Interim Core Map Documentation for Virginia Round-Leaf Birch (*Betula uber*)

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Species Summary

The Virginia round-leaf birch (*Betula uber*; Entity ID #644) is an endangered terrestrial plant. There is no designated critical habitat for this species. This species inhabits a 700-meter stretch of highly disturbed stream bank along Cressy Creek in Smyth County, Virginia. The Virginia round-leafed birch is both wind pollinated and seed dispersed. Though capable of sprouting, it relies on sexual reproduction with other individuals. Additional information is provided in **Appendix 1**. This species is currently included in the Herbicide Strategy.

Description of Core Map

The core map for the Virginia round-leaf birch is based on species range, which includes a 700 m stretch of land along the stream bank of Cressy Creek in Smyth County, Virginia. The species range is highly refined no individual in the population is more than 30m away from Cressy Creek. There is only a single tree that makes up its natural population and 20 progeny plots, planted by the U.S. Fish and Wildlife Service (FWS) as recovery efforts, that make up 926 trees. They are all located within the range. There is no designated critical habitat. **Figure 1** depicts the interim core map for the Virginia round-leaf birch. The core map represents approximately 154 acres spread out along Cressy Creek in Smyth County, in Virginia.

The Virginia round-leaf birch occupies soils that have little profile development and are classifies as stony colluvium. They are flaggy, strongly acid, and exhibit rapid permeability. Soil profiles generally consist of sandy loam material with variable concentrations of gravels, cobbles, and boulders. Landcover categories within the core map are included in Table 1.

The core map developed for the Virginia round-leaf birch is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Virginia round-leaf birch. This core map incorporates information developed by FWS and made available to the public; however, the core map has not been formally reviewed by FWS. This interim core map may be revised in the future to incorporate expert feedback from FWS. This interim core map has an "none" (1) best professional classification because it consists of the species' range without additions or subtractions, and the species is located throughout its range. There is confidence in the core map because the species' range is highly refined, represents areas important for this species' conservation, and contains the one natural population and the 20 progeny plots of this species.

