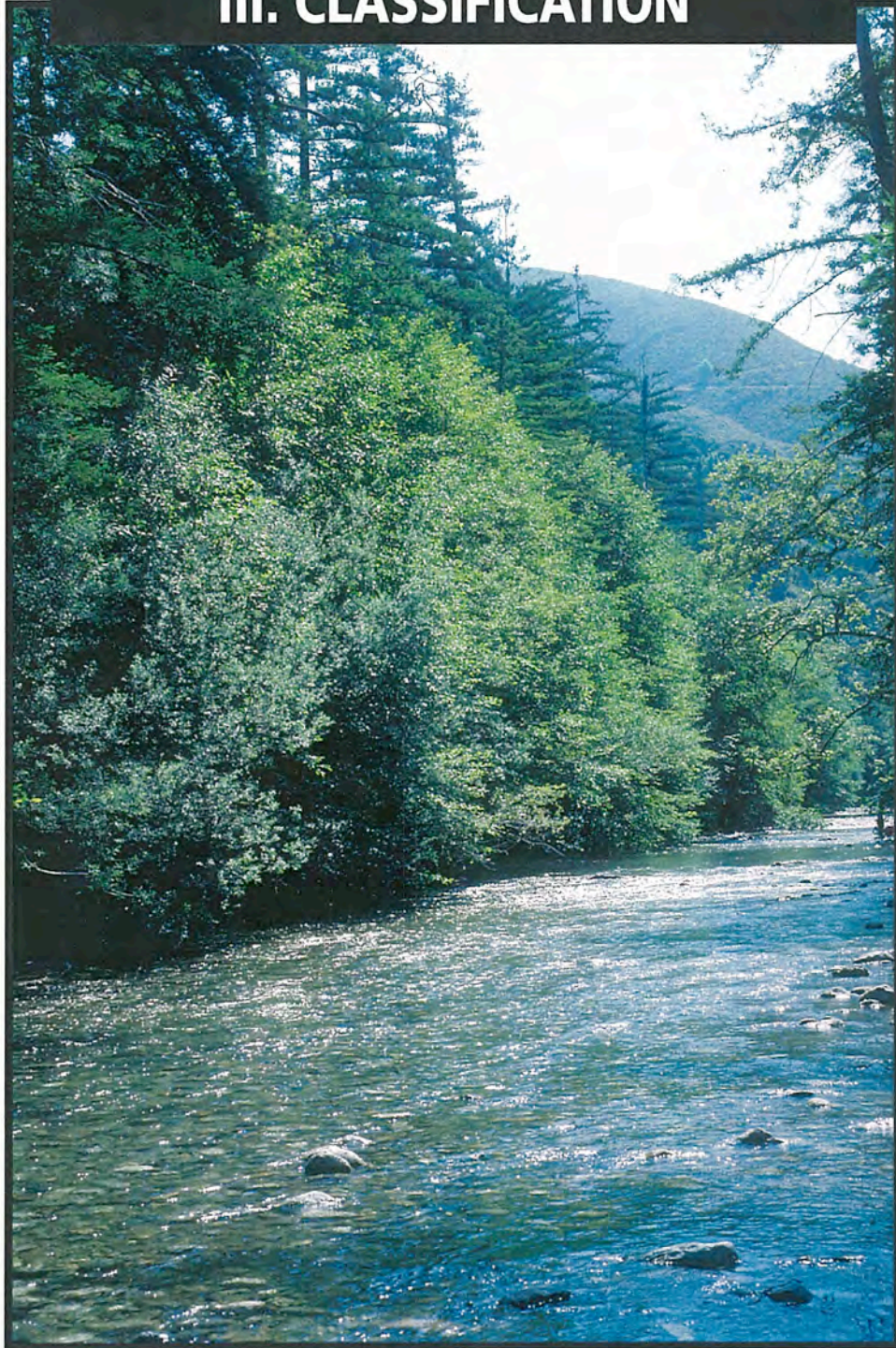


III. CLASSIFICATION



California, Monterey County: Big Sur River

CLASSIFICATION

Wayne R. Ferren Jr.¹, Peggy L. Fiedler², Robert A. Leidy³, and Kevin Lafferty⁴

INTRODUCTION

Classification of wetlands is the assignment of wetlands to groups within a system of categories distinguished by origin, structure, flooding frequency, dominant organisms, or some other combination of physical and/or biological attributes. Hierarchical classification of wetlands is a system of classification where wetlands are ranked in categories one above another. Cowardin et al. (1979) produced a hierarchical classification of wetlands for the U.S. Fish and Wildlife Service that incorporated a ranking of systems containing subsystems, subsystems containing classes, and classes containing subclasses. We have adopted this classification as a starting point and have modified it and expanded it formally to include water regimes, water chemistry, hydrogeomorphic units, and substrate and dominance type categories. Although Cowardin et al. provided modifiers for the classification in the form of categories for water regimes, chemistry and dominance types, these we never formally incorporated into the classification, and no landform/habitat information was provided. Thus it was not possible in their classification to distinguish a wetland based on its ecosystem context such as lagoons, pools, ponds, seeps, springs, etc. Because California has a complex landscape, edaphic, and climatic interface (see Section II: Environmental Setting), it is necessary to have a classification of wetlands that can adequately portray the richness of wetland types. This is essential if conservation efforts are to preserve at least a representation of the wealth of the state's natural heritage. We propose this classification methodology as a contribution toward this conservation effort. Because in part of the rapid urbanization of California, it will be difficult if not impossible to conserve wetland resources that are not identified as distinct nor documented in sufficient detail to determine their ecosystem functions and socioeconomic values.

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Classification of California Wetlands

Early Efforts. Classification of wetlands in California did not begin with the attempt to apply a national classification to the state's resources. The U.S. Forest Service from 1927 to 1941 conducted the Vegetation Type Map Survey of California, which was based largely on types of vegetation cover. Most wetland types were not identified and most of the detailed maps were never published. Although individual researchers published floras and technical papers on particular sites or habitats such as vernal pools in San Diego County (Purer 1939) and marshlands at Newport Bay (Stevenson and Emery 1958), Munz and Keck (1958) are often cited in reference to the vegetation classification they provided in their statewide treatment, *A Flora of California*. In this volume, however, they treated vegetated wetlands in only several broad categories (e.g., coastal salt marshes, freshwater marshes, and alkali sink). More typically, Munz and Keck referred to the habitat in which particular wetland species occurred (e.g., "along streams", "rather deep water", "shallow ponds", "vernal pools", "muddy places"); they also would provide an indication that the wetland community was within a larger context such as "Foothill Woodland", "Chaparral", or "many Plant Communities". No clear sense of palustrine scrub-shrub or forested wetlands occurred in their classification. The importance and impact of the publication of Munz and Keck (1958) cannot be minimized in the treatment of the state's flora or its vegetation. However, their tendency to minimize the richness of wetland types has continued to have a profound effect to the present (e.g., Sawyer and Keeler-Wolf 1994).

