

**Rugel's Pawpaw (*Deeringothamnus rugelii*)**

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

**U.S. Fish and Wildlife Service  
Jacksonville Ecological Services Field Office  
Southeast Region  
Jacksonville, Florida**

**5-YEAR REVIEW**

**Species reviewed:** Rugel’s pawpaw (*Deeringothamnus rugelii*)

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**5-YEAR REVIEW**  
**Rugel's pawpaw/*Deeringothamnus rugelii***

**I. GENERAL INFORMATION**

**A. Methodology used to complete the review:** In conducting this 5-year review, we relied on available information pertaining to historic and current distributions, life history, and habitat of this species. The Service lead recovery biologist for this species conducted the review. Our sources include the final rule listing this species under the Act; the recovery plan; peer reviewed scientific publications; unpublished field observations by the Service, State, and other experienced biologists; unpublished survey reports; and notes and communications from other qualified biologists. The public notice for this review was published on April 26, 2007, with a 60-day public comment period. No comments were received for this species. See the Appendix for a summary of the Peer Review.

**B. Reviewers**

**Lead Region - Southeast Region:** Kelly Bibb, 404-679-7132

**Lead Field Office - Jacksonville, FL, Ecological Services:** Annie Dziergowski, 904-731-3089

**C. Background**

1. **FR Notice citation announcing initiation of this review:** 72 FR 20866, April 26, 2007
2. **Species status:** Stable (2007 Recovery Data Call). *Deeringothamnus rugelii* is a Florida endemic with restricted habitat, known only from Volusia County, Florida. The status has been listed as stable since 2005/2006 because additional surveys conducted in 2003 and 2004 found *D. rugelii* at conservation lands in Volusia County known as the Longleaf Pine Preserve (LPP). In 1999, this species was found at four different locations in Tiger Bay State Forest, Port Orange City Forest, Volusia County Correctional Institute, and near Lake Ashby on private lands. More than half of the plants were located on the Port Orange City Forest. Sites at which this species historically occurred have been altered to serve as cattle pastures, roads, and powerline rights-of-way. Threats include development of habitat, conversion to pine plantation and turf farms, and fire suppression. If management occurs on publicly owned lands within this species range, we believe that *D. rugelii* will remain stable. However, continuing loss of this species on private lands is reducing its overall range. A comprehensive survey needs to be conducted to determine the status of the species on all properties throughout its range.

3. **Recovery achieved:** 1 (0-25% recovery objectives achieved), 2007  
Recovery Data Call

4. **Listing history:**  
Original Listing  
FR notice: 51 FR 34415  
Date listed: September 26, 1986  
Entity listed: Species  
Classification: Endangered

5. **Associated rulemakings:** None

6. **Review History:**

A previous 5-year review for this species was noticed on November 6, 1991 (56 FR 56882). In this review, the status of many species was simultaneously evaluated with no in-depth assessment of the five factors, threats, etc. as they pertained to the individual species. The notices summarily listed these species and stated that no changes in the designation of these species were warranted at that time. In particular, no changes were proposed for the status of the species in this review.

Final Recovery Plan -1988

Recovery Data Call - 2007, 2006, 2005, 2004, 2003, 2002, 2001, 2000, 1999, and 1998.

7. **Species' Recovery Priority Number at start of review (48 FR 43098):**  
2. The "2" indicates a high degree of threat and high recovery potential.

8. **Recovery Plan:**

**Name of plan:** Recovery Plan for Three Florida Pawpaws

**Date issued:** April 5, 1988

## II. REVIEW ANALYSIS

### A. Application of the 1996 Distinct Population Segment (DPS) policy

1. **Is the species under review listed as a DPS?** No. The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listing DPS to only vertebrate species of fish and wildlife. Because the species under review is a plant, the DPS policy is not applicable.

