Britton's Beargrass
(*Nolina brittoniana*)

5-Year Status Review:
Summary and Evaluation

Photo: Todd Mecklenborg - U.S. Fish and Wildlife Service

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

March 2025

STATUS REVIEW
Britton's Beargrass (*Nolina brittoniana*)

GENERAL INFORMATION

Current Classification: Endangered

Lead Field Office: Florida Ecological Services Field Office, Todd Mecklenborg

Reviewers:

Lead Regional Office: Southeast Region, Carrie Straight

Florida Ecological Services Field Office, Vivian Negron-Ortiz

Date of original listing: August 28, 1989 (54 FR 31190; July 27, 1989)

Methodology used to complete the review:

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants (50 CFR 424.11). The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of the Britton's Beargrass (*Nolina brittoniana*) to inform this status review.

The Service announced initiation of this review in the Federal Register on May 11, 2023 (88 FR 30324) with a 60-day comment period. We did not receive any public comments related to this species during the comment period. The primary sources of information used in this analysis were the 1989 final listing rule (54 FR 31190), the 1996 recovery plan, previous 5-year status reviews (Service 2010, 2019), research project reports, peer reviewed scientific publications, unpublished field observations, and personal communications. This review was completed by the Service's Florida Ecological Services Field Office, Gainesville, Florida. All literature and documents used for this review are on file. All recommendations resulting from this review are the result of thoroughly evaluating the best available information on *N. brittoniana*.

FR Notice citation announcing the species is under active review: May 11, 2023 (88 FR 30324)

Species' Recovery Priority Number at start of 5-year review (48 FR 43098): 8. The "8" indicates a species with a moderate degree of threat and high recovery potential.

Review History: Previous 5-year reviews were completed in 2010 and 2019. These reviews recommended no change in status.

REVIEW ANALYSIS

Listed Entity

Taxonomy and Nomenclature
The taxonomy of the listed entity remains valid (Integrated Taxonomic Information System 2024). The species is currently identified as *Nolina brittoniana*, Nash - Britton's Beargrass.

Distinct Population Segment (DPS)
The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish and wildlife. The definition limits listing DPS to vertebrate species of fish and wildlife and because this species is a plant, the DPS policy does not apply.

Recovery Criteria

Recovery Plans
Recovery plans are not regulatory documents and intended to provide guidance to the Service, states, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the Act. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act (84 FR 45020).

Recovery Plan for Nineteen Florida Scrub and High Pineland Pant Species, June 20, 1996

The recovery plan suggests the following criteria to reclassify the species as a threatened species or potentially delisting the species from protections provided by the Act:

"For reclassification, protect eight populations at four or more sites, with simple genetic assessment of number of individuals and demographic monitoring for 5 years.

For delisting, 20 viable populations at five or more sites in each of Highlands, Polk, Orange/Osceola, and Lake counties."

Biology and Habitat Summary

Biology
Detailed descriptions of the species biology including morphology illustrations can be found in the recovery plan and previous 5-year status reviews (Service 1996, 2010, and 2019. The following summary is a brief field description of the basic biology. Perennial herb with long, stiff leaves in a grass-like clump rising from a bulbous stem. Young leaves erect; older leaves up to 6 feet long and 0.5 inches wide. Flowering stalk 3-6 feet tall, topped by a large, showy cluster of small, white flowers. Flowers 6-parted with male and female flowers usually on separate plants. Fruit a papery, symmetrical, 3-lobed capsule, persisting through summer (Chafin 2000).

Although finding seedlings in populations may be difficult to separate from cloned individuals, genetic studies on *N. brittoniana* indicate "that occasional seedling recruitment must occur in this species, although seedlings are virtually unknown. If seedling recruitment and genetic diversity are mutually re-enforcing, this may explain the positive relationship of genetic variation and population size observed in this species" (Menges et al. 2010). Research like this can help focus future conservation priorities. See additional information on species genetics below.

