Dated: November 25, 1997.

Director, Fish and Wildlife Service,

Jamie Rappaport Clark,

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AE38

Endangered and Threatened Wildlife and Plants; Proposed Rule to List the Flatwoods Salamander as Threatened

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule and notice of petition finding.

SUMMARY: The U.S. Fish and Wildlife Service (Service) proposes to list the flatwoods salamander (*Ambystoma cingulatum*) as a threatened species under the authority of the Endangered Species Act of 1973, as amended (Act). This salamander occurs in isolated populations scattered across the lower southeastern Coastal Plain in Florida, Georgia, and South Carolina. Habitat loss and degradation from agriculture, urbanization, and silvicultural practices have resulted in the loss of over 80 percent of its pine flatwoods habitat. Surviving populations are currently threatened by the continued destruction and degradation of their habitat. This proposed rule, if made final, would extend the Act's protection to this species.

DATES: Comments from all interested parties must be received by February 17, 1998. Public hearing requests must be received by January 30, 1998.

ADDRESSES: Comments and materials concerning this proposal should be sent to the Field Supervisor, U.S. Fish and Wildlife Service, 6578 Dogwood View Parkway, Jackson, Mississippi 39213. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Ms. Linda LaClaire at the above address, or telephone 601/965–4900, Ext. 26; facsimile 601/965–4340.

SUPPLEMENTARY INFORMATION:

Background

The earliest reference to the flatwoods salamander, *Ambystoma cingulatum*, was by Cope in 1867 from specimens he collected in Jasper County, South Carolina (referenced in Martof 1968). This salamander is a member of the family Ambystomatidae, the mole salamanders, which contains 15 North American species. A phylogenetic analysis of ambystomatid salamanders was used to determine that the flatwoods salamander is most closely related to the ringed salamander (*A. annulatum*), which occurs in portions of Arkansas, Missouri, and Oklahoma (Shaffer *et al.* 1991).

The flatwoods salamander is a slender, small-headed mole salamander that rarely exceeds 13 centimeters (cm) (approximately 5 inches (in)) in length when fully mature (Means 1986, Conant and Collins 1991, Ashton 1992). Adult dorsal color ranges from black to chocolate-black with highly variable fine, light gray lines forming a netlike or cross-banded pattern across the back (Palis 1996). Undersurfaces are plain gray to black with a few creamy or pearl-gray blotches or spots. Sexual dimorphism is only apparent in breeding males (swollen cloacal region) or in gravid females. Adults most closely resemble Mabee's salamander, *A. mabeei*, with which it shares part of its range in South Carolina (Martof 1968). Mabee's salamanders are often more brownish; have light flecking concentrated on their sides rather than the overall pattern of the flatwoods salamander; and have a single row of jaw teeth as opposed to multiple rows in the flatwoods salamander (Conant and Collins 1991).

Flatwoods salamander larvae are long and slender, broad-headed and bushy-gilled, with white bellies and striped sides (Means 1986, Ashton 1992, Palis 1995d). They have distinctive color patterns, typically a tan mid-dorsal stripe followed by a grayish black dorsolateral stripe, a pale cream mid-lateral stripe, a blue-black lower lateral stripe and a pale yellow ventrolateral stripe (Palis 1995d). The head has a dark brown stripe passing through the eye from the nostril to the gills (Means 1986).

Optimum habitat for the flatwoods salamander is an open, mesic woodland of longleaf/slash pine (*Pinus palustris/P. elliottii*) flatwoods maintained by frequent fires. Pine flatwoods are typically flat, low-lying open woodlands that lie between the drier sandhill community upslope and wetlands down slope (Wolfe *et al.* 1988). An organic hardpan, 0.3 to 0.7 meters (m)(1 to 2 feet) into the soil profile, inhibits subsurface water penetration and results in moist soils with water often at or near the surface (Wolfe *et al.* 1988). Historically, longleaf pine generally dominated the flatwoods with slash pine restricted to the wetter areas (Wolfe *et al.* 1988). Wiregrasses (*Aristida* sp.), especially *A. beyrichiana*, are often the dominant grasses in the herbaceous ground cover (Wolfe *et al.* 1988). The ground cover supports a rich herbivorous invertebrate community which serves as a food source for the flatwoods salamander.

Adult and subadult flatwoods salamanders are fossorial (adapted for living underground) (Mount 1975). They enlarge crayfish burrows (Ashton 1992) or build their own. Captive flatwoods salamanders have been observed digging burrows and resting at night with just the tip of their heads exposed (Goin 1950). Preliminary data indicate that flatwoods salamander males first breed at 1 year of age and females at 2 years of age (Palis 1996). There are no data on survivorship by age class for the species. The longevity record for their close relative, *A. annulatum*, is 4 years, 11 months; however, many Ambystomatidae live 10 years or longer (Snider and Bowler 1992).

