Assessment of Climate Impacts to Species' Habitat Based on the California Wildlife Habitat Relationships Model and a Vegetation Climate Vulnerability Analysis

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Summary

The California Department of Fish and Wildlife (Department) conducted a habitat vulnerability analysis for 522 species to assess the extent to which the habitats on which the species depend may be impacted by climate change based on Thorne et al.'s (2016) models of vegetation climate vulnerability. This study was completed to complement a list of species most likely to be impacted by extended drought conditions, developed during the severe drought of 2011-2017 (CDFW 2016), and to complement lists of species that have been identified as climate vulnerable (Gardali et al. 2012; Wright et al. 2013; CDFW 2015, Appendix C; Stewart et al. 2016). Identifying the species most vulnerable to impacts of climate on habitat conditions will allow the prioritization of monitoring and management for these species across the landscape.

We used vegetation exposure models developed by Thorne et al. (2016) for the "Climate Vulnerability Assessment of California's Vegetation", which predict stress to vegetation communities in two potential future climate scenarios: a warmer and wetter future, and a hotter and drier future. A vegetation community largely defines the composition and structure of species' habitat; therefore, stress on the vegetation community is expected to result in changes to a species' habitat. We brought together species range and habitat suitability information for terrestrial species from the California Wildlife Habitat Relationships Program (CDFW 2014) with the vegetation exposure models to assess where, and to what extent, climate impacts to each species' habitat is expected to occur. These results represent a first step in bringing together species models, habitat data, and projections of future climate impacts to habitats, to better understand where and how warmer and drier future climate conditions will most impact the habitats on which species depend. Further work is needed to test, refine, and expand on these models as we plan for managing wildlife species into the future.

The identification of the species, habitat types, and the locations where modeled high vegetation climate exposure intersects with species distributions can help with prioritizing the establishment of long-term monitoring to track landscape

and species composition changes over time. The results of this habitat vulnerability analysis can be looked at alongside species-specific climate vulnerability analyses for a fuller picture of climate risk for species, and to help identify specific locations in the landscape where that risk should be monitored. Field data collected during the 2011-2017 drought could be used to test the applicability of these climate vulnerability models to extended drought conditions.

Results include:

1. Maps and measures of the extent (in acres) of potentially suitable habitat for each species and the CWHR expert-opinion habitat suitability rank for each habitat type.
2. Maps and measures of the percentage of mapped suitable habitat for each species that is predicted to be stressed by climate change (high climate exposure) and the percentage of habitat for each species with predicted low climate exposure, based on the Climate Vulnerability Assessment of California's Vegetation (Thorne et al. 2016) exposure analysis for future climate scenarios.
3. Measures of the percentage of mapped suitable habitat for each species that has an overall climate vulnerability rank of mid-high or high overall (based on exposure, sensitivity, and adaptive capacity) within the mapped suitable habitat for each species.
4. A list of vertebrate habitat specialists that depend on habitat types (vegetation communities) that are predicted to be highly vulnerable to climate change.

Key findings include:

1. By the end of the century, under an unmitigated emissions scenario (rcp 8.5), 60 species are predicted to have high climate exposure impacts or non-analog climate conditions (outside the range of conditions currently known in California) across the majority of their potentially suitable habitat area regardless of the future climate trajectory (hotter and drier

or warmer and wetter). In contrast, only 4 species are predicted to have low climate impacts (i.e. vegetation refugia) across the majority of their potentially suitable natural habitat regardless of the future climate trajectory.

2. High climate exposure is predicted across at least 20% of the potentially suitable natural habitat for 22 terrestrial species in California over the next two decades under hotter and drier climate conditions, even with reductions in emissions. These species were primarily distributed in forested habitats on the North Coast; but others occurred in grasslands, wet meadows, and riparian areas in the Sierra Nevada and Cascades, and in the mountains of southern California.
3. Twenty-four species in California are habitat specialists that rely on habitat types with overall climate vulnerability ranks of mid-high or high based on exposure, sensitivity, and adaptive capacity. The majority of potential suitable habitat for an additional 65 species is ranked as mid-high to highly vulnerable.
4. Twenty-two species have <100,000 acres of mapped potentially suitable habitat in California, and the majority of habitat for all these species is expected to have high exposure to climate change under at least one future climate scenario evaluated.

Introduction

Global climate models (GCMs) predict warmer temperatures in California in the future, with some models predicting a warmer and drier future and others predicting a warmer and wetter future. Global climate change models describe broadscale changes in temperature and precipitation over long time periods, while drought is a manifestation of short-term weather conditions; however, weather and climate are closely related (climate = the long-term average of weather conditions). The warmer and drier than normal conditions seen in the recent drought parallel warmer and drier conditions predicted by climate change models (Diffenbaugh et al. 2015); Williams et al. (2015) attributed up to 27% of the 2012-2014 drought in California to anthropogenic warming. During the extended drought of 2011-2017, the Department was tasked with identifying the species most likely to be severely impacted by extended drought conditions, and to prioritize monitoring and management for these species across the landscape. This study assessed projected impacts of changing climate conditions on species' habitats, to complement a list of 113 drought-sensitive species identified by expert opinion (CDFW 2016). We used information on species distributions (CDFW 2014) along with models of climate change exposure to vegetation (Thorne et al. 2016) to quantify the projected impacts of two future climate trajectories, a hotter and drier future and a warmer and wetter future, on species habitats.

During 2011-2017, the extended drought in California significantly impacted habitat conditions and species across the state due to warmer and drier-than-normal weather. With climate change, we expect species and habitats to continue to be impacted by changes in weather as climatic conditions change. Species that rely on specific habitat types, are habitat or dietary specialists, or that occur in specific areas of the state, may be particularly vulnerable to changes in climate and weather conditions. Developing hypotheses about which species and locations will be most impacted, based on the best available scientific information, can help prioritize monitoring and wildlife species management.

Thorne et al. (2016) modeled the potential effects of future climate scenarios on macrogroup vegetation types in California as part of the 2015 State Wildlife Action Plan (SWAP) update. Vegetation communities largely make up the structure of wildlife habitat, so vegetation vulnerability can be used as a surrogate for wildlife habitat vulnerability. Thorne et al.'s (2016) work was based on the best available habitat (vegetation) map for California and climate data downscaled to a 270-meter grid. It produced hypotheses about which habitat types, and in what locations, would experience high exposure to "hot and dry" and "warm and wet" future climate conditions, and which areas will remain stable (i.e., remain within current-day climate envelope of the vegetation type). Results were produced for both a low and high carbon emissions scenario, and at several time periods over the next century (early, mid, and end-of-century). Assessing how a "hot and dry" future may impact vegetation communities in California, and in turn species habitats, may provide additional insight into how and where a hotter and drier future climate, punctuated with longer and more frequent droughts, may impact species.

This study analyzed how the impacts to vegetation modeled by Thorne et al. (2016), may impact wildlife species that depend on those habitat areas for feeding, cover, and reproduction, using species-habitat relationships and species habitat distribution models. Habitat suitability models, which use landscape-level environmental data to predict where suitable habitat for a species is found in the landscape, are increasingly used in conservation science. We developed maps of potential habitat suitability for 662 California vertebrate species, bringing together information on species-habitat relationships from the California Wildlife Habitat Relationships program (CDFW 2014) with a statewide California vegetation map (FVEG2015, FRAP 2015). The vegetation climate exposure results of the California Vegetation Climate Vulnerability Assessment (Thorne et al. 2016) were then applied to the habitat distribution maps for individual species. The vegetation climate vulnerability exposure maps identify areas in the landscape where the vegetation, which represents species habitat, is expected to be impacted by two potential future climate trajectories: 1) hotter and drier and 2) warmer and wetter future climate conditions. Applying this information to the

CWHR species habitat distributions allowed us to quantify to what extent each species habitat is expected to be impacted by climate change, and where within each species range these impacts are expected to occur.

Methods

Datasets Used

Species Data

California Wildlife Habitat Relationships (CWHR) species data models (CDFW 2014) were used in the analysis, including species range maps and species-habitat relationship data for 662 California vertebrate species. CWHR is an expert-opinion model of habitat suitability that ranks suitability for reproduction, cover, and feeding for each species within 59 CWHR habitat types that encompass the major wildlife habitats in California. The CWHR habitat types are largely defined by major vegetation communities, such as Mixed Conifer and Blue Oak Woodland, and can be crosswalked to other vegetation classification systems such as the National Vegetation Classification System (NVCS). Each habitat type is partitioned into up to 6 size classes [tree diameter at breast height (DBH), shrub decadence, or herb height] and 4 cover classes (i.e., percent canopy closure), which captures habitat structure important to wildlife. CWHR also defines a range map for each species that represents the maximum, current (within the past 20 years) extent of a species' distribution.

The CWHR can be used to create a spatial potential habitat distribution map for a species by applying the habitat suitability values to a habitat or vegetation map. This analysis used the mean habitat suitability value for reproduction, cover, and feeding. The values ranged from zero to one: low suitability (≤0.33), medium suitability (0.34-0.66), high suitability (>0.66), or unsuitable (=0). Additional essential habitat elements such as snags, riverbanks, and diet elements are also

defined for each species in CWHR but are generally not well-mapped across the landscape, so were not considered in the distribution modeling for this analysis.

Aquatic Species

Aquatic species may be particularly vulnerable to drought or to warming and drying climatic conditions due to their strong reliance on water in the landscape. Although many species need some drinking water for survival, aquatic species require habitats such as standing water, ponds, or riparian areas for reproduction, cover, or feeding. Because aquatic elements such as small wetlands, ponds, or riparian stringers often occur at a smaller scale than is captured in vegetation maps, aquatic species distributions may be poorly represented by vegetation maps. Furthermore, the vegetation vulnerability analysis did not evaluate potential climate impacts to aquatic habitats including lacustrine, riverine, estuarine, and water. The results for aquatic species in this analysis should be interpreted with these limitations in mind. Despite this limitation, we do present the results for aquatic species to quantify potential impacts to the upland portion of aquatic species habitat. To identify aquatic species, we compiled a list of all species that require aquatic elements for one or more life stages, based on Essential or Secondary Aquatic Elements listed in CWHR. In some cases, information from the CWHR Species Life History Account was used to supplement the CWHR Aquatic Element list. A field denoting aquatic species was added to the analysis results tables.

Amphibians that require standing water for reproduction or as primary habitat were denoted as aquatic species. Amphibians that can survive and reproduce without the presence of standing water, or that require only a short window of standing water during rainfall events, were not denoted as aquatic species. Birds that rely on standing water as primary habitat or for feeding, or that require riparian habitat for breeding, were denoted as aquatic species. Mammals and reptiles that are primarily found in aquatic habitats or have high daily water intake requirements and are always found near water, were denoted as aquatic species.

Marine Species

Because of its long coastline, California is home to many marine mammals and birds. Some marine species use terrestrial habitats during part of their life cycle while others spend their entire lives out in the ocean. If the majority of a species range was marine, the species was denoted as marine and it was excluded from the analysis.

Narrowly Distributed Species

Species with small ranges, or that occur in narrowly distributed habitats within their ranges, may be particularly vulnerable to habitat impacts due to the limited amount of total suitable habitat available to them. We identified narrowly distributed species as those for which <10% of their range is potential suitable habitat (widely distributed but rare), or species with <100,000 acres total potential suitable habitat within the state.

Limitations

The CWHR model ranks habitat suitability for reproduction, cover, and feeding for each species within each habitat type and stage. The suitability ranks are based on published literature and expert opinion and are limited to the availability of information for each species. Some species are well-studied, while others are lesser known. There is more uncertainty in the CWHR habitat suitability ranks for lesser-known species. The CWHR model data and range map data for different species vary in age. There may be differences in how the suitability scores were applied for different species because of differences in how the expert reviewers assigned habitat suitability ranks. Although the habitat suitability maps were developed in a 30-meter raster, CWHR habitat suitability ranks were developed based on habitat patch sizes >40 acres in size and are best interpreted for habitat patches >200 acres in size.

Vegetation and Habitat Data

The CWHR species-habitat relationship data was applied to a statewide vegetation map (FVEG2015, FRAP 2015), a multi-source vegetation data layer spanning a time period from approximately 1990-2014. The California Department of Forestry and Fire Protection's CALFIRE Fire and Resource Assessment Program (FRAP), in cooperation with California Department of Fish and Wildlife Vegetation Classification and Mapping Program (VegCAMP) and extensive use of USDA Forest Service Region 5 Remote Sensing Laboratory (RSL) data, compiled the "best available" land cover data available for California into this single comprehensive statewide data set. The FVEG 2015 map classifies each 30 meter pixel as one of the 59 CWHR habitat types, split into stages representing vegetation structure, including up to 6 size classes (tree DBH, shrub decadence, or herb height) and 4 cover classes (i.e., percent canopy closure).

Limitations

The vegetation map used was a multi-source map compiling the best available vegetation data for each region of the state. The sources vary in their age and accuracy. While vegetation maps produced by the CDFW Vegetation Classification and Mapping Program (VegCAMP) are mapped to a fine scale (2 acre minimum mapping unit) and have verified accuracy (>80% accuracy), maps developed using other methods in other areas of the state may have lower accuracy.

The habitat suitability predictions are subject to the limitations and accuracy of the underlying vegetation map. In the case of species that rely on habitat types that occur in small patches on the landscape and may not be captured well by vegetation maps, such as small wetlands, the amount of representative habitat may be underestimated or inaccurately mapped. Many habitats that may be poorly represented on vegetation maps are aquatic, such as small ponds, small wetlands, or riparian stringers. This increases the uncertainty of models for aquatic species, or species that rely on other small, patchy habitats. Habitat suitability may also be influenced by other factors not captured in the vegetation

maps, such as distance to water or the availability of habitat elements such as snags or talus slopes, which were not incorporated into these models.

Vegetation Climate Vulnerability Data

The vegetation climate vulnerability analysis (Thorne et al. 2016), provides an estimate of climate exposure under several future climate scenarios, as well as overall climate vulnerability (based on exposure, sensitivity, and adaptive capacity) of NVCS vegetation macrogroups. See the Thorne et al. (2016) report for detailed methods. The base GIS vegetation layer used in the vegetation climate vulnerability assessment was the same as that used in the CWHR distribution map development, making a direct comparison of species habitat and vegetation exposure possible. The vegetation climate change vulnerability analysis did not assess agricultural lands including cropland, orchards, hayfields, pasture, rice, and vineyards; urban; or aquatic habitats including lacustrine, riverine, estuarine, and water.

Exposure maps

Thorne et al.'s (2016) exposure data is spatially explicit, based on the best available statewide vegetation map (FVEG2015, FRAP 2015) mapped by NVCS macrogroup, and 270 meter downscaled climate data for current climate and future climate scenarios (Flint and Flint 2014, Thorne et al. 2015). The exposure maps provide a measure of how far future climate departs from the current climate envelope of each macrogroup (i.e., range of temperature, precipitation, and other climatic variables in which the macrogroup is currently found) across the landscape. The exposure values ranged from 0-100, with 0-80 representing areas expected to remain suitable for the existing vegetation type (i.e., areas for which any changes in climate remain within the climate envelope for the vegetation type), values of 80-95 representing moderate climate exposure, and values >95 representing areas with high climate exposure.

Overall vegetation climate vulnerability ranks

Thorne et al.'s (2016) overall climate vulnerability rank for each macrogroup was based on the exposure analysis results combined with sensitivity and adaptive capacity scores based on species traits for dominant plant species within each macrogroup. A single overall vulnerability rank is given to each macrogroup, which is not spatially explicit.

Future climate scenarios

The future climate scenarios assessed were defined by three attributes: global climate model (GCM), indicating the trajectory of change in temperature and precipitation; representative concentration pathway (rcp), indicating the magnitude of change as related to the level of continued carbon emissions; and the time period.

We evaluated the results for two GCMs that are representative of two potential climate trajectories in California: a hotter future with decreased precipitation (MIROC_5), and a warmer future with increased precipitation (CNRM_5). While virtually all future climate scenarios for California predict warming temperatures, the degree of warming and the level of precipitation vary across the models. These two models were chosen to represent the two potential future climate trajectories in California and are referred to throughout the report as a hotter and drier future and a warmer and wetter future.

We evaluated the results for two rcps that are representative of different levels of reductions in carbon emissions. Rcp 8.5, the high emissions scenario, assumes no mitigation and no reductions in carbon emissions over the next century. Rcp 4.5, the lower emissions scenario, assumes reductions that result in a stabilization of carbon emissions by mid-century, and subsequent decrease by end-of-century.

We evaluated results for two time periods:

1) Near-term results: A hot and dry GCM (MIROC_ESM), with a low emissions scenario (rcp 4.5), for time period 2010-2039, to represent near-term warmer and

drier climate change conditions. The near-term results were included to represent the most conservative (i.e., lowest climate impact) future, which highlights the species occupying habitats that may be most sensitive to warmer and drier conditions.

2) End-of-century results: We evaluated end-of-century (2070-2099) results for both GCMS (HotDry and WarmWet) and both emissions scenarios (rcp 4.5 and rcp 8.5).

Limitations

The vegetation climate vulnerability analysis excluded urban and agricultural areas. Any species with >50% of its potential distribution mapped in these habitat types was excluded from the analysis. The vegetation climate exposure analysis was based on NVCS macrogroups, the vegetation classification level addressed in SWAP. While in many cases it corresponds 1:1 with the CWHR habitat types, there are some macrogroups that have one: many or many: many relationships with CWHR habitat types. There are cases where multiple CWHR types are included in one macrogroup, such as the California Forest and Woodland macrogroup, which includes CWHR types Montane Hardwood, Montane Hardwood-Conifer, Blue Oak Woodland, Blue Oak-Foothill Pine, Coastal Oak Woodland, Closed-Cone Pine-Cypress, and Valley Oak Woodland. In this case, the climate exposure scores may underestimate the potential exposure of a single CWHR type because the climate envelope, used to define the bounds of suitable climate range for a given type, will likely be larger in a more broadly defined macrogroup.

Analysis steps

All GIS work for this study was done in ArcGIS 10.4. The analysis was done by implementing the following steps for each species:

1. Apply the CWHR habitat suitability scores for each species to FVEG2015, the best available vegetation map of the state, which includes CWHR size and cover class structural habitat attributes, to develop expert-opinion based potential distribution models for each species. The mean habitat

suitability rank for reproduction, cover, and feeding for each CWHR type and stage (i.e., size and cover class) was assigned to every vegetation map pixel in each model. The results were clipped by the respective species ranges. Each species range represents the maximum geographic extent in which that species is expected to occur. These boundaries are often delineated according to topographic features such as elevation which functionally constitute a species' known habitat limits. They are also informed by the body of historical and contemporary occurrence records for each species. The CWHR-based potential distribution model for each species is available as a GIS feature class or map depicting the extent and location of potentially suitable habitat within the species' current range.

2. Generalize the potential species distribution information to 270-meter pixels, to match analysis grain of the vegetation vulnerability assessment. Each 270-meter pixel is made up of 81, 30-meter FVEG pixels. If the majority of the 81 FVEG pixels represented suitable habitat for a species, the 270-meter pixel was classified as suitable.
3. Apply the climate vegetation exposure score from Thorne et al. (2016) to each 270-meter pixel of suitable habitat for each species. The exposure values ranged from 0-100, with 0-80 representing areas where climate change exposure is less likely to impact existing habitat (i.e., areas for which changes in climate remain within the climate envelope for the vegetation type), and values >95 representing areas where exposure to future climate conditions is most likely to impact vegetation and habitat due to changes in vegetation structure and composition. See Thorne et al. (2016) for a full description of vegetation exposure scores.
4. Summarize the results for each species, including the extent of current potentially suitable habitat for each species and the level of modeled future climate exposure within that habitat.

Results

Potential distribution models were developed for 662 terrestrial vertebrate species, including amphibians, birds, mammals, and reptiles. We assessed the

extent of climate vulnerable vegetation types within each species distribution (Appendix A), and excluded 140 species because the majority of their mapped potential habitat was in urban, agricultural, aquatic, or marine habitats that were not modeled in the vegetation climate vulnerability study (Appendix B). We assessed the extent of spatially explicit climate exposure to suitable habitat for each of 522 species (Appendix C). Of the 522 species assessed, 79 were noted as aquatic species, 15 occupy a narrow range of habitats within their distribution (<10% of the species range was mapped suitable habitat), and 21 species are narrowly distributed (<100,000 absolute acres of potentially suitable habitat).

Climate Exposure

The climate exposure analysis is based on a spatially explicit model developed by Thorne et al. (2016) that predicts the degree to which existing vegetation types are expected to be impacted by changes under future climate conditions. It is based on a model that incorporates location-specific factors such as latitude, elevation, topography, and geology, which affect the temperature and availability of water in the landscape (Thorne et al. 2016). The level of climate exposure for this analysis was quantified as the percentage of a potential habitat within a species' range that was predicted to have high climate exposure (climate exposure >95, Thorne et al. 2016). Results for each species and all climate scenarios are provided in Appendix C.

End-of-century Results

By the end of the century, the mean percent of suitable habitat expected to be impacted by high climate exposure, averaged across all species in California, ranges from 14% (sd +/- 12%) to 44% (sd +/- 17%) depending on the level of carbon emissions and the climate trajectory (Table 1). The impact is predicted to be reduced by 16% to 30% under a lower emissions scenario compared with higher emissions.

Table 1. Mean percentage of suitable habitat predicted to be impacted by high vegetation climate exposure. Results are shown for the end of the century, averaged across all species (n=522), and are shown for two different future climate scenarios, Hot and Dry (MIROC_ESM) and Warm and Wet (CNRM_5), and two emission levels, an unmitigated high scenario (rcp 8.5) and a reduced emissions low scenario (rcp 4.5).

Future climate scenario	Mean percentage of suitable habitat highly impacted
Hot and Dry, low emissions	23% (s.d. +/- 16%)
Hot and Dry, high emissions	39% (s.d. +/- 19%)
Warm and Wet, low emissions	14% (s.d. +/- 12%)
Warm and Wet, high emissions	44% (s.d. +/- 17%)

By the end of the century, under an unmitigated emissions scenario (rcp 8.5), 60 species are predicted to have high climate exposure impacts or non-analog conditions across the majority (>50%) of their potentially suitable habitat area regardless of the future climate trajectory (Table 2). This includes six amphibians, 18 birds, 14 mammals, and 22 reptiles. As a percentage of all species assessed per taxonomic group, this is 11% of amphibians, 8% of birds, 9% of mammals, and 30% of reptiles. For only four of these species, models also predict high climate impacts across the majority of potential suitable habitat under a reduced emissions scenario (rcp 4.5; Appendix C): Sonoran Desert Toad (*Incilius alvarius*), Great Plains Toad (*Anaxyrus cognatus*), Couch's Spadefoot (*Scaphiopus couchii*), and Woodhouse's Toad (*Anaxyrus woodhousii*). Only four of the 60 species were also identified as climate vulnerable in species climate vulnerability studies (Gardali et al. 2012; Wright et al. 2013; CDFW 2015, Appendix C; Stewart et al. 2016): Couch's Spadefoot (*Scaphiopus couchii*), Brown-Crested Flycatcher (*Myiarchus tyrannulus*), Mohave Fringe-Toed Lizard (*Uma scoparia*), and Orange-Throated Whiptail (*Aspidoscelis hyperythra*).

Table 2. Sixty species predicted to have high climate impacts across the majority of their potentially suitable habitat area regardless of future climate trajectory. The table shows the percent of potential suitable habitat for each species for which Thorne et al.'s (2016) vegetation exposure models predicted high exposure (>95) or non-analog conditions (outside the range of existing conditions in California). The species shown are predicted to experience climate impacts across the majority of the potentially suitable habitat within their range in both a hotter and drier (MIROC_ESM, denoted as HotDry) and warmer and wetter (CNRM_5, denoted as WarmWet) future climate scenario. Results shown are for a high emissions scenario (rcp 8.5) at the end of the century (2070-2099). Species previously identified as climate vulnerable are denoted with an asterisk in the CWHR ID column.

CWHR ID	Common Name	Scientific Name	HotDry High Exposure	HotDry Non-analog	WarmWet High Exposure	WarmWet Non-analog
A027*	COUCH'S SPADEFOOT	*Scaphiopus couchii*	4%	94%	1%	97%
A028	WESTERN SPADEFOOT	*Spea hammondii*	58%	2%	48%	9%
A030	SONORAN DESERT TOAD	*Incilius alvarius*	0%	73%	0%	73%
A034	WOODHOUSE'S TOAD	*Anaxyrus woodhousii*	17%	60%	7%	71%
A037	GREAT PLAINS TOAD	*Anaxyrus cognatus*	9%	77%	3%	84%
A062	HELL HOLLOW SLENDER SALAMANDER	*Batrachoseps diabolicus*	96%	0%	71%	25%
B057	CATTLE EGRET	*Bubulcus ibis*	53%	3%	48%	13%
B139	GAMBEL'S QUAIL	*Callipepla gambelii*	28%	30%	42%	37%
B254	WHITE-WINGED DOVE	*Zenaida asiatica*	24%	50%	31%	56%
B257	COMMON GROUND-DOVE	*Columbina passerina*	30%	56%	29%	61%
B273	SHORT-EARED OWL	*Asio flammeus*	50%	1%	58%	7%
B275	LESSER NIGHTHAWK	*Chordeiles acutipennis*	32%	19%	45%	23%
B328*	BROWN-CRESTED FLYCATCHER	*Myiarchus tyrannulus*	14%	57%	14%	57%
B352	YELLOW-BILLED MAGPIE	*Pica nuttalli*	52%	0.3%	42%	12%
B359	VERDIN	*Auriparus flaviceps*	28%	30%	43%	38%
B365	CACTUS WREN	*Campylorhynchus brunneicapillus*	32%	21%	42%	27%
B378	BLACK-TAILED GNATCATCHER	*Polioptila melanura*	33%	41%	40%	51%

CWHR ID	Common Name	Scientific Name	HotDry High Exposure	HotDry Non-analog	WarmWet High Exposure	WarmWet Non-analog
B393	NORTHERN MOCKINGBIRD	*Mimus polyglottos*	39%	14%	42%	18%
B428	LUCY'S WARBLER	*Oreothlypis luciae*	11%	41%	30%	40%
B549	GILDED FLICKER	*Colaptes chrysoides*	10%	42%	43%	52%
B551	ISLAND SCRUB-JAY	*Aphelocoma insularis*	80%	0%	93%	0%
B553	CALIFORNIA GNATCATCHER	*Polioptila californica*	80%	0%	72%	0.4%
B620	HARRIS' S HAWK	*Parabuteo unicinctus*	31%	31%	39%	30%
B806	NORTHERN CARDINAL	*Cardinalis cardinalis*	0%	91%	0%	91%
M019	CALIFORNIA LEAF-NOSED BAT	*Macrotus californicus*	33%	45%	35%	55%
M022	ARIZONA MYOTIS	*Myotis occultus*	8%	92%	0.5%	99%
M024	CAVE MYOTIS	*Myotis velifer*	5%	89%	0.2%	94%
M031	CANYON BAT	*Parastrelluss hesperus*	41%	11%	46%	17%
M033	WESTERN RED BAT	*Lasiurus blossevillii*	51%	1%	48%	8%
M040	POCKETED FREE-TAILED BAT	*Nyctinomops femorosaccus*	26%	42%	34%	48%
M047	AUDUBON'S COTTONTAIL	*Sylvilagus audubonii*	38%	12%	43%	17%
M074	ROUND-TAILED GROUND SQUIRREL	*Xerospermophilus tereticaudus*	32%	36%	39%	44%
M092	BAILEY'S POCKET MOUSE	*Chaetodipus rudinoris*	28%	48%	29%	59%
M093	DESERT POCKET MOUSE	*Chaetodipus penicillatus*	24%	34%	40%	32%
M096	SPINY POCKET MOUSE	*Chaetodipus spinatus*	22%	54%	26%	60%
M123	HISPID COTTON RAT	*Sigmodon hispidus*	3%	87%	3%	87%
M125	WHITE-THROATED WOODRAT	*Neotoma albigula*	20%	58%	23%	63%
M150	ISLAND GRAY FOX	*Urocyon littoralis*	51%	0%	87%	0%
R005	MOHAVE DESERT TORTOISE	*Gopherus agassizii*	24%	27%	40%	31%
R008	WESTERN BANDED GECKO	*Coleonyx variegatus*	27%	22%	41%	25%

CWHR ID	Common Name	Scientific Name	HotDry High Exposure	HotDry Non-analog	WarmWet High Exposure	WarmWet Non-analog
R013	COLORADO DESERT FRINGE-TOED LIZARD	*Uma notata*	19%	68%	25%	61%
R014	COACHELLA VALLEY FRINGE-TOED LIZARD	*Uma inornata*	35%	29%	9%	70%
R015*	MOHAVE FRINGE-TOED LIZARD	*Uma scoparia*	28%	34%	44%	34%
R020	DESERT SPINY LIZARD	*Sceloporus magister*	24%	54%	31%	60%
R021	GRANITE SPINY LIZARD	*Sceloporus orcutti*	55%	0.3%	52%	2%
R025	LONG-TAILED BRUSH LIZARD	*Urosaurus graciosus*	29%	32%	45%	41%
R026	ORNATE TREE LIZARD	*Urosaurus ornatus*	1%	96%	0%	96%
R032	FLAT-TAILED HORNED LIZARD	*Phrynosoma mcallii*	23%	59%	33%	55%
R033	GRANITE NIGHT LIZARD	*Xantusia henshawi*	49%	0.4%	49%	2%
R038*	ORANGE-THROATED WHIPTAIL	*Aspidoscelis hyperythra*	72%	0%	62%	0.4%
R050	SPOTTED LEAF-NOSED SNAKE	*Phyllorhynchus decurtatus*	24%	27%	39%	31%
R063	SIERRA GARTERSNAKE	*Thamnophis couchii*	49%	2%	37%	15%
R070	SONORAN LYRESNAKE	*Trimorphodon lambda*	29%	40%	32%	52%
R072	WESTERN DIAMOND-BACKED RATTLESNAKE	*Crotalus atrox*	21%	70%	14%	80%
R073	RED DIAMOND RATTLESNAKE	*Crotalus ruber*	58%	1%	59%	4%
R074	SPECKLED RATTLESNAKE	*Crotalus mitchellii*	35%	31%	39%	42%
R075	SIDEWINDER	*Crotalus cerastes*	24%	26%	42%	30%
R079	GIANT GARTERSNAKE	*Thamnophis gigas*	77%	0.4%	70%	7%
R094	SANDSTONE NIGHT LIZARD	*Xantusia gracilis*	54%	0%	74%	0%
R105	NORTHERN THREE-LINED BOA	*Lichanura orcutti*	31%	19%	42%	23%

Looking at the future climate trajectories separately, more than twice as many species are predicted to see high climate exposure impacts across the majority of their suitable habitat at the end of the century in a warmer and wetter scenario (n=48) than in a hotter and drier scenario (n=20; Appendix C). If non-analog projections are also included, this difference becomes three-fold (n=184 and n=62, respectively). However, with reduced emissions, this is reduced by an order of magnitude to 18 and 6 species, respectively. Similarly, the number of species with low climate exposure (i.e., refugia) throughout the majority of their suitable habitat is increased by an order of magnitude under reduced emissions.

Table 3. Count of species with different climate exposure impacts under four future climate scenarios. The table shows counts of the number of species for which the majority of the potentially suitable habitat within their range fall into three exposure categories: high exposure, high exposure or non-analog, and low exposure (refugia). Results are shown for a hotter and drier (MIROC_ESM, denoted as HotDry) and warmer and wetter (CNRM_5, denoted as WarmWet) future climate scenario, and for an unmitigated, high emissions scenario (rcp 8.5), and a reduced emissions scenario (rcp 4.5). All results are for the end of the century (2070-2099).

	HotDry low emissions	**HotDry high emissions**	**WarmWet low emissions**	**WarmWet high emissions**
Majority of habitat is high exposure	17	18	5	48
Majority of habitat is high exposure or non-analog	18	62	6	184
Majority of habitat is refugia	231	22	303	7

For twenty-five species, low climate impacts, or in other words areas that may represent vegetation climate refugia, are predicted across the majority of potentially suitable habitat in one or more future climate trajectories (Table 4). The majority of suitable habitat is refugia regardless of climate trajectory for only four of these species: Cascades Frog (*Rana cascadae*), Santa Lucia Mountains

Slender Salamander (*Batrachoseps luciae*), Lesser Slender Salamander (*Batrachoseps minor*), and San Simeon Slender Salamander (*Batrachoseps incognitus*). Interestingly, three of these four species were previously identified as climate vulnerable, and all have relatively small distributions.

Table 4. Twenty-five species for which low climate exposure is predicted across the majority of potential suitable habitat. Low climate exposure is defined as areas where the climate is expected to remain within the known climate envelope of the habitat type (Thorne et al. 2016) and may function as habitat refugia. Species denoted with an asterisk in the CWHR ID column have been identified as climate vulnerable in other studies (Gardali et al. 2012, Wright et al. 2013, CDFW 2015, Stewart et al. 2016).

CWHR ID	Common Name	Species Scientific Name	HotDry	WarmWet
A002	NORTHWESTERN SALAMANDER	*Ambystoma gracile*	55%	25%
A003*	LONG-TOED SALAMANDER	*Ambystoma macrodactylum*	45%	53%
A005**	SOUTHERN TORRENT SALAMANDER	*Rhyacotriton variegatus*	53%	27%
A010	DEL NORTE SALAMANDER	*Plethodon elongatus*	55%	37%
A011	SISKIYOU MOUNTAINS SALAMANDER	*Plethodon stormi*	50%	47%
A020	BLACK SALAMANDER	*Aneides flavipunctatus*	52%	30%
A026*	COASTAL TAILED FROG	*Ascaphus truei*	54%	37%
A042*	CASCADES FROG	*Rana cascadae*	59%	58%
A048	COASTAL GIANT SALAMANDER	*Dicamptodon tenebrosus*	62%	40%
A056	GABILAN MOUNTAINS SLENDER SALAMANDER	*Batrachoseps gavilanensis*	46%	66%
A057	SANTA LUCIA MOUNTAINS SLENDER SALAMANDER	*Batrachoseps luciae*	74%	74%
A058*	LESSER SLENDER SALAMANDER	*Batrachoseps minor*	56%	68%
A059*	SAN SIMEON SLENDER SALAMANDER	*Batrachoseps incognitus*	73%	84%
B136	RUFFED GROUSE	*Bonasa umbellus*	64%	48%
B396*	BENDIRE'S THRASHER	*Toxostoma bendirei*	62%	0.01%
M071	ROCK SQUIRREL	*Otospermophilus variegatus*	63%	0.02%
M073	MOHAVE GROUND SQUIRREL	*Xerospermophilus mohavensis*	60%	10%
M082	TOWNSEND'S POCKET GOPHER	*Thomomys townsendii*	64%	1%
M100	CHISEL-TOOTHED KANGAROO RAT	*Dipodomys microps*	54%	15%
M107	PANAMINT KANGAROO RAT	*Dipodomys panamintinus*	55%	16%

CWHR ID	Common Name	Species Scientific Name	HotDry	WarmWet
M129	CALIFORNIA RED-BACKED VOLE	*Myodes californicus*	52%	41%
M159*	WOLVERINE	*Gulo gulo*	36%	51%
R041*	PANAMINT ALLIGATOR LIZARD	*Elgaria panamintina*	63%	21%
R069	SMITH'S BLACK-HEADED SNAKE	*Tantilla hobartsmithi*	59%	18%
R078	AQUATIC GARTERSNAKE	*Thamnophis atratus*	52%	39%

Near-term results

Even with a mitigated emissions scenario, the climate exposure models indicated that some habitats in California may experience high climate-driven impacts due to hotter and drier conditions within the next two decades. For 22 terrestrial species in California, 20% or more of their existing suitable natural habitat is projected to experience high climate exposure over the next two decades if conditions are warmer and drier (Table 5). These species were primarily distributed in forested habitats on the North Coast; but others occurred in grasslands, wet meadows, and riparian areas in the Sierra Nevada and Cascades, and in the mountains of southern California. Only three of the 22 species were previously identified as climate vulnerable.

The two species with the greatest percentage of high climate exposure within their habitats were Dunn's Salamander (*Plethodon dunni*; Figure 1) and Southern California Slender Salamander (*Batrachoseps major*; Figure 2). For both of those species, more than half of their potentially suitable natural habitat may be highly impacted by warmer and drier conditions, which could result in significant impacts to the populations. Townsend's Mole (*Scapanus townsendii*; Figure 3) and Townsend's Vole (*Microtus townsendii*; Figure 4), also show high climate exposure in >50% of their natural habitat, but these species also occur in cropland, pasture, and irrigated hayfields, which were not included in the vegetation climate vulnerability models, and may allow species to persist even in the face of climate change due to irrigation and management (Morelli et al. 2017). An additional 18 species had high climate exposure predicted in 20-50% of their distribution area.

Of these 22 species, 16 occur on the North Coast, where high climate exposure was predicted across many habitat types. Two North Coast species had previously been identified as drought response priorities (CDFW 2016), Dunn's Salamander (Figure 1) and Northern Red-legged Frog (Figure 5). Dunn's Salamander has also been identified as climate vulnerable. The six species not occurring in the North Coast occurred in southern California mountain and desert habitats, and in the Sierra Nevada and Southern Cascades: Southern California Slender Salamander (Figure 2), White-eared Pocket Mouse (Figure 6), Mazama Pocket Gopher (Figure 7), San Gabriel Slender Salamander (Figure 8), Switak's Banded Gecko (Figure 9), and Vagrant Shrew (Figure 10).

