

Virginia Round-Leaf Birch
(Betula uber)

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



**U.S. Fish and Wildlife Service
Virginia Field Office
Gloucester, Virginia**

August 2020

5-YEAR REVIEW
Virginia round-leaf birch/*Betula uber*

1.0 GENERAL INFORMATION

1.1 Reviewers

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Lead Regional Office: North Atlantic-Appalachian Region, Hadley MA; Anne Hecht, 413-575-4031; anne_hecht@fws.gov

1.2 Methodology used to complete the review: This review was conducted internally by the U.S. Fish and Wildlife Service (Service) species lead located in the Virginia Field Office (VAFO). VAFO worked with the U.S. Forest Service (USFS) and the Virginia Department of Conservation and Recreation, Natural Heritage Program (VDCR NHP), to obtain up-to-date information on occurrences, threats, and recovery activities. A request for new information was distributed to all individuals known to have interest in or prior involvement with the species. A field visit to the natural site and other progeny plots along Cressy Creek where the species occurs was conducted on March 4, 2020 by the Service and USFS, to evaluate species' current conditions and discuss potential management and monitoring activities. This review summarizes and evaluates past and current conservation efforts, current threats, and scientific research and surveys related to the species. All pertinent literature and documents on file at VAFO were used for this review.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review: 84 FR 46562-46563; 9/4/2019

1.3.2 Listing history

Original Listing

FR notice: 43 FR 17910-17916

Date listed: April 26, 1978

Entity listed: species

Classification: endangered

Revised Listing, if applicable

FR notice: 59 FR 59173-59177

Date listed: November 16, 1994

Entity listed: species

Classification: threatened

1.3.3 Associated rulemakings: None

1.3.4 Review History: The 1990 Revised Recovery Plan includes an assessment of the species status (Service 1990). In 2006, the Service conducted the first 5-year review for this species (Service 2006), followed by a second 5-year review in 2012 (Service 2012). Both reviews concluded that no change in status was necessary.

1.3.5 Species' Recovery Priority Number at start of 5-year review: 14
This designation corresponds to a species experiencing a low degree of threat and a high recovery potential.

1.3.6 Recovery Plan or Outline

Name of plan or outline: Virginia Round-Leaf Birch Recovery Plan

Date issued: September 24, 1990

Dates of previous revisions, if applicable: March 1982 and September 1985

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Virginia round-leaf birch is a plant; therefore, it is not covered by the DPS policy.

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes, the species has an approved plan containing objective, measurable criteria.

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

Yes. No new information on the biology of the species or its habitat that should be reflected in the criteria has become available since the 1990 recovery plan.

2.2.3 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 recovery objective for *B. uber* is to delist the species by increasing the number of individuals in the wild and meeting the following condition: “establishment of 10 self-sustaining populations, defined on the basis of having each produced through natural regeneration 500-1,000 individuals > 2 meters tall. The populations may include individuals of sweet birch (*Betula lenta*) which carry the round-leaf trait in a cryptic (heterozygous) state.”

This criterion has not been met. Based on the above definition for self-sustaining populations, there currently are no self-sustaining populations of *B. uber*. New recruitment has not been documented at any of the plots in which the species occurs since the 5-year review from 2012.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species’ biology and life history:

No new information has become available since the 5-year review from 2012.

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

The Virginia round-leaf birch is known from a single natural population, which contains individuals that were originally rediscovered in the wild in 1975 (Service 1990). This population, contained within a fenced plot on USFS land for its protection, has dwindled in the last 15 years, from 8 extant individuals reported in 2006 (Service 2006) to 1 individual in 2017 (Bresowar 2020). Additional individuals of *B. uber* occur at this location, but are not considered to be natural since they were planted as part of recovery efforts. In addition to the natural population, 20 progeny plots containing planted greenhouse-grown individuals were established on USFS land in the 1980s, to help recover the species. Progeny plots have been periodically monitored by USFS staff, to ensure that they are not damaged by active timber sales occurring in adjacent lands (T. Blevins, USFS, email to A. Irizarry, Service, February 3, 2020). A full inventory of the species has not been conducted since 2008, when a