This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

Figure 1. Interim core map for the Virginia Round Leaf Birch

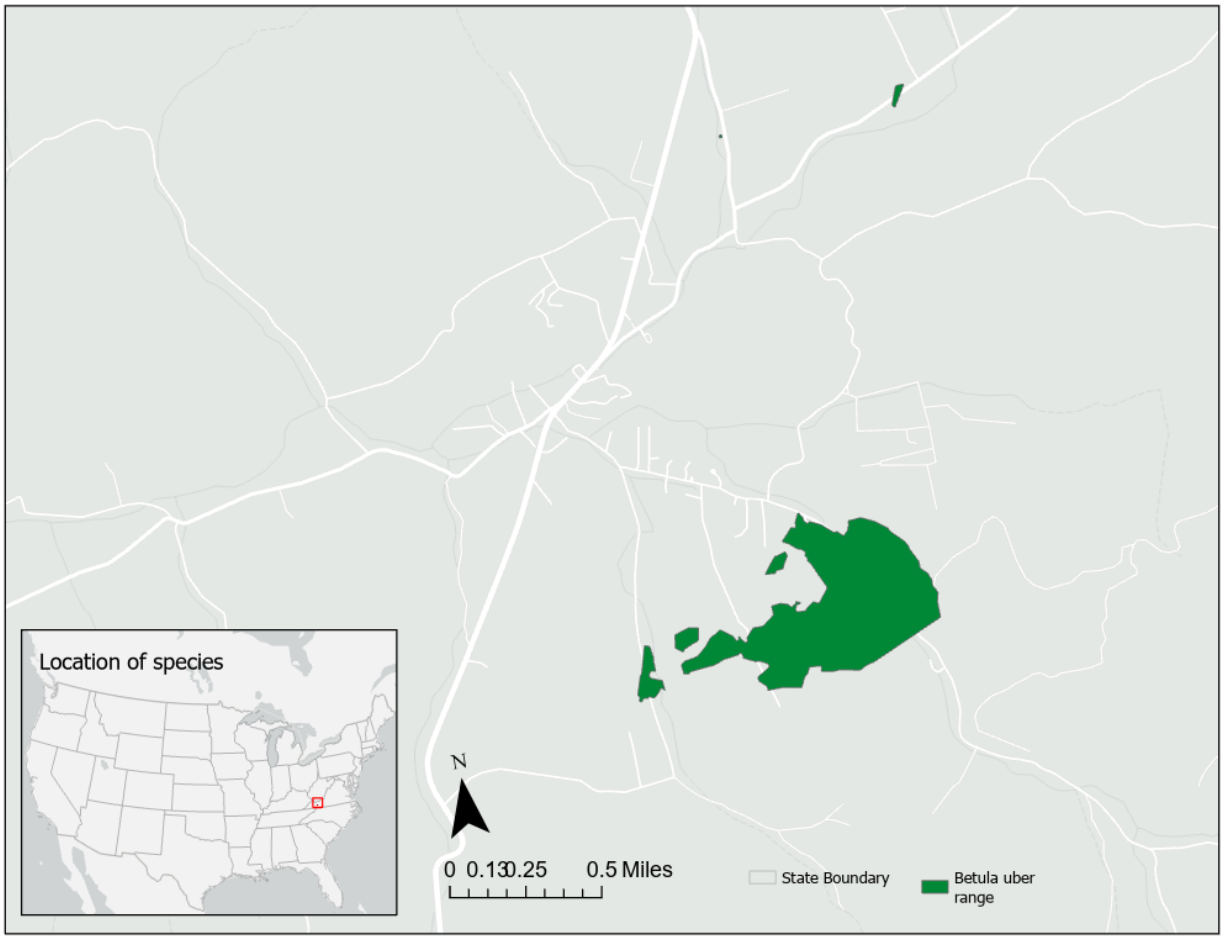

Table 1. Percentage of Interim Core Map Represented by NLCD2 Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover	% of core map represented by example pesticide use
Forestry	Deciduous Forest (41)	16%	26%
Forestry	Evergreen Forest (42)	10%	26%
Agriculture	Pasture/Hay (81)	60%	60%
Mosquito adulticide, residential	Open space, Developed (21)	10%	13%
Mosquito adulticide, residential	Developed, Low intensity (22)	3%	13%
Invasive species control	Woody Wetlands (90)	2%	2%
Total Acres	Interim Core Map Acres	154 Acres	

Evaluation of Known Location Information

There are four datasets with known location information for this species:

- Descriptions of locations provided by FWS;
- Occurrence locations included in iNaturalist;
- Occurrence locations included in the Global Biodiversity Information Facility (GBIF); and
- Occurrence locations included in NatureServe.

EPA evaluated these four sets of data to inform or support the core map. FWS provided the most refined descriptions of the occurrence information and confirmed that all known locations of extant populations are located within the range. iNaturalist has 7 research grade observations, which are consistent with the species range, all of them occurring near Cressy Creek in Virginia. GBIF's occurrence data consisted of a single occurrence that had also been accounted for in iNaturalist. NatureServe included a single documented area that was consistent with the location of the species range. **Appendix 1** includes more information on the available known location information.

Approach Used to Create Core Map

The core map was developed using the "Process EPA Uses to Develop Core Maps for Draft Pesticide Use Limitation Areas for Species Listed by the U.S. Fish & Wildlife Service (FWS) and their Designated Critical Habitats[3]" (referred to as "the process"). This core map was developed by EPA using the 4 steps described in the process document:

1. Compile available information for a species;
2. Identify core map type;
3. Develop the core map for the species; and
4. Document the core map.

For Step 1, EPA compiled available information for the Virginia round-leaf birch from FWS, as well as observation information available from various publicly available sources (including iNaturalist, GBIF, and NatureServe). The information compiled for the Virginia round-leaf birch is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- The species range is highly refined
- There is one natural population and 20 progeny plots that were planted in FWS documentation, all of which are within the species' range
- Occurrence data from other sources are generally consistent with the species range location

For Step 2, EPA used the compiled information to identify the core map type. EPA compared known location data to the range and found that these known locations are consistent with the species range. Based on the narrow range that includes all occurrence data identified by FWS, EPA selected the range to use as the species core map. For step 3, EPA used the ECOS species range for the Virginia round-leaf birch.

Discussion of Approaches and Data that were Considered but not Included in Core Map

Alternative approaches and data were not considered in the development of this interim core map.

