Papery whitlow-wort
(Paronychia chartacea)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Southeast Region
South Florida Ecological Services Office
Vero Beach, Florida

5-YEAR REVIEW
Papery whitlow-wort / *Paronychia chartacea*

I. GENERAL INFORMATION

A. Methodology used to complete the review: This review is based on monitoring reports, surveys, and other scientific and management information, augmented by conversations and comments from biologists familiar with the species. The review was conducted by an Archbold Biological Station (ABS) plant ecologist in collaboration with biologists at the South Florida Ecological Services Office. Literature and documents on file at the South Florida Ecological Services Office were used for this review. All recommendations resulting from this review are a result of thoroughly reviewing all available information on papery whitlow-wort. Comments and suggestions regarding the review were received from South Florida Ecological Services Office supervisors and peer reviews from outside the Service (see Appendix). The public notice for this review was published on April 26, 2007, with a 60-day public comment period.

B. Reviewers
Lead Region: Southeast Region, Kelly Bibb, (404) 679-7132

Lead Field Office: Dave Bender, South Florida Ecological Services Office, (772) 562-3909

Cooperating Field Office(s): Mike Jennings, Jacksonville Ecological Services Office, (904) 731-3336; Vivian Negron-Ortiz, Panama City Field Office, (850) 769-0552

C. Background

1. FR Notice citation announcing initiation of this review: April 26, 2007. 72 FR 20866.

2. Species status: Unknown (2007 Recovery Data Call). The long-term species status was reported as unknown because while some populations are protected, detailed data for those populations are lacking, threats are continuing, and population trends are unknown.

3. Recovery achieved: 3 (51-75% recovery objectives completed) (2007 Recovery Data Call).

4. Listing history
Original Listing
FR notice: 52 FR 2227
Date listed: January 21, 1987
Entity listed: Species
Classification: Threatened

5. Associated rulemakings: N/A

6. Review History:
5-year review: November 6, 1991 (56 FR 56882); in this review different species were simultaneously evaluated with no species-specific in-depth assessment of the five factors, threats, etc. as they pertained to the species' recovery. 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 papery whitlow-wort.
Final Recovery Plan: 1999
Recovery Data Call: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007

7. Species' Recovery Priority Number at start of review: 8. A recovery priority number of "8" represents a moderate degree of threat and high recovery potential.

8. Recovery Plan or Outline
Name of plan: South Florida Multi-Species Recovery Plan
Date issued: May 18, 1999
Dates of previous revisions: January 29, 1990 (original recovery plan), June 20, 1996 (first revision)

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 Endangered Species Act (Act) defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) 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. However, the plan does not adequately take into account the existence of two subspecies, *Paronychia chartacea* ssp. *chartacea*, and *P. c.* ssp. *minima*, each with different habitat requirements and different management needs.

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. The existing recovery criteria are inadequate, particularly given the existence of two geographically disjunct subspecies utilizing different habitats.

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)? No. Factor D is not included among the recovery criteria.

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.

Criteria for delisting papery whitlow-wort (*P. chartacea*):

1. Enough demographic data are available to determine the appropriate numbers of self-sustaining populations and sites needed to ensure 95% probability of persistence for 100 years.

This criterion has not been met. Separate analyses would be needed for each subspecies, and each analysis would require collection of detailed demographic data (*sensu* Menges and Gordon 1996) from multiple populations over several years, as well as data on the reproductive biology, seed ecology, and perhaps genetics of each subspecies. To provide adequate guidelines for managing the two subspecies, models will also require data collected from subpopulations with differing management histories. At present, however, population data being collected are not at the level of detail required for demographic modeling.

2. When these sites, within the historic range of P. chartacea, are adequately protected from habitat loss, degradation, and fragmentation.

