Scrub Buckwheat
(Eriogonum longifolium var. *gnaphalifolium)*

5-Year Review:
Summary and Evaluation

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

5-YEAR REVIEW

Species reviewed: Scrub Buckwheat *(Eriogonum longifolium* var. *gnaphalifolium)*

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I. GENERAL INFORMATION

A. Methodology used to complete the review:

This review was completed by a U.S. Fish and Wildlife Service fish and wildlife biologist located in the Jacksonville Field Office, Florida. None of the review was contracted to outside parties. All literature and documents used in this review are on file at the Jacksonville Field Office and are cited in the Literature Cited section. We used peer-reviewed publications; interim and annual reports provided as part of local and Federal government contracts; data and information available on the internet; unpublished data; and personal communication with land managers, biologists, and researchers. Public notice of this review was given in the Federal Register on April 26, 2007, and a 60-day comment period was opened. The draft of this document was distributed for peer review (see Appendix A) and comments received were addressed.

B. Reviewers

Lead Region – Southeast Region: Kelly Bibb, 404-679-7132
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Cooperating Field Office(s) – Vero Beach, FL, Ecological Services: Marilyn Knight, 772-562-3909

C. Background

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

2. **Species status:** Unknown. Although the species' status was listed as decreasing in the 2007 Recovery Data Call, this determination was based on the fact that some populations of scrub buckwheat occur on unprotected, private lands that are vulnerable to destruction or decline in the future if the properties are developed and/or continue to be unmanaged. However, 27 of the 48 known populations (56 percent) of scrub buckwheat occur on public conservation lands. Available data (see below) for several monitored populations on public lands indicate populations there are stable, but data for scrub buckwheat on the Ocala National Forest (ONF) suggest this species may be in decline. We have no data for the majority of known populations on public lands and

therefore cannot determine the status of this species on those areas. No data are available for unprotected, private lands.

3. **Recovery achieved:** 4 (75-100% recovery objectives achieved). Although the recovery achieved was listed as 3 (50-75% recovery objectives achieved) in the 2007 Recovery Data Call, information and data synthesized since reporting the 2007 Recovery Data Call (see below) indicate that this ranking is not indicative of the current status of this species. A recovery achieved ranking of "4" is most appropriate at this time.

4. **Listing history**
Original Listing
FR notice: 58 FR 25746
Date listed: April 27, 1993
Entity listed: variety
Classification: Threatened

5. **Associated rulemakings:** None

6. **Review History:** None

7. **Species' Recovery Priority Number at start of review:** 15

8. **Recovery Plan or Outline**

Name of plan: Recovery plan for nineteen Florida scrub and high pineland plant species.
Date issued: June 20, 1996

Dates of previous plan: Original plan date – January 29, 1990 (Recovery plan for eleven Florida scrub plant species)

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 does not apply.

B. Recovery Criteria

The current recovery plan identifies two criteria necessary to remove scrub buckwheat from the list of threatened and endangered species. These include: (1) complete planned land acquisitions; protect at least one more site in Lake and/or Pasco counties [this criterion addresses factor A (present or threatened destruction, modification or curtailment of its habitat or range)]; and (2) monitor demographic performance for at least five years.

With respect to criterion 1, the recovery plan listed eight locations where scrub buckwheat was protected. A recent analysis of conservation efforts in central Florida lists 27 protected populations occurring on 15 managed public lands (Turner *et al.* 2006). One of these 15 sites is located in Lake County (Scrub Lake Preserve), which is owned by the Lake County Water District, and this locality record addresses the portion of criterion 1 that requires at least one additional site in Lake and/or Pasco counties. Assessing whether planned land acquisitions have been completed is difficult because criterion 1 does not indicate all specific properties that must be acquired to recover scrub buckwheat. In the proposed rule to list scrub buckwheat (57 FR 45020), reference is made to the benefits of acquiring the Catfish Creek parcel and "several other tracts." The recovery plan indicates that portions of Catfish Creek have been acquired, but additional habitat remained to be purchased to complete the conservation parcel. Catfish Creek currently consists of 8,242 acres with an additional 11,262 acres proposed for acquisition (Turner *et al.* 2006). The total acreage currently under public ownership exceeds the combined acreage of acquired and proposed acquisitions (6,424 acres) identified in the recovery plan. Thus, it is clear that most, if not all, acreage identified in the recovery plan has been acquired at the Catfish Creek parcel. Given the success of acquisitions at Catfish Creek and the fact that seven additional public lands have been acquired since the recovery plan was written, we believe criterion 1 has been fully met.

