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We wish to clarify that although Channel 276C1 currently appears in the FM Table of Allotments at Anchorage, it was downgraded to Channel 276C2 on August 26, 1994, at the request of the former licensee of Station KMXS(FM) (see File No. BPH-931229IA). An editorial amendment to the Table of Allotments was never made to reflect the change at Anchorage. Therefore, it is not necessary to amend the Table of Allotments with respect to that community. However, Morris Communications Corporation is expected to abide by the requirements of Section 1.1104(3)(1) of the Commission's Rules when filing its application to implement the upgrade for Station KMXS(FM) at Anchorage.

List of Subjects in 47 CFR Part 73

Radio broadcasting.

Part 73 of Title 47 of the Code of Federal Regulations is amended as follows:

PART 73—[AMENDED]

1. The authority citation for part 73 reads as follows:

Authority: 47 U.S.C. 154, 303, 334, 336.

§ 73.202 [Amended]

2. Section 73.202(b), the Table of FM Allotments under Alaska, is amended by adding Sterling, Channel 231C2.

3. Section 73.202(b), the Table of FM Allotments under Alaska, is amended by adding Channel 265C2 at Wasilla.

Federal Communications Commission.

John A. Karousos,

Chief, Allocations Branch, Policy and Rules Division, Mass Media Bureau.

[FR Doc. 99-9766 Filed 4-19-99; 8:45 am]

BILLING CODE 6712-01-P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AF59

Endangered and Threatened Wildlife and Plants; Emergency Rule To List the Sierra Nevada Distinct Population Segment of California Bighorn Sheep as Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Emergency rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), exercise our authority to emergency list the Sierra Nevada distinct population segment of California bighorn sheep (*Ovis canadensis californiana*), occupying the Sierra Nevada of California, as endangered under the Endangered Species Act of 1973, as amended (Act). The Sierra Nevada bighorn sheep is known from five disjunct subpopulations along the eastern escarpment of the Sierra Nevada totaling about 100 animals.

All five subpopulations are very small and are imminently threatened by mountain lion (*Puma concolor*) predation and disease. Because these threats constitute an emergency posing a significant risk to the well-being of the Sierra Nevada bighorn sheep, we find that emergency listing is necessary. This emergency rule provides Federal protection pursuant to the Act for this species for a period of 240 days. A proposed rule to list the Sierra Nevada bighorn sheep as endangered is published concurrently with this emergency rule in this same issue of the **Federal Register** in the proposed rule section.

DATES: This emergency rule becomes effective immediately upon publication and expires December 16, 1999.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, 2493 Portola Rd. Suite B, Ventura, California 93003.

FOR FURTHER INFORMATION CONTACT: Carl Benz, at the address listed above (telephone 805/644-1766; facsimile 805/644-3958).

Background

The bighorn sheep (*Ovis canadensis*) is a large mammal (family Bovidae) originally described by Shaw in 1804 (Wilson and Reeder 1993). Several subspecies of bighorn sheep have been recognized on the basis of geography and differences in skull measurements (Cowan 1940; Buechner 1960). These subspecies of bighorn sheep, as described in these early works, include *O. c. cremnobates* (Peninsular bighorn sheep), *O. c. nelsoni* (Nelson bighorn sheep), *O. c. mexicana* (Mexican bighorn sheep), *O. c. weemsi* (Weems bighorn sheep), *O. c. californiana* (California bighorn sheep), and *O. c. canadensis* (Rocky Mountain bighorn sheep). However, recent genetic studies question the validity of some of these subspecies and suggest a need to re-evaluate overall bighorn sheep

taxonomy. For example, Sierra Nevada bighorn sheep appear to be more closely related to desert bighorn sheep than the *O. c. californiana* found in British Columbia (Ramey 1991, 1993). Regardless, the Sierra Nevada bighorn sheep meets our criteria for consideration as a distinct vertebrate population segment (as discussed below) and is treated as such in this emergency rule.

The historical range of the Sierra Nevada bighorn sheep (*Ovis canadensis californiana*) includes the eastern slope of the Sierra Nevada, and, for at least one subpopulation, a portion of the western slope, from Sonora Pass in Mono County south to Walker Pass in Kern County, a total distance of about 346 kilometers (km) (215 miles (mi)) (Jones 1950; Wehausen 1979, 1980). By the turn of the century, about 10 out of 20 historical subpopulations survived. The number dropped to five subpopulations at mid-century, and down to two subpopulations in the 1970s, near Mount Baxter and Mount Williamson in Inyo County (Wehausen 1979). Currently, five subpopulations of Sierra Nevada bighorn sheep occur at Lee Vining Canyon, Wheeler Crest, Mount Baxter, Mount Williamson, and Mount Langley in Mono and Inyo counties, three of which are reintroduced subpopulations established from sheep obtained from the Mount Baxter subpopulation from 1979 to 1986 (Wehausen *et al.* 1987).

The Sierra Nevada bighorn sheep is similar in appearance to other desert associated bighorn sheep. The species' pelage shows a great deal of color variation, ranging from almost white to dark brown, with a white rump. Males and females have permanent horns; the horns are massive and coiled in males, and are smaller and not coiled in females (Jones 1950; Buechner 1960). As the animals age, their horns become rough and scarred with age, and will vary in color from yellowish-brown to dark brown. In comparison to many other desert bighorn sheep, the horns of the Sierra Nevada bighorn sheep are generally more divergent as they coil out from the base (Wehausen 1983). Adult male sheep stand up to a meter (m) (3 feet (ft)) tall at the shoulder; males weigh up to 99 kilograms (kg) (220 pounds (lbs)) and females 63 kg (140 lbs) (Buechner 1960).

