

River basin, but they felt these projects would not adversely affect the mussel. Other Federal activities that could occur and impact the species include, but are not limited to, the carrying out or the issuance of permits for hydroelectric facility construction and operation, reservoir construction, stream alterations, wastewater facility development, pesticide registration, and road and bridge construction. However, it has been the experience of the Service that nearly all section 7 consultations can be resolved so that the species is protected and the project objectives are met.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect; or to attempt any of these), import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations

governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities.

In some instances permits may be issued for a specified time to relieve undue economic hardship that would be suffered if such relief were not available. This species is not in trade, and such permit request are not expected.

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

Anderson, R.M. 1990. Status survey of the Cumberland pigtoe pearly mussel (*Pleurobema gibberum*). Tennessee Cooperative Fishery Research Unit, Tennessee Technological University, Cookeville, Tennessee. Unpublished report. Submitted to the U.S. Fish and Wildlife Service, Asheville Field Office, Asheville, NC. 10 pp.
 Gordon, M.E., and J.B. Layzer. 1989. Mussels (BIVALVIA: UNIONOIDAE) of the

Cumberland River: Review of life histories and ecological relationships. U.S. Fish and Wild. Serv. Biol. Rep. 89(15). 99 pp.

Author

The primary author of this final rule is Richard G. Biggins (see "ADDRESSES" section) (704/259-0321 or FTS 672-0321).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h) by adding the following, in alphabetical order under CLAMS, to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *
 (h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
Clams:							
Mussel, Cumberland pigtoe	<i>Pleurobema gibberum</i>	U.S.A. (TN)	Entire	E	423	NA	NA

Dated: April 10, 1991.
 Richard N. Smith,
 Acting Director, Fish and Wildlife Service.
 [FR Doc. 91-10739 Filed 5-8-91; 8:45 am]
 BILLING CODE 4310-55-M

50 CFR Part 17

RIN 1018-AB42

Endangered and Threatened Wildlife and Plants; *Helianthus schweinitzii* (Schweinitz's Sunflower) Determined to be Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Service determines the plant *Helianthus schweinitzii* (Schweinitz's sunflower), a perennial herb limited to 13 populations in North Carolina and South Carolina, to be an endangered species under the authority of the Endangered Species Act (Act) of 1973, as amended. *Helianthus schweinitzii* is endangered by the loss of historic levels of natural disturbance from fire and grazing by native herbivores, residential and industrial development, mining, encroachment by exotic species, highway construction

and improvement, and roadside and utility right-of-way maintenance. This action implements Federal protection provided by the Act for *Helianthus schweinitzii*.

EFFECTIVE DATE: June 6, 1991.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, 100 Otis Street, room 224, Asheville, North Carolina 28801.

FOR FURTHER INFORMATION CONTACT: Ms. Nora Murdock at the above address (704/259-0321 or FTS 672-0321).

SUPPLEMENTARY INFORMATION:

Background

Helianthus schweinitzii, described by John Torrey and Asa Gray (1841) from material collected in North Carolina, is a rhizomatous perennial herb. This sunflower grows from 1 to 2 meters tall from a cluster of carrot-like tuberous roots; stems are usually solitary, branching only at or above mid-stem, with the branches held in candelabrum-style arches. The narrowly lanceolate opposite leaves are scabrous above, resin-dotted and loosely soft-white-hairy beneath, entire (or occasionally with a few small teeth), 18 centimeters long, and 2.5 centimeters wide. The yellow flowers are approximately 5.5 centimeters in diameter and are borne from September to frost in a rather open system of upwardly arching heads. The fruit of this species is a smooth, dark gray-brown achene approximately 5 millimeters long (Kral 1983, Radford *et al.* 1964, Cronquist 1980). Stems are often a deep red color. The leaves are opposite on the lower parts of the stems, usually becoming alternate on the upper parts. *Helianthus schweinitzii* can be easily confused with several other similar species, including the sympatric *H. laevigatus* and narrow-leaved extremes of *H. microcephalus*. However, the tuberous root system and relatively small heads of *H. schweinitzii*, as well as the rather narrowly lanceolate leaf, which is revolute (at least when dry) and rather densely pubescent and resin-dotted beneath, combine to distinguish *H. schweinitzii* from its similar relatives.

