

## DEPARTMENT OF THE INTERIOR

## Fish and Wildlife Service

## 50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Determination of *Nerodia harteri paucimaculata* (Concho Water Snake) to be a Threatened Species

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule.

**SUMMARY:** The U.S. Fish and Wildlife Service has determined *Nerodia harteri paucimaculata* (Concho water snake) to be a threatened species under the authority contained in the Endangered Species Act of 1973, as amended. A final decision on the determination of critical habitat for the Concho water snake will be published in a separate notice by January 1988. The Concho water snake is a nonpoisonous snake endemic to the Concho and Colorado Rivers in Runnels, Tom Green, Concho, McCulloch, Coleman, Brown, Mills, San Saba, Irion, Lampasas, and Coke Counties, Texas, but no longer occurs in Coke County. The known populations of this snake are currently vulnerable due to low numbers and the threat of further loss of habitat due to inundation and downstream effects from reservoir construction. This rule implements the full protection provided by the Endangered Species Act of 1973, as amended, for *Nerodia harteri paucimaculata*.

**EFFECTIVE DATE:** September 3, 1986.

**ADDRESS:** The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Regional Office of Endangered Species, P.O. Box 1306, 500 Gold Avenue, SW., Room 4000, Albuquerque, New Mexico 87103.

**FOR FURTHER INFORMATION CONTACT:** Sally Stefferud, Endangered Species Biologist, U.S. Fish and Wildlife Service (at the address above) (505-766-3972 or FTS 474-3972).

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

The Concho water snake (*Nerodia harteri paucimaculata*), a nonpoisonous snake, is a member of the family Colubridae, and together with the Brazos water snake (*Nerodia harteri harteri*) constitutes the species *Nerodia harteri*, known as Harter's water snake. The Concho water snake is confined to the Colorado River drainage and the Brazos water snake is confined to the Brazos River drainage. These rivers drain separately to the Gulf of Mexico.

The Brazos water snake was discovered in 1936 in the Brazos River of Texas by Phillip Harter and was described by H. Trapido (1941). The Concho water snake was discovered in 1944 by J. Marr and was described as a distinct subspecies by Tinkle and Conant in 1961. This subspecies is relatively small for *Nerodia*; adults rarely exceed 900 millimeters (3 feet) total length. There are 21-23 dorsal scale rows, four rows of dark brown blotches arranged in alternate fashion on the grayish dorsal surface, and distinct to obscure dark spots along either side of the pink to orange venter (Wright and Wright 1957). Concho water snakes, when compared to Brazos water snakes, have reduced ventral spotting (often totally absent), a more reddish venter, differences in average counts of certain scale groups, and often a reddish dorsal ground color.

Adult Concho water snakes live in either shallow or deep flowing water over a variety of substrates, as long as there are sufficient deep, secure hiding places near nursery grounds. Adults also use woody vegetation along the banks for basking. Juvenile Concho water snakes, however, have much more rigid habitat requirements, the two most important features of which are shallow, rocky-bottomed flowing water, and medium-large flat rocks on the shore that provide hiding places (Scott and Fitzgerald 1985). Under certain conditions (described below), the Brazos water snake can live in impounded waters, and it currently lives in two reservoirs. The gradual slope, shelving rock, and rocky shore of portions of these two reservoirs have created the shallow waters and associated hiding areas necessary for juvenile Brazos water snakes. However, extensive biological surveys have not found Concho water snakes in any of the reservoirs located on the Concho and Colorado Rivers, possibly because shallow water and sloping rocky shoreline habitat, necessary to support this subspecies, does not exist in these reservoirs. Other snakes associated with Concho water snakes include the blotched water snake (*Nerodia erythrogaster*), the diamondback water snake (*Nerodia rhombifera*), the ribbon snake (*Thamnophis proximus*), and the cottonmouth (*Agkistrodon piscivorus*), although only the ribbon snake is found regularly in the same type of microhabitat.

Historically, the Concho water snake occurred over about 276 river miles of the Colorado and Concho Rivers. Now, it is distributed discontinuously over a reduced range of about 199 miles in Runnels, Tom Green, Concho, McCulloch, Coleman, Brown, Mills, San

Saba, Irion, and Lampasas Counties (Williams 1971, Flury and Maxwell 1981, Brnovak 1975, Scott and Fitzgerald 1985).

On December 30, 1982, the Service published a Vertebrate Notice of Review in the Federal Register (47 FR 58454). *Nerodia harteri* was included in category 1 of that notice. Category 1 includes those taxa for which the Service has substantial information on hand to support the biological appropriateness of proposing to list the species as endangered or threatened.

On February 14, 1984, the New Mexico Herpetological Society petitioned the Service to list Harter's water snake (including both subspecies) as threatened with critical habitat. The Service found that substantial information had been presented indicating that the petitioned action might be warranted. A notice of this finding was published on May 18, 1984 (49 FR 21089). A 1-year finding was reported on July 18, 1985 (50 FR 29238), that the petitioned action was warranted for the Concho water snake but that such action was precluded by work on other pending proposals, in accordance with section 4(b)(3)(B)(iii) of the Act. The 1-year finding for the Brazos water snake was reported concurrently and found that the petitioned action was not warranted for that subspecies. A proposed rule to list the Concho water snake was published on January 22, 1986 (51 FR 2923).

**Summary of Comments and Recommendations**

In the January 22, 1986, proposed rule (51 FR 2923) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. The original comment period closed on March 24, 1986, but was reopened on April 3, 1986 (51 FR 9081), to accommodate a public hearing and remained open until May 2, 1986. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. A newspaper notice inviting general public comment was published in the San Angelo, Texas, *Standard-Times* on February 10, 1986. Eighty-one letters of comment were received, and are discussed below. Two requests for a public hearing were received, and a hearing was held in Ballinger, Texas on April 3, 1986. Interested parties were contacted and notified of that hearing, and notices of the hearing were published in the Federal Register on March 17, 1986; the

Abilene, Texas, *Reporter-News* on March 18, 1986; the Big Spring, Texas, *Herald* on March 19, 1986; the Midland, Texas, *Reporter-Telegram* on March 15, 1986; and the San Angelo, Texas, *Standard-Times* on March 20, 1986. Comments received in the hearing are also summarized below.

Because of the need for a prompt determination of threatened status for the Concho water snake, and because of the complexity of the economic analysis that must accompany the final rule designating critical habitat, the Service has decided to make final only the listing portion of this rule at this time. Section 4(b)(6)(C) of the Act allows the Service to postpone the designation of critical habitat for up to one additional year from the date of publication of the proposed rule. Under this provision the final decision on the designation of critical habitat for the Concho water snake will be made by January 22, 1988. Therefore, comments received regarding the proposed critical habitat designation will not be discussed here, but will be addressed in the final notice on critical habitat.