## B. Recovery Criteria

1. **Does the species have a final, approved recovery plan containing objective, measurable criteria?** Yes
2. **Adequacy of recovery criteria.**
  - a. **Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?** No. New information on this species has been collected since the recovery plan was written in 1988. As a result, the recovery goals and criteria should be revised to address the recovery actions needed to reduce threats to this species.
  - b. **Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding existing or new threats)?** Yes. Factor A (present or threatened destruction, modification, or curtailment of its habitat or range) was identified as the primary threat affecting the species at the time of listing.
3. **List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information. For threats-related recovery criteria, please note which of the 5 listing factors are addressed by that criterion. If any of the 5-listing factors are not relevant to this species, please note that here.**

In 1988, the recovery criteria for *Deeringothamnus rugelii* were:  
*Reclassification to threatened status if 10 self-sustaining populations of the species were secured. Delisting could be considered if 20 such populations were secured.*

Of the five listing factors, habitat loss and destruction from development or land conversion to pine plantations (Factor A) is the only factor addressed in the recovery plan. Currently, three sites meet the recovery criteria of being secure. These include Tiger Bay State Forest, Port Orange City Forest, and Volusia County's Longleaf Pine Preserve (LPP). This species was found at the Volusia County Correctional Institute in 1996, but no recent surveys have been conducted to determine its status there. Occupied areas along State Road 44 and State Road 400 road rights-of-way are maintained by mowing which reduces competition by other plants but these areas are not considered to be secure. Historically *D. rugelii* was found on powerline easements and adjacent private lands; however, habitat loss has occurred in these areas due to land use changes such as development. The status of those plants at these sites is unknown.

Factors B, C, D, and E have not been documented as threats at this time.

## C. Updated Information and Current Species Status

### 1. Biology and Habitat

- a. **Abundance, population trends, demographic features, or demographic trends:** *Deeringothamnus rugelii* is endemic to a small area of Volusia County. From the time when it was first located in 1848 until 1998, 23 occurrences of *D. rugelii* have been documented in Volusia County (Johnson and Schultz 1999, Kral 1960). In 1998, there were a maximum of 4538 plants reported at these 23 sites, and 2142 as a minimum. Nine of the 23 occurrences had 100 or more plants. The first extensive surveys occurred in 1981, when five occurrences of *D. rugelii* were found west of New Smyrna Beach (Norman and Brothers 1981). Surveys conducted in 1992 found five additional occurrences of this species along the State Road 44 rights-of-way and adjacent to State Road 44 along powerlines and on private lands (Norman 1992). The Florida Natural Areas Inventory (FNAI) surveyed in 1995-1996 and documented 13 additional occurrences at the Port Orange City Forest, Volusia County Correctional Institute, and adjacent private lands (Johnson and Schultz 1999).

In 1997, FNAI tagged three plots of 220 plants at the Port Orange City Forest site to monitor the effects of roller chopping on *D. rugelii* (Helkowski 1997). In June 1998, wildfires occurred throughout Volusia County and at the Port Orange well field site. The fires appeared to stimulate flowering in *D. rugelii* from a typical 2-3 flowers on each stem to 10-12 flowers per stem. Due to the fires, the project to look at the effects of roller chopping on this species was redesigned to focus on the impacts of fire.

Surveys in August 1998 found that the number of plants in all three plots had increased from 220 to 2272 after the fire. Eighty percent had flowered and 10% had produced fruit. The fire appeared to stimulate plants that had remained either dormant or very inconspicuous prior to the fires to sprout (Helkowski and Johnson 1999). Follow-up surveys in September 1998 found the plants were still stimulated from the fires with additional flowers and fruit (Helkowski and Johnson 2000). During post-fire clean up two of the three plots were disked, which likely resulted in root damage and few plants were found. In May 1999, the second growing season post-fire

surveys of the non-disked plot found similar results (80% of plants found) as immediately after the 1998 fire but the percentage of flowering was considerably less (10%). These percentages of flowering were still higher than the pre-fire percentage of 0% (Helkowski and Johnson 2000).

FNAI conducted additional surveys of all the areas affected by the wildfires in Volusia County in September 1998 and found four additional sites. Two of these occurrences of *D. rugelii* were found at Tiger Bay State Forest, as well as an additional site on the Port Orange well field and one site north of Lake Ashby, were found in areas burned by the fires (Johnson and Schultz 1999). All of these occurrences had fewer than 50 plants. These newly documented occurrences increased the total number of known occurrences from 23 to 29, and increased the total maximum number of known plants from 4538 to 4639 (Johnson and Schultz 1999). The Port Orange City Forest supports the largest number of occurrences (12 of 29 occurrences and 2717 of the 4639 known plants) of *D. rugelii* (Johnson and Schultz 1999).

