D. EPA Recommendations to Further Improve the Rule

AVAQMD should correct the reference in subsection (C)(2)(b) to subsection (C)(1)(c). The correct reference is to (C)(1)(a)(iii). Subsections (E)(3) and (G)(2) should be revised to require record retention for five years, rather than two.

E. Proposed Action and Public Comment

As authorized in sections 110(k)(3) and 301(a) of the Act, EPA is proposing a limited approval of the submitted rule to improve the SIP. If finalized, this action would incorporate the submitted rule into the SIP, including those provisions identified as deficient. This approval is limited because EPA is simultaneously proposing a limited disapproval of the rule under section 110(k)(3). If this disapproval is finalized, sanctions will be imposed under section 179 of the Act unless EPA approves subsequent SIP revisions that correct the rule deficiency within 18 months. These sanctions would be imposed according to 40 CFR 52.31. A final disapproval would also trigger the federal implementation plan (FIP) requirement under section 110(c). Note that the submitted rule has been adopted by the AVAQMD, and EPA's final limited disapproval would not prevent the local agency from enforcing it.

We will accept comments from the public on the proposed limited approval and limited disapproval for the next 30 days.

III. Statutory and Executive Order Reviews

Under Executive Order 12866 (58 FR 51735, October 4, 1993), this proposed action is not a "significant regulatory action'' and therefore is not subject to review by the Office of Management and Budget. For this reason, this action is also not subject to Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (66 FR 28355, May 22, 2001). This proposed action merely proposes to approve State law as meeting Federal requirements and imposes no additional requirements beyond those imposed by State law. Accordingly, the Administrator certifies that this proposed rule will not have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*). Because this rule proposes to approve pre-existing requirements under State law and does not impose any additional enforceable duty beyond that required by State law, it does not contain any unfunded mandate or significantly or uniquely affect small governments, as described in the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4).

This proposed rule also does not have tribal implications because it will not have a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes, as specified by Executive Order 13175 (65 FR 67249, November 9, 2000). This action also does not have Federalism implications because it does not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132 (64 FR 43255, August 10, 1999). This action merely proposes to approve a state rule implementing a Federal standard, and does not alter the relationship or the distribution of power and responsibilities established in the Clean Air Act. This proposed rule also is not subject to Executive Order 13045 "Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997), because it is not economically significant.

In reviewing SIP submissions, EPA's role is to approve state choices, provided that they meet the criteria of the Clean Air Act. In this context, in the absence of a prior existing requirement for the State to use voluntary consensus standards (VCS), EPA has no authority to disapprove a SIP submission for failure to use VCS. It would thus be inconsistent with applicable law for EPA, when it reviews a SIP submission, to use VCS in place of a SIP submission that otherwise satisfies the provisions of the Clean Air Act. Thus, the requirements of section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) do not apply. This proposed rule does not impose an information collection burden under the provisions of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*).

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Intergovernmental relations, Nitrogen dioxide, Ozone, Reporting and recordkeeping requirements.

Authority: 42 U.S.C. 7401 *et seq.*

Dated: March 30, 2004.

Laura Yoshii,

Acting Regional Administrator, Region IX.

[FR Doc. 04–9043 Filed 4–20–04; 8:45 am]

BILLING CODE 6560–50–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; 90-day Finding for Petitions To List the Greater Sage-grouse as Threatened or Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 90-day petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 90-day finding for three petitions to list the greater sage-grouse (Centrocercus urophasianus) as threatened or endangered, under the Endangered Species Act of 1973, as amended. We find that these petitions and additional information available in our files present substantial information indicating that listing the greater sage-grouse may be warranted. As a result of this finding, we are initiating a status review. We ask the public to submit to us any pertinent information concerning the status of or threats to this species.

DATES: The finding announced in this document was made on April 5, 2004. You may submit new information concerning this species for our consideration by June 21, 2004.

ADDRESSES: Data, information, comments, or questions concerning this finding should be submitted to the U.S. Fish and Wildlife Service, 4000 Airport Parkway, Cheyenne, Wyoming 82001. The petitions, finding, and supporting information are available for public inspection, by appointment, during normal business hours, at the above address. Submit new information, materials, comments, or questions concerning this species to the Service at the above address.

FOR FURTHER INFORMATION CONTACT: Dr. Pat Deibert, at the address given in the **ADDRESSES** section (telephone 307–772–2374; facsimile 307–772–2358).

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(A) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), requires that we make a finding on whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information to indicate that the petitioned action may be warranted. We are to base this finding on all information available to us at the time we make the finding. To the maximum extent practicable, we must make this finding within 90 days of receiving the petition and publish a notice of the finding promptly in the **Federal Register**. Our standard for substantial information with regard to a 90-day petition finding is "that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted'' (50 CFR 424.14(b)). When a substantial finding is made, we are required to promptly begin a review of the status of the species, if one has not already been initiated.

On July 2, 2002, we received a petition from Craig C. Dremann to list the greater sage-grouse (*Centrocercus urophasianus*) as endangered across its entire range. Mr. Dremann's 7-page petition summarizes several threats to the species' habitat, based on the author's review of the Oregon Bureau of Land Management's (BLM) management guidelines for the greater sage-grouse (Barett *et al.* 2000). A second petition requesting the same action was received from the Institute for Wildlife Protection on March 24, 2003 (cited as Webb 2002). On December 29, 2003, we received a third petition from the American Lands Alliance and 20 additional conservation organizations (American Lands Alliance *et al.*) to list the greater sage-grouse as threatened or endangered rangewide. Both of these petitions describe multiple threats to the greater sage-grouse from habitat loss and degradation, overutilization, disease and predation, the lack of regulatory protection, human-related factors (*e.g.*, pesticide use), and natural events (*e.g.*, drought). They also provide an extensive discussion, citing scientific literature, of how the unique biological characteristics of the greater sage-grouse compound extrinsic threats affecting the species' habitat and genetic stability. These petitions are 553 and 218 pages, with an additional 459 and 306 pages of literature cited, respectively. Because the petitions submitted by the Institute for Wildlife Protection and American Lands Alliance *et al.* were received after Mr. Dremann's petition, we consider those as providing supporting information for the original request.

In addition to reviewing the three petitions, we have reviewed other pertinent information and scientific literature available in our files, as well as other information that has been provided to us, including detailed comments on the petitions (particularly on the American Lands Alliance *et al.* petition) submitted by the Petroleum Association of Wyoming (PAW).

In addition to the petitions discussed above, we have previously addressed a number of other petitions related to subspecies and Distinct Population Segments (DPSs) of the greater sage-grouse. In a 90-day finding on a petition submitted by the Institute for Wildlife Protection to list the western subspecies of the greater sage-grouse (*C.u. phaios*) as threatened or endangered (February 7, 2003; 68 FR 6500), we concluded there was no scientific basis to recognize the eastern or western subspecies designations. Thus, we determined that the petition did not present substantial scientific or commercial information indicating that listing the western subspecies was warranted. For the same reason, on January 7, 2004, we published a negative 90-day finding for a subsequent petition from the same organization requesting that we list the eastern subspecies of the greater sage-grouse (*C.u. urophasianus*) (69 FR 933).

On May 7, 2001, we published a 12-month petition finding which determined that listing the Columbia Basin DPS of the western sage-grouse (now considered the greater sage-grouse) was warranted but precluded by higher priority listing actions (66 FR 22984). The Columbia Basin DPS of the greater sage-grouse is currently a candidate for listing (67 FR 40657). In a 90-day finding published December 26, 2002 (67 FR 78811), we determined that a petition to emergency list the Mono Basin population of the greater sage-grouse did not present substantial information, because the petitioner failed to adequately identify the DPS or provide sufficient information to document that continued existence of the species was threatened in the Mono Basin of California and Nevada.

A closely related species, the Gunnison sage-grouse (*C. minimus*), is currently on our candidate list (67 FR 40657). Because it is a separate species (Young *et al.* 2000), the Gunnison sage-grouse is not included in this finding.