The current and historical habitat of the Sierra Nevada bighorn sheep is almost entirely on public land managed by the U.S. Forest Service (USFS), Bureau of Land Management (BLM), and National Park Service (NPS). The Sierra Nevada is located along the eastern boundary of California, and peaks vary

in elevation from 1825 to 2425 m (6000 to 8000 ft) in the north, to over 4300 m (14,000 ft) in the south adjacent to Owens Valley, and then drop rapidly in elevation in the southern extreme end of the range (Wehausen 1980). Most precipitation, in the form of snow, occurs from October through April (Wehausen 1980).

Sierra Nevada bighorn sheep inhabit the alpine and subalpine zones during the summer, using open slopes where the land is rough, rocky, sparsely vegetated and characterized by steep slopes and canyons (Wehausen 1980; Sierra Nevada Bighorn Sheep Interagency Advisory Group (Advisory Group) 1997). Most of these sheep live between 3,050 and 4,270 m (10,000 and 14,000 ft) in elevation in summer (John Wehausen, University of California, White Mountain Research Station, pers. comm. 1999). In winter, they occupy high, windswept ridges, or migrate to the lower elevation sagebrush-steppe habitat as low as 1,460 m (4,800 ft) to escape deep winter snows and find more nutritious forage. Bighorn sheep tend to exhibit a preference for south-facing slopes in the winter (Wehausen 1980). Lambing areas are on safe steep, rocky slopes. They prefer open terrain where they are better able to see predators. For these reasons, they usually avoid forests and thick brush if possible (J. Wehausen, pers. comm. 1999).

Bighorn sheep are primarily diurnal, and their daily activity show some predictable patterns that consists of feeding and resting periods (Jones 1950). Bighorn sheep are primarily grazers, however, they may browse woody vegetation when it is growing and very nutritious. They are opportunistic feeders selecting the most nutritious diet from what is available. Plants consumed include varying mixtures of graminoids (grasses), browse (shoots, twigs, and leaves of trees and shrubs), and herbaceous plants depending on season and location (Wehausen 1980). In a study of the Mount Baxter and Mount Williamson subpopulations, Wehausen (1980) found that grass, mainly *Stipa speciosa* (perennial needlegrass), is the primary diet item in winter. As spring green-up progresses, the bighorn sheep shift from grass to a more varied browse diet, which includes *Ephedra viridis* (Mormon tea), *Eriogonum fasciculatum* (California buckwheat), and *Purshia* species (bitterbrush).

Sierra Nevada bighorn sheep are gregarious, with group size and composition varying with gender and from season to season. Spatial segregation of males and females occurs

outside the mating season, with males more than 2 years old living apart from females and younger males for most of the year (Jones 1950; Cowan and Geist 1971; Wehausen 1980). Ewes generally remain all their lives in the same band into which they were born (Cowan and Geist 1971). During the winter, Sierra Nevada bighorn sheep concentrate in those areas suitable for wintering, preferably Great Basin habitat (sagebrush steppe) at the very base of the eastern escarpment. Subpopulation size can number more than 100 sheep, including rams (this was observed at a time when the population size was larger than it is currently) (J. Wehausen, pers. comm. 1999). By summer, these subpopulations decrease in size as more habitat becomes available. Breeding takes place in the fall, generally in November (Cowan and Geist 1971). Single births are the norm for North American wild sheep, but twinning is known to occur (Wehausen 1980). Gestation is about 6 months (Cowan and Geist 1971).

Lambing occurs between late April to early July, with most lambs born in May or June (Wehausen 1980, 1996). Ewes with newborn lambs live solitarily for a short period before joining nursery groups that average about six sheep. Ewes and lambs frequently occupy steep terrain that provides a diversity of slopes and exposures for escape cover. Lambs are precocious, and within a day or so, climb almost as well as the ewes. Lambs are able to eat vegetation within 2 weeks of their birth and are weaned between 1 and 7 months of age. By their second spring, they are independent of their mothers. Female lambs stay with ewes indefinitely and may attain sexual maturity during the second year of life. Male lambs, depending upon physical condition, may also attain sexual maturity during the second year of life (Cowan and Geist 1971). Average lifespan is 9 to 11 years in both sexes, though some rams are known to have lived 12 to 14 years (Cowan and Geist 1971; Wehausen 1980).

Distinct Vertebrate Population Segment

Recent analyses of bighorn sheep genetics and morphometrics (size and shape of body parts) suggest reevaluation of the taxonomy of Sierra Nevada bighorn sheep (*Ovis canadensis californiana*) is necessary (Ramey 1991, 1993, 1995; Wehausen and Ramey 1993, 1998). A recent analysis of the taxonomy of bighorn sheep using morphometrics (e.g., size and shape of skull components) failed to support the current taxonomy (Wehausen and Ramey 1993). However, this and other research (Ramey 1993) support

taxonomic distinction of the Sierra Nevada bighorn sheep relative to other nearby regions.

The biological evidence supports recognition of Sierra Nevada bighorn sheep as a distinct vertebrate population segment for purposes of listing, as defined in our February 7, 1996, Policy Regarding the Recognition of Distinct Vertebrate Population Segments (61 FR 4722). The definition of "species" in section 3(16) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*) includes "any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." For a population to be listed under the Act as a distinct vertebrate population segment, three elements are considered—(1) the discreteness of the population segment in relation to the remainder of the species to which it belongs; (2) the significance of the population segment to the species to which it belongs; and (3) the population segment's conservation status in relation to the Act's standards for listing (i.e., is the population segment endangered or threatened?) (61 FR 4722).