Aquatic species may be particularly sensitive to a drought conditions. Almost half of the drought priority species previously identified are aquatic (CDFW 2016), and one third of the aquatic species in this analysis are among that list (CDFW 2016). An additional three aquatic species had not been identified as drought priority species but were identified by this analysis as having relatively high (>20%) near-term habitat climate exposure risk (Table 5): Northwestern Gartersnake, Pacific Treefrog, and Northwestern Salamander. All three of these species occur along the north coast of California.

Narrowly distributed species may also be particularly sensitive to habitat impacts caused by drought or climate change because the availability of their suitable habitat is already limited. A third (n=5) of the species that occupy a narrow range of habitats within their distribution were also previously identified as high priority drought species, and one additional species with a narrow range of habitats (Pacific Jumping Mouse) was identified as having relatively high near-term habitat climate exposure risk (Table 5). Pacific Jumping Mouse occurs on the north coast. Of the twenty-two species with <100,000 acres of absolute mapped suitable habitat in California, all occur in habitats with a mid-high to high overall climate vulnerability rank (Appendix A) or are predicted to experience high habitat climate exposure by the end of the century (Appendix C).

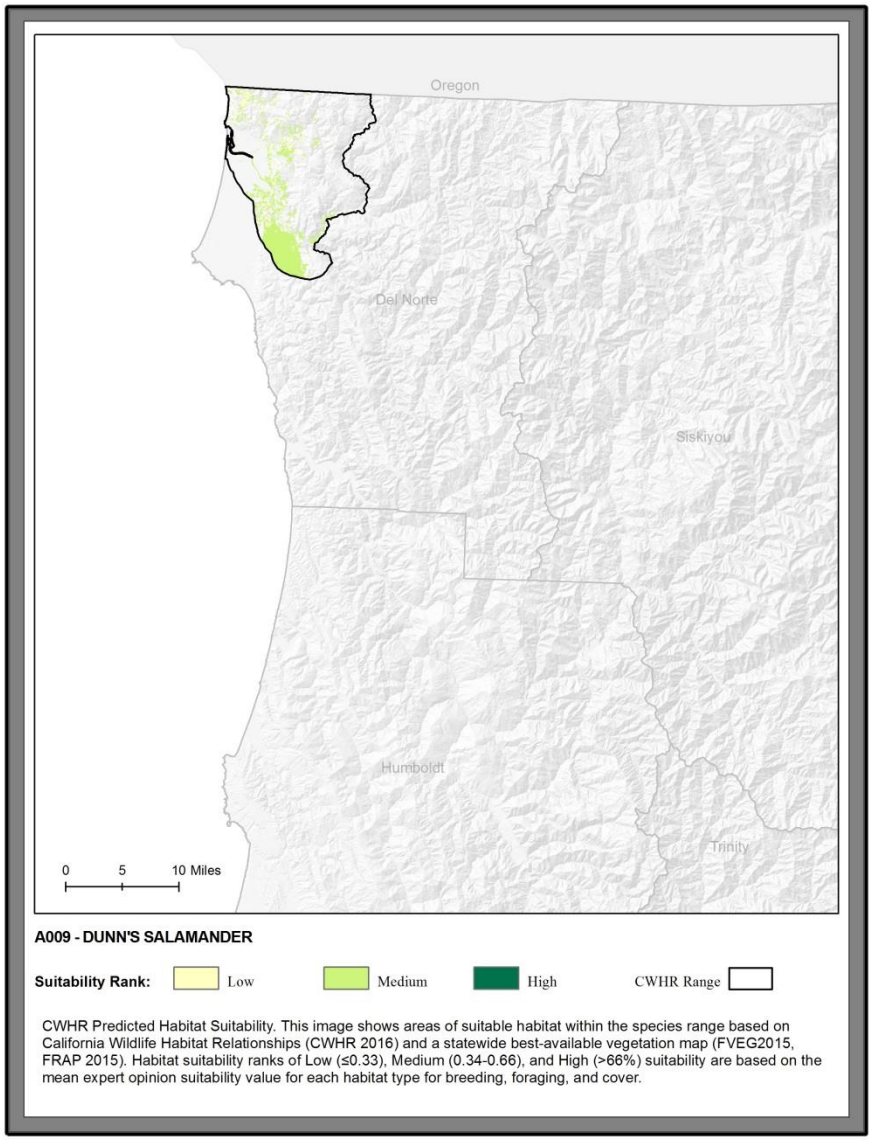
Table 5. List of twenty-two species with the greatest predicted climate impacts to habitat under near-term warmer and drier conditions. High exposure (>95 based on Thorne et al. 2016) is predicted across greater than 20% of the modeled natural suitable habitat within each species' range based on near-term, hotter and drier (GCM=MIROC_ESM) climate projections (2010-2039) under a low emissions scenario (rcp 4.5). The table indicates which of these species have been identified as drought priority (CDFW 2016) or climate vulnerable (Gardali et al. 2012, Wright et al. 2013, CDFW 2015, Stewart et al. 2016). Species for which the drought priority, climate vulnerable, or aquatic taxon is a subspecies or Distinct Population Segment are denoted with an asterisk. Aquatic species are those that require aquatic elements for any life stage. Narrowly distributed species are those for which <10% of range is suitable habitat or the total potential habitat <100,000 acres. All area estimates are rounded to the nearest 1000 acres.

CWHR ID	Scientific Name	Species Common Name	Climate Vulnerable	Drought Priority	Aquatic	Habitat Narrowly Distributed	Total range area (acres)	Area of suitable habitat within range (acres)	Percent natural habitat with high climate exposure
A009	*Plethodon dunni*	DUNN'S SALAMANDER	x	x		x	97,000	16,000	84%
M016	*Scapanus townsendii*	TOWNSEND'S MOLE					1,042,000	130,000	80%
M135	*Microtus townsendii*	TOWNSEND'S VOLE					778,000	133,000	52%
A013	*Batrachoseps major*	SOUTHERN CALIFORNIA SLENDER SALAMANDER		x*		x	4,050,000	114,000	50%
M058	*Tamias siskiyou*	SISKIYOU CHIPMUNK					1,377,000	559,000	49%
R064	*Thamnophis ordinoides*	NORTHWESTERN GARTERSNAKE			x	x	301,000	74,000	45%

CWHR ID	Scientific Name	Species Common Name	Climate Vulnerable	Drought Priority	Aquatic	Habitat Narrowly Distributed	Total range area (acres)	Area of suitable habitat within range (acres)	Percent natural habitat with high climate exposure
A039	*Pseudacris regilla*	PACIFIC TREEFROG			x		1,146,000	1,121,000	44%
A021	*Aneides ferreus*	CLOUDED SALAMANDER					1,083,000	818,000	44%
M017	*Scapanus orarius*	COAST MOLE					2,934,000	612,000	37%
M089	*Perognathus alticolus*	WHITE-EARED POCKET MOUSE					667,000	141,000	33%
A010	*Plethodon elongatus*	DEL NORTE SALAMANDER					2,140,000	1,618,000	31%
M137	*Microtus oregoni*	CREEPING VOLE					8,577,000	1,642,000	30%
M084	*Thomomys mazama*	MAZAMA POCKET GOPHER					6,583,000	984,000	27%
A053	*Batrachoseps gabrieli*	SAN GABRIEL SLENDER SALAMANDER					373,000	101,000	25%
A040	*Rana aurora*	NORTHERN RED-LEGGED FROG	x	x	x		2,971,000	2,772,000	25%

CWHR ID	Scientific Name	Species Common Name	Climate Vulnerable	Drought Priority	Aquatic	Habitat Narrowly Distributed	Total range area (acres)	Area of suitable habitat within range (acres)	Percent natural habitat with high climate exposure
M131	*Arborimus albipes*	WHITE-FOOTED VOLE					1,005,000	291,000	25%
R007	*Coleonyx switaki*	SWITAK'S BANDED GECKO					407,000	243,000	22%
B355	*Poecile atricapillus*	BLACK-CAPPED CHICKADEE					3,112,000	957,000	22%
A002	*Ambystoma gracile*	NORTHWESTERN SALAMANDER			x		4,018,000	3,334,000	21%
M144	*Zapus trinotatus*	PACIFIC JUMPING MOUSE				x	3,226,000	244,000	20%
B136	*Bonasa umbellus*	RUFFED GROUSE					6,701,000	5,158,000	20%
M003	*Sorex vagrans*	VAGRANT SHREW	x*		x*		19,092,000	7,090,000	20%

Figure 1. CWHR distribution and climate exposure results for Dunn's salamander (*Plethodon dunni*).



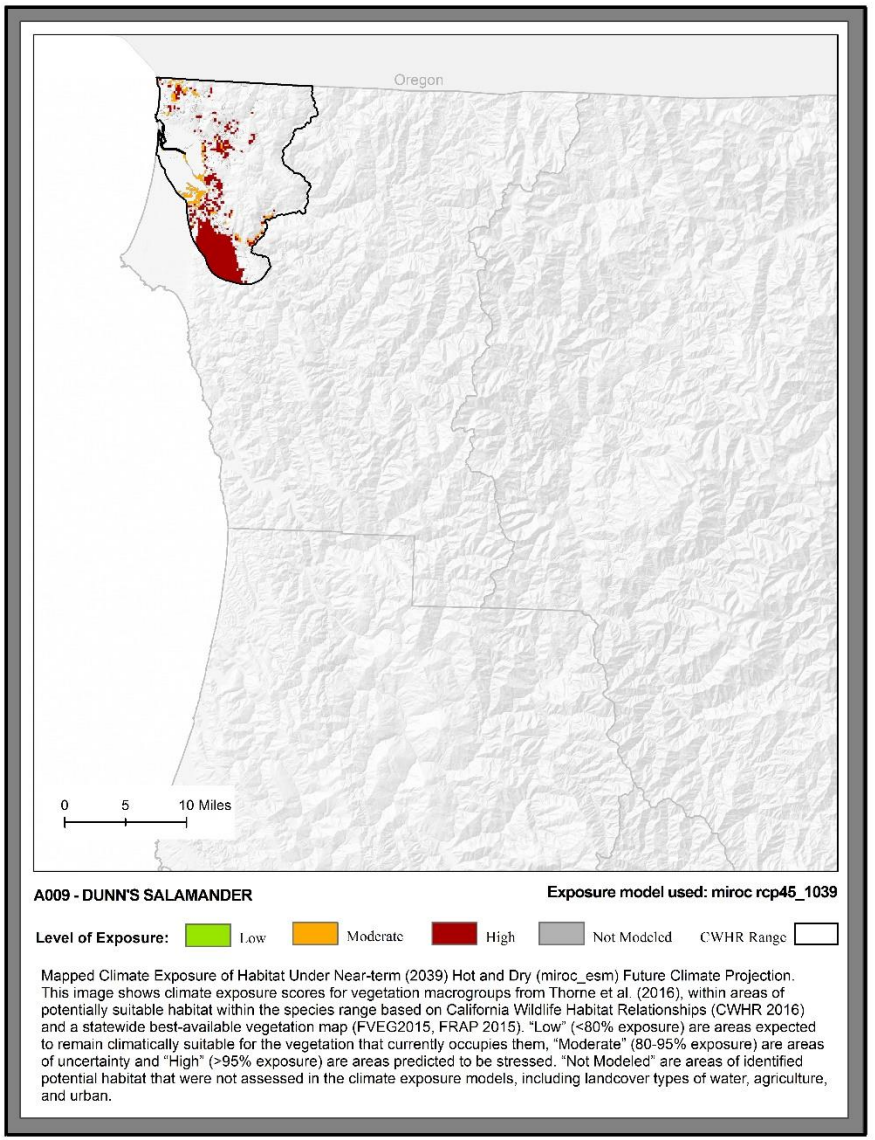
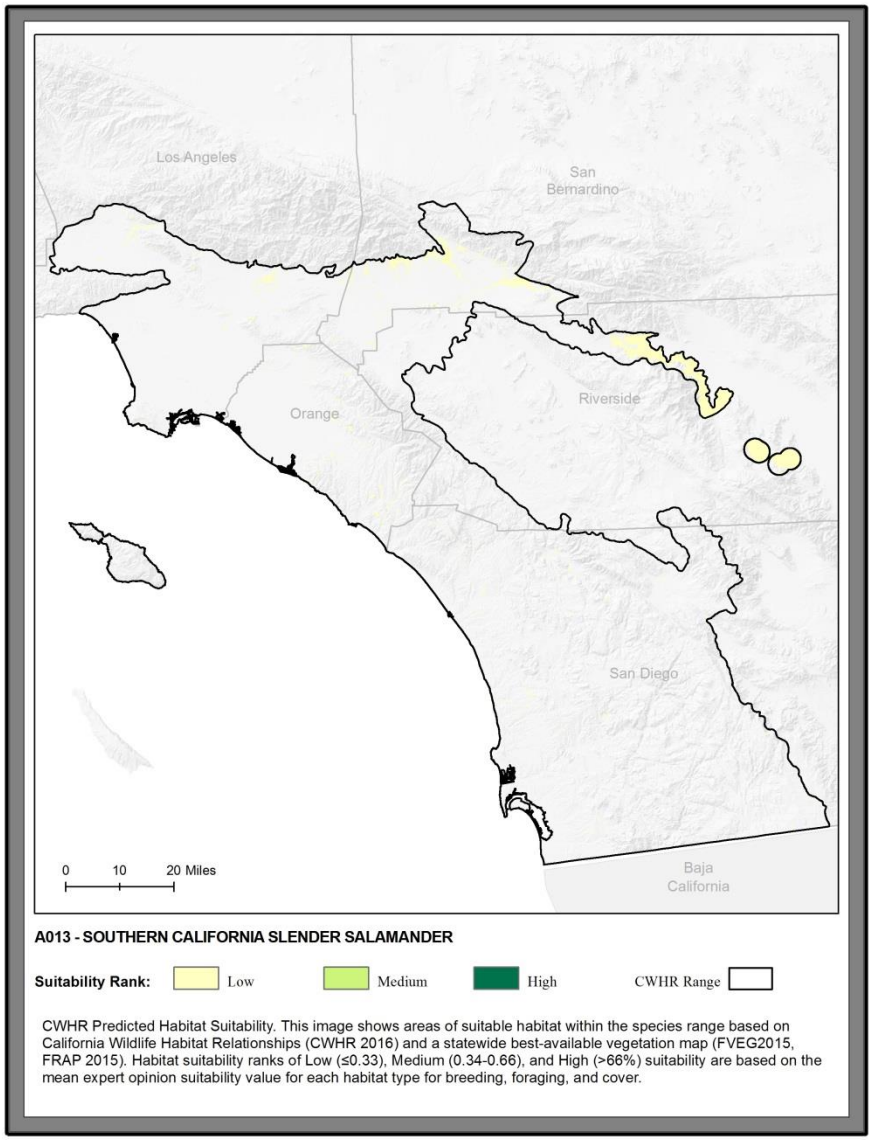


Figure 2. CWHR distribution and climate exposure results for Southern California Slender Salamander (Batrachoseps major).



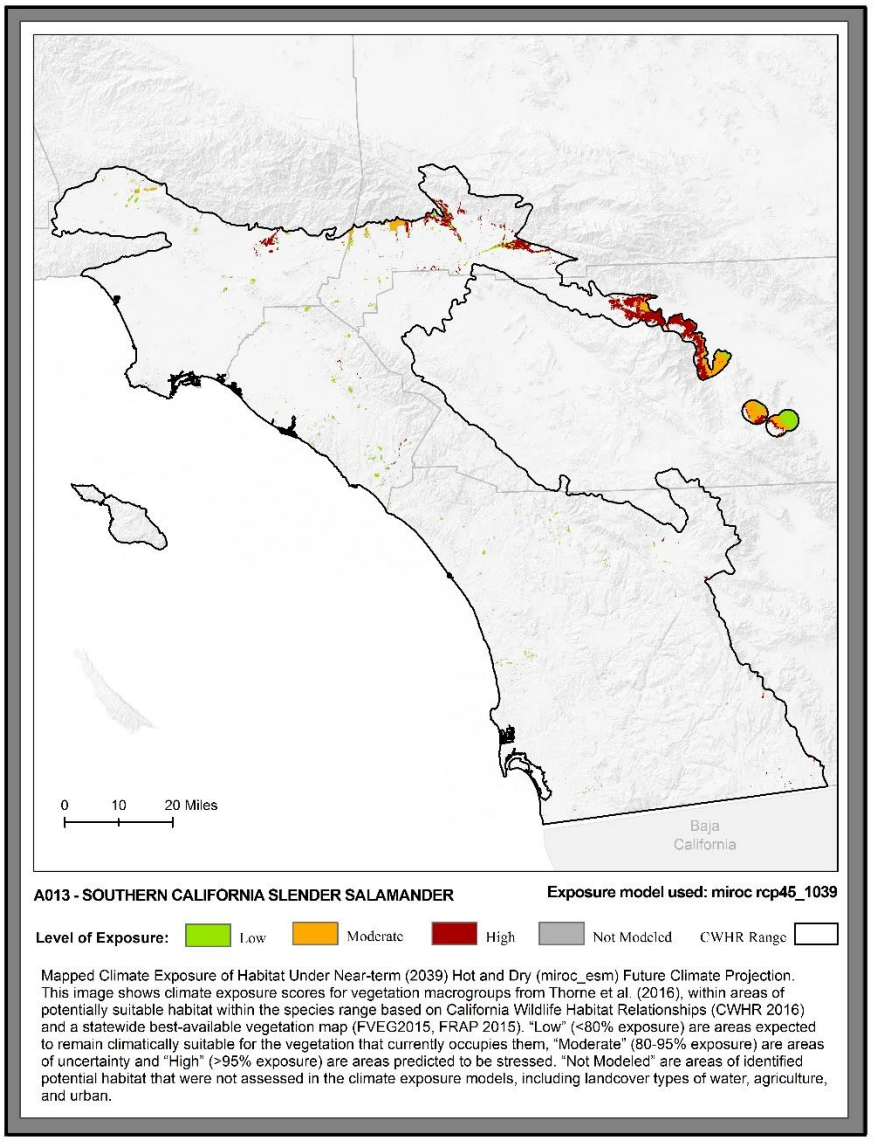
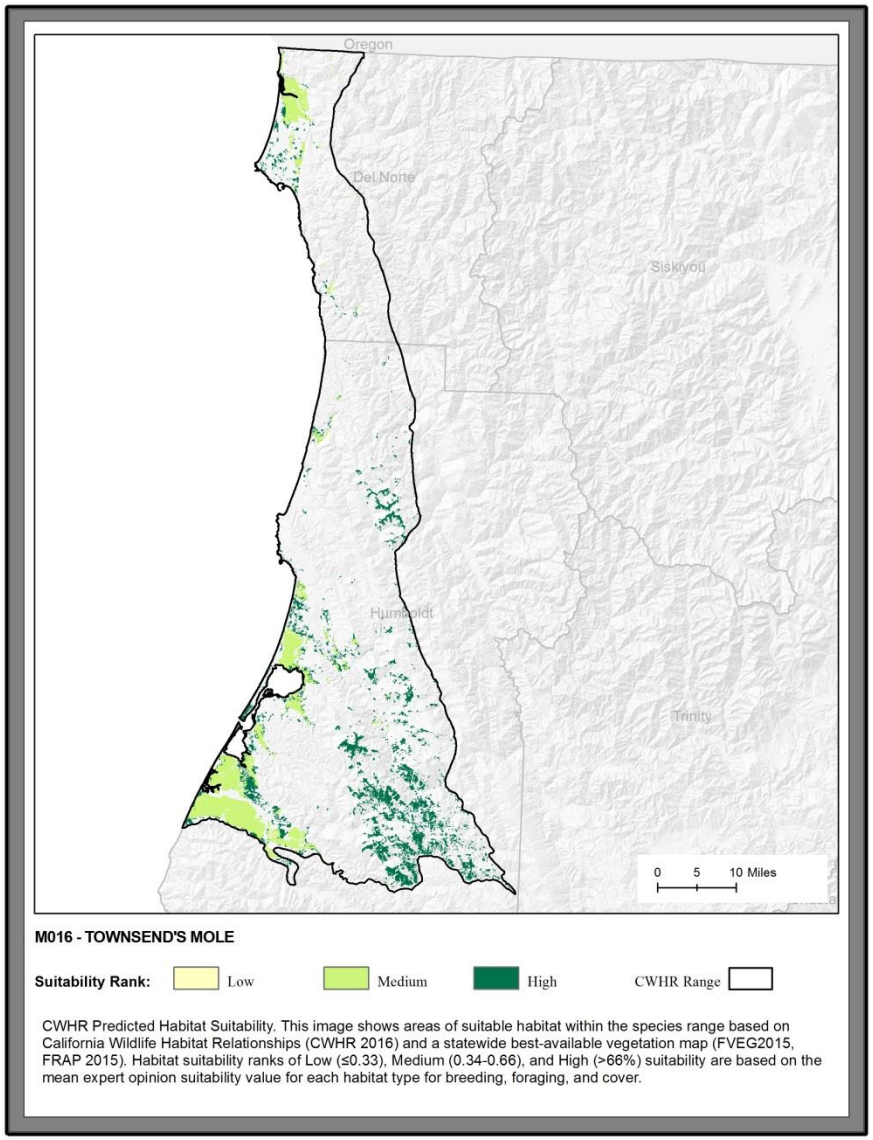


Figure 3. CWHR distribution and climate exposure results for Townsend's Mole *(Scapanus townsendii)*.



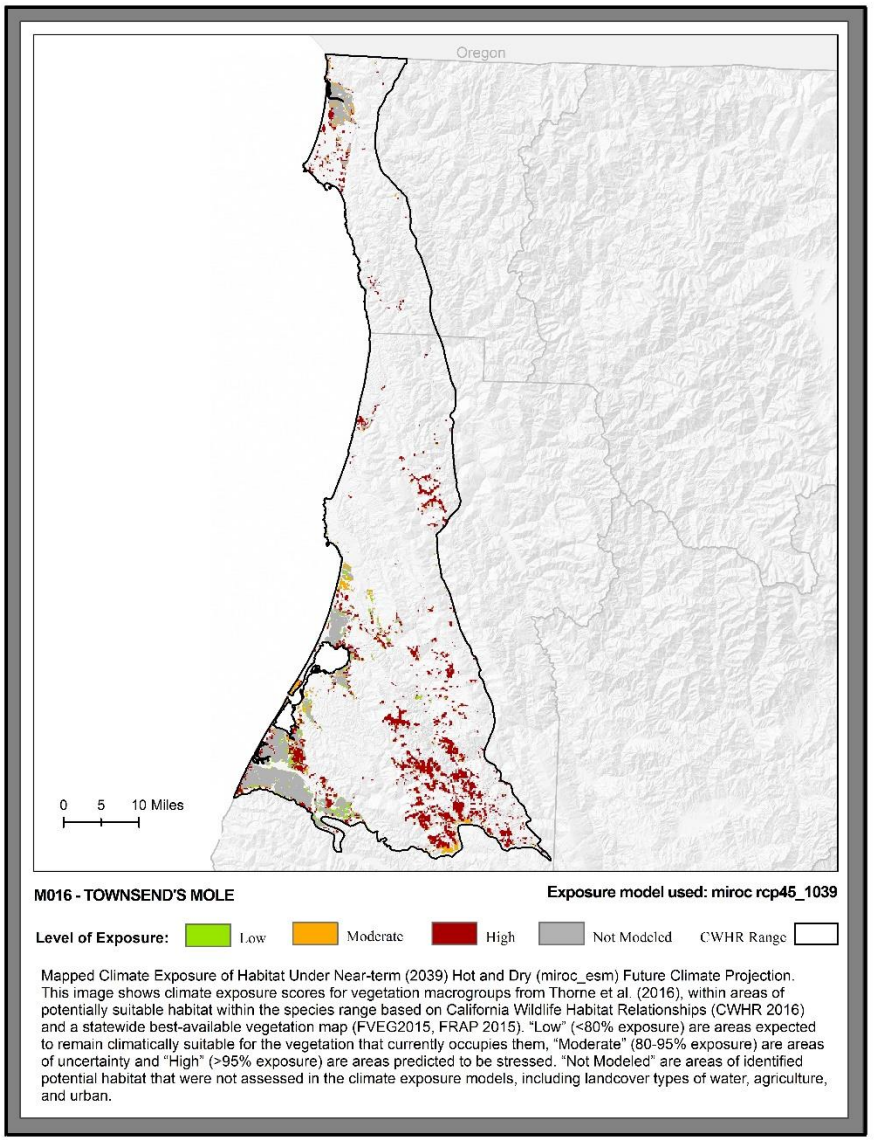
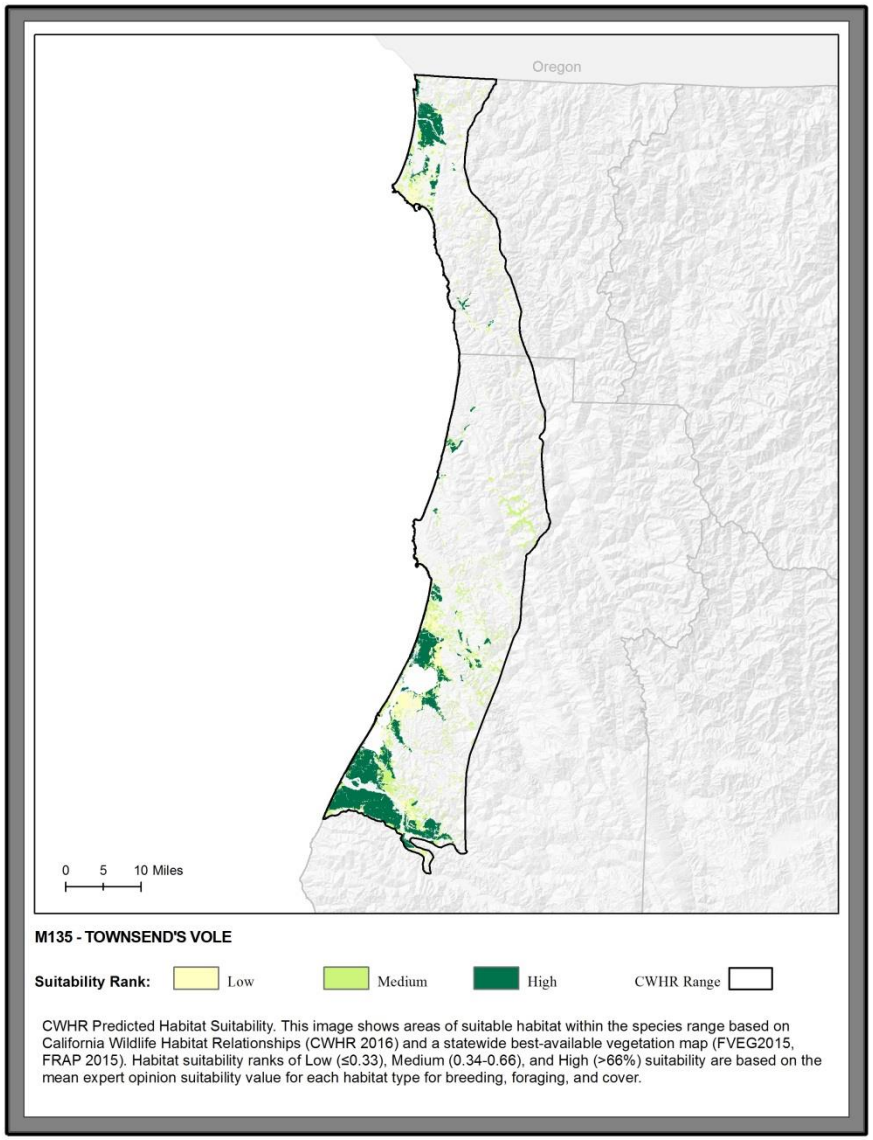


Figure 4. CWHR distribution and climate exposure results for Townsend's Vole (*Microtus townsendii*).



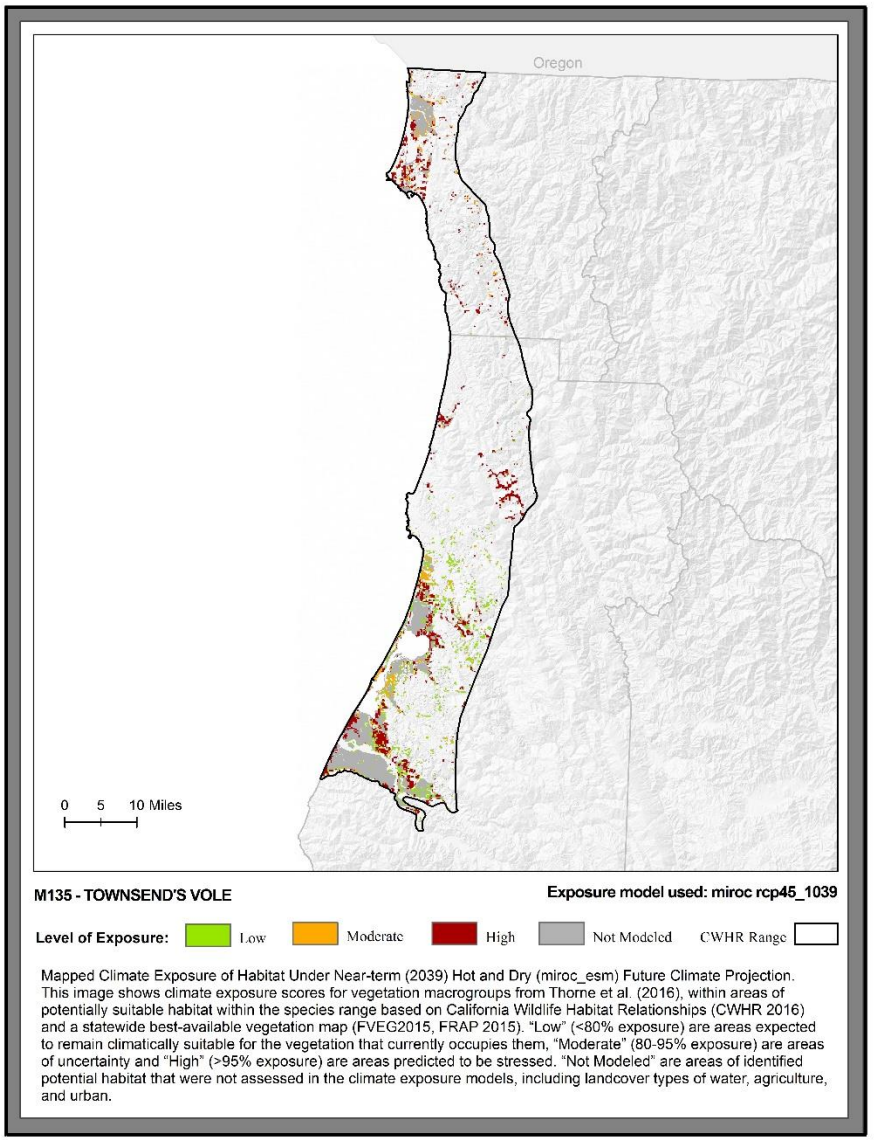
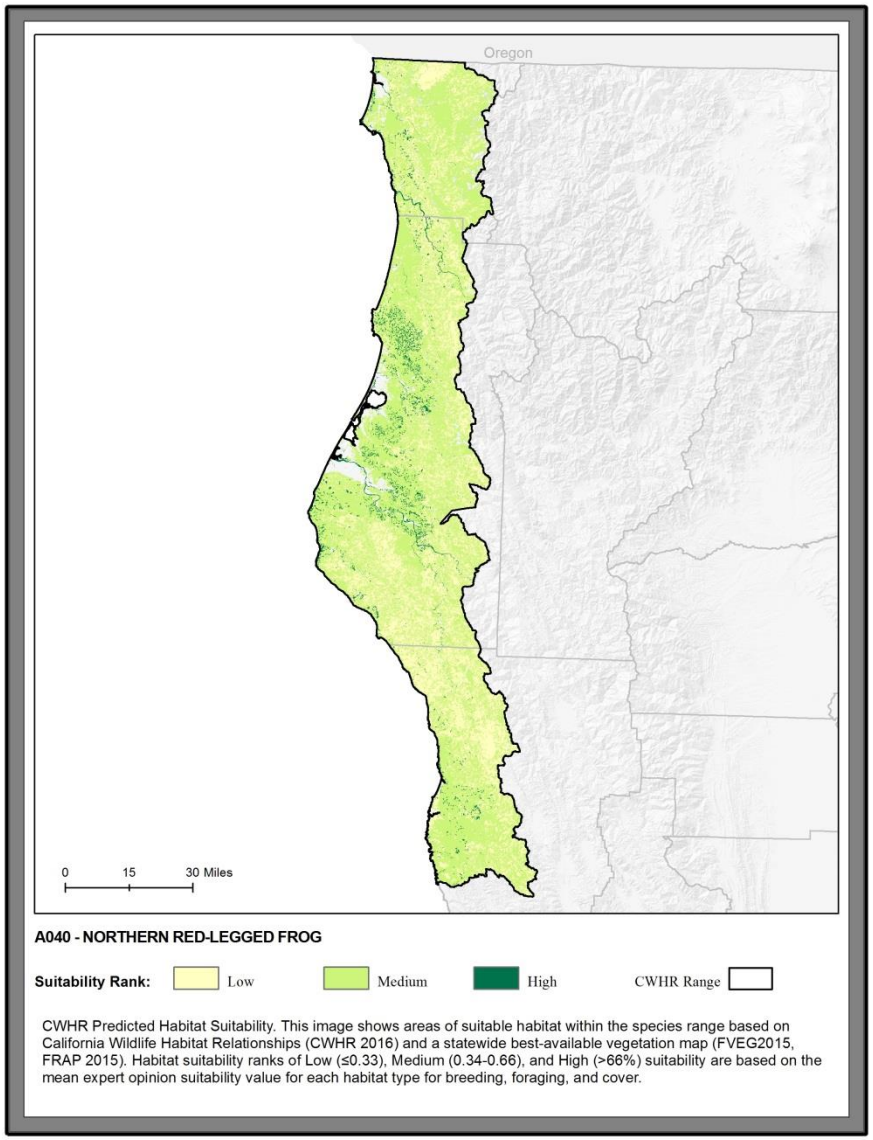


Figure 5. CWHR distribution and climate exposure results for Northern Red-legged Frog (*Rana aurora*).