This criterion has been partially met through the acquisition of populations on sites protected by federal, state, county, and private conservation agencies or organizations. Protected populations of *P. c. chartacea* occur in Lake, Polk, and Highlands Counties. These populations span most of the known historic range of the subspecies on the Lake Wales Ridge (LWR), but most populations off LWR in Lake, Polk, Orange, and Glades Counties are unprotected. Altogether there are 26 protected populations on LWR and three protected populations off LWR. *P. c. minima* was not recognized until 1991 and its prior range is unknown. It is known from Washington and Bay Counties and the only protected population is in the Ecofina Creek Water Management Area (WMA). Three occurrences are protected, while eight are located on unprotected sites. This criterion addresses factors A and E.

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*A) Present or threatened destruction, modification or curtailment of its habitat or range;
B) Overutilization for commercial, recreational, scientific, or educational purposes;
C) Disease or predation;
D) Inadequacy of existing regulatory mechanisms;
E) Other natural or manmade factors affecting its continued existence.

3. When these sites are managed to maintain the rosemary phase of xeric oak scrub communities to support P. chartacea.

This criterion has not been met. This criterion fails to account for differences in the preferred habitats of the two subspecies. However, the criterion retains its validity in that it requires the application of appropriate management activities to maintain habitat. For *P. c. chartacea*, appropriate management of its preferred rosemary scrub habitat involves infrequent high intensity fire. In unprotected sites the application of prescribed fire is not likely. Most protected areas include prescribed fire in their management plans, but lack of funding, drought, and proximity to residential areas often hinders the application of prescribed fire at the desired frequency. No data are available on the management needs of *P. c. minima*. This criterion addresses factor A.

4. When monitoring programs demonstrate that these sites support the appropriate numbers of self-sustaining populations, and those populations are stable throughout the historic range of the species.

This criterion has not been met. Stability is not an appropriate measure of vitality for species characterized by local populations that boom in response to fire (and perhaps other disturbance) and decline with time-since-fire (e.g., Johnson and Abrahamson 1990, Menges and Kohfeldt 1995, Schafer et al. in revision). There is little ongoing monitoring of either subspecies beyond occasional level 1 surveys (*sensu* Menges and Gordon 1996). The lack of monitoring undoubtedly reflects the untested supposition that short-term local abundance—populations of both subspecies often form extensive carpets comprising thousands of individuals—equates with long-term persistence.

Factors B and C are not relevant to this species.

C. Updated Information and Current Species Status

P. c. chartacea occurs in scrub habitats on the LWR and adjacent uplands in central Florida; *P. c. minima* occurs on the margins of karst ponds in the Florida panhandle. Because the two subspecies occur in different geographic locations and in different habitats, each is discussed separately below.

1. Biology and Habitat

a. Abundance, population trends (e.g., increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate), or demographic trends:

P. c. chartacea

Abundance
Surveys typically either note its presence (level 1 monitoring *sensu* Menges and Gordon 1996) or make broad estimates of population sizes (e.g.,

hundreds, thousands). However, two recent datasets contain data based on counts. Clanton (2007) reported 17,106 individuals of *P. c. chartacea* from GPS surveys at Lake Wales Ridge State Forest (LWRSF) conducted in 2006. Schafer (University of Florida, pers. comm. 2008a) recorded 1,425 plants from 16 rosemary scrub and 4 roadside plots censused at ABS from February to March 2003. Plant density was over three times higher in roadside than in scrub populations (12.7 per m^2 vs. 4.29 per m^2).

Population trends

Schafer (pers. comm. 2008b) monitored seedling recruitment and survival from May 2003 through May 2005, providing an estimate of short-term population trends, at least for the plants within her 20 study plots at ABS. The greatest number of plants was recorded in the first survey and included 1,303 seedlings. Despite occasional subsequent recruitment booms, the population declined over the course of the study, with the lowest number of plants recorded in the last survey in 2005.