Adult flatwoods salamanders move to their wetland breeding sites during rainy weather, in association with cold fronts, from October to December (Palis 1997). Breeding sites are isolated (not connected to any other water body) pond cypress (*Taxodium ascendens*), blackgum (*Nyssa sylvatica* var. *biflora*), or slash pine dominated depressions which dry completely on a cyclic basis. They are generally shallow and relatively small. Breeding sites in Florida have a mean size of 1.49 hectares (ha) (3.68 acres (ac)) and a mean depth of less than 39.2 cm (15.4 in) (Palis, in press). These wetlands have a marsh-like appearance with sedges often growing throughout and wiregrasses (*Aristida* sp.), panic grasses (*Panicum* spp.), and other herbaceous species concentrated in the shallow water edges. Trees and shrubs grow both in and around the ponds. A relatively open canopy is necessary to maintain the herbaceous component which serves as cover for flatwoods salamander larvae and their aquatic invertebrate prey. Flatwoods salamander larvae were not captured in sample plots with a high proportion of detritus or open water in a study on the Apalachicola National Forest in Florida (Sekerak *et al.*, in press). Ponds typically have a burrowing crayfish fauna (genus *Procambarus*) and a diverse macroinvertebrate fauna, but lack large predatory fish (e.g., *Lepomis* (sunfish), *Macropterus* (bass), *Amia calva* (bowfin)).

Before the breeding sites become flooded, the males and females court and the females lay their eggs (singly or in clumps) beneath leaf litter, under logs

and sphagnum moss mats, or at bases of bushes, small trees, or clumps of grass (Anderson and Williamson 1976, Means 1986). Egg masses have also been found at the entrances of and within crayfish burrows (Anderson and Williamson 1976). Embryos begin development immediately, but the egg must be inundated before it will hatch. Depending on when eggs are inundated, the larvae usually metamorphose in March or April; the length of the larval period varies from 11 to 18 weeks (Palis 1995d).

The timing and frequency of rainfall is critical to the successful reproduction and recruitment of flatwoods salamanders. Fall rains are required to facilitate movements to the pond and winter rains are needed to ensure that ponds are filled sufficiently to allow hatching, development, and metamorphosis of larvae. In contrast, too much rainfall in the summer will keep pond levels from dropping below the grassy pond edge, as needed to provide dry substrate for egg deposition. This reliance on specific weather conditions results in unpredictable breeding events and reduces the likelihood that recruitment will occur every year.

Adult flatwoods salamanders leave the pond site after breeding. Studies have suggested a homing ability, based on data that salamanders exit the breeding pond near the point of their arrival (Palis 1997). Movements greater than 1,700 m (1,859 yards (yd)) from the breeding pond have been recorded (Ashton 1992). Preliminary studies indicate that the activity range of some individuals (encompassing both terrestrial habitat, breeding sites, and the areas through which they migrate) exceeds 1,500 square m (1,640 square yd) (Ashton 1992). Refugia are needed within this activity range as individuals travel from their breeding sites to the subterranean habitats where they spend the majority of their lives. Thus, a flatwoods salamander population has been defined as those salamanders using breeding sites within 3.2 kilometers (km) (2 miles (mi)) of each other, barring an impassable barrier such as a perennial stream (Palis, in press).

High quality habitat for the flatwoods salamander includes a number of isolated wetland breeding sites within a landscape of longleaf pine/slash pine flatwoods with an abundant herbaceous ground cover (Sekerak 1994). A mosaic of ponds with varying hydrologies is needed to provide appropriate breeding conditions under different climatic regimes.

The historical range of the flatwoods salamander included parts of the States of Alabama, Florida, Georgia, and South Carolina located in the lower Coastal Plain of the southeastern United States. A museum record from Mississippi previously thought to be a flatwoods salamander has been discounted by knowledgeable researchers (Moler, pers. comm., 1988). However, it is possible that flatwoods salamanders once occurred in extreme southeastern Mississippi due to similarities in habitat to historical sites in adjacent Alabama. Recent surveys (Kuss 1988; L. LaClaire, U.S. Fish and Wildlife Service, pers. obs., 1995) have not documented the occurrence of flatwoods salamanders in Mississippi.

Historical records for the flatwoods salamander are limited. Longleaf pine/slash pine flatwoods historically occurred in a broad band across the lower southeastern Coastal Plain. The flatwoods salamander likely occurred in appropriate habitat throughout this area (Means, pers. comm., 1995). The present distribution of the flatwoods salamander consists of isolated populations scattered across the remaining longleaf pine/slash pine flatwoods. The Service has compiled 110 historical records for the flatwoods salamander. Historical records are defined as those localities found prior to 1990. Localities consist of collections made either by sampling breeding sites or collections made of individuals crossing highways on their way to or from breeding sites. During surveys of these localities over the last 7 years, the exact site was located for 52 records (47 percent) and the general area (within several miles) was determined for 45 others (41 percent). Thirteen sites could not be located due to limited information in the record. Of the 97 historical records that were visited, flatwoods salamanders were relocated at only 12 localities (12 percent).

Range-wide surveys of available habitat in Alabama, Florida, Georgia, and South Carolina have been ongoing since 1990 in an effort to locate new populations. A total of at least 1,189 wetlands, which had a minimum of marginal suitability for the flatwoods salamander, were sampled, most of them multiple times. Of these, flatwoods salamanders were found at 102 sites (9 percent success rate). Most surveys were presence/absence searches for larvae, thus no estimates of population size or viability can be inferred from these data.

Information on the current status of the flatwoods salamander by State can be briefly summarized as follows:

In Alabama, there are five historical localities for the flatwoods salamander, all in the extreme southern portion of the State. Surveys conducted from 1992 to 1995 at the historical breeding ponds and other potential breeding sites were not successful at locating any flatwoods salamander populations (Godwin 1994, pers. comm., 1997). The salamander was last observed in Alabama in 1981 (Jones *et al.* 1982).

