CROSSWALK BETWEEN WHR AND CALIFORNIA VEGETATION CLASSIFICATIONS

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INTRODUCTION

A number of classification systems have been developed for California vegetation. Each of these is unique in structure and purpose. Based on the level of specificity desired for research and management application, it is often desirable to compare, or cross-reference, vegetative descriptions of various classifications. This crosswalk is designed to assist the user in cross-referencing the habitats contained within this Guide to the other widely used vegetations classification systems. Crosswalk users can determine how a particular WHR habitat might be defined by other classifications. Simply compare the WHR habitat in the left-hand column with its corresponding cross-reference(s) from the columns at the top of the page.

Vegetation classification systems incorporated into the crosswalk are:

Cheatham and Haller's (1975) California vegetation and classification system;

CNDDB/Holland (1986), the recent revision of Cheatham and Haller by the California Natural Diversity Data Base;

Cowardin (1979), a U.S. Fish and Wildlife Service classification for wetlands;

Eyre (1980), the Society of American Foresters' forest cover type system;

Kuchler's (1977) natural vegetation types;

Parker and Matyas (1979, 1980), the U.S. Forest Service CALVEG classification;

Paysen et al. (1980), a U.S. Forest Service system applied to southern California;

Proctor et al. (1980), a U.S. Fish and Wildlife Service system for the Pacific Northwest Coast; and

Thorne's (1976) plant communities system.

Barbour and Major (1977) contains excellent descriptions and valuable information on California vegetation. However, it deliberately avoids presenting a vegetation classification system and is therefore not included in this crosswalk.

METHODS

We derived the crosswalk from unpublished WHR Standards and guidelines and from the Other Classifications sections of each WHR habitat description. We also compared WHR descriptions

of distribution, and vegetation structure and composition with the vegetation type descriptions of each of the other vegetation classification systems. A WHR type and another vegetation type corresponded if structure and composition descriptions had a majority of elements in common, and the distribution description had at least one location in common. This included three situations:

1. The WHR type was completely included in the vegetation type.

2. The vegetation type was completely included in the WHR type.

3. The WHR type and the vegetation type overlapped (i.e., met criteria for correspondence described above), but neither type completely included the other.

Presence of a particular plant species in both a WHR habitat and a vegetation type from another classification system did not necessarily constitute overlap. For example, grass species in WHR's Annual Grassland (AGS) are dominant in the understory in Cheatham and Haller's Oak Woodlands (7.1), but the two types do not have a majority of structure and composition elements in common, and thus the crosswalk shows that they do not correspond.

For vegetation systems using a hierarchical classification, we used the highest hierarchical level possible in presenting the corresponding vegetation types. For example, WHR's Alpine Dwarf Scrub (ADS) corresponds to all four of Cheatham and Haller's minor subdivisions in the major subdivision Alpine Fell-fields (9.11), thus Alpine Fell-fields is used in the crosswalk. WHR's Low Sage (LSG) corresponds to only one minor subdivision of the major subdivision Sagebrush Scrub (3.31), consequently the minor subdivision Subalpine Scrub (3.312) is used in the crosswalk.

Because we used the highest hierarchical level possible, occasionally one WHR type corresponded to an entire subdivision, while another WHR type may have corresponded to only a portion of that subdivision. For example, Sub-alpine Conifer (SCN) corresponded to all of Cheatham and Haller's Subalpine Coniferous Forests (8.6), while Lodgepole Pine (LPN) corresponded only to portions of that habitat—Lodgepole Pine Forest (8.61) and Whitebark Pine-Lodgepole Pine Forest (8.622).

Some Parker and Matyas (1981) vegetation series descriptions differed significantly among their ecological provinces. As a result, sometimes a WHR type corresponded to a series in only a portion of the ecological provinces for which it was described. This situation is indicated by a list of the corresponding province acronym(s) in parentheses following the series name.

In certain instances, correspondence often could not be determined. This was especially true if the scope or complexity of the WHR type and the classification system differed. We used "not applicable" when the classification system had either regional or ecological limitations (e.g. southern California or wetland classification systems) and "no corresponding vegetation type" if we could find no appropriate correspondence.

CAVEAT FOR USERS

Users should note that a WHR habitat and a corresponding vegetation type in the Crosswalk are not necessarily equivalent. For example, the Crosswalk shows WHR's Coastal Scrub (CSC) corresponding with Munz and Keck's Coastal Strand, but the two are not equivalent because the WHR type is broader. In fact, it encompasses two other Munz and Keck types, Northern Coastal Scrub and Coastal Sage Scrub. In contrast, the WHR habitat description is sometimes narrower than a corresponding type in another classification system. Consider WHR's Chamise-Redshank Chaparral (CRC) which corresponds with, but is not equivalent to, Munz and Keck's Chaparral. Munz and Keck's Chaparral also encompasses WHR's Mixed Chaparral (MCH) and Montane Chaparral (MCD). The crosswalk's format emphasizes that a WHR type can correspond to more than one vegetation type of another classification system. It is important for users to understand that the converse can also be true.

ACKNOWLEDGMENTS

We thank the individual authors of the WHR habitat descriptions, all of whom reviewed portions of the Crosswalk relevant to their chapters. We also thank Robert F. Holland, who graciously prepared the correspondences of CNDDB types with WHR habitats.

Table 6. Crosswalk showing correspondence between Wildlife Habitat Relationships habitats and vegetation types of selected California vegetation classification systems.