We find the petitions by Craig C. Dremann, the Institute for Wildlife and the American Lands Alliance present substantial information indicating that listing the greater sage-grouse may be warranted. In making this finding we rely on information provided by the petitioners and evaluate that information in accordance with 50 CFR 424.14(b). The contents of this finding summarize that information included in the petition and which was available to us at the time of the petition review. Our review for the purposes of a so-called "90-day'' finding under section 4(b)(3)(A) of the Act and section 424.14(b) of our regulations is limited to a determination of whether the information in the petition meets the "substantial information'' threshold. We do not conduct additional research at this point, nor do we subject the petition to rigorous critical review. Rather, as the Act and regulations contemplate, at the 90-day finding, we accept the petitioner's sources and characterizations of the information unless we have specific information to the contrary. Our finding is that the petition states a reasonable case for listing on its face. Thus, in this finding, we express no view as to the ultimate issue of whether the species should be listed. We can come to a conclusion on that issue only after a more thorough review of the species' status. In that review, which will take approximately nine more months, we will perform a rigorous critical analysis of the best available scientific information, not just the information in the petition. We will ensure that the data used to make our determination as to the status of the species is consistent with the Endangered Species Act and the Information Quality Act. We ask the public to submit to us any pertinent information concerning the status of or threats to this species.

Biology and Distribution

The following information regarding the description and natural history of the greater sage-grouse (sage-grouse) (American Ornithologists' Union (AOU) 2000) has been condensed from these sources: Aldrich 1963; Johnsgard 1973; Connelly *et al.* 1988; Connelly *et al.* 2000; Fischer *et al.* 1993; Drut 1994; Western States Sage and Columbia Sharp-Tailed Grouse Technical Committee (WSSCSTGTC) 1996 and 1998; and Schroeder *et al.* 1999. Specific references are cited for data of particular relevance to this finding.

The sage-grouse is the largest North American grouse species. Adult males range in length from 66 to 76 centimeters (cm) (26 to 30 inches (in)) and weigh between 2 and 3 kilograms (kg) (4 and 7 pounds (lb)). Adult females range in length from 48 to 58 cm (19 to 23 in) and weigh between 1 and 2 kg (2 and 4 lb). Males and females have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark green toes. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers forming a ruff around the neck and upper belly. During breeding displays, males also exhibit olive-green apteria (fleshy bare patches of skin) on their breasts.

Sage-grouse depend on a variety of shrub-steppe habitats throughout their life cycle, and are particularly tied to several species of sagebrush (Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), mountain big sagebrush (*A. t. vaseyana*), and basin big sagebrush (*A. t. tridentata*)). Other sagebrush species, such as low sagebrush (*A. arbuscula*), black sagebrush (*A. nova*), fringed sagebrush (*A. frigida*) and silver sagebrush (*A. cana*) are also used. Throughout much of the year, adult sage-grouse rely on sagebrush to provide roosting cover and food. During the winter, they depend almost exclusively on sagebrush for food. The type and condition of shrub-steppe plant communities affect habitat use by sage-grouse populations (Connelly *et al.* 2000; Johnsgard 2002). However, these populations also exhibit strong site fidelity (loyalty to a particular area). Sage-grouse may disperse up to 160 kilometers (km) (100 miles (mi)) between seasonal use areas; however, average individual movements are generally less than 34 km (21 mi) (Schroeder *et al.* 1999). Sage-grouse also are capable of dispersing over areas of unsuitable habitat (Connelly *et al.* 1988). Because of the dependence of sage-grouse on sagebrush, they are rarely found outside of this habitat type (typically limited to periods of migration).

Sage-grouse consume a wide variety of forb (any herbaceous plant that is not a grass) species from spring to early fall (Schroeder *et al.* 1999). Hens require an abundance of forbs for pre-laying and nesting periods. An assortment of forb and insect species form important nutritional components for chicks during the early stages of development. Sage-grouse typically seek out more mesic (moist) habitats that provide greater amounts of succulent forbs and insects during the summer and early fall (Schroeder *et al.* 1999). Winter habitat use varies based upon snow accumulations and elevation gradients (Connelly *et al.* 2000). Sagebrush constitutes 100 percent of the sage-grouse winter diet as it is typically the only food resource available. Differences in the species of sagebrush consumed in the winter may be tied to availability, as well as preference for greater protein levels and lower levels of volatile oils (Connelly *et al.* 2000).

During the spring breeding season, primarily during the morning hours just after dawn, male sage-grouse gather together and perform courtship displays on display areas called leks. Areas of bare soil, short-grass steppe, windswept ridges, exposed knolls, or other relatively open sites may serve as leks. Leks are often surrounded by denser shrub-steppe cover. Leks can be formed opportunistically at sites within or adjacent to nesting habitat (Connelly *et al.* 2000), and therefore are not a limiting factor for sage-grouse. They range in size from less than 0.4 hectare (ha) (1 acre (ac)) to over 40 ha (100 ac) and can host from several to hundreds of males. Some leks are used for many years. These “historic’’ leks are typically larger than, and often surrounded by, smaller “satellite’’ leks, which may be less stable in size and location. A group of leks where males and females may interact within a breeding season or between years is called a lek complex. Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females for mating. A relatively small number of dominant males accounts for the majority of breeding on a given lek (Schroeder *et al.* 1999).

Females may travel more than 20 km (12.5 mi) after mating (Connelly *et al.* 2000). They typically select nest sites under sagebrush cover, although other shrub or bunchgrass species are sometimes used. Nests are relatively simple, consisting of scrapes on the ground that are sometimes lined with feathers and vegetation. Clutch size ranges from 6 to 13 eggs. Nest success ranges from 12 to 86 percent and is relatively low compared to other prairie grouse species (Connelly *et al.* 2000). Shrub canopy and grass cover provide concealment for sage-grouse nests and young, and are critical for reproductive success. Chicks begin to fly at 2 to 3 weeks of age, and broods remain together for up to 12 weeks. Most juvenile mortality occurs during nesting and the chicks’ flightless stage, and is due primarily to predation or severe weather conditions (Schroeder *et al.* 1999; Schroeder and Baydack 2001).

Sage-grouse typically live between 1 and 4 years, but sage-grouse up to 10 years of age have been recorded in the wild. The annual mortality rate for sage-grouse is roughly 50 to 55 percent, which is relatively low compared to other prairie grouse species. Females generally have a higher survival rate than males, which accounts for a female-biased sex ratio in adult birds.

Prior to European expansion into western North America, sage-grouse were believed to occur in 16 States and 3 Canadian provinces—Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, North Dakota, Nebraska, Kansas, Oklahoma, New Mexico, Arizona, British Columbia, Alberta, and Saskatchewan (Schroeder *et al.* 1999; Young *et al.* 2000). The distribution of sage-grouse has contracted in a number of areas, most notably along the northern and northwestern periphery and in the center of their historic range. At present, sage-grouse occur in 11 States and 2 Canadian provinces, ranging from extreme southeastern Alberta and southwestern Saskatchewan, south to western Colorado, and west to eastern California, Oregon, and Washington. Sage-grouse have been extirpated from Nebraska, Kansas, Oklahoma, New Mexico, Arizona, and British Columbia (Schroeder *et al.* 1999; Young *et al.* 2000). The vast majority of the current distribution of the greater sage-grouse is within the United States.

In a **Federal Register** notice dated August 24, 2000, we stated that, prior to European expansion across the continent, there may have been between 1.6 and 16 million sage-grouse in western North America (65 FR 51578). These estimates were calculated by multiplying sage-grouse density estimates for a range of habitats considered of low to high quality (assuming 1 grouse per 1 square kilometer (km^2) (0.4 square mile (mi^2)) as an approximate lower density limit, and 10 grouse per km^2 (0.4 mi^2) as an approximate upper density limit (Michael Schroeder, Washington Department of Fish and Wildlife, pers. comm. 1999, cited in 65 FR 51578)) by the most recent estimate of historic sage grouse distribution (1.6 million km^2 (0.64 million mi^2).

