

BILLING CODE 4310-65-M

**50 CFR Part 17**

RIN 1018-AB23

**Endangered and Threatened Wildlife and Plants; "Arabis Serotina" (Shale Barren Rock Cress) Determined to be an Endangered Species****AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

**SUMMARY:** The Service determines a plant, *Arabis serotina* (shale barren rock cress) to be an endangered species. It is found only in western Virginia and eastern West Virginia. Presently, 26 populations, totaling fewer than 1,000 reproductive individuals, are known. Many populations are adversely affected by deer browsing, construction and maintenance of roads and railroads, and livestock grazing. Several populations occur on Federal lands in the Monongahela and George Washington National Forests. This listing implements the protection provided by the Endangered Species Act of 1973, as amended, for *Arabis serotina*. Critical habitat has not been determined.

**EFFECTIVE DATE:** August 14, 1989.

**ADDRESSES:** The complete file for this rule is available for inspection, by appointment, during normal business hours at the Ecological Services Field Office, Suite 322, 315 S. Allen Street, State College, Pennsylvania 16801.

**FOR FURTHER INFORMATION CONTACT:** Sharon W. Morgan, Fish and Wildlife Biologist (see ADDRESSES section) (814/234-4090).

**SUPPLEMENTARY INFORMATION:****Background**

Shale barren rock cress (*Arabis serotina* Steele), a member of the mustard family, is one of several plant species endemic to dry, exposed, mid-Appalachian habitats known as shale barrens (Keener 1983). These unique shale slopes of Paleozoic age are found in the Ridge and Valley Section of the Appalachian Mountains from Pennsylvania south to Virginia and West Virginia. Usually surrounded by deciduous forest woodlands, shale barrens are isolated islands of habitat characterized by steep southern exposures (generally greater than 20 degree slopes), relatively sparse vegetative cover, high temperatures and low moisture in the summer, and are usually undercut by a stream at the base (Keener 1983). Eighteen endemic plant taxa are recorded from the shale barrens, including *Arabis serotina* and three other Federal candidate plant species (*Allium Oxophilum*, *Taenidia montana*, *Trifolium virginicum*) (Keener 1983).

This species is biennial, with populations usually consisting of two age-classes: young, nonreproductive individuals present in basal rosette form; and second-year plants that are potentially reproductive individuals present in the form of erect, flowering plants lacking a basal rosette of leaves. Another component of populations is the seed bank, consisting of dormant, ungerminated seeds found either at the ground surface or buried in the soil. *A. serotina* may not be a strict biennial, meaning that rosettes may persist longer than one year, resulting in a delay of flowering and fruiting beyond the second year. Plants typically grow to a height of 30 to 60 cm. (one to two feet), with a spreading, compound inflorescence of many tiny whitish flowers, each approximately two to three mm. long (one-eighth inch).

Originally described by Edward Steele in 1911, the species has been

confused with the morphologically similar *Arabis laevigata* (Muhl.) Poir var. *burkii* Porter. Hopkins (1937) reduced *Arabis serotina* to synonymy under *Arabis laevigata* var. *burkii*. Both taxa occur on shale barrens, although the latter is not an endemic. Weiboldt (1987a, 1987b) has shown that *Arabis serotina* is distinguished from *Arabis laevigata* var. *burkii* by several key characteristics. *A. serotina* is taller with wider and more-branched inflorescences, and has smaller flowers and more narrowly winged seeds than *A. laevigata* var. *burkii*. There are also considerable differences between the flowering periods of the two taxa. All varieties of *A. laevigata*, including var. *burkii*, bloom in April and May and set seed before *Arabis serotina* begins to bloom in late June or early July. *Arabis serotina* continues to bloom into September (Wieboldt 1987b).

*Arabis serotina* is presently known from only 26 populations in five Virginia counties (Allegheny, Augusta, Bath, Highland and Rockbridge) and three West Virginia counties (Greenbrier, Hardy and Pendleton). An additional 1934 record from Shenandoah County, Virginia has not been relocated and is considered historic. The species has never been documented to be more widespread, and the reported distribution in seven West Virginia counties (Strausbaugh and Core 1978) was based on collections of *A. laevigata* var. *burkii* (Bartgis 1985). The species' highly restricted range appears to be a result of biogeographic events and not due to recent land-use changes or the lack of suitable habitat elsewhere. During 1983-85, a survey of 70 shale barrens in eight West Virginia counties resulted in only a few new populations (Bartgis 1985). Searches of 15-20 barrens in the range of *A. serotina* in Virginia revealed few additional populations (Mr. Lipford, Virginia Natural Heritage Program, pers. comm. 1988).