In 2003 and 2004, FNAI surveyed, the conservation lands in Volusia County (includes the areas formerly called Southern Pines and Vargal now known as the LPP and the Wiregrass Prairie Preserve). *D. rugelii* was found at the Vargal site. However, the plants found at the other two sites, Southern Pines and Wiregrass Prairie Preserve, were all vegetative and resembled the more common *Asimina pygmea* (pygmy pawpaw). The plants at these sites should be checked in the spring when flowering to confirm the species. *D. rugelii* at LPP responded to the 1998 wildfires and subsequent prescribed fires by producing healthy and vigorous plants. This site represents one of the largest areas containing this species. Continuation and expansion of the prescribed burning program at all of these sites will benefit this species (Schultz and NeSmith 2004). In April 2008, *D. rugelii* was found flowering at additional sites (Lunsford Property) within LPP following a prescribed fire that occurred in October 2007 (R. Sleister, Volusia County Land Management, personal communication, 2008).

- b. Genetics, genetic variation, or trends in genetic variation:**  
No new genetic information is available for this species.

- c. Taxonomic classification or changes in nomenclature:**  
None. The Integrated Taxonomic Information System (ITIS 2008) was checked while conducting this review.
- d. Spatial distribution, trends in spatial distribution, or historic range:** Historically, *D. rugelii* has only occurred in Volusia County, Florida. It was originally found west of New Smyrna Beach along State Road 44. In both 1981 and 1992, the plants were clustered in two areas along State Road 44 near the junction with County Road 415 and I-95, and one area south of State Road 44 and east of County Road 415 just north of Lake Ashby (Johnson and Schultz 1999, Norman 1992, Norman and Brothers 1981). Surveys by FNAI in 1995-1996 found *D. rugelii* in a low ridge between U.S. Highway 92 to the north and County Road 4118 (Pioneer Trail) to the south including the Volusia County Correctional Institute.

Surveys conducted in 1998 found four additional sites with *D. rugelii* (discussed earlier in section 3a). The two occurrences at Tiger Bay State Forest have been confirmed to represent the northernmost range of this species by several miles (Johnson and Schultz 1999). Acquisition and management of LPP by Volusia County has helped expand the range of this species around the Port Orange City Forest. LPP's northern boundary is formed by I-4 and the southern boundary by State Road 44.

The potential for expansion of *D. rugelii* to additional sites outside the current range into the adjacent counties of Flagler and Brevard, as well as other areas of Volusia County, is possible. However, extensive forestry practices with repeated soil disturbances north and south of the currently occupied areas may make expanding the range of *D. rugelii* difficult.

Within the known range of the species, several areas should be considered for inclusion in future surveys. These sites include: 1) private property (if permission is granted) south of the Port Orange City Forest to County Road 4118 in sections 5, 8, 9, and the northern portions of sections 16 and 17 (portions of section 5, 8, 9, and 17 are now part of LPP); 2) a 1958 historic site described as occurring 19 miles west of New Smyrna Beach, west of the junction of State Road 44 and I-95; 3) along the powerline ridge east of Rasley Road; and 4) the I-95 corridor area with the cooperation of the Florida Department of Transportation (FDOT) (Johnson and Schultz 1999).



- e. **Habitat or ecosystem conditions:** *D. rugelii* has typically been found in grassy flatwoods with an open canopy of slash or longleaf pine (*Pinus elliottii* var. *densa* and *P. palustris*), and an understory of wiregrass (*Aristida stricta*) and other grasses. Other species that occur in these areas are dwarf live oaks (*Quercus minima*), saw palmetto (*Serenoa repens*), shiny lyonia (*Lyonia lucida*), shiny blueberry (*Vaccinium myrsinites*), and common pawpaw (*Asimina reticulata*) (Johnson and Schultz 1999). This species has also been located in cow pastures and along road rights-of-way and powerlines.