The WSSCSTGTC (1999) estimated that there may have been 1.1 million birds in 1800. Braun (1998) estimated that the 1998 rangewide spring population numbered about 157,000 sage-grouse, while we estimated the rangewide population of sage-grouse at roughly between 100,000 and 500,000 birds in 2000 (65 FR 51578; August 24, 2000). Using our population estimates in the August 24, 2000, **Federal Register** notice, sage-grouse population numbers may have declined between 69 and 99 percent from historic to recent times (65 FR 51578). The WSSCSTGTC (1999) estimated the decline between historic and present day to have been about 86 percent.

Apparently, much of the overall decline in sage-grouse abundance occurred from the late 1800s to the mid-1900s (Hornaday 1916; Crawford 1982; Drut 1994; Washington Department of

Fish and Wildlife 1995; Braun 1998; Schroeder *et al.* 1999). Other declines in sage-grouse populations apparently occurred in the 1920s and 1930s, and then again in the 1960s and 1970s (Connelly and Braun 1997). Sage-grouse populations in Colorado have declined from 45 to 82 percent since 1980. Populations in Wyoming and Washington have declined 17 and 47 percent, respectively, from pre-1985 to post-1985 (Braun 1998). Sage-grouse numbers in South Dakota declined from approximately 25,000 birds in the 1950's to 5,000 in 1992 (Drut 1994). In Utah, the decline is estimated at 50 percent since settlement (Drut 1994). The State of Nevada has reported declining sage-grouse populations since 1970 (Neel 2001). The aforementioned population trends are based on lek counts. Braun (1998) reports that the number of males per lek, an indicator of population trend, has continuously declined across the species' range since the early 1950s.

Taxonomic Issues

In 1946, Aldrich described a subspecies of greater sage-grouse in the northwestern portion of the species' range based on slight color differences in the plumage of 11 museum specimens. In 1957, the AOU recognized a subspecies division within the sage-grouse taxon. However, since that time it has not conducted a review of this subspecies distinction. The AOU stopped listing subspecies as of the 6th (1983) edition of its Checklist, although it recommended the continued use of the 5th edition for taxonomy at the subspecific level. The AOU has not formally or officially reviewed the subspecific treatment of most North American birds, although it is working toward that goal (Richard C. Banks, National Museum of Natural History, pers. comm. with Oregon Field Office of the Service 2000, 2002). Therefore, the western and eastern subspecies of sage grouse are still recognized by the AOU, based on its 1957 consideration of the taxon.

The validity of the taxonomic separation has been questioned (Johnsgard 1983; Johnsgard 2002; Benedict *et al.* 2003). In our 90-day petition findings for the western subspecies of the greater sage-grouse (68 FR 6500; February 7, 2003) and eastern subspecies of the greater sage-grouse (69 FR 933; January 7, 2004), we concluded there was no basis to recognize these subspecies due to the lack of distinct genetic differences between the two, the lack of ecological or physical factors that might indicate differentiation between the populations, and evidence that birds freely cross the supposed boundary between the subspecies. We continue to believe that our earlier conclusion regarding lack of subspecies differences is correct.

Conservation Status

Pursuant to section 4(a) of the Act, we may list a species, subspecies, or DPS of vertebrate taxa on the basis of any of the following five factors—(A) destruction, modification, or curtailment of habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequacy of existing regulatory mechanisms; and (E) other manmade or natural factors affecting its continued existence. The rangewide petition submitted by Mr. Dremann asserts that greater sage-grouse are subject to threats under Factor A. The other petitions assert that greater sage-grouse are subject to threats under all listing factors, but primarily under Factor A. We used information provided by the petitioners and available in our files to address these factors as follows.

Under Factor A, the petitioners assert that greater sage-grouse have been impacted by the permanent conversion of sagebrush habitats to agricultural lands, and provide both rangewide and site-specific examples which have been published in the scientific literature.

Sagebrush once covered roughly 63 million ha (156 million ac) in western North America (West 1996; Miller and Eddleman 2001, cited in Knick *et al.* 2003). In our review of the scientific literature, we found that western rangelands were converted to agricultural lands on a large scale under the series of Homestead Acts in the 1800s (Braun 1998). According to Schroeder *et al.* (1999), millions of hectares of native sagebrush habitat have been cultivated for the production of potatoes, wheat, and other crops. In some States, more than 70 percent of sagebrush shrub-steppe habitats have been converted to agricultural crops (Braun 1998). This impact has been especially apparent in the Columbia Basin of the Northwest and the Snake River Plain of Idaho. Dobler (1994) estimated that approximately 60 percent of the original shrub-steppe habitat in Washington has been converted to primarily agricultural uses. Hironaka *et al.* (1983, cited in Knick *et al.* 2003) estimated that 99 percent of basin big sagebrush (*A. t. tridentata*) habitat in the Snake River Plain has been converted to cropland.

Development of irrigation projects to support agricultural production also has resulted in additional sage-grouse habitat loss (Braun 1998). During the mid-1900s, a number of hydroelectric dams were developed on the Columbia and Snake Rivers in Washington and Oregon. More than 400 dams were constructed on the Columbia River system alone. The irrigation projects formed by these reservoirs converted native shrub-steppe habitat to irrigated croplands adjacent to the rivers. The projects precipitated conversion of large expanses of upland shrub-steppe habitat in the Columbia Basin for irrigated agriculture (August 24, 2000; 65 FR 51578). This conversion has resulted in the loss of 60 percent of the original 10.4 millon acres of shrub-steppe habitats present prior to European settlement in this area (Dobler 1994). The creation of these reservoirs also inundated hundreds of kilometers of riparian habitats used by sage-grouse broods (Braun 1998). Shrub-steppe habitat continues to be converted for both dryland and irrigated crop production, albeit at much-reduced levels (65 FR 51578; Braun 1998). However, the Bureau of Reclamation retains options for further development of the Columbia Basin Irrigation Project in central Washington (65 FR 51578).

All three petitions identified sagebrush conversion resulting from both chemical (herbicide) and mechanical treatments (shredding, roller chopping, hand slashing, bulldozing, beating, chaining, root plowing, and disk plowing) as a negative impact to greater sage-grouse habitat. The petitions quantify some of this conversion and discuss the resulting impacts to greater sage-grouse populations based on information provided in the scientific literature. Webb (2002) and American Lands Alliance *et al.* also extensively explore the cumulative effects on the greater sage-grouse resulting from habitat conversion using these methods.

Large expanses of sagebrush have been removed and reseeded with non-native grasses to increase forage production (Shane *et al.* 1983, cited in Knick *et al.* 2003). In addition, thinning to reduce sagebrush density has long been practiced and continues today (Wamboldt *et al.* 2002, cited in Knick *et al.* 2003). Braun (1998) concludes that since European settlement of western North America, no sagebrush habitats used by greater sage-grouse have escaped these types of treatments.

Mechanical treatments, if carefully designed and executed, can be beneficial to sage-grouse by improving herbaceous cover, forb production, and resprouting of sagebrush (Braun 1998). However, adverse effects also have been documented (Connelly *et al.* 2000). In Montana, the number of breeding males declined by 73 percent after 16 percent of the habitat was plowed (Connelly *et al.* 2000). Mechanical treatments in blocks greater than 100 ha (247 ac), or of any size reseeded with exotic grasses, degrade sage-grouse habitat by altering the structure and composition of the vegetative community (Braun 1998). Connelly *et al.* (2000) recommend managing for 15–25 percent of sagebrush canopy cover to maintain breeding habitat. Removal of greater than 40 percent of breeding habitat can result in the loss of the breeding population.