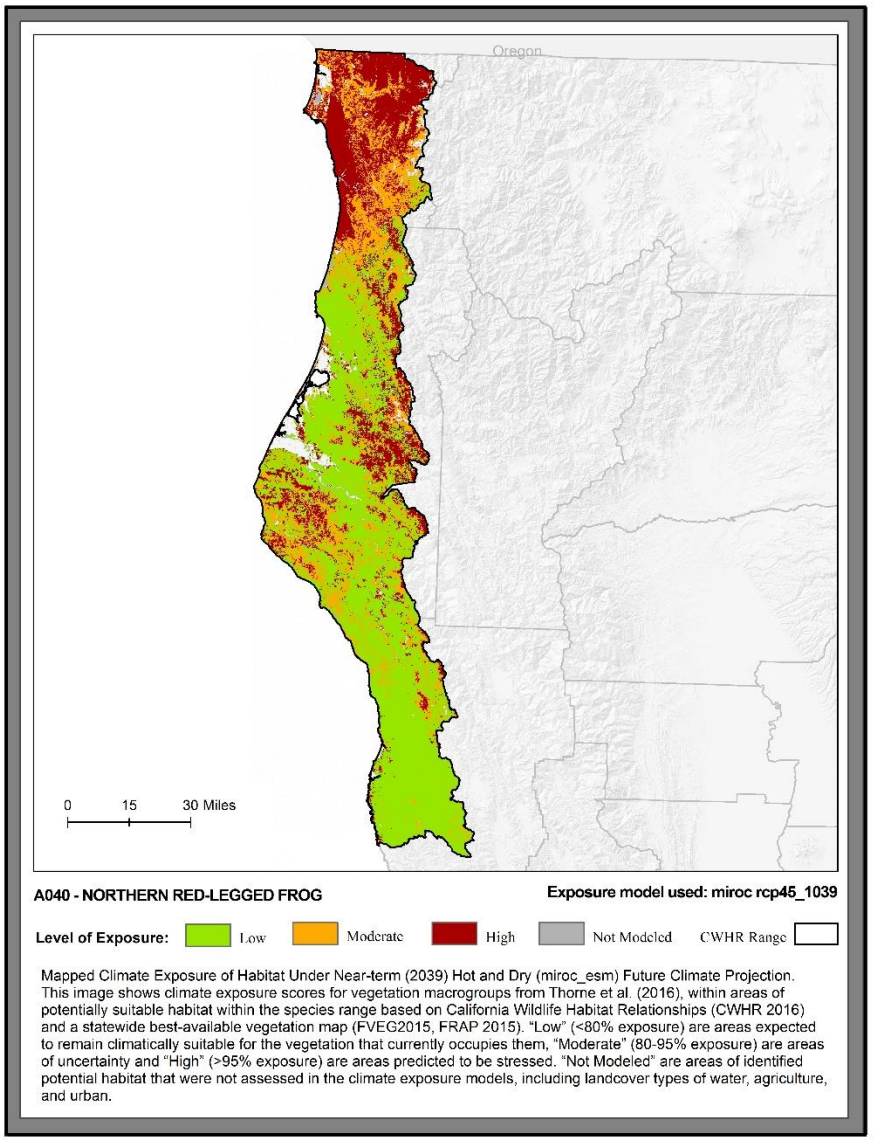
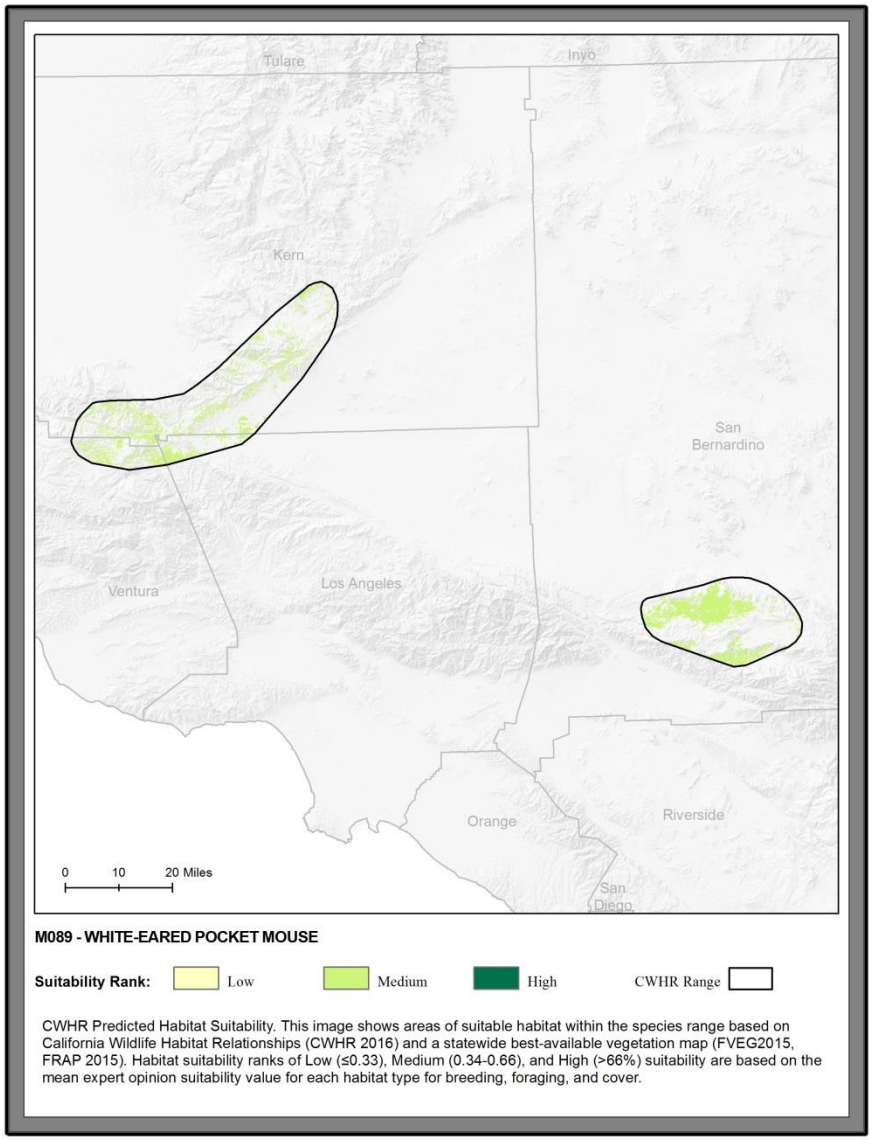


Figure 6. CWHR distribution and climate exposure results for White-eared Pocket Mouse (*Perognathus alticolus*).



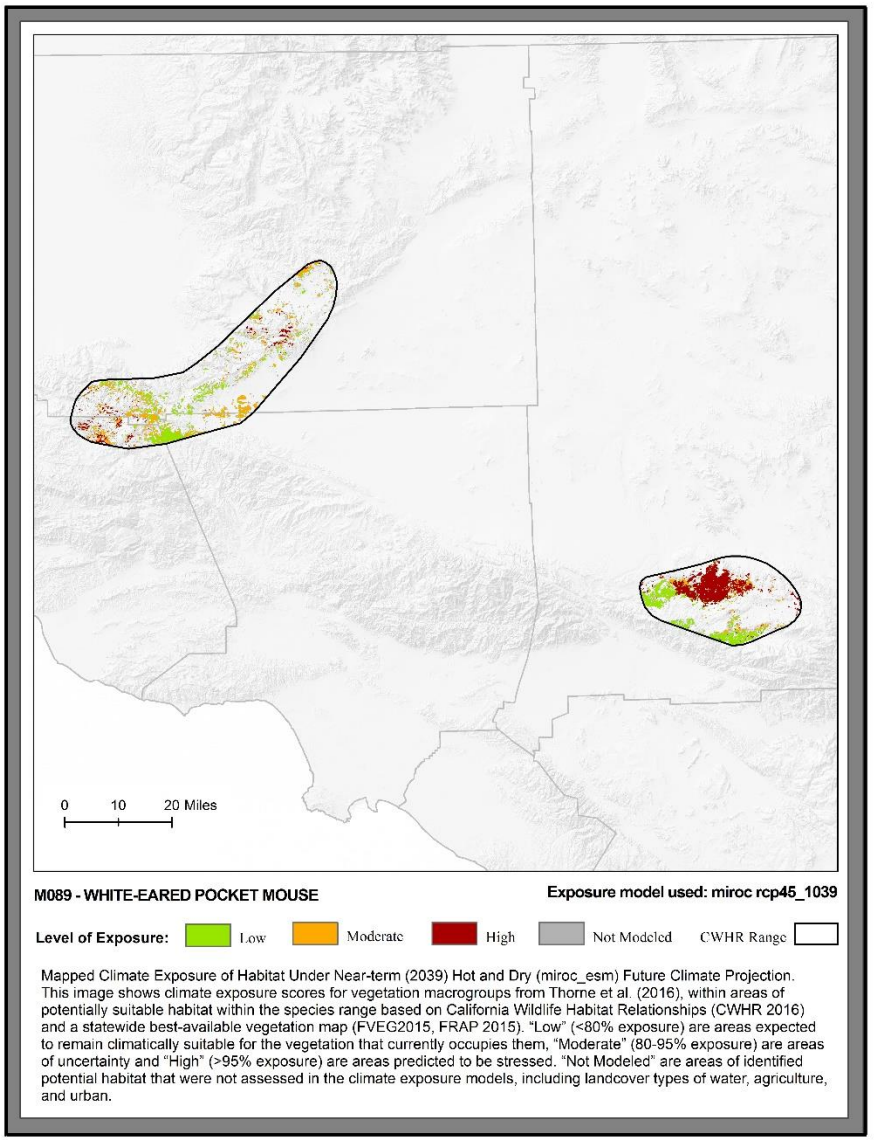
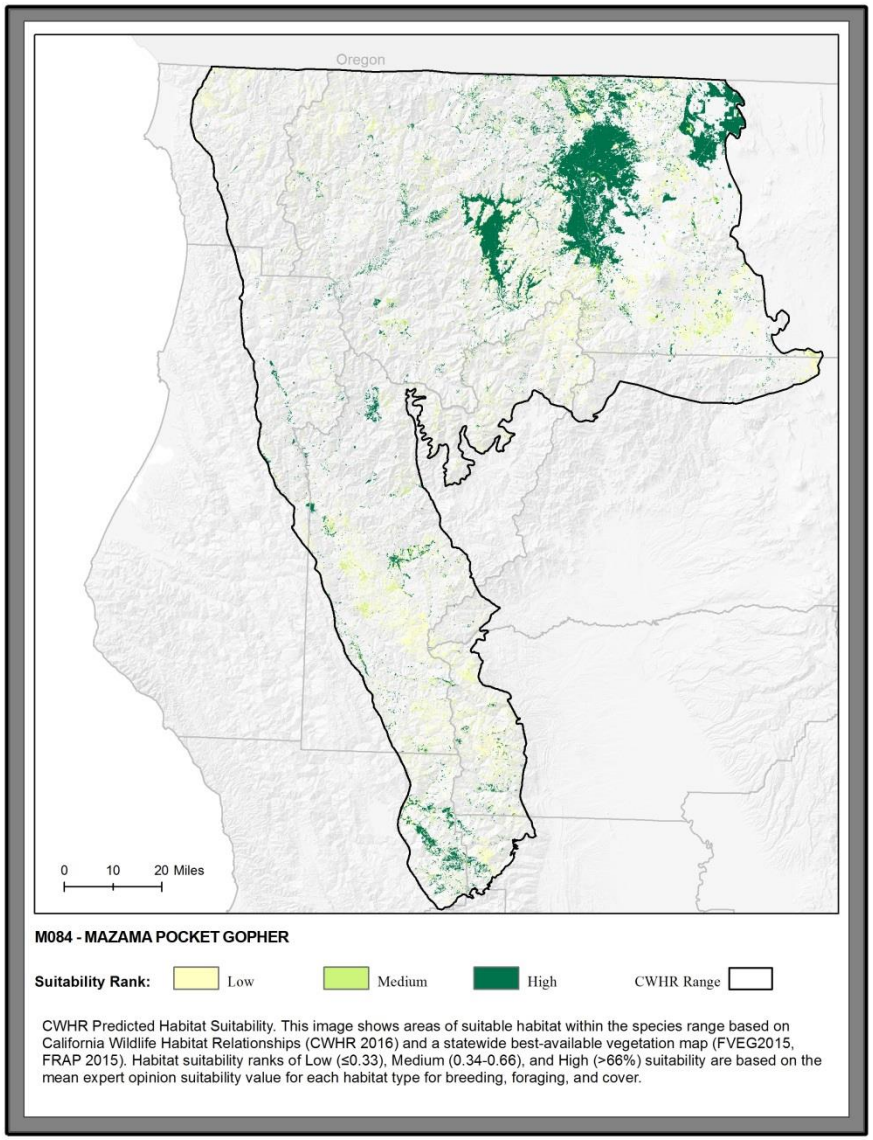


Figure 7. CWHR distribution and climate exposure results for Mazama Pocket Gopher (*Thomomys mazama*).



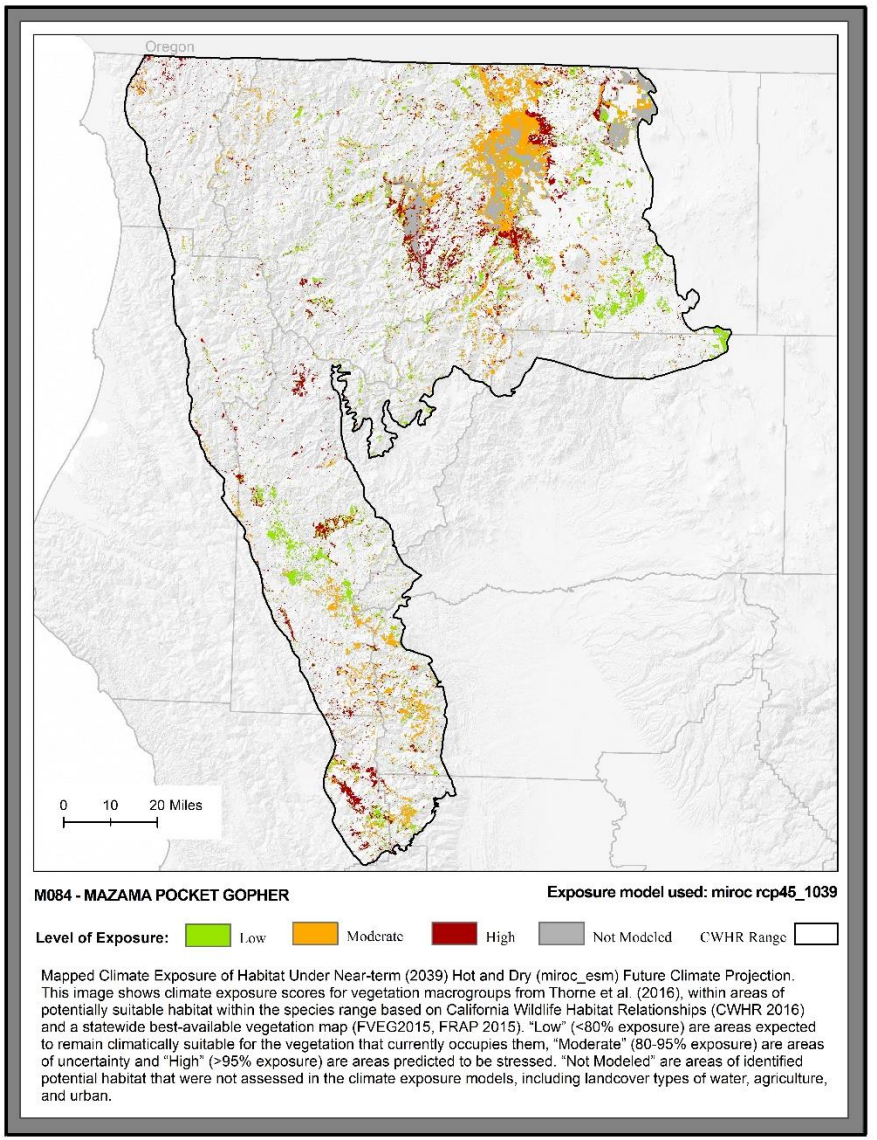
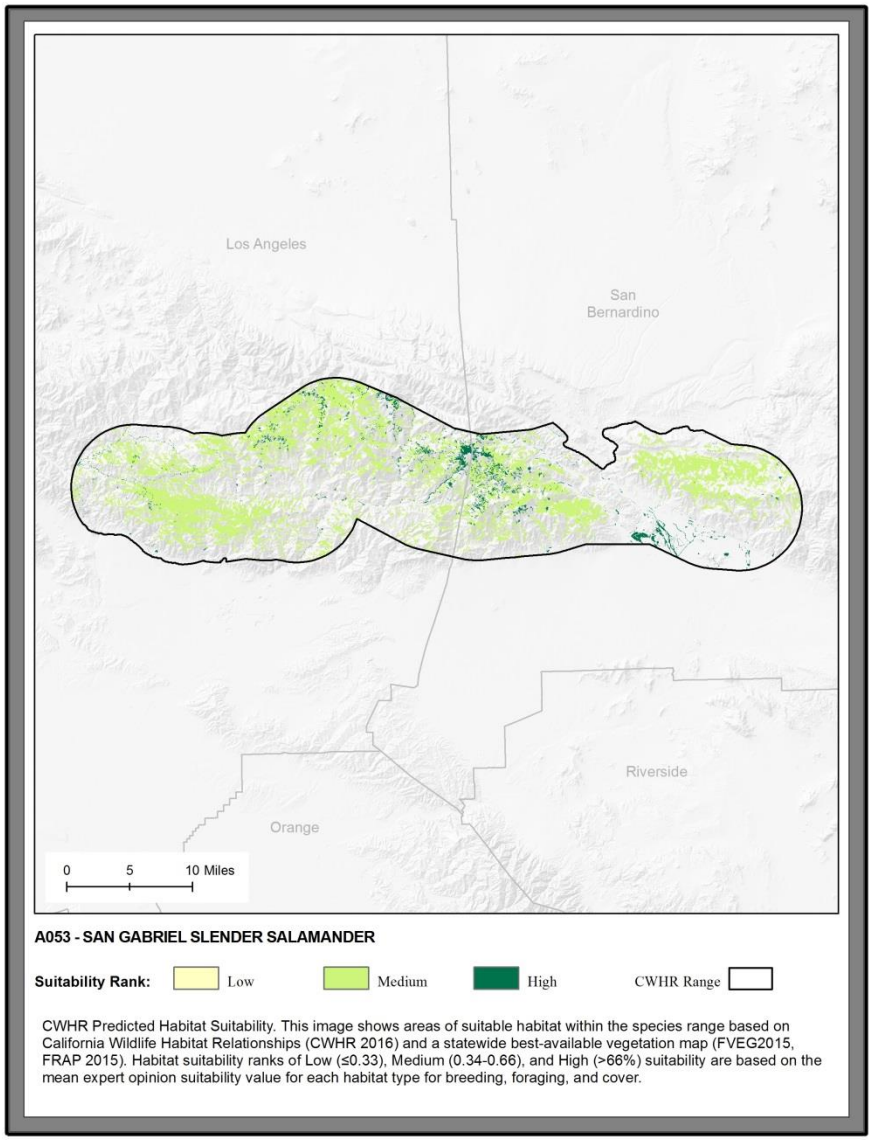


Figure 8. CWHR distribution and climate exposure results for San Gabriel Slender Salamander (*Batrachoseps gabrieli*).



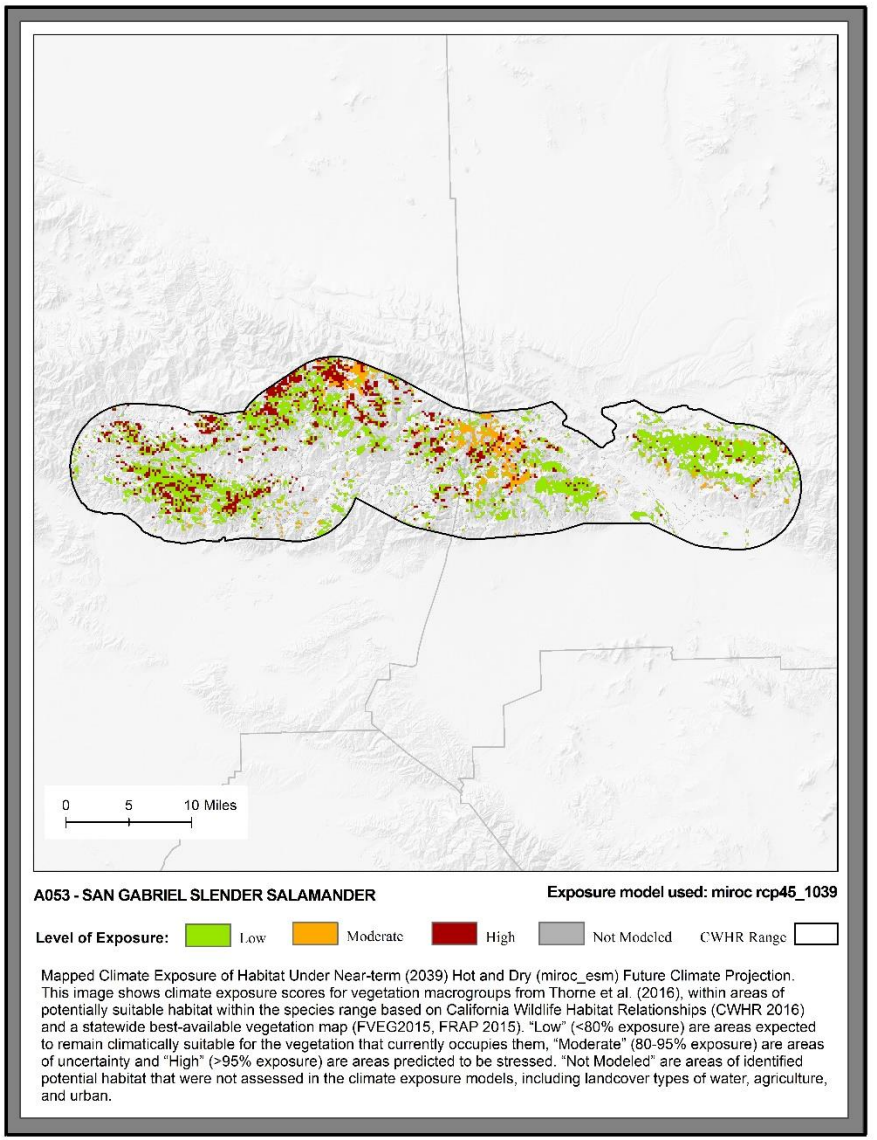
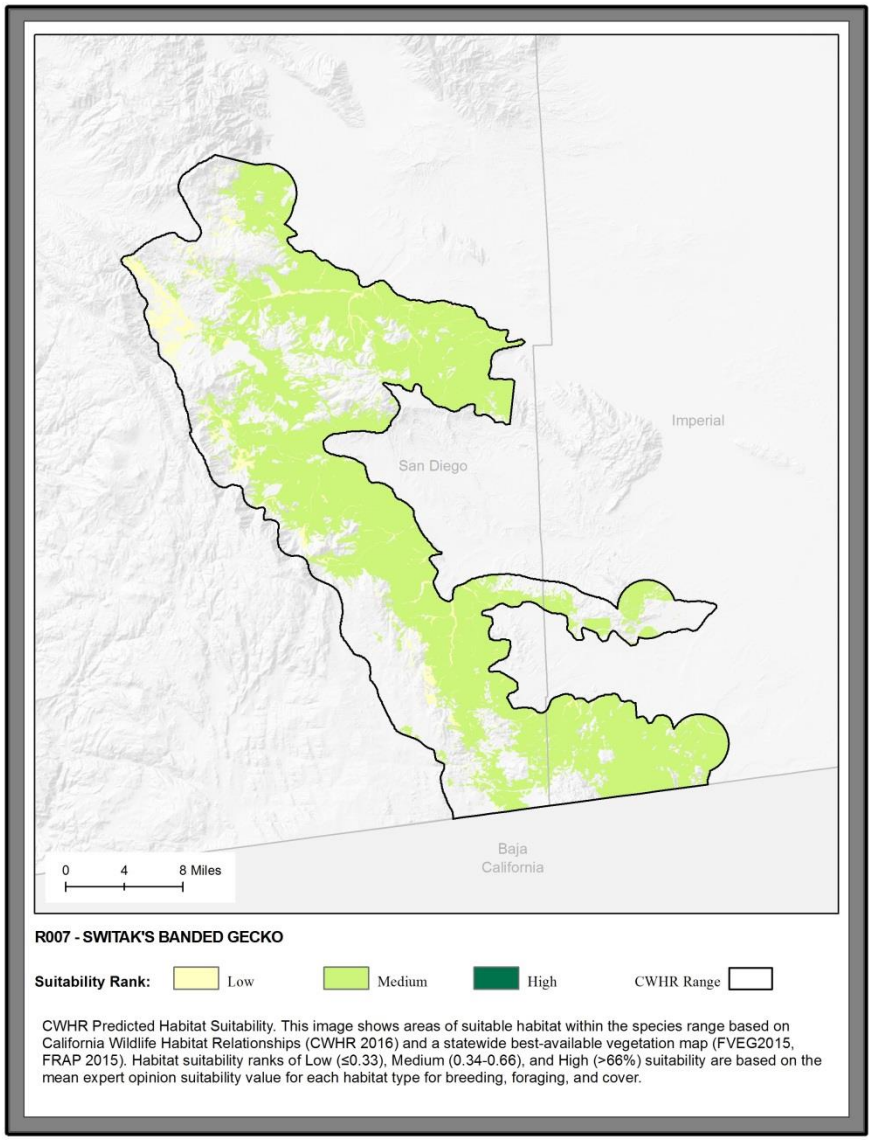


Figure 9. CWHR distribution and climate exposure results for Switak's Banded Gecko (*Coleonyx switaki*).



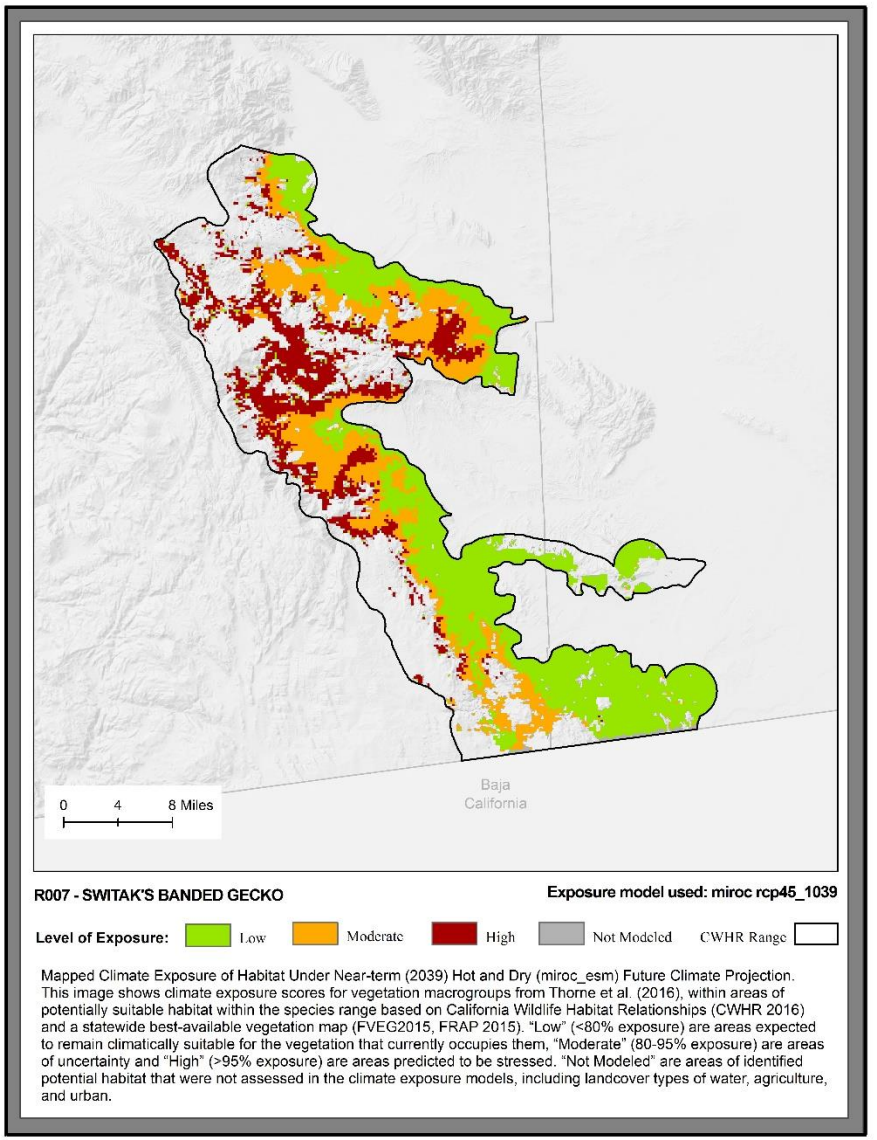
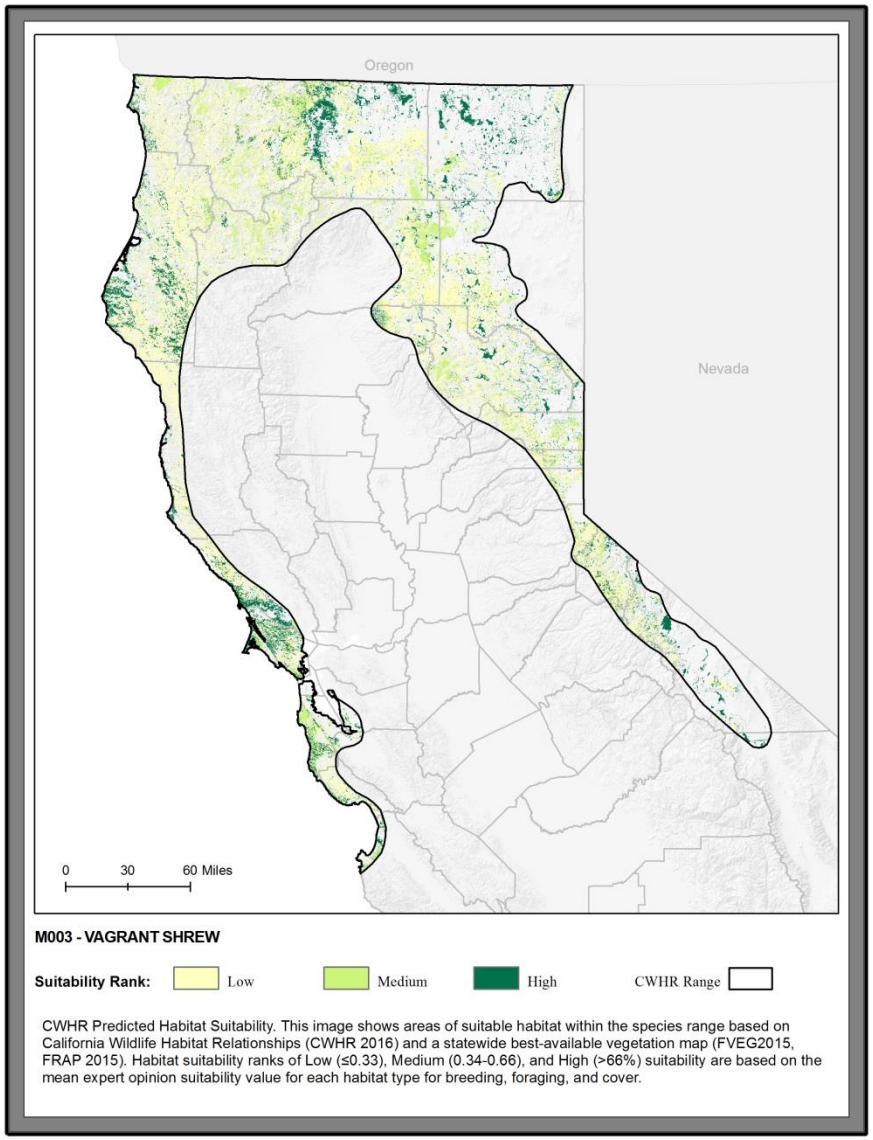
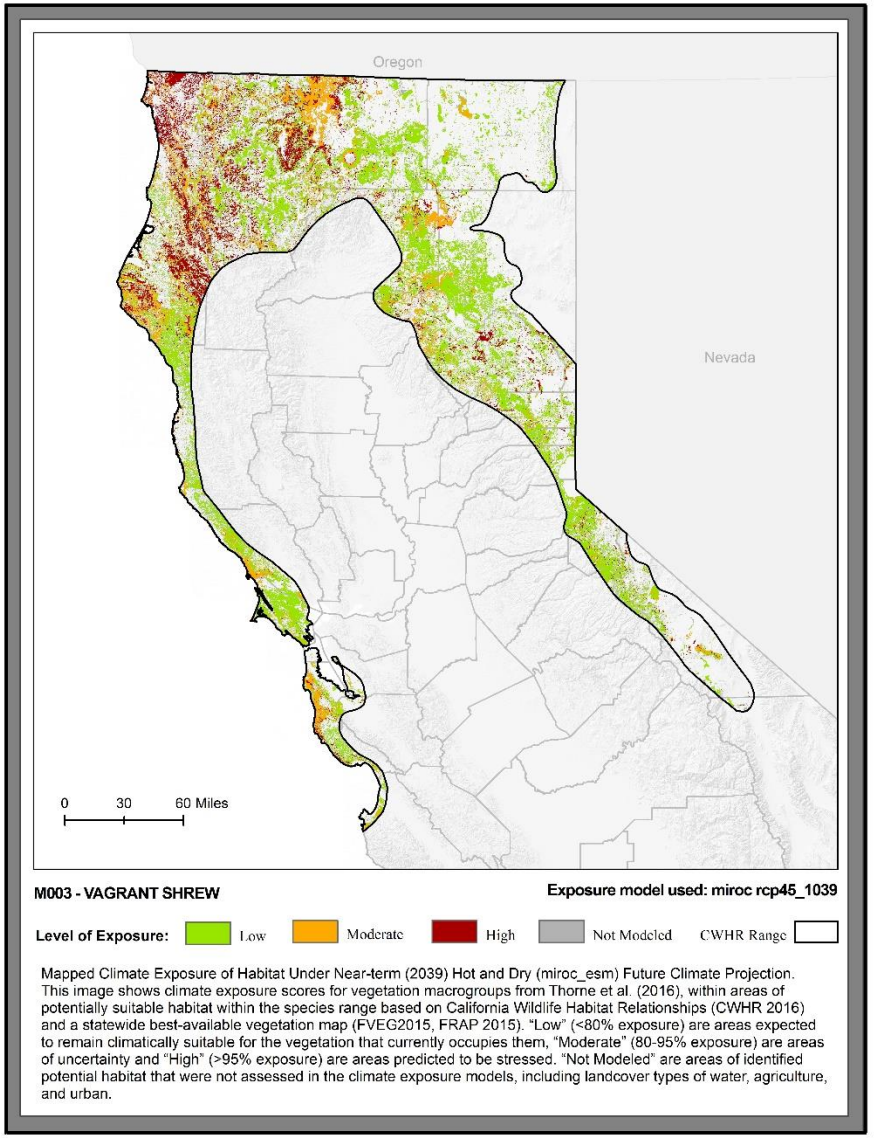


Figure 10. CWHR distribution and climate exposure results for Vagrant Shrew (*Sorex vagrans*).





Results for habitat specialists

We identified habitat specialist species that rely on habitats that may be particularly vulnerable to climate change. We defined habitat specialists as species for which >50% of their high suitability habitat is generally of a single type, and for which <6 total habitat types have any habitat suitability rating.

The Vegetation Climate Vulnerability Analysis (Thorne et al. 2016) provides information on habitats that have overall high climate change vulnerability when sensitivity and adaptive capacity are considered in conjunction with the exposure results. Sensitivity and adaptive capacity are based on life history traits (e.g., dispersal distance, fire response) of the dominant species (tree, shrub, or herb) that comprise each vegetation or habitat type. Incorporating information on sensitivity and adaptive capacity provides a more complete picture of potential climate change impacts by considering species-specific sensitivity and response to changes in temperature and precipitation.

We identified 24 vertebrate species that are habitat specialists in vegetation communities that are predicted to have mid-high to high vulnerability to climate change (Table 6), five of which had previously been identified as priority drought sensitive species, and nine of which had been previously identified as climate vulnerable. Habitat specialists were included in this list if their primary suitable habitat type was given a climate change vulnerability rank of mid-high or higher based on exposure, sensitivity, and adaptive capacity. An additional 65 species do not meet our definition of habitat specialists but the majority of their distribution area falls within habitats ranked as mid-high to highly vulnerable to climate change (Appendix A).

Table 6. List of twenty-four habitat specialist species that depend on habitats with mid-high to high vulnerability to climate change as identified in Thorne (2016). Habitat specialists were defined as species for which five or fewer CWHR habitat types are defined as highly suitable, and generally >50% of their high suitability habitat is of a single type (CDFW 2014). For species that had no CWHR habitats ranked as high suitability, habitats with medium suitability were used. Species that were previously identified as climate vulnerable (Gardali et al. 2012, Wright et al. 2013, CDFW 2015, Stewart et al. 2016) are denoted with an asterisk.

