

Ecography

E7227

Calkins, M. T., Beaver, E. A., Boykin, K. G., Frey, J. K. and Andersen, M. C. 2011. Not-so splendid isolation: modeling climate-mediated range collapse of a montane mammal (*Ochotona princeps*) across numerous ecoregions. – *Ecography* 34: xxx–xxx.

Supplementary material

Appendix Captions

Supplementary Material Appendix 1. Combined inductive and appropriate-habitat-filter models of current predicted suitable habitat (A), as well as suitable habitat under a 1-7°C increase (panels B through H, respectively), as in Fig. 3, except that probabilities of pika persistence in each pixel are displayed under each stepped increase in temperature as continuous (albeit binned) probabilities, rather than made binary in relation to a single threshold probability (24.9%).

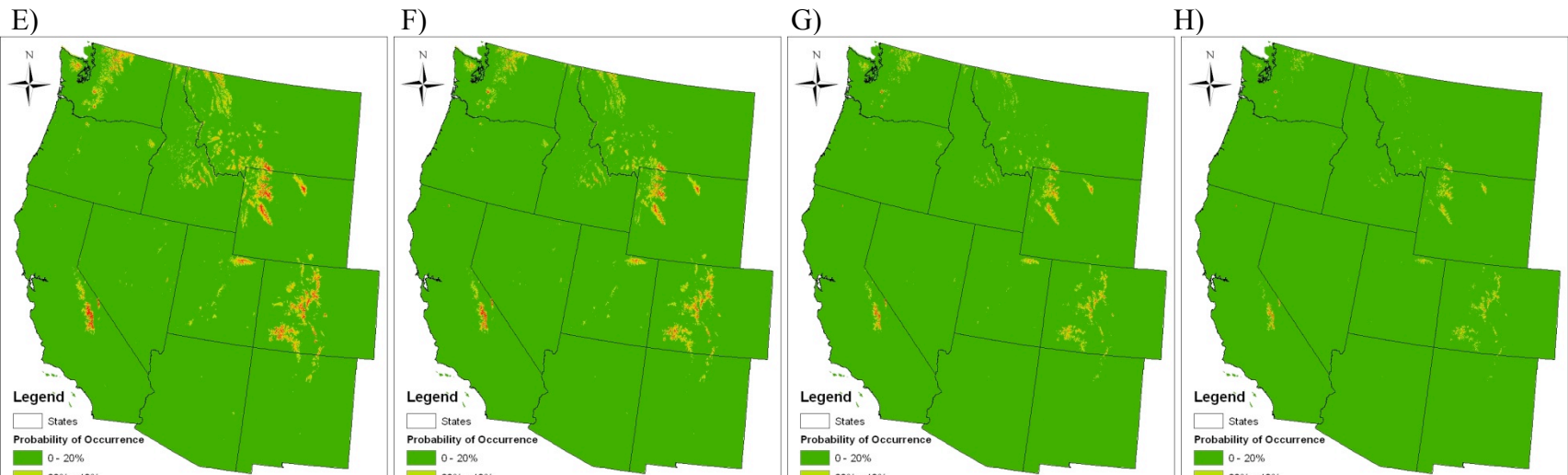
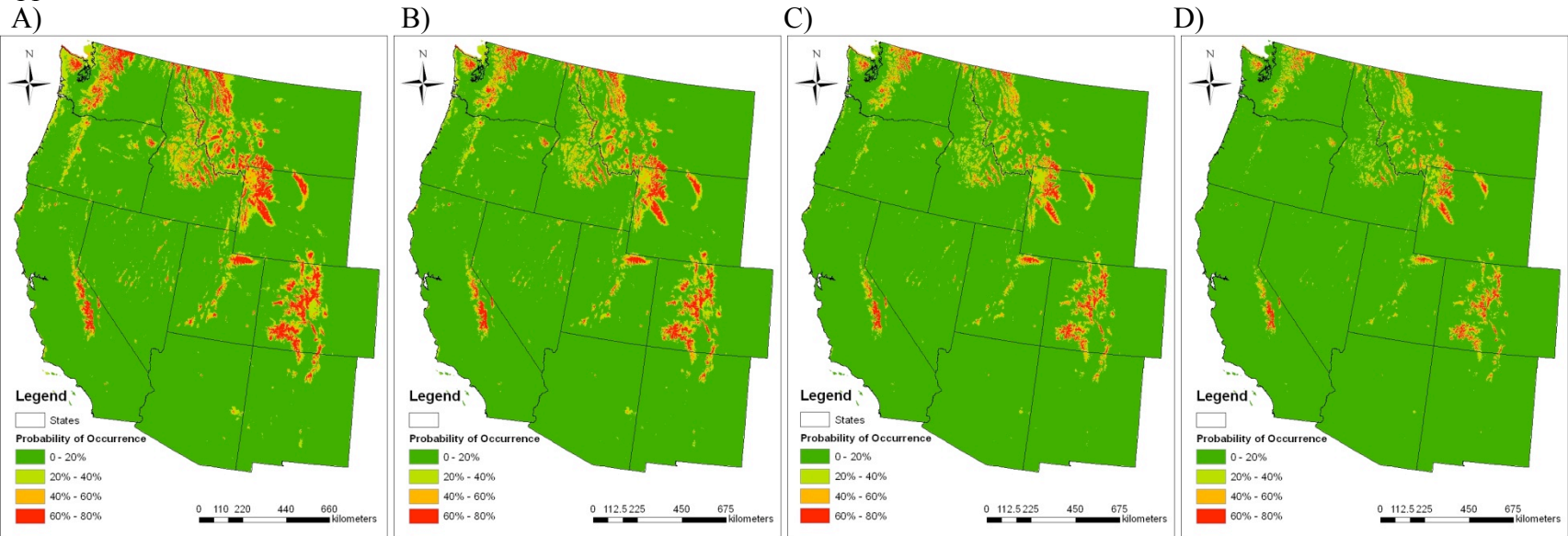
Supplementary Material Appendix 2. Results of bioclimatic-envelope modeling, for predicted current (a) and future distributions of *O. princeps* across the western USA, under stepped 1°C increases in mean temperature of the warmest quarter, from 1-7°C (b through h, respectively). Bioclimatic-envelope models used only climatic predictors to describe distribution, and (in contrast to models used in Fig. 3 and Supplementary Material Appendix 1) did not contain an appropriate-habitat filter mask.

