

**Holy Ghost ipomopsis**  
***(Ipomopsis sancti-spiritus)***

**5-Year Review:**  
**Summary and Evaluation**

**U.S. Fish and Wildlife Service**  
**New Mexico Ecological Services Field Office**  
**Albuquerque, New Mexico**

**5-YEAR REVIEW**  
**Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*)**

**1.0 GENERAL INFORMATION**

**1.1 Listing History**

**Species:** Holy Ghost ipomopsis (*Ipomopsis sancti-spiritus*)

**Date listed:** March 23, 1994

**FR citation(s):** 59 FR 13836

**Classification:** Endangered

**Critical habitat/4(d) rule/Experimental population designation/Similarity of appearance listing:** There have been no associated rulemakings since the species was originally listed in 1994.

**1.2 Methodology used to complete the review:**

The U.S. Fish and Wildlife Service (Service) most recently evaluated the natural history and status of the Holy Ghost ipomopsis (*Ipomopsis sancti-spiritus*) as part of a status review conducted in October 2008 (Service 2008). In addition, species experts recently evaluated the biology and status of the Holy Ghost ipomopsis as part of a recovery summary report conducted in 2019 (Roth 2019), which helped inform this document. We solicited additional data for this 5-year review from interested parties through a Federal Register notice announcing the review on July 26, 2019 (Service 2019a). We also conducted a literature search and a review of information in our files. Since this species is endemic to a single canyon in New Mexico, new data are limited. The 2019 recovery summary report (Roth 2019) provides a species-wide analysis and comprises most of the new information for this species.

**1.3 FR Notice citation announcing the species is under active review:**

The Federal Register Notice: 84 FR 36113-36116, published July 26, 2019, announced the active review of the Holy Ghost ipomopsis.

**2.0 REVIEW ANALYSIS**

**2.1 Recovery Criteria:**

A recovery plan for the Holy Ghost ipomopsis was developed in 2002 (Service 2002) and amended recovery criteria were established in 2019 (Service 2019b). Although the criteria outlined in the Recovery Plan amendment have not been fully implemented, biologists are taking action to conserve the current population, establish new populations, and reach recovery goals.

Due to its highly endemic status, the Holy Ghost ipomopsis remains vulnerable to risks and threats. Natural and anthropogenic threats continue to pose a risk to the Holy Ghost ipomopsis (see Threats section below for more information). The U.S. Fish and Wildlife Service recognizes the amended recovery criteria as relevant for species' recovery and is implementing conservation measures in adherence with the Recovery Plan and amended criteria.

## **2.2 Updated Information and Current Species Status**

### **2.2.1 Biology and Habitat**

The Holy Ghost ipomopsis is an endemic plant found in the Holy Ghost Canyon in the Santa Fe National Forest in north-central New Mexico. The 2-mile long canyon road-cut accompanying Forest Road 122 is the only naturally occurring population of the Holy Ghost ipomopsis. Holy Ghost ipomopsis conservation is a collaborative effort between the U.S. Fish and Wildlife Service, U.S. Forest Service, New Mexico Energy, Minerals, and Natural Resources Department - Forestry Division, University of New Mexico, and Albuquerque BioPark Botanical Garden. Biologists are working to establish additional stable populations of the Holy Ghost ipomopsis in the Santa Fe National Forest (Roth 2019; Service 2008). The Recovery Summary Report (Roth 2019) contains the most current species information.

Since 2005, the greenhouse rearing of Holy Ghost ipomopsis seedlings and rosettes has been successful (86% - 89% success rate) (Roth 2019). Seed collection and greenhouse propagation is essential for establishing new populations in geographically different drainages, a central Recovery Plan objective (Service 2002). Within the natural population at Holy Ghost Canyon, there has been annual interannual variation in the number of plants over the past 17 years. While this trend is likely due to fluctuating environmental conditions, the cause of population increases and declines is not entirely understood. However, it is most likely due to water availability in the canyon (Roth 2019; Figure 1).

In addition to the natural site, the Holy Ghost ipomopsis exists at three transplanted sites (Windsor, Indian Creek, and Panchuela) in the Santa Fe National Forest. Populations were initially healthy with hundreds of individual plants, but maintaining both consistent and increasing populations has been difficult. In 2019, the Indian Creek site had 286 individuals, Windsor had approximately 30 individuals, and Panchuela had 23 individuals (Roth 2019).

A study on habitat disturbance conducted from 2012-2019 revealed that more individual plants survive in thinned forest plots. These results suggest that some disturbance might aid Holy Ghost ipomopsis transplant, survival, and population establishment (Roth 2019).