A total of 33 historical records in 19 counties have been reported for Georgia (Goin 1950, Seyle 1994, Williamson and Moulis 1994); however, flatwoods salamanders have not been relocated at any of these sites in recent years. Surveys over the last 7 years of at least 451 wetlands with potential habitat for the flatwoods salamander have resulted in the location of 27 new breeding sites (6 percent success rate). These 27 breeding sites comprise 10 populations (sites within a 3.2 km (2 mi) radius of one another are considered the same population) (Seyle 1994; Jensen 1995; Moulis 1995a, 1995b; K. Lutz, The Nature Conservancy of Georgia, pers. comm., 1994; D. Stevenson, The Nature Conservancy of Georgia, pers. comm., 1996; L. LaClaire, pers. obs., 1995, 1997). Most extant breeding sites occur on Fort Stewart Military Installation.

In South Carolina, there are 29 historical records for the flatwoods salamander. Despite annual surveys since 1990, flatwoods salamanders have been found at only three of these sites (all sites represent a different population). One site is located on the Francis Marion National Forest and the other two are on private land. No new flatwoods salamander populations have been found, although surveys have been conducted at 57 additional wetlands considered to be potential habitat for this species.

In Florida, 39 of the 43 historical sites were relocated (or the general area thought to be the location). Nine (23 percent) contained flatwoods salamanders. Additional survey work over the past 7 years of at least 500 potential sites over a 22 county area resulted in the location of 75 new breeding sites (15 percent of total sites surveyed). The total number of extant flatwoods salamander populations known to occur in Florida is 34 with most occurring on the Apalachicola National Forest and Eglin Air Force Base (Palis 1993, 1994, 1995a, 1995b, 1995c; Printiss and Means 1996).

The combined State data from all survey work completed since 1990 indicate that 47 populations of flatwoods salamanders are known from across the historical range. Most of these occur in Florida (34 populations or 72 percent). Ten populations have been found in Georgia, three in South Carolina, and none have been found in Alabama. Some of these populations are

inferred from the capture of a single individual. Approximately half of the known populations for the flatwoods salamander occur on public land (25 of 47, or 53 percent). Federal landholdings that harbor flatwoods salamanders include the Apalachicola National Forest, Osceola National Forest, St. Marks National Wildlife Refuge, and Eglin Air Force Base in Florida; Fort Stewart Military Installation and Townsend Bombing Range in Georgia; and Francis Marion National Forest in South Carolina. An additional population is located on property managed by the State of Florida in the Pine Log State Forest. The remaining sites are on private land.

Previous Federal Action

The flatwoods salamander was identified as a Category 2 species in the Service's notices of review for animals published in the **Federal Register** on December 30, 1982 (47 FR 58454), September 18, 1985 (50 FR 37958), January 6, 1989 (54 FR 554), November 21, 1991 (56 FR 58804), and November 15, 1994 (59 FR 58982). Prior to 1996, a Category 2 species was one that was being considered for possible addition to the Federal List of Endangered and Threatened Wildlife, but for which conclusive data on biological vulnerability and threat were not currently available to support a proposed rule. Designation of Category 2 species was discontinued in the February 28, 1996, notice of review (61 FR 7956).

On May 18, 1992, the Service received a petition dated May 8, 1992, from the Biodiversity Legal Foundation, Boulder, Colorado, and Elizabeth Carlton, Gainesville, Florida, to list the flatwoods salamander as an endangered or threatened species throughout its historic range and to designate critical habitat. The petition stated that available evidence indicated that the flatwoods salamander had declined precipitously, that it was on the threshold of extirpation in many locations, and that it had been extirpated from a large portion of its historic range.

A 90-day finding that the petition did not present substantial information that the requested action may be warranted was announced in the **Federal Register** on May 12, 1993 (58 FR 27986). On August 23, 1993, attorneys representing the Biodiversity Legal Foundation, Jasper Carlton, the Director of the Biodiversity Legal Foundation, and Elizabeth Carlton notified the Service of their intent to sue the Service for violation of the Act. The petitioners felt a determination of ''may be warranted'' had, in effect, already been made by the Service through the inclusion of the flatwoods salamander as a Category 2 species on the comprehensive notices of review for animals published prior to 1993. On April 25, 1994, the suit was filed. In response to the agreed settlement, and based upon the Service's 1994 draft guidance relating to petitions for listing former Category 2 species, the 90-day finding announced on May 12, 1993, was rescinded, and replaced by a finding that the petitioned action may be warranted. This finding was announced in the **Federal Register** on September 21, 1994 (59 FR 48406), and included a request for comments and biological data on the status of the flatwoods salamander.

