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Wildlife Habitats - California Wildlife Habitat **Relationships System**

About the CWHR Habitat Classification Scheme

The CWHR habitat classification scheme has been developed to support the CWHR System, a wildlife information system and predictive model for California's regularly-occurring birds, mammals, reptiles and amphibians. When first published in 1988, the classification scheme had 53 habitats. These habitats, except the non-vegetated Barren habitat, are described in detail in the CWHR publication entitled:

A Guide to Wildlife Habitats of California. 1988.

Edited by Kenneth E. Mayer and William F. Laudenslayer, Jr. State of California, Resources Agency, Department of Fish and Game Sacramento, CA. 166 pp.

The entire original publication is available online with updates (see below).

At present, there are 59 wildlife habitats in the CWHR System: 27 tree, 12 shrub, 6 herbaceous, 4 aquatic, 8 agricultural, 1 developed, and 1 non-vegetated (download Habitat Range shapefiles (.zip)). Please note: the 59 habitats described below were designed for use with a predictive model for terrestrial vertebrate wildlife species. They do not represent a comprehensive classification scheme for the conservation and mapping of California's terrestrial vegetation* or its marine and estuarine habitats**.

- Stages are defined for virtually all habitats. A stage is a combination of size and cover class for treedominated habitats, age and cover class for shrub habitats, height and cover class for herb habitats, and depth and substrate for aquatic habitats. A field sampling protocol is well-established for determining stages in all vegetated habitats.
- Special habitat elements are also defined. They include live and decadent vegetation elements such as snags, physical elements such as banks and burrows, aquatic elements, vegetative and animal diet elements and human-made elements.

The predictive model for each species has expert-applied suitability ratings for three life-requisites – breeding, cover and feeding. For each species, each habitat stage is rated as high, medium, low or unsuitable for each of these life requirements. Each special habitat element is also assessed as essential, secondarily essential, preferred or not rated for the species.

* Notes on Classification and Mapping of Terrestrial Vegetation in California

- Information on classification and mapping of terrestrial vegetation is available from the Vegetation Classification and Mapping Program (VegCAMP), CDFW Biogeographic Data Branch.
- Field sampling for CWHR habitat stages has been incorporated into the California Native Plant Society (CNPS) Rapid Assessment Protocol, to increase the utility of the resulting vegetation maps for wildlife modeling and conservation. Information and links to field forms are available on the link opens in new windowCNPS website.
- Crosswalks to the CWHR habitat classification scheme are included in all of California's major vegetation and land cover mapping efforts.

** Notes on Classification of Marine and Estuarine Habitats in California

- A classification scheme for the conservation and management of marine and estuarine habitats was developed in cooperation with the CWHR Program in 2002. It includes descriptions for 22 marine and 19 estuarine habitats. At present, it does not include suitability ratings to habitat stages or special habitat elements for the terrestrial amphibians, reptiles, birds and mammals currently in the CWHR System.
- The new classification includes crosswalks to other important, recent classifications regarding coastal waters. Included are crosswalks to Wetlands of the Central and Southern California Coast and Coastal Watersheds; a methodology for their classification and description (Ferren et al., 1996), Baylands Ecosystem Habitat Goals: a report of habitat recommendations (U.S. Environmental Protection Agency, 1999), A classification scheme for deep sea floor habitats (Greene et al., 1999), and Wildlife-habitat relationships in Oregon and Washington (Johnson and O'Neil, 2001). Also included are crosswalks to a national scheme for marine and estuarine ecosystems and habitat classification published by the National Oceanic and Atmospheric Administration (NOAA) in 2002 and a classification for habitats of the Channel Islands drafted in 2000 by the Channel Island National Marine Sanctuary (CINMS).

link opens in new windowRevision to Marine and Estuarine Habitats of the California Wildlife Habitat Relationships System (2002) (PDF)

A Guide to Wildlife Habitats of California (1988)