Tree Dominated Habitats

	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
SUB-ALPINE CONIFER (SCN)	Subalpine Coniferous Forests (8.6)	Sierran Mixed Subalpine Coniferous Forest (86200) Foxtail Pine Forest (86300) Bristlecone Pine Forest (86400) Southern California Subalpine Forest (86500) Whitebark Pine Forest (86600) Limber Pine Forest (86700)	Mountain Hemlock (205) Englemann Spruce—Subalpine Fir (206) Whitebark Pine (208) Bristlecone Pine (209) Western White Pine (215) Limber Pine (219) California Mixed Subalpine (256)	Upper Montane—Subalpine Forests (17) Southern Montane Subalpine Forest (18) Great Basin Subalpine Forest (19)	Subalpine Forest (17) Bristle-cone Pine Forest (18)	Bristlecone Pine Englemann Spruce—Alpine Fir Foxtail Pine Limber Pine Lodgepole Pine Mountain Hemlock Western White Pine Whitebark Pine	Bristlecone Pine Limber Pine	True Fir Zone: Second Growth Forest (1.1.2 E) True Fir Zone: Old Growth Forest (1.1.2 F)	Subalpine coniferous forest (14c) Bristlecone pine woodland (18a)
RED FIR (RFR)	Red Fir Forest (8.531)	Red Fir Forest (85310)	Red Fir (207)	Coast Range Montane Forest (14) Upper Montane—Subalpine Forests (17)	Red Fir Forest (15)	Red Fir Fed Fir—Noble Fir	no corresponding vegetation type	no corresponding vegetation type	Red fir forest (14b2)
LODGEPOLE PINE (LPN)	Lodgepole Pine Forest (8.61) Whitebark Pine—Lodgepole Pine Forest (8.622)	Lodgepole Pine Forest (86100) Whitebark Pine—Lodgepole Pine Forest (86220)	Lodgepole Pine (218)	Upper Montane—Subalpine Forests (17) Southern Montane Subalpine Forest (18)	Lodgepole Forest (16)	Lodgepole Pine	Lodgepole Pine	no corresponding vegetation type	Lodgepole pine forest (14c1)
SIERRAN MIXED CONIFER (SMC)	Sierran Mixed Conifer Forest (8.423) Sierra Big Tree Forest (8.425)	Ultramafic White Pine Forest (84160) Ultramafic Mixed Coniferous Forest (84180) Sierran Mixed Coniferous Forest (84230) Big Tree Forest (84250)	Sierra Nevada Mixed Conifer (243) Pacific Ponderosa Pine—Douglas-fir (244)	Sierran (14)		Big Tree Jeffrey Pine (NCM, Yellow Pine NI, NS) Forest Mixed Conifer—Fir Mixed Conifer—Pine (NMC, NI, NS, SS) Ponderosa Pine (NI, SS)	Mixed Conifer	not applicable	Yellow Pine forest (14a2) Mixed conifer forest (14a3)

Table 6 (continued)

Tree Dominated Habitats

	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)		Proctor et al. (1980)	Thorne (1976)
WHITE FIR (WFR)	Sierran White Fir Forest (8.424) Southern California White Fir Forest (8.532)	Ultramafic White Pine Forest (84160) Sierran White Fir Forest (84240) Southern California White Fir Forest (85320) Desert Mountain White Fir Forest (85330)	White Fir (211)	Coast Range Montane Forest (14) Sierran Montane Forest (15) Mojave Montane Forest (16)	Yellow Pine Forest (14)	Mixed Conifer—Fir White Fir	White Fir	no corresponding vegetation type	White fir—sugar pine (14b1) White fir (18b)
KLAMATH-MIXED CONIFER (KMC)	Klamath Enriched Conifer Forest (8.54)	Ultramafic White Pine Forest (84160) Ultramafic Mixed Coniferous Forest (84180) Klamath Enriched Coniferous Forest (55400)	Pacific Douglas-fir (229)	Klamath Montane Forest with Douglas Fir (12) Klamath Montane Forest with Yellow Pine (13) Coast Range Montane Forest (14)	Yellow Pine Forest (14) Red Fir Forest (15)	Mixed Conifer—Klamath Enriched Mixed Conifer—Pine (NCM, NI)	not applicable	True Fir Zone: Growth Forest (1.1.2 E) True Fir Zone: Old Growth Forest (1.1.2 F) Mixed Evergreen Zone: Serpentine (1.2.3 E) Mixed Evergreen Zone: Second Growth Forest (Conifer) (1.2.3 J) Mixed Evergreen Zone: Old Growth Forest (1.2.3 K)	Enriched conifer forest (14b3)
DOUGLAS-FIR (DFR)	Western Hemlock Forest (8.22) Douglas-fir Forest (8.24)	Tanoak Forest (81400) Mixed North Slope Forest (81500) Sitka Spruce—Grand Fir Forest (82100) Western Hemlock Forest (82200) Douglas-fir Forest (82400) Port-Orford-cedar Forest (82500)	Pacific Douglas-fir (229) Douglas-fir—Western Hemlock (230) Port Orford-Cedar (231) Douglas-fir—Tanoak—Pacific Madrone (234)	Mixed Evergreen Forest with Chinquapin (21) Mixed Everygreen Forest with Rhododendron (22)	Douglas-Fir Forest (13) Mixed Evergreen Forest (19)	Douglas Fir Douglas Fir—Pine—Madrone Douglas Fir—Tanoak—Madrone	no corresponding vegetation type	Redwood Zone: Second Growth Forest (Mixed) (1.2.2 I) Redwood Zone: Second Growth Forest (Conifer) (1.2.2 J) Redwood Zone: Old Growth Forest (Conifer) (1.2.2 K) Mixed Evergreen Zone: Second Growth Forest (Broadleaf) (1.2.3 H)	Douglas-fir forest (10e) Northern mixed evergreen forest (10f1)

