

Appendix 1. Climate change vulnerability rankings, current special-status designations in California, and course-scale habitat associations for 168 bird species that breed in the Sierra Nevada.

Common Name (<i>Scientific Name</i>)	CCVI Assessment		California Special Status [†]	Habitat(s) [‡]
	GFDL Climate Model	PCM Climate Model		
Wood Duck (<i>Aix sponsa</i>)	Presumed Stable	Presumed Stable		AQU
Mallard (<i>Anas platyrhynchos</i>)	Presumed Stable	Presumed Stable		AQU, RMM
Harlequin Duck (<i>Histrionicus histrionicus</i>)	Presumed Stable	Presumed Stable	S2, BSSC	AQU
Bufflehead (<i>Bucephala albeola</i>)	Presumed Stable	Presumed Stable		AQU
Common Merganser (<i>Mergus merganser</i>)	Moderately Vulnerable	Moderately Vulnerable		AQU
Mountain Quail (<i>Oreortyx pictus</i>)	Presumed Stable	Presumed Stable		MCS
California Quail (<i>Callipepla californica</i>)	Presumed Stable	Presumed Stable		FWC
White-tailed Ptarmigan (<i>Lagopus leucura</i>)	Extremely Vulnerable	Extremely Vulnerable		SUA
Sooty Grouse (<i>Dendragapus fuliginosus</i>)	Presumed Stable	Presumed Stable		MCF
Wild Turkey (<i>Meleagris gallopavo</i>)	Increase Likely	Presumed Stable		FWC
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	Presumed Stable	Presumed Stable		AQU
Great Blue Heron (<i>Ardea herodias</i>)	Presumed Stable	Presumed Stable	S4	AQU, RMM
Turkey Vulture (<i>Cathartes aura</i>)	Presumed Stable	Presumed Stable		FWC

Osprey (<i>Pandion haliaetus</i>)	Moderately Vulnerable	Presumed Stable	S3	AQU
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Moderately Vulnerable	Moderately Vulnerable	S2, E	AQU
Northern Harrier (<i>Circus cyaneus</i>)	Presumed Stable	Presumed Stable	S3, BSSC	RMM
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	Presumed Stable	Presumed Stable	S3	MCF
Cooper's Hawk (<i>Accipiter cooperii</i>)	Presumed Stable	Presumed Stable	S3	FWC
Northern Goshawk (<i>Accipiter gentilis</i>)	Moderately Vulnerable	Moderately Vulnerable	S3, BSSC	MCF
Red-shouldered Hawk (<i>Buteo lineatus</i>)	Presumed Stable	Presumed Stable		FWC, RMM
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	Increase Likely	Increase Likely		FWC, MCS
Golden Eagle (<i>Aquila chrysaetos</i>)	Presumed Stable	Presumed Stable		FWC, MCS
American Kestrel (<i>Falco sparverius</i>)	Presumed Stable	Presumed Stable		FWC
Peregrine Falcon (<i>Falco peregrinus</i>)	Moderately Vulnerable	Moderately Vulnerable	S2	MCF
Prairie Falcon (<i>Falco mexicanus</i>)	Moderately Vulnerable	Presumed Stable	S3	MCS
Virginia Rail (<i>Rallus limicola</i>)	Presumed Stable	Presumed Stable		RMM
Sora (<i>Porzana carolina</i>)	Presumed Stable	Presumed Stable		RMM
American Coot (<i>Fulica americana</i>)	Presumed Stable	Presumed Stable		AQU
Sandhill Crane (<i>Grus canadensis</i>)	Presumed Stable	Presumed Stable	S2, T	RMM