Demographic features

Between May 2003 and June 2008, Schafer (pers. comm. 2008b) followed over 3,400 *P. c. chartacea* individuals at ABS. These data confirm that *P. c. chartacea* is a short-lived perennial, as described in Anderson (1991). For seven seedling cohorts tagged between 2003 and 2005, survival after one year varied from 7.5% to 34.2%. Thus, most plants survived less than one year. However, most cohorts produced individuals that survived for two or more years, and the maximum lifespan observed to date is five years.

Schafer (pers. comm. 2008b) also found that plants that died within the first year often flowered before dying. For example, in the May 2003 cohort, 24.4% of plants flowered within three months and at least 46.8% did so within six months. Moreover, longer lived individuals often flowered more than once, with 359 plants flowering twice and 105 plants flowering three or four times during the study period.

Schafer et al. (in revision) investigated the distribution and density of *P. c. chartacea* populations in Florida rosemary scrub and adjacent roadside populations in relation to fire history and microhabitat. These authors found that population sizes in rosemary scrub decreased with time-since-fire, a result consistent with the observations of Johnson and Abrahamson (1990) and Menges and Kohfeldt (1995). Within rosemary scrub, abundance was greatest in the centers of large gaps (as opposed to small gaps or the edges of large gaps). The density of roadside populations was similar to recently-burned scrub populations.

In a study of seed dispersal and germination in subspecies *chartacea*, Sullivan (Washington University, pers. comm. 2008) found that carpenter ants (*Pogonomyrmex badius*) sometimes collect *chartacea* seeds, but are poor

dispersers. Sullivan (pers. comm. 2008) also found surprisingly low levels of germination across microhabitats (despite supplemental watering and the application of GA_3, a plant growth hormone known to stimulate germination). However, other studies have shown higher rates of field germination for *chartacea* (e.g., Hawkes and Menges 2003, Petrů and Menges 2003). In particular, germination is promoted by the removal of terrestrial lichens (Hawkes and Menges 2003) and biotic soil crusts (Hawkes 2003), both of which increase with time-since-fire in Florida rosemary scrub.

Sullivan (pers. comm. 2008) also confirmed that *chartacea* is gynodioecious, with bisexual plants producing far fewer fruits than female plants, suggesting that *chartacea* may have three sexual morphs: females, functional males, and true bisexuals (hermaphrodites), with a cryptically dioecious / sub-dioecious breeding system.

P. c. minima

Abundance
L. Keppner (Keppner Biological Services, pers. comm. 2008) estimates that the 12 Florida Natural Areas Inventory (FNAI) element occurrence records (EOR) comprise hundreds of thousands of individuals. No formal surveys have been carried out at any of the sites.

Population trends
No data are available to estimate population trends of *P. c. minima.*

Demographic features
There have been no demographic studies of *P. c. minima.*

b. Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding): No genetic studies have been conducted on papery whitlow-wort.

c. Taxonomic classification or changes in nomenclature: In accordance with 50 CFR Subpart B, section 17.12(g), when the Service listed papery whitlow-wort as threatened all lower taxonomic units were included as the listed entity. Thus the same threatened status applies to *P. c. chartacea* and *P. c. minima*.

Anderson (1991) separated the two subspecies on the basis of morphological, life history, geographic, and habitat differences. Sexual dimorphism is more pronounced in subspecies *minima* than in subspecies *chartacea*. *Minima* is an annual, while *chartacea* is a short-lived perennial. *Minima* is restricted to two counties in the Florida panhandle, where it occurs almost exclusively on the sandy margins of karst ponds; *chartacea* occurs on the LWR and Winter Haven Ridge and on adjacent xeric uplands, usually in Florida rosemary

scrub, scrubby flatwoods, or adjacent firelanes and sandy roads (see below for additional details).

