From: Shaye Wolf <swolf@biologicaldiversity.org>
To: <fgc@fgc.ca.gov>
Date: 6/4/2009 12:03 PM
Subject: American pika state listing petition
Attachments: Pika 90-day finding Federal Register notice.pdf

Dear Ms. Gustafson, Mr. Kellogg, Mr. Sutton, Mr. Rogers, and Mr. Richards,

On May 15, 2009, I sent a letter with documents on an accompanying compact disk to the California Fish and Game Commission on behalf of the Center for Biological Diversity to apprise the Commission of scientific studies pertinent to the Commission's reconsideration of the Petition to List the American Pika under the California Endangered Species Act. That letter discussed the U.S. Fish and Wildlife Service's May 7, 2009, positive 90-day finding on the federal petition to list the American pika. I have attached this 90-day finding from the Federal Register to be included in the Commission's reconsideration of the CESA pika listing petition, as it was not included on the compact disk that I sent on May 15.

Please let me know that you have received this attachment. Thank you.

Best,

Shaye

Shaye Wolf, Ph.D.

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[FWS–R6–ES–2009–0021; MO 92210530083–B2]

Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To List the American Pika as Threatened or Endangered with Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 90-day petition finding and initiation of status review.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 90-day finding on a petition to list the American pika (*Ochotona princeps*) as threatened or endangered under the Endangered Species Act of 1973, as amended (Act). We find that the petition presents substantial scientific or commercial information indicating that listing of the American pika may be warranted. Therefore, with the publication of this notice, we are initiating a status review of the species, and we will issue a 12-month finding to determine if the petitioned action is warranted. To ensure that the status review is comprehensive, we are soliciting scientific and commercial data regarding this species. We will make a determination on critical habitat for this species if, and when, we initiate a listing action.

DATES: We made the finding announced in this document on May 7, 2009. To allow us adequate time to conduct the 12–month status review, we request that we receive information on or before July 6, 2009.

ADDRESSES: You may submit information by one of the following methods:

- Federal rulemaking Portal: *http://www.regulations.gov*. Follow the instructions for submitting comments.
- U.S. mail or hand-delivery: Public Comments Processing, Attn: **FWS–R6–ES–2009–0021**; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, Suite 222; Arlington, VA 22203.

We will not accept e-mail or faxes. We will post all comments on *http://www.regulations.gov*. This generally means that we will post any personal information you provide us (see the **Information Solicited** section below for more information).

FOR FURTHER INFORMATION CONTACT: Larry Crist, Field Supervisor, Utah Ecological Services Field Office, 2369 West Orton Circle, Suite 50, West Valley City, UT 84119; telephone 801–975–3330, extension 126. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Information Solicited

When we make a finding that a petition presents substantial information to indicate that listing a species may be warranted, we are required to promptly commence a review of the status of the species. To ensure that our status review is complete and based on the best available scientific and commercial information, we are soliciting information on the American pika or any subspecies of the American pika. We request data and information from the public, other governmental agencies, tribes, the scientific community, industry, or any other interested parties concerning the status of the American pika or any subspecies of the American pika. We are seeking information regarding the species' or subspecies': (1) Historical and current status and distribution; (2) population size and trend; (3) biology and ecology; (4) taxonomy (especially the genetics of the species and subspecies); and (5) ongoing conservation measures for the animals or their habitat.

We also are seeking information on the following five threat factors used to determine if a species, as defined under the Act, is threatened or endangered under section 4(a)(1) of the Act (16 U.S.C. 1531 *et seq.*):

(a) The present or threatened destruction, modification, or curtailment of the species' habitat or range;

(b) Overutilization for commercial, recreational, scientific, or educational purposes;

(c) Disease or predation;

(d) The inadequacy of existing regulatory mechanisms; or

(e) Other natural or manmade factors affecting its continued existence and threats to the species or its habitat.

If we determine that listing the American pika or any subspecies of the American pika under the Act is warranted, we intend to propose critical habitat to the maximum extent prudent and determinable at the time we propose to list the species. Therefore, with regard to areas within the geographical range currently occupied by the species, we also request data and information on what may constitute physical or biological features essential to the conservation of the species, where these features are currently found, and whether any of these features may require special management considerations or protection. In addition, we request data and information regarding whether there are areas outside the geographical area occupied by the species that are essential to the conservation of the species. Please provide specific comments and information as to what, if any, critical habitat you think we should propose for designation if the species is proposed for listing, and why such habitat meets the requirements of the Act.

We will base our 12-month finding on a review of the best scientific and commercial information available, including all information we receive during this public comment period. Please note that submissions merely stating support for or opposition to the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that we make determinations as to whether any species is a threatened or endangered species ''solely on the basis of the best scientific and commercial data available.'' At the conclusion of the status review, we will issue a 12–month finding on the petition, as provided in section 4(b)(3)(B) of the Act.

You may submit your information concerning this status review by one of the methods listed in the **ADDRESSES** section.

If you submit information via *http://www.regulations.gov*, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this personal identifying information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on *http://www.regulations.gov* . Please include sufficient information with your comments to allow us to verify any scientific or commercial information you include.

Information and materials we receive, as well as supporting documentation we used in preparing this 90–day finding, will be available for public inspection on *http://www.regulations.gov*, or by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Utah Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Background

Section 4(b)(3)(A) of the Act requires that we make a finding on whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information indicating that the petitioned action may be warranted. We are to base this finding on information contained in the petition and supporting information readily available in our files at the time of the petition review. 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 information within the Code of Federal Regulations (CFR) regarding 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 the petition presented substantial information, we are required to promptly commence a review of the status of the species.

We received a petition from the Center for Biological Diversity (Center), dated October 1, 2007, requesting that we list the American pika (*Ochotona princeps*) as threatened or endangered under the Act. Additionally, the Center formally requested that we conduct a status review of each of the 36 recognized subspecies of American pikas to determine if separately listing any subspecies as threatened or endangered may be warranted. Specifically, the Center requested that seven American pika subspecies be listed as endangered: The Ruby Mountains pika (*O. p. nevadensis*), *O. p. tutelata* (no common name), the White Mountains pika (*O. p. sheltoni*), the gray-headed pika (*O. p. schisticeps*), the Taylor pika (*O. p. taylori*), the lava-bed pika (*O. p. goldmani*), and the Bighorn Mountain pika (*O. p. obscura*). The Center requested that the remaining subspecies be listed as threatened.

We acknowledged receipt of the petition in a letter dated October 18, 2007. In that letter we advised the petitioner that we could not address its petition then because existing court orders and settlement agreements for other listing actions required nearly all of our listing funding. We also concluded that emergency listing of the American pika was not warranted.