Killdeer (<i>Charadrius vociferus</i>)	Presumed Stable	Presumed Stable		RMM
Spotted Sandpiper (<i>Actitis macularius</i>)	Moderately Vulnerable	Moderately Vulnerable		AQU, RMM
Wilson's Snipe (<i>Gallinago delicata</i>)	Presumed Stable	Presumed Stable		RMM
Black Tern (<i>Chlidonias niger</i>)	Presumed Stable	Presumed Stable	S2, BSSC	AQU, RMM
Band-tailed Pigeon (<i>Patagioenas fasciata</i>)	Presumed Stable	Presumed Stable		FWC, MCF
Mourning Dove (<i>Zenaida macroura</i>)	Increase Likely	Increase Likely		FWC, MCS
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	Presumed Stable	Presumed Stable	S1, E	RMM
Greater Roadrunner (<i>Geococcyx californianus</i>)	Presumed Stable	Presumed Stable		FWC
Barn Owl (<i>Tyto alba</i>)	Presumed Stable	Presumed Stable		FWC, RMM
Flammulated Owl (<i>Otus flammeolus</i>)	Presumed Stable	Presumed Stable	S3	MCF
Western Screech-Owl (<i>Megascops kennicottii</i>)	Presumed Stable	Presumed Stable		FWC
Great Horned Owl (<i>Bubo virginianus</i>)	Presumed Stable	Presumed Stable		FWC, MCF, MCS
Northern Pygmy-Owl (<i>Glaucidium gnoma</i>)	Presumed Stable	Presumed Stable		MCF
Spotted Owl (<i>Strix occidentalis</i>)	Presumed Stable	Presumed Stable	S3, BSSC	MCF
Great Gray Owl (<i>Strix nebulosa</i>)	Moderately Vulnerable	Moderately Vulnerable	S1, E	MCF, RMM
Long-eared Owl (<i>Asio otus</i>)	Presumed Stable	Presumed Stable	S3, BSSC	RMM

Northern Saw-whet Owl (<i>Aegolius acadicus</i>)	Presumed Stable	Presumed Stable		MCF
Common Nighthawk (<i>Centralhordeiles minor</i>)	Increase Likely	Increase Likely	S3	MCF, MCS
Common Poorwill (<i>Phalaenoptilus nuttallii</i>)	Increase Likely	Increase Likely	S2	FWC, MCS
Black Swift (<i>Cypseloides niger</i>)	Moderately Vulnerable	Moderately Vulnerable	S2, BSSC	MCF
Vaux's Swift (<i>Chaetura vauxi</i>)	Presumed Stable	Presumed Stable	S3, BSSC	MCF, RMM
White-throated Swift (<i>Aeronautes saxatalis</i>)	Presumed Stable	Presumed Stable		MCF
Black-chinned Hummingbird (<i>Archilochus alexandri</i>)	Presumed Stable	Presumed Stable		FWC
Anna's Hummingbird (<i>Calypte anna</i>)	Presumed Stable	Presumed Stable		FWC
Calliope Hummingbird (<i>Stellula calliope</i>)	Presumed Stable	Presumed Stable		MCF
Rufous Hummingbird (<i>Selasphorus rufus</i>) [§]	Presumed Stable	Presumed Stable		MCF, RMM
Belted Kingfisher (<i>Megaceryle alcyon</i>)	Presumed Stable	Presumed Stable		AQU
Lewis's Woodpecker (<i>Melanerpes lewis</i>)	Presumed Stable	Presumed Stable		FWC
Acorn Woodpecker (<i>Melanerpes formicivorus</i>)	Increase Likely	Presumed Stable		FWC
Williamson's Sapsucker (<i>Sphyrapicus thyroideus</i>)	Presumed Stable	Presumed Stable		MCF
Red-breasted Sapsucker (<i>Sphyrapicus ruber</i>)	Presumed Stable	Presumed Stable		MCF, RMM
Nuttall's Woodpecker (<i>Picoides nuttallii</i>)	Presumed Stable	Presumed Stable		FWC

Downy Woodpecker (<i>Picoides pubescens</i>)	Presumed Stable	Presumed Stable		RMM
Hairy Woodpecker (<i>Picoides villosus</i>)	Increase Likely	Increase Likely		MCF
White-headed Woodpecker (<i>Picoides albolarvatus</i>)	Presumed Stable	Presumed Stable		MCF
Black-backed Woodpecker (<i>Picoides arcticus</i>)	Presumed Stable	Presumed Stable		MCF
Northern Flicker (<i>Colaptes auratus</i>)	Increase Likely	Increase Likely		FWC, MCF
Pileated Woodpecker (<i>Dryocopus pileatus</i>)	Presumed Stable	Presumed Stable		MCF
Olive-sided Flycatcher (<i>Contopus cooperi</i>)	Presumed Stable	Presumed Stable	S4, BSSC	MCF
Western Wood-Pewee (<i>Contopus sordidulus</i>)	Increase Likely	Increase Likely		FWC, MCF, RMM
Willow Flycatcher (<i>Empidonax traillii</i>)	Presumed Stable	Presumed Stable	S1, E	RMM
Hammond's Flycatcher (<i>Empidonax hammondi</i>)	Presumed Stable	Presumed Stable		MCF
Gray Flycatcher (<i>Empidonax wrightii</i>)	Increase Likely	Increase Likely		MCS
Dusky Flycatcher (<i>Empidonax oberholseri</i>)	Presumed Stable	Presumed Stable		MCF, SUA
Pacific-slope Flycatcher (<i>Empidonax difficilis</i>)	Presumed Stable	Presumed Stable		FWC, MCF
Black Phoebe (<i>Sayornis nigricans</i>)	Presumed Stable	Presumed Stable		RMM
Say's Phoebe (<i>Sayornis saya</i>)	Presumed Stable	Presumed Stable		MCS
Ash-throated Flycatcher (<i>Myiarchus cinerascens</i>)	Increase Likely	Increase Likely		FWC