Thirty letters of comment were received in support of the proposal, 37 questioning or in opposition to the proposal, and an additional 14 which expressed neither support nor opposition to the listing portion of the proposal, or contained only economic information for use in analysis of the critical habitat designation. Nineteen letters were received after the close of the comment period, none of which provided further information that would have had a bearing on the proposed or final rule. These 19 letters were not considered in the decision on the proposal and will not be addressed below.

The public hearing held in Ballinger, Texas, was attended by about 350 people. Fifty-seven oral or written statements were given, 5 in support of the proposal, 46 questioning or in opposition, and 6 neither in support nor opposition. A transcript of this hearing is available for inspection (see **ADDRESSES**). Organizations represented at the hearing included: U.S. House of Representatives; Texas Governor's Office; U.S. Geological Survey; U.S. Army Corps of Engineers; Soil Conservation Service; Texas Parks and Wildlife Department; Texas Department of Highways; Texas General Land Office; Texas Water Development Board; Big Country Audubon Society; Sierra Club; National Audubon Society; Cities of Midland, San Angelo, Ballinger, Coleman, Odessa, Abilene, Paint Rock, and Winters;

Counties of Concho, Runnels, Coleman, and Tom Green; five State legislative districts; six local and regional water boards; and several local governmental or business organizations.

All letters and written or oral statements received during the comment period and public hearing are combined in the following discussion. Many of the comments addressed concerns regarding specific water development projects and how they would affect or be affected by this proposal. Those comments will not be addressed here, unless they requested or resulted in specific changes to the proposal or the rule procedure, because the Endangered Species Act (ESA) provides that listing determinations be based solely on the best available scientific and commercial information. All comments are available for public inspection (see **ADDRESSES**).

Comments of support were received from Texas Parks and Wildlife Department; Texas General Land Office; National Audubon Society; Defenders of Wildlife; Sierra Club; Texas Chapter of the Wildlife Society; American Society of Ichthyologists and Herpetologists; New Mexico Herpetological Society; 15 private individuals; and biologists from Texas A&I University, New York Zoological Society, Midland College, Angelo State University, Dallas Zoo, Central Texas College, Texas A&M University, and Texas Tech University. Comments questioning or in opposition to the proposal were received from Congressman Charles Stenholm; Texas Water Development Board; Cities of Big Spring, Winters, Midland, San Angelo, Ballinger, Coleman, Odessa, Abilene, and Paint Rock; Counties of Brown, Concho, Runnels, and Coleman; six state legislators; Upper Colorado River Authority; Colorado River Municipal Water District; San Angelo Water Advisory Board; Central Colorado River Authority; West Central Texas Municipal Water District; 2 local organizations; and 301 private individuals (one letter contained 261 signatures). Nonsubstantive, economic, or critical habitat comments were received from Bureau of Reclamation, Federal Highway Administration, Soil Conservation Service, U.S. Army Corps of Engineers, Federal Emergency Management Agency, Texas Water Commission, Texas Governor's Office, and four private individuals.

Summaries of all substantive comments addressing the issue of listing the Concho water snake are covered in the following discussion. Comments of similar content are grouped in a number of general issues. These issues and the

Service's response to each are discussed below.

*Issue 1:* Several commentators recommended that the Concho water snake be listed as endangered rather than threatened. They believed that the snake was much nearer to extinction than the proposal indicated and thus more accurately met the criteria for endangered status. Response—The Service believes that the present status of the Concho water snake falls short of the criteria needed to list this snake as endangered. It does not appear to face imminent extinction, but is likely to become an endangered species in the foreseeable future if the past trends continue. If any adverse change occurs to existing habitat conditions, including water flow, pollution, and substrate, or to population stability (or other presently unrecognized instabilities), this species would qualify for endangered status. If such a change occurs, the Service would then promptly reassess the status of the Concho water snake.

*Issue 2:* Several commentators asserted that the Concho water snake was proposed for listing as a means of stopping the construction of proposed Stacy Reservoir, and that without the proposed Stacy project, the snake does not meet the criteria for listing. Response—Although Stacy Reservoir considered a major threat in the proposal to list the Concho water snake it is neither the only threat nor the impetus for the listing. The Concho water snake has been under consideration for 9 years as part of a continuing program to identify and list endangered and threatened amphibians and reptiles. The listing proposal was instigated by a series of events, including the State of Texas listing the Concho water snake as endangered on its 1977 list of endangered species; because of concern for this snake's survival expressed by several herpetologists; because of a petition from the New Mexico Herpetological Society on February 14, 1984, requesting the Service to list the snake; and because of status reports that showed extensive loss of historic range and several factors that threatened this snake's existing habitat.

*Issue 3:* Several technical aspects of the biology and distribution of the Concho water snake in the proposal were questioned and these follow: (1) Several commentators, of whom none were biologists, indicated that they believe the Concho and Brazos water snakes are virtually identical and cannot be distinguished by a layperson. Some questioned whether the Concho

water snake is truly a valid subspecies, and one commenter asked if electrophoretic studies had been done to confirm the taxonomy. Response—The subspecific separation of the Brazos and Concho water snakes is completely accepted by the herpetological community. Although the Concho and Brazos water snakes are difficult for a layperson to distinguish, there are significant differences in coloration, pattern, and scale characteristics. These differences, plus the fact that the two snakes inhabit river systems that are totally separated and have been for hundreds of thousands of years, confirm that the two snakes are at least valid subspecies. The subspecies apparently occupy differing ecological niches within their respective ranges. Some members of the scientific community believe that the Concho and Brazos water snakes are separate species. This question is currently under investigation, including studies using electrophoretic and other genetic and biochemical techniques. The exact taxonomy of the Brazos and Concho water snakes is irrelevant to the proposed listing, because the Endangered Species Act requires the Service to consider subspecies, as well as populations of vertebrate species, for listing. Nevertheless, for purposes of this listing, the Service finds that, considering the best available scientific and commercial data, the Concho water snake is a valid subspecies. (2) Dr. Francis Rose, who conducted the Colorado River Municipal Water District (CRMWD, the sponsors of the Stacy project) study of the Concho water snake, believes that there are indications of population instability in the Concho water snake. During his CRMWD and independent studies of this snake, he observed only immature Concho water snakes downstream from the Stacy crossing on the Colorado River. Lengths of Concho water snakes collected in the last couple of years are considerably less than those collected around the time when the snake was first discovered. The percentage of large individuals is clearly reduced. Dr. Rose believes that smaller sized, female snakes have a lower reproductive capacity than larger snakes, and that these data may indicate lower population recruitment than in previous years. Response—These preliminary signs of population instability are important in the consideration of the status of the Concho water snake. The Service has considered this information in formulating the final rule, noting the preliminary nature of this finding and the limited data upon which it is based.