The distinct population segment (DPS) of bighorn sheep in the Sierra Nevada is discrete in relation to the remainder of the species as a whole. This DPS is geographically isolated and separate from other California bighorn sheep. There is no mixing of this population with other bighorn sheep, and this is supported by evaluation of the population's genetic variability and morphometric analysis of skull and horn variation (Ramey 1993, 1995; Wehausen and Ramey 1993, 1994; Wehausen and Ramey 1999 (in review)). Researchers suggest that all other populations of *O. c. californiana* be reassigned to other subspecies, leaving *O. c. californiana* (i.e., the DPS that is the subject of this rule) only in the central and southern Sierra Nevada (Ramey 1993, 1995; Wehausen and Ramey 1993, 1994; Wehausen and Ramey 1999 (in review)).

Sierra Nevada bighorn sheep DPS is biologically and ecologically significant to the species to which it belongs in that it constitutes the only population of California bighorn sheep inhabiting the Sierra Nevada. This DPS extends from Sonora Pass to Walker Pass, and spans approximately 346 km (215 mi) of contiguous suitable habitat in the United States. The loss of Sierra Nevada bighorn sheep would result in the total extirpation of bighorn sheep from the Sierra Nevada in California.

Status and Distribution

Historically, bighorn sheep populations occurred along and east of the Sierra Nevada crest from Sonora Pass (Mono County) south to Walker Pass (Olancho Peak) (Kern County) (Jones 1950; Wehausen 1979). Sheep apparently occurred wherever appropriate rocky terrain and winter range existed. With some exception, most of the populations wintered on the east side of the Sierra Nevada and spent summers near the crest (Wehausen 1979).

Subpopulations of Sierra Nevada bighorn sheep probably began declining with the influx of gold miners to the Sierra Nevada in the mid-1880s, and those losses have continued through the 1900s (Wehausen 1988). By the 1970s, only 2 subpopulations of Sierra Nevada bighorn sheep, those near Mount Baxter and Mount Williamson in Inyo County, are known to have survived (Wehausen 1979). Specific causes for the declines are unknown. Market hunting may have been a contributing factor as evidenced by menus from historic mining towns such as Bodie, which included bighorn sheep (Advisory Group 1997). However, with the introduction of domestic sheep in the 1860s and 1870s, wild sheep are known to have died in large numbers in several areas from disease contracted from domestic livestock (Jones 1950; Buechner 1960). Large numbers of domestic sheep were grazed seasonally in the Owens Valley and Sierra Nevada prior to the turn of the century (Wehausen 1988), and disease is believed to be the factor most responsible for the disappearance of bighorn sheep subpopulations in the Sierra Nevada. Jones (1950) suggested that scabies was responsible for a die-off in the 1870s on the Great Western Divide. Experiments have confirmed that bacterial pneumonia (*Pasteurella* species), carried normally by domestic sheep, can be fatal to bighorn sheep (Foreyt and Jessup 1982).

By 1979, only 220 sheep were known to exist in the Mount Baxter subpopulation, and 30 in the Mount Williamson subpopulation (Wehausen 1979). Conservation efforts by several Federal and State agencies from 1970 to 1988 were aimed at expanding the distribution of Sierra Nevada bighorn sheep by translocating sheep back into historical habitat. Sheep were obtained from the Mount Baxter subpopulation and transplanted to three historic locations. Consequently, Sierra Nevada bighorn sheep now occur in five subpopulations in Mono and Inyo counties: Lee Vining Canyon, Wheeler Crest, Mount Baxter, Mount Williamson,

and Mount Langley. The Sierra Nevada bighorn sheep population reached a high of about 310 in 1985–86. Subsequently, population surveys have documented a declining trend (J. Wehausen, pers. comm. 1999).

The following table best represents the total Sierra Nevada bighorn sheep population over various time periods. These totals represent the numbers of sheep emerging from winter in each of these years, and best document the status of the population by incorporating winter mortality, especially of lambs born the previous year. These totals are not absolute values; numbers have been rounded to the nearest five (J. Wehausen, pers. comm. 1999). The continuing decline of the Sierra Nevada bighorn sheep has been attributed to a combination of the direct and indirect effects of predation (Wehausen 1996).

TABLE 1. SIERRA NEVADA BIGHORN SHEEP POPULATION NUMBERS, BY YEAR (J. WEHAUSEN, PERS. COMM. 1999)

Year	Number of populations	Total sheep
1978	2	250
1985	4	310
1995	5	100
1996	5	110
1997	5	130
1998	5	100

Previous Federal Action

In our September 18, 1985, Notice of Review, we designated the Sierra Nevada bighorn sheep as a category 2 candidate and solicited status information (50 FR 37958). Category 2 candidates were those taxa for which we had information indicating that proposing to list as endangered or threatened was possibly appropriate, but for which sufficient data on biological vulnerability and threats were not currently available to support a proposed rule. Category 1 taxa were those taxa for which we had sufficient information on file to support issuance of proposed listing rules. In our January 6, 1989 (54 FR 554), and November 21, 1991 (56 FR 58804), Notices of Review, we retained the Sierra Nevada bighorn sheep in category 2. Beginning with our February 28, 1996, Notice of Review (61 FR 235), we discontinued the designation of multiple categories of candidates, and we now consider only taxa that meet the definition of former category 1 as candidates for listing. At this point, the Sierra Nevada bighorn

sheep was identified as a species of concern.

