CENTER *for* BIOLOGICAL DIVERSITY

March 4, 2008

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Cindy Gustafson, Vice President
Mr. Jim Kellogg, Member
Mr. Michael Sutton, Member
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Re: California Department of Fish and Game Report of Petition from Center for Biological Diversity to List American Pika (*Ochotona princeps*) as Threatened

Dear President Rogers, Vice President Gustafson, Commissioners Kellogg and Sutton, and Mr. Carlson and Mr. McCamman,

These comments are submitted on behalf of the Center for Biological Diversity ("Center") regarding the California Department of Fish and Game Report of Petition from Center for Biological Diversity to List American Pika (*Ochotona princeps*) as Threatened[1] (hereinafter "Department Report" or "Report"), per Fish & G. Code § 2074, for consideration in the Candidacy determination at the 6-7 March 2008 Fish and Game Commission hearing. The Center submitted the Petition (hereinafter "Petition") to list the American pika under the California Endangered Species Act on August 21, 2007.

The Department Report recommended that the Commission reject the petition because Department evaluators found that the "petition did not provide sufficient scientific information that the following actions may be warranted: 1) State listing of the pika as a Threatened species and 2) State listing of each of the five subspecies of the pika occurring in California as, variously, either Endangered or Threatened species" (Report: 2). The Department Report concluded that "the Department found that neither the petition nor other sources offers information supporting the suggestion that the pika in California is being threatened by climate warming or an other factor or combination of factors..." (Report: 16). Specifically, the

[1] Gustafson, J.R., and R.J. Logsdon. 2007 (Dec. 21). Evaluation of petition from Ctr. for Biological Diversity to list American pika (*Ochotona princeps*) as threatened. Calif. Dep. Of Fish and Game, Wildl. Branch, Sacramento CA. Nongame Wildlife Program Report 2007-03, 19 pp.

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Department Report determined that that the "rationale for the petition is that local populations of the pika in California are experiencing declines due to 'global warming'" (Report: 3) and that "[the Petition] provides no data on the effect that any such warming currently has on the pika in California" (Report: 3). The Department Report also "found that the petition provides adequate information in some but not all categories required by CESA" (Report: 3), specifically in distribution, range, trend, and abundance.

The Department Report's characterization of the Petition and supplemental information bears no resemblance to the actual contents of those sources. The Department Report failed to evaluate key arguments in the Petition for listing the American pika in California and failed to evaluate the extensive scientific literature presented on current and projected climate change in California which is leading to the present and threatened modification and destruction of the pika's habitat in California. The Department Report misrepresents the findings of a key study (Beever et al. 2003) cited by the Petition that establishes an important link between pika population persistence and climatic factors. The Department Report completely ignores the opinions of independent scientific experts who reviewed the Petition at the Department's request and who stated, for example, that "[i]n my professional opinion all available evidence strongly supports the proposition that American pikas merit protection under the California Endangered Species Act." The Department report states incorrectly that the Petition provided insufficient information on the categories of distribution, range, trend, and abundance as required by CESA, but nevertheless we provide additional information where possible to address the Department Report's findings of inadequacy in these categories. The Department Report also misrepresents the Commission's and Department's legal authority regarding responding to global warming.

As discussed in detail below, the evidence before the Commission indicates that the American pika is imperiled in California by climate change and other factors. Clearly, there is a substantial possibility that listing could occur following a full status review for the American pika, and the Commission must accept the Petition and advance the American pika to Candidacy. The Department Report and its recommendation are inadequate and seriously flawed. Clearly, something went seriously awry with the Department review of the Petition and the problems should be investigated and corrected.

I. The Standard for Determining that the Listing of the American Pika "May Be Warranted"

The Commission is charged with determining whether the Petition, together with the Department's written report, and comments and testimony received, present sufficient information to indicate that listing of the American pika "may be warranted." Fish & G. Code § 2074.2. This standard has been interpreted as the amount of information sufficient to "lead a reasonable person to conclude there is a substantial possibility the requested listing could occur." (emphasis added) *Natural Resources Defense Council v. California Fish and Game Comm.* 28 Cal.App.4th at 1125, 1129. The requested listing for the American pika as threatened would require that the Commission find that the species is "likely to become an endangered species in the foreseeable future" (emphasis added) Fish & G. Code § 2067, after conducting a full status review of the species. Specifically, "a species shall be listed as endangered or threatened, as defined in sections 2062 and 2067 of the Fish and Game Code, if the Commission determines

that its continued existence is in serious danger or is threatened by any one or any combination of the following factors: 1. Present or threatened modification or destruction of its habitat; 2. Overexploitation; 3. Predation; 4. Competition; 5. Disease; or 6. Other natural occurrences or human-related activities" (emphasis added).

As detailed below, the Petition contains more than sufficient scientific information to lead a reasonable person to conclude that the American pika could be considered likely to become endangered in the foreseeable future, particularly from the present or threatened modification of its habitat by climate change.

II. The Department Report Misrepresents the Petition's Rationale for Listing the American Pika as Threatened, Does Not Adequately Evaluate Key Points of the Petition's Rationale, Mischaracterizes the Findings of a Key Study (Beever et al. 2003), and Thus Makes a Recommendation Based on a Inadequate Evaluation

The Department Report misrepresents the Petition's rationale for requesting listing of the American Pika as Threatened in California by presenting and evaluating a subset of the Petition's primary arguments for listing, thereby failing to evaluate important Petition arguments for listing and inadequately evaluating others. The Department Report justifies rejecting the Petition primarily based on its alleged failure to present sufficient scientific information on only one aspect of the rationale (failure to show pika population declines in California), while failing to evaluate or inadequately evaluating the scientific merits of other key aspects of the Petition's rationale for listing. As such, the Department Report and its recommendation are flawed.

Specifically, the Department Report determined that "the rationale for the petition is that local populations of the pika in California are experiencing declines due to 'global warming'" (Report: 3). The Department Report then states that the Petition "provides no evidence of such declines and extirpations in California" (Report: 3).

The rationale of the Petition for listing the American pika as threatened in California as outlined in the Executive Summary (Petition: 1-2) and detailed in Section IX: Nature and Degree of Threat (Petition: 18-36) is that global warming poses a grave "threat to the long-term survival of the American pika in California" and is based on a five-point argument. Specifically,

(1) The American pika is quite unique among California mammal species in being extremely thermally sensitive (i.e. extremely vulnerable to high temperatures) and, as such, has been called an early sentinel of climate change by pika scientists;

(2) The pika's upper-elevation habitat in California has already experienced significant increases in temperature and decreases in insulating winter snowpack in the 20th century that have made pika habitat less climatically suitable (i.e. present modification and destruction of its habitat);

(3) A preliminary study (Moritz 2007) of the Yosemite pika in Yosemite National Park, California, found that the pika experienced an upslope range shift in the 20th century in parallel with rising temperatures;

(4) A published study (Beever et al. 2003) of the American pika in the Great Basin of Nevada and Oregon found that six pika populations were extirpated in the 20th century and that a climate-related factor (maximum elevation of talus habitat) that serves as a proxy of thermal

stress was the single strongest factor explaining these population losses. This study establishes a clear link between pika population persistence and thermal stress from warmer temperatures, which suggests that California pika populations are vulnerable to similar population losses due to rising temperatures from climate change. Further, five of six pika population extirpations occurred in northwestern Nevada and southern Oregon in close proximity to the California border, affecting two of the five pika subspecies that inhabit California;

(5) The pika in California is threatened by continued habitat modification and destruction in this century due to climate change, including rising temperatures, loss of snowpack, and decreases in precipitation (i.e. threatened modification and destruction of its habitat).

