occurring in a timely and effective manner to ensure appropriate habitat is available for the population to persist.

V. Thresholds for Potential Monitoring Outcomes and Conclusions

Effective PDM requires timely evaluation of data and responsiveness to observed trends. In order to assure timely response to observed trends, it is necessary to identify possible outcomes from monitoring that could be anticipated and general approaches for responding to these scenarios. From the analysis of the population surveys, it will be possible to categorize observations into one of the following three possible PDM outcomes.

A. Category I: Stable

***Chrysopsis floridana* remains secure without protections of listing under the Act.**

This would be true if all of the following conditions are met:

1. At least 70% of the monitored populations maintain their Species Status Assessment resiliency metric of high or very high during the PDM period (at least 13 of 18 populations). The categorized population were an estimate of total plants (any life stage): * Low < 100 individuals, ** Moderate 100 - 500 individuals, *** High 501 - 1000, **** Very High > 1000 individuals.
2. Maintain at least 20 populations with a resiliency of moderate or greater during PDM period. Of these populations, at least 70% must have a high resiliency or greater (14 of 20).
3. No new or increasing threats are observed that are of a magnitude or imminence that may jeopardize the continued existence of the species within the foreseeable future.

In this case, the PDM would be concluded at the end of the timeframe specified in this Plan (i.e. five years).

B. Category II: Uncertain

***Chrysopsis floridana* may be less demographically stable than anticipated at the time of delisting, but information does not indicate that the species meets the definition of threatened or endangered. However, uncertainty exists, and further assessment of the species would be recommended.**

This would be true if:

1. Less than 70% of the monitored populations maintain their current Species Status Assessment resiliency metric during the PDM period (14 of 20).
2. Less than 60% of the monitored populations have a high or greater resiliency during the PDM period (less than 12 of 20).
3. There are no new or increasing threats observed that may be of a magnitude or imminence that may jeopardize the continued existence of the species within the foreseeable future.

If any of these conditions are met, the PDM period should be extended for an additional five years, and if necessary, sampling intensity could be increased to provide greater precision in detecting trends. Existing data will be analyzed to determine if any management interventions are available that would be expected to reverse declines and stabilize or improve trends.

C. Category III: Declining

The PDM yields substantial information indicating that threats are causing a decline in the status of the *Chrysopsis floridana* since the time of delisting, such that listing the species as threatened or endangered may be warranted.

This would be true if:

1. Less than 50% of the monitored populations have a high or greater resiliency during the PDM period (less than 10 of 20).
2. If extirpations result in less than 20 total populations monitored remain during the PDM period.
3. There are no new or increasing threats observed that may be of a magnitude or imminence that may jeopardize the continued existence of the species within the foreseeable future.

If any of these conditions are true, then the Service should initiate a formal status review to assess changes in threats to the species, its abundance, population structure, and distribution to determine whether a proposal for relisting is appropriate.

VI. Data Compilation and Reporting Procedures

With the exception of introduced populations that were monitored yearly for a number of years post out-planting, the majority of the populations were not monitored on an annual basis; therefore, monitoring will occur biennial (i.e., every other year) for a minimum of five years. In accordance with Threshold B above, or if needed in coordination with the Service, cooperators can increase monitoring frequency and/or number of populations to decrease uncertainty or assess threats. Cooperators will provide monitoring to the Service which will be collated in biennial reports. Each report will synthesize all monitoring data and comments on the status of the species. Biennial reports summarizing the data will be on file at the

Service's Florida Ecological Services Field Office. Prior to terminating biennial monitoring, a final report will be prepared to include an analysis of the overall population trend and status to document viability of the population. At the conclusion of monitoring (e.g. Threshold A is met above, the species continues to no longer meet the definition of endangered or threatened, and the duration of monitoring is at least five years after the effective date of delisting), a final report will be prepared by the Service.

VII. Estimated Funding Requirements and Sources

The Florida Forest Service receives section 6 funding to promote and benefit flora species protected under the Act. The Plan will utilize this funding source, and other available funding opportunities that may be available, to organize and coordinate a team to accomplish this task. The species recovery lead for the Service will assist The Florida Forest Service staff and other involved parties to accomplish the requirements and final evaluation of the Plan.

A. Anti-deficiency Act Disclaimer

Post-delisting monitoring is a cooperative effort between the Service, State governments, other Federal agencies, and non-governmental partners. Funding of post-delisting monitoring presents a challenge for all partners committed to ensuring the continued viability of the *C. floridana* following removal of Act protections. To the extent feasible, the Service intends to provide funding for post-delisting monitoring efforts through the annual appropriations process. Nonetheless, nothing in this Plan should be construed as a commitment or requirement that any Federal agency obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. 1341, or any other law or regulation.

VIII. Post-Delisting Monitoring Plan Implementation Schedule

The implementation of the Plan will begin the following year following delisting of the species in November. Surveys will occur during the main flowering period of the species (November through December). All data will be summarized in a report and finalized by the following April and consist of the elements described in this Plan.

IX. Literature Cited

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