

SUMMARY: EPA is proposing to approve the maintenance plan for the Douglas area in Cochise County, Arizona and grant the request submitted by the State to redesignate this area from nonattainment to attainment for the National Ambient Air Quality Standards for sulfur dioxide (SO₂).

DATES: Any comments on this proposal must be received by March 30, 2006.

ADDRESSES: Submit comments, identified by docket number EPA-R09-OAR-2005-150, by one of the following methods:

1. *Agency Web site:* <http://www.regulations.gov>. EPA prefers receiving comments through this electronic public docket and comment system. Follow the on-line instructions to submit comments.

2. *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the on-line instructions.

3. *E-mail:* tax.wienke@epa.gov.

4. *Mail or deliver:* Wienke Tax, Office of Air Planning (AIR-2), U.S. Environmental Protection Agency, Region 9, 75 Hawthorne Street, San Francisco, CA 94105-3901.

Instructions: All comments will be included in the public docket without change and may be made available online at <http://www.regulations.gov> including any personal information provided, unless the comment includes Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Information that you consider CBI or otherwise protected should be clearly identified as such and should not be submitted through the agency Web site, eRulemaking portal, or e-mail. The agency Web site and eRulemaking portal are "anonymous access" systems, and EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send e-mail directly to EPA, your e-mail address will be automatically captured and included as part of the public comment. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment.

Docket: The index to the docket for this action is available electronically at <http://www.regulations.gov> and in hard copy at EPA Region IX, 75 Hawthorne Street, San Francisco, CA. While all documents in the docket are listed in the index, some information may be publicly available only at the hard copy location (e.g., copyrighted material), and some may not be publicly available in either location (e.g., CBI). To inspect the hard copy materials, please schedule an appointment during normal business

hours with the contact listed in the **FOR FURTHER INFORMATION CONTACT** section.

FOR FURTHER INFORMATION CONTACT: Wienke Tax, Air Planning Office (AIR-2), Air Division, U.S. EPA, Region 9, (520) 622-1622. E-mail: tax.wienke@epa.gov.

SUPPLEMENTARY INFORMATION: In the Rules and Regulations section of this **Federal Register**, we are taking direct final action to approve the maintenance plan for the Douglas SO₂ nonattainment area. We are also approving the State of Arizona's request to redesignate the Douglas area from nonattainment to attainment for the primary SO₂ NAAQS. We are taking these actions without prior proposal because we believe that the revision and request are not controversial. If we receive adverse comments, however, we will publish a timely withdrawal of the direct final rule and address the comments in subsequent action based on this proposed rule. We do not plan to open a second comment period, so anyone interested in commenting should do so at this time. If we do not receive adverse comments, no further activity is planned. For further information, please see the direct final action.

Dated: December 27, 2005.

Jane Diamond,

Acting Regional Administrator, Region IX.

[FR Doc. 06-1851 Filed 2-27-06; 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 on a Petition To List the Black Hills Mountainsnail 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 on a petition to list the Black Hills mountainsnail (*Oreohelix cooperi*) as threatened or endangered under the Endangered Species Act of 1973, as amended (ESA). We find the petition does not provide substantial scientific information indicating that listing the Black Hills mountainsnail may be warranted. Therefore, we will not be initiating a further status review in response to this petition. We ask the

public to submit to us any new information that becomes available concerning the status of the species or threats to it.

DATES: The finding announced in this document was made February 21, 2006. You may submit new information concerning this species for our consideration at any time.

ADDRESSES: The complete file for this finding is available for public inspection, by appointment, during normal business hours at the South Dakota Ecological Services Field Office, U.S. Fish and Wildlife Service, 420 South Garfield Avenue, Suite 400, Pierre, South Dakota 57501. Submit new information, materials, comments, or questions concerning this species to us at the above address.

FOR FURTHER INFORMATION CONTACT: Field Supervisor, South Dakota Ecological Services Field Office (see **ADDRESSES**) (telephone 605-224-8693; facsimile 605-224-9974).

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(A) of the ESA (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 scientific information provided in the petition and information readily available in our files. To the maximum extent practicable, we are to make this finding within 90 days of our receipt of the petition, and publish our notice of this finding promptly in the **Federal Register**.

Our standard for substantial scientific information within the Code of Federal Regulations (CFR) 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)). If we find that substantial scientific information was presented, we are required to promptly commence a review of the status of the species.

In making this finding, we relied on information provided by the petitioners and readily available in our files, and evaluated that information in accordance with 50 CFR 424.14(b). Our process of coming to a 90-day finding under section 4(b)(3)(A) of the ESA and section 424.14(b) of our regulations is limited to a determination of whether the information in the petition meets the "substantial scientific information" threshold.

As explained in further detail below, the petitioners and Frest and Johannes (2002) refer to the *cooperi* taxon as *Oreohelix cooperi* (Black Hills mountainsnail), however the accepted name for this entity in the published literature is *O. strigosa cooperi* (Cooper's Rocky mountainsnail) (Pilsbry 1934, 1939). We added *O. s. cooperi* (Cooper's Rocky mountainsnail) to our list of candidate species on November 21, 1991, as a Category 2 candidate species (56 FR 58804). A Category 2 candidate species was a species for which we had information indicating that a proposal to list it as threatened or endangered under the ESA may be appropriate, but for which additional information was needed to support the preparation of a proposed rule. This snail was listed as a Category 2 species again in the November 15, 1994, list of candidate species (59 FR 58982). In the February 28, 1996, Notice of Review (61 FR 7595), we discontinued the use of multiple candidate categories and considered the former Category 1 candidates as simply "candidates" for listing purposes. *O. s. cooperi* was removed from the candidate list at that time. The species currently has no Federal regulatory status.

On September 27, 2003, we received a formal petition dated September 24, 2003, from the Biodiversity Conservation Alliance, Center for Native Ecosystems, Native Ecosystems Council, Prairie Hills Audubon Society, The Xerces Society, and Mr. Jeremy Nichols requesting that the Black Hills mountainsnail found in the Black Hills of South Dakota and Wyoming be listed as threatened or endangered and that critical habitat be designated for the species in accordance with section 4 of the ESA. The petition lists the scientific name of the Black Hills mountainsnail as *Oreohelix cooperi*. This taxonomic classification has not been subject to peer review or publication, and is not currently widely used. However, rather than make a determination on the validity of this new taxonomic classification, a decision that would more properly be made at the 12-month finding stage, we simply accept the petitioners' characterization of this taxon and evaluate the petitioners' claims regarding this entity. Thus, for the purposes of this 90-day finding, we refer to the petitioned entity as the Black Hills mountainsnail (*Oreohelix cooperi*). Again, we emphasize that this taxonomy has not yet been fully evaluated or accepted by the scientific community. The uncertainty regarding the taxonomic classification is described in more detail below.

It is unclear whether the petitioned entity is its own species as described by Frest and Johannes (2002) or a portion of the slightly more widespread *O. strigosa cooperi* described by Pilsbry (1934, 1939). The Petitioners identify this land snail as the Black Hills mountainsnail, *Oreohelix cooperi*, submitting that the entity be returned to full species status. The petitioners relied extensively on reports following land snail surveys conducted in 1991, 1992, and 1999 in the Black Hills by Frest and Johannes (1991, 1993, 2002) with 1995 survey contributions by the U.S. Forest Service (USFS) (Frest and Johannes 2002). The argument for elevation of the *cooperi* taxon to full species status by the petitioners and Frest and Johannes (2002) includes morphological distinction of the *cooperi* taxon from other similar species (Pilsbry 1934, 1939; Frest and Johannes 2002), and uncertainty regarding the original collection site of the nominate type species (*O. strigosa strigosa*) on which the taxonomy of *cooperi* is based (Pilsbry 1916, 1934, 1939; Smith 1937; Frest and Johannes 2002).

While only the *cooperi* entity has been petitioned for listing, the petitioners and Frest and Johannes (2002) also propose two new species of *Oreohelix* in the Black Hills called *Oreohelix* new species 1 and *Oreohelix* new species 2. To our knowledge, neither the proposed elevation of the *cooperi* taxon to full species status nor the submittal of *Oreohelix* new species 1 and 2 as a separate species has undergone the peer review and publication process; therefore, these proposals are not formally recognized in scientific literature.