Western Kingbird (<i>Tyrannus verticalis</i>)	Increase Likely	Increase Likely		FWC
Cassin's Vireo (<i>Vireo cassinii</i>)	Presumed Stable	Presumed Stable		FWC, MCF
Hutton's Vireo (<i>Vireo huttoni</i>)	Increase Likely	Presumed Stable		FWC
Warbling Vireo (<i>Vireo gilvus</i>)	Presumed Stable	Presumed Stable		MCF, RMM
Pinyon Jay (<i>Gymnorhinus cyanocephalus</i>)	Presumed Stable	Presumed Stable		MCS
Steller's Jay (<i>Cyanocitta stelleri</i>)	Increase Likely	Increase Likely		MCF
Western Scrub-Jay (<i>Aphelocoma californica</i>)	Increase Likely	Increase Likely		FWC
Clark's Nutcracker (<i>Nucifraga columbiana</i>)	Presumed Stable	Moderately Vulnerable		MCF, SUA
Black-billed Magpie (<i>Pica hudsonia</i>)	Increase Likely	Presumed Stable		MCS, RMM
Common Raven (<i>Corvus corax</i>)	Presumed Stable	Presumed Stable		FWC, MCF, MCS
Horned Lark (<i>Eremophila alpestris</i>)	Presumed Stable	Presumed Stable		SUA
Purple Martin (<i>Progne subis</i>)	Presumed Stable	Presumed Stable	S3, BSSC	FWC, MCF
Tree Swallow (<i>Tachycineta bicolor</i>)	Presumed Stable	Presumed Stable		RMM
Violet-green Swallow (<i>Tachycineta thalassina</i>)	Presumed Stable	Presumed Stable		MCF, RMM
Northern Rough-winged Swallow (<i>Stelgidopteryx serripennis</i>)	Presumed Stable	Presumed Stable		AQU, RMM
Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)	Presumed Stable	Presumed Stable		FWC, RMM

Barn Swallow (<i>Hirundo rustica</i>)	Presumed Stable	Presumed Stable		FWC, RMM
Mountain Chickadee (<i>Poecile gambeli</i>)	Presumed Stable	Presumed Stable		MCF
Chestnut-backed Chickadee (<i>Poecile rufescens</i>)	Presumed Stable	Presumed Stable		FWC
Oak Titmouse (<i>Baeolophus inornatus</i>)	Presumed Stable	Presumed Stable	S3	FWC
Bushtit (<i>Psaltriparus minimus</i>)	Increase Likely	Presumed Stable		FWC, MCS
Red-breasted Nuthatch (<i>Sitta canadensis</i>)	Presumed Stable	Presumed Stable		MCF
White-breasted Nuthatch (<i>Sitta carolinensis</i>)	Presumed Stable	Presumed Stable		FWC, MCF, SUA
Pygmy Nuthatch (<i>Sitta pygmaea</i>)	Presumed Stable	Presumed Stable		MCF
Brown Creeper (<i>Certhia americana</i>)	Increase Likely	Increase Likely		MCF
Rock Wren (<i>Salpinctes obsoletus</i>)	Presumed Stable	Presumed Stable		FWC, MCF, SUA
Canyon Wren (<i>Catherpes mexicanus</i>)	Presumed Stable	Presumed Stable		FWC, MCS
Bewick's Wren (<i>Thryomanes bewickii</i>)	Increase Likely	Presumed Stable		FWC, MCS
House Wren (<i>Troglodytes aedon</i>)	Increase Likely	Increase Likely		FWC, MCS, RMM
Pacific Wren (<i>Troglodytes pacificus</i>)	Presumed Stable	Presumed Stable		MCF
Marsh Wren (<i>Cistothorus palustris</i>)	Presumed Stable	Presumed Stable		RMM
Blue-gray Gnatcatcher (<i>Polioptila caerulea</i>)	Increase Likely	Presumed Stable		FWC
American Dipper (<i>Cinclus mexicanus</i>)	Moderately Vulnerable	Presumed Stable		AQU