CWHR ID	Species Common Name	Primary CWHR Habitat Type	Primary Macrogroup Common Name	Primary Macrogroup Name	Mean Macrogroup Climate Vulnerability Rank
A001	CALIFORNIA TIGER SALAMANDER*	Annual Grassland	California Grassland and Flowerfields	California Annual and Perennial Grassland	Mid-High
A009	DUNN'S SALAMANDER*	Redwood	Pacific Northwest Conifer Forests	Vancouverian Rainforest	Mid-High
A031	BLACK TOAD*	Wet Meadow	Mountain Riparian Scrub and wet meadow; Wet Mountain Meadow	Western Cordilleran montane-boreal wet meadow; Western North America Wet Meadow and Low Shrub Carr	Mid-High
B137	GREATER SAGE-GROUSE*	Sagebrush	Big Sagebrush Scrub	Western North America Tall Sage Shrubland and Steppe	Mid-High
B259	YELLOW-BILLED CUCKOO*	Valley Foothill Riparian	American Southwest riparian forest and woodland	Southwestern North American Riparian, Flooded and Swamp Forest/Scrubland	Mid-High
B315	WILLOW FLYCATCHER	Wet Meadow	Mountain Riparian Scrub and wet meadow; Wet Mountain Meadow	Western Cordilleran montane-boreal wet meadow; Western North America Wet Meadow and Low Shrub Carr	Mid-High

CWHR ID	Species Common Name	Primary CWHR Habitat Type	Primary Macrogroup Common Name	Primary Macrogroup Name	Mean Macrogroup Climate Vulnerability Rank
B413	BELL'S VIREO*	Valley Foothill Riparian	American Southwest riparian forest and woodland	Southwestern North American Riparian, Flooded and Swamp Forest/Scrubland	Mid-High
B467	YELLOW-BREASTED CHAT	Valley Foothill Riparian	American Southwest riparian forest and woodland	Southwestern North American Riparian, Flooded and Swamp Forest/Scrubland	Mid-High
B501	GRASSHOPPER SPARROW	Annual Grassland	California Grassland and Flowerfields	California Annual and Perennial Grassland	Mid-High
M002	MT. LYELL SHREW*	Subalpine Conifer	Subalpine Aspen Forests & Pine Woodlands; Pacific Northwest Subalpine Forest	Rocky Mountain Subalpine and High Montane Conifer Forest; Vancouverian Subalpine Forest	Mid-High - High
M008	INYO SHREW	Pinyon-Juniper	Great Basin Pinyon-Juniper Woodland	Intermountain Basins Pinyon–Juniper Woodland	Mid-High
M044	PYGMY RABBIT	Sagebrush	Big Sagebrush Scrub	Western North America Tall Sage Shrubland and Steppe	Mid-High
M053	ALPINE CHIPMUNK*	Alpine-Dwarf Shrub; Subalpine Conifer	Alpine Vegetation; Subalpine Aspen Forests & Pine Woodlands, Pacific Northwest Subalpine Forest	Vancouverian Alpine Scrub, Forb Meadow & Grassland; Rocky Mountain Subalpine and High Montane Conifer Forest, Vancouverian Subalpine Forest	Mid-High - High

CWHR ID	Species Common Name	Primary CWHR Habitat Type	Primary Macrogroup Common Name	Primary Macrogroup Name	Mean Macrogroup Climate Vulnerability Rank
M064	PANAMINT CHIPMUNK	Pinyon-Juniper	Great Basin Pinyon-Juniper Woodland	Intermountain Basins Pinyon–Juniper Woodland	Mid-High
M065	UINTA CHIPMUNK	Subalpine Conifer	Subalpine Aspen Forests & Pine Woodlands; Pacific Northwest Subalpine Forest	Rocky Mountain Subalpine and High Montane Conifer Forest; Vancouverian Subalpine Forest	Mid-High - High
M068	NELSON'S ANTELOPE GROUND SQUIRREL	Annual Grassland	California Grassland and Flowerfields	California Annual and Perennial Grassland	Mid-High
M082	TOWNSEND'S POCKET GOPHER	Wet Meadow	Mountain Riparian Scrub and wet meadow; Wet Mountain Meadow	Western Cordilleran montane-boreal wet meadow; Western North America Wet Meadow and Low Shrub Carr	Mid-High
M097	DARK KANGAROO MOUSE	Sagebrush	Big Sagebrush Scrub	Western North America Tall Sage Shrubland and Steppe	Mid-High
M099	ORD'S KANGAROO RAT	Sagebrush	Big Sagebrush Scrub	Western North America Tall Sage Shrubland and Steppe	Mid-High
M106	GIANT KANGAROO RAT	Annual Grassland	California Grassland and Flowerfields	California Annual and Perennial Grassland	Mid-High
M108	STEPHENS' KANGAROO RAT	Annual Grassland; Coastal Scrub	California Grassland and Flowerfields; Coastal Sage Scrub, Coastal Dune and Bluff Scrub	California Annual and Perennial Grassland; California Coastal Scrub, Vancouverian Coastal Dune and Bluff	Mid-High

CWHR ID	Species Common Name	Primary CWHR Habitat Type	Primary Macrogroup Common Name	Primary Macrogroup Name	Mean Macrogroup Climate Vulnerability Rank
M114	SALT-MARSH HARVEST MOUSE	Saline Emergent Wetland	Salt Marsh Meadows	North American Pacific Coastal Salt Marsh	High
M138	SAGEBRUSH VOLE	Sagebrush	Big Sagebrush Scrub	Western North America Tall Sage Shrubland and Steppe	Mid-High
R035	ISLAND NIGHT LIZARD*	Coastal Scrub	Coastal Sage Scrub; Coastal Dune and Bluff Scrub	California Coastal Scrub; Vancouverian Coastal Dune and Bluff	Mid-High

Discussion

Applying the results of vegetation climate vulnerability models to wildlife species habitat distributions provides insight into how climate change effects on vegetation might impact wildlife populations. Many spatial models of projected climate change impacts to species are based on climate envelope models of wildlife species distributions, but do not explicitly address impacts to the habitats on which the species depend (e.g., Wright et al. 2013). The results of this study complement other efforts being done by the Department to identify species vulnerable to the warmer and drier conditions present during extended drought (CDFW 2016) and to identify species vulnerable to climate change (Gardali et al. 2012, Wright et al. 2013, CDFW 2015, Stewart et al. 2016).

Application to climate vulnerability analysis

These results represent a first step in bringing together species models, habitat data, and projections of future climate impacts to better understand where and how future climate conditions will most impact the habitats on which species depend. Further work is needed to refine and expand on these models as we plan for managing wildlife species into the future. The identification of the species, habitat types, and the locations where high modeled vegetation climate exposure intersects with species distributions can help with prioritizing the establishment of long-term monitoring to track landscape and species composition changes over time.

Sixty species were predicted to have high climate exposure or non-analog conditions across the majority of their potentially suitable habitat area regardless of the future climate trajectory at a high emissions scenario, and in contrast the same is true for only four species under the lower emissions scenario. This underscores the direct impact that lowering carbon emissions may have to the conservation of wildlife (Thorne 2017).

Although the overall percentage of suitable habitat impacted by high climate exposure, when averaged across all species, is similar between a hotter and drier

future (39%) and a warmer and wetter future (44%; Table 1), there is a much larger difference in the total number of species for which impacts are predicted across the majority of suitable habitat area between the two future climate scenarios (18 and 48, respectively; Table 3). This underscores the importance of assessing the results on a species-specific basis. The impact of climate change on any individual species is highly dependent on the distribution of that species' suitable habitats and the species' range limits.

When non-analog conditions were included, the number of species impacted across the majority of habitat area increased by more than three-fold (from 18 and 48 to 62 and 184, respectively; Table 3). Non-analog conditions represent combinations of temperature and precipitation not currently present in California, making the level of predicted climate change impacts in these areas difficult to assess. However, given the potentially large contribution that non-analog conditions may have to species' habitats in the state, a better understanding of the impacts of non-analog conditions to species and habitats is needed. Incorporating species and climate information into the analysis from locations where these non-analog combinations of temperature and precipitation are currently present, such as neighboring states, could begin to address this question.

Habitat specialists may be particularly sensitive to impacts to their habitat because they may lack the versatility to move or adapt to other habitats. Bringing together vegetation vulnerability information with species-habitat information allowed us to identify 24 habitat specialist species that depend on habitats ranked as highly vulnerable to climate change. Conserving areas of vegetation refugia for these species should be a primary conservation goal.

Application to drought planning and monitoring

Understanding which habitat areas are modeled to be most sensitive to warmer and drier future climate conditions may provide insight into areas that should be monitored during drought. We identified 22 species with high predicted climate exposure to their habitats based on a conservative, near-term, hotter and drier

future climate model. Five of these species had already been identified as high priority drought sensitive species (CDFW 2016), and the remainder may warrant further study and monitoring.

When interpreting these results in the context of drought, is important to keep the distinction between weather (i.e., 2012-2016 drought) and climate (long-term averages in weather) in mind. The degree to which temperature and precipitation will change in a location as predicted by a future climate model may not match the increases in temperature and decreases in precipitation seen on the ground in that location during a specific weather event such as the extended drought. Sixteen of the 22 species identified as occurring in habitats that are vulnerable to near-term hotter and drier conditions occur in Del Norte, Humboldt, Mendocino, and western Siskiyou counties. These results were strongly driven by the hot and dry future climate model showing high exposure in forested habitats along the north coast (e.g., CWHR Redwood, Douglas Fir, Klamath Mixed Conifer, Montane Hardwood, Montane Hardwood-Conifer), particularly in Del Norte County. While there were documented impacts to north coast forests during the recent extended drought (Asner et al. 2015, Baer et al. 2015), the drought started later and was less severe on the north coast compared with other parts of the state (see http://droughtmonitor.unl.edu/). This demonstrates that the exposure results from the vegetation climate vulnerability model do not directly correlate with warming and drying seen during a specific drought event. However, the exposure results, paired with the high overall climate vulnerability rank given to Pacific Northwest Conifer Forests and Pacific Northwest Subalpine Forests, point to a potential vulnerability of these species and habitats to climatic warming, and a need for monitoring in these areas.

The remaining six species identified as potentially vulnerable to habitat impacts due to near-term hotter and dried conditions occur in southern California deserts and mountains, and the Sierra Nevada and Southern Cascades: Southern California Slender Salamander, White-eared Pocket Mouse, Mazama Pocket Gopher, San Gabriel Slender Salamander, Switak's Banded Gecko, and Vagrant Shrew. Only one of these species, Southern California Slender Salamander, was

previously identified as a drought priority species. Southern California Slender Salamander, White-eared Pocket Mouse, and San Gabriel Slender Salamander occur in a variety of habitats in the Tehachapi, San Gabriel, and San Bernardino mountains in southern California, while Switak's Banded Gecko is known from rocky canyons in the Peninsular Ranges in San Diego County. All four of these species are considered rare or sensitive. The Vagrant Shrew occurs in wet meadow and riparian habitats in the Sierra Nevada and Cascades, and the Mazama Pocket Gopher occurs in meadow and grassland habitats in the Klamath and western Cascades. These six species occupy habitat types within locations that are predicted to be highly impacted by hotter and drier climate conditions. Long-term field monitoring in these areas would help us measure and understand the potential impacts of drought and climate change on both common and rare species.

Aquatic species may be particularly vulnerable to drought and represented almost half of the previously identified drought priority species. However, aquatic habitats, particularly small or linear aquatic habitats, may not be well-represented in terrestrial vegetation maps due to issues of scale. Because of this, aquatic species potential distributions based on terrestrial vegetation maps may have poor accuracy. Additional work to better incorporate small wetlands and the availability of water in the landscape into the distributions of aquatic species would improve the accuracy of the predictive models. Further developing methods to better monitor changes to aquatic habitats over time, such as with remote sensing, would improve our ability to identify areas of the state where aquatic species may be most impacted by loss of water in the landscape.

Many of the mammal species on the original drought priority species list were bats. Like aquatic species, bats key into landscape elements that are often not well mapped on vegetation maps, such as mines and caves for roosting. Furthermore, many bats are little-known species for which the species-habitat models in CWHR are not well-developed. Additional work to better understand and map bat distributions would improve the accuracy of the predictive models.

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Appendix A. Climate Vulnerability of Habitats Summary for 522 Species.

The table shows species attributes, range area in California, and potentially suitable habitat area in California as modeled in CWHR (CDFW 2016); and the percent of potentially suitable natural habitat that is ranked with a score of mid-high or high overall climate vulnerability (considering exposure, vulnerability, and adaptive capacity) by Thorne et al. (2016). Note that the habitat climate vulnerability rank differs from the climate exposure analysis summarized in Appendix C. Drought priority species are those identified by CDFW (2016). Climate vulnerable species were identified as climate vulnerable in the State Wildlife Action Plan (SWAP; CDFW 2015, Appendix C) or another climate vulnerability assessment (Gardali et al. 2012, Wright et al. 2013, Stewart et al. 2016). Species for which the drought priority or climate vulnerable taxon was a subspecies or Distinct Population Segment are denoted with an asterisk. Aquatic species are those that require aquatic elements for any life stage. All area estimates are rounded to the nearest 1000 acres.

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
A001	*Ambystoma californiense*	CALIFORNIA TIGER SALAMANDER	x*	x	x	15,266,000	6,640,000	71%
A002	*Ambystoma gracile*	NORTHWESTERN SALAMANDER			x	4,018,000	3,334,000	25%
A003	*Ambystoma macrodactylum*	LONG-TOED SALAMANDER	x*	x*	x	5,012,000	3,624,000	17%
A004	*Dicamptodon ensatus*	CALIFORNIA GIANT SALAMANDER	x		x	2,797,000	1,433,000	27%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
A005	*Rhyacotriton variegatus*	SOUTHERN TORRENT SALAMANDER	x		x	4,511,000	3,319,000	24%
A006	*Taricha granulosa*	ROUGH-SKINNED NEWT			x	16,438,000	13,248,000	19%
A007	*Taricha torosa*	CALIFORNIA NEWT	x*		x	9,914,000	6,467,000	39%
A008	*Taricha rivularis*	RED-BELLIED NEWT	x		x	2,728,000	1,920,000	25%
A009	*Plethodon dunni*	DUNN'S SALAMANDER	x	x		97,000	16,000	94%
A010	*Plethodon elongatus*	DEL NORTE SALAMANDER				2,140,000	1,618,000	15%
A011	*Plethodon stormi*	SISKIYOU MOUNTAINS SALAMANDER				241,000	64,000	0%
A012	*Ensatina eschscholtzii*	ENSATINA				41,709,000	27,697,000	11%
A013	*Batrachoseps major*	SOUTHERN CALIFORNIA SLENDER SALAMANDER	x*			4,050,000	114,000	0%
A014	*Batrachoseps attenuatus*	CALIFORNIA SLENDER SALAMANDER				15,939,000	10,352,000	43%
A015	*Batrachoseps nigriventris*	BLACK-BELLIED SLENDER SALAMANDER				8,489,000	4,579,000	24%
A016	*Batrachoseps pacificus*	CHANNEL ISLANDS SLENDER SALAMANDER				125,000	117,000	83%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
A017	*Batrachoseps simatus*	KERN CANYON SLENDER SALAMANDER	x			191,000	110,000	1%
A018	*Batrachoseps stebbinsi*	TEHACHAPI SLENDER SALAMANDER	x	x		328,000	62,000	1%
A020	*Aneides flavipunctatus*	BLACK SALAMANDER				12,710,000	11,266,000	18%
A021	*Aneides ferreus*	CLOUDED SALAMANDER				1,083,000	818,000	8%
A022	*Aneides lugubris*	ARBOREAL SALAMANDER				21,773,000	9,173,000	16%
A023	*Hydromantes platycephalus*	MOUNT LYELL SALAMANDER	x	x		4,435,000	3,277,000	50%
A024	*Hydromantes shastae*	SHASTA SALAMANDER	x			792,000	128,000	0%
A025	*Hydromantes brunus*	LIMESTONE SALAMANDER	x			128,000	53,000	0%
A026	*Ascaphus truei*	COASTAL TAILED FROG	x	x	x	9,799,000	6,340,000	17%
A027	*Scaphiopus couchii*	COUCH'S SPADEFOOT	x	x	x	2,304,000	2,140,000	0%
A028	*Spea hammondii*	WESTERN SPADEFOOT	x		x	25,419,000	19,006,000	40%
A029	*Spea intermontana*	GREAT BASIN SPADEFOOT			x	7,702,000	5,230,000	65%
A030	*Incilius alvarius*	SONORAN DESERT TOAD			x	117,000	55,000	0%
A031	*Anaxyrus exsul*	BLACK TOAD	x	x	x	66,000	500	99%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
A032	*Anaxyrus boreas*	WESTERN TOAD			x	78,654,000	70,509,000	29%
A033	*Anaxyrus canorus*	YOSEMITE TOAD	x	x	x	2,672,000	1,634,000	69%
A034	*Anaxyrus woodhousii*	WOODHOUSE'S TOAD			x	1,273,000	774,000	0%
A035	*Anaxyrus californicus*	ARROYO TOAD	x	x	x	5,195,000	1,974,000	4%
A036	*Anaxyrus punctatus*	RED-SPOTTED TOAD			x	23,909,000	20,628,000	1%
A037	*Anaxyrus cognatus*	GREAT PLAINS TOAD			x	1,864,000	1,279,000	0%
A038	*Pseudacris cadaverina*	CALIFORNIA TREEFROG			x	8,755,000	4,493,000	23%
A039	*Pseudacris regilla*	PACIFIC TREEFROG			x	1,146,000	1,121,000	13%
A040	*Rana aurora*	NORTHERN RED-LEGGED FROG	x	x	x	2,971,000	2,772,000	37%
A041	*Rana pretiosa*	OREGON SPOTTED FROG			x	620,000	146,000	25%
A042	*Rana cascadae*	CASCADES FROG	x	x	x	2,563,000	1,577,000	19%
A043	*Rana boylii*	FOOTHILL YELLOW-LEGGED FROG	x	x	x	33,655,000	29,343,000	23%
A044	*Rana muscosa*	SOUTHERN MOUNTAIN YELLOW-LEGGED FROG	x*	x	x	2,746,000	1,293,000	36%
A048	*Dicamptodon tenebrosus*	COASTAL GIANT SALAMANDER			x	11,548,000	10,030,000	11%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
A049	*Batrachoseps relictus*	RELICTUAL SLENDER SALAMANDER	x	x		46,000	45,000	24%
A053	*Batrachoseps gabrieli*	SAN GABRIEL SLENDER SALAMANDER				373,000	101,000	0%
A056	*Batrachoseps gavilanensis*	GABILAN MOUNTAINS SLENDER SALAMANDER				2,569,000	2,312,000	47%
A057	*Batrachoseps luciae*	SANTA LUCIA MOUNTAINS SLENDER SALAMANDER		x		1,269,000	1,199,000	31%
A058	*Batrachoseps minor*	LESSER SLENDER SALAMANDER	x	x		79,000	77,000	28%
A059	*Batrachoseps incognitus*	SAN SIMEON SLENDER SALAMANDER		x		179,000	176,000	32%
A060	*Batrachoseps regius*	KINGS RIVER SLENDER SALAMANDER				1,563,000	892,000	18%
A062	*Batrachoseps diabolicus*	HELL HOLLOW SLENDER SALAMANDER				1,371,000	1,206,000	32%
A063	*Batrachoseps robustus*	KERN PLATEAU SLENDER SALAMANDER				731,000	283,000	60%
A067	*Plethodon asupak*	SCOTT BAR SALAMANDER	x			113,000	34,000	0%
A068	*Aneides vagrans*	WANDERING SALAMANDER				4,180,000	2,896,000	31%
A070	*Rana sierrae*	SIERRA NEVADA YELLOW-LEGGED FROG	x	x	x	6,997,000	4,728,000	31%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
A071	*Rana draytonii*	CALIFORNIA RED-LEGGED FROG	x		x	32,889,000	22,226,000	39%
B051	*Ardea herodias*	GREAT BLUE HERON			x	96,875,000	48,424,000	30%
B057	*Bubulcus ibis*	CATTLE EGRET				29,523,000	18,161,000	32%
B058	*Butorides virescens*	GREEN HERON			x	71,876,000	22,954,000	7%
B059	*Nycticorax nycticorax*	BLACK-CROWNED NIGHT HERON			x	67,233,000	21,674,000	11%
B067	*Cygnus columbianus*	TUNDRA SWAN			x	26,088,000	8,055,000	50%
B076	*Aix sponsa*	WOOD DUCK			x	62,037,000	24,987,000	8%
B077	*Anas crecca*	GREEN-WINGED TEAL			x	84,623,000	20,698,000	50%
B079	*Anas platyrhynchos*	MALLARD			x	99,977,000	22,043,000	51%
B083	*Anas cyanoptera*	CINNAMON TEAL			x	64,468,000	12,382,000	59%
B084	*Anas clypeata*	NORTHERN SHOVELER			x	75,658,000	14,721,000	64%
B085	*Anas strepera*	GADWALL			x	76,498,000	15,533,000	58%
B094	*Aythya affinis*	LESSER SCAUP			x	89,612,000	17,341,000	61%
B096	*Histrionicus histrionicus*	HARLEQUIN DUCK	x		x	2,877,000	51,000	71%
B108	*Cathartes aura*	TURKEY VULTURE				91,605,000	85,712,000	22%
B109	*Gymnogyps californianus*	CALIFORNIA CONDOR				5,415,000	4,477,000	47%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B110	*Pandion haliaetus*	OSPREY			x	61,585,000	49,762,000	27%
B111	*Elanus leucurus*	WHITE-TAILED KITE				47,629,000	39,322,000	30%
B113	*Haliaeetus leucocephalus*	BALD EAGLE			x	75,224,000	59,172,000	36%
B114	*Circus cyaneus*	NORTHERN HARRIER				78,983,000	65,015,000	27%
B115	*Accipiter striatus*	SHARP-SHINNED HAWK				95,481,000	67,910,000	29%
B116	*Accipiter cooperii*	COOPER'S HAWK				99,162,000	62,749,000	26%
B117	*Accipiter gentilis*	NORTHERN GOSHAWK				34,437,000	28,050,000	27%
B119	*Buteo lineatus*	RED-SHOULDERED HAWK				61,581,000	26,804,000	36%
B121	*Buteo swainsoni*	SWAINSON'S HAWK		x		21,760,000	13,155,000	46%
B123	*Buteo jamaicensis*	RED-TAILED HAWK				101,200,000	90,831,000	24%
B124	*Buteo regalis*	FERRUGINOUS HAWK				75,266,000	47,487,000	33%
B125	*Buteo lagopus*	ROUGH-LEGGED HAWK				65,715,000	39,529,000	42%
B126	*Aquila chrysaetos*	GOLDEN EAGLE				99,504,000	84,617,000	24%
B127	*Falco sparverius*	AMERICAN KESTREL				99,935,000	96,589,000	23%
B128	*Falco columbarius*	MERLIN				92,463,000	79,326,000	22%
B129	*Falco peregrinus*	PEREGRINE FALCON				75,854,000	65,329,000	32%
B131	*Falco mexicanus*	PRAIRIE FALCON				82,205,000	77,116,000	23%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B134	*Dendragapus fuliginosus*	SOOTY GROUSE				25,304,000	17,718,000	23%
B136	*Bonasa umbellus*	RUFFED GROUSE				6,701,000	5,158,000	8%
B137	*Centrocercus urophasianus*	GREATER SAGE-GROUSE		x		3,422,000	2,390,000	92%
B139	*Callipepla gambelii*	GAMBEL'S QUAIL				18,718,000	16,218,000	0%
B140	*Callipepla californica*	CALIFORNIA QUAIL				73,480,000	65,561,000	28%
B141	*Oreortyx pictus*	MOUNTAIN QUAIL				43,885,000	38,242,000	28%
B145	*Rallus limicola*	VIRGINIA RAIL			x	45,890,000	955,000	63%
B149	*Fulica americana*	AMERICAN COOT			x	101,447,000	21,917,000	50%
B158	*Charadrius vociferus*	KILLDEER				98,771,000	29,382,000	37%
B170	*Actitis macularius*	SPOTTED SANDPIPER			x	64,893,000	14,946,000	54%
B173	*Numenius americanus*	LONG-BILLED CURLEW			x	24,833,000	9,171,000	46%
B251	*Patagioenas fasciata*	BAND-TAILED PIGEON				53,543,000	37,023,000	12%
B254	*Zenaida asiatica*	WHITE-WINGED DOVE				6,685,000	5,286,000	0%
B255	*Zenaida macroura*	MOURNING DOVE				92,777,000	84,450,000	23%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B257	*Columbina passerina*	COMMON GROUND-DOVE				3,233,000	2,729,000	8%
B259	*Coccyzus americanus*	YELLOW-BILLED CUCKOO		x	x	1,862,000	48,000	72%
B260	*Geococcyx californianus*	GREATER ROADRUNNER				63,076,000	37,471,000	5%
B262	*Tyto alba*	BARN OWL				82,200,000	61,668,000	27%
B263	*Psiloscops flammeolus*	FLAMMULATED OWL				28,849,000	20,466,000	14%
B264	*Megascops kennicottii*	WESTERN SCREECH OWL				67,396,000	59,656,000	28%
B265	*Bubo virginianus*	GREAT HORNED OWL				98,927,000	92,557,000	23%
B267	*Glaucidium gnoma*	NORTHERN PYGMY OWL				51,589,000	35,390,000	9%
B268	*Micrathene whitneyi*	ELF OWL		x		27,000	1,000	0%
B269	*Athene cunicularia*	BURROWING OWL				69,342,000	50,468,000	29%
B270	*Strix occidentalis*	SPOTTED OWL				27,600,000	17,566,000	12%
B271	*Strix nebulosa*	GREAT GRAY OWL		x	x	10,427,000	3,620,000	18%
B272	*Asio otus*	LONG-EARED OWL				86,460,000	63,255,000	20%
B273	*Asio flammeus*	SHORT-EARED OWL				32,337,000	22,467,000	45%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B274	*Aegolius acadicus*	NORTHERN SAW-WHET OWL				68,727,000	33,563,000	11%
B275	*Chordeiles acutipennis*	LESSER NIGHTHAWK				43,800,000	37,820,000	16%
B276	*Chordeiles minor*	COMMON NIGHTHAWK				31,729,000	26,066,000	27%
B277	*Phalaenoptilus nuttallii*	COMMON POORWILL				92,127,000	81,161,000	22%
B278	*Antrostomus vociferus*	EASTERN WHIP-POOR-WILL				377,000	97,000	61%
B279	*Cypseloides niger*	BLACK SWIFT			x	4,273,000	3,942,000	22%
B281	*Chaetura vauxi*	VAUX'S SWIFT				26,732,000	20,956,000	10%
B282	*Aeronautes saxatalis*	WHITE-THROATED SWIFT				62,349,000	60,439,000	20%
B286	*Archilochus alexandri*	BLACK-CHINNED HUMMINGBIRD				35,551,000	14,306,000	13%
B287	*Calypte anna*	ANNA'S HUMMINGBIRD				68,893,000	33,241,000	7%
B288	*Calypte costae*	COSTA'S HUMMINGBIRD				33,363,000	22,254,000	7%
B289	*Selasphorus calliope*	CALLIOPE HUMMINGBIRD				23,058,000	10,112,000	25%
B290	*Selasphorus platycercus*	BROAD-TAILED HUMMINGBIRD				3,011,000	405,000	94%
B291	*Selasphorus rufus*	RUFOUS HUMMINGBIRD				13,288,000	11,810,000	13%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B292	*Selasphorus sasin*	ALLEN'S HUMMINGBIRD				9,879,000	4,784,000	22%
B294	*Melanerpes lewis*	LEWIS'S WOODPECKER				57,012,000	41,280,000	33%
B296	*Melanerpes formicivorus*	ACORN WOODPECKER				48,333,000	20,424,000	3%
B297	*Melanerpes uropygialis*	GILA WOODPECKER				2,174,000	268,000	0%
B298	*Sphyrapicus nuchalis*	RED-NAPED SAPSUCKER				33,431,000	5,821,000	12%
B299	*Sphyrapicus ruber*	RED-BREASTED SAPSUCKER				73,323,000	41,522,000	8%
B300	*Sphyrapicus thyroideus*	WILLIAMSON'S SAPSUCKER				13,165,000	4,985,000	23%
B301	*Picoides scalaris*	LADDER-BACKED WOODPECKER				23,711,000	2,879,000	17%
B302	*Picoides nuttallii*	NUTTALL'S WOODPECKER				47,212,000	22,166,000	9%
B303	*Picoides pubescens*	DOWNY WOODPECKER				61,757,000	47,705,000	27%
B304	*Picoides villosus*	HAIRY WOODPECKER				51,934,000	31,988,000	13%
B305	*Picoides albolarvatus*	WHITE-HEADED WOODPECKER				25,380,000	15,786,000	14%
B306	*Picoides arcticus*	BLACK-BACKED WOODPECKER				19,538,000	5,779,000	35%
B307	*Colaptes auratus*	NORTHERN FLICKER				100,045,000	90,310,000	24%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B308	*Dryocopus pileatus*	PILEATED WOODPECKER				26,751,000	15,694,000	13%
B309	*Contopus cooperi*	OLIVE-SIDED FLYCATCHER				40,292,000	25,774,000	13%
B311	*Contopus sordidulus*	WESTERN WOOD-PEWEE				58,234,000	38,780,000	10%
B315	*Empidonax traillii*	WILLOW FLYCATCHER	x*		x	6,556,000	97,000	66%
B317	*Empidonax hammondii*	HAMMOND'S FLYCATCHER				21,097,000	10,501,000	10%
B318	*Empidonax oberholseri*	DUSKY FLYCATCHER				27,690,000	18,729,000	15%
B319	*Empidonax wrightii*	GRAY FLYCATCHER				10,631,000	5,219,000	66%
B320	*Empidonax difficilis*	PACIFIC-SLOPE FLYCATCHER				35,587,000	25,494,000	11%
B321	*Sayornis nigricans*	BLACK PHOEBE				59,993,000	44,325,000	28%
B323	*Sayornis saya*	SAY'S PHOEBE				73,874,000	48,499,000	26%
B326	*Myiarchus cinerascens*	ASH-THROATED FLYCATCHER				76,667,000	41,708,000	3%
B328	*Myiarchus tyrannulus*	BROWN-CRESTED FLYCATCHER		x		482,000	258,000	0%
B331	*Tyrannus vociferans*	CASSIN'S KINGBIRD				13,980,000	9,779,000	46%
B333	*Tyrannus verticalis*	WESTERN KINGBIRD				73,222,000	45,447,000	36%
B334	*Tyrannus tyrannus*	EASTERN KINGBIRD				603,000	307,000	71%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B337	*Eremophila alpestris*	HORNED LARK				75,069,000	41,730,000	30%
B338	*Progne subis*	PURPLE MARTIN				29,506,000	7,438,000	29%
B339	*Tachycineta bicolor*	TREE SWALLOW			x	53,680,000	32,968,000	27%
B340	*Tachycineta thalassina*	VIOLET-GREEN SWALLOW				68,579,000	58,994,000	28%
B341	*Stelgidopteryx serripennis*	NORTHERN ROUGH-WINGED SWALLOW				64,605,000	50,876,000	32%
B343	*Petrochelidon pyrrhonota*	CLIFF SWALLOW				72,814,000	50,014,000	34%
B344	*Hirundo rustica*	BARN SWALLOW				56,828,000	51,476,000	28%
B345	*Perisoreus canadensis*	GRAY JAY				6,147,000	3,303,000	29%
B346	*Cyanocitta stelleri*	STELLER'S JAY				41,240,000	29,286,000	13%
B348	*Aphelocoma californica*	WESTERN SCRUB-JAY				60,563,000	29,585,000	10%
B349	*Gymnorhinus cyanocephalus*	PINYON JAY				14,211,000	6,505,000	68%
B350	*Nucifraga columbiana*	CLARK'S NUTCRACKER				15,746,000	9,171,000	27%
B351	*Pica hudsonia*	BLACK-BILLED MAGPIE				10,527,000	4,471,000	70%

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B352	*Pica nuttalli*	YELLOW-BILLED MAGPIE				16,592,000	12,926,000	36%
B353	*Corvus brachyrhynchos*	AMERICAN CROW				51,558,000	33,245,000	27%
B354	*Corvus corax*	COMMON RAVEN				82,668,000	76,192,000	24%
B355	*Poecile atricapillus*	BLACK-CAPPED CHICKADEE				3,112,000	957,000	11%
B356	*Poecile gambeli*	MOUNTAIN CHICKADEE				41,478,000	28,413,000	11%
B357	*Poecile rufescens*	CHESTNUT-BACKED CHICKADEE				19,728,000	15,794,000	9%
B358	*Baeolophus inornatus*	OAK TITMOUSE				46,075,000	19,647,000	1%
B359	*Auriparus flaviceps*	VERDIN				18,458,000	15,748,000	0%
B360	*Psaltriparus minimus*	BUSHTIT				67,239,000	32,556,000	22%
B361	*Sitta canadensis*	RED-BREASTED NUTHATCH				55,413,000	28,027,000	13%
B362	*Sitta carolinensis*	WHITE-BREASTED NUTHATCH				53,043,000	27,353,000	12%
B363	*Sitta pygmaea*	PYGMY NUTHATCH				22,806,000	8,787,000	9%
B364	*Certhia americana*	BROWN CREEPER				58,268,000	25,627,000	11%
B365	*Campylorhynchus brunneicapillus*	CACTUS WREN				28,364,000	22,000,000	4%
B366	*Salpinctes obsoletus*	ROCK WREN				68,225,000	44,691,000	12%

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B367	*Catherpes mexicanus*	CANYON WREN				42,541,000	6,176,000	3%
B368	*Thryomanes bewickii*	BEWICK'S WREN				77,590,000	28,651,000	13%
B369	*Troglodytes aedon*	HOUSE WREN				68,242,000	27,029,000	10%
B370	*Troglodytes pacificus*	PACIFIC WREN				44,963,000	17,188,000	13%
B373	*Cinclus mexicanus*	AMERICAN DIPPER			x	39,747,000	2,703,000	2%
B375	*Regulus satrapa*	GOLDEN-CROWNED KINGLET				64,535,000	37,558,000	15%
B376	*Regulus calendula*	RUBY-CROWNED KINGLET				100,165,000	71,869,000	15%
B377	*Polioptila caerulea*	BLUE-GRAY GNATCATCHER				55,683,000	19,706,000	26%
B378	*Polioptila melanura*	BLACK-TAILED GNATCATCHER				12,710,000	10,689,000	0%
B380	*Sialia mexicana*	WESTERN BLUEBIRD				65,124,000	45,283,000	25%
B381	*Sialia currucoides*	MOUNTAIN BLUEBIRD				50,544,000	20,609,000	60%
B382	*Myadestes townsendi*	TOWNSEND'S SOLITAIRE				40,949,000	20,269,000	10%
B385	*Catharus ustulatus*	SWAINSON'S THRUSH				38,221,000	27,297,000	12%
B386	*Catharus guttatus*	HERMIT THRUSH				66,881,000	44,178,000	17%
B389	*Turdus migratorius*	AMERICAN ROBIN				101,200,000	61,669,000	25%

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B390	*Ixoreus naevius*	VARIED THRUSH				53,053,000	28,395,000	6%
B391	*Chamaea fasciata*	WRENTIT				54,964,000	26,546,000	11%
B393	*Mimus polyglottos*	NORTHERN MOCKINGBIRD				45,828,000	36,027,000	23%
B394	*Oreoscoptes montanus*	SAGE THRASHER				12,894,000	5,840,000	64%
B396	*Toxostoma bendirei*	BENDIRE'S THRASHER	x	x		3,823,000	664,000	0%
B398	*Toxostoma redivivum*	CALIFORNIA THRASHER				37,107,000	14,492,000	13%
B399	*Toxostoma crissale*	CRISSAL THRASHER				8,035,000	649,000	14%
B400	*Toxostoma lecontei*	LE CONTE'S THRASHER	x			24,877,000	20,512,000	0%
B404	*Anthus rubrescens*	AMERICAN PIPIT				95,250,000	31,092,000	50%
B407	*Bombycilla cedrorum*	CEDAR WAXWING				67,924,000	34,656,000	6%
B408	*Phainopepla nitens*	PHAINOPEPLA				46,973,000	12,524,000	6%
B409	*Lanius excubitor*	NORTHERN SHRIKE				12,002,000	6,091,000	61%
B410	*Lanius ludovicianus*	LOGGERHEAD SHRIKE				79,982,000	66,700,000	26%
B413	*Vireo bellii*	BELL'S VIREO		x*	x	2,308,000	33,000	71%
B414	*Vireo vicinior*	GRAY VIREO				1,506,000	722,000	22%
B415	*Vireo cassinii*	CASSIN'S VIREO				35,094,000	24,412,000	7%

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B417	*Vireo huttoni*	HUTTON'S VIREO				39,882,000	25,538,000	11%
B418	*Vireo gilvus*	WARBLING VIREO				48,227,000	31,859,000	10%
B425	*Oreothlypis celata*	ORANGE-CROWNED WARBLER				66,367,000	40,374,000	12%
B426	*Oreothlypis ruficapilla*	NASHVILLE WARBLER				26,962,000	21,535,000	10%
B427	*Oreothlypis virginiae*	VIRGINIA'S WARBLER				2,513,000	295,000	77%
B428	*Oreothlypis luciae*	LUCY'S WARBLER			x	155,000	105,000	0%
B430	*Setophaga petechia*	YELLOW WARBLER			x	58,529,000	33,957,000	7%
B435	*Setophaga coronata*	YELLOW-RUMPED WARBLER				97,805,000	91,012,000	23%
B436	*Setophaga nigrescens*	BLACK-THROATED GRAY WARBLER				40,965,000	28,968,000	8%
B437	*Setophaga townsendi*	TOWNSEND'S WARBLER				24,084,000	16,623,000	8%
B438	*Setophaga occidentalis*	HERMIT WARBLER				33,494,000	21,907,000	12%
B460	*Geothlypis tolmiei*	MACGILLIVRAY'S WARBLER				30,853,000	12,894,000	13%
B461	*Geothlypis trichas*	COMMON YELLOWTHROAT		x*	x	59,788,000	10,634,000	95%
B463	*Cardellina pusilla*	WILSON'S WARBLER				35,943,000	26,584,000	16%

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B467	*Icteria virens*	YELLOW-BREASTED CHAT			x	33,740,000	1,637,000	94%
B469	*Piranga rubra*	SUMMER TANAGER			x	680,000	76,000	1%
B471	*Piranga ludoviciana*	WESTERN TANAGER				40,884,000	26,270,000	12%
B475	*Pheucticus melanocephalus*	BLACK-HEADED GROSBEAK				68,567,000	37,409,000	8%
B476	*Passerina caerulea*	BLUE GROSBEAK				23,728,000	7,353,000	54%
B477	*Passerina amoena*	LAZULI BUNTING				70,552,000	23,128,000	27%
B482	*Pipilo chlorurus*	GREEN-TAILED TOWHEE				34,239,000	14,861,000	28%
B483	*Pipilo maculatus*	SPOTTED TOWHEE				74,257,000	38,492,000	18%
B484	*Pipilo crissalis*	CALIFORNIA TOWHEE	x*			43,309,000	19,407,000	10%
B485	*Melozone aberti*	ABERT'S TOWHEE			x	1,901,000	259,000	0%
B487	*Aimophila ruficeps*	RUFOUS-CROWNED SPARROW				23,039,000	11,572,000	54%
B489	*Spizella passerina*	CHIPPING SPARROW				85,162,000	43,404,000	36%
B491	*Spizella breweri*	BREWER'S SPARROW				28,625,000	18,482,000	24%
B493	*Spizella atrogularis*	BLACK-CHINNED SPARROW				18,845,000	6,439,000	30%
B494	*Pooecetes gramineus*	VESPER SPARROW				20,953,000	10,929,000	66%
B495	*Chondestes grammacus*	LARK SPARROW				52,512,000	33,940,000	42%