Greater sage-grouse response to herbicide treatments depends on the extent to which forbs and sagebrush are killed. Chemical control of sagebrush has resulted in major declines of sage-grouse breeding populations through the loss of live sagebrush cover (Connelly *et al.* 2000). Herbicide treatment also can result in sage-grouse emigration from affected areas (Connelly *et al.* 2000), and has been documented to reduce the brood carrying capacity of an area in Idaho (Klebenow 1970). While the total size of herbicide-treated areas is unknown, Braun (1998) estimates it exceeds 20 to 25 percent of the remaining sagebrush-dominated rangelands. Small treatments interspersed with nontreated sagebrush habitats appear to be neutral in their effects on sage-grouse. However, all large block treatments greater than 200 ha (494 ac) negatively affect sage-grouse (Braun 1998). Schroeder *et al.* (1999) and Braun (1998) estimated that millions of hectares within current sage-grouse habitat have been treated both mechanically and chemically to remove sagebrush since the early 1960s.

The petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* identify loss of habitat from mining as a significant impact to the greater sage-grouse. In addition to the direct loss of habitat resulting from strip mining, these petitions cite scientific literature regarding the difficulty of re-establishing sagebrush (Lovich and Bainbridge 1999, Saab and Rich 1997, and Rotenberry 1998, as cited in Webb 2002).

Development of mines and energy resources within the distribution of the sage-grouse began prior to 1900 (Robbins and Ward 1994, cited in Braun 1998). Coal, gold, and uranium mining has impacted sage-grouse habitats throughout the West (Braun 1998). Immediate impacts to the greater sage-grouse associated with mining include direct habitat loss from mining, especially open pit mining, and construction of associated facilities, roads, and powerlines (Braun 1998; Connelly *et al.* 2000). For example in Wyoming and Montana there is an estimated 38,833 ha (96,000 acres) of disturbed federal and nonfederal surface associated with existing coal mining operations. Over the next ten years, approximately 20,243 ha (50,000 acres) are estimated to be disturbed for coal mining activities. Of that, 14,170 ha (35,000 acres) should be reclaimed within the same time-period, resulting in a net annual disturbance of 607 ha (1,500 acres) (Kermit Witherbee, Bureau of Land Management, pers. commun.). However, long-term functional habitat recovery would require an extended period of time (Bureau of Land Management 2003), and population re-establishment may require at least 20 to 30 years (Braun 1998). Sage-grouse have been documented to return to some reclaimed mining areas, but there is no evidence that population levels attain their previous size (Braun 1998).

Proposed coal-bed methane development in the Powder River Basin of Wyoming is expected to result in the loss of 21,711 ha (53,626 ac) of sagebrush shrublands by 2011 (Bureau of Land Management 2003). Current sage-grouse habitat loss in the basin from coal-bed methane is estimated at 2,024 (5,000 ac) (Braun *et al.* 2002). Although reclamation of short-term disturbances will be concurrent with project development, “sage-grouse habitats would not be restored to pre-disturbance conditions for an extended period because of the time need to develop sagebrush stands with characteristics that are preferred by sage-grouse.'' (Bureau of Land Management 2003a). Disturbance to other sage-grouse habitats, such as late summer/brood-rearing areas, was not quantified in the Final Environmental Impact Statement for this project, but “disturbance would occur to all other habitat types, including nesting, brood rearing, and wintering areas that are located more than 0.25 miles from lek sites'' (Bureau of Land Management 2003a). The Bureau has proposed avoiding leks during the breeding season, minimizing noise from compressors, and locating powerlines 0.5 mi from breeding and nesting areas (Bureau of Land Management 2003a). Within the entire Powder River Basin, over 80 percent of the surface ownership where coal-bed methane development is occurring is private, where mitigation is not required (Braun *et al.* 2002).

All petitioners identified urban/suburban development as negatively impacting greater sage-grouse habitats. They support their concerns by identifying documented habitat losses from urban development in several states (Braun 1998 and Brigham 1995, as cited in Webb 2002), as well as information presented in the Gunnison sage-grouse management plans. The petitioners also discuss interrelated effects of urban/suburban development, such as construction of necessary infrastructure (roads, powerlines, and pipelines) and predation threats from the introduction of domestic pets.

Historic destruction of sage-grouse habitats for urban development undoubtedly occurred (Braun 1998). More recent urban expansion into rural subdivisions is also resulting in both direct habitat loss and conversion, as well as avoidance of suitable habitats by sage-grouse around these areas due to the presence of humans and pets (Braun 1998; Connelly *et al.* 2000). In some Colorado counties, up to 50 percent of sage-grouse habitat is under rural subdivision development, and it is estimated that 3 to 5 percent of all sage-grouse historic habitat in Colorado has been developed into urban areas (Braun 1998). We are unaware of similar estimates for other States within the range of the greater sage-grouse.

In addition to habitat loss from conversion to agriculture, chemical and mechanical treatments, mining development, and urban/suburban development, sagebrush habitat losses also are occurring as a result of the apparent interaction of natural and anthropogenic factors. According to an article in the Autumn 2003 issue of Utah Division of Wildlife Resource's “Wildlife Review,'' upwards of 400,000 acres (162,000 ha) of dead or dying Wyoming big sagebrush had been documented by State biologists by the end of June 2003 (Fairchild 2003). The species of sagebrush affected provides important food and cover to sagebrush obligate species, including greater sage-grouse. Reasons for the die-off are not entirely clear, but appear to be related to drought, fire suppression, and livestock and big game grazing.

All petitioners identify livestock grazing as one of the primary factors that has degraded greater sage-grouse habitats. The petitions discuss not only the direct impacts of livestock grazing on forage removal and sagebrush trampling (Patterson 1957, Yocom 1956, Dobkin 1995, Autenrieth *et al.* 1997, Klebenow 1982, Braun 1998, and Braun 2001, as cited in Webb 2002), but they also provide extensive reviews of associated factors, such as habitat degradation from livestock concentrations around water developments (Thomas *et al.* 1979 and Braun 1998, as cited in Webb 2002), habitat fragmentation from fences (Call and Maser 1985, Braun 1998 and Wilkinson 2001, as cited in Webb 2002), rangeland treatments to increase forage (Drut 1994, Rogers 1965, Klebenow 1970, Martin 1970, Pyrah 1970, 1971, Wallestad 1971, 1975 and Braun *et al.* 1977, as cited in Webb 2002), invasion of exotic vegetative species (Hoffman 1991, Drut 1994 and Fleischner 1994, as cited in Webb 2002), and changes in soil characteristics, particularly the soil crust (Mack and Thompson 1982 and Quigley and Arbelbide 1997, as cited in Dremann 2002; St. Clair *et al.* 1993, as cited in Webb 2002).

Due to the absence of habitat overlap, it is unlikely that sage-grouse evolved with intensive grazing by wild herbivores, such as bison (Connelly *et al.* 2000). While little experimental evidence directly links grazing management to sage-grouse population trends (Braun 1998), the reduction of grass heights in nesting and brood-rearing areas negatively affects nesting success by reducing cover necessary for predator avoidance (Gregg *et al.* 1994; DeLong *et al.* 1995; Connelly *et al.* 2000). In addition, livestock consumption of forbs may reduce food availability for sage-grouse (*see* discussion under Factor E). This is particularly important for pre-laying hens, as forbs provide calcium, phosphorus, and protein. A hen's nutritional condition affects nest initiation rate, clutch size, and subsequent reproductive success (Connelly *et al.* 2000). Livestock grazing also may result in trampling mortality of seedling sagebrush (Connelly *et al.* 2000). This information suggests that grazing by livestock could reduce breeding habitat, subsequently affecting sage-grouse populations negatively (Beck and Mitchell 2000). However, additional replication studies are necessary to determine the effect of grazing management on sage-grouse nesting success (Beck and Mitchell 2000). Exclosure studies have demonstrated that domestic livestock grazing also reduces water infiltration rates and cover of herbaceous plants and litter, as well as compacting soils and increasing soil erosion (Braun 1998). This results in a change in proportion of shrub, grass, and forbs components in the affected area, and an increased invasion of exotic vegetative species that do not provide suitable habitat for sage-grouse (Miller and Eddleman 2000). Development of springs and other water sources to support livestock in upland shrub-steppe habitats can artificially concentrate domestic and wild ungulates in important sage-grouse habitats, thereby exacerbating grazing impacts in those areas.