The processing of this emergency rule conforms with our listing priority guidance published in the **Federal Register** on May 8, 1998 (63 FR 25502). This guidance clarifies the order in which we will process rulemakings giving highest priority (Tier 1) to processing emergency listings and second highest priority (Tier 2) to resolving the listing status of outstanding proposed listings, resolving the conservation status of candidate species, processing administrative findings on petitions to add species to the lists or reclassify species from threatened to endangered status, and delisting or reclassifying actions. The lowest priority actions, processing critical habitat designations, are in Tier 3. This emergency rule constitutes a Tier 1 action.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, we have determined that the Sierra Nevada bighorn sheep warrants classification as an endangered distinct population segment. We followed procedures found at section 4 of the Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act. We may determine a species to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors, and their application to the Sierra Nevada bighorn sheep distinct population segment (*Ovis canadensis californiana*), are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* Habitat throughout the historic range of Sierra Nevada bighorn sheep remains essentially intact; the habitat is neither fragmented nor degraded. However, by 1900, about half of the Sierra Nevada bighorn sheep populations were lost, most likely because of introduction of diseases by domestic livestock, and illegal hunting (Advisory Group 1997). Beginning in 1979, animals from the Mount Baxter subpopulation were translocated to reestablish subpopulations in Lee Vining Canyon, Wheeler Crest, and Mount Langley in Mono and Inyo counties (Advisory Group 1997). Currently, Sierra Nevada bighorn sheep are limited to five subpopulations. Almost all of the historical and current habitat is administered by either the USFS, BLM, or NPS. Some small parcels of inholdings within the species' range are owned by the Los Angeles Department

of Water and Power. Also, there are some patented mining claims in bighorn sheep habitat, but the total acreage is small.

B. Overutilization for commercial, recreational, scientific, or educational purposes. During the period of the California gold rush (starting about 1849), hunting to supply food for mining towns may have played a role in the decline of the population (Wehausen 1988). Besides being sought as food, Sierra Nevada bighorn sheep were also killed by sheepmen who considered wild sheep as competitors for forage with domestic sheep. The decimation of several wildlife species in the late 1800s prompted California to pass legislation providing protection to deer, elk, pronghorn antelope, and bighorn sheep (Jones 1950; Wehausen 1979).

Commercial and recreational hunting of Sierra Nevada bighorn sheep is not permitted under State law. There is no evidence that other commercial, recreational, scientific, or educational activities are currently a threat. Poaching does not appear to be a problem at this time.

C. Disease or predation. Disease is believed to have been the major contributing factor responsible for the precipitous decline of Sierra Nevada bighorn sheep starting in the late 1800s (Foreyt and Jessup 1982).

Bighorn sheep are host to a number of internal and external parasites, including ticks, lice, mites, tapeworms, roundworms, and lungworms. Most of the time, parasites are present in relatively low numbers and have little effect on individual sheep and populations (Cowan and Geist 1971).

Cattle were first introduced into the Sierra Nevada in 1860s but were replaced with domestic sheep that could graze more extensively over the rugged terrain (Wehausen *et al.* 1987; Wehausen 1988). Large numbers of domestic sheep were grazed seasonally in the Sierra Nevada prior to the turn of the century, and the domestic sheep would use the same ranges as the wild sheep, occasionally coming into direct contact with them. Both domestic sheep and cattle can act as disease reservoirs. Scabies, most likely contracted from domestic sheep, caused a major decline of bighorn sheep in California in the 1870s to the 1890s and caused catastrophic die-offs in other parts of their range (Buechner 1960). A die-off of bighorn sheep in the 1870s on the Great Western Divide (Mineral King area of Sequoia National Park) was attributed to scabies, presumably contracted from domestic sheep (Jones 1950).

Die-offs from pneumonia contracted from domestic sheep is another important cause of losses. In 1988, a strain of pneumonia, apparently contracted from domestic sheep, wiped out a reintroduced herd of bighorn sheep in Modoc County. Native bighorn sheep cannot tolerate strains of respiratory bacteria, such as *Pasteurella* species, carried normally by domestic sheep and close contact with domestic animals results in transmission of disease and subsequent deaths of the exposed animals (Foreyt and Jessup 1982). Bighorn sheep can also develop pneumonia independent of contact with domestic sheep. Lungworms of the genus *Protostrongylus* are often an important contributor to the pneumonia disease process in some situations (J. Wehausen, pers. comm. 1999). Lungworms are carried by an intermediate host snail, which is ingested by a sheep as it is grazing. Lungworm often exists in a population, but usually doesn't cause a problem. However, if the sheep are stressed in some way, they may develop bacterial pneumonia, which is complicated by lungworm infestation. Bacterial pneumonia is usually a sign of weakness caused by some other agent such as a virus, parasite, poor nutrition, predation, human disturbance, or environmental or behavioral stress that lowers the animal's resistance to disease (Wehausen 1979; Foreyt and Jessup 1982). Bighorn sheep in the Sierra Nevada carry *Protostrongylus* species (lungworms), but the parasite loads have been low, and there has been no evidence of any clinical signs of disease or disease transmission (Wehausen 1979; Richard Perloff, Inyo National Forest, pers. comm. 1999).

Currently, domestic sheep grazing allotments are permitted by the U.S. Forest Service in areas adjacent to Sierra Nevada bighorn sheep subpopulations. Domestic sheep occasionally escape the allotments and wander into bighorn sheep areas, sometimes coming into direct contact with bighorn sheep (Advisory Group 1997). For example, in 1995, 22 domestic sheep that were permitted on USFS land wandered away from the main band and were later found in Yosemite National Park, after crossing through occupied bighorn sheep habitat (Advisory Group 1997; Bonny Pritchard, Inyo National Forest, pers. comm. 1999; R. Perloff, pers. comm. 1999). Other stray domestic sheep, in smaller numbers, have been known to wander up the road in Lee Vining Canyon into bighorn sheep habitat (B. Pritchard, pers. comm. 1999). Based on available information, and

given the susceptibility of bighorn sheep to introduced pathogens, disease will continue to pose a significant and underlying threat to the survival of Sierra Nevada bighorn sheep until the potential for contact with domestic sheep is eliminated.