*D. rugelii* is predominately found in the mesic/wet flatwoods at Volusia County conservation land, LPP. The habitat at this site is dominated by mature longleaf pine and an intact groundcover, which frequently includes wiregrass in abundance (Schultz and NeSmith 2004). Vargal, which is now part of LPP, consists of 4,000 acres, of which 960 acres are mesic flatwoods. Vargal was impacted by the 1998 wildfires, which reduced the mid-story and increased the amount and diversity of the groundcover. *D. rugelii* responded to the wildfires at this site with vigorous growth.

This ecosystem needs periodic fires every few years to maintain the open understory. This prevents grasses such as bahia grass (*Paspalum notatum*) from overtaking other species such as *D. rugelii*. The fires also stimulate vegetative and flowering/fruitleting responses (Helkowski and Johnson 2000). Helkowski and Johnson (2000) found that mechanical chopping or disking following a fire may reduce the flowering response and percentage of fruiting. Disking may also reduce re-sprouting since it could injure the underground portions of the plant. Any kind of heavy mechanical treatments (disking, chopping, or rutting) should be avoided within 12 months of a fire since it may kill or injure seedlings, as well as mature plants to a lesser extent.

- f. **Other:** *D. rugelii* has been difficult to propagate from seed and tissue cultures. Weigel (1993) found that cultures would germinate but developed a fungus (*Phylloporia fruticosa*) that killed the culture. Tissue culture samples taken from the stems of plants were used for propagation, but the plant cells produced polyphenol that killed the cultures. In 1994, Weigel (1994) obtained results similar to the 1993 experiment during attempts to propagate additional tissue cultures. Techniques on sterilization to eliminate the fungus and control the

polyphenols are needed to achieve successful culture propagation.

Norman (1994) collected 10 transplants, 11 seedlings, and 69 seeds from two sites that were going to be impacted by development (Sugar Mill Road construction and private property). They were planted in a pasture owned by the St. Johns River Water Management District off County Road 415. From 1994 to 1996, transplants were found to have a higher survival rate than seeds or seedlings, but seedlings had a slightly higher survival rate than seeds (Norman 1996). However, lack of management and unusually heavy rainfall may have impacted the reintroduction.

## 2. **Five-Factor Analysis**

- a. Present or threatened destruction, modification or curtailment of its habitat or range:** Habitat destruction remains the greatest threat to *D. rugelii*. The conversion of mesic flatwoods into dense pine plantations and turf grass farms has affected this species. However, conversion to cow pastures and the planting of bahia grass has had little effect on this species (U.S. Fish and Wildlife Service 1988). In the past, habitat loss has also occurred due to development. Initially *D. rugelii* was located on private property and along powerlines, which were susceptible to destruction due to urban development. It is unknown how much occupied habitat for this species has been lost to development since recent surveys have not been conducted on private lands. However, 2004 aerial surveys determined that an occurrence north of Lake Ashby had been cleared for agricultural fields (A. Johnson, Florida Natural Areas Inventory, personal communication, 2008). However, currently this species is found on three publicly owned lands (Tiger Bay State Forest, Port Orange City Forest, and Volusia County's LPP) where the plants are protected.

Lack of management (i.e., prescribed fire) has led to habitat degradation of *D. rugelii* in Volusia County. *D. rugelii* occurs mainly along open sandy patches that have been controlled under natural conditions with fire. Without natural caused or prescribed fires, the dense overstory could shade out and prevent openings in the groundcover, thus making the habitat unsuitable for *D. rugelii*. Management techniques need to be considered when restoring this habitat. Helkowski and Johnson (2000) found that mechanical chopping such as

disking, chopping, and rutting by heavy machinery might create enough soil disturbances to prevent re-sprouting and might injure portions of seedlings or mature plants. At all of the sites where this species occurs or where suitable habitat exists, management needs to occur. The sites located on private lands and along the FDOT rights-of-way that contain *D. rugelii* are degraded due to fire exclusion or lack of mechanical vegetative management. Mowing along the rights-of-way may not create enough disturbances to impact the plants and minimized the competition with other plant species. *D. rugelii* showed a positive response to fire following the 1998 wildfires that swept through portions of the Port Orange City Forest, Tiger Bay State Forest, and Volusia County's LPP. Mechanical vegetative management techniques and prescribed fire have been implemented at all three sites to maintain or enhance *D. rugelii* habitat.