Helianthus schweinitzii is endemic to the piedmont of the Carolinas, where it is currently known from 10 locations in North Carolina and 5 in South Carolina. The species occurs in clearings and edges of upland woods on moist to dryish clays, clay-loams, or sandy clay-loams that often have a high gravel content and are moderately podzolized. Soils supporting this species are mainly of the Iredell series. Like most sunflowers, this species is a plant of full

sun or the light shade of open stands of oak-pine-hickory (Kral 1983). Natural fires as well as large herbivores, including elk and bison, are part of the history of the vegetation in this species' range. Many of the associated herbs are also cormophytic, sun-loving species which depend on periodic disturbances to reduce the shade and competition of woody plants (Kral 1983). The piedmont areas now occupied by remnant populations of *Helianthus schweinitzii* were characterized in early accounts (Brown 1953) as:

Where the woodlands came to an end, [and] the open prairies began. We are informed by early writers that the Blackjack lands of Chester and York [Counties, South Carolina] were once prairies with no growth of trees, and covered in many places with maiden cane * * * Through this country, with its magnificent woods and wide prairies, roam the buffalo and the deer in large numbers, the luxuriant grass lands also feed the elk * * * The * * * region [is] now thickly covered with Blackjack, but at that time [(during the American Revolution)], [it was] an open prairie, on which persons could be seen at a great distance. The patriots coming to visit their families always endeavored to pass over this plain by night, to avoid detection by the Tories.

Logan (1859) similarly described this same region as a prairie where "vast brakes of cane [stretched] in unbroken lines of evergreen for hundreds of miles * * *." Schweinitz's sunflower, like other prairie species, is dependant upon some form of disturbance to maintain the open quality of its habitat. Currently, artificial disturbance, such as power line and road right-of-way maintenance (where they are accomplished without herbicides and at a season that does not interfere with the reproductive cycle of this sunflower) are maintaining some of the openings historically provided by naturally occurring periodic fires and native grazing animals.

Twenty-one populations of *Helianthus schweinitzii* have been reported historically from 10 counties in North Carolina and South Carolina. Earlier reports of the species from Georgia and Alabama are now believed to have been in error (Robert Kral, Vanderbilt University, personal communication, 1988). Of the 13 remaining populations (located in York County, South Carolina, and Stanly, Cabarrus, Mecklenburg, Rowan, and Union Counties, North Carolina), 5 are within rights-of-way maintained by the North Carolina Department of Transportation, 2 are in rights-of-way maintained by the South Carolina Department of Highways and Public Transportation, 1 is on land managed by the Rock Hill, South Carolina, Department of Parks, Recreation, and Tourism, and the

remaining 5 are on privately owned lands usually in or near transmission line corridors of various utility companies. Extirpated populations are believed to have succumbed as a result of suppression of natural disturbance (fire and/or grazing), residential and industrial development, and highway construction and improvement. The continued existence of *Helianthus schweinitzii* is threatened by these activities, as well as by mining (part of one population exists near an active gravel quarry), herbicide use, and possibly by encroachment of exotic species.

Federal government actions on this species began with section 12 of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), which directed the Secretary of the Smithsonian Institution to prepare a report on those plants considered to be endangered, threatened, or extinct. This report, designated as House Document number 94-51, was presented to Congress on January 9, 1975. The Service published a notice in the July 1, 1975, **Federal Register** (40 FR 27832) of its acceptance of the report of the Smithsonian Institution as a petition within the context of section 4(c)(2) [now section 4(b)(3)] of the Act and of its intention thereby to review the status of the plant taxa named within.

On December 15, 1980, the Service published a revised notice of review for native plants in the **Federal Register** (45 FR 82480); *Helianthus schweinitzii* was included in that notice as a category 1 species. Category 1 species are those species for which the Service currently has on file substantial information on biological vulnerability and threats to support proposing to list them as endangered or threatened. Subsequent revisions of the 1980 notice have maintained *Helianthus schweinitzii* in category 1 until the February 21, 1990, publication of the revised notice of review for native plants in the **Federal Register** (55 FR 6184), in which this species' status changed to category 2 in recognition of the need for additional status surveys. Recent surveys have been conducted by Service and State personnel, and the Service now believes sufficient information exists to list *Helianthus schweinitzii* as endangered.