Predators such as coyote (*Canis latrans*), bobcat (*Lynx rufus*), mountain lion, gray fox (*Urocyon cinereoargenteus*), golden eagle (*Aquila chrysaetos*), and free-roaming domestic dogs prey upon bighorn sheep (Jones 1950; Cowan and Geist 1971). Predation generally has an insignificant effect except on small populations such as the Sierra Nevada bighorn sheep. Coyotes are the most abundant large predator sympatric (occurring in the same area) with bighorn sheep populations (Bleich 1999) and are known to have killed young Sierra Nevada bighorn sheep (Vernon Bleich, California Department of Fish and Game, pers. comm. 1999). In the late 1980s, mountain lion predation of Sierra Nevada bighorn sheep increased throughout their range (Wehausen 1996). This trend has continued into the 1990s, as evidenced by Table 1.

Predation by mountain lion probably was a natural occurrence and part of the natural balance of this ecosystem. From 1907 to 1963, the State provided a bounty on mountain lions; the State also hired professional lion hunters for many years. The bounty most likely kept the mountain lion population reduced such that bighorn sheep predation was rare and insignificant. Between 1963 and 1968, mountain lions were managed as a nongame and nonprotected mammal, and take was not regulated. From 1969 to 1972, lions were re-classified as game animals. A moratorium on mountain lion hunting began in 1972 and lion numbers likely increased. In 1986, the species was again classified as a game animal, but the California Department of Fish and Game (CDFG) hunting recommendations were challenged in court in 1987 and 1988 (Torres *et al.* 1996). In 1990, a State-wide ballot initiative (Proposition 117) passed into law prohibiting the killing of mountain lions except if humans or their pets or livestock are threatened. Another ballot measure, Proposition 197, which would have modified current law regarding mountain lion management failed to pass in 1996, largely because of the public's concern that the change may allow mountain lion hunting (Torres *et al.* 1996). With the removal of the ability to control the mountain lion population, lion predation has become a significant limiting factor for the Sierra Nevada bighorn sheep.

The increased presence of mountain lions appears to have changed Sierra Nevada bighorn sheep winter habitat use patterns. Wehausen (1996) looked at mountain lion predation in two bighorn sheep subpopulations, one in the Granite Mountains of the eastern Mojave Desert, and the other was the Mount Baxter subpopulation in the Sierra Nevada. He found that the lions reduced the subpopulation in the Granite Mountains to eight ewes between 1989 and 1991, and held it at that level for 3 years, after which lion predation decreased and the bighorn sheep subpopulation increased at 15 percent per year for 3 years. All the mortality in that subpopulation was attributed to mountain lion predation. The Mount Baxter bighorn sheep subpopulation abandoned its winter ranges, presumably due to mountain lion predation. Forty-nine sheep were killed by lions on their winter range between 1976 and 1988 out of an average subpopulation size of 127 sheep. These mortalities from mountain lion predation represented 80 percent of all mortality on the winter range, and 71 percent for all ranges used. There is also evidence that many of the bighorn sheep killed were prime-aged animals (J. Wehausen, pers. comm. 1999).

The bighorn sheep on Mount Baxter moved to higher elevations possibly to evade lions. By avoiding the lower terrain and higher quality forage present during the spring, sheep emerge from the winter months in poorer condition. Consequences from the change in habitat use resulted in a decline in the Mount Baxter subpopulation due to decreased lamb survival, because lambs were born later and died in higher elevations during the winter. This may have also been the case with the Lee Vining subpopulation decline, when the bighorn sheep ran out of fat reserves at a time when they should have been replenishing their reserves with highly nutritious forage from low elevation winter ranges. Because of the winter habitat shift by the bighorn sheep, the Mount Baxter subpopulation has declined significantly. With the large decline of bighorn sheep on Mount Baxter, the total population of Sierra Nevada bighorn sheep has now dropped below what existed when the restoration program began in 1979 (Wehausen 1996; Advisory Group 1997). In a 1996 survey on Mount Williamson, there was no evidence of groups of sheep, and this subpopulation was the last one found using its low-elevation winter range in 1986. Mountain lion predation may have led to the extirpation of this subpopulation, one of the last two

native subpopulations of Sierra Nevada bighorn sheep (Wehausen 1996; J. Wehausen, pers. comm. 1999).

The Sierra Nevada bighorn sheep restoration program used the Mount Baxter subpopulation as the source of reintroduction stock from 1979 to 1988. The three reintroduced subpopulations at Lee Vining Canyon, Wheeler Mountain, and Mount Langley all suffered from mountain lion predation shortly after translocation of sheep (Wehausen 1996). The Lee Vining Canyon subpopulation lost a number of sheep to mountain lion predation, threatening the success of the reintroduction effort (Chow 1991, cited by Wehausen (1996)). The subpopulation was supplemented with additional sheep and the State removed one mountain lion each year for 3 years, which helped reverse the decline of this subpopulation (Bleich *et al.* 1991 and Chow 1991, cited by Wehausen (1996)). Also, because domestic sheep are preyed upon by mountain lions, livestock operators who have a Federal permit to graze their sheep on USFS land can get a depredation permit from the State, and have the U.S. Department of Agriculture, Wildlife Services, remove the mountain lion. The Lee Vining Canyon subpopulation occurs in the general area where domestic sheep are permitted, and has benefitted for the last 4 or 5 years from the removal of two to three mountain lions per year that were preying on domestic sheep (B. Pritchard, pers. comm. 1999).

D. *The inadequacy of existing regulatory mechanisms.* In response to a very rapid decline in population numbers, in 1876, the State legislature amended a 1872 law that provided seasonal protection for elk, deer and pronghorn to include all bighorn sheep. Two years later, this law was amended, establishing a 4-year moratorium on the taking of any pronghorn, elk, mountain sheep or female deer. In 1882, this moratorium was extended indefinitely for bighorn sheep (Wehausen *et al.* 1987; Wehausen *et al.* 1988). In 1971, California listed the California bighorn sheep as "rare." The designation was changed to "threatened" in 1984 to standardize the terminology of the amended California Endangered Species Act (Advisory Group 1997), and upgraded the species to "endangered" in 1999 (San Francisco Chronicle 1999). Pursuant to the California Fish and Game Code and the California Endangered Species Act, it is unlawful to import or export, take, possess, purchase, or sell any species or part or product of any species listed as endangered or threatened. Permits may be authorized for certain scientific,

educational, or management purposes. The California Endangered Species Act requires that State agencies consult with the CDFG to ensure that actions carried out are not likely to jeopardize the continued existence of listed species.