- b. Overutilization for commercial, recreational, scientific, or educational purposes:** Not known as a threat at the time of listing or at present.
- c. Disease or predation:** Norman and Brothers (1981) found most of the plants they surveyed had considerable damage due to a particular species of caterpillar. No other information has been collected on the type of caterpillar since that time. Recent surveys have not reported any significant damage due to this caterpillar. Therefore, disease and predation are not known to be a threat at present.
- d. Inadequacy of existing regulatory mechanisms:** The Florida Administrative Code 5B-40 (Preservation of Native Flora in Florida) provides the Florida Department of Agriculture and Consumer Services with limited authority to protect these plants (primarily from the standpoint of illegal harvest) on state and private lands. *D. rugelii* is located at three protected lands (Tiger Bay State Forest, Port Orange City Forest, and Volusia County Conservation Lands) where they have been or are currently being managed.

Volusia County has existing ordinances (Ordinance 2006-01) that provide rules related to conservation lands within the county. Resolution 2003-80 provides general goals and objectives for the management of conservation lands. Volusia County has been actively managing their properties to benefit *D. rugelii*.

Tiger Bay State Forest is owned and managed by the State of Florida. It was first acquired in 1977 and additional parcels have been purchased since that time. The Florida Division of Forestry supports a program, the Florida Plant Conservation Program, whose goal is to restore and maintain existing populations of listed plants on public land and on private lands managed for conservation purposes.

FDOT has located *D. rugelii* along the State Road 44 and I-4 rights-of-way. FDOT has worked with the Service to avoid or transplant plants that could be impacted due to their activities. They have also worked with the Service to mow in certain areas where this species has responded favorably to the mowing.

Several of the sites where *D. rugelii* has been found occur on private lands with little to no protection. The Service's Partners for Fish and Wildlife program could work with these landowners to better manage and protect these sites.

In the absence of protections provided under the Endangered Species Act, we believe existing regulatory mechanisms as described above would be adequate to protect this species.

**e. Other natural or manmade factors affecting its continued existence:** None are known.

Of the five listing factors, habitat loss and degradation (Factor A) is the main threat to *D. rugelii*. Factors B, C, D, and E are not considered threats at this time.

**D. Synthesis**

The current recovery criteria for *D. rugelii* are objective and measurable and all currently known threats are addressed by the recovery criteria. However, the recovery plan should be revised to include more updated information about the species and its management needs.

*D. rugelii* is known to occur at Tiger Bay State Forest, Port Orange City Forest, and Volusia County's LPP which are all in Volusia County, Florida, where they are protected and have some level of land management occurring. Proper management of these protected sites could provide long-term benefits to this species. Regular monitoring for this species has only occurred throughout its historic range. The sites along State Road 44 and 400 rights-of-way are benefiting from occasional mowing; however, additional road projects could impact these plants. Originally, *D. rugelii* was found on private property and

along powerlines where the species is susceptible to habitat degradation and destruction due to land use changes. These sites need to be resurveyed to determine if the species still occurs there and if these sites could be secured.

*D. rugelii* is affected by fire suppression in the mesic flatwoods communities. Wildfires that occurred in 1998 have provided us with important information on how fire affects this species. After the 1998 wildfires, this species responded by producing more flowers, which increased the number of plants.

In summary, *D. rugelii* continues to be threatened by habitat degradation. New information suggests that fire suppression adversely impacts this species. Natural or prescribed fire or other ground disturbance is needed to ensure suitable habitat for this species. Loss of habitat due to development has not been well documented since it occurs mainly on private lands. Three sites are in long-term protection but 10 secure, self-sustaining populations are needed to meet the recovery criteria for reclassification to threatened. It is currently unknown how many plants are needed to create a self-sustaining population. This species continues to only be found in one county, Volusia County, in isolated numbers where the range is restricted by development and roads. Additional surveys are needed to determine if this species occurs at other sites in Volusia County or the adjacent counties before additional habitat loss occurs. This species remains in danger of extinction throughout all or a significant portion of its range.