We received a 60–day notice of intent to sue from the Center dated January 3, 2008. We received a complaint from the Center on August 19, 2008. We submitted a settlement agreement to the Court on February 12, 2009, agreeing to submit a 90-day finding to the **Federal Register** by May 1, 2009, and, if appropriate, to submit a 12-month finding to the **Federal Register** by February 1, 2010.

We received a letter, dated November 3, 2008, from the Center that discussed and transmitted supplemental information found in recent scientific studies that had not been included in the original petition. We considered this additional information when making this finding.

In making this finding, we relied on information provided by the petitioner, as well as information readily available in our files at the time of the petition review. We evaluated the information in accordance with 50 CFR 424.14(b). Our process for making this 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 contains ''substantial scientific and commercial information.''

Species Information

The American pika is a small montane mammal in the order Lagomorpha (rabbits, hares, and pikas) distributed discontinuously throughout the western United States and Canada (Hall 1981, p. 288; Smith and Weston 1990, p. 2). The species inhabits talus fields fringed by suitable vegetation in alpine or subalpine areas extending south from central British Columbia and Alberta into the Rocky Mountains of New Mexico and the Sierra Nevada of California (Hall 1981, p. 288; Smith and Weston 1990, pp. 2–3). A generalist herbivore that does not hibernate, the species relies on harvested stockpiles of summer vegetation stored within talus openings to persist throughout the winter months (Smith and Weston 1990, p. 3). Alpine meadows that provide forage are important to pika survival.

Like other pika species, the American pika has an egg-shaped body with short legs, moderately large ears, and no visible tail (Smith and Weston 1990, p. 2). Fur color varies among subspecies and across seasons, typically with shorter, brownish fur in summer and longer, grayish fur in winter (Smith and Weston 1990, p. 3). The species is an intermediately sized pika, with adult body lengths ranging from 162 to 216 millimeters (6.3 to 8.5 inches) and mean body mass ranging from 121 to 176 grams (4.3 to 6.2 ounces) (Hall 1981, p. 287; Smith and Weston 1990, p. 2).

American pikas forage by feeding and haying (Huntly *et al.* 1986, p. 139; Smith and Weston 1990, p. 4; Dearing 1997b, p. 775). Feeding (the immediate consumption of vegetation) occurs year-round; haying (the storage of vegetation for later consumption) occurs only in summer months after the breeding season (Smith and Weston 1990, p. 4). The primary purpose of haypiles is overwintering sustenance, and individuals harvest more vegetation than necessary for these haypiles (Dearing 1997a, p. 1156). The species takes advantage of plant chemistry by selecting low-phenolic (containing phenol, an organic compound that in high amounts is toxic to pika) vegetation for feeding, while at the same time selecting high-phenolic, but slow-decaying, vegetation for haying (Dearing 1997b, pp. 774, 776, 779). By the time pikas consume the stored vegetation, plant toxins have decayed to palatable levels (Dearing 1997b, pp. 774, 779).

Thermoregulation is an important aspect of American pika physiology, because individuals have a high normal body temperature of approximately 40 °Celsius (C) (104 °Fahrenheit (F)) (MacArthur and Wang 1973, p. 11; Smith and Weston 1990, p. 3), and a relatively low lethal maximum body temperature threshold of approximately 43 °C (109.4 °F) (Smith and Weston 1990, p. 3). Most thermoregulation of individuals is behavioral, not physiological (Smith 1974b, p. 1372; Smith and Weston 1990, p. 3). In warmer environments, such as during midday sun and at lower elevation limits, pikas typically become inactive and withdraw into cooler talus openings (Smith 1974b, p. 1372; Smith and Weston 1990, p. 3).

Temperature restrictions influence the species' distribution because hyperthermia (heat stroke) or death can occur after brief exposures to ambient temperatures greater than 25.5 °C (77.9 °F) (Smith 1974b, p. 1372). Therefore, population range of the American pika progressively increases in elevation in the southern extents of the distribution (Smith and Weston 1990, p. 2). In the northern part of its distribution (southwestern Canada), populations occur from sea level to 3,000 meters (m) (9,842 feet (ft)), but in the southern extent (New Mexico, Nevada, and southern California) populations rarely exist below 2,500 m (8,202 ft) (Smith and Weston 1990, p. 2). Fossil records indicate that the species inhabited sites farther south and at lower elevations during the late Wisconsinan and early Holocene periods (approximately 40,000 to 7,500 years ago), but warming and drying climatic trends in the middle Holocene period (approximately 7,500 to 4,500 years ago) forced populations into the current distribution of montane

refugia (Smith and Weston 1990, p. 2; Grayson 2005, p. 2103).

Within this geographic distribution, the American pika has an obligate association with talus habitat because it uses rock piles for den sites, food storage, and nesting (Smith and Weston 1990, p. 4; Beever *et al.* 2003, p. 39). Talus habitats also provide microclimate conditions suitable for pika survival by creating cooler, moist refugia in summer months (Beever 2002, p. 27) and insulating individuals in the colder winter months (Smith 1978, p. 137). Hafner (1994, p. 380) suggested that neither heat nor aridity directly caused local population extirpations during historical warming periods, but rather it was the upward retreat of alpine permafrost that allowed soil and vegetation to fill talus habitat openings.

Within these habitats, individual pikas are territorial, maintaining a defended territory of 410 to 709 square meters (m2) (4,413 to 7,631 square feet (ft2)), but fully utilizing overlapping home ranges of 861 to 2,182 m2 (9,268 to 23,486 ft2) (various studies cited in Smith and Weston 1990, p. 5). Individuals mark their territories with scent and defend the territories through aggressive fights and chases (Smith and Weston 1990, p. 5). Adults with adjacent territories form facultatively monogamous mating pairs (males are sexually monogamous but make little investment in rearing offspring) (Smith and Weston 1990, pp. 5–6). Females give birth to average litter sizes of 2.34 to 3.68 twice a year (Smith and Weston 1990, p. 4). However, fewer than 10 percent of weaned juveniles are from the second litter, because mothers only wean the second litter if the first litter is lost (various studies cited in Smith and Weston 1990, p. 4).

Adult pikas can be territorially aggressive to juveniles, and parents can become aggressive to their own offspring within 3 to 4 weeks after birth (Smith and Weston 1990, p. 4). Therefore, juveniles need to establish their own territories and create haypiles before the winter snowpack if they are to survive (Smith and Weston 1990, p. 6; Peacock 1997, p. 348). However, establishing a territory and building a haypile does not ensure survival. Among all residents (adults and overwintering juveniles), yearly average mortality in pika populations is between 37 and 53 percent; few pikas live to be 4 years of age (Peacock 1997, p. 346).

