Cranichis ricartii
(no common name)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Southeast Region
Caribbean Ecological Services Field Office
Boquerón, Puerto Rico

5-YEAR REVIEW
Cranichis ricartii

I. GENERAL INFORMATION

A. Methodology used to complete the review

On September 21, 2007, the U.S. Fish and Wildlife Service (USFWS) published a notice in the *Federal Register* (72 FR 54061) announcing the 5-year review of the orchid *Cranichis ricartii* (no common name), and requesting new information concerning the biology and status of the species. A 60-day comment period was opened; however, no information was received from the public during that period.

A USFWS biologist completed this 5-year review using the best available information that we have gathered in the species file since it was listed in 1991. The sources of information used for this review included the original listing rule and the recovery plan for the species, peer-reviewed literature, and information gathered by Service biologists during a site visit in 2015. We did not seek additional peer review on this five-year review, as the consulted leading experts at University of Puerto Rico (Dr. James Ackerman) did not have new or recent information regarding the abundance or threats affecting the species. No part of this review was contracted to an outside party.

B. Reviewers

Lead Region: Kelly Bibb, Recovery Coordinator, Southeast Region, Atlanta. (404) 679-7132.

Lead Field Office: José G. Martínez, Caribbean Ecological Services Field Office, Boquerón, Puerto Rico. (787) 851-7297, extension 219.

C. Background

1. **Federal Register Notice citation announcing initiation of this review:** September 21, 2007; 72 FR 54061.

2. **Species Status:**

   As of the date of this review, we believe the status of *C. ricartii* is uncertain. At the time of listing, the number of individuals and the populations reported were based on anecdotal data without a comprehensive survey. Previous site visits indicate that *C. ricartii*'s presence varies yearly; which may occur due to the species' biology and its growth habits. *Cranichis ricartii* apparently remains in a dormant state until appropriate conditions allow its sprouting, which minimizes the likelihood of it being found. In addition, it produces flowers simultaneously with other morphologically similar orchids in the short period of November to February, making it easy to misidentify.

Comprehensive surveys of the species have not been conducted since it was listed. In January 2015, Service biologists conducted a rapid assessment of the historical site of the *C. ricartii* population within *Alto del Descanso* at the Maricao Commonwealth Forest (MCF; see Figure 1) and found five individuals (USFWS 2015). This rapid assessment does not constitute a comprehensive survey within the area. Furthermore, other areas within the MCF with similar vegetation and structure were not visited during this assessment. Thus, in the absence of long term monitoring and uncertainty about population trends, we deem the status of the species as uncertain. Nevertheless, the species occurs in an undisturbed mature forest which harbors other rare native and endemic species of trees, bromeliads and orchids.

Ackerman (1997 and 2004) reported that *C. ricartii* also occurs in other countries: Cuba, Dominican Republic, and Guadalupe, but no current information is available regarding the size and status of those populations elsewhere.

3. **Recovery Achieved:** 1 (0-25%) of species recovery objectives achieved.

4. **Listing History**
   Original Listing
   FR notice: 56 FR 60933
   Date listed: November 29, 1991
   Entity listed: species
   Classification: endangered

5. **Associated rulemakings:** Not Applicable.

6. **Review History:**

   The Final Rule to list *C. ricartii* as endangered was published on November 29, 1991 (USFWS 1991). The Recovery Plan developed for this species was approved on July 15, 1996 (USFWS 1996). These documents are the most comprehensive analyses of the status of this species and are used as the baseline references documents for this 5-year review.

   Each year the Service reviews and updates listed species information to benefit the required Recovery Report to Congress. Through 2013, we did a recovery data call that included showing status recommendations like "Uncertain" for this plant. We continue to show that species status recommendation in 5-year reviews. The most recent evaluation for *C. ricartii* was completed in 2015.

   Recovery Data Call (RDC): 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, and 2015.