Section 4(b)(3)(B) of the Act and implementing regulations at 50 CFR 424.14, require the Secretary of the Interior, to the extent practicable, within 12 months of receipt of a petition, to make a finding as to whether the action requested in the petition is (a) not warranted, (b) warranted, or (c) warranted but precluded. Because of budgetary constraints and the lasting effects of a congressionally imposed listing moratorium, the Service is processing petitions and other listing actions according to the listing priority guidance published in the **Federal Register** on December 5, 1996 (61 FR 64475). In a **Federal Register** notice published on October 23, 1997 (62 FR 55628), the guidance was extended beyond fiscal year 1997 until such time as the fiscal year 1998 appropriations bill for the Department of the Interior becomes law and new final guidance is published. The fiscal year 1997 guidance clarifies the order in which the Service will process rulemakings following two related events: (1) the lifting on April 26, 1996, of the moratorium on final listings imposed on April 10, 1995 (Pub. L. 104–6), and (2) the restoration of significant funding for listing through passage of the Omnibus Budget Reconciliation Act passed on April 26, 1996, following severe funding constraints imposed by a number of continuing resolutions between November 1995 and April 1996. The guidance calls for giving highest priority to handling emergency situations (Tier 1) and second highest priority (Tier 2) to resolving the status of outstanding proposed listings. Third priority (Tier 3) is given to resolving the conservation status of candidate species and processing administrative findings on petitions to add species to the lists or reclassify threatened species to endangered status. The processing of this petition and proposed rule falls under Tier 3. At this time, the Southeast Region has no pending Tier 1 actions and no overdue Tier 2 actions. Additionally, the guidance states that ''effective April 1, 1997, the Service will concurrently undertake all of the activities presently included in Tiers 1, 2, and 3'' (61 FR 64480). This proposed rule constitutes the Service's 12-month finding on the petitioned action.

Summary of Factors Affecting the Species

Section 4(a) of the Endangered Species Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act set forth the procedures for adding species to the Federal lists. 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 the flatwoods salamander (*Ambystoma cingulatum* Cope) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The major threat to the flatwoods salamander is loss of both its longleaf pine/slash pine flatwoods terrestrial habitat and its isolated, seasonally ponded breeding habitat. The combined pine flatwoods (longleaf pine-wiregrass flatwoods and slash pine flatwoods) historical acreage was approximately 12.8 million ha (32 million ac) (Wolfe *et al.* 1988, Outcalt 1997). Today, the combined flatwoods acreage has been reduced to 2.3 million ha (5.6 million ac) or approximately 18 percent of its original extent. These remaining pine flatwoods (non-plantation forests) areas are typically fragmented, degraded, second-growth forests.

Large acreages of pine flatwoods have been eliminated through land use conversions, primarily urban development and conversion to agriculture and pine plantations (Schultz 1983, Stout and Marion 1993, Outcalt and Sheffield 1996, Outcalt 1997). Surveys of historical flatwoods salamander localities documented the destruction of nine sites from urban development or agriculture and loss of three additional sites due to their conversion to pine plantations. State forest inventories completed between 1989 and 1995 indicate that flatwoods losses through land use conversion are still occurring (Outcalt 1997). In Florida and Georgia, the States where flatwoods habitat is concentrated and where most flatwoods salamander populations occur, 52,600 ha (130,000 ac) were lost to urban and agricultural use during the survey cycle of 8 years (Outcalt 1997).

Conversion of existing pine flatwoods second-growth forests to managed plantations is also continuing. In Georgia and Florida, there was a yearly loss of this habitat to pine plantations of nearly 20,200 ha (50,000 ac) in each State with a loss of 24 percent and 20 percent respectively during the 8 year survey interval (Outcalt 1997). Most of the remaining second-growth pine flatwoods (56 percent) occur on private non-industrial lands which are continuing to be converted to pine plantations after harvest (Outcalt 1997). Urban development is expanding into forested areas, especially in rapidly developing areas of Florida and Georgia. If present rates of loss continue, in 25 years nearly all natural pine flatwoods stands could be destroyed in these two States (Outcalt 1997).

Flatwoods salamander wetland breeding sites have also been degraded and destroyed. The number and diversity of these small wetlands have been reduced by alterations in hydrology, agricultural and urban development, silvicultural practices (described in more detail below), dumping in or filling of ponds, conversion of wetlands to fish ponds, domestic animal grazing, and soil disturbance (Vickers *et al.* 1985, Ashton 1992). Hydrological alterations represent the primary threat to flatwoods salamander breeding sites. Size and suitability of wetlands as breeding sites depend on subsoil moisture, the permeability of the hardpan, the pond's drainage area, and other factors. Alterations to any of these factors can affect the pond's ability to hold water and function as a breeding site.

Forest management strategies commonly used on pine plantations contribute to degradation of flatwoods salamander forested and wetland habitat. These include soil-disturbing site preparation techniques, lowered fire frequencies and reductions in average area burned per fire event (see Factor E), high seedling stocking rates, and herbicide use which reduces plant diversity in the understory. The result of these strategies is a forest that approaches even-age structure, has a dense understory, and low herbaceous cover. Forestry practices that directly affect wetland breeding sites include ditching ponds or low areas to drain water from a site, converting second-growth pine forests to bedded pine plantations, harvesting cypress from the ponds, disposing of slash in wetlands during timber operations, using ponds as part of ditched fire breaks, using fertilizers near wetlands which can result in eutrophication, and disturbing the soil at a wetland (Vickers *et al.* 1985; Ashton 1992; Means *et al.* 1996; Palis, in press).