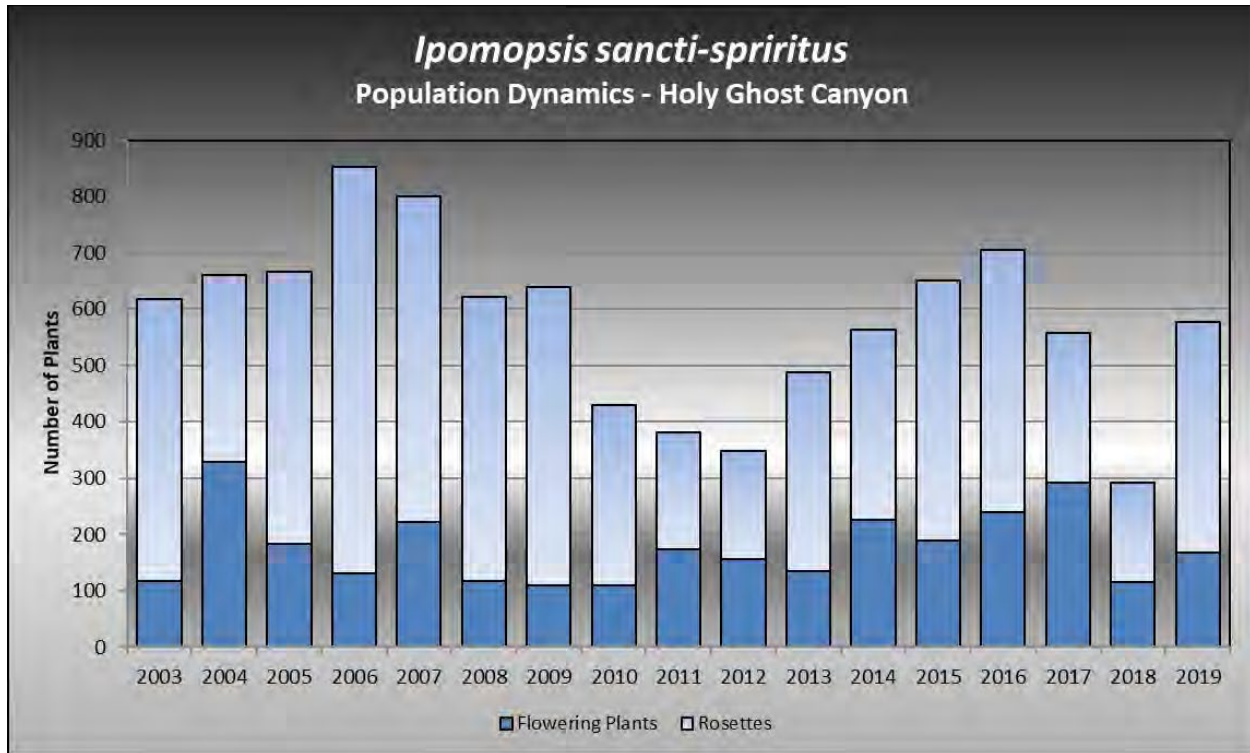


Figure 1: Population monitoring results for Holy Ghost ipomopsis (*Ipomopsis sancti-spiritus*) from efforts 2003-2019. This figure shows number of rosettes and flowering plants. This image is borrowed from Recovery Summary Report for the species (Roth 2019).

In 2016, exploratory surveys in the Santa Fe and Carson National Forests did not reveal any new Holy Ghost ipomopsis populations. Biologists conducted surveys by car and walking along roads, trails, and in burned areas (Roth 2019).

**2.2.2 Threats Analysis (threats, conservation measures, and regulatory mechanisms):**

This analysis summarizes threats from the recovery plan, most recent 5-year review, and Recovery Summary Report (Roth 2019). Following requirements outlined in the Endangered Species Act (Act), we assess threats using a five-factor analysis. The five factors include: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) over-utilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence.

**2.2.2.1 Fire Management and Fire Suppression:**

Fire creates a mosaic landscape and opens the forest canopy allowing light to reach the forest floor, serving an important role in habitat management for the Holy Ghost ipomopsis. Because of heavy recreational use, forest management has suppressed fire in Holy Ghost Canyon for over 80 years (Service 2008). This disruption of ecological processes poses a threat to

the Holy Ghost ipomopsis, potentially disrupting important, dynamic habitat processes needed this plant (Factors A and E).

**2.2.2.2 Anthropogenic Impacts:**

Holy Ghost Canyon is a popular recreation destination. The Holy Ghost ipomopsis is endemic to this canyon and tends to grow along the roadside. Therefore, vehicles and recreation use within the canyon poses a risk to this species. People may collect the flowers or trample the plants, limiting the individual plant’s ability to flower and produce seed. Since the Holy Ghost ipomopsis is a relatively short-lived plant (2-5 years), long-term heavy recreational use may have devastating effects to the entire population (Service 2008). Additionally, potential habitat for the Holy Ghost ipomopsis is also susceptible to natural resource extraction and subsequent activities. While these activities must be approved, the ecological disruption creates a risk for the Holy Ghost ipomopsis (Service 2008; Factors A and E).