The California Fish and Game Code provides for management and maintenance of bighorn sheep. The policy of the State is to encourage the preservation, restoration, and management of California's bighorn sheep. The CDFG supports the concept of separating livestock from bighorn sheep, by creating buffers, to decrease the potential for disease transmission. Such separation would require the purchase and elimination of livestock allotments. However, the State does not have authority to regulate grazing practices on Federal lands. State listing has not prompted the BLM or USFS to effectively address disease transmission associated with Federal livestock grazing programs.

Since the Sierra Nevada bighorn sheep was listed by the State of California in 1971, the CDFG has undertaken numerous efforts for the conservation of the sheep, including but not limited to—(1) intensive field studies; (2) reestablishment of three additional subpopulations in historical habitat; (3) creation, in 1981, of the Sierra Nevada Bighorn Sheep Interagency Advisory Group, including representatives from Federal, State, and local resource management agencies which has produced the Sierra Nevada Bighorn Sheep Recovery and Conservation Plan (1984) and a Conservation Strategy for Sierra Nevada Bighorn Sheep (1997); and (4) culling four mountain lions that were taking Sierra Nevada bighorn sheep, which played a significant role in the efforts to reestablish one subpopulation (Chow 1991, cited by Wehausen (1996)).

Mountain lion hunting has not occurred in California since 1972 (Torres *et al.* 1996). As a result of passage of Proposition 117 in 1990 prohibiting the hunting or control of mountain lions, the CDFG does not have the authority to remove mountain lions to protect the Sierra Nevada bighorn sheep and secure their survival.

Federal agencies have adequate authority to manage the land and activities under their administration to benefit the welfare of the bighorn sheep. Steps are being taken to enhance habitat through prescribed burning to improve forage and maintain open habitat, and to retire domestic sheep allotments that run adjacent to bighorn sheep habitat. For example, 650 acres were burned in 1997 in Lee Vining Canyon to reduce mountain lion hiding cover, and there

are plans to do more burns in other areas on USFS land (R. Perloff, pers. comm. 1999). However, in some cases, because of conflicting management concerns, conservation efforts are not proceeding as quickly as necessary. Although efforts have been underway for many years, the USFS has been unable to eliminate the known threat of contact between domestic sheep and the Sierra Nevada bighorn sheep by either eliminating adjacent grazing allotments, or modifying allotments such that a sufficient buffer zone exists that would prevent contact between wild and domestic sheep.

In 1971, the State, in cooperation with the USFS, established a sanctuary for the Mount Baxter and Mount Williamson subpopulation of Sierra Nevada bighorn sheep and called it the California Bighorn Sheep Zoological Area (Zoological Area) (Wehausen 1979; Inyo National Forest Land Management Plan (LMP) 1988). About 16,564 hectares (41,000 acres) of USFS land was set aside for these two subpopulations. At the time, it was felt that the reason for the species' decline was related to human disturbance. The sanctuary was designed to regulate human use in some areas, and reduce domestic sheep/wild sheep interaction by constructing a fence below the winter range of the Mount Baxter subpopulation along the USFS boundary (Wehausen 1979). Adjacent summer range on NPS land was also given a restrictive designation to reduce human disturbance (Wehausen 1979). The Zoological Area continues to receive special management by the USFS; it encompasses land designated as wilderness and mountain sheep habitat (LMP 1988; R. Perloff, pers. comm. 1999).

E. Other natural or manmade factors affecting its continued existence. The Sierra Nevada bighorn sheep population is critically small with a total of only about 100 sheep known from five subpopulations. There is no known interaction between the separate subpopulations. The Sierra Nevada bighorn sheep currently is highly vulnerable to extinction from threats associated with small population size and random environmental events.

Although inbreeding depression has not been demonstrated in the Sierra Nevada bighorn sheep, the number of sheep occupying all areas is critically low. The minimum size at which an isolated group of this species can be expected to maintain itself without the deleterious effects of inbreeding is not known. Researchers have suggested that a minimum effective population size of 50 is necessary to avoid short-term

inbreeding depression, and 500 to maintain genetic variability for long-term adaptation (Franklin 1980). Small populations are extremely susceptible to demographic and genetic problems (Caughley and Gunn 1996). Small populations suffer higher extinction probabilities from chance events such as skewed sex ratio of offspring, (e.g., fewer females being born than males). For example, the Mount Langley subpopulation has been declining. In 1996–97, out of a subpopulation of 4 ewes and 10 rams, 5 lambs were born, of which 4 were female. Although a positive event for this subpopulation, it could have been devastating if the female:male ratio of offspring had been reversed (J. Wehausen, pers. comm. 1999).

Small, isolated groups are also subject to extirpation by naturally occurring random environmental events, e.g., prolonged or particularly heavy winters and avalanches. In 1995, for example, a dozen sheep died in a single avalanche at Wheeler Ridge (J. Wehausen, pers. comm. 1999). Such threats are highly significant because currently the subpopulations are small and it is also common in bighorn sheep for all members of one sex to occur in a single group. During the very heavy winters in the late 1970s and early 1980s, there was no notable mortality in the subpopulations because they were using low elevation winter ranges (J. Wehausen, pers. comm. 1999).

Competition for critical winter range resources can occur between bighorn sheep and elk and/or deer (Cowan and Geist 1971). However, competition between these species does not appear significant since deer and bighorn sheep readily mix on winter range, and the habitat overlap between elk and bighorn sheep is slight (Wehausen 1979).