Clear-cut harvesting of forested sites appears to be an additional threat. Studies on this type of harvest have demonstrated negative short-term impacts on local amphibian populations, especially salamanders (deMaynadier and Hunter 1995). Raymond and Hardy (1991) monitored the mole salamander (A. talpodieum) at a breeding site adjacent to a recent clear-cut. They found that salamanders were displaced from the cut side of the pond and that there was lowered survivorship in individuals of the breeding population that immigrated to the breeding pond from the clear-cut. Flatwoods salamanders may be vulnerable to the microhabitat drying from clear-cuts due to their moist permeable skin which acts as a respiratory organ and must remain moist to function properly (Duellman and Trueb 1986).

Silvicultural practices affecting both upland and breeding habitats have been implicated in the decline of a flatwoods salamander population located in the panhandle of western Florida and monitored for over 20 years (Means *et al.* 1996). The observed decline at this site was attributed to habitat modifications resulting from clear-cutting, conversion of the site to a pine plantation, and fire suppression. Habitat modifications included soil disturbance, hydrologic changes, canopy closure, and loss of herbaceous ground cover.

Habitat quality data were collected during recent surveys of historical sites where flatwoods salamanders were not relocated. Habitat quality at these sites was characterized as none (site destroyed), low (flatwoods salamanders unlikely), moderate (salamanders possible but habitat degraded), or high (habitat appears suitable for flatwoods salamanders). Three historical flatwoods salamander localities (assigned a quality of none) were altered so greatly by their conversion to slash pine plantations that they were no longer even marginally suitable for the flatwoods salamander. Forty-one historical sites (41 of 97, or 42 percent) were of low or moderate habitat quality. Most of these sites had been converted to slash pine plantations and had a subsequent loss of habitat suitability (L. LaClaire, pers. obs., 1997).

The habitat quality surrounding historical flatwoods salamander breeding ponds in Florida, where flatwoods salamanders have been found in recent surveys, was characterized by Palis (in press). Each site was assigned a score based on pine species dominance and disturbance (second-growth flatwoods versus plantation sites) and the relative abundance of wiregrass (*Aristida* sp.) ground cover. Wiregrass was chosen as a factor of habitat quality because its loss has been used as an indicator of site degradation from fire suppression and/or soil disturbance (Clewell 1989). In Palis' study, approximately 70 percent of the active breeding sites were surrounded by second-growth longleaf or slash pine flatwoods with nearly undisturbed wiregrass ground cover. In general, Palis found that the extant populations of the flatwoods salamander principally occurred on forest lands managed for long rotation, saw-timber production, rather than on short rotation pine plantations managed for pulp production.

Road construction plays a part in habitat degradation and destruction. At least one historical flatwoods breeding site was filled in association with the construction of a road (Palis 1993). Roads increase the accessibility of breeding ponds to off-road vehicle enthusiasts that use pond basins for ''mud bogging'' which disturbs the soil and vegetation and degrades the quality of a site for flatwoods salamander breeding. Roads may also alter the quality of isolated wetlands by draining, damming, or redirecting the water in a basin and contributing hydrocarbons and other chemical pollution via runoff and sedimentation.

A number of habitat degradation factors are implicated in the decline of one South Carolina flatwoods salamander population monitored for over 20 years (Moulis 1987, Bennett pers. comm. 1997). This site is bisected by a road that flatwoods salamanders have to cross to reach their breeding site. Much of the upland area, in which the salamanders dwell as adults, has undergone urban development (Bennett pers. comm. 1997). In addition, fire suppression has resulted in the loss of the open, grassy edge associated with quality breeding sites. Habitat quality at this site has degraded to the point where successful reproduction and recruitment are infrequent and the population is at risk.

Extensive surveys have been conducted over the past 7 years in Alabama, Georgia, Florida, South Carolina and Mississippi to search for flatwoods salamanders at historical localities and at other potential sites. The low level of success of these surveys is believed to be a reflection of both the loss of upland and isolated wetland breeding habitat and the reduction in the quality of these habitats.

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* Overcollecting for scientific purposes may have contributed to the decline of a South Carolina population which was also impacted by habitat degradation. Between 1970 and 1976, a minimum of 84 adults and 870 larvae were collected in this area. Only two flatwoods salamanders have been captured at this locality since 1990, in spite of annual monitoring.

Overcollecting does not presently appear to be a significant threat to populations; however, it may become a problem if the specific locations become available to the general public. The rarity, uniqueness, and attractiveness of the species make the flatwoods salamander a candidate for the pet trade, should it become easy to obtain.

At some sites, larval flatwoods salamanders have been killed in association with bait harvesting for crayfish (Palis 1996). However, while this practice has caused the loss of some individuals, it is not currently thought to be a significant threat to the species as a whole.

C. *Disease or predation.* Disease is currently unknown in the flatwoods salamander.

Exposure to increased predation from fish is a potential threat to the flatwoods salamander when isolated, seasonally ponded breeding sites are changed to more permanent wetlands and become inhabited by fish. Ponds may be modified specifically to serve as fish ponds or sites may be altered due to the construction of drainage ditches or firebreaks which provide avenues for fish to enter the wetlands. Studies of other ambystomatid species have demonstrated a decline in larval survival in the presence of predatory fish (Semlitsch 1987, 1988).