Table 6 (continued)

Tree Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al (1980)	Thorne (1976)
DOUGLAS-FIR (continued)								Mixed Evergreen Zone: Second Growth Forest (Mixed) (1.2.3 I) Mixed Evergreen Zone: Second Growth Forest (Conifer) (1.2.3 J) Mixed Evergreen Zone: Old Growth Forest (1.2.3 K) Sitka Spruce Zone: Second Growth Forest (Mixed) (1.2.4 I)	
JEFFREY PINE (JPN)	Jeffrey Pine (8.51) Upper Montane Mixed Conifer Forest (8.52)	Northern Ultramafic Jeffrey Pine Forest (84171) Southern Ultramafic Jeffrey Pine Forest (84172) Jeffrey Pine Forest (85100) Jeffrey Pine—Fir Forest (85210)	Jeffrey Pine (247)	Northern Jeffrey Pine Forest (3) Southern Jeffrey Pine Forest (4)	Yellow Pine Forest (14) Red Fir Forest (15)	Jeffrey Pine	Ponderosa/Jeffrey Pine	Mixed Evergreen Zone: Serpentine (1.2.3 E)	Yellow pine forest (14a2)
PONDEROSA PINE (PPN)	Coast Range Ponderosa Pine Forest (8.413) "Westside" Ponderosa Pine Forest (8.421) "Eastside" Ponderosa Pine Forest (8.422)	Coast Range Ponderosa Pine Forest (84130) Ultramafic White Pine Forest (84160) Westside Ponderosa Pine Forest (84210) Eastside Ponderosa Pine Forest (84220)	Sierra Nevada Mixed Conifer (243) Pacific Ponderosa Pine—Douglas-fir (244) Pacific Ponderosa Pine (245)	Northern Yellow Pine Forest (5) Southern Yellow Pine Forest (6) Sierran Yellow Pine Forest (7) Yellow Pine—Shrub Forest (8) Klamath Montane Forest with Yellow Pine (13) Coast Range Montane Forest (14)	Yellow Pine Forest (14)	Ponderosa Pine Mixed Conifer—Pine (NCM, NI, NS, SS)	Ponderosa/Jeffrey Pine	no corresponding vegetation type	Yellow Pine forest (14a2)

Table 6 (continued)

Tree Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
EASTSIDE PINE (EPN)	"Eastside" Ponderosa Pine Forest (8.422)	Eastside Ponderosa Pine Forest (84220) Jeffrey Pine Forest (85100) Washoe Pine—Fir Forest (85220)	Interior Ponderosa Pine (237)	Yellow Pine—Shrub Forest (8)	Yellow Pine Forest (14)	Ponderosa Pine (NI, NS)	Ponderosa/Jeffrey Pine	not applicable	Yellow pine forest (14a2) Washoe Pine forest (18c)
REDWOOD (RDW)	Redwood Forest (8.23)	North Coast Alluvial Redwood Forest (61120) Upland Redwood Forest (82320)	Redwood (232)	Redwood Forest (2) Mixed Hardwood and Redwood Forest (24)	Redwood Forest (12)	Redwood Redwood—Douglas Fir	Coast Redwood	Redwood Zone: Early Seral Shrub (1.2.2 G) Redwood Zone: Second Growth Forest (Conifer) (1.2.2 J) Redwood Zone: Old Growth Forest (Conifer) (1.2.2 K)	Redwood forest (10d)
PINYON JUNIPER (PJN)	Pinyon—Juniper Woodland (7.2)	Great Basin Pinyon—Juniper Woodland (72121) Great Basin Pinyon Woodland (72122) Mojavean Pinyon Woodland (72210) Penisular Pinyon Woodland (72310)	Pinyon—Juniper (239)	Juniper—Pinyon Woodland (11)	Pinyon—Juniper Woodland (28)	Singleleaf Pinyon Singleleaf Pinyon—Utah Juniper	Pinyon Pine	not applicable	Pinyon—juniper woodland (18d2)
JUNIPER (JUN)	Northern Juniper Woodland (7.211)	Juniper—Oak Cismontane Woodland (71430) Northern Juniper Woodland (72110) Great Basin Juniper Woodland and Scrub (72123) Mojavean Juniper Woodland and Scrub (72220)	Western Juniper (238)	Juniper Savanna (34) Juniper Shrub Savanna (35)	Northern Juniper Woodland (27)	Juniper Western Juniper	Western Juniper Juniper	not applicable	Mountain juniper woodland (14b4) Northern juniper woodland (18d1)

Table 6 (continued)