Clearly, showing that "local populations of the pika in California are experiencing declines due to 'global warming'" as determined by the Department Report (Report: 3) is a subset of the rationale for the petition, as one part of a five-part argument. The Petition's rationale does not rely on showing that the pika is experiencing declines in California. Rather, the Petition presents scientific information to argue that the long-term survival of the pika in California is threatened by current and projected climate change due to direct thermal stress to pikas and the present and threatened modification and destruction of the pika's habitat due to rising temperature, reduced snowpack, and changes in precipitation. To make this argument, the Petition presents extensive scientific information showing that the pika is highly thermally sensitive due to its rather unique biology and ecology; the pika is threatened with present modification and destruction of its habitat in California due to observed climate change, including direct thermal stress in its restricted talus and mountain meadow habitat due to rising temperature, as supported by extirpations of low-elevation pika populations in the adjacent Great Basin of Nevada and Oregon; and the pika is threatened with continued modification and destruction of its habitat in this century due to changing climate conditions, especially since the effects of climate change are predicted to be especially disruptive in the high-elevation alpine and subalpine regions inhabited by the pika.

The Department Report alludes to additional aspects of the Petition's rationale (Petition arguments 2 and 5 as outlined above) in its Summary of Department's Evaluation in stating that "the petition has much information on global warming in California" (Report: 3). However, the Report does not present or evaluate the extensive scientific information presented on how current and predicted climate change is modifying and degrading the pika's upper elevation habitat in California (petition arguments 2 and 5 as outlined above). The Report also incorrectly evaluates the findings of a published study (Beever et al. 2003) that provided strong evidence that thermal stress from warmer temperatures are linked to pika population extirpations in the Great Basin (Petition argument 4 as outlined above). Therefore the Report wrongly concludes that "[the Petition] provides no data on the effect that any such warming currently has on the pika in California" (Report: 3) and further that "[t]he petition presents no information supporting the contention that a warming climate poses a threat, significant or otherwise, to the pika in California. The petition presents no information that the any climate changes currently are negatively affecting the pika in California" (Report: 12).

Below, we provide a detailed analysis of the five points of the Petition's rationale for listing the American pika as threatened in California and document that the Petition presents more than sufficient scientific information to justify this rationale. We also show how the

Department Report failed to evaluate or did not adequately evaluate the Petition's rationale for listing, including its misinterpretation of the Great Basin Beever et al. (2003) study, in making its recommendation. We clearly demonstrate that the scientific evidence shows that the pika merits consideration for listing under the listing factors specified in Fish & G. Code § 2061, particularly "the present or threatened modification or destruction of its habitat species" and "other natural occurrences or human-related activities."

(1) The American pika is quite unique among California mammal species in being extremely thermally sensitive (i.e. extremely vulnerable to high temperatures) and, as such, has been called an early sentinel of climate change by pika scientists.

The high thermal sensitivity of the American pika is well-established scientifically and was documented extensively in the Petition on pages 10-11. Due to their vulnerability to high temperatures, pikas have been called early sentinels of global warming by five pika researchers: "[p]ikas may be early sentinels of biological response to global climate change such as increased temperatures (Beever 2002: 23); [pikas are] "the global warming canaries of western North America" (Grayson 2006: 2986), and "it appears that the pikas could be a litmus paper for faunal loss due to global climate change" (Smith, Weidong, and Hik 2004: 5). Smith, Weidong, and Hik (2004) state that "[p]ikas are notoriously sensitive to high ambient temperatures and could easily be affected by slight changes in atmospheric temperatures, now on the rise due to climate change" (p. 5).

Two key studies documenting the thermal sensitivity of the American pika were conducted on Sierra Nevada populations in California (Smith 1974b, a). As described in the Petition, American pikas will die under brief exposure to ambient temperatures above 25.5-29.4°C (77.9-84.9°F) if they are prevented from behavioral thermoregulation (Smith 1974b, Smith and Weston 1990); their resting body temperature is close to their lethal temperature (MacArthur and Wang 1973, Smith and Weston 1990); they cannot dissipate heat well because of their thick coat (MacArthur and Wang 1973, Smith 1974b, Beever 2002); and pikas at warmer, lower-elevation sites are precluded from essential surface activities (foraging) during mid-day (Smith 1974b), all of which make them vulnerable to higher temperatures. Pikas are also susceptible to thermal stress in the winter during years of early snowmelt by losing the protective insulation of the snow cover, exposing them to cold winter temperature extremes (Smith 1978). Further, several features of the pika's ecology make them less able to adapt to climate change (Petition: 34). The pika's obligate association with upper-elevation talus habitat that occurs in isolated, discontinuous patches and its poor dispersal ability make it difficult for pikas to move upslope in response to higher temperatures. In addition, the pika is vulnerable to climate-related changes in local vegetation in the meadows directly surrounding the talus because they are central-place foragers that do not range far from the talus. Finally, the pika's fecundity is low relative to other lagomorphs so they are slower to recover from population declines.

The Department Report states that "the petition accurately describes the life history of the pika" (Report: 8) and verifies the above-mentioned descriptions of the pika's thermal sensitivity on pages 10-11 of the Report. The Department Report states that "[p]ika life history characteristics are susceptible to being disrupted by even slight changes in microclimate

conditions" (Report: 11). However, the Department Report fails to review the evidence for the pika's high thermal sensitivity in the context of the present and predicted increases in temperature and decreases in snowpack in the pika's range in California. Most notably, in reviewing the Degree and Immediacy of Threat (Report: 12-14), the Department Report does not acknowledge the extensive scientific evidence that pikas are notoriously sensitive to temperature and thus are quite unique among California mammal species in being especially vulnerable to climate change and in need of special conservation consideration due to threats from climate change.

(2) The pika's upper-elevation habitat in California has already experienced significant increases in temperature and decreases in insulating winter snowpack in the 20th century that have made pika habitat less climatically suitable (i.e. present modification and destruction of its habitat).

The Petition presents extensive scientific information on pages 20-21 documenting how climate conditions have changed in California due to global warming, highlighting impacts in the range of the pika that include increased temperatures, decreased snowpack, and decreased precipitation. These climate changes make pika habitat less climatically suitable and thus have modified and degraded pika habitat in California. The Petition's cited sources include the comprehensive Intergovernmental Panel on Climate Change[2] (IPCC)'s *Fourth Assessment Report – Climate Change 2007* and the 2001 US Global Climate Change Research Program's report *Climate Change Impacts on the United States* which have synthesized the best available science on climate change, and recent regional studies in California that provide updates to these reports.

The Department Report mentions the Petition's analysis of observed climate change in California only once on page 3: "The petition has much information on global warming in California, the western United States, and globally...." However, the Department Report never presents or evaluates the extensive scientific information on observed climate change in California presented in the Petition, nor does it present information gathered on its own. The Department Report's failure to evaluate observed climate change in California that has modified and degraded the pika's habitat is a gross omission, especially since this evidence provides strong support for the Petition's rationale for listing the American pika. The Report's failure to review the current climate science is especially troubling in view of the Report's admission that "[p]ika life history characteristics are susceptible to being disrupted by even slight changes in microclimate conditions" (Report: 11).