D. *The inadequacy of existing regulatory mechanisms.* Regulatory mechanisms currently in effect do not provide adequate protection for the flatwoods salamander and its habitat. There are no existing regulatory mechanisms for the protection of the upland habitats where flatwoods salamanders spend most of their lives. Section 404 of the Clean Water Act is the primary Federal law that has the potential to provide some protection for the wetland breeding sites of the flatwoods salamander. Under section 404, nationwide permit 26 allows these wetlands to be filled with no review process if wetlands are less than 0.13 ha (⅓ ac) and with only minimal review if they are between 0.13 ha and 1.2 ha (3 ac) in size. Nationwide permit 26 cannot be used if there is a potential negative effect on a listed species.

Some populations on Federal lands have benefitted where prescribed burning has been used as a regular management tool. However, multiple use priorities on public lands, such as timber production, and military and recreational use, make protection of the flatwoods salamander secondary. The National Environmental Policy Act (NEPA) requires an intensive environmental review of projects that may adversely affect a federally listed species, but project proponents are not required to avoid impacts to non-listed species.

At the State and local levels, regulatory mechanisms are also limited. The flatwoods salamander is listed as a rare protected species in the State of Georgia (Seyle 1994). This designation protects the species by prohibiting actions that cause direct mortality or the destruction of its habitat on lands owned by the State of Georgia and by preventing its sale, purchase, or possession (Jensen, pers. comm., 1997). At present, there are no known flatwoods salamander populations on lands owned by the State of Georgia. In South Carolina, the flatwoods salamander is listed as endangered (Bennett 1995). Prohibitions extend only to the direct take of the flatwoods salamander (Bennett, pers. comm., 1997). These regulations offer no protection against the most significant threat to the flatwoods salamander, which is loss of its habitat. The flatwoods salamander is considered rare in Florida by the Florida Committee on Rare and Endangered Plants and Animals (Ashton 1992); however, there are no protective regulations for this species or its habitat in the State (Moler 1990).

E. *Other natural or manmade factors affecting its continued existence.* Fire is needed to maintain the natural pine flatwoods community. Fire suppression has been considered the primary reason for the degradation of remaining longleaf pine forest acreage (Means 1996b). Wolfe *et al.* (1988) reported that pine flatwoods naturally burn every 3 to 4 years, probably most commonly in the summer months. Sampling of longleaf pine flatwoods sites in Florida indicated that less than 30 percent of sites on private lands were being prescribed burned to mimic the effects of natural fire (Outcalt 1997). The disruption of the natural fire cycle has resulted in an increase in slash pine on sites formerly dominated by longleaf pine, an increase in hardwood understory, and a decrease in herbaceous ground cover (Wolfe *et al.* 1988; Means, pers. comm., 1995). Ponds surrounded by pine plantations and protected from the natural fire regime become unsuitable flatwoods salamander breeding sites due to canopy closure and the resultant reduction in emergent herbaceous vegetation needed for egg deposition and larval development sites (Palis 1993). Of the 13 historical flatwoods salamander localities altered to the point where the habitat was no longer suitable, fire suppression was a contributing factor in at least 5 (38 percent). Current forest management is moving away from burning as a management tool due to liability considerations and concerns that fire will damage the quality of the timber. When burning is used as a management tool, winter fires are commonly employed. Winter fires may not be optimal for the flatwoods salamander.

Habitat fragmentation of the longleaf pine ecosystem, resulting from habitat conversion, threatens the survival of the remaining flatwoods salamander populations. Forty-seven populations occur across four States. Fifty-three percent (25 of 47) of these populations are widely separated from each other by unsuitable habitat. Research conducted in Florida documented that 25 percent of remaining longleaf pine flatwoods sites were isolated fragments imbedded in agricultural and urban-dominated landscapes (Outcalt 1997). Studies have shown that the loss of fragmented populations is common, and recolonization is critical for their regional survival (Fahrig and Merriam 1994, Burkey 1995). As patches of available habitat become separated beyond the dispersal range of a species, populations are more sensitive to genetic, demographic, and environmental variability and may be unable to recover (Gilpin 1987, Sjogren 1991). Amphibian populations may be unable to recolonize areas after local extinctions due to their physiological constraints, relatively low mobility, and site fidelity (Blaustein *et al.* 1994).

Roads contribute to habitat fragmentation by isolating blocks of remaining contiguous habitat. Migration routes and dispersal of individuals to and from breeding sites may be disrupted. In addition, flatwoods salamanders may be killed by vehicles when attempting to cross roads (Means 1996a).

Pesticides and herbicides may pose a threat to amphibians such as the flatwoods salamander, because their permeable eggs and skin readily absorb substances from the surrounding aquatic or terrestrial environment (Duellman and Trueb 1986). They may be exposed to pesticides and herbicides accumulated in their invertebrate prey or their prey may be reduced through

the use of pesticides. In frogs, use of agricultural pesticides has resulted in lower survival rates, deformities, and lethal effects on tadpoles (Sanders 1970, FROGLOG 1993). Other negative effects of commonly used pesticides and herbicides on amphibians include delayed metamorphosis, paralysis, reduced growth rates, and mortality (Bishop 1992). Herbicides also alter the density and species composition of vegetation surrounding a breeding site and may reduce the number of potential sites for egg deposition, larval development, or shelter for migrating salamanders.

Long-lasting droughts or frequent floods may affect local flatwoods salamander populations. Although these are natural processes, other threats such as habitat fragmentation and habitat degradation may stress a population to the point that it cannot recover or recolonize other sites.