(3) Several commentators pointed out that the distribution outlined in the proposed rule does not include Concho water snakes found by the CRMWD study (Rose 1985) on Spring Creek, a tributary of the Concho River located above Twin Buttes Reservoir. Some contended that the Concho water snake is plentiful in Spring Creek. However, one commenter indicated that the unusual circumstances surrounding the discovery of the two snakes in Spring Creek suggested that those snakes had been transported there from elsewhere. Response—The information regarding the Spring Creek snakes was not included in the proposed rule because that information was not available until autumn 1985. Because the discovery of two Spring Creek snakes was not a significant factor that would change the overall status of the Concho water snake, it was not deemed necessary to revise the proposed listing package which was already partially through the review process. Only two snakes (one of which was dead) have been found in Spring Creek during all studies, and the habitat there is extremely poor (Rose 1985), indicating that this population, if viable, is probably quite small, perhaps a lingering remnant of an earlier, more widespread distribution. Regarding the suggestion that the Concho water snakes found on Spring Creek were transported, the Service agrees that this may be possible, and that the presence of one live and one dead (in a minnow trap) Concho water snake in extremely poor habitat is puzzling. The lack of success of efforts to reverify Concho water snakes in Spring Creek compounds this question. However, because no documentation of transportation exists, the Service will assume that these snakes were resident there. The information regarding the discovery of Concho water snakes in Spring Creek has been incorporated into this rule. (4) Several commentators asserted that the Concho water snake is also found in the South Concho River near Christoval. Response—The Concho water snake was historically found in the South Concho River. However, it was not found there during any of the status surveys; the last record was in 1944 prior to the closure of the Twin Buttes Dam. (5) The CRMWD commented that the Service's population estimates for the Concho water snake are not valid, and challenged the methodology used to make these estimates and the results. Response—The only estimate of the Concho water snake population size was made by Flury and Maxwell (1981), at the request of the Service. However, the authors

indicated that this estimate was not accurate, and the Service has never used it or accepted it as valid. The method used by Flury and Maxwell is not a census method. Their "time-constrained" method was designed to give relative abundance of snakes at different sites, but these relative abundances cannot be converted to estimate the total number of snakes. Secretive animals, such as Concho water snakes, cannot be censused by direct observation (i.e., by counting individuals seen). There are currently two general methods of estimating numbers of secretive animals: those estimates derived from removal procedures, and those from mark and recapture studies. The first type is not feasible because it is difficult to obtain a large enough sample size to estimate population size, and because the Concho water snake is a Texas protected species and removal of sufficient numbers to obtain an accurate estimate might be damaging to the species' survival. Mark and recapture methods are very time consuming and the accuracy depends on the ability to capture and mark a large proportion of the total population. Scott and Fitzgerald (1985) attempted mark and recapture censuses at several places in the Concho and Colorado Rivers, but could not capture a sufficiently large proportion of the population given the time available and the difficulty of locating hidden snakes. In any event, the Service does not believe that an absolutely accurate population estimate is necessary to make a decision regarding the listing of this snake. Because the Service made no reference to the estimate given by Flury and Maxwell, and because the case for listing is based on continuing decline of a naturally limited range and other habitat factors, comments regarding methodologies and results of population estimates do not support a withdrawal of the proposed listing of the Concho water snake. (6) One commentator was concerned with the lack of population trend and reproductive data in the proposed rule. Response—Little population trend and reproductive data are available for the Concho water snake because few herpetologists have worked on this snake, and because of a general lack of funding available to study native, non-game wildlife. However, using early location records and data from Tinkle and Conant (1961) and Williams (1971), the Service was able to determine a downward trend in the range of the Concho water snake; this information is outlined in the proposed and final rules. Although

reproductive data for the Concho water snake are not in the proposed rule, these types of data can be found in Williams (1971). Based on the large numbers of juvenile Concho water snakes found during all studies, the snake appears to be successfully reproducing in its remaining range. (7) More in-depth studies are needed on the life history, biology, and ecology of the Concho water snake. This commentator believed that although the existing data supported the proposed listing, additional data were needed for future decisions regarding protection of the Concho water snake. Response—The Service agrees that such data would be useful, and these types of studies will be recommended in the recovery plan for this snake.

*Issue 4:* Several commentators contended that status studies of the Concho water snake conducted by the Service were incomplete and inadequate, and these comments follow: (1) The studies were too brief and not enough time was spent in the field. Response—Although the three full and two partial seasons of field studies conducted by the Service did not allow for a study such as that required to determine accurate population numbers, the studies were more than adequate to define the basic status of the Concho water snake. Service data were also supplemented by the earlier study of Williams (1971), the 1985 CRMWD study (Rose 1985), and miscellaneous distribution records. There were no major differences in distribution or population status information between these studies. (2) The biologists who conducted the surveys did not check the "numerous creeks that have water on an annual basis." Response—Few streams that are tributaries of the Concho and Colorado Rivers within the range of the Concho water snake sustain a large enough flow for a sufficient time to support enough fish (the principal food of this snake) for the Concho water snake. In addition, a few of these tributaries may have sufficient flow in isolated stretches but are lacking appropriate habitat. Therefore, these tributaries were not sampled as intensively as areas with primary habitat. However, several tributaries of the Concho, Colorado, Llano, and San Saba Rivers were surveyed by Flury and Maxwell (1981) and Scott and Fitzgerald (1985), including Pecan Bayou; South, Middle, and North Forks of the Concho River; and Jim Ned, Beal's, Dove, Spring, Brady, Elm, Valley, Cherokee, Pecan, and Deadman Creeks. (3) Only 32 percent of the potential Concho water snake range (Colorado, Concho, Llano,

and San Saba Rivers) was visited by biologists during surveys. Response—Although the Service does not know how the 32 percent of potential habitat figure was derived, it is incorrect (too low) since it apparently fails to consider the stream miles covered via boat. However, if it were possible to accurately calculate a correct percentage for only the areas intensively searched (includes areas where all rocks small enough to turn were turned, but excludes areas visually searched), the percentage of area searched may not be significantly greater than 32 percent. The assumption that 32 percent of the actual river mileage is an inadequate sample fails to consider that the Concho water snake is not evenly distributed along the Concho and Colorado Rivers, and ignores sampling theory. Concho water snakes are found primarily in areas with shallow riffles. Scott and Fitzgerald (1985) estimated that existing Concho water snake habitat has a median of 4 riffles in every 3 miles (5 km) of river. In addition, biological sampling rarely depends upon 100 percent search. Instead, appropriate patterns and methods are used to search selected sites, with areas of suitable habitat (e.g., shallow riffles) receiving the greatest effort and less suitable habitat (e.g., large pools) receiving proportionately smaller effort. Such samples are then extrapolated to represent the whole. Although the Service is uncertain how the commentators arrived at a 32 percent sampling effort, the Service's effort has given an accurate picture of the distribution, status, and relative abundance of the Concho water snake. (4) Only 23 percent of the "critical stream length" from Lake Spence to Leaday was searched by biologists who conducted the surveys. This "critical stream length" was defined by the commentator as the area where Williams (1971) found the largest number of Concho water snakes. Response—Williams (1971) did not survey the Colorado River from Lake Spence (Robert Lee Dam was under construction but the lake was not yet in existence) to Leaday. His study was on the population ecology of the Concho water snake along a small section of the Colorado River just below the site of Robert Lee Dam. That reach of the Colorado River has now partially been silted in and no longer supports water snakes. (5) Insufficient time was spent searching reservoirs to determine the presence or absence of Concho water snakes at these sites. Response—Scott and Fitzgerald (1985) spent 55 field hours intensively searching for Concho

