U. S. Fish and Wildlife Service

Recovery Plan for White Fringeless Orchid (*Platanthera integrilabia*)

Prepared by:

Geoff Call
U.S. Fish and Wildlife Service
Ecological Services
Cookeville, Tennessee

For:

U.S. Fish and Wildlife Service
Atlanta, Georgia
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Recovery plans delineate reasonable actions that are believed necessary to recover and/or protect the species. Plans are prepared by the U.S. Fish and Wildlife Service, sometimes with the assistance of recovery teams, contractors, State agencies, and others. Plans are reviewed by the public and subject to additional peer review before they are adopted by the U.S. Fish and Wildlife Service. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not obligate other parties to undertake specific tasks and do not necessarily represent the views nor the official positions or approval of any individuals or agencies involved in the plan formulation, other than the U.S. Fish and Wildlife Service. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Assistant Regional Director, Regional Director, or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks. By approving this document, the Regional Director certifies that the information used in its development represents the best scientific and commercial data available at the time it was written. Copies of all documents reviewed in development of the plan are available in the administrative record, located at the U.S. Fish and Wildlife Service's Southeast Regional Office, Atlanta, Georgia.

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Regional Director, U.S. Fish and Wildlife Service

Date: _____

Recovery Plan for White Fringeless Orchid (*Platanthera integrilabia*)

This Recovery Plan describes a vision for the recovery of white fringeless orchid and includes criteria for determining when the species should be considered for removal from the List of Endangered and Threatened Plants (50 CFR 17.12). The Recovery Plan also discusses the recovery strategy for the species, lists site-specific actions that will be necessary to achieve the plan, and estimates the time and cost for implementing recovery actions. Brief descriptions of the species' status, habitat requirements, and limiting factors are included. A detailed discussion of these and other topics pertinent to the recovery of white fringeless orchid can be found in the Species Status Assessment (SSA) for White Fringeless Orchid (Service 2021) and the Recovery Implementation Strategy (Service 2022a). These supplemental documents are available at http://ecos.fws.gov. The Recovery Implementation Strategy and SSA are maintained separately from the Recovery Plan and will be updated on a routine basis.

Current Species Status: White fringeless orchid (*Platanthera integrilabia*) was federally listed as threatened on October 13, 2016 (81 FR 62826, September 13, 2016). As of 2022, there were 89 extant occurrences of the species known from 38 counties in 6 southeastern states: Alabama, Georgia, Kentucky, Mississippi, South Carolina, and Tennessee. These 89 occurrences are distributed among 52 populations, as delineated in the SSA (Service 2021, p. 49) and the 5-Year Status Review (Service 2022b). The species historically occurred in North Carolina. White fringeless orchid is assigned a recovery priority number of 8, indicating a species with moderate degree of threat and high recovery potential.

Habitat Requirements and Limiting Factors: White fringeless orchid habitat is described as partially shaded sites with sandy and acidic soils in wet areas like seeps, seepage slopes, bogs, or swamps, occurring in both forested areas as well as restored grassland or woodland habitats and managed utility line corridors. The species is associated with a wide range of light availability, indicating that individuals can acclimate to, or populations have adapted to, locally prevalent environmental conditions. Available data indicate that the species requires the presence of a single fungal species*, Epulorhiza inquilina*, to form mycorrhiza in root cells, providing a source of carbon for seed germination and growth of seedlings and mature plants. White fringeless orchid also appears dependent on a limited number of diurnal Lepidoptera (butterflies and moths) species for pollination, but could be adapted for pollination by nocturnal hawkmoths.

The remaining populations of white fringeless orchid are in many cases small, isolated, and have limited potential for recolonization should they be extirpated. The greatest threats to this species are loss or degradation of habitat, which are exacerbated by dynamics of small populations. The main causes of habitat degradation or loss include human development and silvicultural practices, which can result in conversion of habitat to non-native forest types or other land uses, altered hydrology, soil disturbance, and increased abundance of competing plants, both native and introduced. Additional threats include loss of individual plants from unauthorized collecting, herbivory, or pathogens (81 FR 62826).

***Recovery Vision*:** The vision for recovery of white fringeless orchid is to work cooperatively with partners to conserve multiple resilient populations across the species' range representing the diversity of habitat types where it occurs. Full recovery means that threats to populations are reduced to a level whereby the species is not likely to become at risk of extinction in the foreseeable future and can therefore be removed from the *List of Endangered and Threatened Plants* (50 CFR 17.12)

***Recovery Criteria*:** Recovery criteria are objective, measurable conditions that, when met, indicate that a species may warrant delisting. Thus, recovery criteria are mileposts that measure progress toward recovery. These criteria address the five factors described in section 4(a)(1) of the Act and incorporate the conservation principles of representation, resiliency, and redundancy (Wolf *et al*. 2015). White fringeless orchid will be considered for delisting when the following conditions are met:

1. Monitoring over a 10-year period demonstrates stable or increasing population growth rates for at least 26 protected populations with resilience levels of moderate to very high (as described in the SSA). To ensure adequate representation and redundancy, these populations must be distributed among Environmental Protection Agency (EPA) Level III Ecoregions as shown in the following table. (Addresses Factors A and E.):

Level III Ecoregion	Moderate Resilience Level	High Resilience Level	Total
Blue Ridge	2	1	3
Piedmont	2	2	4
Ridge and Valley	--	1	1
Southeastern Plains	1	1	2
Southwestern Appalachians*	10	6	16

*At least two of the resilient populations in the Southwestern Appalachians should be located in Georgia or Alabama to ensure representation in the southern portion of the ecoregion.