Habitat and Distribution

Nolina brittoniana is a habitat generalist and occurs in multiple xeric upland communities, including scrub and sandhill (Christman 1988, Christman and Judd 1990, Menges et al. 2007). The species resprouts post disturbance (fire) with relatively stable demography and low annual turnover (Thomas et al. 1998, Menges 2007). The plants spread vegetatively, so a group of rosettes may represent only a single genetic individual. Additional habitat information may be obtained in documents previously noted.

The species distribution is central peninsular Florida and includes the following 12 counties: Hardee, Hernando, Highlands, Hillsborough, Lake, Manatee, Marion, Orange, Osceola, Pasco, Polk, and Seminole (Figure 1).

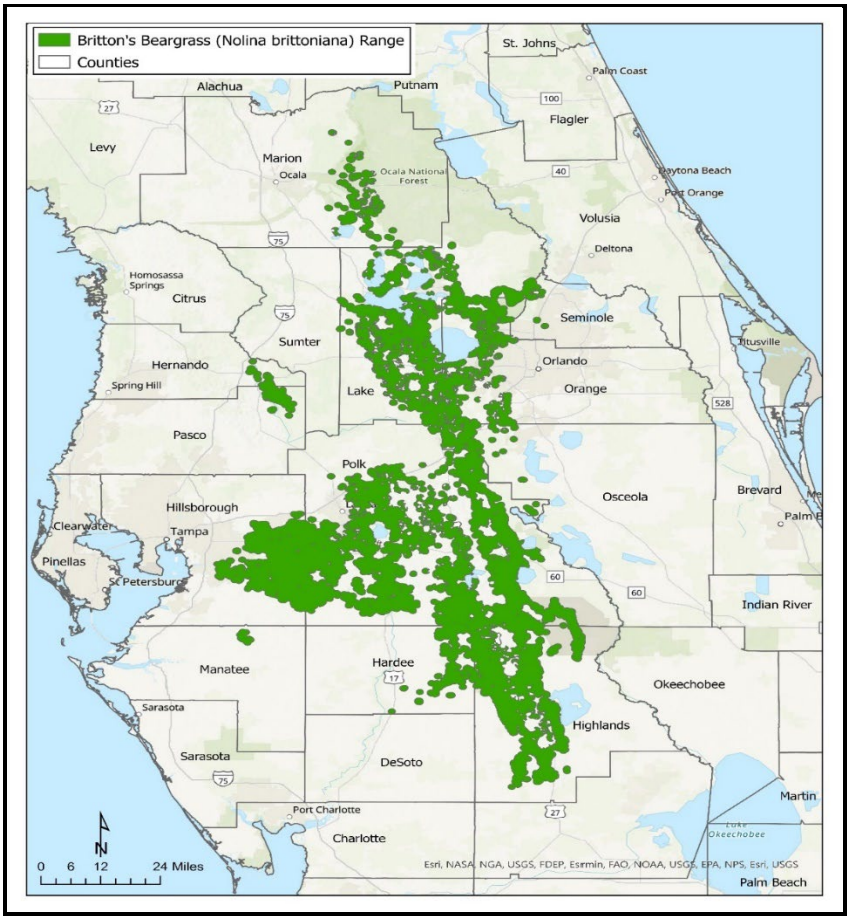

Figure 1. Known *Nolina brittoniana* populations throughout the species' range, Florida.

The Florida Natural Areas Inventory's 2023 Element Occurrence Records (hereafter EOs or populations) is utilized to document populations and conditions of populations. The 2010 5-year status review reported 34 extant populations of *N. brittoniana* on 24 managed conservation parcels (Service 2010). The 2019 status review noted 72 populations on a minimum of 30 conservation lands (Service 2019).

The Florida Natural Areas Inventory's 2023 database documented 94 populations (extant and extirpated). Of these, 53 populations occur on 37 conservation lands. This increase and then subsequent decrease in populations on conservation lands does not necessarily indicate an increasing then decreasing trend. Additional surveys on existing conservation lands along with beneficial management on many of these lands is more likely the result of the increase in population numbers between the 2010 and 2019 reporting. The decrease in the number of populations on conservation lands from 2019 to the current reporting is a consequence of combining populations (EOs) based on updated population criteria (occurrences within a distance of less than 0.6 miles were combined into a single population, which results in fewer populations). The increase in number of populations on conservation lands is consistent with ongoing acquisitions over the years. Table 1 lists the conservation lands and corresponding populations, location, date last observed, and estimated number of individuals.