Historically, researchers hypothesized that American pika juveniles are philopatric, dispersing only if no territory is available in their natal local population site (various studies cited in Smith and Weston 1990, p. 6). However, using indirect genetic methods, Peacock (1997, pp. 346–348) demonstrated that juvenile emigration to other population sites occurred over both long (2 kilometers (km); (1.24 miles (mi))) and short distances, and acted to support population stability by replacing deceased adults. Peacock (1997, pp. 347–348) also concluded that territory availability is a key factor for dispersal patterns, and that local pika populations lacked clusters of highly related individuals.

Dispersal by American pikas is governed by physical limitations. Smith (1974a, p. 1116) suggested that it was difficult for juveniles to disperse over distances greater than 300 m (10 ft) in low-elevation (2,500-m (8,200-ft)) populations. Lower elevations are warmer in summer and represent the lower edge of the elevational range of the species (Smith 1974a, p. 1112). Research at other locations has documented dispersal distances of 3 km (1.9 mi) (Hafner and Sullivan 1995, p. 312). The maximum individual dispersal distance is probably between 10 and 20 km (6.2 and 12.4 mi) (Hafner and Sullivan 1995, p. 312). This conclusion is based on genetic (Hafner and Sullivan 1995, pp. 302–321) and biogeographical (Hafner 1994, pp. 375–382) analysis. Genetic analysis revealed that pika metapopulations are separated by somewhere between 10 and 100 km (6.2 to 62 mi) (Hafner and Sullivan 1995, p. 312). Biogeographical analysis demonstrated that, during the warmer altithermal period of the mid-Holocene (about 6,500 years ago), the species retreated to sites offering thermal refugia, and that the species subsequently expanded its range somewhat as climatic conditions cooled (Hafner 1994, p. 381). However, the species has been unable to recolonize vacant habitat patches greater than 20 km (12.4 mi) from refugia sites and has recolonized less than 7.8 percent of available patches within 20 km (12.4 mi) of those same refugia sites (Hafner 1994, p. 381). Evidence indicates that the lack of recolonization is due to vegetation filling in talus areas (removing pika habitat) or habitat becoming too dry due to environmental changes resulting from historical changes in climate (Hafner 1994, p. 381).

Climatic conditions have shaped the current distribution of the America pika over the course of history, creating geographically isolated populations on montane refugia (Hafner 1994, p. 375; Hafner and Sullivan 1995, p. 302; Grayson 2005, p. 2103). Information presented in the petition indicates that this geographic isolation has resulted in 36 recognized subspecies of the American pika (Hall 1981, p. 287–292). Of these, 31 subspecies occur in the United States over a 10-State region: New Mexico, Colorado, Wyoming, Montana, Utah, Idaho, Nevada, California, Oregon, and Washington (Hall 1981, p. 288). The other five subspecies occur in Alberta and British Columbia, Canada. Recent genetic work has shown that four major genetic units of the American pika exist in the northern Rocky Mountains, Sierra Nevada, southern Rocky Mountains, and Cascade Range (Hafner and Sullivan 1995, p. 308). We will address American pika subspecies designations in the United States and Canada more thoroughly in our status review.

The petitioner requested that 7 of the 36 petitioned American pika subspecies be listed as endangered and that the other 29 subspecies be listed as threatened. Subspecies are listable entities under the Act. We will verify taxonomic classification of pika subspecies and assess whether any or all subspecies are warranted for listing under the Act. If any subspecies are found to be warranted, we will determine whether they are individually warranted for listing as threatened or endangered when we prepare a proposed listing rule.

Threat Factors Affecting the Species

Section 4 of the Act and its implementing regulations (50 CFR 424) set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Listing actions may be warranted based on any of the above threat factors, singly or in combination.

Under the Act, a threatened species is defined as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. An endangered species is defined as a species that is in danger of extinction throughout all or a significant portion of its range. We evaluated each of the five listing factors to determine whether the level of threat identified by information in the petition or in our files was

substantial and indicated that listing the American pika as threatened or endangered may be warranted. Our evaluation is presented below.

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

The petitioner states that threats causing the present or threatened destruction, modification, or curtailment of American pika habitat or range include global climate change, livestock grazing, invasive plant species, and fire suppression.

Global Climate Change

The petitioner states that global climate change is the gravest threat to the long-term survival of the American pika. They assert that predicted global climate change, both thermal and precipitation regime modifications, can directly cause thermal stress and mortality to individuals, contribute to the loss of montane habitat, and synergistically enhance negative ecological and anthropogenic effects. The petitioner provides an overview of global climate change research, including past, present, and predicted future climatic conditions. After presenting an overview of the scientific basis of global climate change, the petitioner discusses observed impacts to the American pika from historic and recent global climate change. Lastly, the petitioner introduces future projected climatic conditions in the American pika's range and hypothesizes how these conditions may affect the species.

The petitioner asserts that the publications of the Intergovernmental Panel on Climate Change (IPCC), specifically the four-volume *IPCC Fourth Assessment Report: Climate Change 2007*, are the best available science on global climate change, and we concur. The IPCC is a scientific intergovernmental body established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) ''to assess scientific information related to climate change, to evaluate the environmental and socio-economic consequences of climate change, and to formulate realistic response strategies'' (IPCC 2007, p. iii). The *IPCC Fourth Assessment Report: Climate Change 2007* included the findings of three working groups composed of more than 500 lead authors and 2,000 expert reviewers and provided objective scientific guidance to policymakers on the topic of climate change (IPCC 2007, p. iii). We concur that the IPCC information on global climate change is reliable.

The IPCC concluded that global climate change is occurring and is caused by human activities, such as the burning of fossil fuels and clearing of forests (Forster *et al.* 2007, pp. 135-136). Historical records analyzed by the IPCC demonstrated that global surface temperatures have risen (with regional variations) during the past 157 years, most strongly after the 1970s (Trenberth *et al.* 2007, p. 252). Globally, average surface temperatures have risen by 0.074 °C plus or minus 0.018 °C (0.13 °F plus or minus 0.03 °F) per decade during the past century (1906 through 2005) and by 0.177 °C plus or minus 0.052 °C (0.32 °F plus or minus 0.09 °F) per decade during the past quarter-century (1981 through 2005) (Trenberth *et al.* 2007, p. 253).

Changes in the amount, intensity, frequency, and type of precipitation also have been summarized by the IPCC (Trenberth *et al.* 2007, p. 262). The warming of global temperatures has increased the probability of precipitation falling as rain rather than snow, especially in near-freezing situations, such as the beginning and end of the snow season (Trenberth *et al.* 2007, p. 263). In many Northern Hemisphere regions, this has caused a reduced snowpack, which can greatly alter water resources throughout the year (Trenberth *et al.* 2007, p. 263). As a result of thermal and precipitation regime changes, the IPCC expects the snowline (the lower elevation of year-round snow) in mountainous regions to rise 150 m (492 ft) for every 1 °C (1.8 °F) increase in temperature (Christenson *et al.* 2007, p. 886). These predictions are consistent with regional predictions for the Sierra Nevada in California that calculate that year-round snow will be virtually absent below 1,000 m (3,280 ft) under a higher emissions scenario (Cayan *et al.* 2006, p. 32).