Golden-crowned Kinglet (<i>Regulus satrapa</i>)	Presumed Stable	Presumed Stable		MCF
Ruby-crowned Kinglet (<i>Regulus calendula</i>)	Presumed Stable	Presumed Stable		MCF
Wrentit (<i>Chamaea fasciata</i>)	Presumed Stable	Presumed Stable		FWC
Western Bluebird (<i>Sialia mexicana</i>)	Increase Likely	Increase Likely		FWC
Mountain Bluebird (<i>Sialia currucoides</i>)	Presumed Stable	Presumed Stable		MCS, SUA
Townsend's Solitaire (<i>Myadestes townsendi</i>)	Presumed Stable	Presumed Stable		MCF
Swainson's Thrush (<i>Catharus ustulatus</i>)	Moderately Vulnerable	Moderately Vulnerable	S4	RMM
Hermit Thrush (<i>Catharus guttatus</i>)	Presumed Stable	Presumed Stable		MCF
American Robin (<i>Turdus migratorius</i>)	Increase Likely	Increase Likely		FWC, MCF, RMM
California Thrasher (<i>Toxostoma redivivum</i>)	Increase Likely	Increase Likely		FWC
European Starling (<i>Sturnus vulgaris</i>)	Increase Likely	Increase Likely		FWC, RMM
American Pipit (<i>Anthus rubescens</i>)	Moderately Vulnerable	Moderately Vulnerable	S2	SUA
Phainopepla (<i>Phainopepla nitens</i>)	Presumed Stable	Presumed Stable	S4	FWC
Orange-crowned Warbler (<i>Oreothlypis celata</i>)	Increase Likely	Increase Likely		FWC, RMM
Nashville Warbler (<i>Oreothlypis ruficapilla</i>)	Presumed Stable	Presumed Stable		FWC, MCF
MacGillivray's Warbler (<i>Geothlypis tolmiei</i>)	Presumed Stable	Presumed Stable		RMM

Common Yellowthroat (<i>Geothlypis trichas</i>)	Presumed Stable	Presumed Stable		RMM
Yellow Warbler (<i>Setophaga petechia</i>)	Presumed Stable	Presumed Stable	S3, BSSC	MCS, RMM
Yellow-rumped Warbler (<i>Setophaga coronata</i>)	Presumed Stable	Presumed Stable		MCF
Black-throated Gray Warbler (<i>Setophaga nigrescens</i>)	Presumed Stable	Presumed Stable		FWC, MCF, MCS
Hermit Warbler (<i>Setophaga occidentalis</i>)	Presumed Stable	Presumed Stable	S3	MCF
Wilson's Warbler (<i>Cardellina pusilla</i>)	Presumed Stable	Presumed Stable		RMM
Green-tailed Towhee (<i>Pipilo chlorurus</i>)	Presumed Stable	Presumed Stable		MCS
Spotted Towhee (<i>Pipilo maculatus</i>)	Increase Likely	Increase Likely		FWC, MCS
Rufous-crowned Sparrow (<i>Aimophila ruficeps</i>)	Increase Likely	Presumed Stable		FWC
California Towhee (<i>Melospiza crissalis</i>)	Increase Likely	Increase Likely		FWC
Chipping Sparrow (<i>Spizella passerina</i>)	Increase Likely	Increase Likely	S3	FWC, MCF, RMM
Brewer's Sparrow (<i>Spizella breweri</i>)	Presumed Stable	Presumed Stable	S3	MCS
Black-chinned Sparrow (<i>Spizella atrogularis</i>)	Increase Likely	Increase Likely	S3	FWC
Vesper Sparrow (<i>Pooecetes gramineus</i>)	Presumed Stable	Presumed Stable		MCS
Lark Sparrow (<i>Chondestes grammacus</i>)	Presumed Stable	Presumed Stable		FWC
Sage Sparrow (<i>Amphispiza belli</i>)	Presumed Stable	Presumed Stable	S2	FWC, MCS