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B496	*Amphispiza bilineata*	BLACK-THROATED SPARROW				32,023,000	24,907,000	11%
B497	*Artemisiospiza belli*	BELL'S SPARROW				56,718,000	31,231,000	16%
B499	*Passerculus sandwichensis*	SAVANNAH SPARROW				82,990,000	54,065,000	31%
B501	*Ammodramus savannarum*	GRASSHOPPER SPARROW				31,729,000	9,353,000	82%
B504	*Passerella iliaca*	FOX SPARROW				71,974,000	37,261,000	20%
B505	*Melospiza melodia*	SONG SPARROW		x*		80,180,000	40,237,000	37%
B506	*Melospiza lincolnii*	LINCOLN'S SPARROW				67,406,000	29,312,000	46%
B509	*Zonotrichia atricapilla*	GOLDEN-CROWNED SPARROW				64,147,000	41,449,000	40%
B510	*Zonotrichia leucophrys*	WHITE-CROWNED SPARROW				92,677,000	71,599,000	28%
B512	*Junco hyemalis*	DARK-EYED JUNCO				100,731,000	56,304,000	20%
B514	*Calcarius lapponicus*	LAPLAND LONGSPUR				7,672,000	3,652,000	75%
B519	*Agelaius phoeniceus*	RED-WINGED BLACKBIRD			x*	95,764,000	25,572,000	50%
B521	*Sturnella neglecta*	WESTERN MEADOWLARK				90,506,000	42,800,000	42%
B524	*Euphagus cyanocephalus*	BREWER'S BLACKBIRD				99,884,000	63,314,000	32%

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B528	*Molothrus ater*	BROWN-HEADED COWBIRD				79,178,000	60,791,000	33%
B530	*Icterus cucullatus*	HOODED ORIOLE				40,762,000	4,405,000	4%
B532	*Icterus bullockii*	BULLOCK'S ORIOLE				86,661,000	15,455,000	7%
B533	*Icterus parisorum*	SCOTT'S ORIOLE		x		5,181,000	3,515,000	13%
B534	*Leucosticte tephrocotis*	GRAY-CROWNED ROSY-FINCH		x		4,402,000	2,364,000	63%
B535	*Pinicola enucleator*	PINE GROSBEAK				6,677,000	1,577,000	97%
B536	*Haemorhous purpureus*	PURPLE FINCH				51,347,000	30,352,000	7%
B537	*Haemorhous cassinii*	CASSIN'S FINCH				23,906,000	12,181,000	37%
B538	*Haemorhous mexicanus*	HOUSE FINCH				86,790,000	48,250,000	37%
B539	*Loxia curvirostra*	RED CROSSBILL				27,735,000	15,227,000	15%
B542	*Spinus pinus*	PINE SISKIN				66,224,000	47,706,000	31%
B543	*Spinus psaltria*	LESSER GOLDFINCH				76,117,000	49,277,000	35%
B544	*Spinus lawrencei*	LAWRENCE'S GOLDFINCH				22,316,000	16,322,000	29%
B545	*Spinus tristis*	AMERICAN GOLDFINCH				79,977,000	36,338,000	44%

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B546	*Coccothraustes vespertinus*	EVENING GROSBEAK				37,710,000	25,426,000	12%
B549	*Colaptes chrysoides*	GILDED FLICKER				1,948,000	1,630,000	0%
B550	*Empidonax occidentalis*	CORDILLERAN FLYCATCHER				2,120,000	397,000	44%
B551	*Aphelocoma insularis*	ISLAND SCRUB-JAY				62,000	59,000	71%
B552	*Baeolophus ridgewayi*	JUNIPER TITMOUSE				9,001,000	1,768,000	32%
B553	*Polioptila californica*	CALIFORNIA GNATCATCHER				2,386,000	1,258,000	51%
B554	*Vireo plumbeus*	PLUMBEOUS VIREO				2,570,000	472,000	68%
B620	*Parabuteo unicinctus*	HARRIS' S HAWK				2,264,000	1,063,000	0%
B699	*Strix varia*	BARRED OWL				10,315,000	8,086,000	13%
B702	*Chaetura pelagica*	CHIMNEY SWIFT				8,641,000	7,830,000	36%
B773	*Setophaga ruticilla*	AMERICAN REDSTART				37,528,000	18,689,000	30%
B798	*Zonotrichia albicollis*	WHITE-THROATED SPARROW				65,525,000	40,387,000	15%
B799	*Zonotrichia querula*	HARRIS'S SPARROW				82,108,000	39,769,000	36%
B806	*Cardinalis cardinalis*	NORTHERN CARDINAL				35,000	29,000	0%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
B809	*Passerina cyanea*	INDIGO BUNTING				70,045,000	16,113,000	33%
M002	*Sorex lyelli*	MT. LYELL SHREW		x	x	1,120,000	162,000	84%
M003	*Sorex vagrans*	VAGRANT SHREW		x*	x*	19,092,000	7,090,000	30%
M004	*Sorex monticolus*	MONTANE SHREW				4,415,000	2,595,000	61%
M005	*Sorex sonomae*	FOG SHREW				5,053,000	3,184,000	30%
M006	*Sorex ornatus*	ORNATE SHREW	x*	x*	x*	36,039,000	19,198,000	49%
M008	*Sorex tenellus*	INYO SHREW				3,376,000	1,689,000	80%
M010	*Sorex palustris*	WATER SHREW			x	21,629,000	9,015,000	21%
M011	*Sorex bendirii*	MARSH SHREW			x	3,235,000	1,646,000	54%
M012	*Sorex trowbridgii*	TROWBRIDGE'S SHREW				29,934,000	17,821,000	13%
M013	*Sorex merriami*	MERRIAM'S SHREW				6,061,000	3,695,000	91%
M014	*Notiosorex crawfordi*	DESERT SHREW				32,978,000	21,235,000	0%
M015	*Neurotrichus gibbsii*	SHREW-MOLE				17,668,000	9,751,000	11%
M016	*Scapanus townsendii*	TOWNSEND'S MOLE				1,042,000	130,000	54%
M017	*Scapanus orarius*	COAST MOLE				2,934,000	612,000	54%
M018	*Scapanus latimanus*	BROAD-FOOTED MOLE				61,108,000	20,488,000	52%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
M019	*Macrotus californicus*	CALIFORNIA LEAF-NOSED BAT	x			13,766,000	11,518,000	0%
M021	*Myotis lucifugus*	LITTLE BROWN BAT	x			34,082,000	32,990,000	30%
M022	*Myotis occultus*	ARIZONA MYOTIS	x			2,331,000	2,204,000	0%
M023	*Myotis yumanensis*	YUMA MYOTIS	x			77,019,000	74,070,000	29%
M024	*Myotis velifer*	CAVE MYOTIS	x*			1,598,000	1,334,000	0%
M025	*Myotis evotis*	LONG-EARED MYOTIS	x*			56,875,000	46,617,000	22%
M026	*Myotis thysanodes*	FRINGED MYOTIS	x*			65,669,000	58,184,000	29%
M027	*Myotis volans*	LONG-LEGGED MYOTIS	x*			70,409,000	69,407,000	25%
M028	*Myotis californicus*	CALIFORNIA MYOTIS				101,148,000	98,847,000	22%
M029	*Myotis ciliolabrum*	SMALL-FOOTED MYOTIS	x			40,702,000	39,296,000	27%
M030	*Lasionycteris noctivagans*	SILVER-HAIRED BAT	x			43,405,000	36,348,000	18%
M031	*Parastrelluss hesperus*	CANYON BAT				70,985,000	68,290,000	20%
M032	*Eptesicus fuscus*	BIG BROWN BAT				100,987,000	99,653,000	22%
M033	*Lasiurus blossevillii*	WESTERN RED BAT	x*			44,498,000	36,463,000	33%
M034	*Lasiurus cinereus*	HOARY BAT	x			76,245,000	71,384,000	30%
M035	*Lasiurus xanthinus*	WESTERN YELLOW BAT	x			12,180,000	722,000	8%

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M036	*Euderma maculatum*	SPOTTED BAT	x			61,443,000	47,299,000	20%
M037	*Corynorhinus townsendii*	TOWNSEND'S BIG-EARED BAT	x*			98,093,000	93,871,000	22%
M038	*Antrozous pallidus*	PALLID BAT	x*			100,688,000	96,841,000	22%
M039	*Tadarida brasiliensis*	BRAZILIAN FREE-TAILED BAT				100,069,000	96,800,000	22%
M040	*Nyctinomops femorosaccus*	POCKETED FREE-TAILED BAT	x			9,381,000	5,613,000	1%
M042	*Eumops perotis*	WESTERN MASTIFF BAT	x*			60,741,000	52,710,000	19%
M043	*Ochotona princeps*	AMERICAN PIKA		x		15,478,000	8,691,000	54%
M044	*Brachylagus idahoensis*	PYGMY RABBIT				4,449,000	2,027,000	100%
M045	*Sylvilagus bachmani*	BRUSH RABBIT	x*			43,595,000	26,542,000	35%
M046	*Sylvilagus nuttallii*	NUTTALL'S COTTONTAIL				13,232,000	4,137,000	84%
M047	*Sylvilagus audubonii*	AUDUBON'S COTTONTAIL				64,242,000	59,189,000	20%
M049	*Lepus americanus*	SNOWSHOE HARE				14,028,000	561,000	25%
M050	*Lepus townsendii*	WHITE-TAILED JACKRABBIT				12,062,000	5,235,000	78%
M051	*Lepus californicus*	BLACK-TAILED JACKRABBIT				94,003,000	73,961,000	24%
M052	*Aplodontia rufa*	MOUNTAIN BEAVER	x*	x*		15,962,000	7,819,000	26%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
M053	*Tamias alpinus*	ALPINE CHIPMUNK		x		1,556,000	394,000	100%
M054	*Tamias minimus*	LEAST CHIPMUNK				7,690,000	4,001,000	92%
M055	*Tamias amoenus*	YELLOW-PINE CHIPMUNK				19,083,000	16,320,000	23%
M056	*Tamias ochrogenys*	REDWOOD CHIPMUNK				2,042,000	1,560,000	50%
M057	*Tamias senex*	SHADOW CHIPMUNK				21,212,000	18,152,000	17%
M058	*Tamias siskiyou*	SISKIYOU CHIPMUNK				1,377,000	559,000	10%
M059	*Tamias sonomae*	SONOMA CHIPMUNK				9,560,000	5,916,000	0%
M060	*Tamias merriami*	MERRIAM'S CHIPMUNK				15,718,000	12,619,000	33%
M061	*Tamias obscurus*	CHAPARRAL CHIPMUNK				2,140,000	670,000	20%
M062	*Tamias quadrimaculatus*	LONG-EARED CHIPMUNK				8,098,000	3,296,000	0%
M063	*Tamias speciosus*	LODGEPOLE CHIPMUNK		x*		8,333,000	4,026,000	30%
M064	*Tamias panamintinus*	PANAMINT CHIPMUNK				4,486,000	499,000	100%
M065	*Tamias umbrinus*	UINTA CHIPMUNK				4,306,000	461,000	100%
M066	*Marmota flaviventris*	YELLOW-BELLIED MARMOT				19,137,000	12,358,000	47%
M067	*Ammospermophilus leucurus*	WHITE-TAILED ANTELOPE GROUND SQUIRREL				30,319,000	25,971,000	13%

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M068	*Ammospermophilus nelsoni*	NELSON'S ANTELOPE GROUND SQUIRREL				4,095,000	1,846,000	77%
M069	*Urocitellus mollis*	PIUTE GROUND SQUIRREL				2,939,000	2,112,000	83%
M070	*Urocitellus beldingi*	BELDING'S GROUND SQUIRREL		x		19,678,000	9,124,000	52%
M071	*Otospermophilus variegatus*	ROCK SQUIRREL				641,000	590,000	10%
M072	*Otospermophilus beecheyi*	CALIFORNIA GROUND SQUIRREL				70,016,000	64,601,000	26%
M073	*Xerospermophilus mohavensis*	MOHAVE GROUND SQUIRREL				7,355,000	6,051,000	4%
M074	*Xerospermophilus tereticaudus*	ROUND-TAILED GROUND SQUIRREL				16,330,000	12,943,000	0%
M075	*Callospermophilus lateralis*	GOLDEN-MANTLED GROUND SQUIRREL		x*		28,165,000	24,011,000	25%
M077	*Sciurus griseus*	WESTERN GRAY SQUIRREL				47,114,000	29,661,000	4%
M079	*Tamiasciurus douglasii*	DOUGLAS' SQUIRREL				32,197,000	18,296,000	14%
M080	*Glaucomys sabrinus*	NORTHERN FLYING SQUIRREL		x*		24,816,000	16,474,000	15%
M081	*Thomomys bottae*	BOTTA'S POCKET GOPHER				86,874,000	67,737,000	22%

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M082	*Thomomys townsendii*	TOWNSEND'S POCKET GOPHER				710,000	500,000	94%
M083	*Thomomys talpoides*	NORTHERN POCKET GOPHER				7,003,000	5,651,000	65%
M084	*Thomomys mazama*	MAZAMA POCKET GOPHER				6,583,000	984,000	30%
M085	*Thomomys monticola*	MOUNTAIN POCKET GOPHER				9,683,000	4,254,000	40%
M086	*Perognathus longimembris*	LITTLE POCKET MOUSE				30,696,000	23,960,000	5%
M087	*Perognathus inornatus*	SAN JOAQUIN POCKET MOUSE				18,896,000	7,291,000	69%
M088	*Perognathus parvus*	GREAT BASIN POCKET MOUSE				12,500,000	6,433,000	71%
M089	*Perognathus alticolus*	WHITE-EARED POCKET MOUSE				667,000	141,000	49%
M091	*Chaetodipus formosus*	LONG-TAILED POCKET MOUSE				26,392,000	21,254,000	4%
M092	*Chaetodipus rudinoris*	BAILEY'S POCKET MOUSE				2,101,000	1,600,000	0%
M093	*Chaetodipus penicillatus*	DESERT POCKET MOUSE				8,775,000	6,189,000	0%
M094	*Chaetodipus fallax*	SAN DIEGO POCKET MOUSE				8,013,000	5,671,000	20%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
M095	*Chaetodipus californicus*	CALIFORNIA POCKET MOUSE				24,650,000	16,383,000	44%
M096	*Chaetodipus spinatus*	SPINY POCKET MOUSE				7,576,000	5,457,000	0%
M097	*Microdipodops megacephalus*	DARK KANGAROO MOUSE				1,760,000	1,184,000	90%
M098	*Microdipodops pallidus*	PALE KANGAROO MOUSE				89,000	24,000	18%
M099	*Dipodomys ordii*	ORD'S KANGAROO RAT				2,294,000	1,478,000	86%
M100	*Dipodomys microps*	CHISEL-TOOTHED KANGAROO RAT				14,881,000	12,683,000	11%
M102	*Dipodomys venustus*	NARROW-FACED KANGAROO RAT				3,413,000	1,960,000	51%
M103	*Dipodomys agilis*	AGILE KANGAROO RAT				11,178,000	7,310,000	32%
M104	*Dipodomys heermanni*	HEERMANN'S KANGAROO RAT				19,403,000	9,809,000	66%
M105	*Dipodomys californicus*	CALIFORNIA KANGAROO RAT				17,814,000	4,768,000	43%
M106	*Dipodomys ingens*	GIANT KANGAROO RAT				4,216,000	2,174,000	85%
M107	*Dipodomys panamintinus*	PANAMINT KANGAROO RAT				7,563,000	6,305,000	29%

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M108	*Dipodomys stephensi*	STEPHENS' KANGAROO RAT				2,894,000	636,000	100%
M109	*Dipodomys deserti*	DESERT KANGAROO RAT				25,179,000	20,437,000	3%
M110	*Dipodomys merriami*	MERRIAM'S KANGAROO RAT				28,656,000	24,430,000	8%
M111	*Dipodomys nitratoides*	FRESNO KANGAROO RAT				5,780,000	1,824,000	76%
M112	*Castor canadensis*	AMERICAN BEAVER	x*		x	26,982,000	12,537,000	28%
M113	*Reithrodontomys megalotis*	WESTERN HARVEST MOUSE			x*	101,150,000	74,595,000	27%
M114	*Reithrodontomys raviventris*	SALT-MARSH HARVEST MOUSE			x	630,000	165,000	99%
M115	*Peromyscus eremicus*	CACTUS MOUSE				33,016,000	25,316,000	6%
M116	*Peromyscus californicus*	CALIFORNIA MOUSE				16,230,000	8,065,000	22%
M117	*Peromyscus maniculatus*	DEER MOUSE				101,447,000	98,807,000	23%
M118	*Peromyscus crinitus*	CANYON MOUSE				33,473,000	28,887,000	16%
M119	*Peromyscus boylii*	BRUSH MOUSE				49,816,000	29,390,000	38%

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M120	*Peromyscus truei*	PINYON MOUSE				59,122,000	38,540,000	37%
M121	*Onychomys leucogaster*	NORTHERN GRASSHOPPER MOUSE				6,474,000	5,073,000	70%
M122	*Onychomys torridus*	SOUTHERN GRASSHOPPER MOUSE				43,456,000	29,723,000	19%
M123	*Sigmodon hispidus*	HISPID COTTON RAT	x*			1,743,000	1,423,000	1%
M125	*Neotoma albigula*	WHITE-THROATED WOODRAT				6,663,000	4,865,000	0%
M126	*Neotoma lepida*	DESERT WOODRAT				46,161,000	31,292,000	12%
M127	*Neotoma fuscipes*	DUSKY-FOOTED WOODRAT				32,643,000	19,211,000	15%
M128	*Neotoma cinerea*	BUSHY-TAILED WOODRAT				23,044,000	18,487,000	40%
M129	*Myodes californicus*	CALIFORNIA RED-BACKED VOLE				13,378,000	7,779,000	17%
M130	*Phenacomys intermedius*	HEATHER VOLE				4,433,000	2,486,000	55%
M131	*Arborimus albipes*	WHITE-FOOTED VOLE				1,005,000	291,000	55%
M132	*Arborimus pomo*	SONOMA RED TREE VOLE		x		6,348,000	3,499,000	26%
M133	*Microtus montanus*	MONTANE VOLE		x		17,654,000	13,894,000	36%
M134	*Microtus californicus*	CALIFORNIA VOLE	x*	x*	x*	51,937,000	37,836,000	35%
M135	*Microtus townsendii*	TOWNSEND'S VOLE				778,000	133,000	36%

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M136	*Microtus longicaudus*	LONG-TAILED VOLE	x*			31,025,000	19,320,000	37%
M137	*Microtus oregoni*	CREEPING VOLE				8,577,000	1,642,000	32%
M138	*Lemmiscus curtatus*	SAGEBRUSH VOLE				5,606,000	3,187,000	98%
M143	*Zapus princeps*	WESTERN JUMPING MOUSE		x		22,471,000	11,197,000	34%
M144	*Zapus trinotatus*	PACIFIC JUMPING MOUSE				3,226,000	244,000	22%
M145	*Erethizon dorsatum*	COMMON PORCUPINE				48,943,000	35,772,000	21%
M146	*Canis latrans*	COYOTE				100,925,000	98,323,000	23%
M147	*Vulpes vulpes*	RED FOX		x*		15,816,000	10,052,000	34%
M148	*Vulpes macrotis*	KIT FOX				34,861,000	28,217,000	15%
M149	*Urocyon cinereoargenteus*	GRAY FOX				96,264,000	87,533,000	20%
M150	*Urocyon littoralis*	ISLAND GRAY FOX				223,000	212,000	87%
M151	*Ursus americanus*	BLACK BEAR				39,114,000	32,362,000	21%
M152	*Bassariscus astutus*	RINGTAIL				86,593,000	65,905,000	24%
M153	*Procyon lotor*	RACCOON				76,487,000	71,314,000	29%
M154	*Martes caurina*	MARTEN		x		20,820,000	14,390,000	17%
M155	*Pekania pennanti*	FISHER				25,311,000	15,437,000	19%

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M156	*Mustela erminea*	ERMINE				26,001,000	19,858,000	12%
M157	*Mustela frenata*	LONG-TAILED WEASEL				76,159,000	71,380,000	30%
M159	*Gulo*	WOLVERINE		x		13,348,000	9,766,000	23%
M160	*Taxidea taxus*	AMERICAN BADGER				100,674,000	69,376,000	27%
M161	*Spilogale gracilis*	WESTERN SPOTTED SKUNK				83,006,000	68,066,000	29%
M162	*Mephitis*	STRIPED SKUNK				76,052,000	68,330,000	27%
M165	*Puma concolor*	MOUNTAIN LION				67,400,000	59,877,000	32%
M166	*Lynx rufus*	BOBCAT				100,925,000	89,301,000	24%
M177	*Cervus elaphus*	ELK				14,005,000	10,636,000	29%
M181	*Odocoileus hemionus*	MULE DEER				69,946,000	65,990,000	30%
M182	*Antilocapra americana*	PRONGHORN				7,002,000	4,476,000	73%
M183	*Ovis canadensis*	BIGHORN SHEEP		x*		33,804,000	19,437,000	0%
M233	*Neotoma macrotis*	BIG-EARED WOODRAT				18,545,000	10,387,000	15%
M234	*Peromyscus fraterculus*	BAJA MOUSE				9,557,000	5,056,000	26%
R004	*Actinemys marmorata*	WESTERN POND TURTLE	x*		x	61,735,000	43,928,000	28%

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R005	*Gopherus agassizii*	MOHAVE DESERT TORTOISE				21,768,000	20,398,000	3%
R007	*Coleonyx switaki*	SWITAK'S BANDED GECKO				407,000	243,000	0%
R008	*Coleonyx variegatus*	WESTERN BANDED GECKO				28,970,000	25,236,000	4%
R009	*Phyllodactylus nocticolus*	PENINSULA LEAF-TOED GECKO				684,000	499,000	0%
R010	*Dipsosaurus dorsalis*	DESERT IGUANA				24,540,000	20,735,000	1%
R011	*Sauromalus ater*	COMMON CHUCKWALLA				23,106,000	20,290,000	2%
R012	*Callisaurus draconoides*	ZEBRA-TAILED LIZARD				26,169,000	23,427,000	3%
R013	*Uma notata*	COLORADO DESERT FRINGE-TOED LIZARD				2,261,000	1,643,000	0%
R014	*Uma inornata*	COACHELLA VALLEY FRINGE-TOED LIZARD				406,000	235,000	0%
R015	*Uma scoparia*	MOHAVE FRINGE-TOED LIZARD		x		8,795,000	7,713,000	0%
R017	*Crotaphytus bicinctores*	GREAT BASIN COLLARED LIZARD				24,668,000	22,944,000	7%
R018	*Gambelia wislizenii*	LONG-NOSED LEOPARD LIZARD				33,174,000	27,326,000	12%
R019	*Gambelia sila*	BLUNT-NOSED LEOPARD LIZARD				4,867,000	2,250,000	85%
R020	*Sceloporus magister*	DESERT SPINY LIZARD				7,777,000	6,419,000	1%

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R021	*Sceloporus orcutti*	GRANITE SPINY LIZARD				3,453,000	2,458,000	24%
R022	*Sceloporus occidentalis*	WESTERN FENCE LIZARD				71,014,000	60,217,000	30%
R023	*Sceloporus graciosus*	COMMON SAGEBRUSH LIZARD				42,027,000	16,668,000	31%
R024	*Uta stansburiana*	COMMON SIDE-BLOTCHED LIZARD				55,189,000	50,818,000	21%
R025	*Urosaurus graciosus*	LONG-TAILED BRUSH LIZARD				16,378,000	13,962,000	1%
R026	*Urosaurus ornatus*	ORNATE TREE LIZARD				693,000	540,000	0%
R027	*Urosaurus nigricaudus*	BAJA CALIFORNIA BRUSH LIZARD				729,000	627,000	8%
R028	*Petrosaurus mearnsi*	MEARNS' ROCK LIZARD				1,037,000	574,000	6%
R029	*Phrynosoma blainvillii*	BLAINVILLE'S HORNED LIZARD		x		37,240,000	23,201,000	42%
R030	*Phrynosoma platyrhinos*	DESERT HORNED LIZARD				28,047,000	25,007,000	6%
R031	*Phrynosoma douglasii*	PYGMY SHORT-HORNED LIZARD				2,872,000	1,686,000	43%
R032	*Phrynosoma mcallii*	FLAT-TAILED HORNED LIZARD				1,648,000	1,844,000	0%
R033	*Xantusia henshawi*	GRANITE NIGHT LIZARD				2,816,000	2,211,000	19%

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R034	*Xantusia vigilis*	DESERT NIGHT LIZARD				26,149,000	21,518,000	15%
R035	*Xantusia riversiana*	ISLAND NIGHT LIZARD		x		51,000	45,000	100%
R036	*Plestiodon skiltonianus*	WESTERN SKINK				53,079,000	36,084,000	26%
R037	*Plestiodon gilberti*	GILBERT'S SKINK				26,876,000	18,217,000	39%
R038	*Aspidoscelis hyperythra*	ORANGE-THROATED WHIPTAIL		x		2,979,000	1,312,000	41%
R039	*Aspidoscelis tigris*	TIGER WHIPTAIL				63,812,000	47,688,000	25%
R040	*Elgaria multicarinata*	SOUTHERN ALLIGATOR LIZARD				48,509,000	43,010,000	25%
R041	*Elgaria panamintina*	PANAMINT ALLIGATOR LIZARD		x		2,680,000	2,284,000	35%
R042	*Elgaria coerulea*	NORTHERN ALLIGATOR LIZARD				31,022,000	23,525,000	19%
R043	*Anniella pulchra*	CALIFORNIA LEGLESS LIZARD		x		29,975,000	9,346,000	19%
R044	*Heloderma suspectum*	GILA MONSTER		x		981,000	954,000	10%
R045	*Rena humilis*	WESTERN THREADSNAKE				34,141,000	26,476,000	6%
R046	*Charina bottae*	NORTHERN RUBBER BOA				35,236,000	20,635,000	13%
R048	*Diadophis punctatus*	RING-NECKED SNAKE				44,795,000	32,053,000	29%
R049	*Contia tenuis*	COMMON SHARP-TAILED SNAKE				29,046,000	18,652,000	3%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
R050	*Phyllorhynchus decurtatus*	SPOTTED LEAF-NOSED SNAKE				23,867,000	20,129,000	1%
R051	*Coluber constrictor*	NORTH AMERICAN RACER				57,707,000	41,732,000	34%
R052	*Coluber flagellum*	COACHWHIP				45,391,000	34,972,000	21%
R053	*Masticophis lateralis*	STRIPED RACER				34,729,000	18,690,000	10%
R054	*Masticophis taeniatus*	STRIPED WHIPSNAKE				15,278,000	6,288,000	71%
R055	*Salvadora hexalepis*	WESTERN PATCH-NOSED SNAKE		x*		37,887,000	31,530,000	13%
R056	*Arizona elegans*	GLOSSY SNAKE				37,814,000	28,271,000	15%
R057	*Pituophis catenifer*	GOPHERSNAKE				97,480,000	82,666,000	22%
R058	*Lampropeltis californiae*	CALIFORNIA KINGSNAKE				84,811,000	78,008,000	19%
R059	*Lampropeltis zonata*	CALIFORNIA MOUNTAIN KINGSNAKE				27,874,000	22,823,000	11%
R060	*Rhinocheilus lecontei*	LONG-NOSED SNAKE				43,350,000	34,339,000	23%
R061	*Thamnophis sirtalis*	COMMON GARTERSNAKE	x*		x	66,362,000	58,880,000	27%
R062	*Thamnophis elegans*	TERRESTRIAL GARTERSNAKE			x	48,781,000	40,063,000	30%
R063	*Thamnophis couchii*	SIERRA GARTERSNAKE			x	17,972,000	9,363,000	24%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
R064	*Thamnophis ordinoides*	NORTHWESTERN GARTERSNAKE			x	301,000	74,000	2%
R066	*Sonora semiannulata*	WESTERN GROUNDSNAKE				25,819,000	22,198,000	4%
R067	*Chionactis occipitalis*	WESTERN SHOVEL-NOSED SNAKE				25,303,000	22,679,000	2%
R068	*Tantilla planiceps*	WESTERN BLACK-HEADED SNAKE				14,982,000	10,602,000	45%
R069	*Tantilla hobartsmithi*	SMITH'S BLACK-HEADED SNAKE				5,726,000	2,764,000	10%
R070	*Trimorphodon lambda*	SONORAN LYRESNAKE				10,176,000	9,690,000	1%
R071	*Hypsiglena chlorophaea*	DESERT NIGHTSNAKE				27,500,000	24,198,000	9%
R072	*Crotalus atrox*	WESTERN DIAMOND-BACKED RATTLESNAKE				6,992,000	5,976,000	0%
R073	*Crotalus ruber*	RED DIAMOND RATTLESNAKE				5,225,000	3,679,000	27%
R074	*Crotalus mitchellii*	SPECKLED RATTLESNAKE				16,633,000	14,627,000	7%
R075	*Crotalus cerastes*	SIDEWINDER				24,319,000	21,731,000	2%
R076	*Crotalus oreganus*	WESTERN RATTLESNAKE				73,745,000	60,480,000	31%
R077	*Crotalus scutulatus*	MOHAVE RATTLESNAKE				13,004,000	11,974,000	1%

CWHR ID	Scientific Name	Common Name	Drought Priority	Climate Vulnerable	Aquatic	Total range area (Acres)	Suitable habitat within range (Acres)	Percent habitat area mid-high to highly climate vulnerable
R078	*Thamnophis atratus*	AQUATIC GARTERSNAKE			x	20,685,000	18,039,000	27%
R079	*Thamnophis gigas*	GIANT GARTERSNAKE	x*		x	7,050,000	2,619,000	57%
R080	*Thamnophis hammondii*	TWO-STRIPED GARTERSNAKE	x		x	15,713,000	10,882,000	39%
R093	*Crotaphytus vestigium*	BAJA CALIFORNIA COLLARED LIZARD				2,879,000	1,703,000	0%
R094	*Xantusia gracilis*	SANDSTONE NIGHT LIZARD				7,000	7,000	0%
R105	*Lichanura orcutti*	NORTHERN THREE-LINED BOA				26,494,000	21,569,000	5%

Appendix B. Species excluded from analysis.

Species were excluded from the analysis if <50% of their suitable habitat area was assessed in the vegetation climate exposure models (Thorne et al. 2016). The vegetation exposure models did not assess agricultural lands including CWHR habitat types Cropland, Orchards, Hayfields, Pasture, Rice, and Vineyards; Urban; or aquatic habitats including Lacustrine, Riverine, Estuarine, and Water. Drought priority species are those identified by CDFW (2016). Species for which the drought priority taxon is a subspecies or Distinct Population Segment are denoted with an asterisk. Marine species were defined as those for which >50% of their range in California is marine habitat. All area estimates are rounded to the nearest 1000 acres.

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
A019	*Batrachoseps campi*	INYO MOUNTAINS SALAMANDER			142,780	na
B001	*Gavia stellata*	RED-THROATED LOON		x	19,824,000	61,000
B002	*Gavia pacifica*	PACIFIC LOON		x	19,824,000	61,000
B003	*Gavia immer*	COMMON LOON		x	24,147,000	758,000
B006	*Podilymbus podiceps*	PIED-BILLED GREBE			82,271,000	3,720,000
B007	*Podiceps auritus*	HORNED GREBE		x	21,455,000	1,208,000
B008	*Podiceps grisegena*	RED-NECKED GREBE		x	8,547,000	318,000
B009	*Podiceps nigricollis*	EARED GREBE			79,177,000	3,313,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B010	*Aechmophorus occidentalis*	WESTERN GREBE			52,454,000	1,678,000
B042	*Pelecanus erythrorhynchos*	AMERICAN WHITE PELICAN	x		46,237,000	4,046,000
B043	*Pelecanus occidentalis*	BROWN PELICAN		x	16,884,000	363,000
B044	*Phalacrocorax auritus*	DOUBLE-CRESTED CORMORANT			53,614,000	3,476,000
B046	*Phalacrocorax penicillatus*	BRANDT'S CORMORANT		x	19,824,000	77,000
B047	*Phalacrocorax pelagicus*	PELAGIC CORMORANT		x	19,824,000	77,000
B049	*Botaurus lentiginosus*	AMERICAN BITTERN			60,574,000	2,928,000
B050	*Ixobrychus exilis*	LEAST BITTERN	x		8,685,000	1,079,000
B052	*Ardea alba*	GREAT EGRET			35,333,000	22,628,000
B053	*Egretta thula*	SNOWY EGRET			37,419,000	11,140,000
B062	*Plegadis chihi*	WHITE-FACED IBIS			2,602,000	1,486,000
B065	*Dendrocygna bicolor*	FULVOUS WHISTLING-DUCK	x		1,035,000	631,000
B070	*Anser albifrons*	GREATER WHITE-FRONTED GOOSE	x*		21,331,000	8,284,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B071	*Chen caerulescens*	SNOW GOOSE			18,963,000	6,195,000
B072	*Chen rossii*	ROSS' S GOOSE			14,528,000	4,435,000
B074	*Branta bernicla*	BRANT		x	42,000	12,000
B075	*Branta canadensis*	CANADA GOOSE			50,179,000	16,362,000
B080	*Anas acuta*	NORTHERN PINTAIL			86,299,000	21,895,000
B082	*Anas discors*	BLUE-WINGED TEAL			33,348,000	5,368,000
B086	*Anas penelope*	EURASIAN WIGEON			19,770,000	7,979,000
B087	*Anas americana*	AMERICAN WIGEON			51,166,000	19,555,000
B089	*Aythya valisineria*	CANVASBACK			46,729,000	3,103,000
B090	*Aythya americana*	REDHEAD	x		23,151,000	2,852,000
B091	*Aythya collaris*	RING-NECKED DUCK			99,711,000	3,827,000
B093	*Aythya marila*	GREATER SCAUP			5,994,000	1,092,000
B097	*Clangula hyemalis*	LONG-TAILED DUCK		x	7,219,000	303,000
B098	*Melanitta americana*	BLACK SCOTER		x	1,591,000	292,000
B099	*Melanitta perspicillata*	SURF SCOTER		x	1,996,000	339,000
B100	*Melanitta fusca*	WHITE-WINGED SCOTER		x	1,911,000	292,000
B101	*Bucephala clangula*	COMMON GOLDENEYE			40,876,000	2,958,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B102	*Bucephala islandica*	BARROW'S GOLDENEYE			4,605,000	451,000
B103	*Bucephala albeola*	BUFFLEHEAD			76,898,000	5,342,000
B104	*Lophodytes cucullatus*	HOODED MERGANSER			54,874,000	6,837,000
B105	*Mergus merganser*	COMMON MERGANSER			65,254,000	7,565,000
B106	*Mergus serrator*	RED-BREASTED MERGANSER			8,892,000	578,000
B107	*Oxyura jamaicensis*	RUDDY DUCK			70,577,000	3,635,000
B143	*Laterallus jamaicensis*	BLACK RAIL	x*		1,963,000	526,000
B144	*Rallus longirostris*	CLAPPER RAIL	x*		2,337,000	427,000
B146	*Porzana carolina*	SORA			43,278,000	2,475,000
B148	*Gallinula galeata*	COMMON GALLINULE			43,560,000	7,606,000
B150	*Grus canadensis*	SANDHILL CRANE	x*		22,396,000	8,972,000
B151	*Pluvialis squatarola*	BLACK-BELLIED PLOVER			15,976,000	5,993,000
B154	*Charadrius nivosus*	SNOWY PLOVER	x*		10,516,000	779,000
B156	*Charadrius semipalmatus*	SEMIPALMATED PLOVER		x	7,216,000	1,021,000
B159	*Charadrius montanus*	MOUNTAIN PLOVER			7,738,000	3,966,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B162	*Haematopus bachmani*	BLACK OYSTERCATCHER		x	4,244,000	60,000
B163	*Himantopus mexicanus*	BLACK-NECKED STILT			23,366,000	4,827,000
B164	*Recurvirostra americana*	AMERICAN AVOCET			27,506,000	4,784,000
B165	*Tringa melanoleuca*	GREATER YELLOWLEGS			27,041,000	4,210,000
B166	*Tringa flavipes*	LESSER YELLOWLEGS			3,882,000	1,004,000
B168	*Tringa semipalmata*	WILLET			18,192,000	3,731,000
B169	*Tringa incana*	WANDERING TATTLER		x	8,319,000	72,000
B172	*Numenius phaeopus*	WHIMBREL		x	5,439,000	494,000
B176	*Limosa fedoa*	MARBLED GODWIT		x	7,481,000	2,339,000
B177	*Arenaria interpres*	RUDDY TURNSTONE		x	5,343,000	309,000
B178	*Arenaria melanocephala*	BLACK TURNSTONE		x	5,234,000	306,000
B179	*Calidris virgata*	SURFBIRD		x	5,191,000	82,000
B180	*Calidris canutus*	RED KNOT		x	1,661,000	200,000
B181	*Calidris alba*	SANDERLING		x	6,003,000	593,000
B183	*Calidris mauri*	WESTERN SANDPIPER			12,349,000	3,107,000
B185	*Calidris minutilla*	LEAST SANDPIPER			69,472,000	6,238,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B190	*Calidris ptilocnemis*	ROCK SANDPIPER		x	572,000	10,000
B191	*Calidris alpina*	DUNLIN			22,018,000	3,888,000
B193	*Calidris himantopus*	STILT SANDPIPER		x	175,000	123,000
B196	*Limnodromus griseus*	SHORT-BILLED DOWITCHER		x	2,398,000	602,000
B197	*Limnodromus scolopaceus*	LONG-BILLED DOWITCHER			28,029,000	4,540,000
B199	*Gallinago delicata*	WILSON'S SNIPE			72,058,000	6,256,000
B200	*Phalaropus tricolor*	WILSON'S PHALAROPE			9,451,000	1,764,000
B211	*Chroicocephalus philadelphia*	BONAPARTE'S GULL		x	6,871,000	609,000
B212	*Larus heermanni*	HEERMANN'S GULL		x	5,387,000	69,000
B213	*Larus canus*	MEW GULL			13,240,000	2,351,000
B214	*Larus delawarensis*	RING-BILLED GULL			50,930,000	17,043,000
B215	*Larus californicus*	CALIFORNIA GULL			44,424,000	18,048,000
B216	*Larus argentatus*	HERRING GULL			23,842,000	4,488,000
B217	*Larus thayeri*	THAYER'S GULL		x	10,494,000	499,000
B219	*Larus livens*	YELLOW-FOOTED GULL		x	484,000	325,000
B220	*Larus occidentalis*	WESTERN GULL		x	9,974,000	1,540,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B221	*Larus glaucescens*	GLAUCOUS-WINGED GULL			17,220,000	2,197,000
B226	*Gelochelidon nilotica*	GULL-BILLED TERN	x	x	73,000	58,000
B227	*Hydroprogne caspia*	CASPIAN TERN			10,822,000	919,000
B228	*Thalasseus maximus*	ROYAL TERN		x	1,617,000	29,000
B229	*Thalasseus elegans*	ELEGANT TERN		x	916,000	57,000
B231	*Sterna hirundo*	COMMON TERN		x	7,268,000	693,000
B233	*Sterna forsteri*	FORSTER'S TERN			25,238,000	3,294,000
B234	*Sternula antillarum*	LEAST TERN		x	1,793,000	166,000
B235	*Chlidonias niger*	BLACK TERN	x		10,727,000	2,344,000
B236	*Rynchops niger*	BLACK SKIMMER	x	x	91,000	66,000
B237	*Uria aalge*	COMMON MURRE		x	6,018,000	309,000
B239	*Cepphus columba*	PIGEON GUILLEMOT		x	3,775,000	61,000
B240	*Brachyramphus marmoratus*	MARBLED MURRELET		x	3,410,000	60,000
B241	*Synthliboramphus scrippsi*	SCRIPPS'S MURRELET		x	717,000	21,000
B243	*Synthliboramphus antiquus*	ANCIENT MURRELET		x	3,522,000	59,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B244	*Ptychoramphus aleuticus*	CASSIN'S AUKLET		x	19,824,000	60,000
B247	*Cerorhinca monocerata*	RHINOCEROS AUKLET		x	27,901,000	172,000
B248	*Fratercula cirrhata*	TUFTED PUFFIN		x	16,202,000	60,000
B256	*Columbina inca*	INCA DOVE			387,000	73,000
B293	*Megaceryle alcyon*	BELTED KINGFISHER			65,294,000	5,285,000
B324	*Pyrocephalus rubinus*	VERMILION FLYCATCHER	x		831,000	124,000
B342	*Riparia riparia*	BANK SWALLOW			1,840,000	1,494,000
B372	*Cistothorus palustris*	MARSH WREN	x*		49,146,000	3,969,000
B520	*Agelaius tricolor*	TRICOLORED BLACKBIRD	x		38,164,000	21,606,000
B522	*Xanthocephalus xanthocephalus*	YELLOW-HEADED BLACKBIRD	x		31,926,000	7,816,000
B525	*Quiscalus mexicanus*	GREAT-TAILED GRACKLE			2,198,000	845,000
B527	*Molothrus aeneus*	BRONZED COWBIRD			119,000	33,000
B548	*Aechmophorus clarkii*	CLARK'S GREBE			73,108,000	3,678,000
B579	*Oceanodroma furcata*	FORK-TAILED STORM-PETREL		x	23,059,000	74,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
B580	*Oceanodroma leucorhoa*	LEACH'S STORM-PETREL		x	19,709,000	70,000
B581	*Oceanodroma homochroa*	ASHY STORM-PETREL		x	28,336,000	70,000
B584	*Oceanodroma melania*	BLACK STORM-PETREL		x	18,691,000	70,000
B603	*Mycteria americana*	WOOD STORK	x		43,000	40,000
B629	*Pluvialis fulva*	PACIFIC GOLDEN-PLOVER			3,012,000	1,225,000
B648	*Calidris bairdii*	BAIRD'S SANDPIPER			33,511,000	3,800,000
B649	*Calidris melanotos*	PECTORAL SANDPIPER			20,330,000	1,089,000
B655	*Phalaropus lobatus*	RED-NECKED PHALAROPE		x	20,825,000	1,012,000
B656	*Phalaropus fulicarius*	RED PHALAROPE		x	24,408,000	828,000
B634	*Haematopus palliatus*	AMERICAN OYSTERCATCHER		x	1,067,000	52,000
B864	*Branta hutchinsii*	CACKLING GOOSE			776,000	445,000
M020	*Choeronycteris mexicana*	HOG-NOSED BAT	x		492,000	266,000
M041	*Nyctinomops macrotis*	BIG FREE-TAILED BAT	x		246,000	163,000
M124	*Sigmodon arizonae*	ARIZONA COTTON RAT	x*		843,000	120,000