Tree Dominated Habitats

	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
JUNIPER (continued)		Cismontane Juniper Woodland and Scrub (72400)							
ASPEN (ASP)	Aspen Groves (6.23)	Aspen Ripariar Forest (61520) Aspen Forest (81B00)	Aspen (217)	no corresponding vegetation type	no corresponding vegetation type	Quaking Aspen	Aspen	no corresponding type	Aspen woodland
CLOSED-CONE PINE-CYPRESS (CPC)	Closed-cone Coniferous Forest (8.3)	Closed-cone Coniferous Forest (83000)	Knobcone Pine (248)	Coastal Cypress and Pine Forests (9)	Closed-cone Pine Forest	Bishop Pine Cuyamaca Gowen Cypress Knobcone Pine MacNab Cypress Modoc Cypress Monterey Cypress Monterey Pine Piute Cypress Pygmy Cypress Santa Cruz Cypress Sargent Cypress Tecate Cypress Torrey Pine	Bishop Pine Cypress Knobcone Pine Monterey Pine Torrey Pine	no corresponding vegetation type	Closed-cone conifer-woodland (9) Shore pine woodland (10a) Torrey pine woodland (10b)
MONTANE HARDWOOD CONIFER (MHC)	Mixed Evergreen Forest (8.11) Coast Range Mixed Conifer Forest (8.411) Santa Lucia Fir Forest (8.412) Coast Range Ponderosa Pine Forest (8.413) Coulter Pine Forest (8.414)	Mixed Evergreen Forest (81100) California Bay Forest (81200) Coast Range Mixed Coniferous Forest (84110) Santa Lucia Fir Forest (84120) Coulter Pine Forest (84140)	Oregon White Oak (233) Douglas-fir—Tanoak—Pacific Mandrone (234) California Black Oak (246) Knobcone Pine (248) Canyon Live Oak (249)	Oregon Oak Forest (20) Mixed Evergreen Forest with Chinquapin (21) Mixed Evergreen Forest with Rhododendron (22) Mixed Hardwood Forest (23) Mixed Hardwood and Redwood	Douglas-fir Forest (13) Mixed Evergreen Forest (19)	Big-cone Douglas Fir Black Oak (NCM, NI, SS, CCM) Coulter Pine Douglas Fir—Pine—Madrone Douglas Fir—Tanoak—Madrone	Big-cone Douglas-fir Black Oak Coulter Pine Digger Pine Madrone Santa Lucia Fir	Redwood Zone: Second Growth Forest (Broadleaf) (1.2.2 H) Redwood Zone: Second Growth Forest (Mixed) (1.2.2 I) Mixed Evergreen Zone: Second Growth Forest (Broadleaf) (1.2.3 H)	Redwood forest (10d) Douglas-fir forest (10e) Mixed evergreen forest (10f) Lower montane coniferous forest (14a)

Table 6 (continued)

Tree Dominated Habitats

	Cheatham and Haller (1975)		Eyre (1980)		Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
MONTANE HARDWOOD (Continued)		Bigcone Spruce—Canyon Oak Forest (84150)		Forest (24) Coulter Pine Forest (26)		Madrone—Tanoak (CCM) Mixed Conifer-Pine (SS) Santa Lucia Fir		Mixed Evergreen Zone: Second Growth Forest (Mixed) (1.2.3 I) Mixed Evergreen Zone: Second Growth Forest (Conifer) (1.2.3 J)	
MONTANE HARDWOOD (MHW)	Northern Oak Woodland (7.11) Canyon Live Oak Forest (8.132)	Oregon Oak Woodland (71110) Black Oak Woodland (71120) Interior Live Oak Woodland (71150) Mixed North Slope Cismontane Woodland (71420) Canyon Live Oak Forest (81320) Interior Live Oak Forest (81330) Black Oak Forest (81340)	California Black Oak (246) Canyon Live Oak (249)	Mixed Evergreen Forest with Chinquapin (21) Mixed Evergreen Forest with Rhododendron (22) Mixed Hardwood Forest (23)	Mixed Evergreen Forest (19) Northern Oak Woodland (20) Southern Oak Woodland (21) Foothill Woodland (22)	Black Oak California Bay Canyon Live Oak Madrone—Black Oak Madrone—Tanoak Tanoak—Madrone	Black Oak Canyon Live Oak Madrone Tanoak	Redwood Zone: Second Growth Forest (Broadleaf) (1.2.2 H) Mixed Evergreen Zone: Second Growth Forest (Broadleaf) (1.2.3 H)	Northern mixed evergreen forest (10f1)
BLUE OAK WOODLAND (BOW)	Blue Oak Woodland (7.121)	Blue Oak Woodland (71140) Interior Live Oak Woodland (71150) Alvord Oak Woodland (71170) Interior Live Oak Forest (81330)	Blue Oak—Digger Pine (250)	Blue Oak—Digger Pine Forest (25)	Foothill Woodland (22)	Blue Oak (NCM, NS, SS, CV) Blue Oak—Digger Pine	Blue Oak	not applicable	Foothill woodland (12b)
VALLEY OAK WOODLAND (VOW)	Central Valley Bottomland Woodland (6.11) Valley Oak Woodland (7.122)	Great Valley Valley Oak Riparian Forest (61430) Valley Oak Woodland (71130)	no corresponding vegetation type	Riparian Forest (28) Valley Oak Savanna (33)	Foothill Woodland (22)	Valley Oak (NCM, CV, CCM, SCM)	Valley Oak	not applicable	Foothill woodland (12b)

Table 6 (continued)