Guide Section

Updates

Wildlife Habitats - California Wildlife Habitat Relationships System 7/17/2020 **Guide Section Updates** link opens in new window Contributing Authors, Acknowledgements, and Preface (PDF) link opens in new windowIntroduction link opens in new windowRevised Classification Rules (2005) and Scope (PDF) (PDF) Includes: How to Use the Guide (PDF) How to Classify Habitats • Special Habitat Elements <u>link opens in new windowAnalysis of Wooded Habitat Sampling</u> • Available Habitat Stages Data (PDF) link opens in new windowNon-Wooded Habitat Sampling Datasheet (PDF) Sampling Data (PDF) <u>link opens in new windowHabitat Element Checklist (PDF)</u> link opens in new window Available Habitat Stages for Agricultural Habitats (PDF) Mine (PDF) link opens in new windowClarification of the Measurement of California Wildlife Habitat Relationships (CWHR) System Size Class 5 and 6 for Tree Habitats (2007) (PDF) link opens in new windowCWHR Crosswalked with CNPS link opens in new windowCrosswalk Between WHR and California <u>Vegetation Classification (2005) (PDF)</u> Vegetation Classifications (PDF) Classification (2005) (PDF) (1998) (PDF)

link opens in new windowCWHR Crosswalked with CalVeg

link opens in new windowUNESCO Formations Within CWHR

link opens in new windowCWHR Crosswalked with DWR Land <u>Use Types (2008) (PDF)</u>

<u>link opens in new windowLiterature</u> Cited (PDF)

Plink opens in new windowPlants and Animals Referenced in Text (PDF)