In addition to disease, mountain lion predation, and random natural events, other factors may contribute to bighorn sheep mortality. For example, two subpopulations (Wheeler Ridge and Lee Vining) have ranges adjacent to paved roadways exposing individuals from those subpopulations to potential hazards. Bighorn sheep have been killed by vehicles in Lee Vining Canyon on several occasions (V. Bleich, pers. comm. 1999).

Reason for Emergency Determination

Under section 4(b)(7) of the Act and regulations at 50 CFR 424.20, we may emergency list a species if the threats to the species constitute an emergency posing a significant risk to its well-being. Such an emergency listing expires 240 days following publication in the **Federal Register** unless, during

this 240-day period, we list the species following the normal listing procedures. We discuss the reasons why emergency listing the Sierra Nevada bighorn sheep as endangered is necessary below. In accordance with the Act, if at any time after we publish this emergency rule, we determine that substantial evidence does not exist to warrant such a rule, we will withdraw it.

Historically, the Sierra Nevada bighorn sheep ranged throughout central and southern Sierra Nevada. The historical habitat of the Sierra Nevada bighorn sheep remains intact. However, the entire range of the species has been reduced to five subpopulations—the Mount Williamson and Mount Baxter subpopulations, which are composed of native sheep, and the Lee Vining Canyon, Wheeler Ridge, and Mount Langley subpopulations, which are descended from sheep taken from the Mount Baxter subpopulation and translocated to historical habitat. These subpopulations have decreased in numbers significantly in the last several years (see Table 1). As discussed under factors C, D, and E in the Summary of Factors Affecting the Species section above, the immediacy of threats to the Sierra Nevada bighorn sheep is so great to a significant proportion of the total population that the routine regular listing process is not sufficient to prevent losses that may result in extinction or loss of significant recovery potential. An emergency posing a significant risk to the well-being and continued survival of the Sierra Nevada bighorn sheep exists as the result of the continual exposure to predation (primarily mountain lion), and the effects of avoidance by bighorn sheep of areas in which they are particularly vulnerable to predation by mountain lions. The Sierra Nevada bighorn sheep is also threatened by the potential increase of contact with domestic sheep in the spring and summer and the transmission of disease. The factors creating an extreme situation are discussed in detail below.

Because Sierra Nevada bighorn sheep exist only as a series of very small subpopulations vulnerable to extinction, the survival of Sierra Nevada bighorn sheep now depends on the most rapid possible increase in as many subpopulations as possible. These small subpopulations are vulnerable to extinction from chance demographic events and the continual loss of genetic variation if they remain small.

Vulnerability to Demographic Problems

Five subpopulations remain that include a total of nine female demes (i.e., local populations) (Mount Langley—eight ewes, Mount Williamson—three ewes, Black Mountain—five ewes, Sand Mountain—five ewes, Sawmill Canyon—two ewes, Wheeler Ridge—17 ewes, Mount Gibbs—two ewes, Tioga Crest—one ewe, Mount Warren—five ewes) (J. Wehausen, pers. comm. 1999). These demes are defined by separate geographic home range patterns of the females. Of these, the Mount Williamson, Black Mountain, and Tioga Crest demes appear not to use low elevation winter ranges at all, and they will probably go extinct as a result (J. Wehausen, pers. comm. 1999). The Black Mountain deme was previously part of the Sand Mountain deme (part of the Mount Baxter subpopulation) and became a separate deme after winter range abandonment occurred in the late 1980s. The five remaining ewes in this deme appear not to know of the Sand Mountain winter range, which lies considerably north of their home range. They were almost certainly all born after winter range abandonment on Sand Mountain. This deme has shown a steady decline in size (J. Wehausen, pers. comm. 1999).

There are six female demes that may persist, but all are still very vulnerable to extinction due to small size. Of the two ewes and lamb that spent February, 1998, at the mouth of Sawmill Canyon (another Mount Baxter subpopulation deme), only a ewe and a lamb remained when last seen there in 1998. Shortly after they were last seen, evidence of a mountain lion was found on the rocks where they had been weathering a month of severe winter storms. When the normal summer range of this deme of females was investigated twice last summer, it was difficult to find evidence of any sheep remaining. This deme may contain only a single remaining ewe, or none (J. Wehausen, pers. comm. 1999).

The Sand Mountain deme has had only four ewes in it for almost this entire decade. During the summer of 1998, Dr. John Wehausen finally documented a yearling female with them, thus the total of five ewes listed above. However, the four adult ewes must now be approaching the ends of their lives, making this deme also very vulnerable to extinction, even if they have been showing some increased winter range use. Without successful births and recruitment of female lambs

into this deme quickly, this deme will experience a decline.

Currently, there is a large lion occupying the winter range areas used by members of the Mount Langley deme. These ewes have been using that winter range enough over the past three winters to be showing a subpopulation increase (recruitment of five lambs for four ewes in the past 2 years). This lion could easily reverse that trend by killing multiple members of this deme and discouraging them from using this winter range. These ewes can be expected to begin appearing on this winter range any day (J. Wehausen pers. comm. 1999).

The Mount Warren deme that uses Lee Vining Canyon as a winter range continues to decline. Besides the loss of numerous ewes last winter or spring to unknown causes, one of two telemetered (radio-collared) ewes was lost to a lion on the winter range in April, 1998. The collar of the other ewe was recently dug out of a snow bank at 3050 m (10,000 ft) in Deer Creek, but biologists will be unable to investigate her cause of death until the summer of 1999 when the snow melts, allowing her carcass to be found. She was last documented alive in late October 1998, but was not with a group of 13 sheep seen in mid-December, thus she may have died in November. This leaves only five ewes in this deme. If the lion that killed at least one ewe in April 1998 returns this spring, it might seriously compromise the future of this deme (J. Wehausen, pers. comm. 1999).