Population Summary

- 2010 – 34 populations on 24 conservation lands.
- 2019 – 72 populations on 30 conservation lands.
- 2023 – 53 populations on 37 conservation lands – some populations from 2019 were merged because of new definition of populations as noted above.

Table 1. *Nolina brittoniana* populations and associated Element Occurrence number/s in parentheses, county of occurrence, last observation, and population estimates for the 37 populations on conservation lands.

Conservation Land (EO #)	County	Last Observed	Plant Estimate
Alafia River State Park (117)	Hillsborough	3/25/2013	5
Archbold Biological Station (7, 105)	Highlands	2000	~ 28
Catfish Creek Preserve State Park (39, 112, 113, 114)	Polk	4/16/2008	~ 15
Hickory Lake Scrub County Park (78)	Polk	2003	2
Highlands Hammock State Park (19)	Highlands	3/29/2017	2
Lake June-in-Winter Scrub Preserve State Park (25, 95)	Polk	11/05/2010	~ 63
LWRNWR - Everglades Headwaters (130, 133, 134)	Polk	10/26/2011	157
LWRNWR - Flamingo Villas (128)	Highlands	10/24/2012	1
LWRNWR - Lake McLeod (92)	Polk	9/2/1998	2
LWRSF - Hesperides Tract and Boy Scouts (15)	Polk	3/30/2017	410
LWRSF - Lake Arbuckle Tract (98, 101)	Polk	7/11/2017	1257
LWRSF - Lake Aurora Scrub (58)	Polk	7/5/2019	5
LWRSF - Lake Livingston East Scrub (22)	Polk	11/01/2018	50-200
LWRSF - Walk-in-the-Water (100, 110, 111)	Polk	4/20/2010	890
LWR Warea Archipelago Ferndale Ridge Preserve (4, 138)	Lake	2/04/1998	~ 200
LWRWEA - Carter Creek (64, 97)	Highlands	1/20/2022	~ 224
LWRWEA - Crooked Lake West (125)	Polk	5/21/2019	8
LWRWEA - Gould Road, Horn Road Scrub (93)	Highlands	4/6/2023	~ 9

LWRWEA- Henscratch Road/Jack Creek (3, 87, 118, 109)	Highlands	8/23/2021	37-226
LWRWEA - Highlands Ridge (127)	Highlands	3/11/1998	2
LWRWEA - Lake Apthorpe/Holmes Avenue (30)	Highlands	3/29/2022	215
LWRWEA - Lake Blue West Scrub (96)	Polk	7/16/2018	~ 50
LWRWEA - Lake Placid Scrub (121)	Highlands	4/3/2014	1
LWRWEA - Mountain Lake Cutoff (69)	Polk	9/17/2012	300+
LWRWEA - McJunkin Ranch (70, 104)	Highlands	10/21/2022	60+
LWRWEA - Royce Ranch (120)	Highlands	4/10/2014	1
LWRWEA - Silver Lake (36)	Highlands	10/20/2021	11-51
Ocala National Forest (99)	Marion	6/27/2016	7
Seminole State Forest - Warea Tract (108)	Lake	7/28/2011	35
Shadow Bay Park (139)	Orange	5/18/2017	6
South Fork State Park (Becker) (122)	Manatee	10/21/2014	10-12
SWFWMD - Chito Branch Reserve (135)	Hillsborough	12/7/2012	150
SWFWMD - Green Swamp (107)	Pasco	3/12/2008	5
Upper Lakes Basin Watershed (115)	Polk	7/26/2010	10
Wekiwa Springs State Park (136)	Orange	4/14/2020	2
Westside Conser. Easements - Lake Davenport (82)	Osceola	11/18/1997	1
Withlacoochee State Forest - Richloam Tract (106)	Pasco	11/29/2022	211

LWR - Lake Wales Ridge Ecosystem
LWRSF - Lake Wales Ridge State Forest
LWRWEA - Lake Wales Ridge Wildlife and Environmental Area
LWRNWR - Lake Wales Ridge National Wildlife Refuge
SWFWMD - Southwest Florida Water Management District

Population Status

Range-wide there are 53 populations (EOs) on 37 conservation lands occurring in 12 counties. The majority of these population do not have current plant estimates, nor are habitat management activities on many of these lands known that would benefit the species' viability. Even though *N. brittoniana* is a relatively long-lived perennial, habitat management is essential, especially application of fire.