Demographic data have been collected at six sites since 1989 at Archbold Biological Station (ABS) and these data have been used to evaluate the effects of fire on demographic performance (Menges 2007). Additional demographic monitoring has been conducted by ABS on the Lake Wales Ridge National Wildlife Refuge (LWRNWR) Carter Creek tract since 2001 (Menges *et al.* 2008) and on Lake Wales Ridge State Forest (LWRSF) since 1988 (Clanton 2005). The ONF annually monitors scrub buckwheat populations contained within three permanent vegetation monitoring plots. On the ONF, abundance and recruitment are assessed in relation to time since prescribed fire (U.S. Forest Service 2005).

The recovery plan did not provide specific guidance about the number of populations that should be monitored nor did it identify any particular demographic performance that had to be met or maintained during the monitoring period (e.g., number or rate of seedling recruitment, plant survival, etc.). Consequently, except for the length of time monitoring should be conducted (five

years) we have no other metrics to evaluate whether monitoring efforts have met the stated recovery criterion. We believe the monitoring efforts described above provide sufficient information for us to understand the demographics of scrub buckwheat, but only on the four properties described above. These four properties represent half of the known localities at the time of the completion of the recovery plan for scrub buckwheat. At present, the four properties for which we have demographic information represent about 15 percent (4 of 27) of populations that occur on public land. In either case, we have a gap in our knowledge of the demographic status for many scrub buckwheat populations. Consequently, with the information currently available, we do not believe that criterion 2 has been fully achieved. In the Recommendations for Future Actions section, we outline methodology to obtain these data without intensive demographic monitoring.

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. As indicated above, we believe criterion 2 is unclear. Additional information is now available on the demography of this species that would help to clarify demographic targets.

   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.

C. Updated Information and Current Species Status

1. **Biology and Habitat:**

   a. **Abundance, population trends, demographic features, or demographic trends:** Survey and monitoring efforts for scrub buckwheat have been limited in scope and duration. The Florida Natural Areas Inventory (FNAI) maintains a database for tracking locality records (locations where one or more individual plants have been observed), but these data are typically not informative about the total numbers of individuals or year-to-year variation in the number of individuals at any particular location.

   Turner *et al.* (2006) used the FNAI database and distance criteria recommended by the International Union for the Conservation of

Nature (IUCN) to combine or separate occurrence records to identify 46 records for scrub buckwheat throughout central Florida. Subsequently, FNAI found two additional populations on private property in Orange County (southern extent of the Mount Dora Ridge) and documented the extirpation of an existing locality in Orange County due to development (A. Jenkins, Florida Natural Areas Inventory, personal communication, 2008). Therefore, currently there are 48 known localities (not including the extirpated locality) of scrub buckwheat, 45 of these occur on the Lake Wales Ridge and three occur on the Mount Dora Ridge. Of the 45 known localities on the Lake Wales Ridge, 26 occur on public lands. Of the three known localities on the Mount Dora Ridge, two occur on private lands and one occurs on Federally-owned land. In combination, the 46 locality records reported by Turner *et al.* (2006) and two new locality records (and one extirpation) reported by FNAI is substantially less than the 92 records referenced by the U.S. Forest Service (USFS) (2005), the 100 records cited by the FNAI (2000), and is within the estimated range of 21-80 occurrence records provided by NatureServe (2007). However, neither the USFS nor FNAI applied the IUCN distance criteria to combine or separate occurrence records.