The petitioner presents research demonstrating that climate change has occurred within the range of the American pika. In the 20th century, regions in which pikas occur (the Pacific Northwest and western United States) have seen annual average temperature increases of 0.6 to 1.7 °C (1.1 to 3.1 °F) and 1.1 to 2.8 °C (2.0 to 5.0 °F), respectively (Parson *et al.* 2000, p. 248; Smith *et al.* 2000, p. 220). This warming corresponds with a reduced mountain snowpack (Mote *et al.* 2005 and Regonda *et al.* 2005 cited in Vicuna and Dracup 2007, p. 330; Trenberth *et al.* 2007, p. 310) and a trend toward earlier snowmelt in western North America (Stewart *et al.* 2004, pp. 217, 219, 223).

The petitioner presents research forecasting future climatic conditions both globally and for the range of the American pika. Predicted global average surface warming during the 21st century is between 1.1 and 6.4 °C (2.0 and 11.5 °F), depending on the emissions scenario analyzed (Solomon *et al.* 2007, p. 70, Table TS. 6). On a regional scale, North America is likely to exceed the global mean warming in most areas (Christenson *et al.* 2007, p. 850). Specifically, warming is likely to be largest in winter in northern regions of North America, with minimum winter temperatures likely rising more than the global average (Christenson *et al.* 2007, p. 850). Across 21 global temperature models using a mid-level emissions scenario, the IPCC predicted that the average annual temperature in western North America (covering the entire range of the American pika) will increase between 2.1 and 5.7 °C (median 3.4 °C) (3.8 and 10.3 °F (median 6.1 °F)) during the 21st century (Christenson *et al.* 2007, p. 856). Similarly, Smith *et al.* (2000, p. 220) reported a projected warming of 4.4 to 6.1 °C (7.9 to 11°F) in the western United States by 2090.

Literature presented by the petitioner demonstrates that temperature increases also are expected to affect precipitation, snowpack, and snowmelt in the range of the American pika. The IPCC concluded that snow-season length and depth of snowpack are very likely to decrease in most of North America (Christenson *et al.* 2007, p. 850). Leung *et al.* (2004, p. 75) concluded that future warming increases in the western United States will cause increased rainfall and decreased snowfall, resulting in reduced snow accumulation or earlier snowmelt. Similarly, Rauscher *et al.* (2008, p. 4) concluded that increased temperatures in the late 21st century could cause early-season snowmelt-driven runoff to occur as much as 2 months earlier than presently in the western United States.

The petitioner asserts that climate variables are of immediate concern to the American pika because past and present trends in climate have important physiological, ecological, and demographic consequences. They state that temperature is a variable of primary importance to the species because it inhibits local population persistence at warmer sites, consequently determining the species' distribution. They also discuss the ecological and physiological roles of precipitation, particularly snow, to the American pika and its habitat. Lastly, they discuss how climate regulates the factors maintaining the American pika's alpine meadow and talus habitat.

The petitioner presents research concluding that the distribution of American pikas from prehistoric times

to the present is a result of changing climatic conditions. Hafner (1994, p. 375) concluded that, in the southern Rocky Mountains, occurrence of pika populations is closely tied to past and present distribution of alpine permafrost conditions, with altithermal warming accounting for 66.7 percent of all post-Wisconsinan period population extirpations. Similar biogeographic analysis demonstrated that climate change and subsequent impacts on vegetation determined the distribution of the American pika in the Great Basin (Grayson 2005, p. 2103). Grayson (2005, p. 2107) describes the history of American pikas in the Great Basin as ''a relentless loss of lower elevation populations, creating the extremely patchy, and generally high elevation, distribution seen today.'' The present distribution of the American pika in the Great Basin is approximately 783 m (2,568 ft) higher in elevation than the distribution during the late Wisconsinan and early Holocene periods (Grayson 2005, p. 2103), demonstrating an elevational retreat tracking colder microclimates. While these trends, acting over long timescales, demonstrate the role of historical climate conditions in shaping pika distribution, the petitioner emphasizes the current threat to the American pika by citing more recent, rapid-range contractions.

To demonstrate the immediate vulnerability of pika populations to human-induced climate change, the petitioner presents research documenting 20th century range contractions in both the Great Basin and the Sierra Nevada. By conducting extensive surveys between 1994 and 1999 at historic sites known to have harbored pikas, a study of Great Basin pika populations found that 7 of 25 populations appeared to have experienced recent extirpations (Beever *et al.* 2003, p. 37). Elevation was an important parameter in models predicting the persistence of pika populations, suggesting that thermal effects have influenced recent persistence trajectories of Great Basin populations of pikas (Beever *et al.* 2003, pp. 43, 46, 47). However, additional factors affect persistence, such as proximity to roads, habitat size, and livestock grazing, which indicate that anthropogenic effects may be working in concert with environmental conditions to produce the apparent extirpations (Beever *et al.* 2003, p. 46). In 2004, the number of apparent population extirpations in the study area had increased to nine (Krajick 2004, p. 1602).

Moritz *et al.* (2008, pp. 261–264) examined long-term responses of small mammal communities to recent climate change in the Sierra Nevada. Because the study area has been protected since 1890, responses to climate change were not confounded by land-use effects (Moritz *et al.* 2008, p. 261). They documented range contractions in high-elevation species and upward range expansion in low-elevation species (Moritz *et al.* 2008, p. 262). Specifically, the lower range limit of the American pika shifted 153 m (502 ft) upslope (Moritz *et al.* 2008, p. 263). Based on the Great Basin and Sierra Nevada studies, the petitioner states that temperatures provide the most likely explanation for observed range shifts in American pika populations.

The petitioner acknowledges the work of Beever (2002, pp. 23–29) to provide further insights into pika population persistence and climate conditions in lower elevation regions. American pikas were detected at historical and new locations at Craters of the Moon and Lava Beds National Monuments (Idaho and California, respectively), a notable finding because the climate at these sites is an estimated 18 to 24 percent drier and 5 to 11 percent warmer during the hottest months of the year than experienced at the interior Great Basin locations where pikas have been extirpated (Beever 2002, pp. 26–27). Three habitat characteristics seemed important to these populations: large, contiguous areas of rocky, volcanic habitat; average or greater than average amounts of accessible vegetation; and microtopography with rocks large enough for subsurface movement and tunneling by pikas (Beever 2002, p. 28). Beever concluded that volcanic sites offered thermal refugia from heat stress but noted that this did not completely explain pika persistence (Beever 2002, p. 27). He proposed that the lack of human land-use impacts also may be important (Beever 2002, p. 27).