Tree Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
COASTAL OAK WOODLAND (COW)	Northern Oak Woodland (7.11) Southern Oak Woodland (7.13) Coast Live Oak Forest (8.131)	Central Coast Live Oak Riparian Forest (61220) Coast Live Oak Woodland (71160) Englemann Oak Woodland (71180) Island Oak Woodland (71190) Walnut Woodland (71200) Coast Live Oak Forest (81310) California Walnut Forest (81600) Island Ironwood Forest (81700)[1] Cherry Forest (81800)[1]	Oregon White Oak (233) California Coast Live Oak (255)	Oregon Oak Forest (20) Mixed Hardwood Forest (23) Southern Oak Forest (27)	Northern Oak Woodland (20) Southern Oak Woodland (21) Foothill Woodland (22)	Black Oak (NCM) Canyon Live Oak (NCM, CCM) Coast Live Oak Engelmann Oak Oregon White Oak (NCM)	Coast Live Oak Engelmann Oak	Redwood Zone: Second Growth Forest (Broadleaf) (1.2.2 H)	Oak woodland (12)
BLUE OAK—DIGGER PINE (BOP)	Blue Oak Woodland (7.121)	Digger Pine Woodland (71300) Digger Pine—Oak Woodland (71410)	Blue Oak—Digger Pine (250)	Blue Oak—Digger Pine Forest (25)	Foothill Woodland (22)	Blue Oak—Digger Pine Blue Oak (NS, SS) Interior Live Oak (NCM, NS, SS, CCM)	Blue Oak Digger Pine	not applicable	Foothill woodland (12b)
EUCALYPTUS (EUC)	no corresponding vetetation type	no corresponding vegetation type	no corresponding vegetation type	no corresponding vegetation type	no corresponding vegetation type	Eucalyptus	Eucalyptus	not applicable	no corresponding vegetation type
MONTANE RIPARIAN (MRI)	Mixed Riparian Woodlands (6.21) Red Alder Groves (6.22) Willow Thickets (6.24)	Montane Riparian Forest (61500) Montane Riparian Scrub (63500)	Palustrine: Forested Wetland: Broadleaved Deciduous	Red Alder (221) Black Cottonwood—Willow (222) Cottonwood—Willow (235)	Riparian Forest (28)	no corresponding vegetation type	Alder Bigleaf Maple Black Cottonwood Cottonwood (NI, NS, SS, CCM, SCM) Cottonwood—Alder	Alder Bigleaf Maple California Bay Cottonwood Willow	Redwood Zone: Riparian (1.2.2. D) Mixed Evergreen Zone: Riparian (1.2.3 D) Sitka Spruce Zone: Riparian (1.2.4 D)	Riparian woodland (7)

Table 6 (continued)

Tree Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Cowardin (1979)	Eyre (1980)	Kuchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
MONTANE RIPARIAN (Continued)							Maple—Alder—Dogwood Maple—Dogwood Red Alder White Alder Willow Willow—Alder		Sitka Spruce Zone: Second Growth Forest (Broadleaf) (1.2.4 H) Sitka Spruce Zone: Second Growth Forest (Mixed) (1.2.4 I)	
VALLEY FOOT-HILL RIPARIAN (VRI)	Central Valley Bottomland Woodland Forest (6.11) Northern Riparian Woodland (6.211) Southern Riparian Woodland (6.212) Southern Alluvial Woodlands (6.31= 7.41)	Freshwater Swamp (52600) North Coast Riparian Forest (61100) Central Coast Riparian Forest (61200) Southern Riparian Forest (61300) Great Valley Riparian Forest (61400) Sycamore Alluvial Woodland (62100) Southern Sycamore—Alder Riparian Woodland (62400) North Coast Riparian Scrub (63100) Southern Riparian Scrub (63300) Great Valley Riparian Scrub (63400)	Palustrine: Forested Wetland: Broad-leaved Deciduous	Cottonwood—Willow (235)	Riparian Forest (28)	no corresponding vegetation type	Black Cottonwood (CCM) California Sycamore Cottonwood (NI, NS, SS, CV, CCM, SCM)	Alder Cottonwood Sycamore Wild Rose Willow	no corresponding vegetation type	Riparian woodland (7)

Table 6 (continued)

Tree Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Cowardin (1979)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
DESERT RIPARIAN (DRI)	Colorado River Bottomland Woodland (6.12) Desert Dry Wash Woodland (6.32=7.42)	Modoc—Great Basin Riparian Forest (61600) Mojave Riparian Forest (61700) Colorado Riparian Forest (61800) Desert Dry Wash Woodland (62200) Modoc—Great Basin Riparian Scrub (63600) Mojave Desert Wash Scrub (63700) Colorado Riparian Scrub (63800)	Palustrine: Forested Wetland: Broad-leaved Deciduous	Cottonwood—Willow (235) Mesquite (242)	Alkali Scrub—Woodland (48)	no corresponding vegetation type	Arrowweed Cottonwood (SI) Mesquite Tamarisk	Arrowweed Cottonwood Mesquite Salt-cedar Willow	not applicable	Desert microphyll woodland (20g) Desert riparian woodland (20i)
PALM OASIS (POS)	Palm Oasis Woodland (6.4)	Desert Fan Palm Oasis Woodland (62300)	Palustrine: Forested Wetland: Broad-leaved Evergreen	no corresponding vegetation type	Oasis Scrub—Woodland (49)	no corresponding vegetation type	Palm	Palm	not applicable	Desert oasis woodland (20h)
JOSHUA TREE (JST)	Joshua Tree Woodland (7.3)	Joshua Tree Woodland (73000)	not applicable	no corresponding vegetation type	Joshua Tree Scrub (40)	Joshua Tree Woodland (29)	Joshua Tree	Joshua Tree	not applicable	Joshua Tree Woodland (20a)

