

source of food for the spider (Coyle 1981, Harp 1992).

Males of the species mature during September and October, and females are known to lay eggs in June. The egg sac is thin-walled and nearly transparent, and it may contain seven to nine eggs. The female remains with the egg sac and, if disturbed, will carry the egg sac with her fangs. Spiderlings emerge in September (Coyle 1981). The means of dispersal of the spiderlings from the parental moss mat is not known. "Ballooning," a process by which the spiders use a sheet of silk played out into the wind to carry them into the air, has been suggested as a possible means of long-range dispersal (Harp 1992), but the species' high sensitivity to desiccation would likely preclude this dispersal method (Harp, personal communication, 1994). The life span of the species is also unknown, but Coyle (1981) estimated that it may take 3 years for the species to reach maturity.

Previous Federal Activity

From 1989 through 1992, status surveys were conducted for the spruce-fir moss spider (Harp 1991, 1992). Based on the results of these surveys, the spider is presently known to exist at only four locations—three sites in North Carolina and one in Tennessee. Of the four remaining populations, only one appears to be relatively stable. This population is located along the Avery/Caldwell County line in North Carolina. The other two populations in North Carolina are located in Swain County. Both of the Swain County populations are extremely small with only one spruce-fir moss spider having been found at each of these two sites in recent years (Harp 1991, 1992). The forests at the two Swain County sites are rapidly declining. The Tennessee population is located in Sevier County. This population was considered healthy in 1989 but is currently believed to be declining in numbers and is endangered by habitat loss/alteration (Harp 1992). The high-elevation spruce-fir forests throughout much of the species' historic range are being decimated by the balsam wooly adelgid (*Adelges piceae*)—an exotic insect pest—and possibly by air pollution (acid precipitation) and other factors not yet fully understood. The death and thinning of the forest canopy results in locally drastic changes in microclimate including increased temperatures and decreased moisture leading to desiccation of the moss mats on which the spruce-fir moss spider, and possibly its prey base, depend for survival.

In absence of status information, the spruce-fir moss spider was not included

in the Service's notice of review for animal candidates that was published in the **Federal Register** of November 21, 1991 (56 FR 58804). However, subsequent surveys of both historic and potential habitat of the species indicate that the spruce-fir moss spider is undergoing a rapid decline in distribution. Presently only one relatively stable population is known to survive and, while currently considered to be healthy, this population is threatened by the same factors that are believed to have resulted in the extirpation and/or decline of the species elsewhere within its historic range. Accordingly, on August 30, 1993, the Service approved the spruce-fir moss spider as a category 1 candidate. Category 1 represents those species for which the Service has enough substantial information on biological vulnerability and threats to support proposals to list them as endangered or threatened species.

The Service has met and been in contact with various Federal and State agency personnel and private individuals knowledgeable about the species concerning the species' status and the need for the protection provided by the Act. On December 31, 1992, the Service notified appropriate Federal, State, and local government agencies, landowners, and individuals knowledgeable about this or similar species, in writing, that a status review was being conducted and that the species might be proposed for Federal listing. A total of 10 written comments were received. The National Park Service, the North Carolina Division of Parks and Recreation, and three private individuals (including the owner of the site containing the Avery/Caldwell County, North Carolina, population) expressed strong support for the potential listing of the spruce-fir moss spider as an endangered species. The U.S. Soil Conservation Service, Tennessee Wildlife Resources Agency, Tennessee Department of Environment and Conservation, Tennessee Valley Authority, and the North Carolina Department of Agriculture stated that they had no new or additional information on the species or threats to its continued existence. No negative comments were received.

On January 27, 1994, the Service published in the **Federal Register** (59 FR 3825) a proposal to list the spruce-fir moss spider as an endangered species. That proposal provided information on the species' biology, status, and threats to its continued existence.

Summary of Comments and Recommendations

In the January 27, 1994, spruce-fir moss spider proposed rule and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to development of a final rule. Appropriate Federal and State agencies, county governments, scientific organizations, individuals knowledgeable about the species or its habitat, and other interested parties were contacted and requested to comment. A legal notice, which invited general public comment, was published in the following newspapers: the "Avery Journal," Newland, North Carolina, February 10, 1994; the "Lenoir News-Topic," Lenoir, North Carolina, February 10, 1994; the "Watauga Democrat," Boone, North Carolina, February 16, 1994; the "Smoky Mountains Times," Bryson City, North Carolina, February 10, 1994; and the "Mountain Press," Sevierville, Tennessee, February 11, 1994.

All written comments received during the comment period are covered in the following discussion.

Ten written responses to the proposed rule were received. The National Park Service, North Carolina Wildlife Resources Commission, North Carolina Division of Parks and Recreation, and three private individuals expressed strong support for the listing of the spruce-fir moss spider as endangered. One of these responses received from a private individual identified errors in the proposed rule concerning the size range of spruce-fir moss spider, and the likely age at which sexual maturity is reached by the species. Another of these respondents provided additional information concerning the status of the species. The Service has incorporated these corrections and additional information into this final rule.

Two responses were received from the Tennessee Valley Authority (TVA) and one from the U.S. Soil Conservation Service (SCS) that expressed neither support nor opposition to the listing. A response from the TVA, Regional Natural Heritage Project, and the response from the SCS stated they had no additional information concerning the spruce-fir moss spider. A response received from the TVA Land Management, while stating that they did not oppose listing of the spider, expressed concern about the lack of peer reviewed information presented in the proposed rule (concerning the spruce-fir moss spider and role of atmospheric pollution as factor in decline of its habitat), stating that the proposal relied