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[2] The IPCC was established by the World Meteorological Organization and the United Nations Environment Programme in 1988 (IPCC 2001a). The IPCC's mission is to assess available scientific and socio-economic information on climate change and its impacts and the options for mitigating climate change and to provide, on request, scientific and technical advice to the Conference of the Parties to the United Nations Framework Convention on Climate Change (IPCC 2001b). Since 1990, the IPCC has produced a series of reports, papers, methodologies, and other products that have become the standard works of reference on climate change (IPCC 2001). The 2007 *Fourth Assessment Report* is the most current comprehensive IPCC reference and has built and expanded upon the IPCC's past products.

(3) A preliminary study (Moritz 2007) of the Yosemite pika in Yosemite National Park, California, found that the pika experienced an upslope range shift in the 20th century in parallel with rising temperatures.

The Petition presents preliminary evidence from the Grinnell Resurvey Project in Yosemite National Park, California, that the pika range shifted upslope during a ~90-year period in parallel with rising temperatures as reported in Moritz (2007) (Petition: 1, 17, 23-24). In reviewing the Petition's information and consulting the report's co-investigator Dr. Jim Patton, the Department Report found that the Petition "provides no evidence of such declines and extirpations [of pika populations] in California" (Report: 3). While we note that the Petition's rationale for listing does not depend on showing that the pika is experiencing declines in California (which is difficult due to the lack of current monitoring of pika populations in California), we are troubled by the Department Report's incomplete analysis of the findings of Moritz (2007), which are reported in the Petition, due to their relevance to the Petition's rationale for listing (Petition: 23-24). As discussed below, the Department Report does not evaluate the upward range contraction detected for the pika in the context of the substantial range contractions found for other high-elevation species by the Grinnell Resurvey Project nor Moritz (2007)'s conclusion that the most likely cause of the range contractions of high elevation species, including the pika, is increased temperature.

The Petition reports that the "pika showed an upward range shift and substantial range contractions on both eastern and western slopes" (Petition: 1, 23) and specifically reports an upward range contraction of 349 m (1145 ft) on eastern slopes and 497 m (1631 ft) on western slopes since the elevational shift is clearly stated in Moritz (2007: Table 6) and Moritz (2007) uses the words "substantial range contraction" (Moritz 2007: 32) in reference to the pika. The Department Report neither verifies nor negates these statements from the Petition. As detailed by the Department Report, the Petition incorrectly states on pages 17 and 21 that the American pika was extirpated from more than one survey site in Yosemite National Park, when in fact the upward range shift was due to the loss of only one population at the lowest elevation. The Petitioner misinterpreted the differential range contractions on east and west slopes and information in the Discussion of Moritz (2007) as indicating that more than one pika population had disappeared:

> For example, all talus between the elevations of 7800 and 9000 feet elevation could be regularly searched (each year or at somewhat longer intervals) for sign of pika (visual sightings, listening for their distinctive calls, searches for active hay piles in the fall, detailed searches for fresh whitewashing on boulders and fecal pellets), especially those historic sites (such as at Glen Aulin) where pika appear to have disappeared (Moritz 2007: 37). (emphasis added)

After submission of the Petition, the Petitioner extensively discussed the findings of Moritz (2007) with Dr. Jim Patton by phone and email conversations in August 2007 and verified that only one pika population was not detected by the Grinnell Resurvey. Dr. Patton stated that pikas were not found at the lowest elevation Grinnell site of Glen Aulin at 7,800 ft, although they were detected at the next highest Grinnell site of 9,000 ft in Tuolumne Meadows (Jim Patton, personal communication, 8/30/07). Although not reported in Moritz (2007),

subsequent surveys have detected the next lowest extant pika population at a historic, non-Grinnell site at 8,300 ft (Jim Patton, personal communication, 8/30/07), suggesting that the pika range has contracted upslope by 500 ft during the past 90 years, as opposed to the average 1388 ft reported in Moritz (2007). Thus, we agree with the Department Report that only one low-elevation pika population was not detected in the Grinnell Resurvey and disappeared during the 90 years in between surveys (Report: 6).

While we agree with Dr. Patton's emailed statement as reported by the Department that "this is but one data point for range retraction" (Report: 3), which makes it difficult to draw conclusions about pika population trends in Yosemite National Park, the high proportion of range contractions detected by the Grinnell Resurvey Project among mid- to high-elevation mammal species like the pika (Moritz 2007) suggests that the absence of pika at the lowest-elevation survey site reflects a range shift rather than a random population extirpation. Range contractions detected for mammal species by the Grinnell Resurvey were both more numerous (13 of 19 species) and of higher magnitude than were range expansions (6 of 19 species) which involved mostly low-elevation species (Moritz 2007, Table 4).

> For range contractions, 14 of 17 have contracted by >30%, with 8 species loosing >50% of their elevational range. Of particular note are substantial range contractions for *Dipodomys heermanni* (-37% of transect range; also a California Department of Fish & Game "Species of Special Concern"), *Tamias senex* (-92%), and multiple high elevation taxa, particularly *Neotoma cinerea* (-94% E, -54% W), *Ochotona princeps* (-33% W, c. 100% E), *Spermophilus beldingi* (-35% W, -90% E), and *Tamias alpinus* (-60% W) (Moritz 2007: 32). (emphasis added)

The Department Report does not evaluate the above-cited finding of Moritz (2007). The Department also does not evaluate two other findings that support the Petition's rationale for listing: Moritz (2007)'s conclusion that the most likely explanation for the range contractions detected for high elevation species like the pika is the "effect of increased temperature" and statement that range retractions of the pika in Yosemite are reflected by range retractions of the pika in Great Basin (Moritz 2007: 36), as noted in the Petition (Petition 23-24). Moritz (2007) offers three potential explanations for the observed range shifts of small mammal species in Yosemite National Park: stochastic fluctuations, fire-related vegetation change, and regional climate change. Moritz (2007) suggests that the strong directionality of the range shifts, totaling 19 upward versus 9 downward shifts, make stochastic fluctuations unlikely. Successional changes due to fire suppression in Yosemite National Park are most evident at mid-elevations (Moritz 2007), making this explanation implausible for the American pika which inhabits high elevations. Moritz (2007) concludes that the "most likely cause for contraction of the high elevation species...is effect of increased temperatures (Moritz 2007: 36). Importantly, Moritz (2007) also states that the range contraction observed in Yosemite National Park for the American pika is consistent with pika range retractions found elsewhere in the pika range "which have been attributed to increased temperatures" and directly cites the Great Basin studies of Erik Beever and Donald Grayson:

> The most likely cause of contractions of the high elevation species and at least

some of the upwards expansions of formerly lower elevation taxa, is effect of increased temperatures (Parmesan, 2006). The mean increase in lower and upper limits of 500-600m is roughly as expected given with the observed climate change of +3 C and assuming that species ranges are limited primarily by physiology. For at least one species, *O. princeps*, the changes observed for Yosemite are reflected by range retractions elsewhere in the range (Beever et al., 2003; Grayson, 2000) and have also been attributed to increased temperatures (Moritz 2007: 36). (emphasis added)

In reference to Dr. Patton's email statement as reported by the Department that "[we in the Yosemite study are] a long way from even believing, much less documenting, that the pika is under threat any place in California" (Report: 3), we note that Dr. Patton conducted the Grinnell Resurvey research in the Sierra Nevada mountains of Yosemite National Park where pikas inhabit higher elevations (7,700-12,120 ft in Grinnell and Storer (1924: 218)) among pika subspecies in California and where pikas would be expected to persist longer before experiencing climate-change related thermal stress from rising temperatures. However, populations of the Gray-headed and Taylor pika in California in northern California inhabit much lower elevation of 5,000-9,000 feet (Howell 1924, Bailey 1936), similar to elevations formerly inhabited by extirpated populations in the Great Basin. Therefore, extrapolating a conclusion that the pika is not threatened in Yosemite National Park to all other regions of California is not a scientifically accurate assessment, especially when pikas exist at much lower elevations in other regions of California.