Of these populations occurring on conservation lands, 26 populations were reported at the last observation date to have a minimum of 50 plants. The range of plants present in populations are often in the hundreds with the largest population having over a thousand plants. These 26 populations occur on 16 conservation lands in 6 counties (Table 1). This metric alone, excluding the remaining 27 populations that updated surveys may show viability, exceeds reclassification and even possibly delisting criteria in the recovery plan (Recovery Plan above, Service 1996).

Genetic Analysis

As noted in the Recovery Criteria, "a simple assessment of number of individuals and demographic monitoring for five years" was suggested. Fifty-two populations throughout the range of the species (Orlando Ridge, Winter Haven Ridge, and Lake Wales Ridge) have had simple assessments of individuals present (n = >2,879 individuals) and genetic sampling of tissue (Menges et al. 1996). In spite of being a peninsular Florida endemic, the species has

more than two life-history traits typically associated with high genetic diversity, including long-lived plants (>10 years), outcrossing, subdioecious (most individuals have either male or female reproductive parts, and some individuals containing both male and female reproductive structures [hermaphroditic]), relatively widespread, and well dispersed (Menges et al. 2001). However, since the species is also clonal, this trait may limit genetic diversity in some populations. A more recent study of population genetics in *N. brittoniana* indicates "no evidence of recent bottlenecks or changes in genetic structure due to habitat loss and fragmentation, consistent with populations having always been small, isolated and low density" (Dolan et al. 2004).

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act. A summary of this assessment is detailed below. Generally, there is no indication that Factors B, C, D, and E poses a significant threat for the species. Factor A (habitat destruction and degradation) threat remains ongoing.

Factor A. The present or threatened destruction, modification, or curtailment of its habitat or range.

The Florida Natural Areas Inventory database has 94 documented populations with 53 (56%) extant populations occurring on conservation lands. At least 13 (14%) are considered historic (extirpated), with the remaining 28 (30%) occurring on private lands of unknown status. The loss of habitat and habitat degradation continues to be the greatest threat to *N. brittoniana* on those private lands, which are not included in Table 1. These populations occurring on private lands have the highest potential for habitat loss (conversion to non-compatible habitat types like development and agriculture) and habitat degradation (fire suppression).

Populations occurring on conservation lands are no longer threatened with destruction of their habitat since these locations are generally protected from development. All conservation lands have management plans for the long-term preservation and conservation of the species present albeit funding, limited personnel availability, and the location on the landscape (e.g., smoke management constraints) may preclude management activities at times, so even on protected lands habitat degradation is likely reduced but remains a threat.

Factor B. Overutilization for commercial, recreational, scientific, or educational purposes.

This factor has not been identified as a threat to the species.

Factor C: Disease or predation.

This factor has not been identified as a threat to the species.

Factor D: The inadequacy of existing regulatory mechanisms.

Florida's "Preservation of Native Flora of Florida" law (Rule Chapter 5B-40 of the Florida Administrative Code provides the Department of Agriculture and Consumer Services with limited authority to protect plants only when they occur on state-owned lands primarily from illegal harvest. This law allows for collection of plants on state-owned lands by permit only and only for scientific and educational purposes. Coupled with protection afforded by the Act,

the existing regulatory mechanisms are adequate to protect this species on conservation lands but are not sufficient to protect populations on private lands from lack of management and/or land use changes.