Savannah Sparrow (<i>Passerculus sandwichensis</i>)	Increase Likely	Increase Likely		MCS
Fox Sparrow (<i>Passerella iliaca</i>)	Increase Likely	Increase Likely		MCF, MCS
Song Sparrow (<i>Melospiza melodia</i>)	Increase Likely	Increase Likely		RMM
Lincoln's Sparrow (<i>Melospiza lincolnii</i>)	Presumed Stable	Presumed Stable		RMM
White-crowned Sparrow (<i>Zonotrichia leucophrys</i>)	Presumed Stable	Presumed Stable		RMM, SUA
Dark-eyed Junco (<i>Junco hyemalis</i>)	Presumed Stable	Presumed Stable		MCF, SUA
Western Tanager (<i>Piranga ludoviciana</i>)	Presumed Stable	Presumed Stable		MCF
Black-headed Grosbeak (<i>Pheucticus melanocephalus</i>)	Presumed Stable	Presumed Stable		FWC, RMM
Lazuli Bunting (<i>Passerina amoena</i>)	Increase Likely	Increase Likely		FWC, RMM
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	Presumed Stable	Presumed Stable		RMM
Western Meadowlark (<i>Sturnella neglecta</i>)	Presumed Stable	Presumed Stable		FWC, MCS, RMM
Yellow-headed Blackbird (<i>Xanthoceph. xanthocephalus</i>)	Presumed Stable	Presumed Stable	S3, BSSC	RMM
Brewer's Blackbird (<i>Euphagus cyanocephalus</i>)	Increase Likely	Increase Likely		RMM
Brown-headed Cowbird (<i>Molothrus ater</i>)	Increase Likely	Increase Likely		FWC, RMM
Bullock's Oriole (<i>Icterus bullockii</i>)	Increase Likely	Presumed Stable		FWC, RMM
Gray-crowned Rosy-Finch (<i>Leucosticte tephrocotis</i>)	Moderately Vulnerable	Moderately Vulnerable		SUA

Pine Grosbeak (<i>Pinicola enucleator</i>)	Moderately Vulnerable	Moderately Vulnerable		MCF
Purple Finch (<i>Carpodacus purpureus</i>)	Presumed Stable	Presumed Stable		FWC, MCF
Cassin's Finch (<i>Carpodacus cassinii</i>)	Presumed Stable	Presumed Stable		MCF, SUA
House Finch (<i>Carpodacus mexicanus</i>)	Increase Likely	Increase Likely		FWC
Red Crossbill (<i>Loxia curvirostra</i>)	Presumed Stable	Presumed Stable		MCF
Pine Siskin (<i>Spinus pinus</i>)	Presumed Stable	Presumed Stable		MCF, SUA
Lesser Goldfinch (<i>Spinus psaltria</i>)	Increase Likely	Presumed Stable		FWC, RMM
Lawrence's Goldfinch (<i>Spinus lawrencei</i>)	Increase Likely	Presumed Stable	S3	FWC
Evening Grosbeak (<i>Coccothraustes vespertinus</i>)	Moderately Vulnerable	Moderately Vulnerable		MCF
House Sparrow (<i>Passer domesticus</i>)	Increase Likely	Presumed Stable		FWC

[†]S1-S4 indicate California State Rarity and Endangerment rankings other than 'secure' (S1 = critically imperiled, S2 = imperiled, S3 = vulnerable, S4 = apparently secure (CDFG 2011a); T and E indicate species listed as Threatened (T) or Endangered (E) in California (CDFG 2011b); BSSC indicates California Bird Species of Special Concern (Shuford and Gardali 2008).

[‡]Species' primary breeding habitats classified as foothill woodlands and foothill chaparral (FWC; 67 species); montane conifer forests (MCF; 62 species); montane chaparral and sagebrush (MCS; 28 species); aquatic habitats including rivers, ponds, and lakes (AQU; 15 species); riparian vegetation, meadows, and marshes (RMM; 52 species); and/or subalpine and alpine habitats (SUA; 13 species).

[§]Rufous Hummingbird is the only species we assessed that does not actually breed in the Sierra Nevada, though it becomes the most common hummingbird species in the region when it migrates through during the summer when most Sierra Nevada bird species are still breeding.