(4) A published study (Beever et al. 2003) of the American pika in the Great Basin of Nevada and Oregon found that six pika populations were extirpated in the 20th century and that a climate-related factor (maximum elevation of talus habitat) that serves as a proxy of thermal stress was the single strongest factor explaining these population losses. This study establishes a clear link between pika population persistence and thermal stress from warmer temperatures, which suggests that California pika populations are vulnerable to similar population losses due to rising temperatures from climate change. Further, five of six pika population extirpations occurred in northwestern Nevada and southern Oregon in close proximity to the California border, affecting two of the five pika subspecies that inhabit California.

The Petition presents an extensive analysis of Great Basin pika research by Beever et al. (2003) and Grayson (2005) that supports the Petition's rationale for listing. The Beever et al. (2003) study is highly relevant to the Petition because it establishes a link between pika population persistence and climatic conditions. Beever et al. (2003) documented the extirpation of six of twenty-five pika populations (24%) in the Great Basin during the 20th century and found that proxy for vulnerability to thermal stress (maximum elevation of talus habitat) was the single strongest factor explaining pika population extirpations. Five of the six population extirpations detected by Beever et al. (2003) occurred in southern Oregon and northwestern Nevada in close proximity to the California border (Exhibit 1) and affected two of the five pika subspecies that inhabit California--the Gray-headed pika and Taylor pika—in areas where they range slightly into Nevada and Oregon, respectively[3]. As noted in the Petition, at least three additional Great

[3] The Beever et al. (2003) study did not survey pika populations within California.

Basin pika populations have gone extinct in the past decade (Krajick 2004, Schwarz 2005, Erik Beever, personal communication 8/10/07), which totals a loss of at least 32% of interior Great Basin populations in the past 100 years (Petition: 17).

We are deeply troubled by the Department Report's misrepresentation of the findings of Beever et al. (2003), especially since the Department uses its incorrect interpretation of this study to purport to refute the Petition's rationale for listing. The Report states that the findings of Beever et al. (2003) are "inconclusive" (Report: 16). Specifically, in its review the Beever et al. (2003) study on page 13 of the Report, the Department incorrectly states that the study was unable to identify causative agents underlying the pika population extirpations: "They [the researchers] could not identify the reasons for the failure of pikas to persist in these sites but reasoned that it could be due to one or a combination of the following causes: 1) isolation factors, due to the difficulty of individual pikas dispersing across inhospitable habitat to recolonized sites in which the species had become extirpated, 2) climatic factors, due to short-term changes in local (Great Basin) temperatures causing death of individuals, and 3) human-induced factors, due to local impacts of grazing animals (Beever et al. 2003)." (emphasis added). The Department then asserts in its Conclusions that "[t]he petition heavily leans on the supposition, based on inconclusive results of studies of the pika in the Great Basin of Nevada, that climatic warming either is currently threatening the pika in California as a whole or one of its five subspecies in the State. However, the Department found that neither the petition nor other source offers information supporting the suggestion that the pika in California is being threatened by climatic warming or any other factor or combination of factors..." (Report: 16). (emphasis added)

Beever et al. (2003) clearly identify causative factors for population extirpations in the Great Basin using two analytical approaches, as described in the Petition on pages 24-25, and both approaches identified a temperature-related variable as a key causative factor. Correct interpretation of Beever et al. (2003) is extremely relevant because it provides support for the Petition's rationale that the pika is being threatened by warming temperatures due to climate change, and therefore, we provide a detailed analysis of this study's analysis and findings below.

Beever et al. (2003) used two analytical approaches to identify the causative factors for Great Basin population extirpations. The first analytical approach employed univariate logistical regression where predictor variables for pika population persistence were individually tested for significance using a null hypothesis approach (results reported in Table 2 of paper), followed by a multivariate information-theoretic approach using Akaike's information criteria which scores the likelihood of alternative models that use different combinations of predictor variables to predict pika population persistence (results reported in Table 3 of paper).

The univariate approach found that the amount of talus habitat in the mountain range and the maximum elevation of talus habitat were the most significant predictors of population persistence (highly significant, $p<0.0001$), indicating that pikas were more likely to persist when there was more talus habitat in the mountain range and at sites with the highest-elevation talus. The univariate approach supported the study's biogeographic hypothesis (hypothesis 1) that "only populations of Great Basin pikas existing in areas having more talus than some minimum threshold should persist" and climatic hypothesis (hypothesis 4) that "the highest elevation talus

should have highest population persistence if pikas are being forced to move upslope" where maximum elevation serves as a proxy of vulnerability to thermal stress. Beever et al. (2003) reasoned that pika populations in areas with more talus habitat in the range would be more likely to persist because these populations are more likely to be larger and thus less vulnerable to stochastic events and small-population risks, especially when confronted with population threats such as increasing temperatures:

> Because talus area remains constant over ecological timescales, space seems an unlikely direct determinant of extinction over the short timescales we investigated, except to the extent that it forces pikas into a small-population dynamic (Caughley 1994). The latter possibility, of synergistic influences with other threats, could well be magnified if increasing temperatures reduce effective area of habitable talus in an area (Beever et al. 2003: 47-48). (emphasis added).

Beever et al. (2003) found that pika population persistence was greater at higher-elevation sites which were significantly cooler in summer than at extirpated sites, and reasoned that sites with higher maximum elevation of talus habitat would facilitate upward migration of pika populations as temperatures increased:

> Extirpated populations were located at significantly lower minimum-encounter and pika-equivalent elevations. Five of the 7 sites had among the most negative residuals of elevation when regressed against latitude (Fig. 2b). Extirpated sites received 19.6% less annual precipitation (ANOVA, P=0.30) and averaged daily maximum temperatures 7.7-10.2% higher than those of extant sites during June, July, and August (P=0.04), consistent with predictions of the third hypothesis (Beever et al. 2003: 43,45).

> Maximum elevation of talus at local and mountain-range scales relates to climatic influence because it denotes how far up-slope pikas can migrate in relatively contiguous taluses under increased temperatures (Beever et al. 2003: 48).

The univariate approach also found that higher probability of population persistence was correlated with lower maximum daily temperatures in August, more easterly longitude, more southern latitude, lack of livestock grazing, greater distance to primary roads, and wilderness management. Therefore, variables exhibiting significant and marginally significant relationships to persistence ($P < 0.15$) in the univariate tests were entered into information-theoretic analyses, the second analytical technique used in the study to identify causative factors.