**2.2.2.3 Other Threats:**

The Intergovernmental Panel for Climate Change (IPCC) predicts hotter temperatures and more erratic precipitation patterns for the southwestern United States (Christensen et al. 2013). The Holy Ghost ipomopsis is sensitive to drought and its limited habitat might become unsuitable under future climate change scenarios (Service 2002; Factor E).

**2.3 Synthesis:**

After reviewing the best available scientific information, we conclude that the Holy Ghost ipomopsis is currently at risk of extinction and remains an endangered species. This is a narrow endemic species with one natural population occurring in a single canyon. This population is vulnerable to stochastic and catastrophic effects such as wildfire and drought. It is also vulnerable to the disruption of historically normal ecological processes, such as the lack of low-intensity fires on the landscape, and anthropogenic activities, such as road disturbance and collection. The species is also sensitive to climatic changes and other environmental fluctuations. The three introduced sites outside of the historical range are not yet well enough established to determine if they will provide long term conservation benefit to the species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species in the 2019 Holy Ghost Ipomopsis Recovery Summary Report (Roth 2019) remains an accurate reflection of the species current status.

**3.0 RESULTS**

**3.1 Recommended Classification:**

- Downlist to Threatened**
- Uplist to Endangered**
- Delist** (*Indicate reasons for delisting per 50 CFR 424.11*):

\_\_\_\_\_ *The species is extinct*

\_\_\_\_\_ *The species does not meet the definition of an endangered species or a threatened species (i.e., is recovered, or new information on status and threats indicate species does not meet definitions).*

\_\_\_\_\_ *The listed entity does not meet the statutory definition of a species.*

X **No change is needed**

### **3.2 New Recovery Priority Number:**

The Recovery Priority Number of 2C is still appropriate for this species and no change is needed.

#### **Brief Rationale:**

A Recovery Priority Number of 2C indicates that the species has a high degree of threat, a high recovery potential, the listed entity is a species, and there is conflict with development. Since biologists are implementing conservation and restoration measures listed in the Recovery Plan, and threats have not significantly changed, it is appropriate to maintain the Recovery Priority Number listed in the 2008 5-year review.

## **4.0 RECOMMENDATIONS FOR FUTURE ACTIONS**

The recommendations below are summarized from the 2019 Recovery Summary Report; more detailed information can be found on pages 28-29 of the report (Roth 2019).

- Closely monitor and manage anthropogenic activities in Holy Ghost Canyon. Disruptions to its reproductive cycle threaten the species' persistence. The collection of flowering plants, especially in high, human traffic areas, should be discouraged.
- If possible, land managers should avoid Holy Ghost ipomopsis habitat when considering resource extraction activities within Santa Fe National Forest. Decision-makers can consider alternatives to minimize and avoid impacts on the species.
- Conduct a population viability analysis at naturally occurring and translocation sites to evaluate and measure success of these populations and better understand reproductive process of the Holy Ghost ipomopsis.
- Management agencies should create a comprehensive fire management plan which incorporates the habitat needs of the Holy Ghost ipomopsis. Integrating the Holy Ghost ipomopsis into post-fire restoration plans to both establish and reestablish populations of the species would increase species resiliency.

## **5.0 REFERENCES**

Christensen, J.H., K. Krishna Kumar, E. Aldrian, S.-I. An, I.F.A. Cavalcanti, M. de Castro, W. Dong, P. Goswami, A. Hall, J.K. Kanyanga, A. Kitoh, J. Kossin, N.-C. Lau, J. Renwick, D.B. Stephenson, S.-P. Xie and T. Zhou, 2013: Climate Phenomena and their Relevance for Future Regional Climate Change. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

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- U.S. Fish and Wildlife Service. 2019b. Recovery Plan for *Ipomopsis sancti-spiritus* (Holy Ghost Ipomopsis), Amendment 1. August 2019. 20 pp.

**U.S. FISH AND WILDLIFE SERVICE**  
**5-YEAR REVIEW of Holy Ghost ipomopsis (*Ipomopsis sancti-spiritus*)**

**Current Classification:** Endangered

**Recommendation resulting from the 5-Year Review:**

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

**FIELD OFFICE APPROVAL:**

**Lead Field Supervisor, Fish and Wildlife Service, Shawn Sartorius**

Approve \_\_\_\_\_