Section 4(b)(3)(B) of the Act, as amended in 1982, requires the Secretary to make certain findings on pending petitions within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires that all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. This was the

case of *Helianthus schweinitzii* because of the acceptance of the 1975 Smithsonian report as a petition. On October 13, 1983, and in October of each year thereafter, through 1989, the Service found that the petitioned listing of *Helianthus schweinitzii* was warranted but precluded by other listing actions of a higher priority and that additional data on vulnerability and threats were still being gathered. The July 2, 1990, proposal for *Helianthus schweinitzii* to be listed as endangered (55 FR 27270) constituted the final 12-month finding for this species.

Summary of Comments and Recommendations

In the July 2, 1990, 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 inviting public comment were published in the Charlotte Observer (North Carolina), the Rock Hill Herald (South Carolina), and the McMinnville Southern Standard (Tennessee) on July 14, 1990, July 21, 1990, and July 15, 1990, respectively.

Twenty-three comments were received, all of which express support for the proposal.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that *Helianthus schweinitzii* should be classified as an endangered species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) 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 *Helianthus schweinitzii* Torrey and Gray (Schweinitz' sunflower) are as follows:

A. The present or threatened destruction, modification, or curtailment of its habitat or range. *Helianthus schweinitzii* has been and continues to be endangered by destruction or adverse alteration of its habitat. Since discovery of this species, approximately one-third of the known populations have been extirpated, largely due to fire/ grazing suppression, and conversion of

the habitat for residential and industrial purposes. Fire suppression and absence of grazing by large native herbivores are a serious problem for this species and will be discussed in detail under Factor E below. At least 12 of the remaining 13 populations are currently threatened by habitat alterations (North Carolina Natural Heritage Program and South Carolina Heritage Trust Program, 1990).

Eight of these populations survive along roadsides, with an additional population being in a utility line right-of-way. Some of the roadside populations are also within utility line rights-of-way. Three others have been partially bulldozed in recent years. All of these populations are small, which increases their vulnerability to extirpation as a result of highway and right-of-way maintenance and improvement, particularly if herbicides are used. Significant declines have been noted within the last 3 years in six of the remaining populations, with decreases ranging from 9 to 89 percent. Since the publication of the proposed rule, two extant populations have been extirpated. During the past 3 years, increases in numbers of stems were noted at only three of the currently extant sites, ranging from 14 percent to 150 percent (the latter figure is from one unusually vigorous population located on a highly vulnerable site only a few feet from the edge of a paved highway). Four of the remaining populations are small, containing less than 40 plants each.

The limited geographic range and scarcity of seed sources, as well as appropriate habitat, increases the severity of the threats to *Helianthus schweinitzii*. As stated in the "Background" section above, this species requires some form of disturbance to maintain its open habitat and can withstand mowing a timber-harvesting operations, if done properly. It cannot withstand bulldozing or direct application of broadleaf herbicides. In addition, the small populations that survive on road edges could be easily destroyed by highway improvement projects or by right-of-way maintenance activities if these are not done in a manner consistent with protecting the species.

B. Overutilization for commercial, recreational, scientific, or educational purposes. *Helianthus schweinitzii*, although it is offered for sale by a few native plant nurseries, is not currently a significant component of the commercial trade in native plants. However, with its relatively showy flowers, the species has potential for horticultural use, and publicity could generate an increased demand which might exceed the

currently available sources of cultivated material. Because of the species' easily accessible populations, it is vulnerable to taking and vandalism that could result from increased specific publicity.

C. Disease or predation. Not applicable to this species at this time.

D. The inadequacy of existing regulatory mechanisms. *Helianthus schweinitzii* is afforded legal protection in North Carolina by North Carolina general statutes, § 106-202.122, 106-202.19 (CUN.SUP.1985), which provides for protection from interstate trade (without a permit) and for monitoring and management of State-listed species and prohibits taking of plants without written permission of landowners. *Helianthus schweinitzii* is listed in North Carolina as endangered. The species is recognized in South Carolina as "threatened and of national concern" by the South Carolina Advisory Committee on Rare, Threatened, and Endangered Plants in South Carolina; however, this State offers no official protection. The Endangered Species Act would provide additional protection and encouragement of active management for *Helianthus schweinitzii*.