Action on this petition was precluded by court orders and settlement agreements for other listing actions that required nearly all of our listing funds for Fiscal Year 2004. On January 14, 2004, we received a 60-day notice of intent to sue, and on December 7, 2004, an amended complaint was filed regarding our failure to carry out the 90-day and 12-month findings on the status of the Black Hills mountainsnail and other species. On October 4, 2005, we reached an agreement with the plaintiffs to submit to the **Federal Register** a completed 90-day finding by February 21, 2006, and to complete, if applicable, a 12-month finding by November 21, 2006 (*Biodiversity Conservation Alliance et al. v. Gale Norton and Steven Williams* (Civ. No. 04–02026(GK))).

A pertinent result of our taxonomic interpretation, as we examine only the status of the larger sized *O. s. cooperi*, submitted as *O. cooperi* by the

Petitioners, is that the number of extant colonies available for our threats evaluation is decreased from 108 extant sites to 41 since our evaluation of the Frest and Johannes (2002) report indicates that the smaller form of *O. s. cooperi* occupies 69 surveyed sites (not addressed herein), and 2 sites contain both size morphs.

Species Biology

Anderson (2005) summarized descriptions of the Black Hills mountainsnail (previously provided by Binney 1859; Pilsbry 1939; and Frest and Johannes 2002). Detailed studies on the biology of the Black Hills mountainsnail appear to be lacking. Frest and Johannes (2002) state that "life history of most Rocky Mountain land snail genera is imperfectly understood, but recent observations in Idaho on the genus *Oreohelix* may be taken as representative." It appears that further study of this species is warranted to determine the accuracy of current submissions and extrapolations, and to unveil additional details regarding this species' biology and ecology (Anderson 2005).

The Black Hills mountainsnail is a litter-dwelling mollusk, known to occupy calcareous soils in the Black Hills; calcium is required for the formation and growth of their shells (Solem 1974; Frest and Johannes 2002; Anderson 2005). Snails also are generally subject to desiccation mortality (Frest and Johannes 2002); thus the species is not equally distributed within the Black Hills, as colonies are restricted to specific soil types and moisture regimes. In the Black Hills, areas underlain by limestone appear to be particularly favorable for relative diversity of snail fauna, while regions underlain by granite or with "exposed gypsum-bearing units" (Frest and Johannes 2002) tended to be relatively lacking in land snails (Frest and Johannes 2002). Occupied habitat types documented by Frest and Johannes (1991, 1993, 2002), generally confirmed by Anderson (2005), include lowland wooded areas and talus slopes, often with a northern and/or eastern exposure. The majority of extant sites are in forests consisting of the *Pinus ponderosa* community series which dominates much of the Black Hills. Typical habitats include partially closed canopy forests with a deciduous tree and shrub component (*Alnus* [or *Corylus*, see Anderson 2005], *Acer*, and *Betula*) sometimes with locally common *Picea glauca*. Riparian woodlands also are occupied, often in areas with adjacent steep rocky slope bases. The species is able to withstand a relatively

high proportion of spruce or pine needles in the duff, does not prefer the "most moist" (Frest and Johannes 2002) areas and may occur at sites with relatively less vegetative cover and thin litter than other Black Hills land snail species (Frest and Johannes 2002; Anderson 2005).

The Black Hills mountainsnail is thought to be herbivorous, feeding on partially decayed deciduous leaves and other degraded herbaceous vegetation and/or associated bacteria or fungi (Brandauer 1988; Frest and Johannes 2002; Anderson 2005). Preferences for leaves of any particular plant species are unknown and feeding habits of juveniles as compared to adults is not available (Anderson 2005). The species potentially matures in 1 to 3 years (Frest and Johannes 2002; Anderson 2005), perhaps surviving in the wild 2 to 6 years, with average life span believed to be less than 2 years (Frest and Johannes 2002). Snails may be active in the winter when conditions allow, as they are apparently resistant to freezing (Frest and Johannes 2002); however, the snails typically aestivate during unfavorable environmental conditions, retreating into their shells behind a mucus seal (epiphragm), where they can apparently survive for relatively long periods of time (Solem 1974; Rees and Hand 1990).

Breeding biology of *Oreohelix cooperi* is not well known and that of *Oreohelix* in general is not well documented (Anderson 2005). Frest and Johannes (2002) state that activity is likely seasonal—April–June and September–November, with breeding occurring in October–November or April–May, and young shed (after hatching internally) in May–June or September–October. Frest and Johannes (2002) also report that reproduction is dependent on environmental conditions, stating that breeding may only occur during spring if fall conditions are dry.

Frest and Johannes (1991, 1993, 2002) have provided the most comprehensive information available to date on the status of *Oreohelix cooperi* in the Black Hills. They surveyed 357 sites in the Black Hills, and found 41 sites occupied by *O. cooperi*. They reported that 15 of the sites where live specimens were found were "significantly large" although this is not further defined (Frest and Johannes 2002). Hand collection was the survey method utilized; litter sampling (a more thorough measure of populations) also was done at some locales. Frest and Johannes (2002) categorized each population as rare, uncommon, common, abundant or very abundant; although the researchers mentioned

caveats that relegated the population estimates they obtained to the status of "tentative" or "crude" (Frest and Johannes 2002).

Threats Analysis Presented in the Petition

Pursuant to section (4) of the ESA, we may list a species, subspecies, or distinct population segment of vertebrate taxa on the basis of any of the following five factors: (A) Present or threatened 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; or (E) other natural or manmade factors affecting its continued existence. In making this 90-day finding, the standard is to determine whether the petition and our files contain substantial scientific information indicating that one or more of these five factors, considered singly or in combination, pose a threat to the Black Hills mountainsnail such that listing under the Act may be warranted. Our evaluation of these threats, based on scientific information provided in the petition and available in our files, is presented below.

A. Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Information on Population Status Provided in the Petition

The petitioners assert that the Black Hills mountainsnail is now rare, but was once more widespread and abundant. They observed that 7 of 39 [note the apparent discrepancy between petitioners' assertions of 39 documented sites versus 41 identified in Frest and Johannes (2002)] currently known sites occupied by the Black Hills mountainsnail were found to have only empty (dead) shells. Presuming snails have been extirpated at these sites, the petitioners state that this equates to a 20 percent reduction in overall population, which they claim is a conservative figure as many now-extirpated sites may never have been documented. Additionally, species population estimates at 18 colonies (56 percent of currently documented sites) are described as rare or uncommon, while 9 colonies (28 percent) are described as common or abundant. Surveys were conducted in 1991, 1992, 1995, and 1999, and while the petitioners acknowledge 8 new colonies were discovered after 1993, they assert that 2 colonies were extirpated during that time.

Evaluation of Information in the Petition Regarding Population Status

Our analysis of Frest and Johannes (2002) indicates that dead shells only (no live specimens) were recorded at 7 (17 percent) of the 41 occupied Black Hills mountainsnail sites. In some cases, live specimens were reported on an initial survey, then only dead shells found upon site revisitation, and the reverse also is true for some locales. Thus, while it is possible that the Black Hills mountainsnail may be extirpated at some of these sites, additional surveys are necessary to determine occupation status with accuracy (Anderson 2005). Our analysis indicated that 28 (68 percent) of *Oreohelix cooperi* sites had population estimates of rare or uncommon (n=15, 37 percent) and common or abundant (n=13, 32 percent) according to Frest and Johannes' (2002) defined categories. A single site (n=1, 2 percent) was documented as having very abundant population estimates, and population estimates were undeterminable at several (n=5, 12 percent) of the sites due to discrepancies or lack of information provided within the 2002 Frest and Johannes report. At an additional 7 sites (17 percent) only empty shells were found. Although only 10 sites were revisited during subsequent surveys, fluctuations in population estimates appeared to occur at those sites that were surveyed a second time.