The results of the Beever et al. (2003)'s information-theoretic analyses clearly indicated maximum elevation of talus habitat, which serves as a proxy for the pika's vulnerability to thermal stress, was the strongest single factor explaining pika population persistence. As evident in Table 3 (Beever et al. 2003: 46), the maximum elevation of talus habitat was included in more of the highest-ranking models than any other factor explaining pika persistence, including the 9 highest-ranking models and 12 of the 13 top models that together accounted for 99.3% of the likelihood. The next strongest explanatory factor—the amount of talus habitat in the range--was

only included in 6 of 13 top models that together accounted for 99.3% of the likelihood. Distance to the nearest road was also included in 6 of the top 13 models and presence of grazing was included in 5 of the top 13 models. Based on the AIC weights presented in Table 3, the maximum elevation of talus habitat had the highest variable weight (0.95), indicating its primacy in explaining pika population persistence, followed by variables having less explanatory power including talus habitat area (0.64), distance to roads (0.56), and grazing (0.28).

As described in the Petition on pages 24-25, Beever et al. (2003) explain that the high model support for the climate-related variable (maximum elevation of talus habitat) indicates that "warmer temperatures seem likely to be contributing to apparent losses [of pika populations] that have occurred at a pace significantly more rapid than suggested by paleontological records":

> Although there has been increasing awareness of long-term trends in climatic variables (e.g. changes in global temperatures), effects on vertebrates are just beginning to be understood. Our finding that maximum elevation of talus habitat occurred in all of the 9 highest-ranking (yet none of the 8 lowest-ranking) models for persistence in information-theoretic analyses (lending support to the fourth hypothesis) suggests that thermal effects have influenced recent persistence trajectories of Great Basin populations of pikas. Thus, warmer temperatures seem likely to be contributing to apparent losses that have occurred at a pace significantly more rapid than that suggested by paleontological records. Maximum elevation of talus at local and mountain-range scales relates to climatic influence because it denotes how far up-slope pikas can migrate in relatively contiguous taluses under increased temperatures. Importance of thermal biology is supported more forcefully by the fact that extirpations occurred in 3 low-elevation areas in close proximity to high-elevation populations that remained extant (i.e. at sites within the Desatoya, Hart, and Ruby mountains) (Beever et al. 2003: 48) (emphasis added).

Beever et al. (2003) then describe in detail the ways that climatically induced thermal stress on Great Basin pikas could influence their distribution.

The information-theoretic approach also distinguished the combination of causative factors that best explains pika population persistence. The best-supported model with the highest likelihood (26.3% likelihood) included the maximum elevation of talus habitat, area of talus habitat in the mountain range, and distance to the nearest road. The next two best-supported models included maximum elevation and talus habitat area (18.5% likelihood) and maximum elevation, distance to nearest road, and grazing status (10.8% likelihood), respectively. Therefore, Beever et al. (2003) found that a combination of climatic factors (elevation serving as a proxy of thermal stress), biogeographic factors (where amount of habitat available to pikas serves as a proxy of extinction risk), and anthropogenic factors (where distance to the nearest road serves as a proxy of human disturbance) best explains pika population persistence. Accordingly, Erik Beever summarized the findings of Beever et al. (2003) as the following:

> Although the proxy for vulnerability to thermal stress [maximum elevation of talus habitat] was the single strongest factor, patterns of losses are best explained

by a combination of climatic, biogeographic, and anthropogenic factors (Erik Beever, personal communication, 2/20/08).

Beever et al. (2003) suggest that increased temperatures interact in cumulative and synergistic ways with anthropogenic influences, such as grazing pressure and human disturbance, to accelerate pika population declines:

> Pikas in the Great Basin appear to have undergone significant losses (>25% of historic sites) during the last half century. The inclusion of some anthropogenic as well as natural variables in models selected using AIC methods in this exploratory analysis suggests that current anthropogenic influences (i.e., grazing status, proximity to roads) may have combined with factors acting over longer timescales (e.g., climate, habitat area) to produce fairly rapid apparent extirpations of pikas in the Great Basin (Beever et al. 2003:50).

In conclusion, the Department's finding that Beever et al. (2003) "could not identify the reasons for the failure of pikas to persist in these sites" is clearly incorrect. The findings of Beever et al. (2003) lends strong support that thermal stress from warmer temperatures is an important contributing factor to observed pika extirpations in the Great Basin. As described in detail above, maximum elevation of talus habitat which serves as a proxy for the vulnerability of pikas to thermal stress, was the single-most important factor in the multivariate information-theoretic analysis and one of the two most significant factors in the univariate analysis to explaining pika population persistence.

We note that research in progress by Erik Beever in the Great Basin will further elucidate the links between temperature and pika population persistence. Erik Beever and colleagues (including a well-published climate modeler who is also a State Climatologist) have research in preparation that investigates the mechanistic links between various types of thermal stress to patterns of pika losses across the Great Basin; this research will be submitted to a peer-reviewed journal in April 2008 (Erik Beever, personal communication, 2/20/08).

In addition to Beever et al. (2003), the paleontological research of Dr. Donald Grayson (Grayson 2005, 2006) on the American pika in the Great Basin also supports the Petition's rationale for listing because these studies provide strong evidence for the linkage between warming temperatures due to climate change and pika population persistence, as discussed in the Petition on pages 22-23 and 33. The Grayson studies were neither acknowledged nor evaluated in the Department Report. Of importance, Grayson (2005) analyzed the recent population extirpations of the American pika found by Beever et al. (2003) in the context of paleontological evidence for pika extirpations in the Great Basin to "place these losses in deeper historic context" and concluded:

> Prehistoric alterations in the distribution of pika populations in the Great Basin were driven by climate change and attendant impacts on vegetation. Today, Great Basin pikas contend with both climate change and anthropogenic impacts and thus may be on the brink of extinction (Grayson: 2103).

Further, Grayson (2006) concluded:

> We know that the Holocene history of pikas in the Great Basin has been characterized by ever-increasing lower altitudinal limits and thus of ever-decreasing population numbers, trends undoubtedly caused by climate change. Given that this trend has continued in recent decades, it is very possible that these animals—the global warming canaries of western North America—are facing extinction unless strong action is taken to reduce anthropogenic impacts on them (Grayson 2006: 2986).

Finally, the findings of Beever et al. (2003) and Grayson (2005, 2006) linking pika population extirpations to climate change in the Great Basin are strengthened by studies of population decline of two other pika species. As described on Petition page 35, the Ili pika (*Ochotona iliensis*) in China has suffered recent, dramatic population losses which have been attributed in part to warmer temperatures (Wei-Dong and Smith 2005). A long-term study of collared pika (*Ochotona collaris*) in Alaska observed a recent population collapse when warm winters reduced the amount of insulating snowpack (Smith et al. 2004). In reference to the findings of Beever et al. (2003) and the above-cited observations of pika population declines, Smith et al. (2004) comment:

> What is going on? Those of us who study pikas in their high remote environs have not considered that anthropogenic effects could wreak havoc on our populations, yet that is exactly what has happened in these three isolated cases – yielding a remarkable pattern of loss. In all these cases, the dramatic decline or loss of pika populations is undoubtedly complex and may be due to a variety of inter-related factors. <u>But, one cause consistently jumps out – increased temperatures resulting from global climate change may be at play. Pikas are notoriously sensitive to high ambient temperatures and could easily be affected by slight changes in atmospheric temperatures, now on the rise due to climate change.</u> The Ili and American pikas may be forced upslope by warming during summer, and simply may run out of suitable rock or talus habitat. In the Yukon, lack of a snowpack that normally serves an insulating function during winter, may cause collared pikas to expend too much energy during this critical season. Much remains to be discovered concerning this relationship, but it appears that the pikas could be a litmus paper for faunal loss due to global climate change (Smith et al. 2004: 5).