Supplementary Material Appendix 3. Tabular comparison of areas of predicted suitable habitat for *O. princeps* under current climate and each of several stepped 1°C increases in mean temperature of the warmest quarter across the western USA, and the percent of potentially suitable habitat that was removed by the appropriate-habitat filter at each climatic context.

Supplementary Material Appendix 4. Cross-walk to compare results of models used to predict distribution of *O. princeps* across the western USA based on stepped 1°C increases in mean temperature of the warmest quarter with IPCC general-circulation models (GCM) for mean annual temperature. Specifically, for each stepped temperature increase, the year at which the mean of all GCM models reached that threshold, and the range of years at which individual GCM first reached that threshold, are shown. The domain spanned 30-49°N latitudes, and 107.5-124.5°W longitudes. Greenhouse gas and aerosol forcing follows the observed record for 1950–2000 and then the A1B scenario for 2000–2100. Modeling for the mean annual temperature was derived from the bias-corrected and spatially downscaled climate projections arose from the World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project phase 3 (CMIP3) multi-model dataset. Projections are served at: http://gdo-dcp.ucllnl.org/downscaled_cmip3_projections/, as described by Maurer et al (2007). Note that IPCC derivations project increases in mean annual temperature, whereas our stepped forecasts were specifically for the warmest quarter.

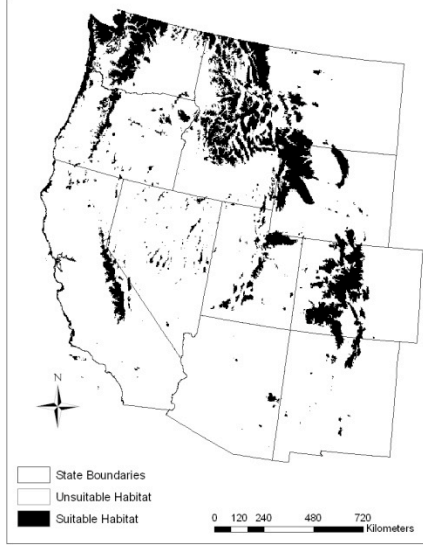
Supplementary Material Appendix 5. Results of bioclimatic-envelope modeling, for predicted current (a) and future distributions (in 2050 (b) and 2080 (c)) of *O. princeps* across the western USA, using the spatially heterogeneous distribution of IPCC-forecasted changes in mean temperature (ensemble of the HADCM3, CCCMA, and CSIRO models). GCM data were downloaded from http://ccafs-climate.org/download_sres.html, using the A2 scenario, described there as reflecting lower emissions than the business-as-usual but higher than the renewable-energy alternative. Note close concurrence of results with those in Figure 3 (e.g., compare 2080 prediction with Fig. 3G).