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 propose this rule. Based on this evaluation, the preferred action is to list the flatwoods salamander as threatened. The range and habitat of this species has been significantly reduced by activities associated with conversion of forests to agriculture and urban development, silvicultural practices, and the disruption of natural fire cycles. Remaining populations are vulnerable as suitable habitat continues to be lost or degraded by these activities. While not in immediate danger of extinction, the flatwoods salamander is likely to become an endangered species in the foreseeable future if the present trend continues.

Critical Habitat

Critical habitat is defined in section 3 of the Act as: (i) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management consideration or protection and; (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require 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. Service regulations (50 CFR 424.12(a)(1)) state that designation of critical habitat is not prudent when one or both of the following situations exist: (1) The species is threatened by taking or other activity and the identification of critical habitat can be expected to increase the degree of threat to the species or (2) such designation of critical habitat would not be beneficial to the species. The Service finds that designation of critical habitat is not prudent for the flatwoods salamander.

Critical habitat designation, by definition, directly affects only Federal agency actions. Activities that might affect the flatwoods salamander on Federal lands include forestry management, military activities, and Federal actions that would impact the hydrology of the wetlands used by the flatwoods salamander for reproduction. Such activities would be subject to review under section 7(a)(2) of the Act, whether or not critical habitat was designated. Federal permit issuance on private lands would also be subject to review; however, the primary activities affecting habitat for the flatwoods salamander on private lands are silvicultural, and are not subject to the Federal review process under section 7.

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. Common to definitions of the ''jeopardy'' and ''adverse modification'' standards is an appreciable detrimental effect on both survival and recovery of the species. The Service currently believes that any significant adverse modification or destruction of flatwoods salamander habitat to the extent that survival and recovery is appreciably diminished would likely jeopardize this species' continued existence. Therefore, habitat protection from Federal actions can be accomplished for the flatwoods salamander through the section 7 jeopardy standard. The Service is currently working with the appropriate Federal land managing agencies to identify, protect, and manage flatwoods salamander habitat.

On private lands, industrial timber landowners are cooperating with the Service to conduct surveys for the flatwoods salamander and to develop management strategies to protect its habitat. Should this rule become final, the Service will continue to coordinate with State and Federal agencies, as well as private property owners and other affected parties through the recovery process to manage habitat for the flatwoods salamander.

The Service believes that any potential benefits to critical habitat designation are outweighed by additional threats to the species that would result from such designation. Collecting for scientific and recreational purposes is a potential threat to the survival of the flatwoods salamander (see Factor B). Flatwoods salamanders are a rare and attractive species, and these characteristics make them potentially valuable in the pet trade. The collection of amphibians and reptiles for the pet trade has increased in recent years. For example, all box turtles have been placed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora due to the increased commercialization of these species. Collection of amphibians and reptiles for personal use and the pet trade is common in the vicinity of the most viable flatwoods salamander populations (K. Enge, Florida Game and Fresh Water Fish Commission, pers. comm., 1997). Permits are required for commercial collecting; however, collection regulations are difficult to monitor and enforce. Flatwoods salamanders concentrate for breeding and reproduction around breeding ponds, where they are most vulnerable to collecting. Publication of specific localities of breeding ponds would be required in the critical habitat designation process in order to obtain the notification benefit provided by such designation. The publication of breeding pond sites would increase the flatwoods salamander's level of vulnerability to illegal collecting.

Based on the above analysis, the Service has concluded that critical habitat designation would provide little additional benefit for the flatwoods salamander beyond that which would result from listing under the Act. The Service also concludes that any potential benefit from such a designation would be offset by an increased level of vulnerability to collecting.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing results in public awareness and conservation actions by Federal, State, and local

agencies, private organizations, and individuals. The 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 taking and harm 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 are codified at 50 CFR part 402. Section 7(a)(4) requires Federal agencies to confer informally with the Service on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. If a species is subsequently listed, 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 the species or 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 flatwoods salamander occurs on Federal lands administered by the Department of Defense, Fish and Wildlife Service, and U.S. Forest Service. These land management agencies would be required to evaluate the potential adverse impacts to the flatwoods salamander from their activities. Federal activities that could impact the flatwoods salamander through destruction or modification of suitable habitat include, but are not limited to, forest management, military operations, and road construction. Other Federal agencies that may be involved in authorizing, funding, or permitting activities that may affect the flatwoods salamander include the Army Corps of Engineers, due to their review of dredge and fill of isolated wetlands under section 404 of the Clean Water Act, nationwide permit 26; the Federal Energy Regulatory Commission, due to their oversight of gas pipeline and power line rights-of-way; and the Federal Highway Administration when Federal funds are involved in road construction. It has been the experience of the Service, however, that nearly all section 7 consultations have been resolved so that the species have been protected and the project objectives have been met.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all threatened wildlife. The prohibitions, codified at 50 CFR 17.21 and 17.31 for threatened wildlife, 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, capture, or collect; or to attempt any of these), import, 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 is also 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 threatened wildlife species under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32 for threatened species. 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. For threatened species, permits also are available for zoological exhibition, educational purposes, or special purposes consistent with the purposes of the Act. 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. However, since this species is not currently in trade, such permit requests are not expected.