There have been no specific challenges to Anderson (1991), although Wunderlin and Hansen (2003) do not recognize the two subspecific taxa. The Integrated Taxonomic Information System (2008) was checked while conducting this review and the taxonomic status of the species and both subspecies is accepted.

d. Spatial distribution, trends in spatial distribution (e.g., increasingly fragmented, increased numbers of corridors), or historic range (e.g., corrections to the historical range, change in distribution of the species' within its historic range):

P. c. chartacea

This subspecies is relatively well protected in managed areas on the LWR, but populations off the LWR in Lake, Orange, Polk, and Glades Counties are unprotected. It is not clear how many of these populations are extant.

Christman (1988) found *P. c. chartacea* in 59.6% (115 of 193) of the scrub sites he surveyed in the late 1980s. Christman's records have been incorporated into the FNAI database. The FNAI database includes 145 EORs for subspecies *chartacea.* Most EORs (86.2%) are on the LWR. Twenty records are off the LWR, including 12 from the Mount Dora Ridge and two from the Winter Haven Ridge. Most EORs (71.0%) are now within protected areas, and all but two of these are on the LWR. Almost a third of *P. c. chartacea* EORs are derived from surveys conducted by Schultz et al. (1999) and Weekley et al. (2001).

Schultz et al. (1999) listed 43 EORs from 16 Conservation and Recreation Lands Program (CARL) sites on the LWR and two CARL sites from nearby Winter Haven Ridge (Lake Blue and Lake MacLeod). Sixteen of these 18 sites are now protected, including both Winter Haven Ridge sites.

Weekley et al. (2001) surveyed eight managed areas in Highlands County to map the occurrences of 20 federally listed plants. For their priority 3 species, including subspecies *chartacea*, Weekley et al. (2001) noted presence/absence within a 10-meter radius of the center of each patch containing higher priority 1 or priority 2 species. The survey resulted in 335 occurrences of *P. c. chartacea* on seven of the eight managed areas visited. The larger number of occurrences in Weekley et al. (2001) reflects differences in the scale of sampling intensity compared with the methodology utilized by Schultz et al. (1999). Translation of the Weekley et al. (2001) occurrences to FNAI EORs resulted in any occurrences that were within 1 kilometer of each other being collapsed into single records in keeping with FNAI EOR spatial criteria.

Subspecies *chartacea* was among 36 imperiled LWR taxa evaluated by Turner et al. (2006) using protection indices for each taxon and for three time periods (past, current, targeted) based on number of locations, extent of occurrence, and area of occupancy. The overall protection index of < 2 for *chartacea* marks it as of high conservation concern. However, several of the targeted areas in Turner et al. (2006) have since been acquired and it ranks among the best protected species in the Turner et al. (2006) survey.

P. c. chartacea is currently protected on 26 managed areas on the LWR: A. D. Broussard Catfish Creek Preserve State Park, ABS, Crooked Lake Sandhill, Highlands Hammock State Park, Jack Creek, Lake June-in Winter State Park, LWRSF (Arbuckle, Hesperides, and Walk-in-Water Tracts), LWR National Wildlife Refuge (NWR) (Carter Creek South, Flamingo Villas), Lake Wales Ridge Wildlife and Environmental Area (LWRWEA) (Carter Creek North, Gould Road, Henscratch 27, Highlands Park Estates, Highlands Ridge, Holmes Avenue, Lake Placid Scrub, McJunkin, Mountain Lake Cutoff, Royce Ranch, Silver Lake, and Sunray/Hickory Lake Tracts), Saddle Blanket Scrub Preserve, Schofield Sandhills, and Tiger Creek Preserve. It is also protected at LWRWEA (Lake Blue) and LWRNWR (Lake MacLeod) on the Winter Haven Ridge, and at Crooked Lake West.

Unprotected populations are known from Ferndale Ridge and Lake Davenport on the LWR, from the Green Swamp in Polk County, and Fisheating Creek in Highlands County. There are undoubtedly many unprotected sites that do not occur within existing databases.