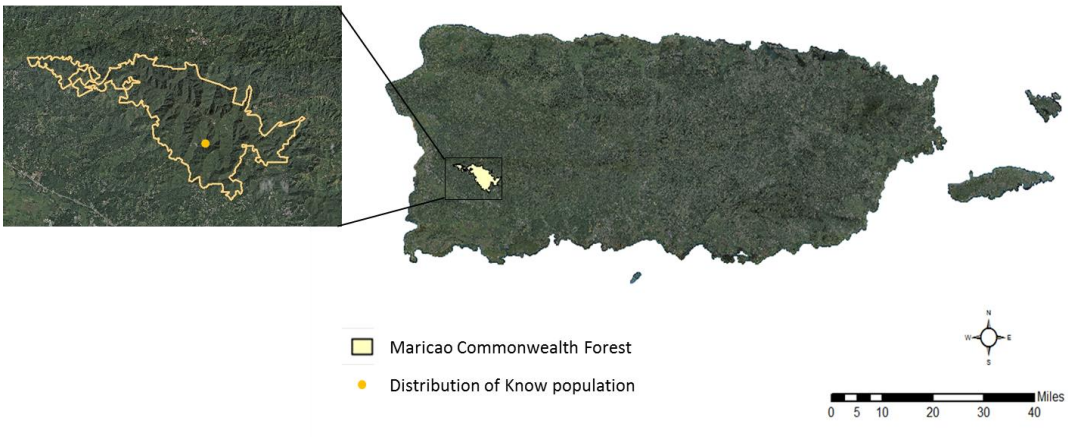

Figure 1. Distribution of known population at Maricao Commonwealth Forest (USFWS 2015).

7. **Species' Recovery Priority Number at start of review (48 FR 43098): 5**. At the time of listing, *C. ricartii* was recognized as a species with a high degree of threat and a low recovery potential.

8. **Recovery Plan:**
   Name of plan: *Lepanthes eltoroensis* and *Cranichis ricartii* Recovery Plan.
   Date issued: July 15, 1996.

II. Review Analysis

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

The Act defines species to include any distinct population segment of any species of vertebrate wildlife. This definition limits listings as distinct population segments (DPS) only to vertebrate species of fish and wildlife. Because the DPS policy is not applicable to this species, it is not further addressed in this review.

B. Recovery Criteria

1. **Does the species have a final, approved recovery plan containing objective, measurable criteria?**
   Cranichis ricartii has an approved recovery plan that provides criteria for reclassification from endangered to threatened (USFWS 1996). However, downlisting criteria are only partially measureable and it does not provide criteria for delisting.

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. Information regarding *C. ricartii's* biology, habitat requirements, and life history was not available when we approved the species 1996 recovery plan. Moreover, at the time of listing, *C. ricartii* was considered endemic to Puerto Rico; but now this orchid is considered as endemic to the Antilles (Cuba, Dominican Republic, Puerto Rico and Guadalupe) (Ackerman 2014). Nevertheless, Ackerman (2014) indicated that the species is rare throughout its entire distribution.

b. **Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?**
Yes. Factors A, B and E were considered threats to this plant when the recovery plan was approved. The recovery criteria are relevant to addressing these threats.

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.

The approved recovery plan established that *C. ricartii* could be considered for reclassification when:

1. An agreement between the Fish and Wildlife Service and the Department of Natural and Environmental Resources concerning the protection of *Cranichis ricartii* within the Maricao Commonwealth Forest property has been prepared and implemented.

2. New populations (the number of which should be determined following the appropriate studies) capable of self-perpetuation have been established within protected areas.

Criterion 1 has been partially met. Although a specific plan for the protection of *C. ricartii* within the MCF does not exist, there are appropriate regulatory mechanisms to protect and promote the recovery of the species in that forest. The MCF is managed for conservation by the Puerto Rico Department of Natural and Environmental Resources (PRDNER) (DNR 1976). The PRDNER also listed *C. ricartii* as endangered, and included it in their list of critical elements. Furthermore, a Cooperative Agreement under Section 6 of the ESA between the USFWS and PRDNER is in place since 1983 to establish and implement an endangered species program in the Commonwealth of Puerto Rico to promote the recovery of listed species (See factor D), including *C. ricartii*. All these regulatory mechanisms promote the conservation and management of federally-listed species within Commonwealth forests.

Criterion 2 has not been achieved. Based on the available information, no propagation techniques or propagation program has been developed for the species. Based on the lack of information and species rarity, this criterion should be further re-evaluated.