Excessive grazing by wild horses has been identified by all petitioners as contributing to a decline in sage-grouse habitat. We are unaware of any studies that specifically address the impact of wild horses on sagebrush and sage-grouse. However, we believe that some impacts from wild horse grazing may be similar to the nature of impacts from domestic livestock in sagebrush habitats.

Fire often has been used as a management tool to reduce sagebrush canopy cover (Connelly *et al.* 2000) for many reasons, including increasing forage for the benefit of domestic livestock and wild ungulates. Our knowledge of sage-grouse response to fire is imperfect, but current information indicates that the species' response to fire varies depending on a variety of factors. Some studies suggest fire increases forbs and other foods important to sage-grouse (Braun 1998); others show food resources do not change between burned and unburned areas (Connelly *et al.* 2000), but that sage-grouse populations decline in response to loss of habitat (Connelly *et al.* 2000). A clear positive response of greater sage-grouse to fire has not been demonstrated (Braun 1998). Several subspecies of "big'' sagebrush (*Artemisia tridentata tridentata, A.t. vaseyana,* and *A.t. wyomingensis*), which provide important sage-grouse habitat, are killed by fire and do not re-sprout after burning (Wrobleski and Kauffman 2003). This suggests that these sagebrush subspecies evolved in an environment where wildfire was infrequent (interval of 30 to 50 years) and patchy in distribution (Braun 1998). Therefore, frequent prescribed fires in these habitats may be detrimental to sage-grouse. The effect of fire on greater sage-grouse habitats in montane sagebrush communities is not clear (Connelly *et al.* 2000). Conversely, long fire intervals and fire suppression can result in increased dominance of woody species, such as western juniper (*Juniperus occidentalis*) (Wrobleski and Kauffman 2003), resulting in a near total loss of shrubs and sage-grouse habitat (Miller and Eddleman 2000).

Wildfires have destroyed extensive areas of sagebrush habitat in recent years. For example, 30 to 40 percent of the sage-grouse habitat in southern Idaho was lost in a 5-year period (1997–2001) due to range fires, according to S. Sather-Blair, a wildlife biologist for the BLM in Idaho (quoted in Healy 2001). The largest contiguous patch of sagebrush habitat in southern Idaho occupies approximately 700,000 acres, according to M. Pellant, a rangeland ecologist with the Idaho BLM (quoted in Healy 2001). Of that total area, about 500,000 acres burned in the years 1999–2001; half of the acres that burned had already been affected by previous fires. In Nevada in 2000, more than 660,000 acres burned statewide (NDOW Hunting Area and Unit 2000 Fire Report). Many of the fires burned in habitat that was in fairly good condition, and which supported good numbers of sage-grouse (NDOW Hunting Area and Unit 2000 Fire Report).

Frequent fires with short intervals within sagebrush habitats favor invasion of cheatgrass (*Bromus tectrorum*), an exotic species that is unsuitable as sage-grouse habitat (Schroeder *et al.* 1999). Large areas of habitat in the western distribution of the greater sage-grouse have already been converted to cheatgrass (Connelly *et al.* 2000). Recovery of an area to sagebrush after cheatgrass becomes established is extremely difficult. The loss of habitat due to cheatgrass establishment results in the loss of sage-grouse populations (Connelly *et al.* 2000). Conversion to cheatgrass also reduces wildfire intervals in sagebrush ecosystems from 30 to 5 years (Pellant 1996). These shortened fire intervals further exacerbate the effects of fire in remaining sage-grouse habitats. Conversion of sagebrush vegetation communities to exotic species, such as Russian thistle (*Salsola* spp.), halogeton (*Halogeton glomeratus*), and medusahead (*Taeniatherum asperum*), also has resulted in sage-grouse habitat loss (Miller and Eddleman 2000).

Petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* assert that military activities negatively affect sage-grouse habitats. These petitions primarily refer to documented negative effects to sage-grouse from activities on the Yakima Training Center in eastern Washington, as well as providing general information regarding impacts of track vehicles on vegetation and soils.

Military facilities are found throughout the range of the greater sage-grouse. The impact of military activities at these facilities on local sage-grouse populations vary from direct mortality to habitat degradation and loss. In the fall of 1995, the U.S. Army conducted its first large-scale training exercise at the 800 square km (313 square mi) Yakima Training Center in Washington State. Analysis of the impacts from this exercise indicated that over 9 percent of the sagebrush plants within sage-grouse protection areas experienced major structural damage (Cadwell *et al.* 1996). In addition, modeling exercises indicated that sagebrush cover would decline due to similar training scenarios if conducted on a biannual basis (Cadwell *et al.* 1996). Military training activities provide multiple ignition sources, thereby increasing the potential for fire within suitable sage-grouse habitat at military facilities. In 1996, over 25,000 ha (60,000 ac) of shrub-steppe habitat was burned as a result of training activities at the Yakima Training Center (65 FR 51578), and other large range fires have occurred at the installation since. The Yakima Training Center has developed a management plan for sage-grouse habitat on the facility (65 FR 51578). While military operations may significantly affect local sage-grouse populations, particularly where populations are isolated, there are few facilities that overlap suitable sage-grouse habitats. We could find no scientific information to support the petitioners' contention that military operations are a limiting factor on the greater sage-grouse populations range-wide.

The petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* assert that habitat fragmentation from mining and energy development, including windpower, negatively impacts the greater sage-grouse. In addition to the direct habitat loss previously mentioned, associated facilities, roads, and powerlines, as well as noise and increased human activities (*see* discussion under Factor E) associated with mining and energy development, can fragment sage-grouse habitats (Braun 1998; Connelly *et al.* 2000). More chronic impacts are less clear. Lek abandonment as a result of oil and gas development has been observed in Alberta (Connelly *et al.* 2000), and, in the Powder River Basin of Wyoming, leks within 0.4 km (0.25 mi) of a coal-bed methane well have significantly fewer males compared to less disturbed leks (Braun *et al.* 2002). The network of roads, trails, and powerlines associated with wells and compressor stations decreases the suitability and availability of sage-grouse habitat, and fragments remaining habitats (Aldridge and Brigham 2003). Human activities along these corridors can disrupt breeding activities and negatively affect survival (Aldridge and Brigham 2003). Female sage-grouse captured on leks near oil and gas development in Wyoming had lower nest-initiation rates, longer movements to nest sites, and different nesting habitats than hens captured on undisturbed sites (Lyon 2000; Lyon and Anderson 2003). Lower nest-initiation rates can result in lower sage-grouse productivity in these areas (Lyon and Anderson 2003). Activities which remove live sagebrush and reduce patch size negatively affect all sagebrush obligates (Braun *et al.* 2002).

In our review of available information, we found that sage-grouse habitats also are fragmented by fences, powerlines, roads, and other facilities associated with grazing, energy development, urban/suburban development, recreation, and the general development of western rangelands. Fences, powerlines and roads also are a direct mortality source for the greater sage-grouse (*see* discussion under Factor E).

Fences constructed for property boundary delineation and livestock management provide perching locations for raptors and travel corridors for mammalian predators, thereby increasing greater sage-grouse predation (Braun 1998; Connelly *et al.* 2000). Greater sage-grouse avoidance of habitat adjacent to fences, presumably to minimize the risk of predation, effectively results in habitat fragmentation even if the actual habitat is not removed (Braun 1998). Over 51,000 km (31,690 mi) of fences were constructed on BLM lands supporting sage-grouse populations between 1962 and 1997 (Connelly *et al.* 2000). Fences also provide a collision hazard, resulting in injury and death (Call and Maser 1985).