Information on Habitat Threats Provided in the Petition

The petitioners cite the sensitivity of the Black Hills mountainsnail to habitat alterations and the snail's limited motility and specialized habitat requirements as factors contributing to its current status, which they say is imperiled. Petitioners assert: (1) That the taxon has declined in range, habitat, and population size; (2) that there have been declines in riparian habitat and mature, dense, mesic forested habitat and understory in the Black Hills; and (3) that these habitat changes and subsequent declines in Black Hills mountainsnail populations and range reductions are caused by domestic livestock grazing, logging, road construction, edge effects, herbicide and pesticide application, mining, spring development, groundwater extraction, and recreation which are described in further detail below.

Domestic Livestock Grazing

Petitioners state that domestic livestock grazing is generally destructive to the Black Hills mountainsnail, and that grazing impacts are both direct (e.g.,

trampling), and indirect (e.g., increased exposure due to vegetation alterations). Petitioners implicate more than a century of grazing in their assertions regarding extirpations of the Black Hills mountainsnail from upland areas and most of the areas within the Rapid Creek watershed and Grand Canyon. They maintain that grazing pressure has not abated and note that 9 currently-documented sites are impacted by grazing; population estimates at 8 of these are reported to be rare or extirpated. Grazing also is implicated in the presumed loss of the northwesternmost known colony, thereby reducing the known range of the species. The petition cites a single instance of a grazed site, subsequently protected, that showed an increase in snail abundance when revisited. Lack of snails in areas that are heavily grazed, including springs which are often troughed for cattle watering, is provided as an indication of the negative impacts of grazing. Many snail colonies occur within the boundaries of USFS grazing allotments where, the petitioners claim, the Black Hills mountainsnail is not adequately protected from livestock. Fortuitous circumstances, rather than adequate protections, are named as the reason for snail survival in currently grazed areas.

Evaluation of Information in the Petition Regarding Livestock Grazing

The Service recognizes that grazing generally has negative effects on land snail individuals and colonies (Frest and Johannes 2002). Alterations of upland habitat and the tendency of cattle to congregate in, and significantly degrade, riparian areas (sites often occupied by land snails) are documented (Armour *et al.* 1991; Fleischner 1994; Belsky and Blumenthal 1997; Belsky *et al.* 1999). It follows that such impacts would have negative effects on resident land snails. Oliver and Bosworth (1999, 2000) and Ports (1996) also observed that grazing has, or potentially has, negatively impacted several *Oreohelix* species in other States. In addition, the petitioners' assertions of extensive, and at times intensive, grazing pressure within the known range of the Black Hills mountainsnail are correct.

While the petitioners indicate that 9 of 41 known colonies are subjected to grazing, another 32 sites (78 percent) are not subjected to grazing pressures (Frest and Johannes 2002). Of the 9 grazed sites, the petitioners indicate that the species was recorded as rare or extirpated at 8 of them. While it appears population estimates at these sites are relatively low, we cannot conclude that

the Black Hills mountainsnail has been extirpated from any of these sites without additional survey information (Anderson 2005; Bishop 1977). As noted by Frest and Johannes (2002) rarely, if ever, are all individuals of a colony found at the surface; the most rigorous sampling method was not applied to most sites, as explained above; and several grazed sites were surveyed only once. While a lack of Black Hills mountainsnails was noted in grazed areas, as well as at some springs developed for livestock watering, the petitioners did not provide evidence that these sites had been previously occupied by the Black Hills mountainsnail.

Most historic records of the snail in the Black Hills are primarily from the Spearfish Creek vicinity. While the snail has recently been documented in areas outside the Spearfish Creek watershed, there is little evidence to suggest the species was widespread either within these areas or other watersheds where they have not yet been located. Habitat requirements (calcareous, moist soils) generally preclude widespread distribution of the species in the Black Hills (Frest and Johannes 2002). While the petitioners pointed out that many colonies occur within USFS grazing allotments, they did not provide substantial scientific information to indicate that those colonies are in areas actually subjected to grazing. Based on our analysis of Frest and Johannes (2002), of 41 extant colonies, 25 (61 percent) are located in the Spearfish Creek and Little Spearfish Creek watersheds, areas that are included, according to petitioners, within USFS grazing allotments. However, the majority of these colonies are in areas not subjected to grazing due to their location within the boundaries of the Spearfish Canyon Scenic Byway (USFS 1996; Cara Staab, USFS, pers. comm. 2005). Livestock grazing is prohibited in the Byway except for occasional use as a management tool (USFS 1996). Other extant colonies outside these areas may include refugia, sites inaccessible or not preferred by cattle where snail colonies can (and do) survive (Baur 1986). Furthermore, USFS management direction prohibits heavy grazing in occupied snail habitat.

On the basis of the above discussion, we conclude that the petitioners have not provided substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of livestock grazing may be warranted.

Logging

The petitioners state that logging negatively affects the Black Hills mountainsnail. Potential logging effects generally include direct mortality of individuals (e.g., beneath heavy machinery or burned slash piles) and indirect impacts (e.g., increased exposure) as a result of habitat alterations. Various forms of logging are asserted to have negative, although variable, degrees of effects on the snail; clearcutting is asserted to be more problematic than precommercial thinning. Tree removal also is noted as a factor limiting expansion of colonies and/or dispersal of individuals. Petitioners claim that post-logging alterations in hydrology may limit available Black Hills mountainsnail habitat via increased runoff, decreased groundwater input and reduced output from springs and seeps. They also note the lack of Black Hills mountainsnail colonies in areas that were completely or in some cases only selectively logged to demonstrate logging effects. The petitioners assert that the continuation of logging practices within the known range of the snail is an ongoing threat to extant colonies. Fortuitous circumstances, rather than adequate protections, are cited as the reason for snail survival in logged areas.

Evaluation of Information in the Petition Regarding Logging

As with grazing activities, logging activities carried out in occupied Black Hills mountainsnail habitat may have negative effects on resident snail individuals and colonies (Frest and Johannes 2002). Black Hills mountainsnails are small, slow, litter-dwelling, relatively sessile (do not move much), sensitive to environmental change, and subject to desiccation mortality. Thus it follows that activities such as logging undertaken at extant locations have the potential to crush land snails, compact the soil, and remove litter and existing vegetative cover, thereby negatively impacting the Black Hills mountainsnail (Frest and Johannes 2002; Anderson 2005). Additional potential effects such as altered hydrology and fragmentation of habitat are described in literature (Aber *et al.* 2000).

The petition noted that different types of logging practices may have different levels of effect on the snails, with clearcutting noted as more harmful than other methods. Large clearcuts are not currently implemented on the Black Hills National Forest, although small patch clearcuts of 10 acres (ac) (4 hectares (ha)) or less have been recently

conducted on fractions of the Black Hills National Forest (0.2 percent of the 1.2 million ac [485,623 ha] between 2002 and 2004) to achieve specific management objectives (C. Staab, pers. comm. 2005). As per USFS directives, no small patch clearcuts were implemented in known occupied Black Hills mountainsnail habitats since the Forest revised its Land and Resource Management plan in 1997 (USFS 1997).

The assertion made by the petitioners regarding altered hydrology due to logging activities is not supported by instances of reduced water availability and subsequent impacts to Black Hills mountainsnail colonies. While Black Hills mountainsnail colonies have not been located in some surveyed areas that had been recently logged (Frest and Johannes 2002), no evidence was provided indicating that these areas ever harbored Black Hills mountainsnail colonies. Logging continues in Black Hills mountainsnail range, but the petition provides no evidence to indicate that areas with extant colonies are targeted for logging. The USFS management direction regarding the Black Hills mountainsnail (Standard 3103) includes protection of all identified colonies, including, but not limited to, those located by Frest and Johannes (2002). This is typically implemented by avoidance of these sites by ground-disturbing activities such as logging (C. Staab, pers. comm. 2005). Some areas occupied by the Black Hills mountainsnail are not accessible to logging equipment. In addition, in some cases the species exists in areas where timber extraction is limited by the USFS (e.g., Spearfish Canyon Scenic Byway) and/or in habitats lacking timber species preferred by logging contractors (C. Staab, pers. comm. 2005). Evidence of past logging has been noted at three extant colonies (Frest and Johannes 2002); thus, the species can (and does) exist despite logging activities within its range.