Habitat Types

Tree Dominated Habitats

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Range Text Map Photo Account
Subalpine Conifer (SCN)	Engelmann Spruce, Subalpine Fir, Mountain Hemlock	Subalpine Conifer Description - link opens in new window Subalpine Conifer Conifer Map - link opens in new window Window Subalpine Conifer Photo - link opens in new window window window
Red Fir (RFR)	Red Fir, White Fir, Lodgepole Pine	Red Fir Description - link opens in new window Red Fir Map - link opens in new window Red Fir Photo - link opens in new in new window window
Lodgepole Pine (LPN)	Lodgepole Pine, Aspen, Mountain Hemlock	Lodgepole Pine Lodgepole Description Pine Map link link opens opens in in new new window window Lodgepole Pine Photo - link opens in new window window
Sierran Mixed Conifer (SMC)	Douglas Fir, Ponderosa Pine, White Fir New! updated description of range	Sierran Mixed Conifer Description - link opens in new window Sierran Mixed Conifer Conifer Map - link opens in new window Sierran Mixed Conifer Photo - link opens in new window window window
White Fir (WFR)	White Fir, Douglas Fir, Sugar Pine New! corrected range map	White Fir White Description Fir Map - Fir Photo link link opens link opens opens in in new in new new window window window
Klamath Mixed Conifer (KMC)	White Fir, Douglas-Fir, Ponderosa Pine New! updated description	Klamath Mixed Conifer Description - link opens in new window Klamath Mixed Conifer Conifer Map - link opens in new window Mixed Conifer Photo - link opens in new window window window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Range Account Map
Douglas Fir (DFR)	Douglas Fir, Tanoak, Ponderosa Pine	Douglas Fir Douglas Douglas Description Fir Map - Fir Photo link link opens link opens opens in in new in new new window window window
Jeffrey Pine (JPN)	Jeffrey Pine, Ponderosa Pine, Sugar Pine	Pine Pine Description Pine Map - link opens in new new window Pine Map - link opens opens in new window window Pine Photo - link opens in new window window window
Ponderosa Pine (PPN)	Ponderosa Pine, Jeffrey Pine, Douglas Fir	Ponderosa Pine Ponderosa Pine Map link link opens opens in in new new window window Ponderosa Pine Photo - link opens in new window window
Eastside Pine (EPN)	Ponderosa Pine, Jeffrey Pine, White Fir	Eastside Pine Pine Pine Map - link Opens in Opens in Onew Window Eastside Pine Photo - link Opens in
Redwood (RDW)	Redwood, Grand Fir, Sitka Spruce	Redwood Description - link opens in new window Redwood Map - link opens in new window Redwood Photo - link opens in new window window window
Pinyon-Juniper (PJN)	Pinyon Species, Juniper Species, Mountain Mahogany Species	Pinyon- Juniper Description - link opens in new window Pinyon- Juniper Map - link opens in new window Pinyon- Juniper Photo - Photo - Ink opens in new window window window
Juniper (JUN)	Juniper Species, White Fir, Jeffrey Pine	Juniper Description - link opens in new window Juniper Map - link opens in new window Juniper Map - link opens in new in new window window Juniper New in link opens in new window window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account	Range Map	Photo
Aspen (ASP)	Aspen, Willows, Alders	Aspen Description - link opens in new window	Aspen Map - link opens in new window	Aspen Photo - link opens in new window
Closed-Cone Pine-Cypress (CPC)	Sargent Cypress, Monterey Cypress, Monterey Pine	- link opens in new window	Cypress Map - link opens in new window	Closed Cone Pine- Cypress Photo - link opens in new window
Montane Hardwood- Conifer (MHC)	Ponderosa Pine, Incense Cedar, California Black Oak	Montane Hardwood- Conifer Description - link opens in new window	Hardwood-	Montane Hardwood- Conifer Photo - link opens in new window
Montane Hardwood (MHW)	Canyon Live Oak, California Black Oak, Oregon White Oak	Montane Hardwood Description - link opens in new window	Hardwood	Montane Hardwood Photo - link opens in new window
Blue Oak Woodland (BOW)	Blue Oak, Interior Live Oak, California Buckeye	Blue Oak Woodland Description - link opens in new window	Blue Oak Woodland Map - link opens in new window	
Valley Oak Woodland (VOW)	Valley Oak, California Walnut, California Sycamore	Valley Oak Woodland Description - link opens in new window	Valley Oak Woodland Map - link opens in new window	Valley Oak Woodland Photo - link opens in new window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Range Account Map
Coastal Oak Woodland (COW)	Coast Live Oak, Engelmann Oak, Island Oak New! updated description of dominants	Coastal Oak Woodland Description - link opens in new window Coastal Oak Woodland Map - link opens in new window Coastal Oak Woodland Map - link opens in new window window window
Blue Oak-Foothill Pine (BOP)	Foothill Pine, Blue Oak, Interior Live Oak	Blue Oak- Foothill Oak- Pine Pine Pine Pine Map- Ilink opens opens in new window Window Blue Oak- Foothill Pine Photo - link opens in new window window Window
Eucalyptus (EUC)	Blue Gum, Red Gum	Eucalyptus Description - link opens in new window Eucalyptus Map - link opens in new window Eucalyptus Photo - link opens in new window window window
Montane Riparian (MRI)	Black Cottonwood, Bigleaf Maple, White Alder	Montane Riparian Description - link opens in new window Montane Riparian Riparian Nap - link opens in new window Montane Riparian Riparian New opens in new window window window
Valley Foothill Riparian (VRI)	Cottonwood, Sycamore, Valley Oak	Valley Foothill Riparian Description - link opens in new window Valley Foothill Riparian Riparian Riparian Photo - link opens in new window window Valley Foothill Riparian Riparian Photo - link opens in new window window
Desert Riparian (DRI)	Tamarisk, Mesquite, Fremont Cottonwood	Desert Riparian Description - link opens in new window Desert Riparian Riparian Map - link opens in new window window Desert Riparian Riparian Photo - link opens in new window window window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Range Account Map
Palm Oasis (POS)	Fan Palm, Velvet Ash, California Sycamore	Palm Oasis Oasis Oasis Map - link opens in new window Palm Oasis Palm Oasis Palm Oasis Palm Oasis Palm Oasis Palm Oasis Ink Opens in new window window window Palm Oasis Photo- ink opens in new window window
Joshua Tree (JST)	Joshua Tree, Juniper Species, Mojave Yucca	Joshua Tree Joshua Tree Description Interpretation

