

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for *Trifolium Stoloniferum* (Running Buffalo Clover)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Service determines *Trifolium stoloniferum* (running buffalo clover) to be an endangered species. This clover ranged from eastern Kansas to West Virginia until perhaps the mid-1800's and was apparently abundant in certain locations. Presently, only a single extant population of *T. stoloniferum* is known. This occurs on private land in Fayette County, West Virginia, and consists of only four individuals. This species is clearly endangered by its rarity alone; threats include trampling or other inadvertent destruction by humans or other animals, crushing by off-road vehicles, and competition with weedy species. This determination implements the protection provided by the Endangered Species Act of 1973, as amended, for *Trifolium stoloniferum*.

DATES: The effective date of this rule is July 6, 1987.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the Annapolis Field Office, U.S. Fish and Wildlife Service, 1825B Virginia Street, Annapolis, Maryland 21401.

FOR FURTHER INFORMATION CONTACT: Ms. Judy Jacobs at the above address (301/269-6324).

SUPPLEMENTARY INFORMATION:**Background**

The running buffalo clover (*Trifolium stoloniferum*) is a member of the Fabaceae (pea family), native to the eastern United States. This short-lived perennial forms long runners from its base. The flowerheads are terminal and large, up to an inch in diameter. Flowers are white, tinged with purple. Flowering normally occurs from mid-April to June and fruits (seed heads) are present into July.

Trifolium stoloniferum was originally named by Henry Muhlenberg in 1813; however, the name was invalid, since it was published without a description. The name was validated by Amos Eaton in his "Manual of Botany for the Northern and Middle States," published in 1818.

Trifolium stoloniferum is morphologically similar to the native buffalo clover *T. reflexum*, but as the name implies, the former species has a stoloniferous habit, while the latter does not. *T. stoloniferum* has also been considered very similar to the stoloniferous introduced species *Trifolium repens*; however, the former has a chromosome number of $n=16$, while the number for *T. repens* is $n=32$ (N. Taylor, University of Kentucky, pers. comm.). A detailed character analysis by Brooks (1983) reveals further morphological differences among these three species.

Documented specimens of *Trifolium stoloniferum* are available from the States of Illinois, Indiana, Kansas, Kentucky, Missouri, Ohio, and West Virginia, indicating the original range of this plant (Brooks 1983). A record from Arkansas is believed to be based on an introduction (R. Brooks pers. comm.). A recent review of historical accounts indicates that before the arrival of white settlers, this species was abundant in several areas of the Ohio Valley and adjacent regions, and may have been a local dominant within the "bluegrass region" of Kentucky (Campbell 1985). Running buffalo clover was apparently adapted to rich soils in "relatively stable ecotones, with continual, moderately intense disturbance," between open forest and pastures or prairies (Campbell 1985). Campbell speculates that the vegetation of these areas was likely maintained by "buffalo" (*Bison bison bison*). After the extirpation of the buffalo from the East, the abundance of *T. stoloniferum* apparently decreased. Brooks (1983) indicates that by the late 19th century, populations of running buffalo clover were, "limited and widely scattered. . . . Shortly thereafter . . . the number of collections dwindled rapidly, with a mere five sites documented after 1900." Brooks field-checked all the documented locations as well as other likely habitat for *T. stoloniferum* in Missouri, and Kansas, without finding any extant populations (R. Brooks pers. comm.). Extensive field work in Kentucky has also revealed no extant populations of *T. stoloniferum* (J. Campbell pers. comm.). The plant is also believed to be extirpated in Illinois, Indiana, Missouri, and Ohio (pers. comm. with State Heritage Programs). Based on this information and his conversations with field botanists, Brooks (1983) concluded that *T. stoloniferum* was possibly extinct.

In 1983 and 1984, two small populations of running buffalo clover were discovered in West Virginia (Bartgis 1985). One of these, a relocation

of the most recent historical record (Webster County 1940), occurred at the margin of a mowed field and in 1984 contained only four plants. During field inspections in 1985 and 1986, these plants could not be relocated. Therefore this population is likely extirpated. The remaining population, located along an off-road-vehicle trail adjacent to the New River in Fayette County, contained 18 plants in the fall of 1985. Repeated disturbances in the spring and summer of 1986 (most likely by motor vehicles) decreased the population to its present level of four plants. This population occurs within the area of an existing hydropower project licensed by the Federal Energy Regulatory Commission. At present, *T. stoloniferum* is not directly impacted by any operational aspect of the hydropower facility. The landowner has blocked the road and is committed to continued protection of the clover. Live shoots from the Fayette County population were sent to the University of Kentucky (UK) and West Virginia University (WVU) greenhouses. The plants at UK have been vegetatively propagated, and those over-wintering outside have produced viable seeds (N. Taylor pers. comm.). Some of these propagules will soon be ready for reintroduction to sites within the clover's original range. At WVU, clover tissues have been cultured to produce more plants. *T. stoloniferum* apparently responds well to this technique (B. Baker, West Virginia University, pers. comm.), which may be important to the species' recovery.