The petitioner cites a study of the congeneric collared pika (*Ochotona collaris*), located in northwest Canada and eastern Alaska, to demonstrate that precipitation also may affect population persistence. During this study, Morrison and Hik (2008, pp. 104–105, 110) documented a population collapse of 90 percent from 1998 through 2000. They hypothesized that the high mortality was related to warmer winters that resulted in low snow accumulation (and, therefore, poor insulation value), increased frequency of freeze-thaw events, icing following winter rains, and late winter snowfalls that delay the start of the growing season (Morrison and Hik 2008, p. 110). The petitioner stresses Morrison and Hik's (2008, p. 110) warning that this species will experience future declines as a result of similar adverse weather conditions if predicted future climatic conditions are realized.

In addition to studies documenting past impacts to the American pika, the petitioner presents investigations into future species' trends. McDonald and Brown (1992, pp. 409–415) applied the theory of island biogeography to isolated mountaintop ranges in the Great Basin of western North America and modeled potential extinctions brought on by changing climatic conditions. They predicted that the American pika would be locally extirpated from five of six mountain ranges that it inhabited in the Great Basin in 1992, assuming a less than 3 °C (5.4 °F) increase in temperature (McDonald and Brown 1992, p.411 Table 1). Broader ecological results of the model indicate that mountain ranges would lose 35 to 96 percent of their boreal habitat and 9 to 62 percent of their current boreal mammal species, depending on the mountain range in question (McDonald and Brown 1992, p. 413). Because a 3 °C (5.4 °F) increase is within the IPCC's predicted temperature increases (see above), the petitioner states that these results indicate the potential for catastrophic declines in the range of the American pika in the foreseeable future.

Loarie (2008, pp. 1-3) predicted impacts of climate change on the distribution of the American pika. Under a relatively low emissions scenario, habitat suitability for the pika would be significantly reduced throughout its range by the year 2100, with suitable habitat occurring only in the southern Rocky Mountains, Yellowstone National Park region, Cascade Mountains, Olympic Mountains, Canadian Rockies, and a small portion of the Sierra Nevada (Loarie 2008, Figure B). The petitioner cites these modeling efforts to demonstrate that the range of American pika habitat is likely to diminish greatly in the future.

Based on these range contractions, the petitioner concludes that projected changes in climate conditions will affect the species because of direct effects from thermal stress and indirect effects from changes in habitat and alpine ecology.

The petitioner contends that temperature increases in the western United States are already exceeding the thermal limits of the American pika in lower elevation populations and that future temperature increases will commit pika populations to an increased rate of extinction. They propose four ways by which thermal

stress will impact the American pika. First, increasing summer temperatures may make talus habitat too hot for species' survival. Because American pikas have an upper lethal body temperature that is just 3 °C (5.4 °F) above normal body temperature, habitat refugia play an important role in their individual thermoregulation (Smith and Weston 1990, p. 3). The petitioner reasons that increasing temperatures will eliminate cool, moist refugia in talus habitat, causing individuals to be unable to thermoregulate in summer months. They state that predictions for higher average summer temperatures combined with more frequent and longer heat waves will place pikas under increased stress during the summer months, potentially causing mortality (Christensen *et al.* 2007, pp. 850, 891). Secondly, they state that, even if the talus refugia remain cool, ambient external temperatures may reduce an individual's ability to forage during midday. They assert that if pika individuals cannot adequately forage in the summer months, they may not have the required body mass or haypile volume needed for winter survival.

The petitioner argues that warmer summer temperatures also will affect the ability of juvenile pikas to successfully disperse and colonize new areas; two previous studies have concluded that warmer temperatures restricted juvenile dispersal (Smith 1974a, p. 1112; 1978, p. 137). They conclude that more adverse climatic conditions may decrease the distance juveniles are able to travel in search of new habitat patches. They claim the species' range is likely to decline if juveniles are unable to colonize new patches or immigrate to other populations. They also conclude that juvenile pikas may not be able to collect adequate haypiles because higher temperatures lead to earlier desiccation of vegetation. Therefore, even if juveniles create new home territories, they may not be able to survive the winter months.

Lastly, the petitioner asserts that the American pika may be sensitive to changing winter conditions. The petitioner cites studies indicating that earlier snowmelt (Smith 1978, p. 133) and loss of snow cover, which provides insulation during cold weather (Morrison and Hik 2008, p. 110), may be associated with high mortality and subsequent population declines. Because the decline in snowpack and earlier montane snowmelt are predicted to occur within the next century (see above), winter survival of the American pika may consequently decrease.

The petitioner contends that indirect effects of climate change, such as vegetative community change and habitat alteration, will affect the American pika. Hotter and potentially drier conditions projected in montane regions could alter the plant communities to species less favorable for pika. One of the most important traits of the local plant community is forage quality and quantity. The petitioner argues that community characteristics less favorable to pika foraging conditions include an abundance of plant species less suitable to pika nutritional needs; an earlier onset of plant desiccation; and less water content, biomass, or compatible phenology in surrounding vegetation. The petitioner states that global climate change has the potential to cause any or all of these community changes.

The petitioner states that a second possible community change is the loss of alpine meadow habitat caused by forest encroachment. They cite studies demonstrating the invasion of forests into alpine meadow habitat across various mountain ranges during the 20th century (Dyer and Moffett 1999, p. 444; Fagre *et al.* 2003, p. 263), and studies indicating that rising temperatures are correlated with this trend (Grabherr *et al.* 1994, p. 448; Walther *et al.* 2005, p. 541). The petitioner concludes that a shift from alpine meadow habitat to forest communities would cause pika forage plants to decline, eventually eliminating suitable pika habitat. Additionally, as alpine meadow habitat is replaced by forest stands, pika habitat will become increasingly smaller and more isolated. Demonstrating the consequences of shrinking alpine habitat, McDonald and Brown (1992, pp. 409–415) predicted that small-mammal extirpations, including the American pika, will be common across mountain ranges in the Great Basin as alpine habitats retreat to higher elevations or disappear in response to global climate change.

In addition to alpine meadows, the petitioner states that global climate change may affect the formation and maintenance of talus habitat. Alpine permafrost conditions provide the necessary freeze–thaw events to form talus habitat while also preventing vegetation encroachment in talus through extremely cold climatic events (Hafner 1994, p. 376). The petitioner asserts that increasing winter temperatures will cause the decline of these conditions and the corresponding decrease in talus habitat. Increasing temperatures will no longer prevent vegetation encroachment, thus filling talus vacancies and making habitat unsuitable for pikas (Hafner 1994, p. 380).