There are no data available to assess the abundance of scrub buckwheat throughout its range. Even if there were, any quantification based on individual plant counts would have little meaning since scrub buckwheat populations vary considerably depending on when counts are made relative to time-since-fire. As discussed below, scrub buckwheat flowers, sets seed, and recruits seedlings soon after fire and begins to decline in abundance several years following fire. Consequently, abundance estimates made one or two years following fire would result in high counts, while estimates made three or more years following fire would result in lower counts (see discussion of demographics below). Thus, it is more informative to assess trends in abundance over time. In this regard, monitoring has been ongoing at four locations: ABS, LWRNWR, LWRSF, and ONF. Scrub buckwheat has been monitored annually at six locations at ABS since 1989 to determine demographic response to various fire regimes. Of the six sites monitored, the total number of plants (± 5,000 individual plants) has fluctuated by about 20 percent over the monitoring period (Menges 2007). Slight increases have occurred in areas where prescribed fire has been used recently (E. Menges, ABS, personal communication, 2007). Overall, these populations appear to be stable given the fire return intervals used at ABS.

On the Carter Creek tract of the LWRNWR, monitoring began in 2001 after use of prescribed fire. Over the next six years in which there were no additional prescribed fires, monitoring results indicated that scrub buckwheat populations declined slightly (E. Menges, ABS, personal communication, 2007). Given the positive demographic response of scrub buckwheat to fire, we believe this population is stable even though it is now in post-fire decline.

From 1988 to 2005, scrub buckwheat numbers increased and their range expanded on LWRSF (Clanton 2005), suggesting this population may be increasing due to implementation of an active fire management program. Prescribed fire has been introduced to long-unburned scrub habitat over this time period and is repeated regularly in some of the management units.

Three of 90 vegetation monitoring plots within the ONF contain scrub buckwheat (U.S. Forest Service 2005). The number of individual plants (measured as basal rosettes) within these plots was lowest in unburned plots but increased substantially in these same plots following prescribed fire (0 to 34 rosettes in one plot and 0 to 46 rosettes in another plot). However, the increase in basal rosettes reported on the ONF probably does accurately reflect the response of scrub buckwheat to fire. It is unlikely that rosettes appeared without the presence of small fire-suppressed individuals prior to fire. These individual were likely missed during pre-fire surveys. Accordingly, although the response of scrub buckwheat to fire appears substantial, more than likely the post-fire counts of rosettes include resprouted individual plants that were not counted previously. Nonetheless, the number of rosettes in one unburned plot remained relatively stable during six years of monitoring (U.S. Forest Service 2005). Based on these data, scrub buckwheat in the three monitoring plots on the ONF appears to be stable given the history of fire return intervals at each of the monitoring sites. However, more recently, FNAI conducted limited surveys on 33 timber stands in the ONF and found that scrub buckwheat was not present at 14 locations where they had been previously reported.

Data are not available for 23 public lands for which FNAI reports a locality record for scrub buckwheat. Accordingly, we do not know how many individual plants occur within populations on these public properties or the status of these populations. Therefore, we are unable to evaluate the likelihood of each population's long-term persistence.

The demographics of scrub buckwheat are largely influenced and dependent on fire frequency. Scrub buckwheat resprouts, flowers,

and recruits seedlings following fire and is able to do so where fire return intervals are relatively short (McConnell and Menges 2002, Satterthwaite *et al.* 2002, Menges 2007). Flowering and seedling recruitment decline rapidly 2-3 years following fire and the remaining vegetative individuals tend to stabilize or decline in number. Demographic modeling suggests that scrub buckwheat population viability is highest when fire return intervals are 5-20 years (Satterthwaite *et al.* 2002). These fire frequencies are typical of fire regimes in sandhill and oak-hickory scrub, the main habitats of scrub buckwheat (Menges 2007). In modeled populations, the probability of a decline increased with increasing fire return intervals. Extinction risks also increased with longer fire return intervals. Satterthwaite *et al.* (2002) indicated that small buckwheat populations may be more susceptible to the adverse effects of long fire return intervals. Nonetheless, scrub buckwheat is long-lived in its vegetative state and populations may persist long-term and remain viable for many years in fire suppressed habitats if a sufficient number of individual plants survive the fire-suppressed time period (Menges 2007).

b. **Genetics, genetic variation, or trends in genetic variation:** No current information is available.

c. **Taxonomic classification or changes in nomenclature:** None.

d. **Spatial distribution, trends in spatial distribution or historic range:** The spatial distribution of scrub buckwheat has not changed from that reported in the 1996 recovery plan. However, additional populations have been located on properties that have been subsequently acquired for conservation purposes within the historic range. Turner *et al.* (2006) indicated that there are 27 populations of scrub buckwheat on protected public and private lands and 21 populations on unprotected private lands.