Appendix 1

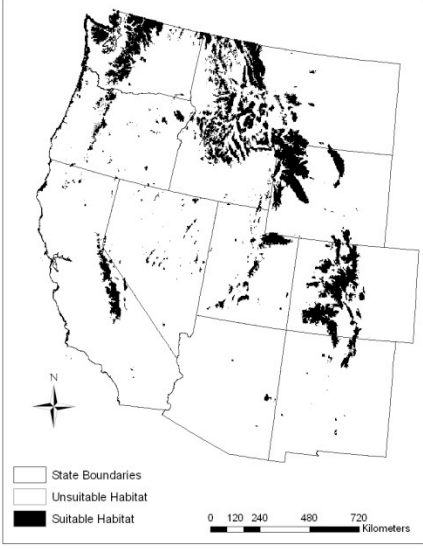


Appendix 2

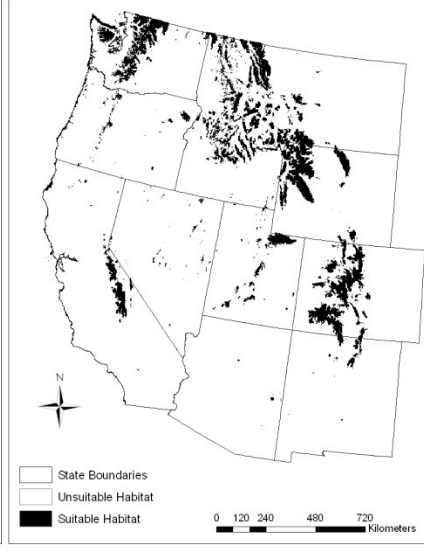
a) [Current]



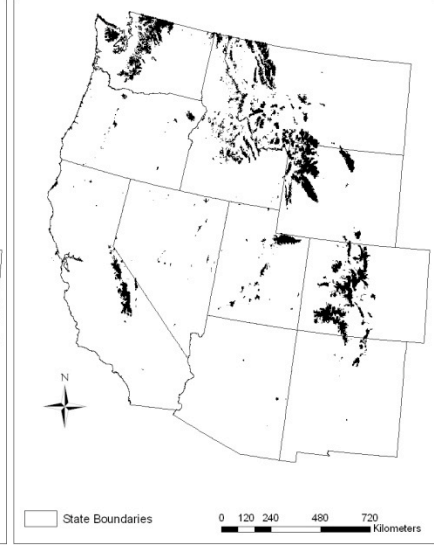
b) [+1°C]



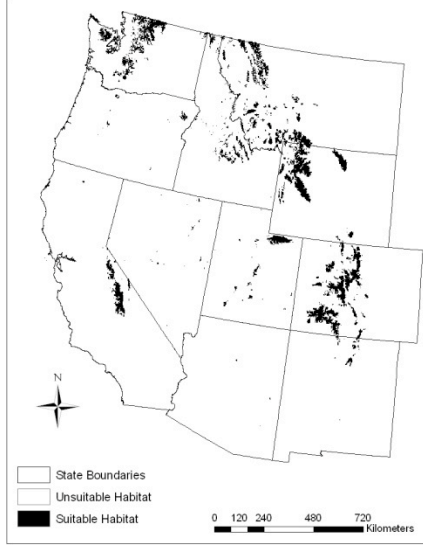
c) [+2°C]



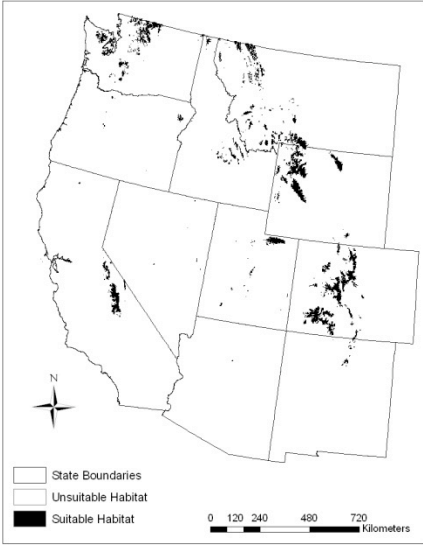
d) [+3°C]



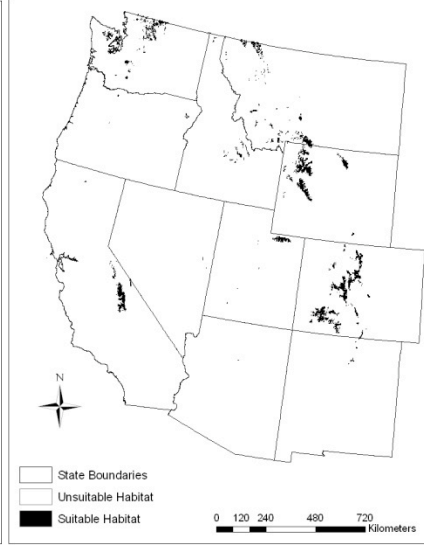
e) [+4°C]