2. Written management agreements have been reached with partners/landowners that allow for sustained monitoring and management of white fringeless orchid populations that demonstrate moderate to very high resilience. (Addresses Factor A.)

3. Alternatively, the species could be considered for delisting if 40 populations with resilience levels of moderate to very high (as described in the SSA), protected or unprotected, are distributed among EPA Level III Ecoregions where the species occurs. At least half of these populations must have resilience levels of high or very high. (Addresses Factor A and E.)

Recovery Strategy: The primary recovery strategy for white fringeless orchid is to ensure that resilient populations exist throughout the species' range. To achieve this the Service must cooperate with partners to carry out recovery actions listed below in *Actions Needed*. The purposes of completing these actions are to:

- reduce threats to the species' long-term viability by protecting, restoring, and managing habitat where populations are extant or could be restored
- conduct monitoring and research to increase knowledge of reproductive biology, life history, and ecological factors regulating population growth
- survey potential habitat to identify new populations
- maintain germplasm using *ex situ* conservation methods and propagate plants for augmenting or restoring populations
- increase public awareness of the species and its conservation

Recovery of white fringeless orchid is based upon the ecological principles of, resiliency, redundancy, and representation (Wolf *et al*. 2015), which were assessed using the framework described in the SSA. Resiliency describes the ability of populations to withstand stochastic events (both environmental and demographic), while redundancy describes the ability for the species as a whole. Resiliency of white fringeless orchid populations was ranked using available data on abundance, observation of flowering plants, and connectivity to other populations. Redundancy was characterized by the number of populations and the resiliency and geographic distribution of those populations.

Representation, which describes the ability of a species to adapt to changing environmental conditions, was characterized in the SSA by the number of populations distributed in five EPA Level III Ecoregions (Omernik 1987, entire) where white fringeless orchid occurs: Blue Ridge, Piedmont, Ridge and Valley, Southwestern Appalachians (includes the Cumberland Plateau), and Southeastern Plains. Representation is now also known in the Central Appalachians after discovery of a population in 2021.

The SSA, and subsequent 5-year Review, classified 25 percent of the 52 assessed populations as having high or very high resilience, while 65 percent of the populations were classified as having low resilience. The existence of 52 populations is positive with respect to redundancy of white fringeless orchid, but the high proportion of populations with low levels of resiliency leaves the species vulnerable to localized extirpation due to stochastic events (environmental and demographic), especially in the southern and eastern portions of its range. White fringeless orchid is well-represented by viable populations within the Southwestern Appalachians ecoregion, which includes the Cumberland Plateau where most populations are located. Redundancy of resilient populations is lacking in all other ecoregions. To have effective representation, multiple populations with moderate to very high resiliency need to be conserved in each region where the species occurs.

Many of the recovery actions, listed below in *Actions Needed*, are interrelated. For example, research to improve scientific knowledge of biological and ecological factors that regulate population growth in the species is needed for developing conservation strategies and monitoring protocols. Those standardized monitoring protocols will be used to measure effectiveness of conservation efforts at reducing threats and sustaining resilient populations. Similarly, genetically diverse *ex situ* germplasm collections are needed for propagation of plants to augment or restore populations. Together, the actions listed below are needed to execute our strategy for recovering white fringeless orchid so that delisting will be possible.

Actions Needed: The actions identified in the table below are those that, based on the best available science, we believe are necessary to accomplish the recovery of white fringeless orchid. We have included a priority number[1] and estimated cost to complete each action.

[1] Recovery actions are assigned numerical priorities to highlight the relative contribution they may make toward species recovery (48 FR 43098):

Priority 1 – An action that must be taken to prevent extinction or to prevent the species from declining irreversibly.
Priority 2 – An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.
Priority 3 – All other actions necessary to provide for full recovery of the species.

Recovery Action	Estimated Cost	Priority
1. Work with partners to protect, restore, and manage habitat where populations are extant or could be restored.	$2,400,000	1
2. Conduct monitoring and research to increase knowledge about biology and ecology of white fringeless orchid to facilitate the development of scientifically sound management plans and models for conducting population viability analyses.	$1,150,000	1
3. Conduct surveys to identify new populations and assess occupancy at historically occupied sites.	$90,000	2
4. Increase the representation and genetic diversity of *ex situ* collections of white fringeless orchid in seedbanks.	$30,000	2
5. Using seeds or propagated plants, augment protected populations that are unable to grow in response to habitat management due to low population size, or introduce populations into suitable, but unoccupied, managed habitat on conservation lands.	$300,000	3
6. Coordinate with partners to promote white fringeless orchid recovery and increase public awareness of the species and its conservation.	$110,000	3
Total Estimated Cost: $4,080,000		

Estimated Cost to Delist: The cost to recover and ultimately delist white fringeless orchid is estimated to be $4,080,000. Some costs are not determinable at this time, and, therefore, the total cost of recovery may be higher than this estimate.