total of 926 individuals of round-leaf birch were reported for all 20 progeny plots (USFS 2008). While the number of extant individuals has not been systematically assessed since 2008, populations informally visited by USFS appear to be stable (T. Blevins, USFS, email to A. Irizarry, Service, February 3, 2020). In addition to the natural population and progeny plots, there is 1 individual located at the Mount Rogers National Recreation Area office yard. Other natural trees are likely to occur on private land, however, the status of those individuals remains unknown (T. Blevins, USFS, email to A. Irizarry, Service, February 19, 2020). The 5-year review from 2012 (Service 2012) indicated the single natural population had been declining due to presumed natural mortality and lack of reproduction. Since then, no seedlings or evidence of reproduction have been observed either at the natural population site or any of the progeny plots. To restore favorable conditions for natural reproduction, all progeny plots require vegetative management. *B. uber* produces abundant seeds every 3-4 years (known as a mast year) and requires exposed mineral soil and forest openings to establish itself. Natural reproduction is expected to occur when one of these mast years coincide with suitable habitat availability, an event that seems to be rare.

In summary, the natural population has seen a major decline, from 11 trees in 1990 (Service 1990), to 8 in 2006 (Service 2006), and only 1 in 2017 (Bresowar 2020). Of the total plants known to occur in the wild (including progeny plots and fenced plot containing the natural population), only 1 is truly natural. The last formal report on the progeny plots in 2008 showed a 37.5% decline in total seedlings planted that included both, round-leaf and sweet birch individuals (USFS 2008). However, informal visits conducted by USFS staff (T. Blevins, USFS, email to A. Irizarry, Service, February 3, 2020) indicate that those populations appear to be stable. These populations require vegetative management to attain optimal conditions for reproductive success and ultimately procure species' recovery. Understory management activities and monitoring for seed production should be assessed and included as a short-term priority for species' recovery. There is currently little to no information available on the status of the species in private lands. Efforts to account for individuals on private lands and assess their status can help to elucidate overall species abundance and population trends.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

Debate continues regarding whether *B. uber* is a species or a variety of *B. lenta*. A study conducted in 2017 used Amplified Fragment Length Polymorphism (AFLP) data to compare individuals of *B. uber*, *B. lenta*, and *B. alleghaniensis* within progeny plots and nearby wild populations in an effort to increase understanding of evolutionary relationships between

closely related individuals of *Betula* sp. The scope of this project was to evaluate species-level genetic similarity for geographically proximate populations of *Betula* sp. in the Cressy Creek watershed (Bresowar 2020). According to their results, *B. uber* displayed greater similarity to *B. alleghaniensis* than to *B. lenta*, despite the prevailing hypothesis that *B. uber* is a morphological variant of *B. lenta* (Bresowar 2020). This work does not present sufficient evidence to fully resolve the species' taxonomic level. Additional sampling or follow-up work has not occurred.

2.3.1.4 Taxonomic classification or changes in nomenclature:

There have been no changes to the taxonomic classification or nomenclature since last review. As stated in previous 5-year reviews (Service 2006, 2012), "Available information indicates that, despite some taxonomic ambiguity, *Betula uber* (Ashe) Fernald can be considered a valid entity regarding its listing under the ESA. Ashe, who discovered the species in 1914, believed it was a variety of the common sweet birch, and he named it *Betula lenta* L. var. *uber* Ashe in 1918. Fernald, after reviewing herbaria specimens, elevated it to species status in 1945 as *Betula uber* (Ashe) Fernald. Some botanists believe it is most likely a variety. Feret submitted a paper to a scientific, peer-review journal, but it was rejected for lack of scientific rigor (Ogle 2003); unfortunately, Feret died before he could resubmit the manuscript. While it is possible that the Virginia round-leaf birch is a striking Mendelian variant with a homozygous recessive gene for round leaves, there is no scientific evidence to support the hypothesis. Sweet birches are common where the round-leaf birch grows, and they have reproduced since 1981-1982 without producing new round-leaf birches. If the round-leaf birch were a homozygous recessive of the sweet birch, one would have expected some new round-leaf birches produced since 1982. On the other hand, no scientific studies have clearly validated the species. The Virginia round-leaf birch appears very close to the line between variety and species. Without definitive evidence warranting a change, the plant's status as a species should be retained."