We conclude that the petitioners have not provided substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of logging may be warranted.

Roads and Road Construction

Petitioners assert that roads and road construction have generally adverse effects on the Black Hills mountainsnail. Claimed impacts include extirpation within the roadway, potential fragmentation of colonies, and indirect adverse effects associated with road establishment such as increased human access, vegetation alterations, and spraying of herbicides (addressed under

discussion of herbicides and pesticides). The Black Hills has an extensive system of roads, both public and user-created, that the petitioners assert have most likely led to the extirpation and/or fragmentation of colonies, and destruction and/or degradation of habitat. Petitioners note that many extant colonies occur near roads, suggesting that this is indicative of past and ongoing impacts. U.S. Highway 14A through Spearfish Canyon is singled out because the taxon occurs most commonly in the Spearfish Creek watershed. The petition claims that effects such as accelerated soil erosion and nutrient loss, dewatering of wetlands, and reduction of organic production and forage yields have affected, and continue to affect, 14 (over 40 percent) extant colonies that are located along or very near Highway 14A. Petitioners also indicate that the USFS is proposing to establish many miles of new roads via timber sales within Black Hills mountainsnail range, although these plans are not finalized; they suggest that these roads would threaten to destroy, modify, and/or curtail extant Black Hills mountainsnail colonies and habitat.

Evaluation of Information in the Petition Regarding Roads and Road Construction

Roads and road construction could generally cause negative effects on land snail individuals and colonies via direct mortality of individuals within roadways and associated loss of habitat (Frest and Johannes 2002; Anderson 2005). Fragmentation of colonies is possible if those colonies are divided by a new road (Baur and Baur 1990; Meadows 2002). Other secondary impacts of roads (e.g., dewatering of wetlands) asserted by the petitioners may or may not occur depending on site-specific conditions.

The petition's claim that "many" colonies exist near roads is true; in fact, nearly all of the areas sampled in the 1990s were next to roads (Frest and Johannes 2002). Consequently, there may be a sampling bias that clouds the issue of potential impacts of roads to extant Black Hills mountainsnail colonies. Frest and Johannes (2002) acknowledge that they were unable to survey all potential habitats. It is unknown how many occupied sites may have been located by searching available habitats located away from roadsides. The petitioners maintain that the colonies along U.S. Highway 14A are currently impacted by roadway effects. However, U.S. Highway 14A is not a new roadway and Black Hills mountainsnail colonies continue to exist adjacent to it; at many sites, active

live snails occur within only a few feet of the road shoulder (Frest and Johannes 2002). Initial construction of this roadway may have negatively impacted the snail (Frest and Johannes 2002; Anderson 2005), but no evidence was provided by the petitioner to indicate that colonies currently adjacent to it are threatened by ongoing secondary impacts.

As mentioned by the petitioners, the Black Hills already has an extensive road system. The need for significant additional road construction is not apparent. The numerous planned logging operations mentioned by the petitioners will require new roadways; however, plans for these projects are not final and there is no evidence suggesting these actions will occur within occupied Black Hills mountainsnail habitats. The USFS administers logging practices that may require roads on the Black Hills National Forest where the majority of Black Hills mountainsnail colonies occur (Frest and Johannes 2002). Current USFS policy requires protection of all sensitive snail colonies, including extant Black Hills mountainsnail colonies documented by Frest and Johannes (1991, 1993, 2002) (C. Staab, pers. comm. 2005).

Based on the above discussion, we conclude that the petitioners have not provided substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of roads and road construction may be warranted.

Edge Effects of Logging and Road Construction

The petitioners state that Black Hills mountainsnail colonies not directly impacted by logging or roads may be indirectly affected by edge effects resulting from these activities. The petition asserts that the edge between cut and uncut forest results in an altered microenvironment 197 to 328 feet (ft) (60 to 100 meters [m]) within the uncut area. Increased light, exposure, air and soil temperatures, and lower soil moisture, with decreased diversity compared to interior/undisturbed forest were cited as factors potentially affecting the Black Hills mountainsnail, particularly since many extant colonies are located within 328 ft (100 m) of roads.

Evaluation of Information in the Petition Regarding Edge Effects of Logging and Road Construction

The petitioners did not describe any specific impacts to the species, either negative or positive. No instances of declines in extant Black Hills mountainsnail colonies have been

linked to edge effects. It is not apparent, based on the current existence of colonies adjacent to open roadways for example, that edge effects are significantly detrimental to this species. The depth-to-edge influence indicated by the petitioners includes a variety of abiotic and biotic factors (Baker and Dillon 2000) that may or may not affect resident mountainsnails. In addition, this depth-to-edge influence also can be reduced over time as the edge "seals" with vegetation (Baker and Dillon 2000). While the Petitioners assert that the Black Hills mountainsnail would be adversely impacted by edge effects, they do not demonstrate a causative relationship. Therefore, we conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of edge effects resulting from logging and road construction may be warranted.

Herbicides and Pesticides

Petitioners note that herbicide and pesticides presently used in the Black Hills can negatively affect the Black Hills mountainsnail, as these chemicals are generally toxic to mollusks upon contact or ingestion, and herbicides serve to remove vegetative cover, thereby increasing exposure to any snails beneath. The petitioners cite spraying in the late 1940s through the 1960s and a single extant Black Hills snail colony reported to be impacted by recent herbicide application as evidence of past and present impacts. Additionally, the petitioners note the USFS's recent initiation of a Noxious Weed Management Plan which involves the use of herbicides. According to petitioners, this plan includes a determination by the USFS that the applications may adversely impact individual Black Hills mountainsnails.

Evaluation of Information in the Petition Regarding Herbicides and Pesticides

Spraying of herbicides and pesticides at sites with extant Black Hills mountainsnail colonies could result in negative impacts to land snail individuals via impacts due to direct contact, ingestion and/or vegetation removal resulting from spraying actions (Frest and Johannes 2002; Anderson 2005). Spraying herbicides to control nonnative plants, a potential secondary impact of roads, also has the potential to result in snail mortality if individuals are present within sprayed areas (Schuytema *et al.* 1994). However, research on pesticide ingestion by snails of various chemicals used on National Forest lands indicates that not all

chemicals are necessarily lethal to snails (Schuytema *et al.* 1994). Additionally, different species of snails may respond differently to toxic chemicals (Schuytema *et al.* 1994). The Petitioners did not cite any research regarding impacts of herbicide or pesticides on the Black Hills mountainsnail. They cite past, present, and future spraying programs as general evidence of threats to the continued existence of the snail; however, they do not present evidence clarifying whether these activities are known to occur at extant Black Hills mountainsnail colonies. The single incidence of spraying noted during 1990s surveys (Frest and Johannes 2002), is not a clear case of spraying-caused extirpation of snails, as the species had not been previously reported from the sprayed site and it appears the site was surveyed only once. Information regarding frequency, locations, or limits of spraying associated with roadsides or noxious weed/pest sites in relation to Black Hills mountainsnail colonies is not provided in the petition, nor are documented responses of Black Hills mountainsnails to spraying activities. USFS management direction (Standard 3103) allows for control of invasive weeds in snail habitat, but only when snails are not on the surface, and weeds must be treated individually rather than by broadcast application. This standard protects Black Hills mountainsnail colonies from adverse impacts of herbicide application. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of herbicides and pesticides may be warranted.

Mining

Adverse impacts to the Black Hills mountainsnail from mining asserted by the petition include direct extirpation of snails at mined sites, exposure of snails to toxic mine wastes and effluvia, long-term sterilization of sites mined due to acidic wastes, and increased exposure of snails from vegetation removal. Mining in the Black Hills is reported to have curtailed the range and habitat of the Black Hills mountainsnail, as no snails have been recently reported from mined sites and a single historic colony near Deadwood (a region subject to past mining) has not been rediscovered. The petitioners state that mining has affected habitats within the Spearfish Creek drainage where the Black Hills mountainsnail is most common, and other riparian areas in the Black Hills also have been impacted. They cite the USFS regarding current mining activity

occurring within a 10-mile (mi) (16-kilometer [km]) radius of the city of Lead, and anticipated expansions or new mines generally within that area in the next 10 years as evidence of future mining impacts to 2 extant colonies of the Black Hills mountainsnail.