Perhaps the most important publication on the flora of California wetlands was authored by Mason (1957) two years before the issue of Munz and Keck (1958). In *A Flora of the Marshes of California*, Mason compiled a compendium on the wetland flora and included much information on the wetland habitats, although he proposed no formal classification of types of wetlands or wetland vegetation. However, he did include many insightful comments for the time, including the following:

Generalizations regarding the floristic organization of the marsh and wetland habitats are difficult, because such organization centers around the intergrading environmental variables that not only account for different combinations of habitat conditions, but, through natural selection, permit a high degree of overlapping of species between habitats. Communities of plants therefore are rarely definitive in relation to what may appear to be distinctive habitat. The three most important sets of environmental variables are:

- 1. The relative permanence of water, or the character of the intermittence of water in the habitat*
- 2. The relative salinity and the hydrogen-ion concentration of the soil solution*
- 3. The habitat variables related to seasonal temperature and length of the growing period*

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Some aspects of each of these three sets of variables are evident in every marsh or wetland habitat. They combine in various ways to produce exceedingly complex habitat diversity....(Mason 1957:7)

Many of the observations made by Mason nearly forty years ago are true today, but have been overlooked by some during later efforts to classify vegetation that includes wetlands.

Improvements and Additions. The first major effort to provide a statewide, numerical, hierarchical classification of habitats was provided by Cheatham and Haller (1975) as an unpublished contribution to Barbour and Major (1977). They defined habitat type or one of its subdivisions as: "an assemblage of natural features of the landscape that lead us to the subjective conclusion that one area is sufficiently different from another to warrant separate description" (Cheatham and Haller 1975:2). They described their "Major Categories" as approximating "Vegetation Types" in Munz and Keck (1958), and their "Habitat Types" as approximating "Plant Communities" in Munz. They also added "Major" and "Minor Subdivisions" of the Habitat Types. In their work for the University of California's Natural Reserve System, Cheatham and Haller (1975:2) found that "...it was obvious we were working with habitat types that fell between Munz and Keck's categories." They subsequently stated that their document "...goes into a more detailed level and attempts to pick up where Munz and Keck leaves off" Cheatham and Haller (1975:2). Several major subsequent works on the classification of California vegetation (e.g., Holland 1986, Sawyer and Keeler-Wolf 1994) elaborate upon the effort set forth by Cheatham and Haller. Relevant examples of the Cheatham and Haller categories with selected subcategories include:

1.0 COASTAL AND SHORELINE HABITATS

- 1.1 Open Water
 - 1.11 Bays and Harbors
 - 1.12 Coastal Esteros
- 1.2 Coastal Wetlands
 - 1.21 Tidal Flats
 - 1.22 Salt Marshes
- 1.3 Exposed Open Coast
 - 1.31 Exposed Sandy Beach
 - 1.32 Exposed Cobble Beach
 - 1.33 Exposed Mixed Beach
 - 1.34 Exposed Rocky Shore
- 1.4 Protected Open Coast

3.0 SCRUB AND CHAPARRAL

- 3.6 Alkali Scrub
 - 3.62 Alkali Sink Scrub
 - 3.621 Intermittently Moist Alkali Sink
 - 3.622 Permanently Moist Alkali Sink
 - 3.63 Alkali Seep

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4.0 GRASSLANDS, VERNAL POOLS, AND MEADOWS

4.4 Vernal Pools

4.41 Great Valley Vernal Pools

4.411 Sacramento Valley Vernal Pools

4.412 San Joaquin Valley Vernal Pools

4.42 Coast Range Vernal Pools

4.43 Southern California Vernal Pools

4.431 Interior Cismontane Vernal Pools

4.432 San Diego Mesa Vernal Pools

4.5 Meadows and Seeps

4.51 Montane Meadow

4.52 High Elevation Meadows

4.54 Alkali Meadows

4.55 Alkali Seep

4.56 Freshwater Seep

5.0 BOGS AND MARSHES

5.1 Bogs and Fens

5.2 Marshes and Swamps

5.21 Coastal Salt Marshes

5.22 Coastal Brackish Marshes

5.23 Alkali Marshes

5.24 Freshwater Marshes

5.25 Seasonal Marshes and Pools

5.26 Freshwater Swamp

6.0 RIPARIAN HABITATS

6.1 Bottomland Woodlands and Forests

6.2 Streambank Woodlands and Forests

6.3 Alluvial Woodlands and Forests

6.3 Palm Oasis Woodland

7.0 WOODLANDS

7.4 Alluvial Woodlands (see 6.3)

10.0 AQUATIC HABITATS

10.1 Springs

10.2 Streams

10.21 Mountain Streams

10.22 Foothill and Valley Streams

10.23 Coastal Streams

10.3 Rivers

10.4 Lakes and Streams

10.5 Cave Aquatic Habitats

At about the same time that Cheatham and Haller (1975) was in preparation, the California Native Plant Society held a symposium entitled *Plant Communities of Southern California*. In the proceedings of the symposium (Latting 1976), Thorne provided another classification of vascular plant communities of California (Thorne 1976), which also is described as a

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replacement for Munz and Keck (1958):

The Munz and Keck classification of plant communities has served a most useful purpose in the past but it omits numerous recognizable plant communities or combines several under one overly broad heading. Most neglected are the aquatic communities with surfweed, marine meadow, vernal pool ephemeral, bog, and riparian communities largely ignored and freshwater marsh and stream, lake, pond, and reservoir aquatic communities combined under freshwater marsh (Thorne 1976:5).

The following hierarchy includes the aquatic communities presented in numerical order by Thorne:

1. MARINE AQUATIC
 - a. Surfweed
 - b. Marine Meadow
3. COASTAL SALT MARSH
 - a. Tidal marsh
 - b. Salt-flat succulent
4. FRESHWATER AQUATIC
 - a. Freshwater marsh
 - b. Lake, pond, and quiet stream aquatic
 - c. Reservoir semiaquatic
5. VERNAL POOL EPHEMERAL
6. SPHAGNUM BOG
 - a. Floating bog
 - b. Darlingtonia bog
 - c. High nutrient bog
7. RIPARIAN WOODLAND
10. PACIFIC CONIFEROUS FOREST
 - d. Redwood forest (in part)
16. MOUNTAIN MEADOW
 - a. Montane Meadow
 - b. Subalpine Meadow
 - c. Alpine Meadow
20. DESERT SCRUB AND WOODLAND
 - h. Desert oasis woodland
 - i. Desert riparian woodland
21. ALKALINE SCRUB
 - b. Alkali sink scrub
 - c. Alkali meadow and aquatic