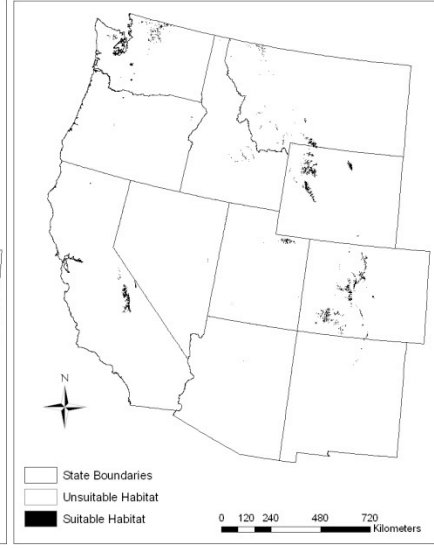
f) [+5°C]



g) [+6°C]



h) [+7°C]



Climatic context	Climate only (km²)	Climate + Land-Cover type (km²)	Potential habitat removed by L-C type (%)
Current	354503.7	212594.3	40.03
+1°C	259257.6	173930.9	32.91
+2°C	184700.8	136454.9	26.12
+3°C	132606.7	98758.0	25.53
+4°C	84746.2	72017.1	15.02
+5°C	53559.0	46481.8	13.21
+6°C	29761.3	28024.8	5.83
+7°C	16544.6	15549.8	6.01

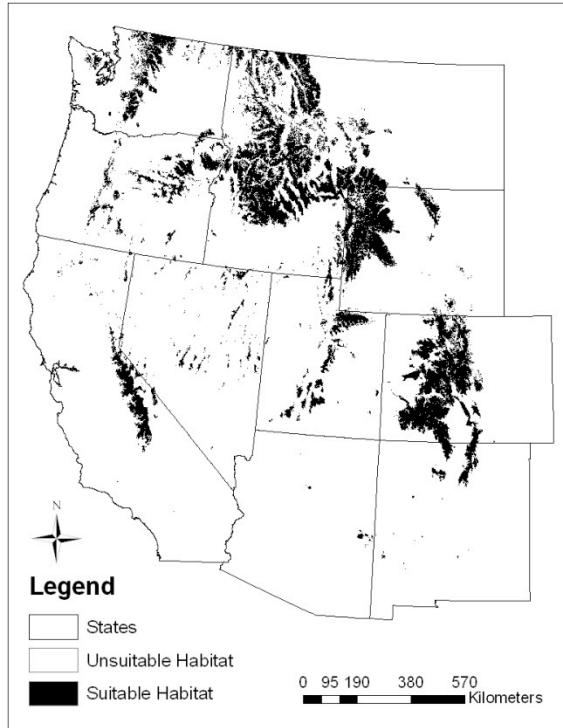
Appendix 3

Change in mean temperature	Year for the mean of all GCM models	Range of years for individual GCM models
+1°C	2016	(1960 - 2071)
+2°C	2042	(1999 - \geq 2099)
+3°C	2063	(2026 - >2100)
+4°C	~2101	(2052 - >2100)
+5°C	>2100	(2071 - >2100)
+6°C	>2100	(2095 - >2100)
+7°C	>2100	(>2100)

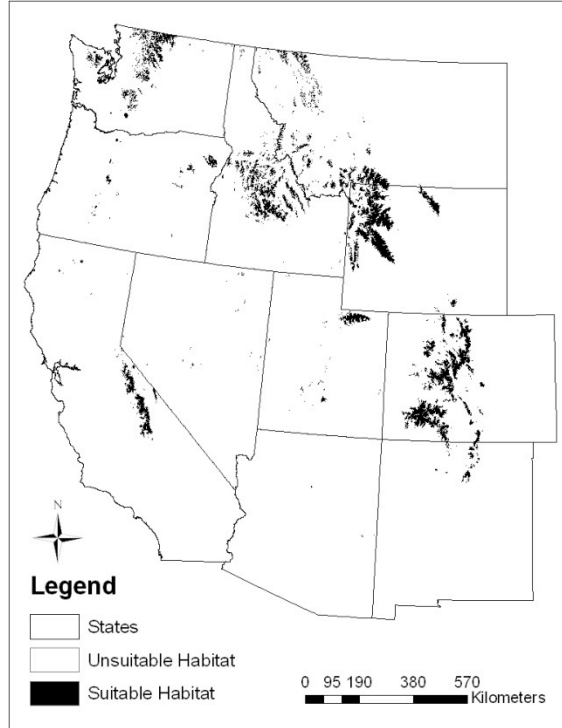
Appendix 4

Appendix 5

a) {Current}



b) {2050}



c) {2080}