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

No change since the 5-year review from 2012. As stated in previous 5-year reviews (Service 2006, 2012) "The current natural population site is the only site the species is ever believed to have been found (botanists believe Ashe mistakenly identified an adjacent creek in his 1918 paper). The tree may thus have always been rare. There is very little other historical evidence regarding distribution. After a few records from 1914, the species was believed extirpated until it was rediscovered in 1975 by Ogle (Ogle 2003). Most recovery work occurred between 1977 and 1995, during which time 20 populations were created on USFS lands. By 1995,

the species no longer appeared to be on the brink of extinction (thus, it was reclassified to threatened), and botanists were largely waiting for a natural reproduction event.”

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

No change since the 5-year review from 2012. As stated in previous 5-year reviews (Service 2006, 2012), “All plants occur along a 700-meter stretch of highly disturbed stream bank surrounded by agricultural land. This riparian forest occurs along Cressy Creek in Smyth County, Virginia.”

2.3.1.7 Other: None

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

The purpose of a 5-year review is to recommend whether a listed taxon continues to warrant protection under the ESA and, if so, whether it should be reclassified (from threatened to endangered or from endangered to threatened). This task requires that the analysis of the threats to the species be performed while assuming that the species is not receiving the regulatory protections, funding, recognition, and other benefits of ESA listing. Summaries of ongoing applications of ESA protections may shed light on some future activities that constitute threats to the species. However, the analysis under Factor D (Inadequacy of Existing Regulatory Mechanisms) focuses on the availability of existing alternative (i.e., non-ESA) mechanisms to address the continuing and foreseeable threats.

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range: The existence of the progeny plots alleviated concerns of extinction for *B. uber*. Some of these progeny plots have become overgrown and require appropriate management to preserve suitable habitat and conditions for seed set. The species’ habitat is not being destroyed; however, it is becoming curtailed by surrounding vegetation, particularly Mountain laurel (*Kalmia latifolia*) and Eastern white pine (*Pinus strobus*). Managing the understory in these plots is crucial to maintain suitable habitat and promote species regeneration. The need for commitments to understory management in the absence of ESA protections have not yet been assessed or assured.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes: There is currently no evidence to suggest that *B. uber* is being overutilized for commercial, recreational, scientific, or educational purposes. As stated in previous 5-year reviews (Service 2006, 2012) “Overcollection for cultivation and research was a problem until the 1990’s, when seeds that were germinated in captivity provided ample seedlings. In addition, providing propagated plants to the nursery trade created a supply of commercially available round-leaf birches that has virtually eliminated the demand for the wild plants.” Hence, this threat is likely to remain low even if ESA protections were removed.

2.3.2.3 Disease or predation: No signs of disease have been observed in this species. As mentioned in previous 5-year reviews (Service 2006, 2012), “Disease is not a threat, but herbivory by deer, rabbits, mice, and domestic livestock has been a problem. Cages placed around seedlings have proven effective in reducing herbivory”. In the event of reproduction occurring within progeny plots, caging seedlings could be essential to ensure long-term survival of new individuals; however, no long-term commitments have been assured.

2.3.2.4 Inadequacy of existing regulatory mechanisms: *Betula uber* has been listed as an endangered species by the Commonwealth of Virginia since 1979, under the Endangered Plant and Insect Species Act of the Code of Virginia (Title 3.2, Chapter 10). This law protects listed plant and insect species from take in the form of collection or translocation, except by the landowner, unless landowner permission and a state permit are obtained. However, the Act does not regulate destruction or alteration of habitat. The Virginia Wildlife Action Plan (VDGIF 2015) identifies important conservation actions that would provide a greater diversity of habitats capable of supporting species in need of greater conservation within mixed hardwood and conifer forests habitat on public lands in Virginia.

Actions to conserve these habitats in the George Washington and Jefferson National Forests would provide some protection for *B. uber* habitat, regardless of the species’ Federal ESA listing status. Moreover, the species falls under the rare community prescription described on the Jefferson National Forests Land and Resource Management Plan (USFS 2004), which allows for periodic population status monitoring and progress towards recovery. However, the plan does not present additional information on management activities or detailed actions to protect the species. The George Washington National Forest and the Jefferson National Forest were administratively combined in 1995, and encompass the Mount Rogers National Recreational Area, which contains the single natural population of *B. uber*. This population is contained within a fenced plot, which prevents visitors from trespassing and collecting or harming plants. Adequacy of these measures and commitments for their implementation in the absence of ESA listing has not yet been fully assessed.