Appendix 1. Information Compiled for Species During Step 1

1. **Recent FWS Documents**
   - Virginia round-leaf birch Recovery Plan (1990)
   - ETWP; Reclassification of the Virginia Round-Leaf Birch (Betula uber) From Endangered to Threatened (1994)
   - Virginia round-leaf birch (Betula uber) 5-Year Review (2006)
   - Virginia round-leaf birch (Betula uber) 5-Year Review (2013)
   - Virginia round-leaf birch (Betula uber) 5-Year Review (2020)
2. **Background Information on Species**
   - **Status:** Federally listed as threatened in 1994 (5-Year Review 2006)
   - **Taxonomy:** FWS identifies the Virginia round-leaf birch as a flowering plant belonging to the Betulaceae (Birch) family (https://www.fws.gov/species/virginia-round-leaf-birch-betula-uber) .
   - **Resiliency:** Low
     - "The 5-year review from 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. *B. uber* produces abundant seeds every 3-4 years (known as mast year) and requires exposed mineral soil and forests 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 (5-Year Review 2020)."
   - **Redundancy:** Low
     - "The current natural population site is the only site the species is ever believed to have been found. The tree may thus have always been rare. Other natural trees are likely to occur on private lands, however, the status of those individuals remains unknown (5-Year Review 2006 & 2020)."
   - **Representation:** Low
     - "The Virginia round-leaf birch is known from a single natural population, which contains individuals that were originally rediscovered in the wild in 1975. This population has dwindled in the last 15 years, from 8 extant individuals reported in 2006 to 1 individual in 2017. 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. 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 (5-Year Review 2020)."
   - **Habitat Description:**
     - "The adult segment of the natural population is almost entirely within the part of the floodplain of Cressy Creek which receives coarse alluvial deposits almost annually (Recovery Plan 1990)."

- "No individuals in the round-leaf birch population are more than 30m from the present streambed of Cressy Creek (Recovery Plan 1990)."
- "Soils have little profile development and are classified locally as stony colluvium. They are very flaggy, strongly acid, and exhibit rapid permeability. Soil profiles generally consist of sandy loam material with variable concentrations of gravels, cobbles, and boulders (Recovery Plan 1990)."
- "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 (5-Year Review 2020)."

- **Pollinator/Reproduction:**
  - "This species is both wind pollinated and seed dispersed. Though capable of sprouting, it relies on sexual reproduction with other individuals. Like most wind pollinated tree species, 90% of the pollen is deposited within 100 meters of the father plant. Two thirds of the seeds fall within 30 meters of the mother plant, and less than 5% are dispersed more than 100 meters (Recovery Plan 1990)."
  - "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 (5-Year Review 2020)."
- **Relevant Pesticide Use Sites (Recovery Plan 2018):**
  - "The slower growth of birches in the outside rows in each plot, compared to trees in the interior positions, led to the decision in late 1987 to remove competing vegetation from the forests bordering the 10 populations establishes in the 1984 and 1985. All stumps were injected with a systematic herbicide to prevent resprouting. The 10 remaining populations were similarly treated in 1988 and 1989 at the rate of five per year (Recovery Plan 1990)."
- **Threats:**
  - Vandalism and collection for scientific purposes are responsible for the loss of 10 of the original 41 individuals in the population, while vandalism alone accounts for an additional loss of 30 seedlings originating from the planned disturbance in 1981. Private landowner A transplanted three seedlings on his property from their natural habitat to his yard. One of the trees on Forest Service land was inadvertently cut back to near ground level during normal maintenance of a transmission corridor prior to any knowledge that round-leaf birch occurred in the area. Likewise, routine road maintenance may have accounted for the loss of several additional seedlings (Recovery Plan 1990).
- **Recovery Criteria/Objectives (1990 Recovery Plan):**
  - "Manage existing individuals and habitat for maintenance and expansion of the single wild population."
    - "Provide immediate protection for existing habitat."
    - "Monitor individuals for general condition and incidence of disease and insect infestations."
    - "Expand zone of management adjacent to existing."
    - "Consider purchase of private property should it become available."
    - "Determine essential habitat."

        - "Encourage natural regeneration."
    - "Retain existing germplasm through cultivation."
        - "Distribute propagated materials to public and private sectors."
        - "Establish pollen and seed banks."
    - "Determine the systematic relationships of round-leaf birch."
        - "Conduct morphological, anatomical, and chemical studies on existing individuals of round-leaf birch and closely related taxa."
        - "Conduct studies of the reproductive and genetic systems of round-leaf birch and closely related taxa."
    - "Establish and maintain additional natural populations."
        - "Establish several sites containing numerous genotypes."
        - "Maintain sites to reduce competition and retain vigor."
    - "Implement educational programs to facilitate management of round-leaf birch."
    - "Continue search for additional natural populations."
- **Recovery Actions (2020 5-Year Review):**
    - "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."
    - "The Service should continue to work with USFS to identify further management actions that expose mineral soil to create appropriate conditions for seed set."
    - "Conduct additional studies to improve understanding of the species' current reproduction conditions and reasons for apparent low-reproductive rates."
    - "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."
    - "Conduct additional genetic analyses to clarify whether the birch is a species or a variety."
    - "Develop and implement a plan to assess the status of the species on private lands."