Scrub buckwheat populations that are located on unprotected lands are susceptible to extirpation because of land use changes. However, periodic censuses are not conducted and it is not possible to quantify the number or location of extirpations that have occurred due to habitat destruction. The Service is aware of two populations, both in Lake County, that have been extirpated due to issuance of incidental take permits under section 10 of the Endangered Species Act.

e. **Habitat or ecosystem conditions:** Scrub buckwheat occurs in oak-hickory scrub, turkey oak barrens, and sandhill vegetation communities on the Lake Wales Ridge from Highlands County

north to Lake County. It is also found to a limited extent on the Mount Dora Ridge in the ONF in Marion County and on two parcels of private property in Orange County. Each of the vegetation communities where scrub buckwheat occurs evolved with periodic fire.

Historic destruction, degradation, and fragmentation of xeric vegetation communities on the Lake Wales Ridge have been well documented (Turner *et al.* 2006). Remaining habitats are relatively small and fragmented compared to pre-settlement conditions. Many of the remaining larger tracts of xeric vegetation have been acquired by private conservation entities and local, State, and Federal governments and agencies for conservation purposes. Most of the governments and agencies tasked with managing these conservation lands have developed management plans intended to restore and/or maintain ecological functions of the protected vegetation communities. Most management plans include the use of prescribed fire. The success of implementing prescribed fire is dependent in large part on the availability of staff, equipment, funding, and the degree to which urban interface issues influence when and how prescribed fire is used. Except for those populations discussed below, we do not currently know the schedule of management actions on public lands where scrub buckwheat populations occur or the effect that ongoing management actions may be having on scrub buckwheat habitat. No evaluation of habitat conditions for scrub buckwheat have been made on unprotected private lands, but we expect that most habitat in these areas is degraded due to fire suppression.

Scrub buckwheat occurs in several xeric plant communities that may be burned at intervals of 1-8 years for sandhill to 5-12 years for oak-hickory scrub. Lands managed under these general fire return intervals are presumed to have maintained suitable habitat for scrub buckwheat.

On the ONF, scrub buckwheat occurs within actively harvested timber stands and habitats that are not managed specifically for timber production. Managed timber stands may be cut on 35- to 60-year rotations and then replanted or allowed to naturally regenerate. This timber management strategy maintains various age classes of sand pine stands within the ONF. The effects of relatively long-term timber harvest rotations (and resulting disturbance regimes via soil disturbance and/or prescribed fire) on scrub buckwheat have not been evaluated. Although it is not clear whether such activities enhance, degrade, or have no effect on

scrub buckwheat, this species has persisted on the ONF after decades of similar timber management activities.

ABS uses prescribed burning at various return intervals to maintain native species composition and structure, or to test hypotheses about responses of native elements or systems to different fire regimes. As a result, most fire-dependent vegetative communities, including those occupied by scrub buckwheat, are burned on a regular basis and generally coincide with the recommendations of Menges (2007).

LWRSF has management responsibility for about 19,600 acres of xeric habitat. Efforts are currently underway to restore and/or maintenance burn most fire-dependent plant communities, including those where scrub buckwheat occurs.

The Carter Creek tract of the LWRNWR was burned in 2001 and scrub buckwheat responded positively to the burn. The number of individual plants has declined since the 2001 burn. Additional burning may be required in the next several years to stimulate flowering and seedling recruitment.

2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

a. Present or threatened destruction, modification or curtailment of its habitat or range: Twenty-seven of the 48 known scrub buckwheat localities occur on private, local, State, or Federal lands that are protected. This number of sites is substantially higher than the nine protected sites specified in recovery criterion number 1. Habitat loss or modification due to land use changes is not anticipated at these 27 sites because most were acquired for conservation purposes. Nonetheless, simply protecting scrub buckwheat habitat is insufficient to ensure long-term persistence because, as discussed above, this species requires periodic habitat management actions. Except for those properties described above, we do not currently have information about the type or frequency of land management activities on public lands where scrub buckwheat occurs. However, in general, it is widely documented that most public land managing agencies have not been able to burn as many acres as are targeted in their management plans. Consequently, most agencies are backlogged in prescribed burning (R. Mulholland, Florida Department of Environmental Protection, personal communication, 2008). Even though we know managing agencies are faced with difficulties in use of prescribed fire in general, we do not know whether specific areas that contain scrub

buckwheat habitat on public lands are threatened with modification due to lack of management.