As with fences, powerlines provide perches for raptors (Connelly *et al.* 2000; Vander Haegen *et al.* 2002, cited in Knick *et al.* 2003), thereby resulting in sage-grouse avoidance of powerline corridors (Braun 1998). Approximately 9,656 km (6,000 mi) of powerlines have been constructed in sage-grouse habitat to support coal-bed methane production in Wyoming's Powder River Basin within the past few years. Leks within 0.4 km (0.25 mi) of those lines have significantly lower growth rates than leks further from these lines, presumably as the result of increased raptor predation (Braun *et al.* 2002). The presence of powerlines also contributes to habitat fragmentation, as greater sage-grouse typically will not use areas immediately adjacent to powerlines, even if habitat is suitable (Braun 1998).

Roads result in habitat loss and fragmentation, although the amount of habitat lost is unknown (Braun 1998). Roads also provide corridors for invasion of exotic vegetative species and predators. Lyon (2000) found that successful sage-grouse hens nested farther (mean distance = 1,138 m) from the nearest road than did unsuccessful hens (mean distance = 268 m) on Pinedale Mesa near Pinedale, Wyoming.

In summary, sagebrush once covered approximately 63 million ha (156 million ac) in western North America. Almost none of the remaining habitats are unaltered (Braun 1998; Knick *et al.* 2003). Approximately one-half of the original area occupied by sage-grouse is no longer capable of supporting sage-grouse on a year-round basis (Braun 1998). Habitat alteration, through loss and degradation, has been identified as the primary explanation for the rangewide reduction in the distribution and population size of the greater sage-grouse (Schroeder *et al.* 1999).

Based on the foregoing discussion, we believe that substantial information is available indicating that previous and ongoing habitat loss, degradation, and fragmentation within the remaining habitats are factors that may threaten the continued existence of the greater sage-grouse.

Under Factor B, the Institute for Wildlife Protection and American Lands Alliance *et al.* cite hunting as a threat to the greater sage-grouse in the contiguous United States. The petitions discuss historic losses of sage-grouse from overhunting, synergistic effects of hunting and habitat degradation, hunting as additive mortality, losses from poaching and incidental take, failure of the States to quantify hunting mortality from falconry seasons, the influence of hunting on extinction risks for small populations, and the effects of nonconsumptive activities (bird watching).

In the early 1900s, Hornaday (1916) cautioned that sage-grouse and other grouse species would face extinction if hunting practices were not changed. Sage-grouse hunting at that time was unregulated and market hunting, poaching, and overharvesting reduced historic sage-grouse populations (Hornaday 1916; Girard 1937; Schroeder *et al.* 1999). The historical impacts of hunting on the greater sage-grouse may have been exacerbated by impacts from human expansion into sagebrush-steppe habitats (Girard 1937).

Greater sage-grouse are currently hunted in 10 of the 11 States where they occur (Bohne *in litt.* 2003) and hunting is regulated by State wildlife agencies. Most State agencies base their hunting regulations on local population information and peer-reviewed scientific literature regarding the impacts of hunting on greater sage-grouse (Bohne *in litt.* 2003). Hunting seasons are reviewed annually, and most States implement adaptive harvest management based on harvest and population data. Hunting may be an additive mortality if brood hens and young birds sustain the highest hunting mortality within a population (Braun 1998; Johnson and Braun 1999). Hunting seasons that are managed to evenly distribute mortality across all age and sex classes are less likely to negatively affect subsequent breeding populations (Braun 1998). Except for Montana, all States with hunting seasons have changed season dates and limits to more evenly distribute hunting mortality across the entire population structure. Connelly *et al.* (2000) state that most greater sage-grouse populations can sustain hunting if the seasons are carefully regulated. No hunting is permitted in Canada.

Connelly *et al.* (2000) recommend restricting the number of lek locations provided to the public for viewing to minimize disturbance to grouse during the breeding season. Negative impacts to greater sage-grouse from nonconsumptive uses during other seasons have not been identified by the scientific community. Similarly, mortality, either direct or indirect, resulting from scientific research on the greater sage-grouse has not been identified as a limiting factor for this species.

Based on the foregoing discussion, we do not believe there is substantial information available to indicate that, if properly managed, utilization of the greater sage-grouse threatens the continued existence of this species throughout its range.

Under Factor C, the petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* discuss predation, but conclude that significant predator impacts to greater sage-grouse, when they occur, are a reflection of anthropogenic impacts to sage-grouse habitat and poor land management.

Greater sage-grouse have many predators, which vary in relative importance to the species, depending on the sex and age of the bird, and the time of year. Adult female greater sage-grouse are most susceptible to predators while on the nest or during brood-rearing when they are with young chicks (Schroeder and Baydack 2001). Common nest predators include ground squirrels (*Spermophilus spp.*), badgers (*Taxidea taxus*), ravens (*Corvus corax*), crows (*C. brachyrhynchos*), magpies (*Pica pica*), coyotes (*Canis latrans*), and weasels (*Mustela spp.*). Juvenile grouse are susceptible to predation from badgers, red foxes (*Vulpes vulpes*), coyotes, weasels, American kestrels (*Falco sparverius*), merlins (*F. columbarius*), northern harriers (*Circus cyaneus*), and other hawks (Braun *in litt.* 1995; Schroeder *et al.* 1999). The mortality rate for juveniles is estimated to be 63 percent during the first few weeks after hatching (Schroeder and Baydack 2001). While chicks are very vulnerable to predation during this period, other causes of mortality, such as weather, are included in this estimate. Adult male sage-grouse are most susceptible to predation during the mating season as they are very conspicuous while performing their mating display. Also, since leks are attended daily, predators may be disproportionately attracted to these areas during the breeding season (Braun *in litt.* 1995). Common lek predators include golden eagles (*Aquila chrysaetos*), ferruginous hawks (*Buteo regalis*), red-tailed hawks (*B. jamaicensis*), Swainson's hawks (*B. swainsoni*), and other large raptors.

Research conducted to determine nest success and sage-grouse survival has concluded that predation typically does not limit sage-grouse numbers (Connelly *et al.* 2000). However, where sage-grouse habitat has been altered, predation can become more significant (Gregg *et al.* 1994; Braun *in litt.* 1995; Braun 1998; DeLong *et al.* 1995; Schroeder and Baydack 2001). Losses of nesting adult hens and nests appear to be related to the amount of herbaceous cover surrounding the nest (Braun *in litt.* 1995; Braun 1998; Connelly *et al.* 2000; Schroeder and Baydack 2001). Removal or reduction of this cover, by any method, can negatively affect nest success and adult hen survival. Similarly, habitat alteration that reduces cover for young chicks can increase the rate of predation on this age class (Schroeder and Baydack 2001). Losses of breeding hens and young chicks can negatively influence overall sage-grouse population numbers, as these two groups contribute most significantly to population productivity. Habitat concerns have not been identified as important factors influencing adult male sage-grouse predation rates as leks are relatively open areas with little cover (Schroeder *et al.* 1999). However, given the sage-grouse breeding system, where only a few males are selected by all the females for mating, loss of some adult males on the lek is not likely to have significant population effects (Braun *in litt.* 1995). Braun (*in litt.* 1995) does recommend limiting powerlines and fences within 1.6 km (1 mi) of leks to minimize the availability of raptor perches.

The Institute for Wildlife Protection and American Lands Alliance *et al.* identify several diseases and parasites that may limit greater sage-grouse populations. However, the petitioners indicate that disease and parasitism are poorly studied in this species (Webb 2002, page 176; American Lands Alliance, page 178).

We agree with the petitioners on the lack of scientific evidence about the effects of disease or parasites on sage-grouse populations, and acknowledge that this factor may be significant to small, isolated populations (Schroeder *et al.* 1999). We also agree with the petitioners' contention that habitat degradation and fragmentation may increase the effects of disease and parasites on greater sage-grouse. While some research suggests parasites may influence male mating success and evolutionary pathways (Boyce 1990), there is little information to support that disease or parasites are a significant limiting factor in the greater sage-grouse.