Evaluation of Information in the Petition Regarding Mining

Mining could cause direct impacts to Black Hills mountainsnails should they occur onsite, and the potential exists for secondary effects to snails resulting from toxic effluents and vegetation removal (Frest and Johannes 2002; Anderson 2005). However, the petitioners did not provide sufficient evidence indicating that mining activities threaten extant colonies of the Black Hills mountainsnail. Although they note that no Black Hills mountainsnails were located in mined areas, they provide no evidence indicating that the snails existed onsite prior to mining. A single historic record of the snail in the vicinity of the City of Deadwood (Pilsbry 1939) and inability of current researchers to relocate that colony is cited as evidence of range reduction due to mining. However, the researchers themselves (Frest and Johannes 2002) indicate that despite lack of rediscovery of the historic colony, the species may still occur in the area. Although negative impacts may have occurred to mountainsnail habitat within the Spearfish Creek watershed, the Black Hills mountainsnail is currently most common in this drainage (Frest and Johannes 2002). Although the petitioners indicate that other riparian areas also have been impacted, evidence of past or present existence of the Black Hills mountainsnail within them and/or impacts to any extant colonies is not provided. The existence of 2 extant colonies within a relatively-large mining focus area near the City of Lead is not sufficient evidence that these colonies will be impacted by future mining activities. The remaining 39 colonies are not located within the mining focus area, thus mining does not appear to be a substantial threat to the majority of extant colonies. Limestone areas in the Black Hills have not been targeted by mining companies seeking gold, silver, and lead. Highly mineralized rock formations containing these elements are generally not found in association with limestone habitats favored by the Black Hills mountainsnail. We conclude that the petition did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of mining may be warranted.

Spring/Water Developments

The petitioners state that spring development (troughing and fencing of natural springs for livestock use) has occurred extensively in the Black Hills, and has extirpated resident mollusks. Factors include drying of the original spring site, disruption of substrates and vegetation, livestock access and trampling, and the deposition of acidic livestock wastes. They state that many extant Black Hills mountainsnail colonies are associated with springs and development of springs has caused extirpation of some colonies with no live individuals noted at developed sites.

Evaluation of Information in the Petition Regarding Spring/Water Developments

Deleterious effects to colonies of Black Hills mountainsnails located onsite could occur upon troughing of springs or by otherwise allowing cattle access to springs (Frest and Johannes 2002). Spring development for livestock watering appears to be common in the Black Hills within the known range of the Black Hills mountainsnail (C. Staab, pers. comm. 2005).

The lack of historic data regarding Black Hills mountainsnail occupation of these sites makes it difficult to determine whether spring development has substantially detrimentally affected the species. While the petitioners state that many Black Hills mountainsnail colonies are associated with springs, our analysis of Frest and Johannes (2002) revealed a report of only 1 extant Black Hills mountainsnail colony at a spring. The site had been developed (troughed and fenced) and negative impacts to the snails resulting from inadequate cattle enclosure were observed (Frest and Johannes 2002). Lack of Black Hills mountainsnail colonies at other developed springs is cited as evidence of the impacts of this activity; however, it is not apparent that these springs were ever occupied by this species, or that the continued persistence of the snail relies on colonies located at springs. In addition, USFS policy (Standard 3104) specifically states that springs or seeps where sensitive species or species of local concern exist will not be developed as water facilities unless development mitigates an existing risk (C. Staab, pers. comm. 2005). We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of spring/water development may be warranted.

Groundwater Extraction

Groundwater extraction for municipal use occurs in the Black Hills and is asserted by the petitioners to reduce water available for springs and seeps that may support the Black Hills mountainsnail, and by possibly affecting streams by reducing current flow regimes. The petitioners indicate this activity has potentially already affected the snails, and continued human developments in the Black Hills will continue to negatively affect this species in the future.

Evaluation of Information in the Petition Regarding Groundwater Extraction

The petitioners did not provide substantial scientific information that groundwater extraction has reached a level resulting in reduction of available moisture at Black Hills mountainsnail colonies. No information on the current rate of groundwater extraction or rise in human consumption and/or human populations within the Black Hills was provided to indicate aquifer water levels may be significantly impacted. No evidence was provided indicating drying of occupied snail habitats at any of the 41 sites and subsequent loss or declines of extant colonies. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of groundwater extraction may be warranted.

Recreational Activities and Developments

Picnic areas, hiking trails, and campgrounds are factors cited by the petitioners as recreational activities and developments that could fragment, extirpate, or generally negatively impact Black Hills mountainsnail colonies by such factors as increased exposure and importation of nonnative plants.

Evaluation of Information in the Petition Regarding Recreational Activities and Developments

Local impacts to occupied Black Hills mountainsnail sites, as described in the petition, could potentially negatively affect individual snails and/or colonies as a result of trampling and/or vegetation removal (Weaver and Dale 1978; Anderson 2005) as well as physical placement of recreation facilities. Development of such sites (e.g., new or expanded picnic areas, campgrounds, or trails) could result in mortality and potential fragmentation of existing colonies if these actions occur in areas occupied by the Black Hills mountainsnail. However, the petitioners did not provide evidence indicating that

the presence of recreational facilities and/or activities has resulted in substantial decline or extirpation of any known Black Hills mountainsnail colonies. Our analysis of the Frest and Johannes (2002) report indicates that 5 (12 percent) of 41 known Black Hills mountainsnail sites occur either within campgrounds, picnic areas, or along hiking trails. Of these, population estimates are reported as "very abundant" at 1 site, "common" or "abundant" at 3 sites, and "rare" at 1 site. As noted earlier, these population estimates are thought to be conservative (Frest and Johannes 2002). It is not apparent that these sites have experienced severe impacts as a result of these facilities and activities. In addition, no recreational impacts at the remaining 36 sites were noted by Frest and Johannes (2002). Thus, we conclude that the petition does not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of recreational activities and developments may be warranted.

Summary of Factor A

While a variety of anthropogenic activities that likely affect the Black Hills mountainsnail and/or its habitat are occurring across the range of the snail, with few exceptions, the petition fails to provide scientific documentation to demonstrate that the areas where habitat loss and degradation are occurring also are areas where Black Hills mountainsnail populations occur. Information provided by the petitioners and the conclusions drawn from it are compromised by the lack of historic data and inherent limitations of the methodologies used for current population estimates (Frest and Johannes 2002), resulting in the inability to determine trends with accuracy. Based on the preceding discussion, we have concluded the petition and other available information do not constitute substantial scientific information indicating that listing the Black Hills mountainsnail may be warranted due to any threat in factor A.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Information Provided in the Petition

The petition states that the Black Hills mountainsnail has been collected for scientific and educational purposes, but the petition does not provide any indication that collecting poses any threat to the survival of the species.

Evaluation of Information in the Petition

The Service concurs with the petitioners that overutilization for commercial, recreational, scientific, or educational purposes does not appear to threaten the continued existence of the Black Hills mountainsnail.

C. Disease or Predation

Information Provided in the Petition

The Petitioners assert that predation by rodents, other small mammals, amphibians, reptiles, birds, and insects, as well as parasitism by insect larvae may cause mortality of the Black Hills mountainsnail. No mention of disease affecting the Black Hills mountainsnail is made in the petition.

Evaluation of Information in the Petition

The Service recognizes that the potential sources of natural mortality to the snail described by the petitioners are likely to occur. However, no scientific information is provided indicating that this mortality results in declines of extant mountainsnail colonies. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of effects of predation may be warranted.

D. Inadequacy of Existing Regulatory Mechanisms

Information Provided in the Petition

The petitioners assert that existing regulatory mechanisms do not adequately protect the Black Hills mountainsnail or its habitat; many colonies lack any protection. They note the USFS, the Service, the States of South Dakota and Wyoming, and the City of Spearfish fail to protect this species as explained further below.