The 21 scrub buckwheat populations occurring on unprotected private lands are susceptible to degradation of habitat due to lack of management and destruction due to land use changes. Habitat degradation will likely continue on these lands because private landowners have no incentives to manage their properties for scrub buckwheat. Even though scrub buckwheat can persist for long periods in fire suppressed conditions, a reduction in flowering and seedling recruitment can be expected in long-unburned habitats (McConnell and Menges 2002, Satterthwaite *et al.* 2002, Menges 2007). These adverse effects are expected to continue into the future on unprotected and unmanaged parcels. In addition, urban development is projected to increase in Florida in the coming decades (Zwick and Carr 2006), and we expect a commensurate decline in native vegetation communities. Such assessments, however, cannot project absolute risks of habitat destruction, on a parcel-by-parcel basis. Consequently, while we acknowledge the future risks of destruction of unprotected scrub buckwheat populations, we do not know which, if any, of the 20 populations are imminently at risk.

As a result of land acquisition efforts over the past several decades by private entities and local, State, and Federal governments, 27 scrub buckwheat populations have been protected from habitat destruction and this level of conservation has exceeded recovery criterion 1 in the recovery plan. Even though 21 of the known populations of scrub buckwheat are not secure and are vulnerable to destruction or decline, we believe the 27 protected populations represent an adequate number of conserved populations to ensure long-term persistence of this species if protected populations benefit from periodic management activities that create and maintain suitable scrub buckwheat habitat (see Recommendations for Future Actions). While each of the public lands containing scrub buckwheat may undertake management activities, we do not currently have information about what types of management or how frequently management occurs on most public lands. Consequently, scrub buckwheat may still be at risk from habitat modification due to lack of management, but we will not know the extent of this risk until we evaluate more thoroughly the historic and ongoing management actions on public lands (see Recommendations for Future Actions).

b. **Overutilization for commercial, recreational, scientific, or educational purposes:** Overutilization is not known to be a threat

to scrub buckwheat at this time.

c. **Disease or predation:** Disease and predation are not known to be threats to scrub buckwheat at this time.

d. **Inadequacy of existing regulatory mechanisms:** 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 scrub buckwheat from illegal harvest on State and private lands. However, this regulatory mechanism does not prevent destruction of habitat due to land use changes on private lands.

Title 62D-2.013 of the Florida Administrative Code (FAC) prohibits the removal, destruction, or damage of plants from Florida Department of Environmental Protection, Division of Recreation and Park's properties. Titles 68A-15.004 and 68A-17.004 FAC prohibit the destruction or removal of any protected State plant from any Wildlife Management Area or Wildlife and Environmental Area, respectively, without the written consent of the land manager, FWC, Executive Director of the FWC, or fee title holder of private property managed by the FWC. Title 5I-4.005 FAC prohibits the destruction, injury or disturbance of plants on lands managed by the Florida Department of Forestry. Title 40E-7.537 FAC prohibits the destruction or removal of any native plant on lands owned by Florida's Water Management Districts. Scrub buckwheat also occurs on private land owned by a research entity (ABS) and conservation organization (The Nature Conservancy) (TNC). Protection of scrub buckwheat occurs through applicable State regulations requiring private landowner authorization to remove plants from private property. Because the scrub buckwheat is listed by the State of Florida, these protective regulations apply to this species on the above mentioned State properties and private properties.

The National Wildlife Refuge System Administration Act (NWRAA) represents organic legislation that set up the administration of a national network of lands and water for the conservation, management, and restoration of fish, wildlife, and plant resources and their habitats for the benefit of the American people. Amendment of the NWRAA in 1997 required the refuge system to ensure that the biological integrity, diversity, and environmental health of refuges be maintained. Therefore, scrub buckwheat populations occurring on any Refuges are protected.