water snakes on 12 reservoirs in the Concho, Colorado, and San Saba drainages. In addition, Maxwell has searched Twin Buttes and Spence Reservoirs, and Lake Nasworthy has been subjected to extensive reptile searches by the Angelo State University vertebrate zoology classes for the past two decades. None of these searches has revealed the existence of Concho water snakes on reservoirs. (6) "Hundreds" of stock tanks in the area were not searched. Response—Stock tanks in the area were not searched because these tanks do not provide habitat suitable for Concho water snakes. (7) Studies were done at the wrong time of the year; therefore, the number and range of the Concho water snake were underestimated. This commentator cited the Service studies as being conducted from "May through September," and pointed out that Scott and Fitzgerald (1985) found that Concho water snakes were more numerous in the fall and early spring and were scarce in August. Response—Scott and Fitzgerald (1985) indicated that Concho water snakes were indeed difficult to locate in August due to their retreat from the heat into deep cracks and crevices. They also indicated that October, April, and May are the best months for surveys, because the snakes are more easily accessible. Flury and Maxwell (1981) included all of these months in their surveys, and Scott and Fitzgerald included April and May in theirs. Both studies also found large numbers of Concho water snakes in June and September. Surveys were not conducted after October or before April because most snakes hibernate during these periods. (8) Studies were conducted during the wrong years. Some commentators asserted that the Scott and Fitzgerald (1985) studies were conducted during a dry, hot period, when the Concho and Colorado Rivers were flowing infrequently. These commentators believed that such conditions would make it difficult to find Concho water snakes, as they would not be "laying out on the river banks."

Response—Although hot, dry conditions may have caused snakes to retreat into deeper hiding places, drought years also should have caused snakes to concentrate around smaller areas of water. The similarity of Scott and Fitzgerald's (1985) findings to those of Flury and Maxwell (1981), which were taken during a non-drought year, suggest that dry conditions did not adversely affect the relative ability of searchers to locate Concho water snakes. (9) The difference in the number

of Concho water snakes reported in the stretch of the Colorado River from Maverick to Ballinger, as a percent of the total Concho water snakes found, was cited by several commentators as an indication that there were major conflicts in the data between the Flury and Maxwell (1981) and Scott and Fitzgerald (1985) studies. An additional comment by Dr. Francis Rose, who conducted the CRMWD study of the Concho water snake, disagreed with the proportion found in that stretch by Scott and Fitzgerald (1985). He believed, based on his own work, that the proportion found by Flury and Maxwell (1981) was more accurate. Response—The percentage of snakes found in that area by Scott and Fitzgerald (1985) was miscited in the proposed rule as 30 percent. The correct figure is 20 percent, with the additional 10 percent being located from Ballinger downstream to the confluence with the Concho River. The difference between studies (20 percent versus 3 percent) is not significant because Scott and Fitzgerald (1985) spent significantly more time surveying this portion of the river than did Flury and Maxwell (1981) and thus would be expected to have located more snakes. Both studies show the area to be occupied by a viable population of Concho water snakes. (10) The total distribution of the Concho water snake is not yet known. The snake may be found in areas outside of those already searched. Response—Because of previous surveys conducted on the Concho water snake, the range of this snake is perhaps better known than for any other American snake. Areas searched outside of the previously known historical range during the three recent distributional studies had no Concho water snakes; these snakes were found only within their known historical range. Therefore, although a few Concho water snakes may yet be found in isolated areas of the Concho and Colorado River basins, it is highly unlikely that any significant populations exist outside of the range reported in this rule.

*Issue 5:* Numerous commentators questioned the Service's analysis of threats to the Concho water snake, and several commentators recommended ways to reduce or avoid threats. These comments are as follows: (1) Numerous commentators asserted that the proposed Stacy Dam and Reservoir is not a threat to the survival of the Concho water snake, and that without this threat, the snake did not meet the criteria for threatened status. The reasoning behind this assertion is that the Brazos water snake is known to live

in Possum Kingdom Reservoir and Lake Granbury in the Brazos River system. Because these two snakes are subspecies of the same species, these commentators believe this indicates that the Concho water snake will also live in reservoir habitat, including Stacy Reservoir if it is built. Some commentators stated that the Concho water snake itself is found in Possum Kingdom and Lake Granbury, and one commentator indicated that the Brazos water snake also existed in "Lake Graham" and "Lake Whitney." Other commentators stated that the habitat that will make up the shoreline of Stacy Reservoir will be similar to that found at Possum Kingdom and Lake Granbury thus providing suitable habitat for the Concho water snakes. Response—The Service believes that the Stacy Dam and Reservoir, as currently proposed, constitutes a major threat to the survival of the Concho water snake. The threats to the snake from the proposed Stacy Reservoir project are not confined to the inundation area. Threats to upstream and downstream populations of the snake are also important, and are discussed in factor A in the "Summary of Factors Affecting the Species" section. Stacy Reservoir is not, however, the only threat to the survival of the Concho water snake, although it is an important component when considering the snake's future status. The declining range of the Concho water snake, and threats such as pollution, declining water flows, other water developments, and siltation are other factors that have resulted in the proposed threatened status for this snake. The proposed Stacy project and its additional potential threats to a significant portion of the current range of the Concho water snake make the listing of this species more urgent. The Brazos water snake, not the Concho water snake, lives in Possum Kingdom Reservoir and Lake Granbury in the Brazos River system. The Concho water snake is found only in the Concho and Colorado River systems. No Lake Graham exists in either the Brazos or Colorado River systems, and no Brazos water snakes were found in Lake Whitney when that reservoir was surveyed by Scott and Fitzgerald in 1984. The fact that the Brazos water snake is living in two reservoirs does not mean that the Concho water snake lives in any existing reservoirs or that it could live in the proposed Stacy Reservoir. Although these two snakes are subspecies of the same species, and thus closely related, it is not unusual to find that two subspecies of the same species have significant differences in their habitat