Trifolium stoloniferum was first recognized by the Service in the Federal Register notice of review published on November 28, 1983 (48 FR 53641). That notice, which covered plants being considered for classification as endangered or threatened, included *Trifolium stoloniferum* in category 2*. Category 2 comprises those taxa for which proposed listing is possibly appropriate but for which conclusive data on biological vulnerability are not currently available to support a proposed rule. The asterisk (*) indicates taxa that are possibly extinct. The Service was informed of the extant populations of this species in December 1984. On March 10, 1986, the Service proposed endangered status for this species (51 FR 8217).

Summary of Comments and Recommendations

In the March 10, 1986, proposed rule (51 FR 8217) 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. A newspaper notice that invited public comment was published in the *Charleston Gazette* on April 12, 1986. Nine comments were received and are discussed below.

Letters supporting the listing were received from the West Virginia Department of Natural Resources, Ohio Department of Natural Resources, Dr. Ralph Brooks of the Kansas Biological Survey, Indiana Department of Natural Resources, Federal Energy Regulatory Commission, and The Nature Conservancy. The proposal received further letters of support from two researchers at the University of Kentucky. One of these letters, from Dr. Julian Campbell, supplied some comments and additional information on threats, which have been incorporated into this final rule.

Finally, a letter was received from the law firm representing the landowner corporation, commenting on this listing as it relates to FERC relicensing. On June 13, a meeting was held in Newton Corner, Massachusetts, to discuss concerns raised in this letter. These will not be discussed in detail here, since they relate primarily to the relicensing, rather than to this listing. All of the corporation's concerns relative to the listing were addressed at the meeting; it now fully supports the listing and has been extremely cooperative in protecting the clover population on its land.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the running buffalo clover should be classified as endangered. Section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations promulgated to implement the listing provisions of the Act (codified at 50 CFR Part 424) 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 *Trifolium stoloniferum* are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* It is difficult to determine the original extent and abundance of running buffalo clover, since elimination of the natural ground cover within its range began during the 1790's, before *T. stoloniferum* was even

described, and long before the area was adequately botanized. By 1850, native vegetation of the Kentucky bluegrass region had been largely replaced by pasture plants, including bluegrass (*Poa pratensis*) and introduced white clover (*Trifolium repens*) (Campbell 1985). Therefore, we must rely on early, nontechnical accounts, such as those summarized by Campbell (1985) to infer the original extent of running buffalo clover. Quotations from early observers in the Kentucky bluegrass region indicate at least localized abundance: "rich soil . . . adorned with great patches of fine white clover" (Ranck 1901, *re* 1775), "covered with clover in full bloom" (Walker 1924, *re* 1775), "a turf of white clover" (Henderson 1775) "an abundance of wild rye, clover and buffalo grass covering vast tracts of country" (Filson 1784) (all quoted in Campbell 1985). Campbell argues that many of these and other early accounts referred to *Trifolium stoloniferum*, the only clover known to have been native to the region. White clover (*Trifolium repens*) was introduced and began to spread shortly after settlement, and apparently running buffalo clover began to decline at about the same time. By the late 1800's, when the majority of collections were made, the species was known only from localized, widely scattered localities. Today, *T. stoloniferum* is believed to be extirpated throughout its range, with the exception of the one population in West Virginia.

The precise reasons for this striking decline are unclear. It is likely that running buffalo clover was to some extent dependent on the buffalo for soil enrichment, periodic intense disturbance and seed dispersal (Campbell 1985, Larson 1940, Reynolds *et al.* 1982). In this regard it is interesting that the Webster County, West Virginia population was in the immediate vicinity of the last recorded site for buffalo in the State, and all other West Virginia records are in the immediate vicinity of known buffalo trails (Bartgis 1985). Other factors contributing to the species' demise could include clearing of its habitat for pasture and agriculture, competition with introduced species, and other habitat changes resulting from the industrial revolution (Brooks 1983), and possibly, diseases introduced with non-native clovers (see below).

B. *Overutilization for commercial, recreational, scientific or educational purposes.* Running buffalo clover is not known to be used for any commercial or recreational purpose. Because of its rarity, it is subject to collection by botanists and/or curiosity seekers. Given the fact that only four individuals of this species are known to exist in the

wild, any collection would be over-collection. The species could also be eliminated in the wild by a single act of vandalism.