Shrub Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
ALPINE DWARF SCRUB (ADS)	Alpine Fell-fields (9.11)	Alpine Fell-field (91100) Alpine Dwarf Scrub (94000)	no corresponding vegetation type	Alpine Communities (39)	Alpine Fell-fields (26)	Cushion Plant	Buckwheat	Tundra/Alpine (1.112)	Alpine fell-fields (17)
LOW SAGE (LSG)	Subalpine Sagebrush (3.312)	Subalpine Sagebrush Scrub	no corresponding vegetation type	Sagebrush Steppe (31)	Sagebrush Scrub (6)	Low Sagebrush	Sagebrush	not applicable	Mountain sagebrush scrub (19c)

Table 6 (continued)

Shrub Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al (1980)	Thorne (1976)
BITTERBRUSH (BBR)	Sagebrush Scrub (3.31)	Great Basin Mixed Scrub (35100) Big Sagebrush Scrub (35210) Rabbitbrush Scrub (35400) Shadscale Scrub (36140)	no corresponding vegetation type	Sagebrush Steppe (31) Juniper Shrub Savanna (35)	Sagebrush Scrub (6)	Bitterbrush Bitterbrush—Rabbitbrush Curlleaf Mountain Mahogany Rabbitbrush	Rabbitbrush	no corresponding vegetation type	Great Basin sagebrush scrub (19a)
SAGEBRUSH (SGB)	Great Basin Sagebrush (3.311) *Wyethia* Meadow—Scrub (3.34=4.53)	Blackbrush Scrub (34300) Great Basin Mixed Scrub (35100) Big Sagebrush Scrub (35210) Sagebrush Steppe (35300) Rabbitbrush Scrub (35400) Great Basin Juniper Woodland and Scrub (72123)	no corresponding vegetation type	Sagebrush Steppe (31) Juniper Shrub Savanna (35)	Sagebrush Scrub (6)	Basin Sagebrush Blackbush Sagebrush Mule Ears	Rabbitbrush	not applicable	Great Basin sagebrush scrub (19a)
MONTANE CHAPARRAL (MCP)	Montane Chapparral (3.75)	Montane Chaparral (37500) Montane Dwarf Scrub (38000)	no corresponding vegetation type	Chaparral (29)	Chaparral (23)	Bush Chinquapin Greenleaf Manzanita Greenleaf Manzanita—Shrub Black Oak Huckleberry Oak Huckleberry Oak—Pine Mat Manzanita Montane Mixed Shrub Tobacco Brush	no corresponding vegetation type	Mixed Evergreen Zone: Early Seral Shrub (1.2.3 G)	Montane chaparral (13f)
MIXED CHAPARRAL (MCH)	Mixed Chaparral (3.71) Semi-Desert Chaparral (3.74)	Upper Sonoran Mixed Chaparral (37100) Semi-Desert Chaparral (37400)	no corresponding vegetation type	Chaparral (29) Island Chaparral (30)	Chaparral (23)	Brewer Oak—Mountain Mahogony Ceanothus	Ceanothus Manzanita Mountain Mahogany	Mixed Evergreen Zone: Serpentine (1.2.3 E)	Mixed chaparral (13a) Serpentine chaparral (13)

Table 6 (continued)

Shrub Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
MIXED CHAPARRAL (continued)	Serpentine Chaparral (3.76) Island Chaparral (3.77)	Serpentine Chaparral (37600) Island Chaparral (37700) Upper Sonoran *Ceanothus* Chaparral (37800) Scrub Oak Chaparral (37900) Interior Live Oak Chaparral (37A00) Upper Sonoran Manzanita Chaparral (37B00) Maritime Chaparral (37C00) Ione Chaparral (37D00) Mesic North Slope Chaparral (37E00) Poison-oak Chaparral (37 F00) Coastal Sage—Chaparral Scrub (37G00) Alluvial Fan Chaparral (37H00) Flannel Bush Chaparral (37J00) Upper Sonoran Subshrub Scrub (39000) Digger Pine—Chaparral Woodland (71320) Island Ironwood Forest (81700)[1] Silk-tassel Forest (81900)[1]				Common Manzanita Deerbrush Hoary Manzanita Manzanita Mariposa Manzanita Mixed Chaparral Scrub Oak Wedgeleaf Ceanothus Whiteleaf Manzanita Whiteleaf Manzanita—Toyon	*Prunus* Scrub Oak Sumac Toyon		Island chaparral (13c) Desert transition chaparral (13g)

Table 6 (continued)