***Date of Delisting*:** If all actions are fully funded and implemented as outlined, including full cooperation of all partners needed to achieve recovery, we anticipate that recovery criteria for delisting could be met by 2044.

Literature Cited:

Omernik, J. M. 1987. Ecoregions of the conterminous United States. Map (scale 1:7,500,00). Annals of the Association of American Geographers 77:118-125.

U.S. Fish and Wildlife Service. 2021. Species Status Assessment report for *Platanthera integrilabia* (white fringeless orchid), Version 1.0. March 2021. Atlanta, Georgia.

U.S. Fish and Wildlife Service. 2022a. Recovery Implementation Strategy for White Fringeless Orchid (*Platanthera integrilabia*). Atlanta, Georgia.

U.S. Fish and Wildlife Service. 2022b. White Fringeless Orchid (*Platanthera integrilabia*) 5-Year Review: Summary and Evaluation. August 2022. Atlanta, Georgia.

Wolf, S., B. Hartl, C. Carroll, M. C. Neel, and D. N. Greenwald. 2015. Beyond PVA: why recovery under the Endangered Species Act is more than population viability. BioScience 65:200-207.

Appendix: Summary of Public Comments:

Comment 1:

We received one comment that recommended that we mention that numerous white fringeless orchid populations occur in powerline corridors in the *Habitat Requirements and Limiting Factors* section of the recovery plan. We have made this addition in the text.

Comment 2:

We received a comment asking for clarification as to why the numbers of populations needed to meet recovery criteria were chosen. The recovery criterion calling for stable or increasing growth rates for a period of ten years at least 26 protected populations of moderate to very high resiliency, distributed among the EPA Level III Ecoregions, would achieve the recovery vision of working cooperatively with partners to conserve multiple resilient populations across the diversity of habitat types where white fringeless orchid occurs. The numeric target for protected populations with moderate or better resilience that we set for each ecoregion is intended to ensure that sufficient redundancy is retained for the species to withstand catastrophic events within any portion of the species range. We assume providing adequate redundancy across all representative units will be effective in maintaining adaptive variation that may be distributed among the ecoregions where the species occurs and is necessary for the species to adapt to future changes in environmental conditions. In some cases (i.e., Ridge and Valley) increasing redundancy would not be possible without introducing the species outside its known historical range, but we have determined that doing so is not warranted based on the species historical distribution and is not necessary to recover the species. The alternative recovery criterion requiring that there be forty populations of moderate to high resiliency with at least half with high or very high resilience levels, regardless of protection status, provides a path to recovery that acknowledges that unprotected populations contribute to the species redundancy and representation especially in cases where those populations are highly resilient. The higher number of populations required to satisfy this alternative criterion was deemed necessary to provide a sufficient reduction in the likelihood that the species could become at risk of extinction in the foreseeable future because protections would not be required for all of those populations. It was necessary to increase the number of populations so that redundancy and representation could still be maintained without there being assurances into the future.

Comment 3:

We received a comment asking if "stochasticity" as mentioned in the recovery plan referred to both environmental stochasticity and demographic stochasticity. We did intend for it to capture both and have changed the text to reflect this.

Comment 4:

We received comments from two commenters regarding monitoring protocols. One commenter recommended that we create a specific task in the actions section that would call for the development of a monitoring protocol that could be used across the various populations in order to evaluate recovery. Another commenter noted that they support the development of a standardized monitoring protocol for the species. We note the support for this activity and agree with its importance. While developing a standardized monitoring protocol has not been called out as a stand-alone recovery action, it is listed as an activity (2.1) in the recovery implementation strategy to support *Recovery Action 2: Conduct monitoring and research to increase knowledge about biology and ecology of white fringeless orchid to facilitate the development of scientifically sound management plans and models for conducting*

population viability analyses).

Comment 5:

One commenter noted that listed species on private property could result in forfeiture of financial value or result in income-loss for the landowner, and that such losses could be offset by conservation easements or fee simple land purchases. The commenter encouraged the Service to be aware of, and pursue, all relevant sources of funding for these activities and/or purchases. We recognize the importance of working with landowners in the conservation and recovery of listed species and have identified working with partners and private landowners to protect populations on privately owned lands as an activity in the recovery implementation strategy for the species. As indicated in the Recovery Implementation Strategy, potential mechanisms to do this include fee simple purchase, conservation easement purchase or donation, or establishing a conservation agreement to ensure habitat is managed and protected from incompatible land uses.