CWHR ID	Scientific Name	Common Name	Drought Priority	Marine	Total Range Area (acres)	Terrestrial Potential Suitable Habitat within Range (acres)
M139	*Ondatra zibethicus*	COMMON MUSKRAT			23,599,000	2,622,000
M158	*Mustela vison*	AMERICAN MINK			42,009,000	2,838,000
M163	*Lontra canadensis*	NORTHERN RIVER OTTER	x*		25,756,000	1,731,000
M164	*Enhydra lutris*	SEA OTTER		x	2,953,000	44,000
M167	*Callorhinus ursinus*	NORTHERN FUR-SEAL		x	8,300,000	65,000
M168	*Arctocephalus townsendi*	GUADALUPE FUR-SEAL		x	18,161,000	69,000
M169	*Eumetopias jubatus*	NORTHERN (STELLER) SEA-LION		x	7,989,000	61,000
M170	*Zalophus californianus*	CALIFORNIA SEA-LION		x	20,122,000	350,000
M171	*Phoca vitulina*	HARBOR SEAL		x	20,122,000	354,000
M173	*Mirounga angustirostris*	NORTHERN ELEPHANT SEAL		x	19,824,000	74,000
R002	*Kinosternon sonoriense*	SONORA MUD TURTLE			53,000	2,000
R065	*Thamnophis marcianus*	CHECKERED GARTERSNAKE			512,000	176,000

Appendix C. Predicted climate exposure impacts to suitable habitat for 522 species under four climate change scenarios at the end of the century.

The table shows the percent of potentially suitable habitat for each species that is predicted to be impacted by high climate exposure, moderate climate exposure, non-analog conditions, low climate exposure (predicted to remain stable and function as vegetation refugia), or was not assessed, based on climate exposure data from the Vegetation Climate Vulnerability Assessment for California (Thorne 2016). Note that the habitat climate exposure analysis differs from the vulnerability rank summarized in Appendix A. Results shown are for the end of the century (2070-2099), and include two GSMs, MIROC-ESM (HotDry) and CNRM-5 (WarmWet), and two emissions scenarios: low (rcp 4.5; reduced emissions scenario) and high (rcp 8.5; unmitigated emissions). Potential habitat areas that were not assessed include CWHR habitat types Cropland, Orchards, Hayfields, Pasture, Rice, and Vineyards; Urban; or aquatic habitats including Lacustrine, Riverine, Estuarine, and Water.

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
A001	CALIFORNIA TIGER SALAMANDER	*Ambystoma californiense*	9%	19%	45%	0%	34%	18%	20%	2%	12%	12%	48%	0%	25%	26%	18%	3%	27%
A002	NORTHWESTERN SALAMANDER	*Ambystoma gracile*	7%	18%	66%	0%	15%	21%	55%	0.1%	32%	29%	27%	2%	36%	25%	22%	8%	10%
A003	LONG-TOED SALAMANDER	*Ambystoma macrodactylum*	4%	10%	69%	0%	16%	22%	45%	0%	9%	20%	53%	0%	19%	53%	10%	1%	17%
A004	CALIFORNIA GIANT SALAMANDER	*Dicamptodon ensatus*	14%	12%	43%	0%	38%	21%	11%	0%	21%	29%	20%	0%	62%	1%	7%	0%	30%
A005	SOUTHERN TORRENT SALAMANDER	*Rhyacotriton variegatus*	6%	15%	62%	0%	12%	17%	53%	0.1%	27%	28%	26%	2%	31%	27%	18%	7%	17%
A006	ROUGH-SKINNED NEWT	*Taricha granulosa*	9%	16%	64%	0%	20%	20%	48%	0%	25%	26%	37%	1%	35%	31%	18%	5%	11%
A007	CALIFORNIA NEWT	*Taricha torosa*	13%	10%	56%	0%	30%	22%	27%	0.2%	12%	15%	52%	0%	34%	26%	18%	1%	21%
A008	RED-BELLIED NEWT	*Taricha rivularis*	3%	9%	69%	0%	27%	28%	27%	0%	32%	29%	21%	0%	62%	1%	19%	0.3%	18%
A009	DUNN'S SALAMANDER	*Plethodon dunni*	40%	1%	0%	0%	40%	0.2%	0%	0.4%	11%	0%	0%	30%	0%	0%	0%	40%	60%
A010	DEL NORTE SALAMANDER	*Plethodon elongatus*	9%	21%	54%	0%	17%	12%	55%	0.1%	21%	24%	35%	4%	16%	37%	17%	14%	16%
A011	SISKIYOU MOUNTAINS SALAMANDER	*Plethodon stormi*	1%	3%	48%	0%	0.2%	2%	50%	0%	1%	21%	29%	0%	0.4%	47%	4%		48%
A012	ENSATINA	*Ensatina eschscholtzii*	14%	15%	51%	0%	33%	15%	32%	0.2%	20%	19%	41%	0.3%	32%	30%	13%	5%	20%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
A013	SOUTHERN CALIFORNIA SLENDER SALAMANDER	*Batrachoseps major*	8%	21%	8%	0%	17%	16%	4%	1%	31%	4%	3%	0%	22%	0.1%	1%	14%	63%
A014	CALIFORNIA SLENDER SALAMANDER	*Batrachoseps attenuatus*	12%	19%	42%	0%	34%	19%	20%	0%	25%	19%	29%	1%	40%	13%	12%	8%	27%
A015	BLACK-BELLIED SLENDER SALAMANDER	*Batrachoseps nigriventris*	12%	12%	49%	0%	32%	13%	28%	0%	5%	11%	57%	0%	23%	41%	8%	1%	26%
A016	CHANNEL ISLANDS SLENDER SALAMANDER	*Batrachoseps pacificus*	1%	5%	93%	0%	42%	39%	18%	0%	1%	52%	46%	0%	87%	5%	8%		1%
A017	KERN CANYON SLENDER SALAMANDER	*Batrachoseps simatus*	15%	16%	46%	0%	53%	14%	10%	0%	1%	6%	69%	0%	19%	42%	15%		23%
A018	TEHACHAPI SLENDER SALAMANDER	*Batrachoseps stebbinsi*	21%	3%	2%	0%	24%	1%	1%	0%	6%	11%	9%	0%	9%	5%	12%		74%
A020	BLACK SALAMANDER	*Aneides flavipunctatus*	8%	16%	70%	0%	19%	23%	52%	0%	26%	28%	38%	1%	39%	30%	20%	5%	6%
A021	CLOUDED SALAMANDER	*Aneides ferreus*	14%	30%	40%	0%	23%	15%	45%	0.3%	36%	28%	12%	8%	14%	22%	25%	24%	16%
A022	ARBOREAL SALAMANDER	*Aneides lugubris*	9%	11%	42%	0%	31%	13%	18%	0%	11%	15%	36%	0%	32%	21%	8%	1%	38%
A023	MOUNT LYELL SALAMANDER	*Hydromantes platycephalus*	16%	26%	42%	0%	45%	30%	8%	0%	9%	13%	62%	0%	24%	47%	14%		16%
A024	SHASTA SALAMANDER	*Hydromantes shastae*	3%	1%	24%	0%	5%	4%	19%	0%	5%	7%	17%	0.2%	12%	6%	8%	3%	71%
A025	LIMESTONE SALAMANDER	*Hydromantes brunus*	1%	6%	50%	0%	42%	11%	3%	0%	11%	29%	16%	0%	54%	0.2%	2%	0%	44%
A026	COASTAL TAILED FROG	*Ascaphus truei*	4%	11%	63%	0%	10%	15%	54%	0%	18%	24%	36%	1%	20%	37%	16%	5%	22%
A027	COUCH'S SPADEFOOT	*Scaphiopus couchii*	81%	12%	4%	1%	4%	0.1%	0.3%	94%	76%	17%	6%	0%	1%	0%	0%	97%	1%
A028	WESTERN SPADEFOOT	*Spea hammondii*	27%	23%	40%	0%	58%	15%	15%	2%	29%	18%	42%	0%	48%	20%	12%	9%	10%

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A029	GREAT BASIN SPADEFOOT	*Spea intermontana*	19%	21%	47%	0%	31%	29%	28%	0%	30%	33%	25%	0%	68%	8%	12%		12%
A030	SONORAN DESERT TOAD	*Incilius alvarius*	71%	1%	0%	0%	0%	0%	0%	73%	68%	4%	0%	0%	0%	0%	0%	73%	27%
A031	BLACK TOAD	*Anaxyrus exsul*	0%	33%	2%	0%	31%	0%	4%	0%	0%	0%	35%	0%	12%	2%	22%		65%
A032	WESTERN TOAD	*Anaxyrus boreas*	18%	20%	56%	0%	41%	20%	33%	0.4%	26%	22%	47%	0.2%	43%	31%	16%	5%	5%
A033	YOSEMITE TOAD	*Anaxyrus canorus*	17%	22%	32%	0%	50%	14%	7%	0%	8%	15%	47%	0%	25%	33%	12%		29%
A034	WOODHOUSE'S TOAD	*Anaxyrus woodhousii*	52%	10%	12%	5%	17%	1%	0.5%	60%	59%	14%	6%	1%	7%	0%	1%	71%	21%
A035	ARROYO TOAD	*Anaxyrus californicus*	19%	12%	32%	0%	36%	7%	20%	0.1%	8%	9%	46%	0%	28%	27%	7%	1%	37%
A036	RED-SPOTTED TOAD	*Anaxyrus punctatus*	22%	16%	57%	0.4%	25%	12%	34%	24%	30%	23%	43%	0%	42%	7%	18%	28%	5%
A037	GREAT PLAINS TOAD	*Anaxyrus cognatus*	71%	7%	6%	3%	9%	1%	0.3%	77%	74%	11%	2%	0.3%	3%	0%	0%	84%	13%
A038	CALIFORNIA TREEFROG	*Pseudacris cadaverina*	22%	14%	39%	0%	45%	10%	20%	0.1%	10%	11%	54%	0%	34%	31%	9%	1%	25%
A039	PACIFIC TREEFROG	*Pseudacris regilla*	21%	35%	43%	0%	34%	19%	46%	0.3%	48%	35%	7%	9%	23%	19%	28%	29%	1%
A040	NORTHERN RED-LEGGED FROG	*Rana aurora*	12%	24%	62%	0%	22%	29%	46%	0.1%	44%	32%	18%	3%	52%	13%	20%	12%	2%
A041	OREGON SPOTTED FROG	*Rana pretiosa*	6%	7%	32%	0%	25%	8%	11%	0%	2%	5%	38%	0%	10%	25%	9%		56%
A042	CASCADES FROG	*Rana cascadae*	1%	5%	72%	0%	6%	13%	59%	0%	3%	29%	46%	0%	10%	58%	10%	0.1%	22%
A043	FOOTHILL YELLOW-LEGGED FROG	*Rana boylii*	15%	18%	62%	0%	35%	19%	40%	1%	27%	22%	45%	0.4%	37%	34%	16%	8%	5%
A044	SOUTHERN MOUNTAIN YELLOW-LEGGED FROG	*Rana muscosa*	27%	15%	25%	0%	48%	7%	11%	0%	9%	10%	47%	0%	17%	37%	12%	0.4%	34%
A048	COASTAL GIANT SALAMANDER	*Dicamptodon tenebrosus*	6%	15%	72%	0%	12%	19%	62%	0%	23%	28%	41%	1%	26%	40%	22%	5%	7%
A049	RELICTUAL SLENDER SALAMANDER	*Batrachoseps relictus*	30%	17%	53%	0%	63%	24%	12%	0%	11%	12%	77%	0%	35%	43%	22%		0.3%
A053	SAN GABRIEL SLENDER SALAMANDER	*Batrachoseps gabrieli*	16%	9%	13%	0%	26%	8%	4%	0%	14%	5%	20%	0%	23%	8%	7%	0.4%	62%

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A056	GABILAN MOUNTAINS SLENDER SALAMANDER	*Batrachoseps gavilanensis*	2%	7%	88%	0%	22%	28%	46%	0%	2%	4%	92%	0%	6%	66%	24%		3%
A057	SANTA LUCIA MOUNTAINS SLENDER SALAMANDER	*Batrachoseps luciae*	1%	4%	94%	0%	9%	15%	74%	0%	2%	8%	89%	0%	5%	74%	20%		2%
A058	LESSER SLENDER SALAMANDER	*Batrachoseps minor*	0%	0%	99%	0%	0.3%	42%	56%	0%	0%	7%	92%	0%	5%	68%	25%		1%
A059	SAN SIMEON SLENDER SALAMANDER	*Batrachoseps incognitus*	1%	0.2%	99%	0%	6%	21%	73%	0%	1%	2%	97%	0%	2%	84%	14%		0.3%
A060	KINGS RIVER SLENDER SALAMANDER	*Batrachoseps regius*	32%	19%	26%	0%	53%	6%	10%	8%	35%	8%	34%	0.1%	27%	23%	5%	22%	23%
A062	HELL HOLLOW SLENDER SALAMANDER	*Batrachoseps diabolicus*	29%	56%	11%	0%	96%	1%	0.1%	0%	72%	22%	3%	0%	71%	0%	0.1%	25%	3%
A063	KERN PLATEAU SLENDER SALAMANDER	*Batrachoseps robustus*	16%	9%	35%	0%	25%	7%	27%	0%	7%	26%	27%	0%	29%	17%	14%		40%
A067	SCOTT BAR SALAMANDER	*Plethodon asupak*	0.2%	3%	41%	0%	1%	6%	37%	0%	1%	6%	37%	0%	0.1%	43%	1%		56%
A068	WANDERING SALAMANDER	*Aneides vagrans*	5%	12%	64%	0%	14%	18%	48%	0.1%	25%	25%	29%	2%	36%	24%	16%	5%	19%
A070	SIERRA NEVADA YELLOW-LEGGED FROG	*Rana sierrae*	11%	18%	49%	0%	41%	17%	19%	0%	12%	17%	49%	0%	27%	35%	13%	3%	22%
A071	CALIFORNIA RED-LEGGED FROG	*Rana draytonii*	18%	17%	51%	0%	44%	18%	23%	1%	23%	15%	47%	0%	39%	27%	13%	8%	14%
B051	GREAT BLUE HERON	*Ardea herodias*	15%	16%	45%	0.1%	35%	16%	24%	1%	9%	17%	50%	0%	32%	24%	13%	6%	24%
B057	CATTLE EGRET	*Bubulcus ibis*	26%	23%	27%	0.2%	53%	11%	8%	3%	9%	17%	50%	0%	48%	6%	9%	13%	24%
B058	GREEN HERON	*Butorides virescens*	10%	11%	38%	0.1%	22%	12%	24%	1%	10%	13%	37%	0%	24%	20%	10%	6%	40%
B059	BLACK-CROWNED NIGHT HERON	*Nycticorax nycticorax*	12%	11%	38%	0.1%	27%	13%	20%	1%	7%	11%	44%	0%	31%	18%	10%	3%	39%
B067	TUNDRA SWAN	*Cygnus columbianus*	20%	21%	15%	0%	43%	7%	7%	1%	10%	15%	32%	0%	38%	3%	8%	7%	44%
B076	WOOD DUCK	*Aix sponsa*	10%	11%	38%	0%	25%	12%	22%	0.2%	7%	13%	38%	0%	23%	21%	9%	5%	41%

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B077	GREEN-WINGED TEAL	*Anas crecca*	14%	14%	25%	0.1%	29%	11%	11%	2%	6%	11%	35%	0%	27%	9%	11%	5%	48%
B079	MALLARD	*Anas platyrhynchos*	14%	13%	22%	0.1%	27%	11%	10%	1%	7%	10%	32%	0%	26%	8%	10%	5%	51%
B083	CINNAMON TEAL	*Anas cyanoptera*	18%	17%	17%	0.1%	36%	9%	6%	2%	8%	13%	31%	0%	35%	4%	7%	6%	48%
B084	NORTHERN SHOVELER	*Anas clypeata*	14%	14%	26%	0.1%	30%	11%	12%	1%	5%	11%	38%	0%	27%	10%	12%	5%	46%
B085	GADWALL	*Anas strepera*	15%	14%	26%	0.1%	30%	11%	12%	2%	6%	10%	38%	0%	26%	11%	12%	5%	46%
B094	LESSER SCAUP	*Aythya affinis*	13%	14%	24%	0.1%	28%	11%	11%	1%	7%	10%	34%	0%	27%	9%	11%	4%	49%
B096	HARLEQUIN DUCK	*Histrionicus histrionicus*	2%	0.3%	1%	0%	2%	1%	0.4%	0.1%	1%	0.4%	2%	0%	2%	0.3%	0.3%	1%	97%
B108	TURKEY VULTURE	*Cathartes aura*	20%	21%	58%	0.2%	36%	19%	36%	8%	12%	22%	65%	0%	45%	23%	18%	13%	1%
B109	CALIFORNIA CONDOR	*Gymnogyps californianus*	18%	18%	54%	0%	38%	15%	37%	0.5%	5%	18%	68%	0%	29%	49%	11%	2%	9%
B110	OSPREY	*Pandion haliaetus*	18%	21%	54%	0.1%	40%	20%	32%	2%	13%	22%	58%	0%	41%	31%	15%	7%	7%
B111	WHITE-TAILED KITE	*Elanus leucurus*	20%	20%	48%	0.2%	43%	18%	25%	3%	9%	15%	65%	0%	41%	25%	15%	9%	11%
B113	BALD EAGLE	*Haliaeetus leucocephalus*	18%	21%	57%	0%	41%	21%	33%	1%	11%	21%	64%	0%	43%	32%	16%	5%	4%
B114	NORTHERN HARRIER	*Circus cyaneus*	22%	20%	49%	0.2%	36%	16%	28%	11%	10%	18%	62%	0%	44%	16%	16%	15%	10%
B115	SHARP-SHINNED HAWK	*Accipiter striatus*	17%	20%	54%	0.1%	38%	20%	32%	2%	11%	20%	61%	0%	41%	29%	15%	7%	9%
B116	COOPER'S HAWK	*Accipiter cooperii*	17%	19%	55%	0.1%	39%	18%	32%	1%	11%	20%	60%	0%	38%	32%	16%	5%	9%
B117	NORTHERN GOSHAWK	*Accipiter gentilis*	14%	20%	59%	0%	32%	21%	39%	0%	12%	23%	57%	0%	37%	37%	17%	3%	8%
B119	RED-SHOULDERED HAWK	*Buteo lineatus*	20%	19%	34%	0.1%	43%	14%	15%	1%	9%	16%	48%	0%	43%	11%	11%	8%	27%
B121	SWAINSON'S HAWK	*Buteo swainsoni*	23%	27%	38%	0%	46%	18%	23%	0.5%	9%	21%	58%	0%	61%	8%	16%	3%	13%
B123	RED-TAILED HAWK	*Buteo jamaicensis*	20%	21%	57%	0.2%	37%	19%	35%	7%	12%	22%	65%	0%	44%	26%	17%	12%	1%
B124	FERRUGINOUS HAWK	*Buteo regalis*	19%	18%	48%	0.2%	30%	16%	28%	11%	9%	17%	59%	0%	41%	14%	17%	14%	14%
B125	ROUGH-LEGGED HAWK	*Buteo lagopus*	23%	20%	39%	0.2%	34%	16%	22%	11%	11%	18%	54%	0%	41%	14%	14%	14%	18%
B126	GOLDEN EAGLE	*Aquila chrysaetos*	19%	20%	55%	0.2%	35%	19%	33%	8%	11%	21%	62%	0%	42%	25%	17%	11%	6%
B127	AMERICAN KESTREL	*Falco sparverius*	21%	21%	58%	0.2%	38%	19%	35%	8%	12%	22%	65%	0%	44%	26%	17%	12%	0.4%
B128	MERLIN	*Falco columbarius*	20%	20%	50%	0.2%	36%	17%	30%	9%	11%	19%	61%	0%	42%	20%	16%	13%	9%

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B129	PEREGRINE FALCON	*Falco peregrinus*	18%	21%	57%	0.1%	41%	22%	33%	1%	11%	21%	64%	0%	43%	32%	16%	5%	3%
B131	PRAIRIE FALCON	*Falco mexicanus*	22%	22%	55%	0.2%	39%	19%	32%	9%	11%	21%	67%	0%	46%	22%	17%	14%	1%
B134	SOOTY GROUSE	*Dendragapus fuliginosus*	10%	16%	53%	0%	27%	18%	36%	0%	12%	22%	47%	0%	22%	40%	15%	2%	20%
B136	RUFFED GROUSE	*Bonasa umbellus*	5%	16%	66%	0%	8%	14%	64%	0%	21%	27%	39%	0%	16%	48%	17%	6%	13%
B137	GREATER SAGE-GROUSE	*Centrocercus urophasianus*	15%	14%	51%	0%	22%	33%	26%	0%	11%	12%	58%	0%	70%	2%	9%		19%
B139	GAMBEL'S QUAIL	*Callipepla gambelii*	27%	16%	52%	0.5%	28%	11%	26%	30%	7%	21%	67%	0%	42%	3%	13%	37%	5%
B140	CALIFORNIA QUAIL	*Callipepla californica*	17%	22%	58%	0%	38%	21%	38%	0.5%	13%	20%	63%	0%	45%	28%	19%	5%	3%
B141	MOUNTAIN QUAIL	*Oreortyx pictus*	14%	20%	60%	0%	35%	21%	39%	0%	12%	22%	59%	0%	36%	38%	17%	2%	6%
B145	VIRGINIA RAIL	*Rallus limicola*	15%	3%	5%	0.1%	19%	2%	1%	1%	10%	4%	9%	0%	20%	0.4%	1%	1%	77%
B149	AMERICAN COOT	*Fulica americana*	13%	13%	22%	0.1%	27%	11%	10%	1%	7%	10%	32%	0%	26%	8%	10%	5%	51%
B158	KILLDEER	*Charadrius vociferus*	15%	15%	26%	0.2%	28%	12%	13%	4%	8%	12%	37%	0%	29%	10%	10%	7%	44%
B170	SPOTTED SANDPIPER	*Actitis macularius*	13%	15%	17%	0.1%	27%	11%	6%	1%	7%	11%	27%	0%	28%	5%	8%	4%	54%
B173	LONG-BILLED CURLEW	*Numenius americanus*	20%	20%	19%	0.4%	42%	6%	9%	3%	7%	14%	38%	0%	42%	5%	7%	7%	40%
B251	BAND-TAILED PIGEON	*Patagioenas fasciata*	14%	15%	53%	0%	33%	16%	33%	0.2%	9%	18%	55%	0%	31%	33%	13%	5%	18%
B254	WHITE-WINGED DOVE	*Zenaida asiatica*	47%	13%	28%	2%	24%	5%	10%	50%	14%	17%	59%	0%	31%	1%	2%	56%	10%
B255	MOURNING DOVE	*Zenaida macroura*	20%	21%	56%	0.2%	38%	19%	33%	8%	11%	21%	65%	0%	45%	23%	17%	12%	3%
B257	COMMON GROUND-DOVE	*Columbina passerina*	59%	15%	17%	1%	30%	3%	3%	56%	17%	21%	54%	0%	29%	0%	1%	61%	9%
B259	YELLOW-BILLED CUCKOO	*Coccyzus americanus*	13%	6%	0.1%	0%	13%	0%	0%	6%	3%	6%	9%	0%	12%	0%	0%	7%	81%
B260	GREATER ROADRUNNER	*Geococcyx californianus*	18%	16%	46%	0.3%	26%	11%	29%	13%	9%	17%	54%	0%	35%	14%	14%	17%	20%
B262	BARN OWL	*Tyto alba*	20%	18%	44%	0.2%	35%	16%	25%	7%	10%	15%	58%	0%	41%	17%	14%	11%	17%
B263	FLAMMULATED OWL	*Psiloscops flammeolus*	11%	16%	58%	0%	29%	16%	40%	0%	9%	21%	54%	0%	22%	43%	16%	3%	16%
B264	WESTERN SCREECH OWL	*Megascops kennicottii*	21%	21%	54%	0.2%	37%	19%	34%	7%	13%	21%	62%	0%	41%	29%	16%	12%	3%
B265	GREAT HORNED OWL	*Bubo virginianus*	20%	21%	58%	0.2%	38%	19%	35%	8%	12%	22%	65%	0%	45%	25%	17%	12%	1%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
B267	NORTHERN PYGMY OWL	*Glaucidium gnoma*	12%	15%	55%	0.1%	29%	16%	36%	1%	10%	19%	53%	0%	27%	36%	14%	6%	18%
B268	ELF OWL	*Micrathene whitneyi*	9%	0%	0%	0%	0%	0%	0%	9%	0%	0%	9%	0%	0%	0%	0%	9%	91%
B269	BURROWING OWL	*Athene cunicularia*	20%	18%	47%	0.3%	29%	15%	29%	12%	10%	19%	58%	0%	42%	12%	16%	16%	14%
B270	SPOTTED OWL	*Strix occidentalis*	10%	13%	54%	0%	26%	15%	37%	0%	10%	22%	46%	0%	26%	34%	13%	4%	23%
B271	GREAT GRAY OWL	*Strix nebulosa*	9%	11%	40%	0%	28%	13%	20%	0%	3%	17%	41%	0%	19%	31%	9%	1%	39%
B272	LONG-EARED OWL	*Asio otus*	17%	17%	51%	0.1%	31%	17%	31%	7%	10%	19%	57%	0%	34%	24%	16%	11%	15%
B273	SHORT-EARED OWL	*Asio flammeus*	26%	25%	34%	0%	50%	17%	17%	1%	11%	19%	55%	0%	58%	11%	10%	7%	15%
B274	NORTHERN SAW-WHET OWL	*Aegolius acadicus*	12%	15%	54%	0.1%	29%	17%	35%	0.4%	10%	19%	52%	0%	27%	36%	14%	3%	19%
B275	LESSER NIGHTHAWK	*Chordeiles acutipennis*	23%	21%	52%	0.4%	32%	13%	32%	19%	11%	22%	63%	0%	45%	11%	17%	23%	4%
B276	COMMON NIGHTHAWK	*Chordeiles minor*	15%	20%	54%	0%	32%	22%	35%	0.1%	12%	22%	54%	0%	37%	33%	15%	3%	11%
B277	COMMON POORWILL	*Phalaenoptilus nuttallii*	20%	20%	56%	0.2%	37%	18%	34%	8%	11%	21%	66%	0%	42%	25%	17%	12%	3%
B278	EASTERN WHIP-POOR-WILL	*Antrostomus vociferus*	6%	11%	35%	0%	6%	13%	33%	0%	20%	19%	13%	0%	34%	16%	2%		48%
B279	BLACK SWIFT	*Cypseloides niger*	18%	20%	57%	0%	42%	20%	33%	0.2%	8%	21%	67%	0%	25%	49%	16%	6%	4%
B281	VAUX'S SWIFT	*Chaetura vauxi*	10%	15%	64%	0%	26%	18%	45%	0%	12%	24%	53%	0%	29%	38%	17%	4%	11%
B282	WHITE-THROATED SWIFT	*Aeronautes saxatalis*	22%	20%	57%	0.2%	37%	18%	33%	11%	10%	21%	69%	0%	44%	23%	18%	15%	0.4%
B286	BLACK-CHINNED HUMMINGBIRD	*Archilochus alexandri*	18%	15%	29%	0%	39%	8%	14%	1%	4%	9%	49%	0%	29%	20%	7%	6%	38%
B287	ANNA'S HUMMINGBIRD	*Calypte anna*	12%	13%	43%	0%	29%	13%	27%	0.4%	8%	14%	47%	0%	27%	27%	10%	5%	31%
B288	COSTA'S HUMMINGBIRD	*Calypte costae*	19%	14%	49%	0.3%	27%	10%	30%	15%	7%	19%	57%	0%	35%	17%	12%	18%	17%
B289	CALLIOPE HUMMINGBIRD	*Selasphorus calliope*	8%	12%	39%	0%	22%	12%	24%	0%	6%	14%	39%	0%	16%	31%	11%	1%	41%
B290	BROAD-TAILED HUMMINGBIRD	*Selasphorus platycercus*	13%	20%	22%	0%	23%	12%	21%	0%	2%	8%	47%	0%	15%	26%	16%		44%
B291	RUFOUS HUMMINGBIRD	*Selasphorus rufus*	8%	15%	71%	0%	25%	21%	49%	0%	15%	27%	53%	0%	33%	39%	18%	5%	6%
B292	ALLEN'S HUMMINGBIRD	*Selasphorus sasin*	5%	7%	42%	0%	14%	12%	28%	0%	6%	12%	36%	0%	22%	21%	9%	2%	46%

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B294	LEWIS'S WOODPECKER	*Melanerpes lewis*	16%	20%	55%	0%	38%	20%	32%	1%	10%	20%	61%	0%	39%	32%	15%	5%	9%
B296	ACORN WOODPECKER	*Melanerpes formicivorus*	11%	13%	41%	0%	27%	12%	25%	0.2%	8%	15%	42%	0%	25%	25%	10%	5%	35%
B297	GILA WOODPECKER	*Melanerpes uropygialis*	14%	3%	1%	0.2%	0.1%	0%	0%	17%	0.5%	1%	16%	0%	0.3%	0%	0%	17%	82%
B298	RED-NAPED SAPSUCKER	*Sphyrapicus nuchalis*	11%	9%	18%	0.1%	14%	6%	13%	4%	7%	11%	20%	0%	23%	6%	4%	5%	62%
B299	RED-BREASTED SAPSUCKER	*Sphyrapicus ruber*	13%	16%	49%	0%	32%	16%	29%	0.2%	9%	17%	51%	0%	30%	31%	12%	4%	22%
B300	WILLIAMSON'S SAPSUCKER	*Sphyrapicus thyroideus*	9%	10%	45%	0%	26%	14%	24%	0%	4%	17%	43%	0%	14%	42%	8%	0%	36%
B301	LADDER-BACKED WOODPECKER	*Picoides scalaris*	6%	6%	24%	0.2%	5%	5%	19%	6%	6%	12%	18%	0%	24%	2%	4%	6%	64%
B302	NUTTALL'S WOODPECKER	*Picoides nuttallii*	15%	13%	45%	0%	34%	14%	24%	0.3%	6%	13%	54%	0%	30%	28%	11%	5%	27%
B303	DOWNY WOODPECKER	*Picoides pubescens*	17%	20%	57%	0%	40%	19%	34%	1%	11%	21%	62%	0%	39%	32%	16%	6%	6%
B304	HAIRY WOODPECKER	*Picoides villosus*	13%	16%	52%	0%	32%	16%	32%	0.1%	10%	19%	53%	0%	29%	34%	14%	4%	19%
B305	WHITE-HEADED WOODPECKER	*Picoides albolarvatus*	11%	16%	54%	0%	31%	15%	35%	0%	8%	20%	52%	0%	20%	44%	14%	3%	19%
B306	BLACK-BACKED WOODPECKER	*Picoides arcticus*	9%	13%	40%	0%	31%	14%	17%	0%	3%	13%	46%	0%	18%	33%	11%	0.5%	38%
B307	NORTHERN FLICKER	*Colaptes auratus*	20%	21%	57%	0.1%	37%	19%	35%	7%	12%	22%	64%	0%	44%	25%	17%	11%	2%
B308	PILEATED WOODPECKER	*Dryocopus pileatus*	9%	12%	54%	0%	24%	15%	36%	0%	9%	21%	45%	0%	24%	34%	13%	4%	25%
B309	OLIVE-SIDED FLYCATCHER	*Contopus cooperi*	11%	16%	55%	0%	29%	16%	36%	0%	10%	21%	52%	0%	26%	38%	15%	3%	18%
B311	WESTERN WOOD-PEWEE	*Contopus sordidulus*	13%	16%	51%	0%	33%	16%	31%	0.2%	9%	18%	53%	0%	31%	32%	13%	5%	20%
B315	WILLOW FLYCATCHER	*Empidonax traillii*	4%	5%	4%	0%	9%	3%	2%	0%	4%	4%	6%	0%	9%	2%	2%	0%	86%
B317	HAMMOND'S FLYCATCHER	*Empidonax hammondii*	8%	11%	49%	0%	22%	12%	33%	0%	6%	19%	43%	0%	16%	38%	11%	3%	32%
B318	DUSKY FLYCATCHER	*Empidonax oberholseri*	11%	15%	56%	0%	30%	15%	37%	0.1%	8%	20%	54%	0%	21%	44%	14%	3%	18%