In both Virginia and West Virginia, all populations occur on Brallier Formation

shales on south- to southwest-facing slopes at elevations of 1300 to 2500 feet. Most of the known populations occur partially or completely in the George Washington and Monongahela National Forests.

Populations are fairly small at all 26 locations. Since plants in the rosette stage are inconspicuous and easily overlooked, most population counts refer to only flowering and/or fruiting plants. Approximately 130 reproductive plants were found at the 13 Virginia sites in 1987 (M. Lipford, pers. comm. 1987) and only about 700 reproductive individuals comprised the 13 West Virginia populations in 1985 (Bartgis in press). Although a few additional populations may be located in the future, the typically small population sizes suggest that the total number of individuals will remain small. In both states, most populations are moderately to severely browsed by deer. Rangewide, sites have been affected to some degree by road or railroad construction, small flood-control projects, and grazing by livestock.

The U.S. Fish and Wildlife Service (Service) recognized *Arabis serotina* as a Category 2 candidate for listing in the Supplement to Review of Plant Taxa for Listing as Endangered or Threatened Species published in the Federal Register on November 28, 1983 (48 FR 53641). Category 2 comprises those taxa for which listing is possibly appropriate but for which existing information is insufficient to support a proposed rule. The updated notice of review for plant taxa published on September 27, 1988 again included *Arabis serotina* in Category 2.

In 1985, the Service contracted with The Nature Conservancy's Eastern Regional Office to conduct status survey work on *Arabis serotina* and other Federal candidate species. Those reports (Bartgis 1985, Rawinski and Cassin 1986) documented a high degree of threat at most *Arabis serotina* sites and recommended immediate listing by the Service. This listing implements the protection provided by the Endangered Species Act of 1973 (16 U.S.C. *et seq.*) as amended, for *Arabis serotina*.

#### Summary of Comments and Recommendations

In the November 17, 1988 proposed rule and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper

notices were published in the Covington Virginian, the Daily News Leader (Staunton), the Pendleton Times, the Inter-Mountain and the Moorefield Examiner from November 22, 1988 through December 4, 1988. Ten comments were received, including letters from one Federal agency, one State agency, three colleges or universities, and five conservation organizations or individuals. Eight commentors supported listing, one acknowledged receipt of the proposal and the final commenter requested additional information. In addition, two of the commentors suggested that critical habitat be listed. The Service's reasons for not determining critical habitat for this species are stated below.

#### Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Arabis serotina* should be classified as an endangered species. Procedures found at section 4(a)(1) of the Endangered Species Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Arabis serotina* Steele (shale barren rock cress) are as follows:

##### A. The Present or Threatened Destruction, Modification or Curtailment of Its Habitat or Range

In West Virginia, five of the shale barrens supporting known populations of *Arabis serotina* have been partially destroyed by road construction and a sixth was affected by a small flood-control dam which degraded the habitat available for the species (Bartgis in press). In Virginia, three shale barrens supporting known *Arabis serotina* populations were partially destroyed by road construction, two were damaged by railroad construction, and one is crossed by a hiking trail (T. Wieboldt, Virginia Polytechnic Institute, pers. comm. 1987). The extent of the impacts of all these projects upon the *Arabis serotina* populations is unknown. Two of the West Virginia populations have been grazed by sheep or goats in the past. While no longer grazed by livestock, presently both sites have little vegetation, marked erosional features, and very few *Arabis serotina* individuals (Bartgis in press).

##### B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes

*Arabis serotina* is not known to be used for any commercial or recreational purpose. Because of its rarity, it may be subject to collection by botanists and curiosity seekers. Since most populations consist of 20 or fewer individuals, collection or vandalism at those sites could eliminate populations.

##### C. Disease or Predation

The larvae of the butterfly *Olympia marble* (*Euchloe olympia*) have been reported to feed on *Arabis serotina* (Clench and Opler 1983), but the report is believed erroneous. Timing of larval emergence suggests that they feed on *A. laevigata* var. *burkii* (Bartgis in press). White-tailed deer (*Odocoileus virginianus*) are known to heavily browse *Arabis serotina* populations.