3. **Description of Species Range**
    - "The single natural population of round-leaf birch is confined to a 700m stretch of highly disturbed, second-growth forest less than 100m wide along the banks of Cressy Creek, near the town of Sugar Grove, in Smyth County, Virginia.
    - "The current natural population site is the only site the species is ever believed to have been found. The tree may thus have always been rare, and it may even be speciating from the sweet birch. 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 (5-Year Review 2006).'
4. **Critical Habitat**
    - FWS has not designated a critical habitat for this species. (https://ecos.fws.gov/ecp/species/2736)

5. **Known Locations**
    - **Known Locations Described in FWS Documents**
        - "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 95-Year Review 2020)."

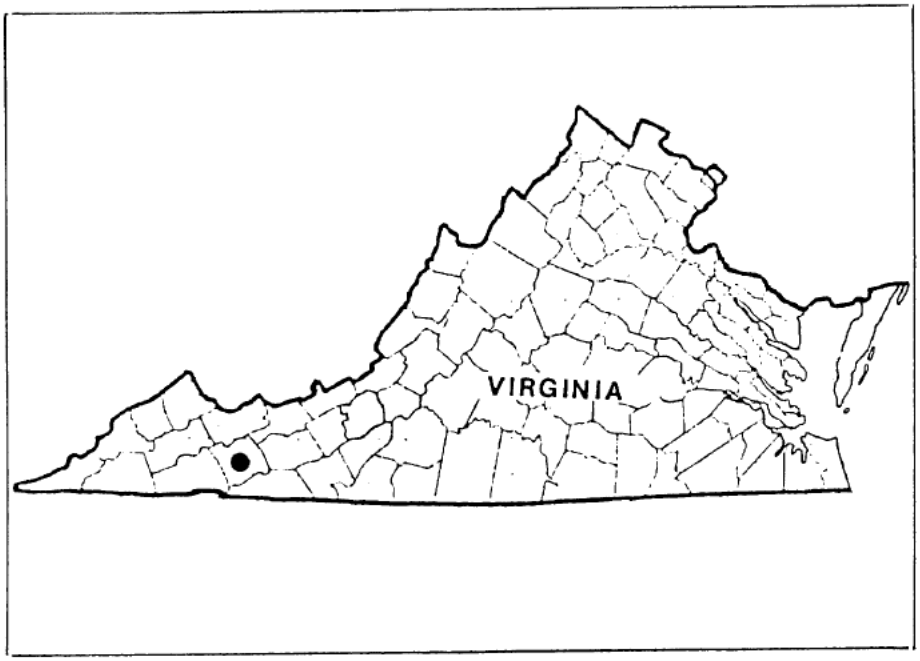

Figure 2. Location of Betula uber from the 1990 FWS Recovery Plan.

- **Occurrences Included in Public Databases**
    - EPA queried iNaturalist, GBIF, and NatureServe. Collectively, the occurrence data are consistent with the range identified by FWS (https://ecos.fws.gov/ecp/species/2736), with all the occurrences falling within the range.
    - iNaturalist (available here) had 7 research grade observations for this species. All 7 observations are within the range identified by FWS.
    - GBIF (available here) included 1 human observations (from 2010-2025). This observation is included in iNaturalist. The GBIF point is within the range identified by FWS.
    - Occurrence in NatureServe were consistent with other occurrence data (linked here) for 1 documented distribution.

Appendix 2. GIS Data Review and Method to Develop Core Map (Step 3)

This core map was created based on the species range. Based on FWS, the Virginia round-leaf birch (*Betula uber*) inhabits a 700m stretch of highly disturbed stream bank along Cressy Creek in Smyth County, Virginia. The species range is highly refined. No individual in the population is more than 30m away from Cressy Creek.

Dataset References and Software

- **ArcGIS Pro**
  - Software used: ArcGIS Pro 3.5.2

- **FWS Species Range**
  - From ECOS (https://ecos.fws.gov/ecp/species/2736)
  - Last updated on 03/03/2022