(5) The pika in California is threatened by continued habitat modification and destruction in this century due to climate change, including rising temperatures, loss of snowpack, and decreases in precipitation (i.e. <u>threatened modification and destruction of its habitat</u>).

The Petition presents extensive scientific information on pages 27-30 on how climate conditions in California are projected to change within this century. Even under lower-emission scenarios, pika habitat in California will experience significant continued increases in temperature, loss of snowpack, and decreased precipitation particularly in summer. These changing climate conditions will continue to make pika habitat climatically unsuitable and thus pose an undeniable and significant threat in modifying and destroying pika habitat in California.

The Petition's cited sources include the 2007 IPCC *Fourth Assessment Report – Climate Change* 2007, the 2006 California Climate Change Center report *Scenarios of Climate Change in California*, the 2001 US Global Climate Change Research Program's report *Climate Change Impacts on the United States*, and regional climate studies for California.

We note that the 2005 California Wildlife Action Plan (Bunn et al. 2005) summarizes climate change projections for California, highlighting that climate change will be especially disruptive in the Sierra Nevada and Cascades inhabited by the five pika subspecies in California:

> Climate change will affect ecological communities and wildlife species throughout California. Current climate models predict overall temperature increases of between 4 degrees and 10.5 degrees Fahrenheit by the end of the century, accompanied by hotter, drier summers and warmer, wetter winters (Hayhoe et al. 2004, Schneider and Kuntz-Duriseti 2002, Turman 2002). Rising temperatures and altered precipitation patterns will result in changes in plant communities and reduced habitat suitability for some wildlife species. Some communities and species may shift to higher elevations or latitudes, but this will become ever more challenging as remaining natural areas shrink and the gaps between habitats grow. Throughout the state, drier summers may also increase fire frequency and intensity. Climate change effects will be especially disruptive in the Sierra Nevada and Cascades and Central Valley and Bay-Delta regions. In the Sierra Nevada, warmer temperatures will reduce the annual snowpack and result in earlier snowmelt. Spring and summer streamflows are projected to decline by as much as 25 percent by 2050 and 55 percent by the end of the century (duVair 2003). With warmer temperatures, alpine and subalpine communities may also be greatly reduced (California Wildlife Action Plan: 27-28).

Further, in regards to the alpine and subalpine plant communities that the pika depends on for food:

> Average annual temperature is a key element that determines plant communities found across the elevation gradient of the Sierra Nevada and Cascades. As temperature rises, alpine and sub-alpine plant communities will shrink as mixed conifer forest expands higher in the range. Alpine and sub-alpine plant communities may decline by 40 percent to 50 percent by mid-century (California Wildlife Action Plan: 317-318).

The Department Report refers to the Petition's extensive analysis of predicted climate change in California only briefly on page 3: "The petition has much information on global warming in California, the western United States, and globally...." Although this information is highly relevant to the Petition's rationale for listing, the Department Report never evaluates the extensive scientific information on predicted climate change in California presented in the Petition nor gathers its own information on predicted climate change. Nor does the Department Report review the Petition's extensive analysis (Petition: 30-35) of how changing climate conditions are predicted to affect the pika in California through direct effects from thermal stress

and indirect effects from changes in vegetation, talus habitat, interactions with predators, and disease prevalence, much of which is based on information in Beever et al. (2003). In failing to evaluate this information, the Department Report does not review important scientific information suggesting that the pika is being affected by climatic warming in California.

The Department's failure to evaluate climate projections for California is also contrary to the recommendations of the 2005 California Wildlife Action Plan. The California Wildlife Action Plan identifies climate change as one of four major threats to wildlife diversity in California (Bunn et al. 2005: 3) and states that the state wildlife agencies and land managers "should consider the most current projections of the effects of global warming" when "planning long-term conservation or restoration projects" as one of the statewide conservation recommendations and as a recommended conservation action to restore and conserve wildlife in California:

> i. In their conservation planning and ecosystem restoration work, state and federal wildlife agencies and land managers should consider the most current projections of the effects of global warming.
> Global warming is expected to have major consequences for ecosystems and wildlife populations throughout the state. Projected changes are important factors to consider when planning long-term conservation or restoration projects (California Wildlife Action Plan: 32). (emphasis added)

Further:

> In their conservation planning and ecosystem restoration work, state and federal wildlife agencies and land managers should consider the most current projections of the effects of global warming (California Wildlife Action Plan: 329).

Finally, protection of the pika from global warming impacts is needed before its habitat in core, upper-elevation regions of its range in the Sierra Nevada becomes climatically unsuitable and the pika is committed to extinction in California. Due to time lags in the climate system, warming will continue for centuries to come even after greenhouse gas emissions are stabilized. As described on page 28 of the Petition, interactions between variables including greenhouse gas emissions, total greenhouse gas levels in the atmosphere, temperature change, and melting of ice sheets create time lags in the climate system during which time temperatures warm before the climate system stabilizes at a new equilibrium (IPCC 2001a, Solomon et al. 2007). As an example, even if greenhouse gases were stabilized for 100 years in 2000, a further warming of 0.5°C (0.9°F) would occur in the 21st century (Meehl et al. 2007). Thus, once pika habitat at higher elevations approaches a point that is thermally unsuitable for pikas, the pika will be committed to range-wide extinction in California as temperatures continue to warm as part of the climate commitment and pikas have no more no more upper-elevation habitat to retreat to.

Based on the above-cited reasons, we demonstrate that there is clearly sufficient scientific information in the Petition and presented in this submission to merit the determination that the American pika "may be warranted" for listing as threatened in California.

III. The Department Report Ignores Relevant Data and Opinions That the Department Itself Solicited

On January 28, 2008, pursuant to the California Public Records Act, CA Government Code § 6250 et seq., the Center requested all documents relating to the Petition to List the American Pika, including all reports, memos, intra & inter-agency communications, including but not limited to email, phone notes and meeting notes from the Department of Fish and Game. Despite the requirement to provide the documents to us within 10 working days, the Department did not disclose the first set of documents until February 26, 2008. The response is incomplete, as it omits pieces of correspondence referenced in the Department report and in the documents provided. Nevertheless, it is apparent that the Department requested, and then proceeded to ignore, information from scientists with expertise in the American pika.

For example, Lyle Nichols, Ph.D., of the Santa Monica College Department of Life Sciences, reviewed the Petition at the Department's request and wrote to John Gustafson on December 13, 2007:

> My bottom line conclusion is that this Petition is essentially correct in all important aspects....In my professional opinion all available evidence strongly supports the proposition that American pikas merit protection under the California Endangered Species Act....Protection under the California Endangered Species Act should certainly be extended to the Bodie Hills population regardless of its taxonomic status....I would include a short section covering Emergency Management Options." Exhibit 2.