Factor E: Other natural or manmade factors affecting its continued existence.
The Service is not aware of any climate change information specific to the habits or habitat of *N. brittoniana* that would indicate what potential effects climate change and increasing temperatures and rainfall, or extended drought conditions may have on this species.
The National Climate Assessment (NCA 2014) reports that the average precipitation has decreased in central Florida since 1900; however, heavy downpours are increasing in frequency and intensity since 1970. Future projected precipitation changes in seasonality for central Florida indicate 0 to +10 percent in winter, 0 to -10 percent in spring, -10 to -20 percent in summer, and +10 to +20 percent in fall will occur. Statewide annual rainfall is projected to increase from 0 to +20 percent by 2100. Sea level rise resulting from a warming climate and hotter water temperatures will not directly affect this species since it occurs in noncoastal areas. However, sea level rise in the range of 0.3-1.2 meters (1-4 feet) by 2100, is expected to impact coastal Florida (Runkle et al., 2022). Although this will not directly impact the species, this may change the influence of land use and population growth to the inland portions of the state where this species does occur.

Consecutive dry days are expected to increase 10 to 20 percent for most of Florida. Predictions of increased drought frequency, intensity, and duration could result in plant losses due to prolonged drought conditions. The Service has no evidence that climate changes observed to date have had any adverse impact on the species, or its habitat, nor is there information suggesting that the species will not be able adapt to predicted changes in weather conditions.

Species Status Summary (3 Rs)
The Species Status Assessment (SSA; https://www.fws.gov/project/species-status-assessment) Framework is an analytical approach developed by the Service to deliver foundational science for informing all decisions under the Act. Part of the SSA framework is to assess the listed entity's ability to sustain populations over time. To sustain populations over time, a species must have the capacity to withstand:

(1) environmental and demographic stochasticity and disturbances (Resiliency),
(2) catastrophes (Redundancy), and
(3) novel changes in its biological and physical environment (Representation).

Although this species does not have a formal SSA, we have briefly assessed Resiliency, Redundancy, and Representation below.

Resiliency is the ability of a species to withstand environmental stochasticity (normal, year-to-year variations in environmental conditions such as temperature, rainfall), periodic disturbances within the normal range of variation (fire, floods, storms), and demographic stochasticity (normal variation in demographic rates such as mortality and fecundity).

Nolina brittoniana is a habitat generalist that is a long-lived perennial, is subdioecious (allowing for some degree of self-fertilization or cross fertilization) and clonal. These traits provide the species the ability to maintain demographic stochasticity because it can reproduce in different ways and survive periods of suboptimal conditions. Because it is long-lived and has been seen in some locations since prior to its listing over 30 years ago it has shown resiliency to past periods of disturbances. The species occurs in multiple xeric upland communities, including scrub and sandhill indicating the species shows less specialization than some other rare endemic species sharing similar geography (Menges et al. 2001), and the species has relatively stable demography and low annual turnover. These traits allow some populations to avoid some periods of suboptimal conditions (flood/storms, see additional discussion below under Redundancy).

Many of these populations are within contiguous tracts of land that provide for connectedness between populations a trait that should allow for natural recovery from disturbance events to the species, its habitats, and pollinators/seed dispersers. The species is a disturbance-dependent plant and readily resprouts post fire, suggesting some level of environmental stochasticity may not be detrimental and may actually be beneficial to the species. In one study seed density in the soil of disturbed sites (i.e., site was previously disked or plowed) was closely linked to the proximity of adult plants and in other sites (e.g., undisturbed or burned sites) seed density was not related to proximity to adult plants (Hartnett and Richardson 1989). Some of these characteristics may limit the species' representation but also allow it to persist when there are few nearby plants for cross-pollination. These characteristics provide the species with resiliency.

Redundancy is the ability of a species to withstand catastrophes. Catastrophes are stochastic events that are expected to lead to population collapse regardless of population health and for which adaptation is unlikely.

Nolina brittoniana inhabits a large area of central peninsula Florida occurring on 37 managed conservation lands that are considered secured populations (n=53) across 12 counties range wide. In addition to known, managed populations, there are additional populations (n=13) on private or unmanaged lands. Based on the widespread distribution and nature of the species along with its general biological characteristic, a single catastrophic event is unlikely to impact all individuals in all populations and the species should have sufficient redundancy to be viable in the foreseeable future.

Representation is the genetic diversity found in the species allowing it to adapt to both near-term and long-term changes in its physical (climate conditions, habitat conditions, habitat structure, etc.) and biological (pathogens, competitors, predators, etc.) environments.