P. c. minima

The FNAI database includes 12 EORs for *P. c. minima*, a third of which occur on a single managed area, the Ecofina Creek WMA in Washington and Bay Counties. The other eight EORs also occur within these two counties. Ten of 12 EORs were recorded by L. Anderson or E. and L. Keppner. Anderson's 1991 monograph established the taxonomic validity of subspecies *minima* and characterized its primary habitat. Eleven of 12 documented populations occur on the white sand margins of karst ponds within Florida rosemary scrub sites. E. and L. Keppner discovered the only population of *P. c. minima* known to occur on a sandhill site (L. Keppner, pers. comm. 2008).

Subspecies *minima* is poorly protected, since only a third of the known 12 EORs occur within a managed area. Although Ecofina Creek WMA may encompass the epicenter of *minima*'s distribution, large peripheral populations may harbor genetic variants critical to the maintenance of the taxon. The eight unprotected sites are all on private lands.

e. Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

P. c. chartacea

Based on surveys on the LWR in Highlands County, Menges et al. (2007) characterized subspecies *chartacea* as a soil generalist. Forty percent of occurrences in Highlands County were recorded from xeric scrubby flatwoods soils (e.g., Satellite sand) and an almost equal percentage from Florida rosemary scrub soils (e.g., Archbold and St. Lucie sands). *P. c. chartacea* was rarely recorded on sandhill or flatwoods soils (<10% for each category). Although the soil preferences of *P. c. chartacea* elsewhere on the LWR have not been quantified, it is well known from white, gray, and yellow sands throughout its range, but is most abundant on white sands.

Because of its preference for open sand gaps within Florida rosemary scrub (Schafer et al. in revision), subspecies *chartacea* is characterized as a gap specialist (Menges et al. 2008). As time-since-fire increases, gaps decrease in area (Menges et al. 2008) and *P. c. chartacea* decreases in abundance (Schafer et al. in revision). This dynamic may be reinforced by the adverse effects of the allelopathic litter of Florida rosemary on germination of subspecies *chartacea* (Hunter and Menges 2002) and by increases in cover of terrestrial lichens (Hawkes and Menges 2003) and biotic soil crusts (Hawkes 2003).

P. c. minima

Other than its preference for the margins of karst ponds, nothing is known about the habitat requirements of subspecies *minima*. The role of fire, flooding or other disturbance in the maintenance of these populations is unknown (L. Keppner, pers. comm. 2008).

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f. Other: N/A

2. Five-Factor Analysis

a. Present or threatened destruction, modification or curtailment of its habitat or range: For subspecies *chartacea*, about 30% of FNAI EORs are not protected from threats that are range-wide in scope. Fire suppression is pervasive at unprotected sites and gradually alters habitat over a period of years. Habitat loss through agricultural and residential development is immediate, ongoing, and cumulative. Seventy percent of FNAI EORs occur within one of the 26 managed areas listed in C(1)(d) above. Loss of populations off the LWR in Orange, Polk, and Glades Counties would constitute a significant curtailment of the historic range of *chartacea* (Turner et al. 2006). Some of these sites may already have been lost.

For subspecies *minima*, it is unknown how many populations have already been lost and its historical range has apparently not been documented. Eight of 12 extant sites appear to be in imminent danger of being lost; all are on privately owned land and could be destroyed if development or habitat modification occurs on those lands. For both subspecies a range-wide survey is needed to determine the current status of populations and the threats to each.

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: Not known as a threat at the time of listing or at present.

d. Inadequacy of existing regulatory mechanisms: Papery whitlow-wort is listed as endangered by the State of Florida on the Regulated Plant Index (Florida Department of Agriculture and Consumer Services Rule 5B-40). This law regulates the taking, transport, and sale of listed plants. Property owners are not prohibited under this law from destroying populations of listed plants nor are they required to manage habitats to maintain populations.