requirements. There are four major and several minor reservoirs in the range of the Concho water snake, and none of these are known to be inhabited by this subspecies. Extensive surveys on existing Concho-Colorado River reservoirs have failed to turn up any Concho water snakes. In addition, conditions at the proposed Stacy Reservoir will be quite different from those at the Possum Kingdom and Lake Granbury sites where Brazos water snakes have been found living. The Stacy location does not appear to offer shallow, gradually sloping, rocky reservoir shorelines like the Brazos reservoirs. The Brazos reservoirs also have only small fluctuations in water level compared to the expected 45 vertical feet of fluctuation at Stacy Reservoir. The Service is examining the possibility of modifying reservoir habitat that would allow for the existence of Concho water snakes in reservoirs, although such habitat modification has never been attempted for any snake (see the "Available Conservation Measures" section for discussion of potential habitat modifications). (2) Numerous commentators believed that because of the potential impact of this proposed listing on the proposed Stacy Reservoir project, the evidence showing the threat to the Concho water snake from the Stacy project should be indisputable. Response—Without precise knowledge of all the behavioral, physiological, and other factors that are key to the survival of the Concho water snake, plus an in depth review of the factors associated with the construction and operation of Stacy Reservoir, it is impossible to present "indisputable" evidence regarding the exact effects of Stacy Reservoir on this snake, nor does the ESA require this level of proof. However, the Service can make predictions based on existing documented evidence interpreted by highly qualified professionals. The general effects of dam and reservoir construction on the Concho water snake are well documented. Three studies of the Concho water snake, two conducted by the Service and one by CRMWD, have all concluded that Stacy Reservoir, as currently proposed, would adversely affect the Concho water snake. In addition, the Service's Region 2 Herpetological Recovery Team, composed of six of the Southwest's leading herpetologists, has examined all status reports and conducted field examinations of the proposed Stacy Reservoir site, Possum Kingdom Reservoir, and Lake Granbury. Based on these examinations, the team has



concluded that the Concho water snake would probably not survive and reproduce in Stacy Reservoir, as proposed. Additional studies and project review are needed to determine if reservoir and downstream habitats might be modified to allow maintenance or establishment of Concho water snake populations. (3) Several commentators questioned the extent to which the proposed Stacy Reservoir project would impact upstream and downstream populations of the Concho water snake. Some contended that the existence of the Concho water snake upstream from Lake Buchanan and possibly Twin Buttes Reservoir, indicates that snakes located upstream from the Stacy Reservoir would not be affected by the project. Other comments addressed downstream effects, asserting that the proposed reservoir would actually enhance Concho water snake habitat downstream from the dam because guaranteed minimum flow releases are required by the project's State water permit. One commenter pointed out that it appeared to be contradictory to state that minimum flows below the proposed Stacy Dam were necessary to sustain the Concho water snakes there, when the river already has recorded periods of no flow at that location. That commenter also believed that there were contradictions between Scott and Fitzgerald's (1985) conclusion that "Low water flows associated with dams or drought do not, by themselves, eliminate *N. harteri* from riparian habitats," and Flury and Maxwell's (1981) conclusion that "Dams and their impoundments pose a threat to the subspecies by inundation of upstream areas and by reduction of downstream water flow." In addition, it was pointed out that the Brazos water snake is thriving just downstream from the dam at Possum Kingdom Reservoir. Response—Regarding upstream effects of reservoirs on the Concho water snake, it is not just the reservoir itself that adversely affects the upstream populations. The population above Lake Buchanan is not genetically isolated from upstream populations, and appears to be doing well. The Spring Creek population found above Twin Buttes Reservoir is of unknown size and condition. The population in Spring Creek may be, at most, a lingering remnant of an earlier distribution, the decline of which may be due to the isolation of these upstream populations by Twin Buttes, Nasworthy, and O.C. Fisher Reservoirs. A primary effect of the proposed Stacy Reservoir on upstream populations of the Concho water snake is the separation of the Concho water snake into three

physically isolated populations. These populations would represent the most peripheral portions of the presently existing distribution. The effects of this fragmentation are discussed under factor A in the "Summary of Factors Affecting the Species" section of this rule. Regarding the downstream effects of the proposed Stacy Reservoir on the Concho water snake, such effects are dependent upon the operation and flow release schedules that would be set up for the reservoir. However, it is unlikely that the Stacy Reservoir-induced changes (as proposed) in the amount, timing, chemistry, and temperature of the flow would enhance the habitat of the Concho water snake downstream from the dam, although certain flow release schedules might reduce the severity of downstream habitat modification. The Concho water snake does not require a constant minimum flow in the river. It can withstand periods of no flow, but it cannot withstand total cessation of flow such as has occurred in sections below E.V. Spence Reservoir. Scott and Fitzgerald's (1985) statement, that it is not the low flow or cessation of flow itself that eliminates the snakes, is true. The Concho water snake does not, as a fish would, die from not being in the water. Rather, the effects of the flow reduction on the snake's food (fish) and habitat are the immediate cause of the snake's elimination or decline. Flury and Maxwell's (1981) statement that dams and impoundments are a threat to the Concho water snake because they reduce the downstream flow, is also true. Low flow periods are stressful for the snake, and although the snake has evolved mechanisms for dealing with such stress, these mechanisms may become ineffective if such periods are significantly extended. However, the primary adverse effect of dam-induced flow alteration is the loss of the major flood flows, or the changes in the timing and intensity of such flows. River systems are dependent upon such flooding to flush out accumulated sediments and to maintain riffle areas. Without flooding, sediment accumulates and vegetation takes root in the channel covering the rocks, eliminating hiding places for the snake. Reduction of flows also results in adverse effects through changes in water temperatures and reduced ability to dilute pollutants. The Brazos water snake does live below the dam of Possum Kingdom Reservoir. However, the flow releases from that reservoir are for power generation purposes and are quite different in amount, timing, and intensity than those expected from the proposed Stacy

project, whose purpose is water supply storage. (4) Several commentators referred to "mitigation" measures that they believed could or should be accomplished as a part of the Stacy Reservoir project. Some commentators stated that such mitigation should be used in lieu of listing, and if such mitigation occurred, the Concho water snake would no longer meet the criteria for threatened status. Response—As previously addressed under Issue 5 (1), the Concho water snake meets the criteria for threatened status even when not considering impacts associated with the proposed Stacy project. Therefore, mitigation of the impacts of the Stacy project would not remove the snake from a threatened status. Furthermore, future mitigation possibilities are not considered in determining a species to be threatened, as in this rule. (5) Several commentators suggested that the threats to the Concho water snake could be alleviated by relocating the snake outside of the inundation area of the proposed Stacy Reservoir, thereby removing the need to list this snake. Response—Several factors other than the Stacy project are involved in the decline of the Concho water snake, and these would not be alleviated by relocating snakes outside of the proposed Stacy Reservoir area; the snake's status would be threatened even without the Stacy project. Successful relocation of snakes from Stacy Reservoir to areas outside of the historic range of the Concho water snake is unlikely because many of these areas do not have suitable habitat, and the Concho water snake would likely not compete successfully with other snakes that occur naturally in these areas. Moving the Concho water snake into other areas inside its currently occupied range has also been examined and found unnecessary. Those areas that are already occupied by the Concho water snake are presumably at their carrying capacity. Addition of more Concho water snakes would merely result in increased deaths. The successful reintroduction of Concho water snakes into some areas of historic range that are presently unoccupied is unlikely because suitable habitat on these sites has been destroyed. The Service is examining the possibility of restoring suitable habitat within these presently unoccupied historic sites (see the "Available Conservation Measures" section for discussion). (6) Several commentators asserted that the Concho water snake is declining for natural reasons, will go extinct despite any human actions, and therefore does not qualify for listing. Response—The exten-