As in many northeastern states, deer populations are increasing in both Virginia and West Virginia, resulting in greater browsing pressure on many herbaceous plants. In West Virginia, eight of eleven *A. serotina* populations surveyed in 1985 had been browsed by deer resulting in partial or complete loss of 15 percent to 70 percent (average 30 percent) of the inflorescences in those populations. For example, in an unusually large population of 124 plants only 47 plants successfully set seed (Bartgis in press). At three Virginia populations with only one or two reproductive individuals each, all were browsed in 1987 (M. Lipford pers. comm. 1987). Since the plant is a biennial inhabiting a stressful environment, such a significant loss of propagules in any given year could lead to lower reproductive success. As the median reproductive population size observed in West Virginia during 1985 was 17 plants, and in Virginia during 1987 was seven plants, any minor decreases in reproductive potential through grazing or other means could completely eliminate populations.

##### D. Inadequacy of Existing Regulatory Mechanisms

*Arabis serotina* is not currently protected by any state or local laws or regulations. Four populations in West Virginia and seven in Virginia occur in established National Forest Special Interest Areas (U.S. Dept. of Agriculture 1986a, 1986b). These areas are managed by the Forest Service to protect the habitat and species present. Some of these populations extend onto adjacent private land. Special Interest Areas (SIA) are not permanent designations and may be revoked by the

administering national forest. Although the SIA designation prevents habitat alteration, it does not provide protection from threats such as deer predation that may adversely affect these populations.

One West Virginia population occurs on a shale barren leased by The Nature Conservancy (TNC), and that organization is also securing voluntary protection of at least two additional populations. These voluntary agreements have no binding legal status. The ten populations on private land are not protected by any laws or regulations.

#### *E. Other Natural or Manmade Factors Affecting Its Continued Existence*

Shale barren communities are relatively long-term features of the landscape, but may gradually be replaced by woodlands through succession (Keener 1983). However this process is slow and is unlikely to affect more than a very few *Arabis serotina* populations in the near future.

*A. serotina* is the most sporadic and rarest of the shale barren endemics (Wieboldt in Rawinski and Cassin 1986) and recent surveys show that populations have declined in the past few years. In addition to predation by deer, populations have been adversely affected by severe droughts in 1987 and 1988. One Virginia shale barren supported 100 reproductive individuals in 1985, but in 1987 only nine were found. Another Virginia shale barren showed three individuals in 1984 but none was found in 1987 (M. Lipford, pers. comm. 1987). At one West Virginia barren which had 136 reproductive individuals in 1985, only 12 plants set fruit in 1987 (Bartgis in press).

Many biennial species typically exhibit fluctuations in population numbers from year to year; however, repeated loss of reproductive individuals several seasons in succession poses a serious threat to long-term survival of species. Low population numbers combined with continually decreasing contributions to the seed bank result in the species being particularly vulnerable to any natural or human-caused stresses. No attempt has been made to assess the size of the seed bank at any population. If present trends continue, the future of smaller populations will be highly uncertain.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by the species in determining to make this final rule. Based on this evaluation, the preferred action is to list *Arabis serotina* as endangered. Habitat degradation and loss of reproduction through grazing

pose severe problems to the continued existence of the species. Although 26 populations are known, 15 of these populations number 20 or fewer individuals, making the species particularly vulnerable to any threats. In addition, most of the available shale barren habitat for this species has been inventoried, making it unlikely that many new populations will be found.

#### **Critical Habitat**

Section 4(a) 3 of the Act requires, to the maximum extent prudent and determinable, that the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for *Arabis serotina*. Very small population sizes make this species particularly vulnerable to any vandalism or collecting. Since the plant occurs in unique, easily-identified habitats, publication of critical habitat maps may result in vandalism and collection by curiosity seekers. The Act prohibits taking of plants only in cases of (1) Removal and reduction to possession on lands under Federal jurisdiction, or malicious damage or destruction on such lands; (2) removal, cutting, digging up, or damaging or destroying plants in knowing violation of any State law or regulation, including State criminal trespass law. The Forest Service, The Nature Conservancy and landowners of major populations on private land have been informed of population locations and the importance of protecting the species' habitat. Listing will result in habitat protection through the recovery process and section 7 consultations. Therefore, it would not be prudent to determine critical habitat for *Arabis serotina*.