Shrub Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
CHAMISE—REDSHANK CHAPARRAL (CRC)	Mixed Chaparral (3.71) Chamise Chaparral (3.72) Red Shank Chaparral (3.73)	Chamise Chaparral (37200) Red Shank Chaparral (37300)	no corresponding vegetation type	Chaparral (29)	Chaparral (23)	Ceanothus Chamise Red Shanks	Chamise Redshank	no corresponding vegetation type	Chamise (13d) Red-shanks chaparral (13e)
COASTAL SCRUB (CSC)	Coastal Dune Scrub (2.22) Coastal Bluff Scrub (3.1) Coastal Scrub (3.2) Maritime Cactus Scrub (3.51=3.24)	Backdune Scrub (21300) Coastal Bluff Scrub (31000) Coastal Scrub (32000) Coastal Sage—Chaparral Scrub (37G00) Alluvial Fan Chaparral (37H00)[1]	no corresponding vegetation type	Coastal Sagebrush (32) Northern Seashore Communities/Northern dune scrub (50, part) Southern Seashore Communities/Dune scrub (51, part) Coastal Prairie-Scrub Mosaic/Coastal scrub (52, part)	Coastal Strand (1) Northern Coastal Scrub (4) Coastal Sage Scrub (5)	Buckwheat California Sagebrush Coyote Brush Encelia Lupine Ragweed Sage Salal Sumac	Baccharis California Buckwheat Coastal Sagebrush Encelia Lupine Opuntia Salvia	Redwood Zone: Early Seral Shrub (1.2.2 G)	Coastal scrub (8)
DESERT SUCCULENT SHRUB (DSS)	Desert Cactus Scrub (3.52)	Sonaran Mixed Woody and Succulent Scrub (33220) Mojave Mixed Woody and Succulent Scrub (34240)	no corresponding vegetation type	Cactus Scrub (44)	Creosote Bush Scrub (8)	Cholla Ocotillo	Agave Ocotillo Opuntia	not applicable	Stem-succulent scrub (20e) Semi-succulent scrub (20f)
DESERT WASH (DSW)	Desert Dry Wash Woodland (6.32=7.42)	Desert Dry Wash Woodland (62200) Modoc—Great Basin Riparian Scrub (63600) Mojave Desert Wash Scrub (63700)	Mesquite	Alkali Scrub-Woodland (48)	Creosote Bush Scrub (8)	Arrowweed Catclaw Smoke Tree—Desert Willow	Catclaw Desert Ironwood Salt-cedar Smoke Tree	not applicable	Desert microphyll woodland (20g)
DESERT SCRUB (DSC)	Partially Stabilized and Stabilized Desert Dunes (2.3) Blackbush Scrub (3.32)	Stabilized and Partially Stabilized Desert Dunes (22200)	no corresponding vegetation type	Mojave Creosote Bush (41) Sonoran Creosote Bush (42)	Creosote Bush Scrub (8)	Buckwheat Creosote Croton	Ambrosia Coldenia Creosote Bush	not applicable	Blackbush scrub (19b) Desert dune sand plant (20d)

Table 6 (continued)

Shrub Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Eyre (1980)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
DESERT SCRUB (continued)	Low Desert Scrub (3.4)	Stabilized and Partially Stabilized Sand Fields (22300) Sonoran Desert Scrub (33000) Mojavean Desert Scrub (34000) Great Basin Mixed Scrub (35100) Rabbitbrush Scrub (35400) Semi-desert Chaparral (37400)		Blackbush Scrub (43)		Perennial Grass (SI-Galetta)	Croton Encelia Galleta Grass		
ALKALI DESERT SCRUB (ASC)	Shadscale Scrub (3.33) Alkali Scrub (3.6)	Chenopod Scrub (36000) Alkali Meadows and Seeps (45300) Alkali Meadow (45310) Alkali Playa (46000)	no corresponding vegetation type	Desert Saltbush (45) Salton Sea Saltbush (46) San Joaquin Saltbush (47)	Shadscale Scrub (7) Alkali Sink (9)	Perennial Grass (CV, SI-Saltgrass) Pickleweed Saltbush Shadscale	Greasewood Iodine Bush Pickleweed Saltbush Saltgrass Suaeda	not applicable	Shadscale scrub (21a) Alkali sink scrub (21b)

Herbaceous Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Cowardin (1979)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
ANNUAL GRASSLAND (AGS)	Valley and Foothill Grassland (4.2) Vernal Pools (4.4)	Valley and Foothill Grassland (42000) Vernal Pool (44000)	not applicable	California Prairie (36)	Valley Grassland (25)	Annual Grass—Forb	Bromegrass Fescue Mustard Needlegrass Wild Oats	no corresponding vegetation type	Vernal Pool Ephemeral (5) Great Central and Coast Range valley grassland (11b) Southern California grassland (11c)

Table 6 (continued)