U.S. Forest Service

Petitioners cite failure of the 1997 Revised Land and Resource Management Plan (1997 RLRMP), a USFS document which serves to guide management activities on the Black Hills National Forest, to ensure viability of the Black Hills mountainsnail. An amendment to the 1997 Plan (Phase I Amendment) included a USFS directive (Standard 3103) stating that colonies identified by Frest and Johannes (1991, 1993, 2002) be protected from adverse management activities. However, the petitioners maintain that Standard 3103 is inadequate because it: (a) Serves only to maintain (not recover) populations that the Petitioners assert are "most likely not viable;" (b) fails to protect colonies that may be located in the future; (c) does not provide well-defined

and substantive management direction; and (d) fails to protect the species' habitat. Although the USFS has applied 100- to 200-ft (30- to 60-m) buffers from management actions around extant Black Hills mountainsnail colonies, the adequacy of these buffers is questioned by the petitioners. They note that some colonies have been fenced to exclude livestock, but assert that it is not well maintained and many colonies are still not fenced. The application of Standard 3103 is observed to be inconsistent. An additional USFS directive under the Phase I Amendment, Standard 3104, is intended for the protection of wildlife and plants associated with moist soil conditions by stating that no springs or seeps with sensitive species shall be developed. However, the petitioners claim Standard 3104 also is inadequate for many of the same reasons listed as failures of Standard 3103.

The Black Hills mountainsnail is listed as a Sensitive Species by the USFS under the name *Oreohelix strigosa cooperi*, Cooper's rocky mountainsnail. Lack of any additional USFS protective regulations for the Black Hills mountainsnail, despite its Sensitive Species designation, is asserted by the petitioners. They claim that USFS has not fulfilled Sensitive Species objectives by failing to ensure that agency actions do not cause the snail to become threatened or endangered, and that viable, well distributed populations exist. The petitioners also claim the USFS has proposed to remove the snail from their Sensitive Species list.

The USFS has proposed to monitor identified colonies, but the petitioners believe that the monitoring plan is inadequate and potentially ineffective. Only colonies potentially affected by management activities are to be monitored on a 4-year rotating basis. Details regarding which activities may impact snails and timing and method of impact disclosure by the USFS are called into question and the 4-year rotation is suggested as inadequate to detect potential impacts or extirpation of colonies. Analysis of impacts to the snail via the National Environmental Policy Act (NEPA) is not considered by the petitioners to be adequate protection since the USFS may choose alternatives that may impact the snail.

Finally, the Petitioners maintain that additional revisions of the 1997 RLRMP (Phase II Amendments) which were to include management of the Black Hills mountainsnail as a "species of local concern," are inadequate to ensure persistence of the species.

Evaluation of Information in the Petition Regarding the Inadequacy of Existing USFS Regulatory Mechanisms

We recognize that the petitioners' evaluations of USFS Standards 3103 and 3104 within the Phase I Amendment to the 1997 RLRMP have some merit. The lack of specificity, direction, and consistency of application of these Standards might have allowed broad discretion for management actions which may result in negative impacts to the Black Hills mountainsnail depending on USFS management decisions. However, USFS has recently amended its LRMP for the Black Hills National Forest to afford increased protection of the Black Hills mountainsnail. The amended LRMP (Phase II Amendment) was signed in late 2005 and will go into effect in early 2006. In the amended LRMP, Standard 3103 has been revised to protect all snail colonies of species of local concern rather than just protection of extant sites identified by Frest and Johannes (1991, 1993, 2002). The new Standard also provides management direction that will retain sufficient overstory, moisture regimes, ground temperatures, humidity, and ground litter in snail colonies. In addition, the standard calls for avoidance of activities (burning, heavy grazing, off-highway vehicles, heavy equipment use) that would compact soils or alter vegetation composition and ground cover. Revised standard 3103 also provides for protective criteria for prescribed burning and control of invasive weeds if necessary in occupied snail habitat.

The petitioners' assertions that the Black Hills mountainsnail populations are "most likely not viable" on USFS lands appears unsubstantiated, with no evidence provided to support this claim. The USFS protects all snail colonies, typically by applying 100- to 200-ft (30- to 60-m) buffer zones around sites occupied by the Black Hills mountainsnail. Current modifications to the 1997 RLRMP include more specific information regarding protection of snail colonies (C. Staab, pers. comm. 2005). The petitioners' assertion that the USFS proposed to remove the snail from their Sensitive Species list appears unsubstantiated, and the snail remains on the list as *Oreohelix strigosa cooperi* (C. Staab, pers. comm. 2005; USFS 2005). By listing this Sensitive Species as *O. s. cooperi*, USFS protections are extended to sites occupied by the smaller form of the *cooperi* entity as well. Thus the USFS recognizes at least 108 colonies (the large and small morphs of *O. s. cooperi*), rather than just

the 41 sites occupied by the large morph (Frest and Johannes 2002) (USFS 2005).

The petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail may be warranted due to inadequate USFS regulatory mechanisms. The Black Hills mountainsnail does not appear to be threatened on USFS lands, thus we cannot find that inadequate regulatory mechanisms of the USFS contribute to the species' asserted declines. The information in the petition concerning protection on USFS lands is now outdated. The management direction contained in the revised LRMP appears protective of the Black Hills mountainsnail and its habitat; the Petitioners did not provide substantial scientific information that additional protection on USFS land is necessary.

U.S. Fish and Wildlife Service

The petitioners cite removal of the Black Hills mountainsnail from the Category 2 Candidate list (61 FR 64481–64485; December 5, 1996) by the Service and our failure to provide funding for surveys for the species in 1999, despite providing funds for surveys in 1991 and 1992, as evidence of lack of "special attention" for this species. In addition, 2 extant colonies occur on Service property and the petitioners claim that we are not using our authority to protect those colonies.

Evaluation of Information in the Petition Regarding the Inadequacy of Existing USFWS Regulatory Mechanisms

We did remove the Cooper's Rocky mountainsnail, *Oreohelix strigosa cooperi* from the Category 2 Candidate Species list. However, removal from Category 2 Candidate Species list did not alter the level of protection afforded this species because Category 2 candidate status did not confer a regulatory benefit. Formerly recognized Category 2 species lacked sufficient information to justify issuance of a proposed rule to list as federally threatened or endangered (Service 1996b). The Service discontinued using the Category 2 designation to reduce confusion and clarify that the Service did not regard those species as candidates for listing (Service 1996b). Only former Category 1 Candidate Species, now known simply as Candidate Species, had sufficient evidence to warrant publication of a proposed rule.

Lack of Service funding for Black Hills mountainsnail surveys was indicative of budget constraints rather than lack of Service interest. Extant colonies on Service property at D.C.

Booth Historic Fish Hatchery have been avoided since identification (Steve Brimm, Service, pers. comm. 2005).

The Petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the inadequacy of USFWS regulatory mechanisms of the Service may be warranted. We cannot find that inadequate regulatory mechanisms of the Service contribute to the species' asserted decline on Service lands because the mountainsnail is being protected on our lands without ESA status.

States of South Dakota and Wyoming

The petitioners indicate that all extant colonies of the Black Hills mountainsnail occur in the State of South Dakota, and no protection of these sites is offered by South Dakota law, which has no mechanism for protecting and recovering invertebrates.

The petitioners claim that no extant Black Hills mountainsnail colonies occur in Wyoming, but that the species historically and recently resided there. They indicate the State of Wyoming has no mechanism for recovering or protecting any imperiled species at all, and the Wyoming Natural Diversity Database does not track invertebrates.

Evaluation of Information in the Petition Regarding the Inadequacy of Existing State Regulatory Mechanisms

Contrary to information in the petition, based on our evaluation of Frest and Johannes (2002) it does not appear that all Black Hills mountainsnail colonies are located in South Dakota; four are found in Wyoming. The remaining 37 sites are found in South Dakota.