#### **Available Conservation Measures**

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate

their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402. Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

The U.S. Department of Agriculture, Forest Service partially or completely owns sixteen of the known *Arabis serotina* populations. Activities in these areas that may affect the species would require section 7 consultation.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 set forth a series of general trade prohibitions and exceptions that apply to all endangered plants. With respect to *Arabis serotina*, all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export, transport in interstate or foreign commerce in the course of a commercial activity, sell or offer for sale this species in interstate or foreign commerce, or to remove and reduce to possession the species from areas under Federal jurisdiction. In addition, for listed plants, the 1988 amendments (Pub. L. 100-478) to the Act prohibit the malicious damage or destruction on Federal Lands and the removal, cutting, digging up, or damaging or destroying of listed plants in knowing violation of any State law or regulation, including State criminal trespass law. Certain exceptions can apply to agents of the Service and State conservation agencies. The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered species under certain circumstances. It is anticipated that few trade permits would ever be sought or issued since the species is not common in cultivation or in the wild. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, P.O. Box 27329, Washington, DC 20038-7329 (202/343-4955).

**National Environmental Policy Act**

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

**References Cited**

Bartgis, R. 1985. Status surveys in West Virginia—Results and analysis of investigations of *Allium oxiphilum*, *Arabis serotina*, *Ptilimnium fluviatile*, and *Trifolium stoloniferum*. Unpublished report. West Virginia Field Office, The Nature Conservancy.  
 Bartgis, R. Inpress. Distribution and status of *Arabis serotina* (Brassicaceae) in West Virginia. Proc. W.V. Acad. Sci.  
 Clench, H.K., and P. Opler. 1983. Studies on Nearctic *Euchloe*. Part 8. Distribution, ecology, and variation of *Euchloe olympia* (Pieridae) populations. Ann. Carnegie Mus. 52:41-54.  
 Hopkins, M. 1937. *Arabis* in eastern and central North America. Rhodora 39:83-98, 106-184, 155-186.  
 Keener, C. 1983. Distribution and biohistory of the endemic flora of the mid-

Appalachian shale barrens. Bot. Rev. 49:65-115.  
 Rawinski, T., and J. Cassin. 1988. Final status survey for 32 plants. The Nature Conservancy unpublished report submitted to U.S. Fish and Wildlife Service, Newton Corner, Massachusetts.  
 Strausbaugh, P.D., and E.C. Core. 1978. Flora of West Virginia, 2nd edition. Seneca Books, Grantsville.  
 Steele, E.S. 1911. New and noteworthy plants from the eastern United States. Contr. U.S. Natl. Herb. 13:359-374.  
 U.S. Dept. of Agriculture. 1986a. Land and Resource Management Plan for the George Washington National Forest. U.S. Govt. Printing Office, Washington, D.C.  
 U.S. Dept. of Agriculture. 1986b. Land and Resource Management Plan for the Monongahela National Forest. U.S. Govt. Printing Office, Washington, D.C.  
 Wieboldt, T. 1987a. The shale barren endemic, *Arabis serotina* (Brassicaceae). (Abstract). Va. Acad. Sci. 37(2):86.  
 Wieboldt, T. 1987b. The shale barren endemic, *Arabis serotina* (Brassicaceae). Sida 12(2):381-389.

**Author**

The primary author of this rule is Sharon W. Morgan (see ADDRESSES section) using substantial information provided by Rodney L. Bartgis, West Virginia Department of Natural Resources.

**List of Subjects in 50 CFR Part 17**

Endangered and threatened wildlife, Fish, Marine mammals, Plants (agriculture).

**Regulation Promulgation**

**PART 17—[AMENDED]**

Accordingly, Part 17, Subchapter B of Chapter I, Title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation of Part 17 continues to read as follows:

**Authority:** Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 98 Stat. 1411; Pub. L. 100-478, 102 Stat. 2308; Pub. L. 100-653, 102 Stat. 3825 (16 U.S.C. 1531 et seq.); Pub. L. 99-625, 100 Stat. 3500 (1986), unless otherwise noted.

2. Amend § 17.12(h) for plants by adding the following, in alphabetical order under the Family Brassicaceae, to the List of Endangered and Threatened Plants:

**§ 17.12 Endangered and threatened plants.**

\* \* \* \* \*  
 (h) \* \* \*

Species		Historic Range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Brassicaceae—Mustard Family						
<i>Arabis serotina</i> .....	Shale barren rock cress.....	U.S.A. (VA, WV).....	E	352	NA	NA

Dated: June 12, 1989  
 Susan Recce Lamson,  
 Acting Assistant Secretary for Fish and Wildlife and Parks.  
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