Existing regulatory mechanisms appear adequate to protect scrub buckwheat on State and federally owned lands. Furthermore, we believe scrub buckwheat on the two private parcels owned by organizations dedicated to conservation are adequately protected because neither ABS nor TNC would authorize removal or destruction of scrub buckwheat except for scientific or educational purposes. In such cases, we anticipate these organizations would seek research permits from the Service to evaluate potential impacts resulting from proposed research or educational projects involving scrub buckwheat.

Overall, we do not believe that inadequacy of existing regulatory mechanisms is a significant threat to scrub buckwheat because over one half of known populations occur on properties for which State and/or Federal regulations afford adequate protection.

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

D. Synthesis

Recovery criterion 2 identified in the recovery plan as necessary for removal of the scrub buckwheat from the list of threatened and endangered species has not been met because the demographics of many populations have not been evaluated.

The demography and distribution of scrub buckwheat on public lands are well understood. Scrub buckwheat can persist for long periods in unmanaged habitats, but reproduction and recruitment is highest following fire. The number of individual plants in monitored scrub buckwheat populations varies depending on time since fire. Population size generally increases soon after fire and declines in the years following fire, but this cyclical trend may be typical in viable populations where fire occurs at appropriate intervals. Three out of four monitored scrub buckwheat populations on public land appear to be stable considering the fire return intervals used at each of the locations and time since last fire at some locations.

For populations that are not monitored on public lands, we do not currently know how many individual scrub buckwheat plants make up each of the populations nor do we know what type of management or how frequently management occurs on these public lands. Consequently we cannot make inferences about the demographic viability of scrub buckwheat populations on most public lands.

The spatial distribution of scrub buckwheat has not changed from that reported in the 1996 recovery plan. However, additional populations have been located on properties that have been subsequently acquired for conservation purposes within the historic range.

As a result of land acquisition efforts over the past several decades by private entities and local, State, and Federal governments, 27 of 48 scrub buckwheat populations have been protected from habitat destruction and this level of conservation has exceeded conservation recommendations described in the recovery plan for this species. Even though 21 of the known populations of scrub buckwheat are not secure and are vulnerable to destruction or decline, we believe the 27 protected populations represent an adequate number of conserved populations to ensure long-term persistence of this species.

Threats due to habitat degradation resulting from lack of management on public lands exist, but we do not have information to evaluate the extent of this risk factor at this time. Threats resulting from overutilization for commercial, recreational, scientific, or educational purposes and disease or predation are not known to exist. Existing regulatory mechanisms are not inadequate on State and federally owned lands.

III. RESULTS

A. Recommended Classification: No change is needed.

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

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

Revise the recovery criteria to establish measureable goals for demographic monitoring, including but not limited to: the number of populations that should be monitored, the demographic parameters that should be measured, and the demographic performance levels/rates that should be met.

Monitoring of scrub buckwheat populations should be initiated on the ONF to evaluate the response of scrub buckwheat to soil disturbances associated with timber harvesting/site preparation activities and to determine the status of the species on the ONF.

The demographic status of scrub buckwheat populations may be inferred with minimal additional information. We believe that information regarding the number of individual plants and land management history can allow for a reasonable estimation of the current demographic status of extant scrub buckwheat populations. In this regard, we do not currently know how many plants exist on 23 of the 27 public lands where records indicate scrub buckwheat occurs. Consequently we recommend that surveys be conducted on public lands where no count data are available. Surveys initiated soon after fire would be valuable in assessing post-fire response of scrub buckwheat. We also suggest that a synthesis be conducted of historic and ongoing management actions on the same parcels for which counts are conducted. Knowing the historic and ongoing

management strategy will provide information about whether land management strategies are conducive to long-term persistence of scrub buckwheat.

The use of temporally and spatially appropriate management actions (e.g., prescribed fire or other disturbance regime) in areas containing scrub buckwheat should be encouraged on all public lands.

V. REFERENCES

Clanton, K.B. 2005. Lake Wales Ridge State Forest plant monitoring and management, 2004-2005 final report from 1/2004 through 12/2004. Florida Plant Conservation Program, Florida Division of Forestry, Tallahassee, Florida.

Florida Natural Areas Inventory (FNAI). 2000. *http://www.fnai.org/FieldGuide/pdf/Eriogonum_longifolium_var_gnaphalifolium.pdf*. Accessed October 11, 2007.