### **III. RESULTS**

**III.A. Recommended Classification:** No change is needed.

**III.B. New Recovery Priority Number:** No change is needed.

### **IV. RECOMMENDATIONS FOR FUTURE ACTIONS**

1. Revise the current recovery plan to include more objective and measurable recovery criteria that are related to reducing the threats identified in the recovery plan, as well as update information on the species distribution and biology.
2. Support further research on:
  - a. The effects of prescribed burning and other management tools on *D. rugelii*. Continue working with public land managers to increase management efforts to benefit *D. rugelii* on their sites.
  - b. Additional life history needs.
  - c. The most appropriate methodology to germinate seeds or tissue cultures, grow seedlings, and successfully out-plant seedlings to native habitat.

3. Encourage non-Federal agencies to protect and manage habitat under the Partners for Fish and Wildlife Program.
4. Complete a rangewide survey to find all sites known to be occupied by or have the potential to be occupied by *D. rugelii* and determine population size. Current distribution information is needed to determine where plants currently exist and to prioritize recovery actions.
5. Consider reintroduction and monitoring of *D. rugelii* on additional publicly owned lands with suitable habitat. Reintroduction of *D. rugelii* could help to increase the number of populations on protected sites and augment populations where needed.

## V. REFERENCES

- Helkowski, J. 1997. A study of the effects of roller chopping on populations of Rugel's pawpaw (*Deeringothamnus rugelii*). Final report submitted to the Florida Department of Agriculture and Consumer Services Division of Administration (FDACS)/Division of Forestry, Tallahassee, Florida.
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U.S. FISH AND WILDLIFE SERVICE  
5-YEAR REVIEW of Rugel's pawpaw (*Deeringothamnus rugelii*)


**Current Classification:** Endangered

**Recommendation resulting from the 5-Year Review:** No change

**Review Conducted By:** Annie Dziergowski

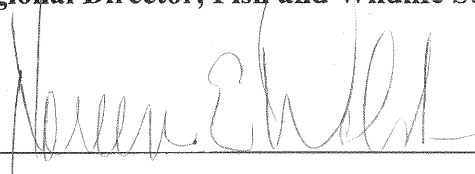
**FIELD OFFICE APPROVAL:**

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

Approve  Date 9/11/08  
David L. Hankla

**REGIONAL OFFICE APPROVAL:**

**Lead Regional Director, Fish and Wildlife Service**

Approve  Date 9/25/08



## APPENDIX

### Summary of peer review for the 5-year review of Rugel's Pawpaw (*Deeringothamnus rugelii*)

**A. Peer Review Method:** See B. below.

**B. Peer Review Charge:** On June 9, 2008, the following letter and Guidance for Peer Reviewers of Five-Year Status Reviews were sent via e-mail to potential reviewers requesting comments on the 5-year review. Requests were sent to Amy Jenkins and Ann Johnson (both with Florida Natural Areas Inventory), Randy Sleister (Volusia County Natural Resources), and Mike Jenkins (Florida Division of Forestry, Plant Conservation).

*We request your assistance in serving as a peer reviewer of the U.S. Fish and Wildlife Service (Service) 5-year status review of the endangered Rugel's pawpaw (*Deeringothamnus rugelii*). The 5-year review is required by section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 et seq.). A 5-year review is a periodic process conducted to ensure the listing classification of a species as threatened or endangered on the Federal List of Endangered and Threatened Wildlife and Plants is accurate. The initiation of the 5-year review for the Rugel's pawpaw was announced in the Federal Register on April 26, 2007, and the public comment period closed on June 26, 2007. No public comments were received on the notice for this species.*

*The enclosed draft of the status review has been prepared by the Service pursuant to the Act. In keeping with Service directives for maintaining a high level of scientific integrity in the official documents our agency produces, we are seeking your assistance as a peer reviewer for this draft. Guidance for peer reviewers is enclosed with this letter. If you are able to assist us, we request your comments be received in this office on or before June 27, 2008. Please send your comments to Annie Dziergowski at the address on this letter. You may fax your comments to Annie Dziergowski at (904)731-3045 or send comments by e-mail to [Annie\\_Dziergowski@fws.gov](mailto:Annie_Dziergowski@fws.gov).*