The State of South Dakota does not currently provide legal protections for the Black Hills mountainsnail. However, it is not apparent that South Dakota Threatened and Endangered Species Statutes, based on definitions within those statutes, exclude invertebrates from the State list of imperiled species (South Dakota statutes, Endangered and Threatened Species) as the Petitioners state. Thus the Black Hills mountainsnail apparently is not precluded from the State list of threatened or endangered species, although it currently is not on the list. The species is tracked via the State's Natural Heritage Database (South Dakota Department of Game, Fish and Parks [SDGFP] 2005a). Furthermore, the State has recently developed a list of "Species of Greatest Conservation Need" as part of their Comprehensive Wildlife Conservation Strategy that includes Cooper's Rocky mountainsnail,

Oreohelix strigosa cooperi (SDGFP 2005b). Species of Greatest Conservation Need include State and/or federally listed species for which the State has a mandate for recovery, species for which South Dakota represents a significant portion of the species' overall range, and/or species that are indicative of, or depend upon, a declining or unique habitat in South Dakota (SDGFP 2005b). The Comprehensive Wildlife Conservation Strategy is designed to maintain and conserve the State's biodiversity (SDGFP 2005b). For South Dakota, designation as a Species of Greatest Conservation Need means that the Department is committed to conservation of the species and will use its available resources, including State Wildlife Grants, for necessary research, monitoring, and habitat conservation (Doug Backlund, pers. comm. 2005). Thus, the State currently recognizes the unique value of the snail. We cannot find that inadequate regulatory mechanisms of the State of South Dakota contribute to the species' asserted demise because the species appears to be sustained without special status from the State of South Dakota.

The petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the inadequacy of State regulatory mechanisms of the State of South Dakota may be warranted.

Our analysis of the Frest and Johannes (2002) report indicates that four Black Hills mountainsnail sites were located in Wyoming and the Black Hills mountainsnail is not necessarily extinct from these areas; it appears live specimens were documented there as recently as 1999.

The State of Wyoming has recently developed a list of "Species of Greatest Conservation Need" as part of their Comprehensive Wildlife Conservation Strategy that includes Cooper's Rocky mountainsnail, *Oreohelix strigosa cooperi*. Wyoming's list of Species of Greatest Conservation Need is "intended to provide a foundation for conserving these species in Wyoming" (Wyoming Game and Fish Department 2005). Paucity of data on this species is noted by the State (Wyoming Game and Fish Department 2005), and current information indicates that the Black Hills mountainsnail is not widely distributed in Wyoming (Frest and Johannes 2002). Although the species is not afforded regulatory protection by the State of Wyoming, the species does not appear to require regulatory mechanisms by the State to sustain it.

The petitioners did not provide substantial scientific information indicating that listing the Black Hills

mountainsnail due to the inadequacy of State regulatory mechanisms of the State of Wyoming may be warranted.

City of Spearfish, South Dakota

A single extant Black Hills mountainsnail colony exists in the City of Spearfish Campground. The Petitioners assert that the City has no regulations in place to protect or recover the mountainsnail or any other species from ongoing activities or further development.

Evaluation of Information in the Petition Regarding the Inadequacy of Existing Regulatory Mechanisms of the City of Spearfish

The City of Spearfish has not taken steps to protect extant colonies of the Black Hills mountainsnail (City of Spearfish Campground 2005). However, regardless of any potential protections that could be provided by the City, jurisdiction would be limited to the single colony currently located within the City of Spearfish Campground.

The petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the inadequacy of regulatory mechanisms of the City of Spearfish may be warranted.

Summary for Factor D

The petitioners indicated that existing regulatory mechanisms of the USFS, USFWS, the States of South Dakota and Wyoming, and the City of Spearfish are currently inadequate, are not protective of the Black Hills mountainsnail, and contribute to a decline of the species. However, the Service does not find that other potentially regulated activities pose a threat such that listing the Black Hills mountainsnail may be warranted due to any threat in factor D. Thus regulatory mechanisms, where existent and applicable, are not deemed inadequate. The petitioners did not provide evidence that the Black Hills mountainsnail requires additional regulatory mechanisms to be sustained.

E. Other Natural or Manmade Factors Affecting the Continued Existence of the Black Hills Mountainsnail

Vulnerability of Small, Isolated Populations

The petitioners submit that Black Hills mountainsnail populations have been reduced and fragmented from historic levels making the species more vulnerable to stochastic events and extinction. They indicated that population estimates at surveyed sites were "rare" or "uncommon" at 18 (56 percent) of known colonies, and that large areas of unsuitable habitat exists

between colonies. The petitioners cited the snail's small size, vulnerability to desiccation and predation, and limited motility as factors that limit the taxon's ability to rapidly colonize areas, making them unable to respond quickly to environmental change.

Evaluation of Information in the Petition Regarding Vulnerability of Small, Isolated Populations

The life history of the Black Hills mountainsnail makes the taxon inherently susceptible to mortality and/or environmental change, and gives it a limited ability to colonize new areas (Frest and Johannes 2002). We also recognize that some degree of population reduction and fragmentation of colonies may have occurred based on recent survey information and observations (Frest and Johannes 2002).

However, the petitioners' claim regarding reduction and fragmentation of populations of the Black Hills mountainsnail from historic levels is not substantiated due primarily to lack of documentation of any historic levels and/or historic distribution of this species. The petitioners appear to base their claim on the presumption that Black Hills habitat alterations in the past century have caused significant range reduction and a corresponding decline in populations of the snail. However, without additional evidence of historically occupied areas, valid trend data resulting from comparison with currently identified occupied sites is not obtainable. The Black Hills mountainsnail has seldom been reported outside the Spearfish Creek watershed of South Dakota as indicated by published reports (Over 1915, 1942; Pilsbry 1934, 1939; Henderson 1937; Roscoe 1954) and museum collections (Frest and Johannes 2002). Currently, the species' known distribution appears to be broader than what was known historically. Our analysis of current survey data (Frest and Johannes 2002) indicates that 15 (37 percent) of 41 extant colonies were reported as "rare" or "uncommon" rather than 18 (56 percent) as reported by Petitioners. Additionally, 13 (31 percent) of extant colony population estimates were reported as "common" or "abundant," a single site (2 percent) fell under the "very abundant" category, while population estimates at 5 sites (12 percent) could not be determined due to discrepancies or missing data (Frest and Johannes 2002). As stated earlier, these values should be viewed as tentative; they potentially underestimate extant populations.

The Petitioners did not provide substantial scientific information

indicating that listing the Black Hills mountainsnail due to the described effects of vulnerability of small, isolated populations may be warranted. The life history of the snail is such that it is subject to natural mortality and limited mobility; however, it has adapted with these constraints and does not appear to have reduced in range due to this threat.

Habitat Fragmentation

The Petitioners assert that habitat fragmentation threatens the continued survival of the Black Hills mountainsnail. Lack of connectivity between colonies, slow rates of migration, and large areas of unsuitable habitat between colonies are cited as evidence that the snails may not recover from fragmentation.

Evaluation of Information in the Petition Regarding Habitat Fragmentation

Some habitat fragmentation may have resulted from past human activities in the Black Hills (Frest and Johannes 2002). However, the petitioners' claim regarding fragmentation of Black Hills mountainsnail habitats from historic levels is not substantiated, due primarily to lack of documentation of historic distribution of this species outside of the Spearfish Creek watershed. Spearfish Canyon harbors the majority of extant colonies (Frest and Johannes 2002). Close proximity among these colonies does not support the argument that fragmentation is a threat. Relatively few colonies exist in areas outside Spearfish Creek watershed; however, some degree of fragmentation may be normal for a slow-moving, generally sessile animal that owes long-distance dispersals primarily to passive means such as avalanche, flood, or being carried by birds (Baker 1958; Karlin 1961; Baur 1986). Any resulting new colonies could be naturally separated from the parent colony by unsuitable habitat; this does not necessarily indicate that fragmentation threatens the species. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of habitat fragmentation may be warranted.