McConnell, K. and E.S. Menges. 2002. Effects of fire and treatments on the Florida endemic scrub buckwheat (*Eriogonum longifolium* Nutt. var. *gnaphalifolium* Gand.). Natural Areas Journal 22(3):194-201.

Menges, E.S. 2007. Integrating demography and fire management: an example from Florida scrub. Australian Journal of Botany 55:261-272.

Menges, E.S., C.W. Weekley, and G.L. Clarke. 2008. Sandhill restoration studies and experimental introduction of *Ziziphus celata* at Lake Wales Ridge National Wildlife Refuge. Final report. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida.

NatureServe. 2007. http//www.natureserve.org/explorer/serlet/NatureServe?searchsciorcommonName=scrub+buckwheat. Accessed October 11, 2007.

Satterthwaite, W.H., E.S. Menges, and P.F. Quintana-Ascencio. 2002. Assessing scrub buckwheat viability in relation to fire using multiple modeling techniques. Ecological Applications 12(6):1672-1687.

Turner, W.R., D.S. Wilcove, and H.M. Swain. 2006. State of the scrub: conservation progress, management responsibilities, and land acquisition priorities for imperiled species of Florida's Lake Wales Ridge. Archbold Biological Station, Lake Placid, Florida.

U.S. Forest Service. 2005. 2005 Annual monitoring and evaluation report, National Forests in Florida. Tallahassee, Florida.

Zwick, P.D. and M.H. Carr. 2006. Florida 2060: a population distribution scenario for the state of Florida. A research project prepared for 1000 Friends of Florida by the GeoPlan Center at the University of Florida, Gainesville. Available on the internet at http://www.1000friendsofflorida.org/planning/2060.asp.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Scrub Buckwheat *(Eriogonum longifolium* var. *gnaphalifolium)*

Current Classification: Threatened

Recommendation resulting from the 5-Year Review: No change needed.

Review Conducted By: Michael Jennings

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 7/23/08

REGIONAL OFFICE APPROVAL:

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

Approve _____ Date 7/15/08

APPENDIX A

Summary of peer review for the 5-year review of scrub buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*)

A. Peer Review Method: Prospective peer reviewers were identified if they met one or more of the following criteria: (1) they had recent scientific publications related to scrub buckwheat biology, ecology, or conservation; (2) they had recently conducted research or monitoring of scrub buckwheat related to biology, ecology, or conservation; or (3) they had knowledge of scrub buckwheat biology, ecology, or conservation because of their current professional position.

Prospective peer reviewers were notified electronically on March 28, 2008, and asked of their willingness to participate in the peer review and whether they would be able to complete their review by April 28, 2008, and follow peer review guidance (see B below).

Three prospective peer reviewers were notified: Dr. Eric Menges, Archbold Biological Station; Amy Jenkins, Florida Natural Areas Inventory; and Dr. Mary Carrington, Governors State University. Each reviewer provided comments by April 28, 2008.

B. Peer Review Charge: See Appendix B.

C. Summary of Peer Review Comments/Report:

Dr. Menges: In the Recovery Criteria discussion, Dr. Menges suggested that the review should also discuss the additional public land acquisitions that have protected scrub buckwheat and the relationship of these acquisitions to satisfying criterion 1. Dr. Menges also provided updated literature regarding monitoring on the LWRNWR and suggested we identify that ABS has been conducting the monitoring at this site. Under the abundance, population trends, demographic features, or demographic trends section, Dr. Menges indicated that our discussion of trend information at ABS was confusing and inconsistent with trend summaries for other areas. Also in this section, Dr. Menges suggested that monitoring results from the ONF may not be accurate because small, fire suppressed plants may not have been observed if they were not individually marked. He indicated that observing many plants after fire in areas where none were found before is an indication that small plants were missed during surveys conducted before prescribed fires were introduced. At the end of the abundance, population trends, demographic features, or demographic trends section, Dr. Menges made several editorial comments and indicated that scrub buckwheat is not found in rosemary scrub and suggested this reference be deleted. Consequently, under the habitat or ecosystem conditions section, Dr. Menges replaced discussion of fire return intervals in rosemary scrub with fire return intervals in sandhill scrub. Under the five-factor analysis, Dr. Menges indicated that fire suppression is a continuing problem on private and public lands. Dr. Menges supported our recommendations for future actions.