*We appreciate your assistance in helping to ensure our decisions continue to be based on the best available science. If you have any questions or need additional information, please contact Annie Dziergowski at (904)731-3089. Thank you for your assistance.*

*Sincerely yours,*

*David L. Hankla  
Field Supervisor*

*Enclosures*

**Guidance for Peer Reviewers of Five-Year Status Reviews**  
*U.S. Fish and Wildlife Service, Jacksonville Ecological Services Field Office*

*July 5, 2007*

*As a peer reviewer, you are asked to adhere to the following guidance to ensure your review complies with Service policy.*

*Peer reviewers should:*

- 1. Review all materials provided by the Service.*
- 2. Identify, review, and provide other relevant data apparently not used by the Service.*
- 3. Not provide recommendations on the Endangered Species Act (ESA) classification (e.g., endangered, threatened) of the species.*
- 4. Provide written comments on:*
  - Validity of any models, data, or analyses used or relied on in the review.*
  - Adequacy of the data (e.g., are the data sufficient to support the biological conclusions reached). If data are inadequate, identify additional data or studies that are needed to adequately justify biological conclusions.*
  - Oversights, omissions, and inconsistencies.*
  - Reasonableness of judgments made from the scientific evidence.*
  - Scientific uncertainties by ensuring that they are clearly identified and characterized, and that potential implications of uncertainties for the technical conclusions drawn are clear.*
  - Strengths and limitation of the overall product.*
- 5. Keep in mind the requirement that we must use the best available scientific data in determining the species' status. This does not mean we must have statistically significant data on population trends or data from all known populations.*

*All peer reviews and comments will be public documents, and portions may be incorporated verbatim into our final decision document with appropriate credit given to the author of the review.*

*Questions regarding this guidance, the peer review process, or other aspects of the Service's recovery planning process should be referred to Annie Dziergowski, U.S. Fish and Wildlife Service, at 904-731-3089, email: [annie\\_dziergowski@fws.gov](mailto:annie_dziergowski@fws.gov).*

### **C. Summary of Peer Review Comments/Report**

A summary of peer review comments is provided below. The complete set of comments is available at the Jacksonville, Ecological Services Field Office, U.S. Fish and Wildlife Service, 7915 Baymeadows Way, Suite 200, Jacksonville, Florida, 32256.

*Mike Jenkins, Florida Division of Forestry, Plant Conservation, Tallahassee, Florida:* Mr. Jenkins suggested minor edits.

*Ann Johnson, Florida Natural Areas Inventory, Tallahassee, Florida:* Ms. Johnson provided an update on the number of occurrences that have been recorded by FNAI. In addition, she also provided clarification on some of the data that were included in the review. She also provided information on areas that were included in the review but where the species had not been confirmed. She wanted to emphasize the importance of management since this species is stimulated to flower after some level of ground disturbance such as fire, timbering, mowing, or some similar disturbance. Numerous minor edits were suggested.

*Randy Sleister, Volusia County Natural Resources, Land Management, DeLand, Florida:* Mr. Sleister provided updated information and maps on the current land acquisition by Volusia County and the management activities that are occurring at these sites. He also provided information on new plants there were found after a prescribed burn had occurred the previous year. Numerous minor edits were suggested.

### **D. Response to Peer Review:**

The Service accepted all minor edits from peer reviewers. Overall reviewers felt the draft document adequately characterizes the known information on the status and threats of the listed populations.

*Mike Jenkins, Florida Division of Forestry, Plant Conservation, Tallahassee, Florida:* All comments provided by Mr. Jenkins were incorporated.

*Ann Johnson, Florida Natural Areas Inventory, Tallahassee, Florida:* All comments provided by Ms. Johnson were incorporated. Areas that had been included in the review as having the species were removed to address Ms. Johnson's comment that the species had not been confirmed there. The updates on occurrences and recent land acquisitions were included. Corrections were made to data referenced in the review.

*Randy Sleister, Volusia County Natural Resources, Land Management, DeLand, Florida:* All comments provided by Mr. Sleister were incorporated. We included the information he provided on recent land acquisitions as well as the current management activities being conducted at these sites.