With the likely extinction of some of the existing demes, the remaining demes become all the more important to the persistence of this distinct population segment. We do not know which demes may survive and which may die out. All population dynamics over the past 15 years have been unanticipated (J. Wehausen, pers. comm. 1999). In short, it is not possible to predict population trajectories. Individual mountain lions can do enormous damage to any of these small demes, as can catastrophic events such as snow avalanches. The current larger size of the Wheeler Ridge deme does not preclude it from experiencing a sudden decline, as the Mount Warren deme experienced last winter (J. Wehausen, pers. comm. 1999).

Every deme is critical to the survival of the DPS at this point. We do not know which ewes in each deme may prove to be the ones critical to persistence of those demes. Thus, every remaining female in every deme is critically important to the persistence of their demes.

Lastly, the potential for contact with domestic sheep and the transmission of disease could, by itself, eliminate an entire deme. Domestic sheep continue to stray into Sierra Nevada bighorn sheep habitat. Recently, domestic sheep have come in close proximity to the resident bighorn sheep on numerous occasions, but, by good fortune, domestic sheep have not come into contact with bighorn sheep during these events.

Vulnerability to demographic problems must be viewed as a combination of immediate threats of predation, changed habitat use due to the presence of mountain lions, the resultant decline in ewe nutrition and lamb survivorship, exposure to environmental catastrophes, and the transmission of disease from domestic sheep.

Vulnerability to Genetic Problems

Also unknown is the current distribution of genetic variation among all of these subpopulations. It will be at least a year before fecal DNA research will shed some light on this question (J. Wehausen, pers. comm. 1999). It is likely that each subpopulation has lost some genetic variability thereby reducing its ability for long-term adaptation. The ultimate goal of conserving this DPS must be to preserve as much of its genetic variation as possible. It is likely that all or some of the existing demes now contain some variation not represented in others. Once some measure of this distribution is known through DNA analysis, a possible goal will be to attempt to distribute that variation among as many subpopulations as possible. Until some measure of the distribution of genetic variation exists, every deme should be considered a significant portion of the overall population, just as they should from a demographic perspective. Maintenance of genetic variability requires preservation of rams in addition to ewes.

In summary, it is now necessary to consider that every individual is currently a significant portion of the overall population of Sierra Nevada bighorn sheep because of the small number of sheep remaining and extreme vulnerability of every deme to extinction. Losses from predation and the potential for disease transmission through contact with domestic sheep are threats posing a significant risk to the well-being of the DPS. For these

reasons, we find that the Sierra Nevada bighorn sheep is in imminent danger of extinction throughout all or a significant portion of its range and warrants immediate protection under the Act.

Critical Habitat

Critical habitat is defined in section 3 of the Act as—(i) the specific area within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those biological features (I) essential to the conservation of the species and (II) that may require special management considerations 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, 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. Our regulations (50 CFR 424.12(a)) state that critical habitat is not determinable if information sufficient to perform required analysis of impacts of the designation is lacking or if the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat. Section 4(b)(2) of the Act requires us to consider economic and other relevant impacts of designating a particular area as critical habitat on the basis of the best scientific data available. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the conservation benefits, unless to do such would result in the extinction of the species.

We find that designation of critical habitat for the Sierra Nevada bighorn sheep is not determinable at this time. We have determined that information sufficient to perform required analysis of impacts of the designation is lacking. We specifically solicit this information in the proposed rule (see “Public Comments Solicited” section) published in this same issue of the **Federal Register**. When a “not determinable” finding is made, we must, within 2 years of the publication date of the

original proposed rule, designate critical habitat, unless the designation is found to be not prudent. We will protect Sierra Nevada bighorn sheep habitat through section 7 consultations to determine whether Federal actions are likely to jeopardize the continued existence of the species, through the recovery process, through enforcement of take prohibitions under section 9 of the Act, and through the section 10 process for activities on non-Federal lands with no Federal nexus.

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 encourages and results in conservation actions by Federal, State, and private agencies, groups 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. We discuss the protection required of Federal agencies and the prohibitions against taking and harm, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened, and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402. Section 7(a)(4) of the Act requires Federal agencies to confer informally with us 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 such a species or to destroy or adversely modify its critical habitat. If a Federal agency action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with us. Federal agency actions that may require conference and/or consultation include those within the jurisdiction of the USFS, BLM, and NPS.

We believe that protection of the Sierra Nevada bighorn sheep requires reduction of the threat of mountain lion predation, particularly during the months of April and May 1999 when bighorn sheep attempt to use low elevation winter ranges to obtain necessary nutrition after lambing, and ewes and lambs are most vulnerable to lion predation. Emergency listing will allow the Service to remove mountain lions that threaten Sierra Nevada bighorn sheep. Removal of mountain lions may not necessarily involve lethal techniques.

We believe that protection of the Sierra Nevada bighorn sheep also requires reduction of the threat of disease transmission from domestic sheep by preventing domestic sheep from coming into contact with bighorn sheep. We will work with the USFS to reduce the threat of disease transmission by domestic sheep. Reduction of this threat may involve elimination of grazing allotments adjacent to bighorn sheep habitat, or modifying allotments to create a sufficient buffer zone that would prevent contact between domestic sheep and bighorn sheep.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. The prohibitions, as codified at 50 CFR 17.21, in part, make it illegal for any person subject to the jurisdiction of the United States to take (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt any such conduct), import or export, transport in interstate or foreign 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 our agents and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. For endangered species, such permits are available for scientific purposes, to enhance the propagation or survival of the species, or for incidental take in connection with otherwise lawful activities.

Dated: April 14, 1999.

Jamie Rappaport Clark,

Director, Fish and Wildlife Service.

[FR Doc. 99-9935 Filed 4-19-99; 8:45 am]

BILLING CODE 4310-55-P