Shrub Dominated Habitats

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account	Range Map	Photo
Alpine Dwarf-Shrub (ADS)	Oceanspray, Greene Goldenweed, Mountain Heather	Alpine Dwarf- Shrub Description - link opens in new window	Alpine Dwarf- Shrub Map - link opens in new window	Alpine Dwarf- Shrub Photo - link opens in new window
Low Sage (LSG)	Low Sagebrush, Black Sagebrush, Rabbitbrush Species	Low Sage Description - link opens in new window	Low Sage Map - link opens in new window	Low Sage Photo - link opens in new window
Bitterbrush (BBR)	Bitterbrush Species, Big Sagebrush, Rubber Rabbitbrush	Bitterbrush Description - link opens in new window	Rifferhriich	Bitterbrush Photo - link opens in new window
Sagebrush (SGB)	Sagebrush Species, Rabbitbrush Species, Horsebrush	Sagebrush Description - link opens in new window	Sagebrush Map - link opens in new window	Sagebrush Photo - link opens in new window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Range Account Photo
Montane Chaparral (MCP)	Ceanothus Species, Manzanita Species, Bitter Cherry	MontaneMontaneMontaneChaparralMontaneMontaneDescriptionChaparralChaparral- linkMap - linkPhoto -opens inopens inlink opensnewnewin newwindowwindowwindow
Mixed Chaparral (MCH)	Scrub Oak, Ceanothus Species, Manzanita Species	Mixed Chaparral Description - link opens in new window Mixed Chaparral Chaparral Map - link opens in new window Mixed Chaparral Chaparral Photo - link opens in new in new window window
Chamise-Redshank Chaparral (CRC)	Chamise, Redshank, Ceanothus Species	Chamise- Redshank Chaparral Description - link opens in new window Chamise- Redshank Chaparral Chaparral Map - link opens in new window Window Chaparral Photo - link opens in new window window window
Coastal Scrub (CSC)	Coyotebush, California Buckwheat, Sage Species	Coastal Scrub Description - link opens in new window Coastal Coastal Scrub Map - link Opens in new window Coastal Scrub Photo - link opens in new in new window window window
Desert Succulent Shrub (DSS)	Octillo, Mojave Yucca, Desert Agave	Desert Succulent Shrub Description - link opens in new window Desert Succulent Shrub Map - link opens in new window Desert Succulent Shrub Shrub Photo - link opens in new window window window
Desert Wash (DSW)	Paloverde Species, Desert Ironwood, Mesquite	Desert Wash Description - link opens in new window Desert Wash Map - link opens in new window Desert Wash Map - link opens in new window window Desert Wash Map - link opens in new window window window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account	Range Map	Photo
Desert Scrub (DSC)	Creosotebush, Catclaw Acacia, Desert Agave	Description - link opens in new window	Desert Scrub Map - link opens in new window	Desert Scrub Photo - link opens in new window
Alkali Desert Scrub (ASC)	Allscale, Saltbush Species, Shadscale	Alkali Desert Scrub Description - link opens in new window	Alkali Desert Scrub Map - link opens in new window	Alkali Desert Scrub Photo - link opens in new window

Herbaceous Dominated Habitats

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account	Range Map	Photo
Annual Grassland (AGS)	Wild Oats, Soft Chess, Brome Species New! updated range map and description of range	Annual Grassland Description - link opens in new window	Grassland	Annual Grassland Photo - link opens in new window
Perennial Grassland (PGS)	California Oatgrass, Hairgrass, Sweet Vernalgrass New! updated range map and description of range	Perennial Grassland Description - link opens in new window	Grassland	Perennial Grassland Photo - link opens in new window
Wet Meadow (WTM)	Sedge Species, Rush Species, Tufted Hairgrass	Meadow Description - link opens in new window	Wet Meadow	Wet Meadow Photo - link opens in new window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account	Range Map	Photo
Fresh Emergent Wetland (FEW)	Cattail, Bulrush, Redroot Nutgrass	Fresh Emergent Wetland Description - link opens in new window	Fresh Emergent Wetland Map - link opens in new window	Fresh Emergent Wetland Photo - link opens in new window
Saline Emergent Wetland (SEW)	Cordgrass, Pickleweed, Bulrush		Saline Emergent Wetland Map - link opens in new window	Saline Emergent Wetland Photo - link opens in new window
Pasture (PAS)	Bermuda Grass, Ryegrass, Tall Fescue		Pasture Map - link opens in new window	