We have recently become aware that greater sage-grouse are susceptible to the introduced West Nile Virus (WNV) (*Flavivirus*), a concern highlighted by American Lands Alliance *et al.* While the virus has been implicated in the deaths of 24 individuals in Wyoming and Montana, actual population impacts of this disease on sage-grouse are not known. A survey of 111 hunter-killed birds and live birds trapped at sites of WNV activity in Wyoming and Montana revealed that none of the birds had antibody titers against WNV. This evidence is not conclusive and warrants further investigation, but suggests that the number of sage-grouse surviving WNV infection might be small (Dr. Todd Cornish, Wyoming State Veterinary Laboratory, University of Wyoming, pers. comm. 2003). We will continue to monitor this situation.

Based on the preceding discussion, we do not believe there is substantial information available at this time to indicate that disease or predation are factors that may threaten the continued existence of the greater sage-grouse. We will continue to monitor sage-grouse reaction to WNV as the virus becomes more prevalent across the species' range.

Under Factor D, the petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* claim that regulations for greater sage-grouse management established by State wildlife agencies are not sufficient to protect the species, because hunting is still permitted. The petitions also state that "existing regulatory mechanisms are virtually non-existent'' (Webb 2002, page 177; American Lands Alliance *et al.*, page 180) and current management for the conservation of greater sage-grouse is insufficient.

Greater sage-grouse are under the management authority of State wildlife agencies. Most State agencies base their hunting regulations on local population information and peer-reviewed scientific literature regarding the impacts of hunting on the greater sage-grouse (Bohne *in litt.* 2003). Hunting seasons are reviewed annually, and most States implement adaptive management based on harvest and population data (*see* previous discussion under Factor B).

A large portion of habitat for the greater sage-grouse occurs on lands managed by the BLM and the U.S. Forest Service (USFS). The BLM has designated the greater sage-grouse as a special status species in 5 of the 11 States in which it currently occurs (Nevada, California, Oregon, Washington, and Wyoming). Management for special status species are addressed under BLM Manual 6840, "Special Status Species Management.'' This document provides agency policy and guidance for the conservation of special status plants and animals and the ecosystems on which they depend (BLM 2001). Although not a regulatory document, BLM Manual 6840 provides a mechanism for the conservation of the greater sage-grouse and its habitat. At present, there are no regulations requiring that BLM land use plans specifically address the conservation needs of special status species (BLM 2003b).

However, with respect to the sage-grouse, the FWS and BLM are developing strategies for conservation of the species, including BLM's draft interim planning and habitat management guidelines for its lands. FWS and BLM are also working with the States on the Sage Grouse Conservation Planning Framework Team which will produce the range-wide greater sage grouse conservation assessment and the conservation action plans to follow. In addition, BLM is undertaking a number of on-the-ground sagebrush habitat restoration projects, while it is working to complete the longer-term joint conservation assessment and planning.

The USFS requires that fish and wildlife habitats be managed to maintain viable populations of existing native vertebrate species (36 CFR 219.19). In addition, each region of the USFS maintains a sensitive species list. The USFS policy requires the agency to employ special management emphasis to ensure the viability of designated sensitive species, and "to preclude trends towards endangerment that would result in a need for Federal listing'' (USFS 1991). The greater sage-grouse is designated as a USFS sensitive species in Regions 1, 2, 4, 5, and 6, which are within the species' range. All National Forests within these regions are required to implement the USFS Sensitive Species Policy (FSM 2672.1) for the greater sage-grouse. In addition, several individual National Forests in Regions where the greater sage-grouse is not designated as a sensitive species have chosen to make the bird a Management Indicator Species (Clinton McCarthy, USFS, pers. comm. 2003). This designation requires the individual National Forest to establish objectives for the maintenance and improvement of habitat for the greater sage-grouse (36 CFR 219.19), and to monitor the status of this species on the National Forest.

Some greater sage-grouse habitat also occurs on lands managed by other Federal agencies, including the Service, National Park Service, Department of Energy, Bureau of Reclamation, and Department of Defense. Some agencies have developed site-specific plans for conserving sage-grouse habitats on their lands (*i.e.*, Yakima Training Center, Seedskadee National Wildlife Refuge) (66 FR 22984). However, we are unaware of any other agency efforts to protect and conserve sage-grouse on these Federal lands. Greater sage-grouse also occur on Native American Tribal lands. In January 2004, the Service provided a Tribal Wildlife Grant to the Shoshone and Arapahoe Joint Council of Wyoming to assist in developing a management plan for the greater sage-grouse and sagebrush habitats on the Wind River Reservation.

The petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* assert that all existing State and private conservation planning efforts for sage-grouse are ineffective because no regulatory mechanisms or funding resources are in place to ensure these efforts are implemented. Most of the States within the range of the greater sage-grouse have initiated conservation planning efforts for sage-grouse and sage-grouse habitat on State, private, and, in some cases, Federal lands. The plans are focused on addressing local sage-grouse or sagebrush habitat concerns through a variety of mechanisms (*i.e.*, changes in regulations, habitat improvement projects, etc.). When completed, the Service will review these conservation plans to determine if they are consistent with our Policy for the Evaluation of Conservation Efforts (68 FR 15100). This policy evaluates the likelihood of implementation and effectiveness for each conservation strategy presented. It is currently impossible to evaluate the effectiveness of State and private conservation efforts for the greater sage-grouse, as most are either being drafted or have not been implemented at the time of this finding. The Service is not aware of any State regulations that conserve greater sage-grouse habitat or encourage habitat conservation efforts on private lands.

The greater sage-grouse is listed as an endangered species at the national level in Canada, as well as at the provincial level in Alberta and Saskatchewan. Provincial laws in Saskatchewan prevent sage-grouse habitat from being sold or from having native vegetation cultivated. Individual birds are protected by provincial law in Alberta, but their habitat is not. However, the Province has developed guidelines to protect leks. Passage of the Canadian Species At Risk Act in 2002 allows for habitat regulations to protect sage-grouse (Aldridge and Brigham 2003).

Based on the information currently available to us for this finding, the principal concern regarding the adequacy of regulatory mechanisms is in relation to habitat conservation. The past and ongoing degradation of greater sage grouse habitat, such as habitat conversion, fragmentation, and alteration due to various land use practices (see discussion of Factor A, above), is due in large part to human actions rather than natural events. To the extent that such human-caused habitat degradation is contributing to population declines of greater sage grouse, it indicates that existing regulatory mechanisms, particularly at the Federal level (since most of the habitat is on Federal land), but also at the State, Provincial, and local levels, may be inadequate with regard to addressing threats to the species.

Under Factor E, the petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* assert that fences, powerlines, and roads are sources of direct injury and mortality to greater sage-grouse. Fences are a documented collision hazard for sage-grouse (Call and Maser 1985; Braun 1998). Over 51,000 km (31,960 mi) of fences were constructed on BLM lands supporting sage-grouse populations between 1962 and 1997 (Connelly *et al.* 2000). Direct mortality of greater sage-grouse as a result of collision with, and electrocution from, powerlines has been documented (Braun 1998; Aldridge and Brigham 2003). Sage-grouse suffer direct mortality from collisions with automobiles (Hornaday 1916; Braun 1998). To our knowledge, the extent of mortality from these factors has not been quantified. Also, the Service has not found any evidence suggesting that collisions and electrocutions limit greater sage-grouse populations.

The Institute for Wildlife Protection and American Lands Alliance *et al.* also identify fire as a source of direct mortality to the greater sage-grouse. While we agree that some sage-grouse may perish in fires, either wild or prescribed, this mortality factor has not been identified by the scientific community as a limiting factor for sage-grouse populations.

The petitions from the Institute for Wildlife Protection and American Lands Alliance *et al.* identify several factors that may be affecting greater sage-grouse populations which are not discussed above. These include mining toxins (such as cyanide), herbicides, pesticides, ozone depletion, endocrine disrupters, pollution, global warming, competition for resources between the greater sage-grouse and other species of grouse and livestock, off-road vehicle and snowmobile use, noise, weather, natural stochastic events, and loss of genetic variation. We know of no scientific information supporting threats to greater sage-grouse populations as a result of ozone depletion, endocrine disrupters, global warming, or pollution. The petitions also do not present supporting scientific information specific to the greater sage-grouse and these threats, but rather draw conclusions based on studies on other species, including humans.