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B319	GRAY FLYCATCHER	*Empidonax wrightii*	9%	21%	42%	0%	16%	26%	30%	0.1%	11%	17%	44%	0%	50%	9%	13%		28%
B320	PACIFIC-SLOPE FLYCATCHER	*Empidonax difficilis*	16%	16%	51%	0%	35%	15%	32%	0.2%	10%	18%	54%	0%	36%	28%	12%	6%	18%
B321	BLACK PHOEBE	*Sayornis nigricans*	18%	19%	44%	0.1%	41%	16%	23%	1%	10%	16%	55%	0%	39%	22%	13%	7%	19%
B323	SAY'S PHOEBE	*Sayornis saya*	19%	18%	46%	0.2%	30%	15%	27%	12%	8%	17%	58%	0%	38%	15%	15%	15%	16%
B326	ASH-THROATED FLYCATCHER	*Myiarchus cinerascens*	16%	15%	44%	0.2%	26%	12%	27%	10%	9%	16%	50%	0%	32%	17%	13%	14%	24%
B328	BROWN-CRESTED FLYCATCHER	*Myiarchus tyrannulus*	58%	16%	9%	0%	14%	6%	5%	57%	23%	13%	47%	0%	14%	8%	3%	57%	17%
B331	CASSIN'S KINGBIRD	*Tyrannus vociferans*	15%	14%	60%	0%	39%	18%	31%	0%	3%	9%	77%	0%	29%	43%	16%	1%	11%
B333	WESTERN KINGBIRD	*Tyrannus verticalis*	18%	19%	42%	0.1%	39%	17%	22%	1%	10%	16%	54%	0%	43%	19%	12%	5%	21%
B334	EASTERN KINGBIRD	*Tyrannus tyrannus*	44%	11%	14%	0%	16%	22%	31%	0%	17%	34%	18%	0%	32%	15%	22%		31%
B337	HORNED LARK	*Eremophila alpestris*	18%	18%	42%	0.3%	26%	14%	24%	13%	9%	17%	52%	0%	36%	11%	15%	16%	22%
B338	PURPLE MARTIN	*Progne subis*	6%	8%	22%	0%	13%	9%	13%	0%	6%	9%	21%	0%	14%	13%	8%	1%	64%
B339	TREE SWALLOW	*Tachycineta bicolor*	18%	20%	34%	0.1%	39%	14%	17%	1%	12%	17%	43%	0%	41%	13%	11%	7%	28%
B340	VIOLET-GREEN SWALLOW	*Tachycineta thalassina*	16%	21%	57%	0%	37%	22%	34%	1%	13%	21%	61%	0%	41%	31%	16%	5%	6%
B341	NORTHERN ROUGH-WINGED SWALLOW	*Stelgidopteryx serripennis*	20%	21%	44%	0.2%	41%	19%	23%	3%	12%	17%	57%	0%	44%	20%	14%	8%	14%
B343	CLIFF SWALLOW	*Petrochelidon pyrrhonota*	18%	18%	41%	0%	37%	16%	22%	2%	10%	15%	52%	0%	38%	22%	11%	6%	23%
B344	BARN SWALLOW	*Hirundo rustica*	16%	20%	58%	0%	38%	21%	34%	1%	13%	22%	59%	0%	44%	28%	15%	7%	6%
B345	GRAY JAY	*Perisoreus canadensis*	4%	9%	56%	0%	10%	11%	47%	0%	11%	26%	32%	0%	18%	33%	14%	4%	32%
B346	STELLER'S JAY	*Cyanocitta stelleri*	13%	16%	55%	0%	32%	17%	34%	0.2%	10%	20%	52%	0%	30%	34%	14%	5%	17%
B348	WESTERN SCRUB-JAY	*Aphelocoma californica*	13%	15%	38%	0%	31%	13%	22%	0.2%	8%	13%	46%	0%	31%	22%	9%	4%	34%
B349	PINYON JAY	*Gymnorhinus cyanocephalus*	12%	23%	42%	0%	29%	24%	23%	0%	8%	16%	52%	0%	52%	10%	13%		24%
B350	CLARK'S NUTCRACKER	*Nucifraga columbiana*	9%	13%	53%	0%	27%	15%	32%	0%	6%	20%	49%	0%	18%	44%	13%	0%	25%
B351	BLACK-BILLED MAGPIE	*Pica hudsonia*	8%	20%	39%	0%	19%	27%	21%	0%	8%	14%	44%	0%	59%	1%	6%		34%
B352	YELLOW-BILLED MAGPIE	*Pica nuttalli*	16%	26%	43%	0%	52%	19%	14%	0.3%	8%	13%	63%	0%	42%	18%	13%	12%	15%

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B353	AMERICAN CROW	*Corvus brachyrhynchos*	17%	18%	36%	0%	40%	15%	16%	1%	9%	15%	47%	0%	39%	12%	12%	8%	29%
B354	COMMON RAVEN	*Corvus corax*	19%	20%	59%	0%	35%	20%	36%	8%	12%	22%	65%	0%	44%	25%	18%	11%	1%
B355	BLACK-CAPPED CHICKADEE	*Poecile atricapillus*	6%	12%	37%	0%	11%	8%	35%	0.1%	16%	17%	22%	0%	7%	27%	12%	10%	45%
B356	MOUNTAIN CHICKADEE	*Poecile gambeli*	16%	18%	50%	0%	37%	14%	33%	0.2%	10%	20%	54%	0%	29%	36%	14%	5%	16%
B357	CHESTNUT-BACKED CHICKADEE	*Poecile rufescens*	8%	13%	67%	0%	22%	19%	47%	0%	13%	25%	51%	0%	33%	33%	17%	5%	12%
B358	OAK TITMOUSE	*Baeolophus inornatus*	13%	14%	38%	0%	32%	13%	19%	0.2%	6%	11%	47%	0%	27%	23%	9%	5%	35%
B359	VERDIN	*Auriparus flaviceps*	27%	17%	51%	0.5%	28%	10%	27%	30%	9%	23%	63%	0%	43%	3%	11%	38%	5%
B360	BUSHTIT	*Psaltriparus minimus*	14%	15%	42%	0%	31%	16%	24%	0.2%	9%	14%	49%	0%	34%	23%	10%	4%	28%
B361	RED-BREASTED NUTHATCH	*Sitta canadensis*	12%	14%	45%	0%	30%	14%	28%	0.1%	9%	18%	45%	0%	26%	29%	12%	5%	29%
B362	WHITE-BREASTED NUTHATCH	*Sitta carolinensis*	10%	14%	45%	0%	27%	14%	28%	0.2%	8%	15%	46%	0%	23%	32%	12%	3%	31%
B363	PYGMY NUTHATCH	*Sitta pygmaea*	7%	9%	48%	0%	22%	15%	28%	0%	5%	15%	43%	0%	13%	39%	12%	0.5%	36%
B364	BROWN CREEPER	*Certhia americana*	11%	13%	46%	0%	28%	14%	28%	0.1%	8%	17%	45%	0%	25%	28%	12%	5%	30%
B365	CACTUS WREN	*Campylorhynchus brunneicapillus*	26%	16%	47%	0.3%	32%	10%	26%	21%	8%	19%	62%	0%	42%	6%	13%	27%	11%
B366	ROCK WREN	*Salpinctes obsoletus*	16%	17%	47%	0%	25%	15%	30%	9%	11%	18%	51%	0%	38%	15%	14%	13%	20%
B367	CANYON WREN	*Catherpes mexicanus*	10%	9%	24%	0%	20%	9%	13%	0.1%	4%	7%	31%	0%	18%	17%	5%	2%	57%
B368	BEWICK'S WREN	*Thryomanes bewickii*	12%	13%	36%	0%	27%	11%	22%	1%	7%	12%	41%	0%	27%	20%	8%	4%	40%
B369	HOUSE WREN	*Troglodytes aedon*	12%	13%	36%	0%	28%	12%	21%	0.3%	7%	12%	42%	0%	27%	20%	9%	5%	39%
B370	PACIFIC WREN	*Troglodytes pacificus*	8%	11%	47%	0%	22%	14%	32%	0%	8%	18%	41%	0%	20%	31%	12%	3%	33%
B373	AMERICAN DIPPER	*Cinclus mexicanus*	3%	7%	10%	0%	4%	12%	4%	0.1%	3%	4%	13%	0%	7%	8%	4%	1%	80%
B375	GOLDEN-CROWNED KINGLET	*Regulus satrapa*	12%	15%	52%	0%	30%	16%	32%	0%	9%	18%	52%	0%	29%	33%	13%	3%	21%
B376	RUBY-CROWNED KINGLET	*Regulus calendula*	17%	18%	53%	0.1%	32%	16%	33%	7%	10%	20%	58%	0%	37%	24%	15%	11%	12%
B377	BLUE-GRAY GNATCATCHER	*Polioptila caerulea*	13%	15%	36%	0%	30%	14%	19%	1%	6%	11%	47%	0%	32%	20%	8%	4%	36%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
B378	BLACK-TAILED GNATCATCHER	*Polioptila melanura*	35%	15%	43%	1%	33%	7%	14%	41%	8%	27%	59%	0%	40%	0.3%	3%	51%	6%
B380	WESTERN BLUEBIRD	*Sialia mexicana*	15%	18%	47%	0%	35%	16%	27%	2%	10%	16%	53%	0%	34%	25%	14%	7%	20%
B381	MOUNTAIN BLUEBIRD	*Sialia currucoides*	15%	18%	29%	0%	32%	15%	13%	1%	8%	14%	41%	0%	38%	12%	9%	4%	38%
B382	TOWNSEND'S SOLITAIRE	*Myadestes townsendi*	13%	16%	44%	0%	33%	14%	27%	0%	7%	17%	49%	0%	27%	32%	12%	2%	27%
B385	SWAINSON'S THRUSH	*Catharus ustulatus*	13%	13%	57%	0%	29%	17%	38%	0%	10%	19%	55%	0%	31%	34%	14%	4%	16%
B386	HERMIT THRUSH	*Catharus guttatus*	16%	17%	53%	0%	35%	17%	32%	2%	11%	19%	56%	0%	34%	33%	14%	6%	14%
B389	AMERICAN ROBIN	*Turdus migratorius*	16%	19%	51%	0.1%	37%	18%	29%	1%	10%	18%	57%	0%	34%	30%	15%	6%	15%
B390	VARIED THRUSH	*Ixoreus naevius*	13%	15%	51%	0%	31%	15%	32%	0.2%	10%	17%	52%	0%	31%	29%	12%	6%	21%
B391	WRENTIT	*Chamaea fasciata*	13%	14%	41%	0%	31%	13%	24%	0.2%	8%	14%	46%	0%	30%	23%	10%	5%	32%
B393	NORTHERN MOCKINGBIRD	*Mimus polyglottos*	27%	20%	41%	0.4%	39%	13%	21%	14%	10%	18%	60%	0%	42%	14%	13%	18%	13%
B394	SAGE THRASHER	*Oreoscoptes montanus*	18%	23%	38%	0%	23%	25%	28%	3%	12%	24%	43%	0%	57%	6%	10%	5%	21%
B396	BENDIRE'S THRASHER	*Toxostoma bendirei*	0.3%	8%	72%	0%	2%	16%	62%	0%	11%	46%	23%	0%	78%	0%	1%	1%	20%
B398	CALIFORNIA THRASHER	*Toxostoma redivivum*	12%	10%	31%	0%	27%	9%	17%	0.2%	4%	9%	41%	0%	23%	21%	7%	3%	47%
B399	CRISSAL THRASHER	*Toxostoma crissale*	11%	3%	3%	0.4%	6%	0.3%	1%	10%	1%	4%	13%	0%	7%	0.1%	0.4%	11%	82%
B400	LE CONTE'S THRASHER	*Toxostoma lecontei*	21%	16%	56%	0.3%	23%	12%	36%	23%	10%	21%	63%	0%	43%	7%	17%	27%	6%
B404	AMERICAN PIPIT	*Anthus rubrescens*	14%	15%	28%	0.2%	26%	15%	14%	3%	8%	12%	37%	0%	34%	9%	10%	5%	42%
B407	CEDAR WAXWING	*Bombycilla cedrorum*	13%	15%	47%	0%	32%	15%	29%	0.2%	9%	16%	50%	0%	30%	29%	12%	5%	24%
B408	PHAINOPEPLA	*Phainopepla nitens*	14%	12%	24%	0.1%	29%	7%	12%	2%	4%	8%	38%	0%	23%	17%	5%	6%	50%
B409	NORTHERN SHRIKE	*Lanius excubitor*	14%	19%	37%	0%	25%	23%	23%	0%	7%	16%	47%	0%	54%	6%	10%	0.1%	30%
B410	LOGGERHEAD SHRIKE	*Lanius ludovicianus*	21%	20%	50%	0.2%	35%	17%	30%	10%	10%	19%	62%	0%	45%	17%	16%	14%	8%
B413	BELL'S VIREO	*Vireo bellii*	13%	0.4%	2%	0%	9%	1%	0.4%	5%	1%	2%	12%	0%	9%	0.2%	1%	6%	84%
B414	GRAY VIREO	*Vireo vicinior*	11%	17%	50%	0%	36%	18%	23%	0%	7%	7%	64%	0%	27%	39%	12%		22%
B415	CASSIN'S VIREO	*Vireo cassinii*	12%	15%	55%	0%	29%	17%	36%	0%	11%	21%	51%	0%	27%	37%	15%	4%	17%
B417	HUTTON'S VIREO	*Vireo huttoni*	15%	15%	50%	0%	35%	15%	30%	0.2%	10%	17%	53%	0%	35%	26%	12%	7%	20%
B418	WARBLING VIREO	*Vireo gilvus*	12%	16%	54%	0%	31%	17%	33%	0.1%	10%	19%	52%	0%	30%	33%	13%	4%	19%

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B425	ORANGE-CROWNED WARBLER	*Oreothlypis celata*	16%	16%	52%	0.1%	33%	16%	32%	2%	11%	18%	55%	0%	32%	32%	13%	7%	16%
B426	NASHVILLE WARBLER	*Oreothlypis ruficapilla*	12%	16%	62%	0%	29%	18%	43%	0.1%	11%	23%	55%	0%	26%	42%	17%	4%	10%
B427	VIRGINIA'S WARBLER	*Oreothlypis virginiae*	9%	17%	24%	0%	22%	9%	19%	0%	8%	8%	34%	0%	23%	18%	10%		50%
B428	LUCY'S WARBLER	*Oreothlypis luciae*	42%	2%	39%	0%	11%	6%	25%	41%	16%	11%	56%	0%	30%	10%	3%	40%	17%
B430	YELLOW WARBLER	*Setophaga petechia*	14%	15%	47%	0.1%	32%	14%	28%	1%	8%	16%	51%	0%	27%	31%	12%	5%	25%
B435	YELLOW-RUMPED WARBLER	*Setophaga coronata*	20%	21%	57%	0.1%	37%	18%	35%	7%	12%	22%	64%	0%	43%	26%	17%	12%	2%
B436	BLACK-THROATED GRAY WARBLER	*Setophaga nigrescens*	12%	15%	57%	0%	29%	18%	38%	0%	10%	19%	55%	0%	29%	38%	15%	3%	16%
B437	TOWNSEND'S WARBLER	*Setophaga townsendi*	12%	13%	55%	0%	25%	17%	37%	0%	10%	16%	53%	0%	30%	33%	15%	2%	20%
B438	HERMIT WARBLER	*Setophaga occidentalis*	9%	13%	56%	0%	24%	17%	37%	0%	10%	19%	49%	0%	24%	37%	15%	2%	22%
B460	MACGILLIVRAY'S WARBLER	*Geothlypis tolmiei*	6%	11%	40%	0%	17%	13%	26%	0%	8%	14%	35%	0%	18%	25%	12%	2%	43%
B461	COMMON YELLOWTHROAT	*Geothlypis trichas*	12%	13%	26%	0%	26%	12%	12%	1%	6%	10%	36%	0%	26%	11%	12%	4%	49%
B463	WILSON'S WARBLER	*Cardellina pusilla*	9%	15%	62%	0%	26%	19%	41%	0%	11%	20%	55%	0%	28%	40%	16%	2%	14%
B467	YELLOW-BREASTED CHAT	*Icteria virens*	11%	4%	14%	0%	19%	2%	7%	0.4%	1%	4%	24%	0%	18%	6%	3%	1%	71%
B469	SUMMER TANAGER	*Piranga rubra*	15%	2%	0.5%	0%	0.3%	1%	0.3%	16%	1%	1%	16%	0%	1%	0%	0.3%	16%	82%
B471	WESTERN TANAGER	*Piranga ludoviciana*	11%	15%	57%	0%	29%	17%	37%	0%	10%	21%	52%	0%	29%	36%	15%	3%	17%
B475	BLACK-HEADED GROSBEAK	*Pheucticus melanocephalus*	13%	16%	50%	0%	32%	16%	30%	0.2%	9%	17%	53%	0%	30%	31%	13%	5%	21%
B476	BLUE GROSBEAK	*Passerina caerulea*	20%	23%	15%	0.2%	44%	5%	6%	4%	5%	16%	38%	0%	40%	5%	4%	9%	41%
B477	LAZULI BUNTING	*Passerina amoena*	11%	13%	34%	0%	26%	13%	19%	0.2%	6%	10%	41%	0%	29%	18%	8%	3%	42%
B482	GREEN-TAILED TOWHEE	*Pipilo chlorurus*	22%	13%	30%	0.3%	21%	12%	16%	16%	9%	14%	42%	0%	24%	15%	7%	18%	35%
B483	SPOTTED TOWHEE	*Pipilo maculatus*	13%	16%	45%	0%	31%	16%	27%	0.3%	8%	15%	51%	0%	32%	27%	11%	4%	26%

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B484	CALIFORNIA TOWHEE	*Pipilo crissalis*	14%	13%	36%	0%	33%	11%	19%	0.3%	6%	12%	46%	0%	30%	21%	8%	5%	37%
B485	ABERT'S TOWHEE	*Melozone aberti*	16%	2%	0.1%	1%	0%	0%	0%	19%	1%	2%	15%	0%	0.4%	0%	0%	18%	81%
B487	RUFOUS-CROWNED SPARROW	*Aimophila ruficeps*	15%	13%	40%	0%	33%	11%	23%	1%	4%	12%	51%	0%	29%	24%	11%	4%	32%
B489	CHIPPING SPARROW	*Spizella passerina*	15%	18%	44%	0%	36%	16%	24%	1%	9%	16%	53%	0%	33%	26%	13%	5%	23%
B491	BREWER'S SPARROW	*Spizella breweri*	25%	16%	39%	0.4%	26%	13%	21%	21%	11%	22%	48%	0%	37%	7%	10%	28%	19%
B493	BLACK-CHINNED SPARROW	*Spizella atrogularis*	12%	13%	37%	0%	29%	12%	22%	0%	4%	11%	48%	0%	26%	27%	9%	1%	38%
B494	VESPER SPARROW	*Pooecetes gramineus*	17%	18%	35%	0.1%	34%	16%	19%	2%	5%	13%	53%	0%	41%	15%	11%	3%	30%
B495	LARK SPARROW	*Chondestes grammacus*	19%	20%	46%	0.1%	44%	18%	21%	1%	7%	16%	62%	0%	44%	23%	12%	6%	15%
B496	BLACK-THROATED SPARROW	*Amphispiza bilineata*	19%	17%	54%	0.3%	24%	14%	36%	17%	9%	21%	60%	0%	44%	9%	17%	20%	10%
B497	BELL'S SPARROW	*Artemisiospiza belli*	18%	15%	47%	0.1%	25%	13%	31%	12%	9%	17%	55%	0%	38%	14%	14%	14%	20%
B499	SAVANNAH SPARROW	*Passerculus sandwichensis*	19%	17%	45%	0.2%	31%	15%	26%	10%	9%	17%	56%	0%	40%	14%	14%	13%	19%
B501	GRASSHOPPER SPARROW	*Ammodramus savannarum*	11%	17%	26%	0%	30%	12%	11%	1%	6%	11%	38%	0%	28%	10%	11%	5%	46%
B504	FOX SPARROW	*Passerella iliaca*	13%	15%	39%	0%	32%	14%	22%	0.1%	7%	14%	46%	0%	29%	26%	10%	3%	33%
B505	SONG SPARROW	*Melospiza melodia*	15%	15%	36%	0.1%	32%	13%	20%	1%	8%	13%	45%	0%	30%	20%	11%	5%	35%
B506	LINCOLN'S SPARROW	*Melospiza lincolnii*	14%	13%	29%	0.1%	30%	11%	13%	1%	6%	12%	38%	0%	28%	14%	10%	4%	44%
B509	GOLDEN-CROWNED SPARROW	*Zonotrichia atricapilla*	17%	19%	44%	0%	40%	18%	23%	1%	9%	15%	56%	0%	42%	21%	13%	5%	20%
B510	WHITE-CROWNED SPARROW	*Zonotrichia leucophrys*	20%	19%	47%	0.2%	35%	16%	27%	8%	10%	18%	58%	0%	43%	17%	15%	12%	14%
B512	DARK-EYED JUNCO	*Junco hyemalis*	15%	18%	52%	0%	35%	18%	31%	0.5%	10%	19%	55%	0%	37%	30%	13%	4%	16%
B514	LAPLAND LONGSPUR	*Calcarius lapponicus*	17%	9%	40%	0.3%	22%	18%	24%	1%	5%	13%	49%	0%	49%	9%	6%	3%	33%
B519	RED-WINGED BLACKBIRD	*Agelaius phoeniceus*	15%	14%	25%	0.1%	30%	11%	12%	1%	7%	11%	36%	0%	29%	10%	10%	5%	46%

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B521	WESTERN MEADOWLARK	*Sturnella neglecta*	18%	19%	40%	0.1%	38%	17%	21%	1%	9%	15%	53%	0%	41%	19%	12%	5%	23%
B524	BREWER'S BLACKBIRD	*Euphagus cyanocephalus*	17%	19%	48%	0.1%	36%	19%	28%	1%	11%	19%	53%	0%	40%	24%	14%	5%	17%
B528	BROWN-HEADED COWBIRD	*Molothrus ater*	18%	20%	54%	0%	41%	20%	31%	1%	11%	20%	62%	0%	42%	29%	15%	5%	8%
B530	HOODED ORIOLE	*Icterus cucullatus*	9%	5%	6%	0.1%	15%	2%	2%	2%	3%	5%	13%	0%	14%	1%	2%	4%	79%
B532	BULLOCK'S ORIOLE	*Icterus bullockii*	9%	10%	25%	0%	23%	9%	11%	0.4%	5%	7%	32%	0%	19%	13%	6%	4%	56%
B533	SCOTT'S ORIOLE	*Icterus parisorum*	9%	17%	58%	0%	21%	16%	46%	0.5%	23%	22%	39%	0%	49%	18%	13%	4%	16%
B534	GRAY-CROWNED ROSY-FINCH	*Leucosticte tephrocotis*	9%	20%	40%	0%	18%	38%	12%	0%	8%	11%	49%	0%	34%	25%	10%		31%
B535	PINE GROSBEAK	*Pinicola enucleator*	20%	20%	16%	0%	47%	5%	3%	0%	3%	12%	40%	0%	29%	14%	11%	0%	45%
B536	PURPLE FINCH	*Haemorhous purpureus*	12%	14%	50%	0%	30%	15%	31%	0.2%	9%	18%	49%	0%	29%	31%	12%	5%	24%
B537	CASSIN'S FINCH	*Haemorhous cassinii*	10%	16%	44%	0%	30%	17%	23%	0%	6%	16%	47%	0%	26%	31%	13%	1%	30%
B538	HOUSE FINCH	*Haemorhous mexicanus*	17%	19%	43%	0.1%	37%	18%	23%	2%	9%	16%	55%	0%	41%	21%	12%	5%	20%
B539	RED CROSSBILL	*Loxia curvirostra*	7%	13%	53%	0%	23%	15%	35%	0%	8%	20%	45%	0%	18%	38%	14%	3%	27%
B542	PINE SISKIN	*Spinus pinus*	16%	19%	51%	0%	39%	18%	29%	1%	10%	19%	58%	0%	35%	30%	15%	5%	14%
B543	LESSER GOLDFINCH	*Spinus psaltria*	18%	20%	46%	0.1%	41%	18%	23%	1%	9%	16%	58%	0%	41%	23%	13%	5%	17%
B544	LAWRENCE'S GOLDFINCH	*Spinus lawrencei*	21%	19%	45%	0%	48%	15%	20%	1%	7%	13%	66%	0%	35%	29%	12%	9%	15%
B545	AMERICAN GOLDFINCH	*Spinus tristis*	17%	17%	43%	0.1%	37%	17%	22%	1%	8%	14%	55%	0%	39%	20%	12%	6%	23%
B546	EVENING GROSBEAK	*Coccothraustes vespertinus*	12%	16%	58%	0%	29%	17%	39%	0%	12%	22%	51%	0%	30%	34%	16%	5%	15%
B549	GILDED FLICKER	*Colaptes chrysoides*	39%	12%	45%	0%	10%	14%	30%	42%	21%	48%	26%	0%	43%	0%	0%	52%	4%
B550	CORDILLERAN FLYCATCHER	*Empidonax occidentalis*	6%	12%	29%	0%	13%	10%	23%	0%	3%	6%	38%	0%	8%	24%	15%		53%
B551	ISLAND SCRUB-JAY	*Aphelocoma insularis*	2%	10%	87%	0%	80%	19%	1%	0%	10%	32%	58%	0%	93%	1%	6%		1%
B552	JUNIPER TITMOUSE	*Baeolophus ridgewayi*	11%	21%	23%	0%	27%	11%	17%	0%	2%	9%	43%	0%	27%	11%	16%		45%
B553	CALIFORNIA GNATCATCHER	*Polioptila californica*	51%	17%	16%	0%	80%	2%	1%	0%	0.3%	4%	79%	0%	72%	4%	7%	0.4%	17%
B554	PLUMBEOUS VIREO	*Vireo plumbeus*	9%	14%	24%	0%	19%	6%	21%	0%	5%	6%	36%	0%	17%	14%	16%		53%

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B620	HARRIS' S HAWK	*Parabuteo unicinctus*	30%	17%	28%	1%	31%	5%	10%	31%	9%	11%	57%	0%	39%	1%	6%	30%	23%
B699	BARRED OWL	*Strix varia*	5%	15%	66%	0%	18%	18%	50%	0%	14%	21%	51%	0%	24%	38%	19%	5%	14%
B702	CHIMNEY SWIFT	*Chaetura pelagica*	14%	14%	68%	0%	36%	22%	38%	0%	8%	23%	66%	0%	55%	22%	18%	1%	4%
B773	AMERICAN REDSTART	*Setophaga ruticilla*	16%	17%	46%	0.4%	24%	18%	31%	7%	10%	19%	51%	0%	41%	14%	17%	7%	20%
B798	WHITE-THROATED SPARROW	*Zonotrichia albicollis*	16%	18%	50%	0.1%	37%	17%	30%	1%	10%	17%	57%	0%	39%	26%	13%	6%	16%
B799	HARRIS'S SPARROW	*Zonotrichia querula*	18%	19%	41%	0.1%	41%	16%	21%	1%	9%	15%	55%	0%	40%	20%	12%	6%	22%
B806	NORTHERN CARDINAL	*Cardinalis cardinalis*	91%	0.1%	0%	0%	0%	0%	0%	91%	10%	70%	11%	0%	0%	0%	0%	91%	9%
B809	INDIGO BUNTING	*Passerina cyanea*	11%	14%	37%	0%	26%	14%	23%	0.3%	6%	13%	43%	0%	36%	14%	9%	4%	38%
M002	MT. LYELL SHREW	*Sorex lyelli*	2%	7%	29%	0%	23%	9%	7%	0%	2%	6%	31%	0%	6%	24%	8%		62%
M003	VAGRANT SHREW	*Sorex vagrans*	8%	14%	32%	0%	14%	15%	25%	0%	13%	15%	26%	0%	19%	22%	12%	1%	46%
M004	MONTANE SHREW	*Sorex monticolus*	19%	21%	31%	0%	51%	13%	7%	0%	6%	15%	51%	0%	23%	36%	13%		29%
M005	FOG SHREW	*Sorex sonomae*	7%	14%	58%	0%	17%	18%	43%	0.1%	18%	24%	37%	0%	36%	19%	17%	6%	22%
M006	ORNATE SHREW	*Sorex ornatus*	19%	16%	46%	0%	42%	16%	22%	1%	4%	12%	65%	0%	34%	29%	14%	4%	19%
M008	INYO SHREW	*Sorex tenellus*	11%	22%	40%	0%	17%	31%	24%	0%	8%	17%	47%	0%	44%	11%	18%		27%
M010	WATER SHREW	*Sorex palustris*	6%	11%	40%	0%	21%	11%	24%	0%	5%	16%	36%	0%	14%	31%	10%	1%	43%
M011	MARSH SHREW	*Sorex bendirii*	7%	9%	46%	0%	20%	17%	25%	0.1%	12%	17%	33%	0%	41%	3%	12%	6%	38%
M012	TROWBRIDGE'S SHREW	*Sorex trowbridgii*	8%	11%	57%	0%	20%	16%	40%	0%	9%	20%	47%	0%	23%	36%	14%	3%	23%
M013	MERRIAM'S SHREW	*Sorex merriami*	18%	16%	44%	0%	25%	29%	25%	0%	8%	16%	54%	0%	63%	5%	10%		22%
M014	DESERT SHREW	*Notiosorex crawfordi*	22%	16%	49%	0.3%	27%	10%	30%	21%	8%	18%	62%	0%	35%	10%	18%	25%	12%
M015	SHREW-MOLE	*Neurotrichus gibbsii*	5%	9%	57%	0%	12%	14%	45%	0%	11%	21%	38%	0%	22%	31%	14%	4%	29%
M016	TOWNSEND'S MOLE	*Scapanus townsendii*	20%	12%	4%	0%	4%	27%	5%	0.1%	28%	4%	4%	0%	18%	2%	12%	3%	64%
M017	COAST MOLE	*Scapanus orarius*	7%	9%	13%	0%	7%	11%	11%	0%	12%	8%	8%	0%	17%	4%	5%	2%	71%
M018	BROAD-FOOTED MOLE	*Scapanus latimanus*	11%	11%	27%	0%	25%	11%	13%	1%	6%	9%	35%	0%	21%	15%	10%	4%	50%
M019	CALIFORNIA LEAF-NOSED BAT	*Macrotus californicus*	37%	16%	42%	1%	33%	7%	11%	45%	8%	24%	64%	0%	35%	2%	4%	55%	4%
M021	LITTLE BROWN BAT	*Myotis lucifugus*	14%	22%	63%	0%	30%	26%	43%	0.2%	16%	26%	58%	0%	40%	38%	19%	2%	1%
M022	ARIZONA MYOTIS	*Myotis occultus*	77%	15%	7%	0%	8%	0%	0%	92%	12%	31%	57%	0%	0.5%	0%	0%	99%	0.3%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
M023	YUMA MYOTIS	*Myotis yumanensis*	20%	22%	56%	0%	42%	21%	33%	2%	13%	21%	64%	0%	44%	32%	16%	7%	2%
M024	CAVE MYOTIS	*Myotis velifer*	79%	12%	3%	0%	5%	0%	0%	89%	18%	36%	40%	0%	0.2%	0%	0%	94%	6%
M025	LONG-EARED MYOTIS	*Myotis evotis*	14%	18%	58%	0%	34%	22%	35%	0%	11%	19%	60%	0%	37%	36%	15%	3%	9%
M026	FRINGED MYOTIS	*Myotis thysanodes*	16%	20%	60%	0%	37%	23%	36%	1%	11%	21%	64%	0%	40%	35%	17%	3%	4%
M027	LONG-LEGGED MYOTIS	*Myotis volans*	17%	20%	63%	0%	37%	22%	39%	2%	13%	24%	63%	0%	42%	32%	18%	7%	0.2%
M028	CALIFORNIA MYOTIS	*Myotis californicus*	20%	21%	58%	0.2%	37%	20%	35%	8%	12%	22%	65%	0%	44%	26%	17%	12%	1%
M029	SMALL-FOOTED MYOTIS	*Myotis ciliolabrum*	18%	19%	61%	0%	38%	20%	39%	2%	11%	20%	67%	0%	43%	32%	19%	5%	2%
M030	SILVER-HAIRED BAT	*Lasionycteris noctivagans*	17%	20%	55%	0%	38%	20%	35%	0.2%	14%	22%	57%	0%	36%	35%	17%	5%	7%
M031	CANYON BAT	*Parastrelluss hesperus*	24%	22%	53%	0.2%	41%	17%	29%	11%	11%	20%	67%	0%	46%	19%	16%	17%	1%
M032	BIG BROWN BAT	*Eptesicus fuscus*	20%	21%	58%	0.2%	38%	20%	35%	8%	12%	22%	66%	0%	44%	26%	18%	12%	0.2%
M033	WESTERN RED BAT	*Lasiurus blossevillii*	21%	21%	56%	0%	51%	19%	26%	1%	8%	19%	70%	0%	48%	26%	15%	8%	3%
M034	HOARY BAT	*Lasiurus cinereus*	18%	21%	57%	0%	43%	21%	33%	0.4%	12%	21%	65%	0%	43%	32%	16%	5%	3%
M035	WESTERN YELLOW BAT	*Lasiurus xanthinus*	8%	4%	2%	0.3%	4%	1%	1%	8%	2%	2%	11%	0%	5%	0.4%	1%	9%	86%
M036	SPOTTED BAT	*Euderma maculatum*	21%	18%	48%	0.2%	33%	15%	29%	11%	11%	20%	57%	0%	42%	16%	15%	15%	12%
M037	TOWNSEND'S BIG-EARED BAT	*Corynorhinus townsendii*	20%	21%	58%	0.2%	37%	19%	35%	8%	12%	22%	65%	0%	44%	25%	17%	12%	1%
M038	PALLID BAT	*Antrozous pallidus*	20%	21%	57%	0.2%	37%	19%	35%	8%	12%	22%	65%	0%	44%	26%	17%	12%	1%
M039	BRAZILIAN FREE-TAILED BAT	*Tadarida brasiliensis*	20%	21%	58%	0.2%	37%	19%	35%	8%	12%	22%	65%	0%	44%	26%	17%	12%	1%
M040	POCKETED FREE-TAILED BAT	*Nyctinomops femorosaccus*	39%	15%	29%	2%	26%	6%	11%	42%	13%	13%	60%	0%	34%	1%	3%	48%	14%
M042	WESTERN MASTIFF BAT	*Eumops perotis*	22%	19%	51%	0.3%	37%	14%	29%	12%	9%	17%	66%	0%	40%	19%	15%	18%	8%
M043	AMERICAN PIKA	*Ochotona princeps*	12%	17%	38%	0%	27%	23%	18%	0%	7%	13%	48%	0%	31%	25%	12%	0%	32%
M044	PYGMY RABBIT	*Brachylagus idahoensis*	3%	15%	57%	0%	11%	32%	33%	0%	5%	14%	56%	0%	65%	1%	9%		25%
M045	BRUSH RABBIT	*Sylvilagus bachmani*	15%	15%	43%	0%	35%	15%	23%	1%	7%	13%	53%	0%	31%	24%	12%	6%	27%
M046	NUTTALL'S COTTONTAIL	*Sylvilagus nuttallii*	6%	18%	38%	0%	15%	27%	21%	0%	6%	13%	43%	0%	47%	4%	11%		38%
M047	AUDUBON'S COTTONTAIL	*Sylvilagus audubonii*	22%	20%	54%	0.2%	38%	15%	31%	12%	10%	19%	67%	0%	43%	19%	17%	17%	4%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
M049	SNOWSHOE HARE	*Lepus americanus*	0.3%	1%	9%	0%	2%	3%	6%	0%	1%	4%	6%	0%	2%	7%	2%	0.1%	89%
M050	WHITE-TAILED JACKRABBIT	*Lepus townsendii*	13%	15%	33%	0%	23%	22%	17%	0%	6%	14%	41%	0%	49%	4%	9%		38%
M051	BLACK-TAILED JACKRABBIT	*Lepus californicus*	19%	19%	47%	0.2%	33%	16%	28%	8%	10%	18%	57%	0%	41%	17%	15%	12%	15%
M052	MOUNTAIN BEAVER	*Aplodontia rufa*	6%	13%	41%	0%	21%	12%	26%	0%	9%	15%	37%	0%	15%	31%	11%	3%	40%
M053	ALPINE CHIPMUNK	*Tamias alpinus*	8%	12%	22%	0%	35%	6%	1%	0%	1%	5%	36%	0%	6%	30%	5%		58%
M054	LEAST CHIPMUNK	*Tamias minimus*	14%	18%	43%	0%	22%	28%	25%	0%	6%	17%	51%	0%	63%	2%	9%		25%
M055	YELLOW-PINE CHIPMUNK	*Tamias amoenus*	11%	19%	64%	0%	26%	21%	47%	0%	14%	25%	55%	0%	29%	47%	16%	2%	6%
M056	REDWOOD CHIPMUNK	*Tamias ochrogenys*	6%	16%	62%	0%	26%	30%	27%	0%	14%	30%	40%	0%	67%	2%	14%	1%	16%
M057	SHADOW CHIPMUNK	*Tamias senex*	11%	18%	64%	0%	31%	18%	44%	0%	13%	24%	57%	0%	29%	45%	15%	4%	7%
M058	SISKIYOU CHIPMUNK	*Tamias siskiyou*	11%	19%	21%	0%	15%	10%	25%	0.1%	29%	14%	8%	0%	7%	18%	11%	14%	50%
M059	SONOMA CHIPMUNK	*Tamias sonomae*	5%	12%	55%	0%	10%	16%	46%	0%	16%	18%	38%	0%	22%	29%	18%	3%	28%
M060	MERRIAM'S CHIPMUNK	*Tamias merriami*	16%	16%	57%	0%	39%	18%	32%	1%	5%	13%	72%	0%	29%	43%	15%	3%	10%
M061	CHAPARRAL CHIPMUNK	*Tamias obscurus*	23%	15%	33%	0%	38%	10%	22%	0%	17%	12%	41%	0%	43%	20%	7%	0.4%	30%
M062	LONG-EARED CHIPMUNK	*Tamias quadrimaculatus*	7%	10%	48%	0%	28%	18%	19%	0%	3%	17%	45%	0%	21%	31%	10%	3%	35%
M063	LODGEPOLE CHIPMUNK	*Tamias speciosus*	9%	12%	43%	0%	28%	13%	24%	0%	4%	18%	43%	0%	11%	46%	8%		35%
M064	PANAMINT CHIPMUNK	*Tamias panamintinus*	13%	24%	26%	0%	24%	14%	25%	0%	2%	9%	51%	0%	17%	29%	17%		38%
M065	UINTA CHIPMUNK	*Tamias umbrinus*	5%	9%	17%	0%	25%	6%	1%	0%	2%	5%	25%	0%	3%	24%	5%		68%
M066	YELLOW-BELLIED MARMOT	*Marmota flaviventris*	13%	18%	47%	0%	32%	23%	23%	0%	7%	16%	55%	0%	34%	31%	13%	0%	22%
M067	WHITE-TAILED ANTELOPE GROUND SQUIRREL	*Ammospermophilus leucurus*	21%	18%	55%	0.3%	24%	15%	37%	19%	12%	22%	61%	0%	44%	9%	19%	22%	5%