Herbaceous Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Cowardin (1979)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
	Coastal Prairie (4.1)	Coastal Prairie (41000) Coastal Terrace Prairie (41100) Bald Hills Prairie (41200)	not applicable	Coastal Prairie—Scrub Mosaic (52)	Coastal Prairie (24)	Perennial grass (CCM, NCM)	not applicable	Redwood Zone: Early Seral Grassland/Pasture (1.2.2 F) Sitka Spruce Zone: Early Seral Grassland/Pasture (1.2.4 F)	Northern coastal prairie (11a)
WET MEADOW (WTM)	Montane Meadow (4.51) High Elevation Meadows (4.52) Alkali Meadows (4.54) Alkali Seep (4.55) Freshwater Seep (4.56)	Meadow and Seep (45000)	not applicable	California Prairie (36) Alpine Communities (39)	Valley Grassland (25)	Perennial Grass (NCM) Sedge—Rush	Sedge Wiregrass	Arctic Alpine Zone: Tundra/Alpine (1.1.1 D) True Fir Zone: Subalpine Meadow (1.1.2 G)	Mountain meadow (16) Alkali meadow and aquatic (21C)
FRESH EMERGENT WETLAND (FEW)	Freshwater Seep (4.56) Bogs and Fens (5.1) Alkali Marsh (5.23) Freshwater Marshes (5.24) Seasonal Marshes and Ponds (5.25) Freshwater Swamp (5.26)	Bog and Fen (51000) Coastal and Valley Freshwater Marsh (52410) Transportation Freshwater Marsh (52420) Montane Freshwater Marsh (52430)	Riverine: Lower Perennial Emergent Wetland Riverine: Tidal Emergent Wetland Lacustrine: Littoral Emergent Wetland Palustrine: Emergent Wetland	Tule Marsh (37)	Freshwater Marsh (3)	Cattail—Sedge (SCM) Sedge—Rush (NIM, NS, SS, SCM)	Bulrush Cattail	Arctic Alpine Zone: Palustrine (1.1.1 B) True Fir Zone: Palustrine (1.1.2 B) Redwood Zone: Palustrine (1.2.2 B) Mixed Evergreen Zone: Palustrine (1.2.3 B) Sitka Spruce Zone: Palustrine (1.2.4 B)	Freshwater marsh (4a) Sphagnum bog (6)
SALINE EMERGENT WETLAND (SEW)	Coastal Wetlands (1.2) Coastal Saltmarshes (5.21=1.22) Coastal Brackish Marsh (5.22)	Coastal Salt Marsh (52100) Coastal Brackish Marsh (52200)	Estuarine: Intertidal Emergent Wetland	Coastal Saltmarsh (38)	Coastal Saltmarsh (2)	Cattail—Sedge Pickleweed—Cordgrass Pickleweed Sedge—rush (CCM)	Bulrush Cordgrass Pickleweed Saltgrass Suaeda	Intertidal Estuarine Zone: Emergent Vegetation (2.1.2 C) Above Tide Estuarine Wetland Zone: Diked Marsh (2.1.3 A)	Coastal salt marsh (3)

Table 6 (continued)

Herbaceous Dominated Habitats

WHR Type	Cheatham and Haller (1975)	CNDDB (1986)	Cowardin (1979)	Küchler (1977)	Munz and Keck (1973)	Parker and Matyas (1981)	Paysen et al. (1980)	Proctor et al. (1980)	Thorne (1976)
PASTURE (PAS)	no corresponding vegetation type	no corresponding vegetation type	no corresponding vegetation type	no corresponding vegetation type	no corresponding vegetation type	Urban/Agri-cultural[2]	no corresponding vegetation type	Redwood Zone: Agricultural (1.2.2 E) Sitka Spruce Zone: Agricultural (1.2.4 E)	no corresponding vegetation type

Aquatic Habitats

WHR Type	Cheatham and Haller (1975)	Cowardin (1979)	Proctor et al. (1980)	Thorne (1976)
RIVERINE (RIV)	Streams (10.2) Rivers (10.3)	Riverine	Arctic Alpine Zone: Riverine (1.1.1 C) True Fir Zone: Riverine (1.1.2 C) Redwood Zone: Riverine (1.2.2 C) Mixed Evergreen Zone: Riverine (1.2.3 C) Sitka Spruce Zone: Riverine (1.2.4 C)	

Table 6 (continued)

Aquatic Habitats

	Cheatham and Haller (1975)	Cowardin (1979)	Proctor et al. (1980)	Thorne (1976)
LACUSTRINE (LAC)	Lakes and Ponds (10.4)	Lacustrine	Arctic Alpine Zone: Lacustrine (1.1.1 A)	Lake, pond, and quiet stream aquatic (4.b)
			True Fir Zone: Lacustrine (1.1.2 A)	Reservoir semi-aquatic (4.c)
			Redwood Zone: Lacustrine (1.2.2 A)	
			Mixed Evergreen Zone:Lacustrine (1.2.3 A)	
			Sitka Spruce Zone: Lacustrine (1.2.4 A)	
			Beaches and Dunes: Dune Lake (2.2.2 E)	
ESTUARINE (EST)	Coastal Estero (1.12)	Estuarine	Subtidal Estuarine Zone: (2.1.1)	Tidal marsh (3a)
	Tidal Flats (1.21)		Intertidal Estuarine (2.1.2 B)	
MARINE (MAR)	Exposed Open Coast (1.3)	Marine	Beach Surf Zone (2.2.1)	Marine aquatic (1)
	Protected Open Coast (1.4)		Rocky Surf Zone (2.3.1)	
	Bays and Harbors (1.11)		Oceanic Zone (3.0)	

Table 6 (continued)

Developed Habitats

WHR Type	Parker and Matyas (1981)	Proctor et al. (1980)
CROPLAND (CRP)	Urban/Agri-cultural[2]	Redwood Zone: Agricultural (1.2.2 E) Sitka Spruce Zone: Agricultural (1.2.4 E)
ORCHARD-VINEYARD (OVN)	Urban/ Agricultural[2]	Redwood Zone: Agricultural (1.2.2 E) Sitka Spruce Zone: Agricultural (1.2.4 E)
URBAN (URB)	Urban/Agri-cultural[2]	Human Activity Zones: Inland (4.1) Human Activity Zones: Coastal (4.2)

[1] CNDDB solicits information to clarify these classifications

[2] Urban/Agricultural vegetation type is described only in Parker and Matyas (1979)