Summary of Global Climate Change

Based on the results of these empirical studies, along with predictions of declining climatic habitat suitability (Loarie 2008, pp. 1–4), we find that the range of the American pika and the habitat within the range are likely to decrease as surface temperatures increase. Furthermore, the results of studies in the 20th century correspond with results of biogeographic research into historical range shifts by the American pika in response to historical climate change (Hafner 1994, p. 381; Grayson 2005, pp. 2108–2109). Therefore, we find that the petitioner presents substantial information to indicate that listing the American pika may be warranted as a threatened or endangered species due to the present or threatened destruction, modification, or curtailment of its range due to impacts attributed to climate change.

Livestock Grazing

The petitioner states that livestock grazing may negatively affect the American pika by altering the native vegetation community surrounding talus fields. Specifically, the petitioner suggests that livestock promote the invasion of exotic plants and that livestock browsing or trampling of native food sources may limit the food available to American pika. To demonstrate this relationship, they cite research investigating apparent extirpations of the American pika in the Great Basin (Beever *et al.* 2003, pp. 37-54) and the Ili pika (*Ochotona iliensis*) in the Tian Shan Mountains of China (Wei-Dong and Smith 2005, pp. 30–34). However, the information cited in the petition provided little to support the claim that livestock promote invasion of exotic plants.

Recent research of American pika local populations in the Great Basin demonstrated a negative correlation between livestock-grazed areas and population persistence (Beever *et al.* 2003, pp. 41–45). In this study, six apparent extirpations (out of seven) occurred on grazed lands (out of 14 grazed sites) (Beever *et al.* 2003, p. 54). These six extirpations represent 24 percent of the 25 populations reported earlier in the 20th century for this area (Beever *et al.* 2003, p. 37).

Similar results were presented from a census of sites known to harbor the Ili pika in the Xinjiang Uygur Autonomous Region in China (Wei-Dong and Smith 2005, p. 30). The authors reported being unable to find any Ili pika individuals

at 14 sites and finding fresh signs of Ili pika at only 6 sites, despite investigating areas where Ili pika were observed 10 years earlier (Wei-Dong and Smith 2005, p. 32). The authors hypothesized that livestock grazing, which had just recently begun occurring above 3,000 m (9,843 ft), could have a negative effect on these populations (Wei-Dong and Smith 2005, p. 33).

The petitioner cites the California Wildlife Action Plan (Bunn *et al.* 2006, p. 4) and the New Mexico Wildlife Conservation Strategy (New Mexico Department of Game and Fish 2006, p. 183) to demonstrate that excessive grazing is a recognized threat to alpine meadows across the range of the American pika. Pika habitat evolved free of intense grazing pressure, but this habitat has now become attractive grazing sites for livestock, resulting in losses of native vegetation and meadow degradation (Bunn *et al.* 2006, p. 296).

The petitioner presents general information demonstrating the threat of excessive grazing to American pika habitat, and presents the possibility that grazing activities led to localized population extirpations or declines in both the American pika and China's Ili pika. However, the results from the American pika (Beever *et al.* 2003, pp. 37–54) and Ili pika (Wei-Dong and Smith 2005, pp. 30–34) research presented grazing as only one of many possible causes of extirpations.

Beever *et al.* (2003, p. 45) acknowledged that results describing the effects of grazing are mixed and should be cautiously interpreted, because other variables also show strong negative correlation to American pika persistence. The results indicate the possibility that grazing effects to pikas are correlated with other variables, such as elevation or talus habitat area (Beever *et al.* 2003, pp. 45, 49).

The results of observational surveys for Ili pikas (Wei-Dong and Smith 2005, pp. 30–34) do not provide any direct linkage between livestock grazing and pika extirpations, because no quantitative data were collected to describe grazing pressure. The conclusion that grazing may have a negative influence on Ili pika populations was one of three hypotheses presented in the discussion. While this hypothesis is valid, it should not be confused with direct scientific evidence.

Summary of Livestock Grazing

It is possible that livestock grazing could reduce vegetation close to talus habitat and subsequently cause pikas to forage farther from the protective cover of talus, thus increasing energy demands and risk of predation on pikas (Beever *et al.* 2003, p. 49). However, it also is possible that livestock do not affect the generalist diet of pikas, because livestock avoid rocky talus slopes, create minimal grazing pressure on pika-foraged areas, or prefer specific forage (graminoids) (Beever *et al.* 2003, p. 50). Similarly, while it is possible that excessive livestock grazing leads to local pika population extirpations through increased individual mortality from the above stresses, it also is possible that other factors are actually causing the extirpations, such as disease, climate, or stochastic events. We will further investigate whether livestock grazing is a potential threat when we address the threats to the American pika in our 12–month status review.

Invasive Plants and Fire Suppression

The petitioner states that the invasion of exotic plant species may alter alpine meadow foraging habitat to a community less favorable for the American pika. They state that this threat is increasing and list many possible vectors for invasive species. Additionally, they propose that fire suppression may contribute to the encroachment of trees into alpine and subalpine meadows, also altering vegetation communities to a less favorable state.

While the petitioner cites literature demonstrating that invasive plants are infiltrating alpine areas, these studies do not demonstrate a threat to habitat of the American pika. McDougall *et al.* (2005, p. 159) revealed that invasive plant species are colonizing treeless areas, but do so in the Australian Alps, far from American pika habitat. While these results can be interpreted as a harbinger of possible threats to pikas in North America, research has determined that alpine and wilderness areas are still relatively unaffected by invasive plants in the Northwest mountain ecoregions of the United States (Parks *et al.* 2005, p. 137).

When we reviewed the State Wildlife Action Plans (WAPs) in the range of the American pika we found that invasive plants are listed as threats in some pika habitat, but not in its primary alpine habitat. New Mexico's WAP acknowledged that wet meadow habitat can be manipulated to replace native vegetation with pasture species (New Mexico Department of Game and Fish 2006, p. 183). California's WAP (Bunn *et al.* 2006, p. 272) listed invasive plants as a threat to the Modoc plateau (for example, cheatgrass (*Bromus tectorum*) and pepper weed (*Lepidium virginicum*)), but stated that subalpine and alpine plant communities in the Sierra Nevada and Cascades are relatively intact, with few invasive plants (Schwartz *et al.* 1996 cited in Bunn *et al.* 2006, p. 299). Similarly, Nevada's WAP (Nevada Department of Wildlife 2005, p. 159) did not list invasive plants as a threat to alpine and tundra habitats. Utah's WAP (Sutter *et al.* 2005, pp. 5–7, 8–7) listed invasive plants (cheatgrass and noxious weeds) as a threat to the American pika's secondary habitat of mountain shrub. Alpine habitats that are the primary habitat for the American pika are not identified as a key habitat by the State of Utah and, therefore, threats to this habitat are not listed in the Utah WAP (Sutter *et al.* 2005, pp. 5–8).