C. Updated Information and Current Species Status

1. Biology and Habitat

a. Species' abundance, population trends (*e.g.* increasing, decreasing, stable), demographic features, or demographic trends

Cranichi ricartii is a tiny terrestrial orchid up to 27 cm (10 in) tall. Flowers are mostly green, nonresupinate and the fruits grow an erect ellipsoidal capsule that shows only for a short period during late fall to early winter, which makes it less detectable (Ackerman 1995). Previous surveys suggest that *C. ricartii* is not found at the same site from year to year (USFWS 1996). This fluctuation may be related to the species' biology and its growth habits. *Cranichis ricartii* apparently remains in a dormant state until appropriate conditions allow its sprouting. This behavior minimizes the likelihood of being found. At the time of the recovery plan, this plant was known from only three locations from the MCF. One population was eliminated in 1995 when a road was built in the area (Cedeño-Maldonado and Breckon 1996). On July 30, 2008, Service biologist Carlos Pacheco, requested from Rubén Padrón (former MCF manager) any new information regarding *C. ricartii*. Mr. Padrón indicated that he had visited the only two, apparently remaining populations in MCF (~30 individuals), but that he did not find the species during three consecutive years before 2008. No further specific details were provided by Mr. Padrón.

In early 2015, Service biologists Omar Monsegur and Xiomara Labiosa visited *Alto del Descanso* trail (the area of the two known sites) in the MCF to conduct a rapid assessment on the historical site of a *C. ricartii* population. The Service biologists found that the plant was still present in a slope near a cliff at the *Alto del Descanso* adjacent to State Road PR-120. A total of five individuals of *C. ricartii* were documented and only three of them had flowers. *Cranichis ricartii* occur within an area that also harbors populations of *Prescotia oligantha*, *Cranichis tenuis* and *Liparis saundersiana.* When sterile these three orchid species may resemble and be confused with *C. ricartii*. Thus, care should be taken when conducting surveys to avoid confusing *C. ricartii* with the latter species and overestimating the number of individuals (USFWS 2015).

b. Genetics, genetic variation, or trends in genetic variation:

No information on the genetics, genetic variation or trends in genetic variation of *C. ricartii* was found during this review.

c. Taxonomic classification or changes in nomenclature:

No new information regarding taxonomic classification or changes in nomenclature was found during this review for *C. ricartii*.

d. Spatial distribution, trends in spatial distribution, or historical range:

The final listing rule and the recovery plan described the *C. ricartii* as endemic to Puerto Rico. However, Ackerman (1997 and 2004) recognized specimens of *C. ricartii* lumped into herbarium collections of *Prescotia oligantha*. Based on the last available information, *C. ricartii* is now considered as endemic to the Antilles (Cuba, Dominican Republic, Puerto Rico and Guadalupe) (Ackerman 2014). Nevertheless, Ackerman (2014) indicates that the species is rare throughout its entire distribution.

In Puerto Rico, *C. ricartii* has been reported from three locations restricted to MCF, where Rubén Padrón and Juan Ricart first discovered it in 1979 (USFWS 1996). The two locations described above and one population that was eliminated in 1995 when a road was built in the area (Cedeño-Maldonado and Breckon 1996). Ackerman (1989) located the species between *Monte Montoso* and *Alto del Descanso* at Road PR-120. This road runs along the ridge of the higher mountains of the MCF, the area where prime habitat for *C. ricartii* occurs (USFWS 2015). The Service only knows the population at the *Alto del Descanso* area.

e. Habitat or ecosystem condition:

Cranichis ricartii grows in humus of moist serpentine scrub forests of montane ridges at elevations above 680 m (meter) (2,265 ft (feet)) (USFWS 1996). The habitat of the *Alto del Descanso* site was characterized by Service biologists that found the individuals growing around of a dense stands of native vegetation influenced by winds, producing a structure with a low canopy forest about 15 feet (5 m) of height (USFWS 2015). Some common species on the area includes *Coccoloba microstachya, Coccoloba pyrifolia, Coccoloba sintenisii, Guettarda valenzuelana, Guettarda pungens, Commocladia glabra, Clusia clusioides, Tabebuia haemantha, Plumeria krugii, Eugenia padronii, Ternstroemia peduncularis, Brunfelsia densifolia, Rondeletia inermis, Gesneria pedunculosa* and *Calyptranthes peduncularis*. Other orchid species that occur in the same area are the following; *Basiphyllaea corallicola, Eltroplectris calcarata, Epidendrum ackermanii, Ponthieva racemosa, Polystachya foliosa, Polystachya concreta, Prosthechea pygmaea* and *Vanilla poitaei*. Also associated to the vegetation are the following bromeliads: *Catopsis floribunda*, *Pitcairnia angustifolia*, *Tillandsia bulbosa* and *Vriesea macrostachya*. However, the most outstanding characteristic of the site is the presence of *Schizaea poeppigiana,* a rare native terrestrial fern that has only been recorded from the summit of pristine mogotes at the Río Abajo Commonwealth Forest and from the higher elevations of the MCF. Also noteworthy is the abundance in the area of the rare *Cranichis tenuis* and *Liparis saundersiana*. *Cranichis ricartii* is extremely rare compared to the latter species. Thus, it may be suggested that *Schizaea poeppigiana, Cranichis tenuis* and *Liparis saundersiana* are associated to the suitable habitat for *C. ricartii*. Further suitable habitat may extend to other summits within the MCF, particularly along road PR-120.

We do not have any information about the species habitat or ecosystem condition in Cuba, Dominican Republic, and Guadeloupe.

2. Five Factor Analysis

(a) Present or threatened destruction, modification, or curtailment of its habitat or range;

The Final Rule (USFWS 1991) and the Recovery Plan (USFWS1996) for *C. ricartii* identified forest management practices such as establishment and maintenance of plantations, selective cutting, trail maintenance and shelter construction, as a threat to *C. ricartii*. At present time, this scenario has changed, the MCF is managed for conservation and some designated areas are used for recreation. The PRDNER has established regulatory mechanisms such as laws, regulations and special designations for recreation facilities and construction of infrastructure to prevent habitat modification on the MCF and other Commonwealth forests (See Factor D discussion below).

Furthermore, since 2009 the Service and PRDNER have been working together in the monitoring of federally listed species as part of the plans for the reintroduction of the Puerto Rican parrot into the MCF. More recently, the Service, USFS and PRDNER signed a Candidate Conservation Agreement for the elfin-woods warbler at the MCF. All these recent efforts promote interagency coordination that are expected to result in conservation benefits to at-risk and listed species within and adjacent to the MCF.

In the particular case of *Alto del Descanso* trail area where one of the known *C. ricartii* populations exists, we have identified a possible threat by habitat modification. *Cranichis ricartii* individuals found in this area are close to road PR-120. This road runs along the ridge of the higher mountains of the MCF, in an area that has been historically used to extract fill material for construction activities. This population could be threatened by road maintenance or enhancement. Serpentine soils are susceptible to landslides. Because of the location of the population, landslides in the area may affect the species or its habitat. In fact, Service biologists did document landslides adjacent to this population during the site visit in 2015, but the landslides did not affect the specific area were the species occurs.

Based on the above, we continue to consider that the species is threatened by destruction, modification, or curtailment of its habitat or range. However, we consider this threat low to moderate. We also consider this threat as imminent because landslides are occurring in the area. No information regarding this Factor is available from other countries where the species occurs.

(b) Overutilization for commercial, recreational, scientific, or educational purposes;

The recovery plan stated overutilization for commercial, recreational, scientific, or educational purposes as a threat to the species (USFWS 1996). However, at present, we are not aware that this factor is a threat to *C. ricartii*. The peculiar growth habit of the species, which include its tiny size, underground stage and short reproductive period, make it very difficult to locate. Additionally, Commonwealth regulations prohibit collection of plants, including listed species, in Commonwealth Forests (See Factor D). Therefore, we believe this Factor is not a threat to *C. ricartii* in Puerto Rico. However, no information is available on this Factor in the other countries the species is found.

(c) Disease or predation;

The Final Rule for *C. ricartii* stated that disease and predation had not been documented as factors in the decline of *C. ricartii* (USFWS 1991). Based on the best available information, we do not consider this Factor to be a threat to the species. No information on this factor is available from other countries where the species occurs.