Nolina brittoniana has been shown to have fairly high genetic variability relative to other scrub-endemic species, which is more typical of species that are long lived, have demographic stability, outcrossing, and longer pollinator movement distances (Menges et al. 2001; 2010). These traits indicate the species may have sufficient representation. The species' clonal nature may limit genetic diversity in places or at times; however, this enables the species to persist

during times or in areas where additional plants will be unavailable for cross-pollination (see above).

Synthesis

Britton's beargrass, *Nolina brittoniana*, is a perennial herbaceous plant that is a habitat generalist occurring in multiple xeric upland communities, including scrub and sandhill in 12 counties in central peninsular Florida. Range-wide there are 53 populations of *N. brittoniana* on 37 conservation lands occurring in 12 counties. The majority of these populations do not have current plant estimates (no survey data since 2000); however, 26 populations were reported at their last observation date to have a minimum of 50 plants. The numbers of plants present in these populations are often in the hundreds with the largest populations having over a thousand plants. These larger populations occur on 16 conservation lands in 6 counties. The loss of habitat and habitat degradation continues to be the greatest threat to *N. brittoniana* on private lands. The populations occurring on conservation lands are no longer threatened with destruction of their habitat since these locations are generally protected from development; however, habitat degradation can occur because of limitations of appropriate habitat management. This species and its habitat are dependent on natural or prescribed fire for long-term maintenance which may be limited even on conservation lands because of their proximity to urban centers or limitations of resources to conduct prescribed burns. All conservation lands have management plans for the long-term preservation and conservation of the species on their properties. The Service is not aware of any information to indicate that overutilization, disease, predation, or other natural or manmade factors pose a significant threat to the species. There are 94 documented populations with 53 (56 %) extant populations occurring on conservation lands. At least 13 (14%) populations are considered historic (extirpated), with the remaining 28 (30%) populations occurring on private lands of unknown status. Genetic studies have indicated that there appears to be no current concerns related to genetic bottlenecks or genetic diversity. Because of the significant number of populations within conservation lands and their geographic spread, the Service is recommending that *N. brittoniana* no longer meets the definition of an endangered species and should be considered for reclassification as threatened.

RECOMMENDED FUTURE ACTIVITIES

A. Perform systematic surveys at known locations to determine viability and population trends.

B. Continue collaborating with land managers to increase beneficial habitat management in occupied habitat.

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RESULTS / SIGNATURES

U.S. Fish and Wildlife Service
Status Review of Britton's Beargrass (*Nolina brittoniana*)

Status Recommendation:

On the basis of this review, we recommend the following status for this species. A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

_X_ Downlist to Threatened
____ Uplist to Endangered
____ Delist:
____ *The species is extinct*
____ *The species does not meet the definition of an endangered or threatened species*
____ *The listed entity does not meet the statutory definition of a species*
____ No change needed

The information we have analyzed indicates that the species should be reclassified. As part of the next steps the Service will plan to draft a Species Status Assessment Report (SSA). This work will be prioritized based on other workload of the lead Field Office. A recommendation team will assess the information available in the SSA and recommend if a change in species status is needed. If the best scientific information available continues to support a change in classification, the Service will move forward with a proposed rule to reclassify the species. Any proposed rule will be published in the Federal Register at which time any interested person can comment and provide additional information on the proposed rule. After the proposed rule, the Service will analyze any new information received in public comments or by species experts. Typically, within one year of a reclassification proposal, if the decision continues to be supported by the best scientific information, we will publish a final reclassification rule.

FIELD OFFICE APPROVAL:
Division Manager – Florida Ecological Services Field Office, U.S. Fish and Wildlife Service

Approve NICOLE COLANGELO Digitally signed by NICOLE COLANGELO Date: 2025.03.17 13:09:00 -04'00'

LEAD REGIONAL OFFICE APPROVAL:
Assistant Regional Director – Ecological Services, U.S. Fish and Wildlife Service

Approve CATHERINE PHILLIPS CZARNECKI Digitally signed by CATHERINE PHILLIPS CZARNECKI Date: 2025.03.14 13:08:12 -04'00'