E. Other natural or manmade factors affecting its continued existence. As mentioned in Factor A, many of the remaining populations are small in numbers of individual stems and in terms of area covered by the plants. Therefore, there may be low genetic variability within populations, making it more important to maintain as much habitat and as many of the remaining colonies as possible. Much remains unknown about the demographics and reproductive requirements of this species in the wild, although germination tests and cultivation experiments have been conducted at the North Carolina Botanical Garden in cooperation with the Center for Plant Conservation, The Garden Club of America, and the Fauquier-Loudoun Garden Club of Virginia. A few commercial nurseries specializing in native plants are currently propagating this species and are offering cultivated specimens for sale.

In the absence of uncontrolled natural fires and grazing of the large, free-roaming herbivores now extirpated from the area, controlled burning or some other suitable form of disturbance, such as well-timed mowing or careful clearing, is essential to maintaining the prairie remnants occupied by *Helianthus schweinitzii*. Without such periodic disturbance, this type of habitat is gradually overtaken and eliminated by shrubs and trees of the adjacent woodlands. As the woody species

increase in height and density, they overtop *Helianthus schweinitzii*, which, like most other sunflowers, is shade intolerant. The current distribution of the species is ample evidence of its dependence on disturbance. Of the 15 remaining populations, 11 are in roadside or power line rights-of-way.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list *Helianthus schweinitzii* as endangered. With one-third of the species' populations already having been eliminated and only 13 remaining in existence, and based upon its dependence on some form of active management, it clearly warrants protection under the Act. Endangered status seems appropriate because of the imminent serious threats facing those populations. As stated by Kral (1983),

The problem is that, this being a very localized species, * * * seed sources are usually * * * destroyed [thereby preventing recolonization of bulldozed or otherwise severely disturbed sites]; therefore large tracts of the former range of *H. schweinitzii* now lack it [the species].

Critical habitat is not being designated for the reasons discussed below.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time the species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not presently prudent for *Helianthus schweinitzii*. As discussed in Factor B in the "Summary of Factors Affecting the Species," *Helianthus schweinitzii* is threatened by taking, an activity difficult to enforce and only regulated by the Act with respect to plants in cases of (1) removal and reduction to possession of endangered plants from lands under Federal jurisdiction, or their malicious damage or destruction on such lands; and (2) removal, cutting, digging up, or damaging or destroying endangered plants in knowing violation of any State law or regulation, including State criminal trespass law. Because such provisions are difficult to enforce, publication of critical habitat descriptions and maps would make *Helianthus schweinitzii* more vulnerable and would increase enforcement problems. All involved parties and principal landowners have been notified of the location and importance of protecting this species' habitat. Protection of this species'

habitat will be addressed through the recovery process and through the section 7 consultation process. Therefore, it would not now be prudent to determine critical habitat for *Helianthus schweinitzii*.

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.

Federal activities that could impact *Helianthus schweinitzii* and its habitat in the future include, but are not limited to, the following: Utility right-of-way construction, maintenance, and improvements; highway construction, maintenance, and improvement; and permits for mineral exploration and mining. The Service will work with the involved agencies to secure protection and proper management of *Helianthus schweinitzii* while accommodating agency activities to the extent possible.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 set forth a series of general prohibitions and exceptions that apply to all endangered plants. With respect to *Helianthus schweinitzii*, 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 endangered 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, damaging or destroying of endangered plants in knowing violation of any State law or regulation, including State criminal trespass law. Certain exceptions 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 will be sought or issued because the species is not common in cultivation or in the wild. Requests for copies of the regulations on listed plants and inquiries regarding prohibitions and permits may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, room 432, Arlington, Virginia 22203 (703/358-2104).

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

A complete list of all references cited herein, as well as others, is available upon request from the Asheville Field Office (see "ADDRESSES" section).

Author

The primary author of this final rule is Ms. Nora Murdock (see "ADDRESSES" section) (704/259-0321 or FTS 672-0321).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

FART 17—[AMENDED]

(1) The authority citation for 50 CFR part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

(2) Amend § 17.12(h) by adding the following, in alphabetical order under the family Asteraceae, 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					
Asteraceae—Aster family:						
<i>Helianthus schweinitzii</i>	Schweinitz's sunflower.....	U.S.A. (NC, SC).....	E	424	NA	NA

Dated: April 10, 1991.
Richard N. Smith,
Acting Director, Fish and Wildlife Service.
[FR Doc. 91-10740 Filed 5-6-91; 8:45 am]
BILLING CODE 4310-55-M

50 CFR Part 17
RIN 1018-AB52

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for *Scirpus ancistrochaetus* (Northeastern Bulrush)