Dr. Nichols wrote in a separate email on November 26, 2007:

> The status of American Pikas in the Bodie Hills outside Bodie State Historic Park is very grim. I have surveyed many patches of potential habitat throughout the Bodie Hills and found abundant evidence (mostly in the form of old droppings) that these sites were occupied by pikas in decades past. Now essentially all these patches are extinct. The only place that I have found evidence of current pika occupation in the Bodie Hills outside Bodie Park was on Bodie Mountain (10,167') elevation). This was a sighting of a single live animal. Exhibit 2.

Dr. Ed West, Ph.D., West Bioacoustics, also reviewed the Petition, and concluded

> The CBD identifies a genuine potential problem with regard to the potential impacts of climate change on thermally sensitive species such as the pika....Certainly lower elevation populations such as those at Bodie now would likely go extinct with increased temperatures. But whether or not the core populations currently distributed along the full length of the Sierras would be jeopardized with extinction is not known. I believe it would be valuable to take a closer look at the real adaptive capacity of pikas, at their distribution across the Sierras and at the microclimate changes that would realistically occur (including subtalus conditions) with climate change before listing is approved. Exhibit 2.

These statements simply cannot be squared with the statement in the Department Report that "the Department found that neither the petition nor other source offers information supporting the suggestion that the pika in California is being threatened by climatic warming or any other factor or combination of factors..." (Report: 16). The irreconcilable differences between the information before the Department and the characterization of that information in the Report that was ultimately transmitted to the Commission shows that something went seriously awry in the Department's review process.

IV. The Department Report Incorrectly States That The Petition Does Not Provide Adequate Information In The Categories Of Range, Distribution, Trend In The Size Or Distribution, And Abundance.

The Department Report found that the Petition did not provide adequate information in some categories required by CESA, specifically in range, distribution, trend, and abundance (Report: 3). We respond to each of these assertions below and provide additional information where possible to address the Report's finding of inadequacy in these categories.

(1) "The petition does not describe the overall geographic range of the pika in California or the geographic range of any of the five subspecies found in the State." (Report: 3)

This statement in the Department Report is incorrect since the distribution of American pika subspecies in California is described on pages 13-16 of the Petition based on multiple scientific sources and is depicted on the distribution map on page 16 of the Petition. Because American pika populations are patchily distributed in discrete talus patches in the mountain regions of the American West, the distributional information for pika subspecies is reported in the scientific literature as records of pika sightings at specific localities. The most recent compilation of distributional records for American pika subspecies in the scientific literature is provided in Hall (1981) which we used as a primary source for describing the distribution of the five California subspecies in the Petition. We also presented a map of American pika distribution in California which we based on (1) the distribution map in Hafner (1993) which is the most recent map found in the scientific literature and identical to the map in Hafner and Sullivan (1995), and (2) the extensive records of pika locations provided by the Global Biodiversity Information Facility database. We used the Global Biodiversity Information Facility database because it provided the most complete records of pika subspecies locations in California, drawing information from six sources.

We felt that the description of localities where pika subspecies have been found, coupled with the map, provided an adequate and accurate representation of the distribution as reported in the scientific literature. However, we did not specify the counties where each California pika subspecies is found. Therefore, in order to provide this information, we are re-submitting our distribution map (Exhibit 3) with the California counties outlined in addition to the following summary of distribution per subspecies which now includes information on counties. We also specify that the overall geographic range of the pika in California encompasses the southern

Cascades and Great Basin range of northeastern California and the Sierra Nevada mountains of eastern California, including Siskiyou, Modoc, Shasta, Lassen, Tehama, Plumas, Placer, Nevada, El Dorado, Mono, Tuolumne, Mariposa, Madera, Fresno, Tulare, and Inyo counties.

Mt. Whitney pika (*Ochotona princeps albata*)

The Mt. Whitney pika is found in Tulare, Inyo, and Fresno counties, and is the only American pika subspecies to occur exclusively in California. Howell (1924:44) notes the geographic distribution as the "[s]outhern part of the high Sierra Nevada, from Kearsarge Pass south to the headwaters of the Tule and Kern Rivers at an altitudinal range from 8,500 feet to 13,000 feet."

Yosemite pika (*Ochotona princeps muiri*)

The Yosemite pika is found in the high elevations of the Sierra Nevada mountains ranging from El Dorado county to the north to Inyo county to the south, including El Dorado, Mono, Tuolumne, Mariposa, Madera, Fresno, and Inyo counties. It is also found in a few localities in Nevada. Grinnell and Storer (1924) describe this subspecies in the Yosemite region as a "[c]ommon resident of the Hudsonian Zone, extending down locally into part of the Canadian Zone and up into Arctic-Alpine. Recorded from Ten Lakes, Tenaya Lake, and Washburn Lake eastward to Bloody [Canyon] to Ellery Lake"[4] (Grinnell and Storer 1924:218). Further:

> The Yosemite Cony is an alpine species, found only in the higher parts of the mountains above the fir belt, chiefly in the zone occupied by the alpine hemlock, white-bark pine, Sierran heather, and cassiope. Even within this narrow area it does not live everywhere, but is restricted to a single type of habitat, that comprised in moraines or taluses of broken granite....Altitudinally, the cony is found, in the Yosemite National Park, as low as 7700 feet, for example, near Glen Aulin, on the Tuolumne River; upward it ranges to about 12,000 feet, as on the slopes of Mount Dana and on the very summit of Parsons Peak, 12,120 feet.
>
> In one typical rock slide, at the head of Lyell [Canyon], our estimates indicated a population of at least one cony for every 750 square yards. This would mean a population of about six to an acre...(Grinnell and Storer 1924:218).

Gray-headed pika (*Ochotona princeps schisticeps*)

The Gray-headed pika is found in northern California in Placer, Nevada, Tehama, Plumas, Shasta, Lassen, and Siskiyou counties and also ranges into northwestern Nevada. Howell (1924) described *O. p. schisticeps* as distributed in the boreal zones of the northern Sierra Nevada, from Mount Shasta south to Donner Pass at elevations from 5,000 to 9,000 feet.

White Mountain pika (*Ochotona princeps sheltoni*)

[4] The Canadian Zone refers to areas from approximately 6,000- 8,000 feet in elevation, the Hudsonian Zone to areas from approximately 8,000-11,000 feet in elevation, and the Arctic Zone to areas from approximately 11,000-13,000 feet in elevation. For a fuller description of these life zones, see Grinnell and Storer (1924:4-12).

The White Mountains pika is found in the White Mountains of Mono and Inyo counties and western Nevada. Howell (1924) lists the geographic distribution as the "White Mountains of California and Nevada at 8,000-13,000 feet in elevation."