Forest Fires

Forest fires are submitted by the petitioners as a threat to the Black Hills mountainsnail due mainly to the observed lack of the snails in areas with recent severe forest fires. While the snails may survive low-intensity fires, the petitioners emphasize severe (large-scale, stand-replacing fires) fires in their assertions regarding current and future

declines of the species. The petitioners report that such severe fires occur more frequently in today's managed forest than they had historically. Increases in human-caused ignitions may be a factor.

Evaluation of Information in the Petition Regarding Forest Fires

Forest management practices have likely contributed to alterations of the historic fire regime in the Black Hills, potentially reducing the frequency of burns from historic times (Brown and Sieg 1999), and recent management activities such as fire suppression also may contribute to more severe fires today than in the past (Baker and Ehle 2001). However, historic fire frequencies in some cases may be longer than previously reported (Baker and Ehle 2001) and it appears that large-scale, stand-replacing fires did occur in the Black Hills historically (Shinneman 1996; Shinneman and Baker 1997). The effects of fire on the Black Hills mountainsnail specifically are unknown, although the species apparently evolved with fire (Frest and Johannes 2002; Anderson 2005). In general, snails may be better able to survive low-intensity fires while high-intensity fires that burn the litter and downed woody debris where snails reside would be detrimental (Frest and Johannes 2002; Anderson 2005).

Evidence of past fires has been noted at two extant Black Hills mountainsnail colonies (Frest and Johannes 2002) although information regarding timing or severity of the burns is not provided. Frest and Johannes (2002) note that no land snails were located at five sites within an area that burned in 2000, but Anderson (2005) points out that the unnamed species of *Oreohelix* identified by Frest and Johannes (2002) do occur " * * * within areas that have been burned in wildfires over the last few years" (Anderson 2005). Management efforts in the Black Hills to reduce fuels and preclude large-scale, severe fires are ongoing (C. Staab, pers. comm. 2005). The typically low-lying, moist and/or rocky areas the snails prefer may be less susceptible to fire due to higher moisture levels and/or relative lack of fuels. Spearfish Creek watershed, the area most commonly occupied by the snails, contains numerous residences and businesses and is recognized for its scenic value (USFS 1996). While it may be possible for severe wildfires to occur in this area, control and suppression of wildfire occurring within the canyon would likely be aggressive in order to protect lives, property, and scenic values. While not widely distributed throughout the Black Hills, the species does occur in several different drainages

(Frest and Johannes 2002). It does not appear likely that fire has or is likely to threaten the Black Hills mountainsnail population. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of forest fires may be warranted.

Flooding

The petitioners assert that a single Black Hills mountainsnail colony appeared to have been recently extirpated by a flood event and they describe an historic example of a catastrophic flood event in the Black Hills as evidence that flooding threatens the species.

Evaluation of Information in the Petition Regarding Flooding

Large precipitation events may cause localized flooding, potentially affecting extant Black Hills mountainsnails. However, the petitioners did not provide evidence to suggest this factor would occur frequently, impact a significant number of extant colonies, nor result in catastrophic declines of the species. The petitioners' claims that a single flood event extirpated a colony documented by Frest and Johannes (1993) are complicated by the possibility that, while some snails may have suffered mortality as a result of scouring flows and bedload deposition on the documented site, individuals also may have been transported by the flows and deposited in new areas downstream, potentially resulting in formation of one or more new colonies (Baker 1958; Karlin 1961; Baur 1986). Additionally, Frest and Johannes (2002) indicate that documented snail colonies " * * * occurred in areas very rarely subject to flooding, such as slope bases or other areas naturally protected from even 20-year floods." It is not likely that flooding would threaten the Black Hills mountainsnail population because the sites where Black Hills mountainsnails are found are rarely subject to flooding. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of flooding may be warranted.

Environmental Stochasticity

The petitioners claim that environmental stochasticity (the occurrence of random environmental events) poses a threat to the Black Hills mountainsnail as a result of its small, isolated, and fragmented population, reduced habitat and range, and inability to respond quickly to environmental

change. They cite several references (e.g., Duthrie 1930; Shinneman and Baker 1997) documenting catastrophic events in the Black Hills.

Evaluation of Information in the Petition Regarding Environmental Stochasticity

Random environmental events can affect local populations if the result is high mortality of the species, habitat loss, or little or no possibility of recolonization. Isolation can be a contributing factor (Pettersson 1985) to local extinctions, although it is not apparent that isolation among Black Hills mountainsnail colonies is a threat to the species. Small populations may exhibit shorter lifetimes with a higher probability of becoming extinct than large populations (Hanski *et al.* 1996), and it appears that the population growth rates and carrying capacity are key contributing factors in the length of time to potential extinction (Lande 1993).

While the petition submits generalities that might occur to Black Hills mountainsnail populations, the type of specific data necessary to determine that environmental stochasticity is posing a threat to the species does not appear to be available. The only demographic information existing for this species is in the form of population estimates at documented sites, and these are described to be inexact due to difficulties in surveying the species (Frest and Johannes 2002). Information related to population growth rates, carrying capacities, and accurate population sizes of Black Hills mountainsnail populations, subpopulations, and metapopulations does not exist, and evidence that environmental stochasticity poses a threat to this species is not supported. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountainsnail due to the described effects of environmental stochasticity may be warranted.

Climate Change

The petitioners assert that human-caused changes in the earth's climate such as increased temperature and lower precipitation, will stress ecosystems and wildlife. Climate change could lead to increases in frequency and intensity of wildfires, decreased range and density of Ponderosa pines in the Black Hills, grasslands and savannah replacement of forests and riparian woodlands, and upward movement of ecological zones, all of which would increase insolation and risk of dessication of the Black Hills

mountain snail and reduce available habitat.

Evaluation of Information in the Petition Regarding Climate Change

Climate change has been linked to a number of conservation issues and observed changes in animal populations, behavioral phenologies, habitats, and ranges. However, direct evidence that climate change is the cause of these alterations is often lacking (McCarty 2001). To our knowledge, specific analysis regarding potential effects of climate change on the Black Hills mountain snail has not been conducted. The information provided by the petition is speculative in nature and does not provide concrete evidence of threats to the petitioned entity. We conclude that the petitioners did not provide substantial scientific information indicating that listing the Black Hills mountain snail due to the described effects of climate change may be warranted.

Summary for Factor E

The petitioners submit that extant Black Hills mountain snail colonies are isolated making them more vulnerable to extinction; their habitat is fragmented, they are susceptible to fires and floods and random environmental changes as well as long-term climate changes threaten to reduce or eliminate

extant colonies and their habitats. While some or all of these factors may affect the Black Hills mountain snail, the petitioners failed to provide substantial scientific information to indicate that these factors pose a threat such that listing the Black Hills mountain snail may be warranted due to any threat in factor E. Lack of historic data to demonstrate that the former range and population estimates for this species were substantially greater than the species' current range and population size, lack of demonstration of a population decline, as well as lack of direct causative links of the asserted factors to alleged species decline, preclude determination of these factors as threats to the species.

Finding

We have reviewed the petition and literature cited in the petition, and evaluated that information in relation to other pertinent literature and information available in our files. After this review and evaluation, we find the petition does not present substantial scientific information to indicate that listing the Black Hills mountain snail may be warranted at this time. Although we will not be commencing a status review in response to this petition, we will continue to monitor the species' population status and trends, potential threats, and ongoing management

actions that might be important with regard to the conservation of the Black Hills mountain snail across its range. We encourage interested parties to continue to gather data that will assist with the conservation of the species. If you wish to provide information regarding the Black Hills mountain snail, you may submit your information or materials to the Field Supervisor, Ecological Services, South Dakota Field Office (see **ADDRESSES**).

References Cited

A complete list of all references cited herein is available, upon request, from the U.S. Fish and Wildlife Service, Ecological Services, South Dakota Field Office (see **ADDRESSES** section).

Author

The primary author of this finding is the staff of the South Dakota Ecological Services Field Office (see **ADDRESSES**).

Authority

The authority for this action is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: February 21, 2006.

Marshall P. Jones, Jr.

Acting Director, Fish and Wildlife Service.
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