to which natural causes might be contributing to the decline of the Concho water snake cannot be discerned because of the extensive man-caused perturbations within the historic range of this snake. However, because man-caused habitat perturbations are extensive within the historic range of the Concho water snake, it is unlikely that natural forces are the major reason for decline of this snake. Even if natural factors were the sole cause for the decline of this species, listing would still be appropriate (see section 4(a)(1)(E) of the Act). (7) Two commentators contended that the Concho water snake will thrive despite habitat loss and damage, because as a species becomes more scarce its reproductive rate increases, as evidenced by the "proven fact that the more coyotes are hunted and trapped, the larger the litters." The commentators also contended that "this is also true of rattlesnakes and other species." Response—It is known in certain mammals that the reproductive rate will decrease in reaction to extremely high population densities. When densities are reduced, these reproductive rates return to normal levels. This may appear as an increase, because of the previously depressed levels. It is not true that the reproductive rate increases as the species becomes more scarce; in fact, increasing scarcity is often a function of decreasing reproductive capacity and higher mortality. There is no evidence that this type of adaptation occurs in snakes or any other reptiles. (8) One commentator contended that the amount of range of the Concho water snake that has been lost is not significant because there were never large numbers of the snake in those areas. This conclusion is based on the assumption that the Concho water snake would not do well in the colder water of the upper Concho basin or the saltier water of the Colorado River above Robert Lee Dam. Response—Although no data exist on the numbers of Concho water snakes that were once found in the streams above San Angelo, there is excellent documentation of a large population that once existed in the area near Robert Lee. This was the population that Williams (1971) studied and which he estimated contained over 300 snakes. This population was eliminated following the closure of Robert Lee Dam.

*Issue 6:* Several commentators stated that the Service failed to identify or give adequate treatment to other potential threats. These comments are as follows: (1) One biological organization commented that the Service had not given enough consideration to the threat

of habitat fragmentation on the survival of the Concho water snake, especially considering that a reservoir would be constructed in the center of this snake's existing range. Such fragmentation was cited as a major cause of recent species extinctions. Response—Information on the possible effects of habitat fragmentation have been added to the final rule and can be found in factor A of the "Summary of Factors Affecting the Species." (2) Dr. Norman Williams, who did an earlier (1971) study of the Concho water snake, suggested that the loss of riffle dwelling fish (the principal food of the Concho water snake) due to reduced water flows, siltation, and inundation, further threatens this snake. Response—This information has been added to the final rule. (3) Dr. Francis Rose, who conducted the CRMWD study of the Concho water snake, thinks that the pollution in the Concho River below San Angelo has significant adverse effects on the Concho water snake. He bases this conclusion on his studies of the snake, and he also stated that Concho water snakes he observed in the area below San Angelo were immature and sparsely distributed. Response—This information has been added to the final rule. (4) Dr. Francis Rose believes that the killing of Concho water snakes by recreationists has negatively affected populations of this snake. He cites his own experiences, including knowledge of one fisherman who killed 50 individual snakes at the Concho crossing in three days. Response—This information has been added to the final rule. (5) One commentator asserted that predation by fish is a major factor in the survival of young Concho water snakes, and that listing will not reduce this threat. Response—Although fish may prey upon young Concho water snakes, there are no data that suggest that fish, or predation in general, has been a major factor in the overall decline of the Concho water snake. Therefore, the Service has not included this as a major factor in this final rule. (6) One commentator suggested that the "abnormally cold" winter of 1983-84 may have caused the Concho water snake's decline, and asked if the Service noted a decrease in the population of snakes in 1984. Response—No major changes in the population of Concho water snakes were noted in 1984. Cold winters, such as that of 1983-84, may cause increased mortality of snakes during these periods, but they generally do not have long-lasting effects on snake populations. For a snake to persist in an area for thousands of centuries, it must be able to survive periodic cold winters. (7) One commentator said that the

Service should have addressed the issue that listing of the Concho water snake would increase the monetary value of captive specimens, thereby increasing demand for collection of wild specimens for trade and thus threatening the species. Response—This issue was not considered in this rule because, as far as is known, there are few if any captive specimens of the Concho water snake, and no known trade exists in captive or wild specimens.

*Issue 7:* Several commentators were concerned with protection and management of Concho water snakes, as follows: (1) Two commentators requested that the Service seek guaranteed instream minimum flow rights and easements or fee title to critical riparian areas to provide for the perpetuation and expansion of the Concho water snake. Response—After this rule becomes final, the Service will initiate a recovery plan that will address protection and enhancement of habitat. Additionally, such measures may be evaluated through future section 7 consultations. (2) Two commentators recommended that the Service give top priority to the immediate development and implementation of a recovery plan for the Concho water snake. Response—The ESA requires that priority for development of recovery plans be given to listed species "most likely to benefit from such plans, particularly those species that are, or may be, in conflict with construction or other developmental projects or other forms of economic activity." The Concho water snake does conflict with construction activity and the Service expects to develop a recovery plan after this rule becomes final. (3) Several commentators believed that the Concho water snake should be maintained in a zoo or other captive situations in lieu of listing. Response—The Endangered Species Act requires the Service to protect and conserve listed species and the ecosystems upon which they depend. Maintaining captive populations of the Concho water snake would not fulfill this requirement.

*Issue 8:* One commentator contended that the Service failed to comply with the "Environmental Protection Act" (National Environmental Policy Act, NEPA), and that an Environmental Impact Statement should have been prepared to assess the impact of the proposed rule on the human environment. This commentator asked if the Service had consulted with the Environmental Protection Agency regarding this matter. Response—The Service's position on NEPA compliance for any regulations adopted pursuant to

Section 4(a) of the Endangered Species Act (listing, critical habitat designation, reclassification, delisting) is set forth in the *Federal Register* of October 25, 1983 (48 FR 49244). This position was based in part on recommendations from the Council on Environmental Quality, and holds that section 4 listing actions are exempt from NEPA review "as a matter of law."

*Issue 9:* The Service failed to properly educate the public regarding the Concho water snake and the snake should not be listed until such efforts are made. Response—Extensive information regarding the Concho water snake has been disseminated through the proposed rule which was distributed to about 200 people and all subscribers to the *Federal Register*. Information was also provided through public notices published in local newspapers, through responses to news media requests, and through the extensive information provided at the public hearing. The Service has fulfilled all public information requirements regarding proposed listings.

#### Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the Concho water snake should be classified as a threatened 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 the Concho water snake (*Nerodia harteri paucimaculata*) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The remaining populations of Concho water snakes occur in 10 Texas Counties: Runnels, Tom Green, Concho, McCulloch, Coleman, Brown, Mills, San Saba, Irion, and Lampasas. This snake historically occurred along approximately 276 miles of the Concho and Colorado Rivers, but now has spotty distribution within only about 199 miles of these rivers. The snake has apparently lost 77 miles of its range along the upstream end of that range. The present range is located on the Concho River from near Veribest, Tom Green County, to the confluence with the Colorado River, and on the Colorado River from near Maverick, Runnels County, to the FM 45 bridge, Mills County, with two small disjunct populations; one is located below Bend,

San Saba County, and a second is located on Spring Creek near Mertzon, Irion County (Rose 1985). However, 95 percent of the Concho water snakes located by the two studies conducted by the Service (Flury and Maxwell 1981, Scott and Fitzgerald 1985) were found in a 131 mile stretch extending downstream on the Concho River from near the town of Veribest, Tom Green County, to the confluence with the Colorado River; and on the Colorado River from near Maverick, Runnels County, downstream to just below its confluence with Salt Creek, northwest of the town of Doole, McCulloch County. This 131 mile stretch is only 66 percent of the existing range of the snake. The studies found only 5 percent of the Concho water snakes in the remaining 68 miles (33 percent) of this snake's range. The distributional status of this snake was confirmed by the two Service studies (Flury and Maxwell 1981, Scott and Fitzgerald 1985) and by a study done by the Colorado River Municipal Water District (CRMWD) in connection with the proposed Stacy Reservoir project (Rose 1985).

Habitat of the Concho water snake has been affected by four large mainstream reservoirs on the Concho and Colorado Rivers, plus several smaller impoundments on tributary streams. At least two separate aspects of impoundment result in losses of Concho water snake habitat. Above dams the rocky shoreline and riffle habitat are inundated. Below dams normal water flow is curtailed, and floodwater scouring is prevented. Without such flooding, the rocky streambed becomes covered with silt. This silt then provides an excellent substrate for growth of salt cedar and other vegetation, which eliminates the rocky-bottomed riffle areas required by juvenile Concho water snakes (Scott and Fitzgerald 1985). The closure of Robert Lee Dam on the Colorado River completely eliminated a large population of Concho water snakes and 28 miles of habitat. The dam reduced discharge immediately downstream by 98.9 percent, to an annual average of 124 days with discharge below 1 cubic foot per second (Flury and Maxwell 1981). In the Concho River, the closure of Twin Buttes Dam reduced immediate downstream discharge by 74.2 percent; however, discharge in the river remains well above 1 cubic foot per second below the dam (Flury and Maxwell 1981). To date, there have been no agreements for the management of flow releases from dams for the maintenance of the Concho water snake. The Service is evaluating the possibility of

maintaining or reestablishing suitable Concho water snake habitats within the historic range of the snake using mechanical habitat construction maintained by regulated flow releases from existing or proposed dams.

In addition to flow reductions immediately downstream from the two major reservoirs mentioned above, there have been drastic overall declines in the flows of the Concho and Colorado Rivers resulting from cumulative impacts of water impoundments, and from agricultural and other diversions. These flow declines began very early in the history of European settlement of the area. Overall declines in the average annual discharge of the Concho River at Paint Rock and the Colorado River at Ballinger since 1935 are 61 and 65 percent, respectively. The loss of flow in these rivers has reduced suitable habitat for the Concho water snake and for the fish upon which it feeds, and has also aggravated other problems, such as pollution. Inflow of nutrients into the Concho River in the San Angelo area, along with reduced dilution capability associated with lower flows, has created large concentrations of algae in portions of the river. Buildup of algae in riffle areas reduces populations of both the Concho water snake and fish, this snake's primary food. Evidence of this excess nutrient load reaches as far downstream as Paint Rock in Concho County.

Stacy Reservoir, on the Colorado River, is an additional reservoir planned within the remaining range of the Concho water snake. This proposed water impoundment would be built on the Colorado River 14 miles below its confluence with the Concho River and would inundate 32 miles of the Colorado River and 14 miles of the Concho River. The proposed reservoir would inundate 35 percent of the proposed critical habitat for the species, and an extensive but unknown amount of habitat downstream from the dam could also be affected, depending on the amount and timing of water releases from the reservoir. The State water permit for this project stipulates maintenance of a flow of not less than 8.0 cubic feet per second (cfs) at the Winchell gauge (about 55 miles downstream from the dam site) from April through September, and a flow of not less than 2.5 cfs from October through March. However, under existing conditions, flows at the Winchell gauge exceed 8.0 cfs 90 percent of the time, and average low flow exceeds 50 cfs (U.S. Army Corps of Engineers 1986). This reduction in existing flows due to completion of the Stacy project could have significant



adverse effects on Concho water snakes living downstream from Stacy Dam. Thirteen percent of the proposed critical habitat and 16 percent of the individual snakes that have been observed lie within the 55 miles from the dam site to Winchell. Thus, 48 percent of the proposed critical habitat and 76 percent of the individual snakes that have been located occur within the area expected to be primarily affected by the construction and operation of Stacy Reservoir, as proposed. In addition, Stacy Reservoir would divide the remaining Concho water snakes into three physically separated populations. Such habitat fragmentation has been cited as the primary cause of recent species extinctions (Wilcox and Murphy 1985). According to Wilcox and Murphy, fragmentation has several adverse impacts: (1) It dramatically reduces the amount of habitat available to the organism; (2) it removes most of the best habitat, leaving the more peripheral portions of the range, much of which usually consists of sub-optimal habitat; (3) it restricts genetic interchange and population influx between populations; and (4) it leaves the remaining populations much more vulnerable to environmental variations and natural catastrophes. The isolation of the Concho water snake populations above San Angelo was suggested as the cause of the disappearance of those populations. Lake Nasworthy impounded the South Concho River in 1930 and the Concho water snake was last found in this river in 1944. The Service is currently evaluating ways to minimize the effects of habitat fragmentation on the Concho water snake (see the "Available Conservation Measures" section for discussion).

Sites at which this snake is known to occur are largely bordered by privately owned lands. No discernable problems for the habitat of the Concho water snake have resulted from that ownership. The inaccessibility of the habitat on private lands may provide some degree of protection to Concho water snakes, shielding the animals and their habitat from disturbances.

**B. Overutilization for commercial, recreational, scientific, or educational purposes.** Concho water snakes are sometimes captured or killed by recreationists. Presently, the effect of this activity on Concho water snake populations is believed to be minimal; however, instances have been reported of large numbers of water snakes being killed by fishermen (Dr. Francis Rose, Texas Tech University, pers. comm., March 11, 1986). Although recreational use of the Concho and Colorado Rivers

is increasing, negative impacts on the subspecies, primarily from human-caused, direct mortality, are confined mostly to the vicinity of bridges and road crossings.