Existing federal and state regulations prohibit the removal or destruction of listed plant species on public lands. However, they afford no protection to listed plants on private lands. In addition, state regulations are less stringent than federal regulations on land management practices that may adversely affect populations of listed plants. Existing regulatory mechanisms are inadequate to protect this species.

e. Other natural or manmade factors affecting its continued existence: Maintenance of viable populations of imperiled plant species depends largely on the determination of the appropriate management regime of populations on managed areas. For subspecies *chartacea*, inadequate use of fire or the use of mechanical treatments as a surrogate for fire may reduce population sizes or adversely affect demographic performance. For subspecies *chartacea*, appropriate management means burning Florida rosemary scrub often enough to maintain large gaps within the rosemary shrub matrix. In the absence of data on the biology and autecology of subspecies *minima*, its management needs cannot be determined. The preferred habitat of subspecies *minima* on the margins of karst ponds suggests that disturbances other than fire may be required for the maintenance of its populations (L. Keppner, pers. comm. 2008).

D. Synthesis

Papery whitlow-wort is comprised of two geographically isolated subspecies which differ in microhabitat preferences and perhaps life history characteristics and management needs.

Refining the recovery program for this species must begin with an awareness that the recovery requirements of the subspecies may differ.

None of the recovery criteria has been met for papery whitlow-wort. Subspecies *chartacea* is relatively well protected within the existing network of managed areas on the LWR, but populations off LWR are almost completely unprotected. There is little knowledge of the biology, autecology, and demography of *chartacea* compared to other Florida scrub endemics. Fire management continues to lag behind schedule in many protected areas. Subspecies *minima* is poorly protected, with two-thirds of known occurrences located outside its only managed area. Nothing is known about the life history, demographic structure, or management needs of *P. c. minima*. Due to the lack of key data and continued threats, papery whitlow-wort continues to meet the definition of threatened under the Act.

III. RESULTS

A. Recommended Classification:

__X__ **No change is needed**

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

- A taxonomic study evaluating the distinctiveness of the two subspecies should be conducted.
- A study of the reproductive biology of the two subspecies should be conducted to determine the degree of floral dimorphism/sexual gender and sex ratios of populations.
- For *P. c. chartacea,* surveys should be conducted to assess the status of the FNAI EORs that occur on unprotected sites and to evaluate the feasibility of protecting additional populations. Following Turner et al. (2006), extant parcels in the Green Swamp and at Fisheating Creek, Avon Park Lakes, Lake Davenport and other sites should be targeted for acquisition. Acquisition of these sites would also extend protection to other federally listed plants.
- For *P. c. minima*, it is unclear how well existing FNAI EORs reflect the historic range of the taxon. It is possible that additional surveys of areas with appropriate habitat are needed. The possibility of acquiring additional populations also needs to be assessed.
- Habitat for *P. c. chartacea* needs to be maintained through burning Florida rosemary scrub within the modal fire return interval defined by other gap specialists and by Florida rosemary (Menges 2007).
- Habitat maintenance requirements of *P. c. minima* need to be investigated.
- For both subspecies, the minimal monitoring should be establishment of level 2 monitoring (*sensu* Menges and Gordon 1996) to track changes in population sizes over time. Level 2 monitoring requires that surveys be repeated at defined intervals (e.g., annually, bi-annually, every five years, or both before and after imposition of management treatments) and that surveys take place within well-defined areas (e.g., within plots small enough to be searched thoroughly within a minimum of effort). ABS's Population Dynamics of Endemic Plants (PDEP) project was designed as a model of level 2 monitoring that can be deployed by other agencies. Presence/absence data (level 1 monitoring *sensu* Menges and Gordon 1996) or the periodic accumulation of GPS points cannot provide meaningful data

for determining population trends or for quantifying responses to prescribed fire or other management activities.