(d) Inadequacy of existing regulatory mechanisms:

Following listing, *C. ricartii* acquired protection under the Endangered Species Act of 1973, as amended. In 1999, the Commonwealth of Puerto Rico approved Law No. 241, also known as New Wildlife Law of Puerto Rico (*Nueva Ley de Vida Silvestre de Puerto Rico*). The purpose of this law is to protect, conserve, and enhance both native and migratory wildlife species, declare as the property of Puerto Rico all wildlife species within its jurisdiction, regulate permits, hunting activities, and exotic species, among other activities. This law also has provisions to protect habitat for all wildlife species, including plants. In 2004, the PRDNER approved Regulation 6766 to regulate the management of threatened and endangered species in the Commonwealth of Puerto Rico (PRDNER 2004). *Cranichis ricartii* was included in the list of protected species of this regulation and designated as critically endangered. Article 2.06 of Regulation 6766 prohibits collecting, cutting, removing, among other activities, listed plant individuals within the jurisdiction of Puerto Rico.

The MCF is protected by Law No. 133-1975 (12 L.P.R.A. sec 191) , as amended in 2000, known as the Puerto Rico Forest Law (*Ley de Bosques de Puerto Rico*). Section 8 (A) of Law No. 133, prohibits cutting, killing, destroying, uprooting, extracting, or in any way hurting any tree or vegetation within a Commonwealth Forest without authorization of the Secretary of the PRDNER. The PRDNER also identified the MCF as a Critical Wildlife Area (CWA). The CWA designation constitutes a special recognition by the Commonwealth with the purpose of providing information to Commonwealth and Federal agencies about the conservation needs of these areas, and to assist permitting agencies in

precluding negative impacts as a result of permits or endorsements (PRDNER 2005).

Based on the presence of Commonwealth and Federal laws and regulations protecting this species, and the fact the *C. ricartii* is only known to occur within the MCF, we do not consider the inadequacy of existing regulatory mechanisms as a threat to the species in Puerto Rico. Nevertheless, we do not have available information regarding this threat from other countries where the species occurs.

(e) Other natural or manmade factors affecting its continued existence.

Low reproductive capacity

Cranichis ricartii was described in 1989 by Ackerman, who reported in 1995 that all flowers set fruit, and suggested it is autogamous. The floral biology of orchids is somewhat unusual and, unlike most flowering plants, the seeds of orchids lack endosperm (Ackerman 1992). For successful germination, the seed must be dispersed to a suitable habitat and substrate, and then come into contact with appropriate mycorrhizal fungi in the soil, which provides the necessary energy to germinate (Ackerman 1992). Fungi are essential for the germination and growth of some orchids (Rasmussen 1995). However, the limited knowledge on the reproductive capacity of *C. ricartii*, and the lack of data regarding its viable potential to naturally recruit, makes it difficult to predict the recovery of the species.

Exotic species

In the rapid assessment conducted in early 2015 by Service biologists, it was noted that individuals of Honduran Pine (*Pinus caribea*) were planted on the area along the trail adjacent to the population. They noted that the pine seedlings were already establishing in the area and colonizing the native forest. This may pose a significant threat to *C. ricartii* as this pine tree and its seedlings form a dense bed of leaf litter that modifies the species' habitat and would make it difficult or not allow the species to naturally disperse.

Climate change and natural landslides

It is assumed that *C. ricartii* is adapted to disturbances caused by tropical storms, which frequently affect the islands of the Caribbean. However, in Puerto Rico this species is confined to a small geographical area within the MCF. Under these conditions, the species may be more susceptible to climate change impacts, which are predicted to increase in frequency and strength (i.e., tropical storms and severe droughts) (Hopkinson et al. 2008). Modification of habitat microclimatic conditions of the species by climate change may compromise its continued existence (Swarts and Dixon 2009). Furthermore, long periods of rain associated with tropical storms and the steep slopes on which the populations have been

reported, may result in massive landslides that may significantly affect the species. However, we have no specific information to assess the species vulnerability to climate change.