Taylor pika (*Ochotona princeps taylori*)

The Taylor pika is found in northern California in Lassen, Siskiyou, and Modoc counties and ranges into southern Oregon. Bailey (1936) reported the range of *O. p. taylori* as the dark-colored lava fields of southeastern Oregon and northeastern California, from 5,000 to 9,000 feet in elevation, wherever suitable cover and talus rock occurred. In California, specimens have been collected from 5 locations: Warren Peak, Sugar Hill, 5 miles NW of Eagle Peak in Modoc County, 2 mi N. of Medicine Lake in Siskiyou County, and 4 mi SW of McDonald Peak in Lassen County (MVZ database; Bailey 1936). This subspecies has also been reported from Lower Klamath Lake, Drews Creek, and the lava beds near the head of the Owyhee River (Bailey 1936). In Oregon, specimens are available from northern end of the Warner Mountains, Adel, Jack Lake, Fort Warner Creek, Guano Valley, and the northern end of the Steens Mountains (Bailey 1936). Maillard (1927) reported *O. p. taylori* from Quaking Aspen Spring, at 4500 feet in elevation, 12 miles west of Happy Camp Forest Service Station in Modoc County. Also:

> [the pika] is more numerous and more widely distributed in [Modoc] county than was at first supposed...Fresh sign was found in several places along the Warner Range...from 5000 feet upward, one small colony being in the rocky bottom of Eagle [Canyon], just before the [canyon] opens abruptly into the rolling plain, about a mile westerly from Eagleville. Another colony of conies was noted by Gilmore on a hill above the Pit River Forest Service Station in September, 1926...A large colony exists near the top of the Warner Range, a little southeast of Eagle Peak, at close to 9000 feet elevation....(Maillard 1927:356).

(2) "The petition provides no information on the distribution of the pika within its California geographic range, other than to say that "elevations of historic populations [in California] ranged from 1370 [meters] to 3700 [meters]." (Report: 3)

This statement in the Department Report is incorrect since the distributions of American pika subspecies within its California geographic range were reported on pages 13-16 of the Petition in terms of the elevational ranges where each subspecies is typically found as well as descriptors of its habitat, whether talus or lava fields. Petition Section V (Habitat Necessary for Survival) on pages 5-6 provides further detailed information on the talus habitat to which pikas are restricted and the microclimatic conditions where they are found.

(3) "The petition provides no information or description on any overall trend in the size or distribution of populations of the pika in California or of populations of four of the five subspecies occurring in the State." (Report: 3)

Current monitoring of pika populations in California is not occurring, with the exception of the Grinnell Resurvey effort in Yosemite National Park (Moritz 2007). Therefore, we could find no information on the trend in the size or distribution of populations of pika subspecies with

the exception of the Yosemite pika. The Grinnell Resurvey detected the loss of the lowest-elevation pika population at Glen Aulin in the ~90 years between surveys (Moritz 2007).

(4) "The petition has no information on abundance of the pika." (Report: 3)

The total number of individuals that comprise each of the American pika subspecies is not well-known, and therefore, we could find no information on abundance of the pika in California with the exception of the White Mountains pika. The White Mountains pika was listed by the IUCN as VU-D1, signifying that the subspecies is vulnerable with less than 1000 mature individuals in the wild. This abundance estimate is reported on page 18 of the Petition in Section VIII. Population Status, Trends and Abundance.

V. Misstatement of the Commission's and Department's Legal Authority

The Department Report states, on page 14:

> The Petition makes the following general recommendations as needed for managing the pika in California: "mitigating greenhouse gas pollution, facilitating adaptation to climate change, and monitoring pika populations and their habitat." We believe that the former two recommendations are not in the purview of the Commission or Department to effect.... (emphasis added).

This is clearly incorrect and deeply troubling. While the CESA, like the federal Endangered Species Act, was passed well before global warming had been identified as the leading threat to the planet's biological diversity, it was intentionally drafted broadly to include all factors which threaten species. The Commission and Department are both bound by CESA to protect species from global warming, just as they would protect species from any other threat such as invasive species or development pressure. *See, e.g.* Fish & G. Code §§ 2051, 2052, 2055; *see also* § 2061 (defining "conserve," "conserving," and "conservation" very broadly as methods and procedures which are necessary to protect and recover threatened and endangered species which "include but are not limited to, all activities associated with scientific resources management, such as research, census, law enforcement, habitat acquisition, restoration and maintenance, propagation, live trapping, and transplantation...." (emphasis added); see also §2062 (defining "endangered species" as one imperiled by "one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease...." (emphasis added). As noted above, the California Wildlife Action Plan instructs state agencies to specifically consider global warming.

Moreover, both the California Legislature and the Governor have now made it extremely clear that all state agencies must respond to climate change and take action to reduce their emissions. The California Global Warming Solutions Act (AB 32, 2006) notes that

> Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack,

> a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems. California Health and Safety Code § 38501.

The Global Warming Solutions Act then unambiguously directs that "[a]ll state agencies shall consider and implement strategies to reduce their greenhouse gas emissions." California Health and Safety Code § 38592(a).

Similarly, Executive Order S-3-05, noting that California is "particularly vulnerable to the impacts of climate change," and that global warming both threatens both "to greatly reduce the Sierra snowpack," and California's "natural habitats," set targets for greenhouse gas reductions within the state and also directs the California Environmental Protection Agency to coordinate efforts to meet those goals by the California Resources Agency (within which both the Commission and Department reside) and other agencies.

VI. Conclusion

The evidence before the Commission indicates that the American pika faces serious threats in California from climate change and other factors. There is more than a "substantial possibility" that listing could occur following a full status review for the American pika. The Commission must accept the Petition and advance the American pika to Candidacy. The Department Report and its recommendation are inadequate and seriously flawed. Something went seriously awry with the Department review of the Petition and the problems should be investigated and corrected.

Rather than objectively evaluate the available information, the authors of the Department Report made every conceivable argument, no matter how frivolous or unsubstantiated, against listing the American pika, while simultaneously ignoring evidence and arguments in support of protection. Many of the arguments made in the Department Report are strikingly similar to those made by the Commission in its rejection of the California tiger salamander Petition. Exhibit 4. In invalidating the Commission's decision, Judge Connelly wrote "In making the findings, the Commission misstated or ignored substantial evidence in the administrative record and relied on conflicting information of doubtful scientific value. As a result, the Commission's rejection of the Center's 2004 petition constitutes an abuse of the Commission's discretion and must be set aside." Exhibit 5 at 14-15. Based on the evidence before it, the Commission must accept the Petition and advance the American pika to Candidacy. Just as in the case of the California tiger salamander, denying the American pika Candidacy status would violate the law.

Thank you for your consideration of these comments. Please contact Brian Nowicki at 916-201-6938, bnowicki@biologicaldiversity.org, if you have any questions.

Yours Sincerely,

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[5] All of the cited references with the exception of Smith et al. 2004 were provided on a compact disk at the time of submission of the Petition and thus should be part of the record. Smith et al. (2004) is provided as Exhibit 6.

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Attached Documents

Exhibit 1: Map of pika subspecies (from the August 21, 2007, petition), showing extirpations of populations near the border of California, based on Beever, et al. (2003).

Exhibit 2: Correspondence included in the Department of Fish and Game February 27, 2008, response to the Center for Biological Diversity's January 28, 2008 Public Records Act request. 15 pages.

Exhibit 3: Map of distribution of pika subspecies in California (from the August 21, 2007, petition, with county boundaries added).

Exhibit 4: California Fish and Game Commission December 24, 2004, notice of findings regarding the California tiger salamander. 8 pages.

Exhibit 5: Superior Court of California December 14, 2006, ruling on the challenge of the California Fish and Game Commission's denial of the petition to list the California tiger salamander. 15 pages.

Exhibit 6: Smith, A.T., L. Weidong, and D.S. Hik. 2004. Pikas as harbingers of global warming. Species: newsletter of the Species Survival Commission, IUCN—The World Conservation Union. 41: 4-5. 5 pages.

Exhibit 1: Petition map of pika subspecies, showing extirpations of populations near the border of California based on Beever et al. (2003).