Aquatic Habitats

See also: "Notes on Classification of Marine and Estuarine Habitats"

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Range Photo Account
Riverine (RIV)	Water Moss, Algae, Duckweed	Riverine Description - link opens in new window Riverine Riverine Photo - link opens in new new window window window window
Lacustrine (LAC)	Plankton, Duckweed, Water Lilies	Lacustrine Description - link opens in new window Lacustrine Lacustrine Map - link opens in new window Lacustrine Photo - link opens in new window window window
Estuarine (EST)	Plankton, Algae, Eel Grass	Estuarine Description - link opens in new window Estuarine Estuarine Map - link opens in new window Estuarine Map - link opens in new window window window Map - link opens in new window window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Range Account Photo
Marine (MAR)	Plankton, Algae, Kelp	Marine Description - link opens in new window Marine Marine Map - link Opens in new window Marine Photo - link opens in new window window window window
Developed Habitats		
HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account Range Map Photo
Cropland (CRP)	Tomatoes, Corn, Wheat ** Replaced by DGR, IGR, IRH, IRF, RIC **	Cropland Description - link opens in new window Cropland Cropland Map - link opens in new window Map - link opens in new window in new window window
Dryland Grain Crops (DGR)	Cereal Rye, Barley, Wheat	Dryland Gran CropsDryland GrainDryland GrainDescriptionCropsCrops- linkMap - linkPhoto -opens inopens inlink opensnewnewin newwindowwindowwindow
Irrigated Grain Crops (IGR)	Corn, Dry Beans, Safflower	IrrigatedIrrigatedIrrigatedGrainIrrigatedIrrigatedCropsGrainGrainDescriptionCropsCrops- linkMap - linkPhoto -opens inopens inlink opensnewnewin newwindowwindowwindow
Irrigated Hayfield (IRH)	Alfalfa, Hay	Irrigated Hayfield Irrigated Description Hayfield - link Map - link opens in opens in new new in new window

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Range Account Map
Irrigated Row and Field Crops (IRF)	Tomatoes, Cotton, Lettuce	Row and Irrigated Field Row and Row and Crops Field Field Description Crops Crops - link Map - link Photo - opens in opens in link opens new new in new window window window
Rice (RIC)	Rice	Rice Description - link opens in new window Rice Map - link Opens in new window Rice Map - link Opens in new in new window window Window
Orchard - Vineyard (OVN)	Apples, Oranges, Grapes ** Replaced by DOR, EOR, VIN **	Orchard - Vineyard Description - link opens in new window Orchard - Vineyard - Ink opens in new window window opens in new window window
Deciduous Orchard (DOR)	Almonds, Walnuts, Peaches	Deciduous Orchard Description - link opens in new window Deciduous Deciduous Orchard Orchard Orchard Description Orchard Orchard Iink opens in new window window window
Evergreen Orchard (EOR)	Oranges, Avocados, Lemons	Evergreen Orchard Description - link opens in new window Evergreen Orchard Orchard Map - link opens in new window Evergreen Orchard Orchard Ink opens in new window window window
Vineyard (VIN)	Grapes, Kiwi Fruit, Boysenberries	Vineyard Description Vineyard Vineyard Vineyard Vineyard Vineyard Photo - Opens in Opens in Opens in Opens Opens in New Vindow Vineyard Vi

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account	Range Map	Photo
Urban (URB)	Grass Lawns, Ornamental Trees, Hedges	Urban Description - link opens in new window	Urban Map - link opens in new window	

Non-vegetated Habitats

HABITAT TYPE	PRIMARY SPECIES REFERENCED IN TEXT	1988 Text Account	Range Map	Photo
Barren (BAR)	Rock, Gravel, Soil	Barren Description - link opens in new window	Barren Map - link opens in new window	Barren Photo 1 Barren Photo 2

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