Ms. Jenkins: Ms. Jenkins provided a number of editorial recommendations and information about two new locality records on private property and one record of extirpation from private property. However, her primary focus was on the 5-year review's conclusion that scrub buckwheat populations on monitored public lands were stable. She indicated that preliminary

surveys conducted by FNAI on the ONF indicated that scrub buckwheat was not found at 14 previously known locations. Ms. Jenkins indicated that such findings do not support the 5-year review's conclusion that scrub buckwheat is stable on the ONF.

Dr. Carrington: Dr. Carrington did not believe that the information provided in the 5-year review supported the conclusion that the status of scrub buckwheat was stable. She noted that the review provided information for only four populations on protected lands and no data on private lands and concluded that these data were insufficient to determine that scrub buckwheat was stable. She also indicated that the 5-year review did not justify attainment of recovery criterion 1 and recommended that a comparison be made between the number of populations protected at Catfish Creek at the time the recovery plan was prepared and the number of populations currently protected. Dr. Carrington indicated that the discussion of attainment of recovery criterion 2 was adequate and that the recommendations for future actions were appropriate to adequately assess the demographic status of scrub buckwheat populations. She suggested that this section also recommend that the time span of surveys of scrub buckwheat populations on all sites (minimum of five annual counts) include counts immediately after burns, so that trends in relation to time since burning can be compared.

D. Response to Peer Review

Dr. Menges: In response to comments, we have modified the Recovery Criteria discussion to more clearly highlight the importance of previous land acquisitions in meeting criterion 1. We also included reference to new monitoring work conducted by ABS at LWRNWR. We have modified our discussion of scrub buckwheat trends on ABS to be consistent with the remainder of the document. We agreed with Dr. Menges' comment that monitoring results on the ONF may not reflect accurate pre-fire baseline information. Nonetheless, our generalization that monitored scrub buckwheat populations appear stable would not change. In fact, finding more fire-suppressed plants prior to fire would tend to substantiate our generalized conclusion that monitored scrub buckwheat populations are stable on the ONF. We accepted Dr. Menges' edits at the end of the abundance, population trends, demographic features, or demographic trends sections and those provided under the habitat or ecosystem condition section. We acknowledged Dr. Menges' concerns about fire suppression on public lands and have incorporated language to address this concern.

Ms. Jenkins: The information provided by Ms. Jenkins represents new data and we have incorporated this information into the 5-year review, where applicable. We also revised our discussion of population stability on the ONF. However, it is our understanding that the surveys recently conducted by FNAI were limited in scope and included only a small portion of the known localities of scrub buckwheat on the ONF. It is not clear whether these findings are indicative of the status of scrub buckwheat throughout the ONF. Nonetheless, we believe the recent survey results are informative about the potential decline of scrub buckwheat on the ONF and will evaluate future survey results conducted by FNAI.

Dr. Carrington: We agreed with Dr. Carrington that data provided in the 5-year review do not support a conclusion that scrub buckwheat (as a species) is stable and have modified the text to reflect this uncertainty. However, we do believe that on three protected properties where

monitoring has occurred, scrub buckwheat populations are stable. These are outlined in abundance, population trends, demographic features, or demographic trends section. We suspect that scrub buckwheat populations on other protected properties are also stable and we recommend that surveys be conducted to confirm the status of this species on protected lands. We believe the discussion of attainment of recovery criterion 1 was not clear and led to Dr. Carrington's comment that the 5-year review did not adequately support our conclusion. We have reworded this section, indicating that this criterion addresses success in acquisition of habitat and not in the number of scrub buckwheat populations protected. We agreed with Dr. Carrington's suggestion that surveys be conducted post-fire to better assess scrub buckwheat response in the years following fire. As currently written, the recommendation to conduct annual surveys does not exclude surveys immediately following fire and we presume any annual monitoring would continue even after fire. Nonetheless, we included additional language to encourage post-fire monitoring.

APPENDIX B

Guidance for Peer Reviewers of Five-Year Status Reviews

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

March 6, 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 that appears not to have been 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 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 Mike Jennings, U.S. Fish and Wildlife Service, at 904-232-2580, extension 113, email: michael_jennings@fws.gov.