It is the policy of the Service, published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify, to the maximum extent practicable, those activities that would or would not constitute a violation of section 9 of the Act if the species is listed. The intent of this policy is to increase public awareness of the effects of the proposed listing on future and ongoing activities within a species' range. Activities which the Service believes are unlikely to result in a violation of section 9 for the flatwoods salamander are:

(1) Possession of legally acquired flatwoods salamanders;

(2) Lawful hunting activities;

(3) Lawful burning of habitat where the flatwoods salamander is known to occur, when used as a forest or wildlife management technique, including winter burning;

(4) Federally approved projects that involve activities such as discharge of fill material, draining, ditching, tiling, bedding, diversion or alteration of surface or ground water flow into or out of a wetland (i.e., due to roads, impoundments, discharge pipes, etc.), when such activity is conducted in accordance with any reasonable and prudent measures given by the Service in accordance with section 7 of the Act;

(5) Conversion of pine flatwoods habitat where the flatwoods salamander does not occur;

(6) Timber harvesting (including clear-cutting) in pine flatwoods habitat where the flatwoods salamander does not occur; and

(7) Crayfish bait collecting operations that do not harm flatwoods salamanders.

Activities that the Service believes would be likely to result in a violation of section 9, if the species is listed, include, but are not limited to:

(1) Unauthorized collecting or handling of individual flatwoods salamanders;

(2) Possessing, selling, transporting, or shipping illegally taken flatwoods salamanders;

(3) Unauthorized destruction or alteration of wetlands used as breeding sites by flatwoods salamanders. These actions would include discharge of fill material, draining, ditching, tiling, bedding, diversion or alteration of surface or ground water flow into or out of a wetland (i.e., due to roads, impoundments, discharge pipes, etc.), and operation of any vehicles within the wetland;

(4) Discharge or dumping of toxic chemicals, silt, or other pollutants (i.e., sewage, oil, and gasoline) into isolated wetlands or upland habitats supporting the species; and

(5) Unlawful destruction or alteration of suitable pine flatwoods habitat within a 1.6-km (1-mi) radius surrounding a known flatwoods salamander breeding pond. These actions would include, but are not limited to, destruction of the herbaceous ground cover or alteration of a site's existing hydrology, such as might result from conversion of habitat to agricultural or urban use, conversion of habitat to intensively managed pine plantations, or ditching and draining a site.

Other activities not identified above will be reviewed on a case-by-case basis to determine whether a violation of section 9 of the Act may be likely to result from such activities should the flatwoods salamander become listed. The Service does not consider these lists to be exhaustive and provides them as information to the public.

Questions regarding whether specific activities may constitute a future violation of section 9, should this species be listed, should be directed to

the Field Supervisor of the Service's Jackson Field Office (see **ADDRESSES** section). Requests for copies of the regulations regarding listed wildlife and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, 1875 Century Blvd., Suite 200, Atlanta, Georgia 30345, or telephone 404/679–7319; facsimile 404/679–7081.

Section 10(a)(1)(B) authorizes the Service to issue permits for the taking of listed species incidental to otherwise lawful activities such as agriculture, forestry, and urban development. Take permits authorized under section 10 must be supported by a habitat conservation plan (HCP) that identifies conservation measures that the permittee agrees to implement to conserve the species. A key element of the Service's review of a HCP is a determination of the plan's effect upon the long-term conservation of the species. The Service would approve a HCP, and issue a section 10(a)(1)(B) permit if the plan would minimize and mitigate the impacts of the taking and would not appreciably reduce the likelihood of the survival and recovery of that species in the wild.

Public Comments Solicited

The Service intends that any final action resulting from this proposal will be as accurate and as effective as possible. Therefore, comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule are hereby solicited. Comments are particularly sought concerning:

(1) Biological, commercial trade, or relevant data concerning any threat (or lack thereof) to the flatwoods salamander;

(2) The location of any additional populations of this species and the reasons why any habitat should or should not be determined to be critical habitat as provided by section 4 of the Act;

(3) Additional information concerning the range, distribution, and population size of this species; and

(4) Current or planned activities in the subject area and their possible impact on this species.

Final promulgation of the regulation on this species will take into consideration the comments and any additional information received by the Service, and such communications may lead to a final regulation that differs from this proposal.

The Act provides for one or more public hearings on the proposal, if requested. Requests must be received within 45 days of the date of publication of the proposal in the **Federal Register**. Such requests must be made in writing and addressed to the Field Supervisor (see **ADDRESSES** section).

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).

Required Determinations

The Service has examined this regulation under the Paperwork Reduction Act of 1995 and found it to contain no information collection requirements.

References Cited

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

Author: The primary author of this proposed rule is Linda V. LaClaire, Jackson Field Office (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and record-keeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, the Service hereby proposes to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, 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 section 17.11(h) by adding the following, in alphabetical order under AMPHIBIANS, to the List of Endangered and Threatened Wildlife to read as follows:

§ 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						
*	*	*	*	*	*		*
AMPHIBIANS							
*	*	*	*	*	*		*
Salamander flatwoods.	*Ambystoma cingulatum.*	U.S.A. (AL, FL, GA, SC).	Entire	T	NA	NA	
*	*	*	*	*	*		*

Dated: November 24, 1997.

Jamie Rappaport Clark,

Director, Fish and Wildlife Service.

[FR Doc. 97–32739 Filed 12–15–97; 8:45 am]

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