Based on the above information, we consider the possible adverse effects of exotic species to be high and imminent; however, we consider the effects of low reproductive capacity, climate change, and natural landslide as low to moderate and non-imminent threats to *C. ricartii*.

4. Synthesis

Cranichis ricartii was listed as endangered in 1991 due to its rarity, forest management practices (Factor A), collection (Factor B) and restricted distribution (Factor E). Critical habitat was not designated for this species because of the risk of vandalism and possibility of over collection (USFWS 1996). At the time of listing, *C. ricartii* was reported to be endemic to Puerto Rico, but now it is also known to occur in Dominican Republic, Cuba, and Guadalupe, which considerably expands its distribution range. However, the USFWS does not have additional information regarding the status of the species in these countries. In Puerto Rico, previous communications from a prior MCF manager about the time of the recovery plan indicated that the numbers of this rare orchid remaining in MCF was 30 individuals in two populations, where it grows on montane ridges at elevations above 680 m (2,265 ft) in humus of moist and serpentine scrub forest. At present, we have documented the presence of the species within undisturbed mature forest at *Alto del Descanso* within MCF. During a rapid assessment conducted in 2015, five individuals were observed in the area. Due to the species rarity, lack of comprehensive surveys, lack of long-term monitoring and uncertainty about population trends, we deem the status of the population as uncertain.

The limited information for Puerto Rico suggests that at present, *C. ricartii* is not threatened by overutilization for commercial, recreational, scientific or educational purposes (Factor B), disease or predation (Factor C), and the inadequacy of existing regulatory mechanisms (Factor D).

Based on the information gathered for this review, we believe that *C. ricartii* is currently threatened by habitat destruction or modification (Factor A) and natural factors such as apparent low reproduction capacity, exotic species, potential climate change effects and landslides (Factor E). We consider habitat destruction and modification as a low to moderate threat. We consider the possible adverse effects of exotic species to be high and imminent; however, we consider the effects of low reproductive capacity, potential climate change effects, and natural landslide as low to moderate and non-imminent threats to *C. ricartii*. Although we consider that the recovery criteria for reclassification of *C. ricartii* have been partially met, given the lack of data the Service needs to review recovery criteria to assess if appropriate recovery of the species is feasible (see recommendation in this review).

III. RESULTS

A. Recommended Classification:

__X__ **No, no change is needed.**

B. New Recovery Priority Number: 11. Based on our current analysis of the 5-listing factors, we only identified the Factor A and Factor E as a threats to *C. ricartii*. We believe the degree of these threats is moderate, but the species still has a low recovery potential due reasons explained above.

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

1. Evaluate the status of the *C. ricartii* population through comprehensive surveys. These surveys should include other suitable habitat within MCF. Any survey should focus on the period when the species is in flower (November to February).

2. Gather information on ecological (e.g., endemism to serpentine, habitat requirements), biological (e.g., breeding systems, genetic structure of the population), and demographic (e.g., recruitment, growth rate) aspects of *C. ricartii*.

3. Ensure road maintenance along *Alto del Descanso* trail and Road PR-120 is appropriately coordinated with State and Federal agencies to avoid affecting the population and habitat of the species.

4. Evaluate the feasibility of eradicating *Pinus caribea* from the area. At this moment, there is a low number of individuals of this species in the area and its eradication may be logistically feasible.

5. Revise the Recovery Plan to reflect most up-to-date information and to develop reclassification and delisting measurable criteria for the species based on the five listing factors.

V. REFERENCES

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Myrcia paganii*

Current Classification: Endangered

Recommendation resulting from the 5-Year Review

____ **Downlist to Threatened**
____ **Uplist to Endangered**
____ **Delist**
_X_ **No change is needed**

Review Conducted By: José A. Cruz-Burgos, Caribbean Ecological Services Field Office, Boquerón, Puerto Rico

FIELD OFFICE APPROVAL:

Edwin E. Muñiz, Lead Field Supervisor, U.S. Fish and Wildlife Service

Approve Edwin Muñiz Date 9/16/2015

REGIONAL OFFICE APPROVAL:

Lead Regional Director, U.S. Fish and Wildlife Service

Approve Lis Ellis Date 6/16/16