At least one study has documented direct mortality of greater sage-grouse as a result of ingestion of alfalfa sprayed with organophosphorus insecticides (Blus *et al.* 1989). Direct ingestion of other herbicides, such as chlordane, also are toxic to sage-grouse (Schroeder *et al.* 1999). However, there is little information supporting the contention that normal use of herbicides negatively affects greater sage-grouse (Schroeder *et al.* 1999), and the scientific community has not identified exposure to these substances as a limiting factor for this species. Pesticides and herbicides may result in a reduction of food resources for the greater sage-grouse, particularly nesting females and chicks (Schroeder *et al.* 1999). Seventeen different radionuclides (radioactive atoms) were found in greater sage-grouse captured near nuclear facilities at the Idaho National Engineering Laboratory in southeastern Idaho (Connelly and Markham 1983). The effects of these substances on greater sage-grouse appear to be minimal (Schroeder *et al.* 1999).

During part of the year, greater sage-grouse distribution may overlap with sharp-tailed (*Tympanuchus phasianellus*) and blue (*Dendragapus obscurus*) grouse in some areas of their ranges. Although it is likely that these species are consuming some of the same foods, there is no information that these resources are limiting and no evidence suggesting competition with other grouse species has negative effects on sage-grouse (John Connelly, Idaho Department of Fish and Game, pers. comm. 2003). Cattle and sheep will consume sagebrush, as well as grass. Sheep also consume rangeland forbs in areas where sage-grouse occur (Pedersen *et al.* 2003). The effects of direct competition between livestock and sage-grouse will depend on condition of the habitat and grazing practices, and thus vary across the range of the species. For example, Aldridge and Brigham (2003) suggest that poor livestock management in mesic sites, which are considered limited habitats for sage-grouse in Alberta, results in a reduction of forbs and grasses available to sage-grouse chicks, thereby affecting chick survival. Livestock may modify sage-grouse habitat by altering vegetation structure and changing composition; this is addressed under Factor A above.

The petitions state that off-road vehicle or snowmobile use affects greater sage-grouse through habitat alteration and degradation, increased stress, and direct mortality. While the petitions do not present supporting scientific information specific to the greater sage-grouse, we agree that habitat degradation may occur in areas of off-road vehicle and/or snowmobile use through damage to soils and plant structure, and creation of corridors for invasive species. These concerns have been discussed under Factor A. We are unaware of scientific reports documenting direct mortality of greater sage-grouse through collision with off-road vehicles or snowmobiles. We also are unaware of instances where snow compaction as a result of snowmobile use precluded greater sage-grouse survival in wintering areas. Sage-grouse are highly sensitive to disturbance, and off-road vehicle or snowmobile use in winter areas may increase stress on birds and displace sage-grouse to less optimal habitats. However, there is no empirical evidence available documenting these effects on sage-grouse, nor could we find any scientific data supporting the contention that stress from vehicles during winter was limiting greater sage-grouse populations.

The petitions identify noise as a potential impact to the greater sage-grouse through interference with sage-grouse mating displays, communication between hens and their broods, movement out of suitable habitat, and physiological stress. Acoustic signals are important in greater sage-grouse mate selection (Gibson and Bradbury 1985), and the impacts of noise on greater sage-grouse resulting from activities associated with oil and gas development on public lands have been addressed in National Environmental Policy Act documents (*e.g.*, draft Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project (BLM 1999)). In Wyoming's Powder River Basin, leks within 1.6 km (1 mi) of coal-bed methane facilities have consistently lower numbers of males attending than leks farther from these types of disturbances. Noise associated with these facilities is cited as one possible cause (Braun *et al.* 2002). However, the actual impact of noise from anthropogenic sources on the greater sage-grouse is currently unknown. The petitioners acknowledge the lack of scientific studies on the effects of noise on the greater sage-grouse (Webb 2002, page 141; American Lands Alliance *et al.*, page 145).

Drought is a common occurrence throughout the range of the greater sage-grouse (Braun 1998). Sage-grouse populations will decline in a drought as a consequence of increased nest predation and early brood mortality brought on by decreased nest cover and food availability (Braun 1998; Schroeder *et al.* 1999). Although drought has been a consistent and natural part of the sagebrush-steppe ecosystem, drought impacts on the greater sage-grouse can be exacerbated through poor habitat management, which results in reduced cover and food (Braun 1998; see discussion under Factor A). These effects also may be amplified through sagebrush habitat loss, as food and cover may already be limited. Cold wet weather during incubation and early brood-rearing can result in nest and brood loss (Patterson 1952; Schroeder *et al.* 1999).

Natural stochastic (randomly-occurring) events, such as floods and blizzards, can significantly affect local populations if the event results in high mortality or large areas of habitat loss. These events are most significant to small and/or fragmented populations. Small, isolated populations also may be at greater risk to the deleterious effects from inbreeding. It is unlikely that any one of the above factors has played a significant role in the population declines and range reductions of sage-grouse (65 FR 51578). However, these influences may now play an important role in the dynamics of relatively small and isolated local populations, particularly in the Columbia Basin of Oregon and Washington (65 FR 51578; Benedict *et al.* 2003).

The Institute for Wildlife Protection and American Lands Alliance *et al.* expressed concerns that greater sage-grouse are susceptible to a loss of genetic variation due to inbreeding depression. However, in a recent survey of 16 greater sage-grouse populations, only the Columbia Basin population in Washington shows low genetic diversity, likely as a result of long-term population declines and population isolation (Benedict *et al.* 2003). We are unaware of any other genetic studies suggesting that inbreeding depression is a concern to other greater sage-grouse populations.

Based on the foregoing discussion, we do not believe there is substantial information to indicate that natural and manmade factors not associated with habitat loss or degradation (Factor A) threaten the continued existence of the greater sage-grouse in the contiguous United States.

Finding

We have reviewed the petitions submitted by Mr. Dremann, the Institute for Wildlife Protection, and American Lands Alliance *et al.*, other pertinent information and scientific literature available in our files, and other information provided to us, including the PAW commentary. The PAW commentary suggests that there are flaws in the petitions, including inaccurate or contradictory statements, erroneous interpretation of scientific literature, conclusions not supported by literature, a lack of knowledge of the subject material, biased presentation, and lack of scientific references. We agree that the petitions contain some minor errors of the type identified in the PAW report; however, we also acknowledge that the petitions contain accurate information, which we have confirmed through our review of the scientific, peer-reviewed literature and direct communications with species experts. Based on our review of all available information, and notwithstanding the factual errors identified within the petitions by the PAW report, we find there is substantial information to indicate that listing the greater sage-grouse may be warranted. This finding is based primarily on the historic and current destruction, modification, or curtailment of greater sage-grouse habitat or range, and the inadequacy of existing regulatory mechanisms in protecting greater sage-grouse habitats throughout the species' range.

Public Information Solicited

We are required to promptly commence a review of the status of the species after making a positive 90-day finding on a petition. With regard to this positive petition finding, we are requesting information primarily concerning the species' population status and trends, potential threats to the species, and ongoing management measures that may be important with regard to the conservation of the greater sage-grouse throughout the contiguous United States.

If you wish to comment, you may submit your comments and materials concerning this finding to the Field Supervisor (see **ADDRESSES** section). Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Respondents may request that we withhold a respondent's identity, as allowable by law. If you wish us to withhold your name or address, you must state this request prominently at the beginning of your comment. However, we will not consider anonymous comments. To the extent consistent with applicable law, we will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

References Cited

A complete list of all references cited herein is available upon request from the Wyoming Field Office (*see* **ADDRESSES**).

Author

The primary author of this document is Dr. Pat Deibert, Wyoming Field Office, Cheyenne, Wyoming.

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: April 5, 2004.

Steve Williams,

Director, Fish and Wildlife Service.

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