Individuals occurring on private land would have limited protection under ESA or state endangered species laws, however, there is no information available on the occurrence of individuals outside of USFS lands (T. Blevins, USFS, email to A. Irizarry, Service, February 19, 2020).

2.3.2.5 Other natural or manmade factors affecting its continued existence: No change since the 5-year review from 2012.

2.4 Synthesis

The progeny plots on USFS land have played a key role in the recovery of *B. uber*, allowing the species time and opportunity to persist. To continue to serve that purpose, progeny plots that have become overgrown with surrounding vegetation require appropriate land management. Specifically, competing vegetation should be cleared from around birch individuals, to enhance the potential for natural regeneration. Known populations (including progeny plots and the natural population site), have not been surveyed in sufficient detail since the last formal report in 2008 to provide an updated number of extant individuals. This report showed a 37.5% decline in the original 1,920 seedlings planted in the progeny plots, which included round-leaf and sweet birch individuals as well (USFS 2008). Recent informal visits conducted by USFS staff (T. Blevins, USFS, email to A. Irizarry, Service, February 3, 2020) indicate that those populations appear to be stable. Assessing the current population status is essential for the recovery of the species, thus conducting a formal survey of the population, including progeny plots, natural population plot, and private lands, should be a top priority. Only 1 tree is considered to be natural, even though there are additional young individuals within the natural population site. Though natural reproduction continues to be exceedingly rare, we expect numbers of *B. uber* would increase following management activities coupled with a few years of abundant seed production. To assure that this occurs, a plan to formally monitor seed production along with developing a formal plan for timely management, should be implemented within a reasonable timeframe.

When the recovery plan was completed in 1990, vandalism was identified as one of the main threats to the species' persistence. Vandalism and related human activities are no longer significant threats, likely due to propagation of round-leaf birches which eliminated the demand for wild plants.

3.0 RESULTS

3.1 Recommended Classification:

 X **No change is needed**

3.2 New Recovery Priority Number: 8. This designation corresponds to a species experiencing a moderate degree of threat and a high recovery potential. Elevation of threat magnitude from low to moderate reflects apparent rarity of natural seed production and current lack of plans for management actions needed to promote successful reproduction.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- 1) Develop and implement short-term management activities that improve the potential for natural reproduction in the progeny plots and natural population plot. Specifically, competing vegetation should be cleared from all plots in which the species occurs.
- 2) The Service should continue to work with USFS to identify further management actions that expose mineral soil to create appropriate conditions for seed set.
- 3) Conduct additional studies to improve understanding of the species' current reproduction conditions and reasons for apparent low-reproductive rates.
- 4) Perform an inventory of the species within the natural population plot and the 20 progeny plots. Surveys are needed to update current population size and to monitor population trends over time, seed production, and evidence of reproduction within the plots.
- 5) Conduct additional genetic analyses to clarify whether the birch is a species or a variety.
- 6) Develop and implement a plan to assess the status of the species on private lands.

5.0 REFERENCES

- Bresowar, G.E. 2020. Report of research activities and findings: AFLP analysis of populations of *Betula uber*, *Betula lenta*, and *Betula allegheniensis* at Jefferson National Forest, USFS. Emory and Henry College, Emory, VA.
- Ogle, D.W. 2003. Status assessment of the Virginia Round-Leaf Birch, *Betula uber* (Ashe) Fernald, with recommendations for delisting. Glade Spring, VA. 13 p.
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- U.S. Forest Service. 2008. Virginia Round-Leaf Birch inventory data. Mount Rogers Recreational Area, Marion, VA.
- Virginia Department of Game and Inland Fisheries. 2015. Virginia State Wildlife Action Plan. Accessed July 2020. <http://bewildvirginia.org/wildlife-action-plan/pdf/2015-Virginia-Wildlife-Action-Plan.pdf>.

**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of VIRGINIA ROUND-LEAF BIRCH**

Current Classification: Threatened

Recommendation resulting from the 5-Year Review:

 X No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: 8

Review Conducted By: Amarilys Irizarry, Fish and Wildlife Biologist, Virginia Field Office

REGIONAL OFFICE APPROVAL:

Assistant Regional Director, Fish and Wildlife Service

Approve _____ Date _____