Human fire suppression is identified by the petitioner as a potential cause of forest encroachment up elevational gradients and into mountain meadows, resulting in reduced foraging areas for the pika. However, much of the available scientific literature indicates that climate change is a more likely cause of this forest encroachment (Dyer and Moffett 1999, pp. 444, 452). Similarly, Fagre *et al.* (2003, p. 263) concluded that precipitation (snow depth) is a critical variable regulating conifer expansion.

Summary of Invasive Plants and Fire Suppression

Invasions of nonnative plants could change the composition of meadows used for foraging by the American pika. However, invasions by exotic plant species have not been shown to constitute a major threat to alpine systems, and the petitioner provided no evidence demonstrating that the American pika would be harmed by a change in diet to these nonnative plants. Forest encroachment is a credible threat to alpine meadow habitat. However, climate change has been indicated as a more likely rangewide cause of forest encroachment than fire suppression (Dyer and Moffett 1999, p. 452). We will further investigate whether invasive plants and fire suppression are potential threats to the present or threatened destruction, modification, or curtailment of pika habitat or range when we address the threats to the American pika in our 12-month status review.

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

The petitioner did not present information, nor do we have information in our files, suggesting that overexploitation is affecting American pika populations. However, we will

further investigate whether overutilization for commercial, recreational, scientific, or educational purposes is a potential threat when we address the threats to the American pika in our 12-month status review.

C. Disease or Predation

The petitioner states that changing climatic conditions may make the American pika more vulnerable to both predators and disease, because evolutionary adaptations and constraints will no longer safeguard individuals. They state that American pika individuals may be more susceptible to winter and spring predation from weasels (*Mustela* spp.) in talus habitat by increasing their accessibility if there is decreased snowpack and earlier snowmelt. They additionally present the view that forest encroachment into meadow foraging habitat may decrease the pika's ability to visibly detect predators. Finally, they assert that disease prevalence in pikas and their forage base may increase as temperature and humidity constraints allow disease pathogens to expand spatially and temporally.

The American pika is known to be a prey species in the alpine ecosystem. Potential predators of the pika include coyotes (*Canis latrans*), longtail weasels (*Mustela frenata*), shorttail weasels (*M. erminea*), and pine martens (*Martes americana*) (Smith and Weston 1990, p. 5). Weasels have been identified as the most effective pika predators because of their ability to hunt within talus interstices (Ivins and Smith 1983, p. 279).

Changes to climate and habitat could possibly alter predator–prey interactions and increase the success of predators. For example, the petitioner asserts that decreased snowpack and earlier snowmelt could increase accessibility of talus slopes by weasels, thus increasing pika mortality. However, this assertion is speculative and no information was presented to indicate that changes in predation rates may adversely affect pika population persistence.

Changes to climate also may increase disease occurrence, prevalence, and severity to both the American pika and its forage base. Changing climatic conditions could affect host-pathogen relationships by increasing pathogen vital rates (development, transmission, or reproduction), decreasing life cycle limitations typically occurring in winter, and altering host susceptibility (Harvell *et al.* 2002, p. 2158). For plants, decreases in pathogen winter mortality would likely increase disease severity because pathogens usually die in winter (Harvell *et al.* 2002, p. 2159). For wildlife, climate change is most likely to allow disease vectors to alter ranges and life history, possibly increasing the occurrence and severity of vector-borne diseases (Harvell *et al.* 2002, p. 2160). Elevational and latitudinal changes for wildlife and plant diseases may introduce more severe or new diseases to pikas and their forage base. However, the American pika is not known to be at risk from any specific disease threats at this time.

Summary of Disease and Predation

Little empirical data exists to demonstrate that increased predation would greatly alter population persistence, and the species is not known to be at risk from any specific disease or pathogen. However, we will further investigate whether disease and predation are potential threats when we address the threats to the American pika in our 12–month status review.

D. The Inadequacy of Existing Regulatory Mechanisms

The petitioner states that existing regulatory mechanisms are inadequate to prevent the decline of the American pika because global and national regulations are failing to reduce carbon emissions to levels that will slow global surface warming. They further state that no legal mechanisms currently exist to regulate greenhouse gases on a national level in the United States. They argue that stabilizing current climatic conditions through reductions in greenhouse gas emissions is necessary to preserve remaining American pika habitat.

According to the IPCC, anthropogenic emissions of long-lived greenhouse gases, especially carbon dioxide, are currently contributing the largest positive radiative forcings (leading to warming of climate) of any climatic factor (Forster *et al.* 2007, pp. 136–137). Furthermore, the IPCC determined that the cumulative radiative forcings from human activities are influencing present and future climatic conditions much more than natural processes (Forster *et al.* 2007, pp. 136–137). The petitioner argues that changes in climate caused by human activities must be mitigated through stronger regulatory mechanisms because existing mechanisms are inadequate.

To demonstrate that past attempts at regulating global emissions have failed, the petitioner summarizes major global climate initiatives. The petitioner claims that the United Nations Framework Convention on Climate Change has not effectively controlled global greenhouse emissions, because the year 2000 emission goals established under this convention were not met. Furthermore, the petitioner states that the Kyoto Protocol also is inadequate to prevent significant climate change because emissions reduction targets for the first commitment period are unlikely to be met, the goals are too modest to sufficiently reduce global warming, and negotiations have not begun in earnest for emission reductions after 2012. They claim that a major reason why the Kyoto Protocol's goals will not be met is because the United States has not ratified the protocol.

To demonstrate the need for United States regulation, the petitioner presents data indicating that United States emissions are expected to increase by 43.5 percent between 2001 and 2025 (GAO 2003, p. 2), a substantial contrast to the reduction goals laid forth in the Kyoto Protocol. The petitioner asserts that the lack of action by the U.S. Environmental Protection Agency (EPA) to regulate greenhouse gas emissions under the Clean Air Act illustrates the inadequacy of existing regulatory mechanisms. Specifically, the petitioner describes the 2007 decision by the Supreme Court overturning EPA's rejection of a petition to regulate greenhouse gas emissions from automobiles under the Clean Air Act, and asserts that EPA has not yet taken action in response to the matter being remanded to it by the Supreme Court for further consideration. [Note: EPA recently responded to the Supreme Court by publishing a finding on April 17, 2009, on six greenhouse gases that contribute to air pollution; the EPA finding does not affect this 90-day petition finding.] The petitioner also asserts that the Federal government's Global Climate Change Initiative, which relies on voluntary measures and focuses on reducing the amount of greenhouse gas emissions per unit of energy produced, not the overall level of emissions, is inadequate and that under the plan U.S. cumulative greenhouse gas emissions would continue to increase between 2002 and 2012, based on information from the U.S. Government Accounting Office (GAO 2003a). Lastly, while they acknowledge that some examples of legislation, such as the California Global Warming Solutions Act of 2006, are steps in the right direction, they believe that State and local regulations are insufficient on their own to slow global warming.