**C. Disease or predation.** No problems of disease or predation on Concho water snakes are presently known to exist.

**D. The inadequacy of existing regulatory mechanisms.** Harter's water snake (as *Natrix harteri*, including both the Concho and Brazos water snakes) is listed as endangered by the State of Texas (31 T.A.C. Sec. 57.131-136, July 11, 1984), but no management or monitoring program exists. The State prohibits the taking of State-listed species, except under a State-issued collecting permit. The State generally prohibits selling, offering or advertising for sale, possessing, or distributing such listed species or goods made from such species (Texas Parks and Wildlife Code § 68.015 (1975) as amended in 1981). However, State listing in Texas provides no protection for the habitat of listed species. Therefore, the Endangered Species Act of 1973, as amended, would provide additional protection for the Concho water snake and its habitat through section 7 (interagency cooperation), as well as through the prohibitions of sections 4(d) and 9(a)(1) and provisions for recovery planning.

**E. Other natural or manmade factors affecting its continued existence.** Its naturally restricted range and narrow habitat requirements make the Concho water snake quite vulnerable to further habitat loss. In addition to direct effects on the Concho water snake, declining flows, inundation, pollution, and other habitat threats discussed in item A above have adverse impacts on riffle-dwelling fish in the Concho and Colorado Rivers. Because riffle-dwelling fish are the principal food of the Concho water snake, any declines of these fish will also result in declines of the snake.

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 Concho water snake as threatened. Although the Concho water snake has experienced extensive habitat loss and presently faces imminent threats to a large portion of its remaining population, the Service is proposing threatened rather than endangered status because the subspecies presently occupies 199 miles of river and is common in localized areas. The reasons for postponing the designation of critical habitat are given in the following section. Designation of

critical habitat will be addressed in a subsequent Federal Register notice.

#### Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that critical habitat be designated to the maximum extent prudent and determinable concurrently with the determination that a species is endangered or threatened. Section 4(b)(6)(C) further indicates that a concurrent critical habitat determination is not required and the final decision on designation may be postponed for one additional year from the date of publication of the proposed rule, if the Service finds that a prompt determination of endangered or threatened status is essential to the conservation of the species involved. The Service believes that a prompt determination of threatened status for the Concho water snake is essential. As a proposed species, the Concho water snake would be eligible only for the limited consideration given under the conference requirement of section 7(a)(4) of the Act, as amended. This does not require a limitation on the commitment of resources on the part of concerned Federal agencies or applicants for Federal permits. Therefore, to ensure that the full benefits of section 7 and other conservation measures under the Act will apply to the Concho water snake, prompt determination of threatened status is essential.

Section 4(b)(2) of the Act requires the Service to consider economic and other impacts of designating a particular area as critical habitat. The Service is in the process of evaluating the information obtained during the comment period on the economic impacts of designating critical habitat. However, because of the complexities and extent of the activities being assessed, the Service has not completed the evaluation. The Service is currently performing the economic and other impact analyses required for a determination in the near future. The final decision on designation of critical habitat for the Concho water snake must be made by January 22, 1988, pursuant to section 4(b)(6)(C)(ii) of the Act, as amended.

#### 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 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 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, and were recently revised at 51 FR 19926 (June 3, 1986). 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.

Concho water snakes are found only in rivers and adjacent riparian areas flowing through privately owned lands. Known Federal activities that may affect this subspecies are authorization of the proposed construction of Stacy Reservoir on the Concho and Colorado Rivers, and other possible future federally funded or authorized dam and reservoir construction, highway and bridge construction, or irrigation projects. Such activities, although on private lands, would be subject to section 7 consultation if Federal funding is involved, or if the activity requires Federal authorization. Stacy Dam and Reservoir require an authorizing permit from the U.S. Army Corps of Engineers, under section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. 403), as amended. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action that is likely to jeopardize the continued existence of any species proposed to be listed under Section 4. On May 5, 1986, the Service issued a Conference Report to the U.S. Army Corps of Engineers (U.S. Fish and Wildlife Service 1986). One of the conclusions of the report was if the Concho water snake were to be listed as threatened, the Service would issue a biological opinion finding that the proposed Stacy Reservoir project

would jeopardize the snake's continued existence. Although the Conference Report analyzed and rejected as infeasible seven habitat modification and research alternatives that were considered in attempting to accommodate both the Stacy Reservoir project and the survival of the Concho water snake, the Service is now reevaluating the feasibility of those seven and possible other alternatives. Some alternatives presently being considered to help reduce impacts associated with the Stacy project include: (1) Manipulation of reservoir shoreline and water levels in Stacy Reservoir to create suitable habitat for Concho water snakes; (2) river channel manipulation for restoration of destroyed Concho water snake habitats; (3) release of suitable flows from Stacy and existing dams to maintain existing or restored downstream habitat suitable for all age classes of Concho water snakes (includes periodic releases that would scour out silt and vegetation); (4) capture and transfer of Concho water snakes to improved, restored, or newly created habitat; (5) construction of artificial channels with habitat suitable for Concho water snakes, to replace habitat lost to inundation and/or to provide for migration of snakes around reservoirs; (6) research to determine detailed life history information and habitat requirements for the Concho water snake and to apply that information to on-site management of these snakes and their existing, improved, or newly created habitat; and (7) possible other alternatives to be developed. To date, none of these alternatives has been used to reverse the declining range of the Concho water snake.

The Act and its implementing regulations found at 50 CFR 17.21 and 17.31 set forth a series of general prohibitions and exceptions that apply to all threatened wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, ship in interstate commerce in the course of a 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 threatened wildlife species under certain circumstances. Regulations governing permits involving threatened

wildlife species are at 50 CFR 17.32. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, for incidental take in connection with otherwise lawful activities, zoological exhibition, educational purposes, or special purposes consistent with the purposes of the Act.

#### 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* (October 25, 1983 (48 FR 49244)).

This final listing is effective upon publication in the *Federal Register*. Because the Stacy Dam and Reservoir project, as currently proposed, could pose significant threats to the Concho water snake, and because this proposed action is presently pending for permit approval by the Army Corps of Engineers, the Service believes that the protection available to the species under section 7(a)(2) of the Act should be implemented as soon as the public receives notice of the final listing decision. For these reasons, the Service finds that "good cause" exists to make the final rule listing the Concho water snake as a threatened species effective upon publication. 5 U.S.C. 553(d)(3); 50 CFR 424.18(b)(1).

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**Author**

This final rule was prepared by Sally Stefferud, Endangered Species Staff, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

**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 continues to read as follows:

Authority: Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*).

2. Amend § 17.11(h) by adding the following, in alphabetical order under "Reptiles," 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						
REPTILES							
Snake, Concho water	<i>Nerodia harteri paucimaculata</i>	U.S.A. (TX)	Entire	T		NA	NA

Dated: August 27, 1986.  
**P. Daniel Smith,**  
*Acting Assistant Secretary for Fish and Wildlife and Parks.*  
 {FR Doc. 86-19823 Filed 9-2-86; 8:45 am}  
 BILLING CODE 4310-55-M