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M068	NELSON'S ANTELOPE GROUND SQUIRREL	*Ammospermophilus nelsoni*	17%	19%	51%	0%	34%	24%	29%	0%	8%	11%	69%	0%	33%	36%	19%	0.1%	13%
M069	PIUTE GROUND SQUIRREL	*Urocitellus mollis*	13%	18%	56%	0%	16%	34%	37%	0%	11%	17%	59%	0%	71%	5%	12%		13%
M070	BELDING'S GROUND SQUIRREL	*Urocitellus beldingi*	12%	16%	31%	0%	25%	21%	14%	0%	8%	11%	40%	0%	33%	17%	10%	0.2%	40%
M071	ROCK SQUIRREL	*Otospermophilus variegatus*	2%	10%	85%	0%	15%	19%	63%	0%	10%	38%	50%	0%	81%	0%	6%	9%	3%
M072	CALIFORNIA GROUND SQUIRREL	*Otospermophilus beecheyi*	18%	21%	58%	0%	41%	20%	34%	0.5%	11%	21%	64%	0%	43%	32%	16%	5%	4%
M073	MOHAVE GROUND SQUIRREL	*Xerospermophilus mohavensis*	3%	18%	73%	0%	15%	19%	60%	0.3%	9%	11%	74%	0%	49%	10%	35%		6%
M074	ROUND-TAILED GROUND SQUIRREL	*Xerospermophilus tereticaudus*	31%	17%	44%	1%	32%	8%	17%	36%	8%	22%	63%	0%	39%	2%	8%	44%	7%
M075	GOLDEN-MANTLED GROUND SQUIRREL	*Callospermophilus lateralis*	14%	21%	58%	0%	34%	21%	38%	0%	13%	23%	57%	0%	32%	41%	17%	3%	7%
M077	WESTERN GRAY SQUIRREL	*Sciurus griseus*	13%	16%	52%	0%	31%	16%	33%	0.2%	9%	18%	53%	0%	29%	33%	13%	5%	19%
M079	DOUGLAS' SQUIRREL	*Tamiasciurus douglasii*	9%	14%	52%	0%	26%	15%	34%	0%	9%	20%	47%	0%	22%	35%	15%	3%	25%
M080	NORTHERN FLYING SQUIRREL	*Glaucomys sabrinus*	9%	15%	57%	0%	26%	16%	38%	0%	10%	22%	49%	0%	23%	39%	15%	3%	20%
M081	BOTTA'S POCKET GOPHER	*Thomomys bottae*	20%	19%	46%	0.2%	33%	14%	27%	10%	10%	18%	57%	0%	38%	18%	15%	14%	15%
M082	TOWNSEND'S POCKET GOPHER	*Thomomys townsendii*	8%	11%	75%	0%	2%	28%	64%	0%	7%	17%	70%	0%	82%	1%	10%		6%
M083	NORTHERN POCKET GOPHER	*Thomomys talpoides*	19%	23%	47%	0%	34%	29%	26%	0%	9%	19%	61%	0%	71%	5%	12%		11%
M084	MAZAMA POCKET GOPHER	*Thomomys mazama*	8%	5%	10%	0%	4%	6%	14%	0%	8%	10%	6%	0%	5%	12%	7%	0.2%	76%

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M085	MOUNTAIN POCKET GOPHER	*Thomomys monticola*	9%	13%	30%	0%	24%	12%	16%	0%	8%	10%	34%	0%	20%	23%	9%	0%	48%
M086	LITTLE POCKET MOUSE	*Perognathus longimembris*	22%	17%	53%	0.3%	27%	12%	34%	20%	9%	21%	63%	0%	42%	10%	18%	24%	7%
M087	SAN JOAQUIN POCKET MOUSE	*Perognathus inornatus*	14%	17%	45%	0%	37%	19%	18%	1%	1%	7%	67%	0%	31%	26%	17%	1%	25%
M088	GREAT BASIN POCKET MOUSE	*Perognathus parvus*	18%	21%	37%	0%	26%	24%	26%	0.1%	11%	20%	45%	0%	57%	9%	10%	0%	24%
M089	WHITE-EARED POCKET MOUSE	*Perognathus alticolus*	6%	21%	12%	0%	19%	13%	6%	0%	17%	6%	15%	0%	20%	16%	3%		61%
M091	LONG-TAILED POCKET MOUSE	*Chaetodipus formosus*	21%	16%	55%	0.3%	23%	12%	36%	23%	9%	21%	64%	0%	39%	8%	19%	26%	7%
M092	BAILEY'S POCKET MOUSE	*Chaetodipus rudinoris*	46%	15%	29%	0%	28%	5%	9%	48%	8%	11%	71%	0%	29%	0.1%	2%	59%	10%
M093	DESERT POCKET MOUSE	*Chaetodipus penicillatus*	32%	22%	34%	1%	24%	11%	20%	34%	11%	13%	66%	0%	40%	7%	11%	32%	11%
M094	SAN DIEGO POCKET MOUSE	*Chaetodipus fallax*	22%	17%	50%	0%	46%	14%	28%	1%	14%	10%	64%	0%	60%	13%	12%	4%	12%
M095	CALIFORNIA POCKET MOUSE	*Chaetodipus californicus*	16%	17%	53%	0%	40%	18%	27%	1%	3%	10%	73%	0%	29%	38%	15%	4%	14%
M096	SPINY POCKET MOUSE	*Chaetodipus spinatus*	52%	11%	24%	1%	22%	4%	8%	54%	12%	17%	59%	0%	26%	0.3%	2%	60%	12%
M097	DARK KANGAROO MOUSE	*Microdipodops megacephalus*	11%	17%	62%	0%	15%	32%	42%	0%	9%	13%	68%	0%	79%	0.3%	10%		11%
M098	PALE KANGAROO MOUSE	*Microdipodops pallidus*	4%	35%	4%	0%	5%	0.5%	38%	0%	2%	15%	27%	0%	4%	23%	17%		56%
M099	ORD'S KANGAROO RAT	*Dipodomys ordii*	17%	17%	53%	0%	15%	33%	39%	0%	9%	16%	62%	0%	72%	5%	10%		13%
M100	CHISEL-TOOTHED KANGAROO RAT	*Dipodomys microps*	9%	19%	68%	0%	19%	17%	54%	5%	9%	18%	68%	0%	50%	15%	29%	2%	5%
M102	NARROW-FACED KANGAROO RAT	*Dipodomys venustus*	1%	3%	63%	0%	7%	13%	47%	0%	1%	7%	59%	0%	5%	49%	14%		32%
M103	AGILE KANGAROO RAT	*Dipodomys agilis*	22%	19%	44%	0%	46%	13%	25%	0.2%	10%	14%	61%	0%	45%	26%	12%	2%	15%
M104	HEERMANN'S KANGAROO RAT	*Dipodomys heermanni*	14%	18%	48%	0%	35%	16%	26%	2%	3%	11%	66%	0%	27%	31%	16%	5%	21%
M105	CALIFORNIA KANGAROO RAT	*Dipodomys californicus*	15%	15%	24%	0%	29%	14%	11%	0%	15%	18%	22%	0%	35%	3%	6%	10%	46%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
M106	GIANT KANGAROO RAT	*Dipodomys ingens*	12%	17%	58%	0%	26%	30%	30%	0%	8%	7%	72%	0%	25%	35%	27%		13%
M107	PANAMINT KANGAROO RAT	*Dipodomys panamintinus*	11%	22%	61%	0%	15%	24%	55%	0%	15%	23%	57%	0%	47%	16%	30%	1%	6%
M108	STEPHENS' KANGAROO RAT	*Dipodomys stephensi*	30%	12%	9%	0%	49%	1%	1%	0%	1%	7%	43%	0%	48%	0.1%	1%	2%	49%
M109	DESERT KANGAROO RAT	*Dipodomys deserti*	22%	17%	55%	0.3%	24%	11%	35%	24%	8%	21%	65%	0%	38%	8%	20%	27%	7%
M110	MERRIAM'S KANGAROO RAT	*Dipodomys merriami*	22%	18%	55%	0.3%	25%	13%	37%	20%	11%	22%	62%	0%	42%	10%	19%	24%	5%
M111	FRESNO KANGAROO RAT	*Dipodomys nitratoides*	20%	22%	47%	0%	40%	25%	25%	0.2%	8%	12%	69%	0%	38%	32%	19%	0.3%	10%
M112	AMERICAN BEAVER	*Castor canadensis*	13%	15%	39%	0%	30%	13%	25%	0.2%	12%	16%	40%	0%	20%	29%	12%	6%	33%
M113	WESTERN HARVEST MOUSE	*Reithrodontomys megalotis*	18%	18%	46%	0.1%	32%	16%	27%	7%	11%	17%	55%	0%	40%	18%	14%	11%	17%
M114	SALT-MARSH HARVEST MOUSE	*Reithrodontomys raviventris*	17%	4%	35%	0%	27%	28%	2%	0%	10%	4%	42%	0%	54%	0%	3%		44%
M115	CACTUS MOUSE	*Peromyscus eremicus*	23%	16%	52%	0.3%	30%	12%	31%	19%	8%	18%	65%	0%	41%	12%	16%	22%	8%
M116	CALIFORNIA MOUSE	*Peromyscus californicus*	18%	14%	39%	0%	40%	11%	21%	0.5%	3%	11%	58%	0%	34%	26%	9%	2%	29%
M117	DEER MOUSE	*Peromyscus maniculatus*	20%	21%	58%	0.2%	38%	20%	35%	7%	12%	22%	66%	0%	44%	26%	17%	12%	0.2%
M118	CANYON MOUSE	*Peromyscus crinitus*	22%	19%	54%	0.2%	27%	15%	36%	17%	11%	22%	62%	0%	46%	11%	18%	20%	5%
M119	BRUSH MOUSE	*Peromyscus boylii*	17%	17%	39%	0%	35%	14%	23%	0.5%	10%	15%	48%	0%	36%	22%	12%	4%	27%
M120	PINYON MOUSE	*Peromyscus truei*	12%	16%	50%	0%	29%	19%	31%	0.3%	10%	18%	51%	0%	33%	28%	14%	3%	22%
M121	NORTHERN GRASSHOPPER MOUSE	*Onychomys leucogaster*	23%	24%	47%	0%	34%	31%	29%	0%	10%	20%	63%	0%	73%	7%	13%		6%
M122	SOUTHERN GRASSHOPPER MOUSE	*Onychomys torridus*	23%	17%	49%	0.2%	30%	13%	30%	16%	9%	18%	62%	0%	39%	14%	17%	19%	11%
M123	HISPID COTTON RAT	*Sigmodon hispidus*	78%	6%	2%	4%	3%	0%	0%	87%	13%	25%	52%	0%	3%	0%	0%	87%	10%
M125	WHITE-THROATED WOODRAT	*Neotoma albigula*	55%	12%	19%	1%	20%	4%	6%	58%	12%	19%	58%	0%	23%	0.4%	2%	63%	12%
M126	DESERT WOODRAT	*Neotoma lepida*	19%	16%	51%	0.2%	26%	12%	34%	14%	9%	18%	59%	0%	38%	16%	16%	17%	13%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
M127	DUSKY-FOOTED WOODRAT	*Neotoma fuscipes*	9%	13%	55%	0%	22%	19%	36%	0%	11%	19%	47%	0%	28%	30%	13%	6%	23%
M128	BUSHY-TAILED WOODRAT	*Neotoma cinerea*	14%	20%	58%	0%	30%	22%	41%	0%	14%	23%	56%	0%	33%	43%	16%	0.3%	8%
M129	CALIFORNIA RED-BACKED VOLE	*Myodes californicus*	4%	10%	63%	0%	10%	15%	52%	0%	13%	25%	40%	0%	19%	41%	15%	3%	23%
M130	HEATHER VOLE	*Phenacomys intermedius*	13%	18%	36%	0%	39%	14%	14%	0%	6%	16%	46%	0%	24%	32%	11%		33%
M131	WHITE-FOOTED VOLE	*Arborimus albipes*	8%	8%	20%	0%	14%	5%	15%	0.2%	12%	8%	15%	0%	12%	4%	7%	11%	65%
M132	SONOMA RED TREE VOLE	*Arborimus pomo*	5%	13%	56%	0%	15%	16%	43%	0%	16%	21%	37%	0%	32%	20%	16%	5%	26%
M133	MONTANE VOLE	*Microtus montanus*	12%	20%	55%	0%	34%	23%	29%	0%	9%	19%	58%	0%	37%	35%	14%	0%	14%
M134	CALIFORNIA VOLE	*Microtus californicus*	18%	18%	40%	0%	39%	15%	20%	1%	8%	14%	53%	0%	37%	21%	12%	5%	24%
M135	TOWNSEND'S VOLE	*Microtus townsendii*	7%	12%	11%	0%	8%	13%	9%	0.1%	15%	6%	10%	0%	15%	3%	7%	6%	70%
M136	LONG-TAILED VOLE	*Microtus longicaudus*	14%	17%	39%	0%	29%	18%	23%	0%	11%	17%	43%	0%	31%	26%	12%	2%	29%
M137	CREEPING VOLE	*Microtus oregoni*	5%	8%	15%	0%	6%	7%	16%	0%	11%	9%	8%	0%	9%	11%	6%	1%	72%
M138	SAGEBRUSH VOLE	*Lemmiscus curtatus*	14%	17%	48%	0%	22%	30%	26%	0%	5%	15%	59%	0%	65%	3%	11%		21%
M143	WESTERN JUMPING MOUSE	*Zapus princeps*	10%	14%	47%	0%	28%	16%	27%	0%	8%	19%	44%	0%	20%	37%	12%	1%	30%
M144	PACIFIC JUMPING MOUSE	*Zapus trinotatus*	1%	2%	5%	0%	3%	3%	3%	0%	2%	3%	3%	0%	5%	1%	2%	1%	92%
M145	COMMON PORCUPINE	*Erethizon dorsatum*	14%	18%	52%	0%	34%	18%	32%	0.2%	11%	21%	53%	0%	34%	32%	14%	4%	15%
M146	COYOTE	*Canis latrans*	20%	21%	58%	0.2%	38%	20%	35%	8%	12%	22%	66%	0%	44%	26%	18%	12%	0.2%
M147	RED FOX	*Vulpes vulpes*	12%	17%	44%	0%	32%	19%	21%	0.4%	7%	15%	50%	0%	25%	34%	10%	3%	28%
M148	KIT FOX	*Vulpes macrotis*	21%	17%	57%	0.4%	25%	14%	35%	21%	8%	21%	67%	0%	39%	12%	20%	24%	4%
M149	GRAY FOX	*Urocyon cinereoargenteus*	19%	20%	56%	0.1%	36%	18%	34%	7%	12%	21%	62%	0%	42%	25%	17%	12%	5%
M150	ISLAND GRAY FOX	*Urocyon littoralis*	15%	5%	78%	0%	51%	32%	15%	0%	8%	20%	70%	0%	87%	4%	7%		2%
M151	BLACK BEAR	*Ursus americanus*	13%	18%	60%	0%	33%	18%	39%	0%	12%	22%	57%	0%	30%	40%	17%	3%	10%
M152	RINGTAIL	*Bassariscus astutus*	17%	18%	49%	0.2%	31%	16%	29%	8%	11%	19%	55%	0%	36%	22%	14%	12%	15%
M153	RACCOON	*Procyon lotor*	19%	21%	57%	0.1%	43%	21%	33%	1%	12%	21%	65%	0%	44%	32%	16%	5%	2%
M154	MARTEN	*Martes caurina*	9%	17%	57%	0%	27%	21%	35%	0%	8%	20%	54%	0%	19%	48%	15%	2%	17%
M155	FISHER	*Pekania pennanti*	9%	13%	54%	0%	25%	15%	35%	0%	8%	21%	47%	0%	21%	37%	14%	3%	24%
M156	ERMINE	*Mustela erminea*	9%	16%	61%	0%	27%	17%	41%	0%	10%	23%	52%	0%	25%	42%	16%	4%	14%

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M157	LONG-TAILED WEASEL	*Mustela frenata*	19%	22%	58%	0%	42%	21%	34%	0.4%	13%	21%	64%	0%	44%	32%	16%	5%	2%
M159	WOLVERINE	*Gulo gulo*	10%	18%	59%	0%	28%	23%	36%	0%	9%	21%	57%	0%	20%	51%	15%	1%	13%
M160	AMERICAN BADGER	*Taxidea taxus*	18%	18%	44%	0.2%	30%	16%	27%	9%	10%	17%	54%	0%	39%	17%	14%	11%	19%
M161	WESTERN SPOTTED SKUNK	*Spilogale gracilis*	18%	20%	54%	0.1%	40%	20%	31%	1%	11%	20%	61%	0%	42%	29%	15%	5%	8%
M162	STRIPED SKUNK	*Mephitis mephitis*	18%	20%	56%	0.1%	40%	20%	33%	1%	12%	21%	62%	0%	42%	32%	15%	5%	6%
M165	MOUNTAIN LION	*Puma concolor*	18%	20%	58%	0%	38%	21%	35%	3%	12%	21%	63%	0%	41%	32%	17%	7%	3%
M166	BOBCAT	*Lynx rufus*	20%	20%	56%	0.1%	37%	18%	34%	7%	12%	21%	63%	0%	43%	26%	17%	11%	4%
M177	ELK	*Cervus elaphus*	8%	14%	62%	0%	17%	21%	47%	0%	14%	18%	53%	0%	19%	45%	18%	3%	15%
M181	MULE DEER	*Odocoileus hemionus*	19%	21%	58%	0%	39%	21%	35%	3%	13%	21%	64%	0%	42%	32%	17%	8%	2%
M182	PRONGHORN	*Antilocapra americana*	16%	17%	49%	0%	26%	31%	25%	0%	7%	17%	58%	0%	67%	2%	12%		18%
M183	BIGHORN SHEEP	*Ovis canadensis*	22%	16%	54%	0.3%	24%	11%	34%	23%	11%	22%	60%	0%	38%	8%	18%	28%	7%
M233	BIG-EARED WOODRAT	*Neotoma macrotis*	23%	21%	37%	0%	54%	10%	15%	0.5%	3%	10%	66%	0%	42%	24%	10%	3%	20%
M234	BAJA MOUSE	*Peromyscus fraterculus*	23%	19%	38%	0%	45%	12%	22%	0.2%	11%	12%	56%	0%	46%	24%	8%	2%	20%
R004	WESTERN POND TURTLE	*Actinemys marmorata*	17%	19%	50%	0%	41%	18%	28%	1%	10%	18%	59%	0%	38%	28%	15%	6%	13%
R005	MOHAVE DESERT TORTOISE	*Gopherus agassizii*	23%	17%	58%	0.4%	24%	12%	35%	27%	8%	22%	68%	0%	40%	8%	19%	31%	2%
R007	SWITAK'S BANDED GECKO	*Coleonyx switaki*	12%	30%	39%	0%	11%	24%	45%	0%	47%	16%	17%	0%	68%	1%	12%		20%
R008	WESTERN BANDED GECKO	*Coleonyx variegatus*	23%	18%	54%	0.4%	27%	12%	35%	22%	9%	21%	66%	0%	41%	11%	19%	25%	4%
R009	PENINSULA LEAF-TOED GECKO	*Phyllodactylus nocticolus*	11%	33%	40%	0%	22%	25%	37%	0.1%	41%	15%	27%	0%	58%	13%	8%	4%	17%
R010	DESERT IGUANA	*Dipsosaurus dorsalis*	21%	16%	57%	0.3%	23%	12%	36%	24%	9%	21%	64%	0%	40%	8%	19%	28%	6%
R011	COMMON CHUCKWALLA	*Sauromalus ater*	22%	18%	55%	0.3%	25%	12%	35%	24%	9%	22%	64%	0%	41%	9%	18%	28%	5%
R012	ZEBRA-TAILED LIZARD	*Callisaurus draconoides*	21%	18%	57%	0.4%	23%	12%	37%	24%	10%	22%	64%	0%	42%	9%	19%	27%	3%
R013	COLORADO DESERT FRINGE-TOED LIZARD	*Uma notata*	59%	13%	14%	5%	19%	2%	3%	68%	13%	13%	65%	0%	25%	1%	4%	61%	9%
R014	COACHELLA VALLEY FRINGE-TOED LIZARD	*Uma inornata*	27%	14%	38%	0%	35%	8%	6%	29%	11%	19%	48%	0%	9%	0%	0%	70%	22%

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R015	MOHAVE FRINGE-TOED LIZARD	*Uma scoparia*	28%	22%	46%	0%	28%	11%	23%	34%	4%	14%	77%	0%	44%	4%	13%	34%	4%
R017	GREAT BASIN COLLARED LIZARD	*Crotaphytus bicinctores*	20%	19%	60%	0%	23%	13%	40%	21%	9%	23%	66%	0%	42%	10%	21%	25%	2%
R018	LONG-NOSED LEOPARD LIZARD	*Gambelia wislizenii*	21%	19%	56%	0.3%	23%	15%	38%	20%	12%	22%	61%	0%	45%	9%	19%	23%	5%
R019	BLUNT-NOSED LEOPARD LIZARD	*Gambelia sila*	22%	20%	47%	0%	39%	22%	27%	0%	8%	13%	67%	0%	38%	34%	16%	1%	12%
R020	DESERT SPINY LIZARD	*Sceloporus magister*	50%	15%	28%	1%	24%	6%	11%	54%	12%	18%	64%	0%	31%	1%	2%	60%	6%
R021	GRANITE SPINY LIZARD	*Sceloporus orcutti*	28%	19%	41%	0%	55%	15%	18%	0.3%	11%	8%	70%	0%	52%	24%	11%	2%	11%
R022	WESTERN FENCE LIZARD	*Sceloporus occidentalis*	17%	21%	56%	0%	41%	21%	32%	0.4%	11%	20%	63%	0%	42%	30%	16%	5%	6%
R023	COMMON SAGEBRUSH LIZARD	*Sceloporus graciosus*	8%	12%	36%	0%	17%	14%	25%	0%	7%	13%	35%	0%	25%	21%	9%	1%	44%
R024	COMMON SIDE-BLOTCHED LIZARD	*Uta stansburiana*	21%	18%	57%	0.3%	31%	17%	36%	14%	10%	19%	69%	0%	41%	22%	19%	16%	3%
R025	LONG-TAILED BRUSH LIZARD	*Urosaurus graciosus*	28%	16%	49%	0.5%	29%	9%	24%	32%	9%	24%	62%	0%	45%	1%	8%	41%	6%
R026	ORNATE TREE LIZARD	*Urosaurus ornatus*	89%	6%	1%	0%	1%	0%	0%	96%	32%	21%	43%	0%	0%	0%	0%	96%	4%
R027	BAJA CALIFORNIA BRUSH LIZARD	*Urosaurus nigricaudus*	9%	23%	60%	0%	32%	25%	35%	0%	22%	10%	59%	0%	35%	46%	10%		8%
R028	MEARNS' ROCK LIZARD	*Petrosaurus mearnsi*	10%	30%	43%	0%	19%	24%	38%	1%	44%	20%	18%	0%	69%	1%	6%	6%	18%
R029	BLAINVILLE'S HORNED LIZARD	*Phrynosoma blainvillii*	20%	20%	44%	0%	47%	14%	22%	1%	6%	13%	65%	0%	34%	30%	13%	7%	17%
R030	DESERT HORNED LIZARD	*Phrynosoma platyrhinos*	22%	18%	57%	0.4%	24%	12%	38%	23%	11%	23%	63%	0%	43%	9%	19%	26%	3%
R031	PYGMY SHORT-HORNED LIZARD	*Phrynosoma douglasii*	26%	24%	33%	0%	44%	16%	23%	0%	7%	17%	59%	0%	55%	19%	9%		17%
R032	FLAT-TAILED HORNED LIZARD	*Phrynosoma mcallii*	52%	15%	26%	5%	23%	5%	10%	59%	21%	17%	60%	0%	33%	4%	6%	55%	2%
R033	GRANITE NIGHT LIZARD	*Xantusia henshawi*	18%	22%	50%	0%	49%	18%	23%	0.4%	13%	8%	69%	0%	49%	27%	13%	2%	10%

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R034	DESERT NIGHT LIZARD	*Xantusia vigilis*	12%	19%	63%	0%	24%	16%	44%	9%	11%	22%	60%	0%	45%	15%	22%	11%	7%
R035	ISLAND NIGHT LIZARD	*Xantusia riversiana*	0%	1%	99%	0%	78%	22%	0%	0%	0%	0%	100%	0%	44%	1%	55%		0%
R036	WESTERN SKINK	*Plestiodon skiltonianus*	12%	15%	56%	0%	28%	19%	36%	0.1%	11%	18%	54%	0%	29%	33%	15%	5%	17%
R037	GILBERT'S SKINK	*Plestiodon gilberti*	22%	23%	41%	0%	53%	15%	17%	1%	5%	13%	67%	0%	39%	28%	12%	6%	14%
R038	ORANGE-THROATED WHIPTAIL	*Aspidoscelis hyperythra*	48%	12%	17%	0%	72%	3%	1%	0%	0.4%	2%	74%	0%	62%	5%	8%	0.4%	24%
R039	TIGER WHIPTAIL	*Aspidoscelis tigris*	21%	19%	51%	0.2%	34%	16%	30%	11%	10%	19%	62%	0%	43%	17%	16%	15%	9%
R040	SOUTHERN ALLIGATOR LIZARD	*Elgaria multicarinata*	17%	19%	59%	0%	42%	19%	33%	1%	9%	20%	66%	0%	39%	33%	16%	7%	5%
R041	PANAMINT ALLIGATOR LIZARD	*Elgaria panamintina*	11%	31%	52%	0%	15%	17%	63%	0.1%	18%	31%	45%	0%	34%	21%	40%		5%
R042	NORTHERN ALLIGATOR LIZARD	*Elgaria coerulea*	11%	16%	59%	0%	28%	19%	39%	0%	12%	23%	51%	0%	29%	38%	16%	3%	14%
R043	CALIFORNIA LEGLESS LIZARD	*Anniella pulchra*	13%	12%	40%	0%	32%	11%	22%	1%	5%	8%	53%	0%	24%	33%	7%	2%	34%
R044	GILA MONSTER	*Heloderma suspectum*	21%	24%	54%	0%	27%	29%	24%	18%	16%	34%	49%	0%	70%	0%	1%	28%	1%
R045	WESTERN THREADSNAKE	*Rena humilis*	23%	18%	51%	0.3%	29%	11%	32%	20%	9%	20%	64%	0%	39%	13%	17%	23%	8%
R046	NORTHERN RUBBER BOA	*Charina bottae*	9%	14%	58%	0%	26%	17%	39%	0%	10%	22%	50%	0%	27%	36%	15%	4%	18%
R048	RING-NECKED SNAKE	*Diadophis punctatus*	15%	17%	49%	0%	34%	16%	29%	0.4%	10%	16%	54%	0%	33%	28%	13%	6%	20%
R049	COMMON SHARP-TAILED SNAKE	*Contia tenuis*	11%	15%	55%	0%	31%	15%	35%	0.3%	9%	19%	53%	0%	31%	31%	12%	7%	19%
R050	SPOTTED LEAF-NOSED SNAKE	*Phyllorhynchus decurtatus*	23%	17%	56%	0.4%	24%	11%	33%	27%	8%	21%	66%	0%	39%	7%	18%	31%	5%
R051	NORTH AMERICAN RACER	*Coluber constrictor*	15%	18%	49%	0%	35%	17%	29%	0.4%	9%	17%	55%	0%	36%	28%	13%	5%	18%
R052	COACHWHIP	*Coluber flagellum*	20%	18%	56%	0.2%	29%	16%	34%	14%	9%	18%	66%	0%	39%	19%	18%	17%	6%
R053	STRIPED RACER	*Masticophis lateralis*	14%	13%	45%	0%	34%	13%	26%	0.2%	6%	13%	54%	0%	28%	29%	10%	5%	28%
R054	STRIPED WHIPSNAKE	*Masticophis taeniatus*	17%	24%	41%	0%	33%	26%	24%	0%	7%	19%	57%	0%	61%	8%	14%	0.1%	17%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
R055	WESTERN PATCH-NOSED SNAKE	*Salvadora hexalepis*	22%	19%	55%	0.3%	28%	14%	36%	18%	10%	21%	65%	0%	42%	16%	17%	21%	4%
R056	GLOSSY SNAKE	*Arizona elegans*	22%	17%	55%	0.3%	31%	14%	31%	18%	8%	17%	68%	0%	41%	14%	18%	21%	6%
R057	GOPHERSNAKE	*Pituophis catenifer*	19%	19%	51%	0.1%	34%	17%	31%	7%	11%	19%	59%	0%	40%	22%	16%	11%	11%
R058	CALIFORNIA KINGSNAKE	*Lampropeltis californiae*	20%	20%	55%	0.2%	36%	17%	34%	8%	12%	21%	62%	0%	43%	22%	17%	13%	5%
R059	CALIFORNIA MOUNTAIN KINGSNAKE	*Lampropeltis zonata*	16%	18%	57%	0%	33%	15%	41%	1%	12%	24%	54%	0%	31%	38%	14%	7%	10%
R060	LONG-NOSED SNAKE	*Rhinocheilus lecontei*	22%	17%	53%	0.2%	30%	15%	32%	15%	9%	18%	65%	0%	41%	16%	18%	18%	8%
R061	COMMON GARTERSNAKE	*Thamnophis sirtalis*	16%	20%	59%	0%	39%	20%	35%	0.5%	24%	22%	48%	0.2%	40%	33%	16%	6%	5%
R062	TERRESTRIAL GARTERSNAKE	*Thamnophis elegans*	14%	20%	58%	0%	35%	22%	35%	0%	13%	22%	57%	0%	39%	32%	16%	5%	8%
R063	SIERRA GARTERSNAKE	*Thamnophis couchii*	24%	20%	26%	0%	49%	8%	11%	2%	11%	18%	41%	0%	37%	11%	6%	15%	30%
R064	NORTHWESTERN GARTERSNAKE	*Thamnophis ordinoides*	8%	23%	1%	0%	24%	6%	1%	1%	21%	11%	0%	0%	3%	0%	2%	27%	68%
R066	WESTERN GROUNDSNAKE	*Sonora semiannulata*	22%	18%	55%	0.4%	24%	12%	35%	25%	10%	22%	64%	0%	39%	9%	19%	28%	5%
R067	WESTERN SHOVEL-NOSED SNAKE	*Chionactis occipitalis*	21%	17%	58%	0.4%	23%	12%	37%	25%	9%	22%	66%	0%	41%	9%	19%	29%	3%
R068	WESTERN BLACK-HEADED SNAKE	*Tantilla planiceps*	14%	14%	61%	0%	35%	22%	32%	0.1%	6%	9%	74%	0%	28%	44%	16%	1%	11%
R069	SMITH'S BLACK-HEADED SNAKE	*Tantilla hobartsmithi*	7%	19%	66%	0%	19%	11%	59%	2%	15%	28%	49%	0%	46%	18%	23%	4%	9%
R070	SONORAN LYRESNAKE	*Trimorphodon lambda*	32%	16%	51%	0%	29%	8%	22%	40%	5%	31%	63%	0%	32%	6%	9%	52%	1%
R071	DESERT NIGHTSNAKE	*Hypsiglena chlorophaea*	23%	18%	55%	0.3%	25%	14%	36%	21%	10%	23%	63%	0%	42%	10%	20%	24%	4%
R072	WESTERN DIAMOND-BACKED RATTLESNAKE	*Crotalus atrox*	59%	16%	20%	2%	21%	2%	3%	70%	10%	27%	59%	0%	14%	1%	1%	80%	4%
R073	RED DIAMOND RATTLESNAKE	*Crotalus ruber*	28%	20%	41%	0%	58%	13%	17%	1%	11%	10%	68%	0%	59%	16%	10%	4%	11%
R074	SPECKLED RATTLESNAKE	*Crotalus mitchellii*	33%	18%	44%	0.5%	35%	10%	19%	31%	11%	23%	62%	0%	39%	6%	9%	42%	4%

CWHR ID	Common Name	Scientific Name	HotDry rcp4.5 High	HotDry rcp4.5 Mod	HotDry rcp4.5 Low	HotDry rcp4.5 Non-an.	HotDry rcp8.5 High	HotDry rcp8.5 Mod	HotDry rcp8.5 Low	HotDry rcp8.5 Non-an.	WarmWet rcp4.5 High	WarmWet rcp4.5 Mod	WarmWet rcp45 Low	WarmWet rcp45 Non-an.	WarmWet rcp85 High	WarmWet rcp85 Low	WarmWet rcp85 Mod	WarmWet rcp85 Non-an.	Not assessed
R075	SIDEWINDER	*Crotalus cerastes*	23%	17%	57%	0.4%	24%	12%	35%	26%	9%	22%	66%	0%	42%	8%	18%	30%	3%
R076	WESTERN RATTLESNAKE	*Crotalus oreganus*	18%	21%	57%	0%	41%	21%	33%	0.4%	11%	21%	64%	0%	42%	33%	16%	5%	4%
R077	MOHAVE RATTLESNAKE	*Crotalus scutulatus*	10%	19%	69%	0%	26%	15%	43%	13%	8%	23%	67%	0%	50%	6%	22%	20%	2%
R078	AQUATIC GARTERSNAKE	*Thamnophis atratus*	7%	14%	75%	0%	19%	25%	52%	0%	15%	22%	60%	0%	33%	39%	21%	3%	4%
R079	GIANT GARTERSNAKE	*Thamnophis gigas*	21%	45%	15%	0%	77%	3%	0%	0.4%	12%	18%	51%	0%	70%	0.3%	4%	7%	19%
R080	TWO-STRIPED GARTERSNAKE	*Thamnophis hammondii*	16%	13%	61%	0%	38%	18%	34%	0%	2%	10%	78%	0%	25%	46%	18%	1%	10%
R093	BAJA CALIFORNIA COLLARED LIZARD	*Crotaphytus vestigium*	21%	22%	44%	0%	30%	14%	26%	17%	22%	16%	48%	0%	56%	3%	6%	21%	13%
R094	SANDSTONE NIGHT LIZARD	*Xantusia gracilis*	0%	3%	97%	0%	54%	19%	27%	0%	1%	20%	79%	0%	74%	0%	26%		0.3%
R105	NORTHERN THREE-LINED BOA	*Lichanura orcutti*	22%	17%	54%	0%	31%	12%	32%	19%	25%	21%	46%	0%	42%	10%	18%	23%	7%