The petitioner stresses that immediate legislative action is necessary to save the American pika because scientists warn that we are approaching emission levels that would cause dangerous climate change (Hansen *et al.* 2008, pp. 217–218). Hansen *et al.* (2008, p. 218)

concluded that present global mean carbon dioxide (CO2) concentration of 385 parts per million (ppm) is already in the dangerous zone. Hansen *et al.* (2008, p. 217) further concluded that a 350-ppm CO2 target is necessary if ''humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted.''

The petition concludes that existing regulatory mechanisms relating to global warming are inadequate to ensure the continued survival of the American pika and that regulatory measures related to other threats to the pika are also inadequate to ensure its survival in the face of advancing climate change. It asserts that ensuring the American pika's survival requires immediate action, particularly in the United States, to reduce greenhouse gas emissions.

Summary of Inadequacy of Existing Regulatory Mechanisms

The petitioner provides information relative to regulations that address a change of global or national carbon dioxide emissions to levels that would affect global surface warming trends. We will further investigate whether the inadequacy of existing regulatory mechanisms is a potential threat when we address the threats to the American pika in our 12-month status review.

E. Other Natural or Manmade Factors Affecting its Continued Existence

The petitioner states that the American pika is threatened by human activities, including roadways and recreational activities. They present the results of Beever *et al.* (2003, pp. 37–54) that show a negative correlation between population persistence and distance to roads, and a positive correlation between population persistence and lands managed under wilderness protection. They also state that the alpine and subalpine forging habitats on which the America pika is dependent are sensitive to disturbance and difficult to restore and that, therefore, any major human disturbances, such as roads or off-highway vehicle (OHV) use, have an enduring effect on the landscape. The petitioner cites the New Mexico and Nevada WAPs, which acknowledge roadways and recreational usage as threats to alpine communities (Nevada Department of Wildlife 2005, p. 159; New Mexico Department of Game and Fish 2006, p. 183).

Human activities could alter the ecology or life history of the American pika in many ways, including direct take (recreational shooting), harassment (proximity of cars, pets, or people), and vegetation community change (trampling or removal of plants). The petitioner focuses on two specific types of disturbance, roads and recreational OHV usage, as threats most likely to alter pika persistence.

Research in the Great Basin demonstrates that American pika population persistence is negatively correlated with proximity to roads, and even more so when analyzing distance to primary roads (Beever *et al.* 2003, p. 45). In analyses, the ''distance to roads'' parameter appeared in four of the top five models, including the most plausible model (Beever *et al.* 2003, p. 46). Although this signals an important relationship between road proximity and pika population persistence, the authors acknowledged that other variables (such as elevation and habitat size) may be confounding these results (Beever *et al.* 2003, p. 49), and reveal that direct human influence was only seen at three of seven extirpated sites (Beever *et al.* 2003, p. 45). Roads pose a possible risk to a subset of American pika populations. However, we found no evidence that roads constitute a rangewide threat; the majority of pika populations are currently in areas unlikely to have roads, such as steep, high-elevation sites.

The petitioner asserts that human activities also may alter the ecology of the American pika habitat and have long-term consequences, because alpine environments provide little opportunity for ecosystem recovery (Butler 1995 and Chambers 1997 cited in Beever *et al.* 2003, p. 49). A possible safeguard to these effects is the fact that protected wilderness areas are concentrated at these high-elevation sites (Norton 1999 cited in Beever *et al.* 2003, p. 50). However, wilderness areas encompass only a fraction of alpine habitat in the western United States. Although alpine areas have historically been free of dense human activity, human-induced threats are increasing.

The petitioner asserts that a newly emerging threat is recreational OHV usage on non-snow-covered terrain. Recreational OHV usage has the potential to greatly alter alpine systems through vegetation disturbance, trail creation, and increased erosion. Additionally, OHVs provide easier access to alpine areas, increasing human presence in areas previously considered remote. When OHV usage is combined with communication towers and ski activities, human presence and impacts on alpine areas are at unprecedented levels. However, we found minimal evidence to support the hypothesis that human influence in alpine communities constitutes a rangewide threat to the American pika, because the probability of direct human disturbance to population locations remains quite low.

Summary of Natural or Manmade Factors Affecting Continued Existence

Although direct human disturbance can negatively affect American pika population sites, the probability of humans interacting with the American pika remains low across the species' range because the species inhabits remote alpine locations. Lower elevation population locations are more susceptible to human disturbances because they are more likely to have roads and more accessible to human activity. We will further investigate whether natural or manmade factors affecting the continued existence of the American pika are potential threats when we address the threats to the species in our 12-month status review.

Finding

We reviewed the petition, petition supplement, supporting information provided by the petitioner, and information in our files, and evaluated that information to determine whether the sources cited support the claims made in the petition. We find that the petitioner presented substantial information under Factor A, indicating that listing the American pika as threatened or endangered under the Act may be warranted because of the present or threatened destruction, modification, or curtailment of its habitat or range as a result of effects related to global climate change. Continued surface warming may alter alpine ecosystems to conditions that do not support the American pika, possibly resulting in individual mortality, population extirpations, and range contraction. We will address any other potential threats during our 12-month status review.

Therefore, we are initiating a status review to determine if listing the American pika under the Act is warranted. As part of our status review of the American pika, we will examine available information on threats to the species and make a final determination on whether the species is warranted for listing as threatened or endangered under the Act.

We encourage interested parties to continue gathering data that will assist with the conservation and monitoring of the American pika. You may submit information regarding the American pika by one of the methods listed in the **ADDRESSES** section at any time. The petitioner requested that critical habitat be designated for this species. If we determine in our 12-month finding that listing the American pika is warranted,

we will address the designation of critical habitat at the time of the proposed listing rulemaking.

The ''substantial information'' standard for a 90-day finding is not the same as the Act's ''best scientific and commercial data'' standard that applies to a 12-month finding to determine whether a petitioned action is warranted. A 90-day finding is not a status assessment of the species and does not constitute a status review under the Act. Our final determination of whether a petitioned action is warranted is not made until we have completed a thorough status review of the species as part of the 12-month finding on a petition, which is conducted following a positive 90-day finding. Because the Act's standards for 90-day and 12-month findings are different, as described above, a positive 90-day finding does not mean that the 12-month finding also will be positive.

References Cited

A complete list of all references cited herein is available upon request from the Utah Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT** section).

Author(s)

The primary authors of this document are staff from the Utah Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT** section).

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: April 29, 2009

Signed: Bernard Mazer

Acting Director, U.S. Fish and Wildlife Service

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