C. *Disease or predation.* Dr. Julian Campbell (*pers. comm.*) has observed that *T. stoloniferum* is highly palatable to herbivores, apparently having evolved no chemical defenses, unlike white clover, which has cyanide in its leaves. Campbell has noted heavy slug damage to some of his plants and cited an incident of rabbit depredation on another plant. Some greenhouse plants at UK have recently succumbed to a viral or virus-like disease, possibly transmitted from white clover (*Trifolium repens*). Susceptibility to this or other recently introduced diseases may have contributed to the species' decline (N. Taylor *pers. comm.*), and must be studied with regard to the species' recovery.

D. *Inadequacy of existing regulatory mechanisms.* The extant population of *T. stoloniferum* presently receives no protection under any Federal, State or local law or regulation, other than the protection afforded by its proposed endangered status under the Endangered Species Act.

E. *Other natural or manmade factors affecting its continued existence.* As stated above, the Fayette County population of running buffalo clover is located immediately adjacent to an off-road-vehicle path that provides the only public access to a 10-mile stretch of the New River. Due to its location, the population is extremely vulnerable to being run over, trampled, covered by trash or killed by petroleum or other pollutants. Closing the road has alleviated the potential for these impacts to some extent, but the recent population declines underscore the precarious nature of the present situation.

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 the running buffalo clover as endangered. The Act defines an endangered species as "any species which is in danger of extinction throughout all or a significant portion of its range." This definition is most appropriate for *Trifolium stoloniferum* at this time. The reasons for not designating critical habitat are 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 any habitat of a species which is considered to be critical habitat at the time the species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for *Trifolium stoloniferum*, because its very restricted distribution makes it vulnerable to extinction from taking. Public access to published habitat descriptions and precise maps would almost certainly result in collection or vandalism, which would be fatal for this species in the wild. Therefore, it would not be prudent to determine critical habitat for *Trifolium stoloniferum*.

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. Such actions are initiated by the Service following listing. The protection required of Federal agencies and the prohibitions against taking 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 listed as endangered or threatened and with respect to its critical habitat if any is designated. Regulations implementing this interagency cooperation provision of the Act, published on June 3, 1986 (51 FR 19926), 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 consultation with the Service. The Federal Energy

Regulatory Commission (FERC) has licensing authority for the project area on which the Fayette County population of *T. stoloniferum* occurs. The existing project does not directly impact *T. stoloniferum*; however, any future project developments possible impacting this species would require section 7 consultation to ensure protection for this species and its habitat.

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 plant species. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export any endangered plant, transport it in interstate or foreign commerce in the course of a commercial activity, sell it or offer it for sale in interstate or foreign commerce, or remove it from an area under Federal jurisdiction and reduce it to possession. 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. With regard to *T. stoloniferum*, it is anticipated that few permits will ever be sought or issued since the species is not common in cultivation or in the wild, and is not presently known to occur on Federal land. Any populations re-established on Federal lands would be carefully monitored by authorized personnel. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Federal Wildlife Permit Office, U.S. Fish and Wildlife Service, Washington, DC 20240 (703/235-1903).

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).

Literature Cited

Bartsis, R. 1985. Rediscovery of *Trifolium stoloniferum* Muhl. ex A. Eaton. *Rhodora* 87: 425-429.
 Brooks, R.E. 1983. *Trifolium stoloniferum*, Running Buffalo Clover: Description, Distribution and Current Status. *Rhodora* 85: 343-354.
 Campbell, J.J.N. 1985. The land of Cane and Clover: Pre-settlement Vegetation in the So-called Bluegrass Region of Kentucky. Unpubl. ms., Herbarium, University of Kentucky, Lexington, March, 1985.
 Larson, F. 1940. The Role of the Bison in Maintaining the Shortgrass Plains. *Ecology* 21: 113-121.
 Reynolds, H.W., R.D. Glaholt and A.W.L. Hawley. 1982. Bison, pp. 972-1007 In: J.A. Chapman and C.A. Feldhamer [eds.], *Wild Mammals of North America*. Baltimore: The Johns Hopkins University Press, 1147 pp.

Author

The primary author of this final rules is Judy Jacobs, Endangered Species Staff, U.S. Fish and Wildlife Service, 1825B Virginia Street, Annapolis, Maryland 21401 (301/269-6324 or FTS 922-4197).

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 for Part 17 reads 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, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*)

2. Amend 17.12(h) by adding the following, in alphabetical order under the family Fabaceae, 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					
Fabaceae—Pea family:						
<i>Trifolium stoloniferum</i>	Running buffalo clover	U.S.A. (IL, IN, KS, KY, MO, OH, WV)	E	7/0	NA	NA

Dated: May 27, 1987.

Susan Recce.

*Acting Assistant Secretary for Fish and
Wildlife and Parks.*

[FR Doc. 87-12877 Filed 6-4-87; 8:45 am]

BILLING CODE 4310-55-M