AGENCY: Fish and Wildlife Service, Interior.
ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service determines *Scirpus ancistrochaetus* Schuyler (Northeastern bulrush), a perennial herb of the sedge family (Cyperaceae) to be an endangered species pursuant to the Endangered Species Act of 1973 (Act), as amended. Thirteen extant populations of *Scirpus ancistrochaetus* are found in open shallow ponds, wet depressions, and marshes in Virginia, West Virginia, Maryland, Pennsylvania, Massachusetts, and Vermont; the species is also known historically from New York. Eight of the thirteen extant populations are extremely small, each having less than 70 flowering culms. The species is threatened by habitat loss and modification through residential, agricultural and recreational development. This listing implements protection and recovery provisions afforded by the Act to *Scirpus ancistrochaetus*. Critical habitat has not been determined.

EFFECTIVE DATE: June 6, 1991.
ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business

hours at the New England Field Office, U.S. Fish and Wildlife Service, 22 Bridge St., Concord, New Hampshire 03301.
FOR FURTHER INFORMATION CONTACT: Susanna L. von Oettingen at the above address (telephone: 603/225-1411 or FTS 834-4411).

SUPPLEMENTARY INFORMATION:

Background

Scirpus ancistrochaetus (Northeastern bulrush), a perennial member of the sedge family (Cyperaceae), was described as a new species by A.E. Schuyler in 1962. Though *Scirpus ancistrochaetus* is closely related to *Scirpus atrovirens* Willd. and *Scirpus hattorianus* Mak., Kartesz and Kartesz (1980) also acknowledged *S. ancistrochaetus* as a distinct species. The Northeastern bulrush is a tall, leafy plant, generally 80 to 120 cm (30 to 47 inches) in height. Flowering culms (stems) are produced from short, woody, underground rhizomes. The lower leaves are 40 to 60 times as long as wide; the uppermost leaves are 30 to 50 times as long as wide (Schuyler 1962). A distinctive field characteristics that aids in separating this species from other bulrushes is the arching rays of the inflorescence. The flowers have six, small, rigid perianth bristles each covered to the base with thick-walled, sharply pointed barbs projecting downward. The yellow-brown achenes (fruits) are mostly ovate, and thickened and tough at the top. *S. ancistrochaetus* flowers from mid-June to July, and sets fruit between July and September (Crow 1982).

The reproductive mechanism of *S. ancistrochaetus* is not clearly understood. It appears to most often reproduce vegetatively, with new plants developing from the nodes and culms of recumbent stems. The absence of isolated individuals suggests that sexual recruitment may not be occurring

(Bartgis, Maryland Natural Heritage Program, pers. comm., 1990). Seeds of *S. ancistrochaetus* can be easily germinated *in vitro*, an experimental evidence indicates that seeds will remain viable for many years (W. Brumback, New England Wildflower Society, Inc., *in litt.*, 1991; A Schuyler, Academy of Natural Sciences of Philadelphia, *in litt.*, 1991).

Schuyler (1963, 1967) investigated the relationship between *Scirpus ancistrochaetus* and two closely related species, *S. atrovirens* and *S. hattorianus* and observed that *S. ancistrochaetus* will hybridize with both species, generally producing a sterile hybrid. When in its vegetative form, *S. atrovirens* is very similar in appearance to *S. ancistrochaetus*, while hybrids between these two species are morphologically intermediate, both in vegetative and reproductive forms. The ancestral relationship of *Scirpus ancistrochaetus* to *S. atrovirens*, as well as its scarcity and scattered occurrence in isolated wetlands in areas where the flora has been well researched, suggests that *S. ancistrochaetus* is a relict species (Schuyler, pers. comm., 1990).

The Northeastern bulrush is found at the unshaded water's edge of acidic to circumneutral natural ponds, wet depressions or shallow sinkholes. The ponds are often clustered and separated by a few hundred feet or yards. *S. ancistrochaetus* may be found in one or more ponds within a wetland complex, though rarely, if ever, occurring in all of the ponds. These wetlands, generally less than one acre in size, appear to occur primarily in low-lying areas in hilly country (Schuyler 1962) and have seasonally variable water levels, ranging from inundation to desiccation (Rawinski 1990). The ponds and depressions where *S. ancistrochaetus* may be found are considered unusual habitats, especially in the southern