- To conduct population viability analyses, detailed demographic data (level 3 monitoring *sensu* Menges and Gordon 1996) should be collected from multiple populations of both subspecies. These data need to be collected across the full geographic range of both subspecies, from populations in contrasting habitats (e.g., rosemary scrub vs. roadsides for subspecies *chartacea*, pond margins vs. sandhill for subspecies *minima*), and in sites with differing management histories.
- Studies should be conducted to understand the genetic diversity of both subspecies; this may aid in the identification of new acquisition needs.
- Where monitoring is being conducted, data should be collected on fire management activities to aid in the interpretation of trends and identifying the most favorable treatments.
- A revised recovery plan should be developed to address the existence of two subspecies with separate geographic ranges and their potential need for differing management practices to ensure recovery.

V. REFERENCES

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR REVIEW of Papery whitlow-wort *(Paronychia chartacea)*

Current Classification ___Threatened___

Recommendation resulting from the 5-Year Review

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
__X__ No change is needed

Appropriate Listing/Reclassification Priority Number, if applicable _____

Review Conducted By ___Carl W. Weekley, Archbold Biological Station___

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 7-21-08

The lead Field Office must ensure that other offices within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. The lead field office should document this coordination in the agency record.

REGIONAL OFFICE APPROVAL:

The Regional Director or the Assistant Regional Director, if authority has been delegated to the Assistant Regional Director, must sign all 5-year reviews.

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

Approve Noreen E Walsh Date 9/28/08

The Lead Region must ensure that other regions within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. If a change in classification is recommended, written concurrence from other regions is required.

Cooperating Regional Director, Fish and Wildlife Service

_____Concur _____ Do Not Concur

Signature_____Date_____

APPENDIX

Summary of peer review for the 5-year review of papery whitlow-wort (*Paronychia chartacea*)

A. Peer Review Method: The Service conducted peer review. Six peer reviewers were selected by the Service. Individual responses were requested and five peer reviewers provided a response.

B. Peer Review Charge: See attached guidance.

C. Summary of Peer Review Comments/Report: Peer review comments were minor. They included editorial issues, information about two additional protected sites, clarifications on data sources and characterization of the breeding system, and four recommendations for future actions. There were four suggestions for future actions: (1) to conduct a taxonomic review of the distinctiveness of the two subspecies; (2) to conduct a study of the breeding system of the two subspecies (specifically, the degree of sexual dimorphism); (3) to conduct surveys of genetic diversity to aid in the identification of additional acquisition needs; and (4) to include data on fire management in routine monitoring to help clarify population trends in response to management activities. These recommendations reflected the comments of other reviewers on the need for genetic and demographic data.

One reviewer provided information on two additional protected sites, one on and one off the Lake Wales Ridge. Another reviewer clarified the characterization of the breeding system in subspecies *chartacea.* A third reviewer provided additional information on how demographic data collection had been conducted in one study. A fourth reviewer suggested that the status review include a summary of land management activities on each managed area containing the two subspecies. One comment provided information on seed storage history and related issues.

D. Response to Peer Review: The Service was in agreement with all comments and concerns received from peer reviewers. Nearly all comments were incorporated. Specifically, the editorial issues were addressed, information on two additional protected sites was incorporated, the characterization of the breeding system of subspecies *chartacea* was clarified, and the four recommendations for future actions were incorporated.

Summarizing land management activities of each managed area containing the two subspecies is beyond the scope of the status review. Similarly, the status review makes no provision for information on seed collection or storage or other *ex situ* activities.

Guidance for Peer Reviewers of Five-Year Status Reviews

U.S. Fish and Wildlife Service, South Florida Ecological Services Office

February 20, 2007

As a peer reviewer, you are asked to adhere to the following guidance to ensure your review complies with U.S. Fish and Wildlife Service (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 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 the Service must use the best available scientific data in determining the species' status. This does not mean the Service 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 the Service's 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 Cindy Schulz, Endangered Species Supervisor, South Florida Ecological Services Office, at 772-562-3909, extension 305, email: Cindy_Schulz@fws.gov.