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Both the Cheatham and Haller (1975) and the Thorne (1976) classifications made important contributions beyond previous efforts to classify the wetland resources, nonvegetated as well as vegetated, in California. However, neither provided a methodology that was sufficiently detailed for the identification, classification, and nomenclature of the great richness of wetland types that occur in California. In 1980, The Nature Conservancy and the California Natural Diversity Data Base (Holstein 1980) released a draft version of the *California Vegetation Cover Types*, which included a hierarchical list of types based on vegetation cover and arranged in systems, cover classes, cover types, and community types. The list provided no information on locations or habitats and did not separate wetland from upland types. As with many efforts, Holstein (1980) excluded areas not supporting vegetation cover, but he did include systems for bryophytes, lichens, and algae.

Agency Efforts. State and federal agencies also have developed classifications of vegetation for public lands. The U.S. Fish and Wildlife Service developed a comprehensive classification methodology to inventory and map the nation's wetlands as part of the National Wetland Inventory (NWI) Program. This classification, entitled "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al. 1979), has provided the definition accepted in this volume (see Section I, Introduction). The U.S. Fish and Wildlife Service's (i.e., Cowardin et al. 1979) "ecological" approach to defining wetlands emphasizes the presence of wetland hydrology, hydrophytic vegetation, and hydric soils (Tiner 1989). Under the U.S. Fish and Wildlife Service definition, a wetland must be periodically saturated or covered by shallow water during a portion of the growing season, regardless of the presence of hydrophytes or hydric soils (Tiner 1989). NWI maps, plotted on 7.5" U.S.G.S. quadrangle maps, exist for the study region.

In a series of publications (Payson et al. 1980; Payson et al. 1982; Hunter and Payson 1986), the U.S. Forest Service published a hierarchical classification and guides to the statewide and southern California areas. The most relevant publication, *A Vegetation Classification System Applied to Southern California* (Payson et al. 1980), included the following hierarchical elements based on plant structure (i.e., physiognomy) and cover: Formations (e.g., Herbaceous), Subformations (e.g., Aquatic), Series (e.g. Pondweed Series), Associations (i.e., a plant community or the basic unit of the classification), and Phases (i.e., local variants). The authors state that:

The Vegetation Classification System for Southern California is compatible at all levels with a national land classification system being proposed by the Forest Service and which incorporates the international system for classifying vegetation...The system is based upon a hierarchical stratification of plant cover ...The nomenclature for Association reflects the dominant overstory species., and the most prevalent (or distinguishing) associated species....The Associations have not yet been developed. They can be identified on the ground on a project basis of identified uniformity for the entire

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southern California area after adequate field samples are taken (Payson et al. 1980:2).

This classification system is open ended in that the Associations and Phases are generally left undescribed. As with most other efforts, nonvegetated areas are not included and only physiognomy and vegetation cover is used to classify the upland and wetland vegetation. In a related effort, the U.S. Forest Service has undertaken an ecosystem-type classification for its lands, including reconnaissance and intensive sampling and ecological type description (Allen 1987). The "Ecological Type" is the basic unit of the classification model and "...is defined as a classified category of land with a unique plant association and physical site characteristics, differing from other categories of land in its ability to produce vegetation and respond to management" (Allen 1987:2). This classification apparently is meant largely for upland ecological types, and would include only vegetated wetlands on Forest Service lands.

In 1990, the U.S. Environmental Protection Agency (EPA), Region IX, prepared a draft "*List of Priority Wetland and Aquatic Habitats of California*" (Leidy 1990). As stated in the document, "The ...list represents the initial efforts to identify priority wetland and aquatic habitats within California. This list identifies particularly important and vulnerable wetland and aquatic habitats in order that these areas can receive improved levels of protection by EPA under its various review and regulatory authorities" (Leidy 1990:1). The extensive annotated list includes by region the name, location, habitat types, categorized value, threat, and status of the wetlands and aquatic habitats. The following "habitat types" are used: (1) estuarine; (2) lagoon/bay, open ocean; (3) riverine [perennial stream, intermittent stream, pool/riffle sequence]; (4) lacustrine; (5) mud flat; (6) vegetated shallows (7) emergent wetland [salt marsh, brackish marsh, freshwater marsh]; (8) riparian woodland/wetland; (9) farmed wetland; (10) vernal pool; and, (11) other. In a recent effort, EPA IX funded a study of the assessment of functions of the waters of the U.S., including wetlands, in the Santa Margarita Watershed (L. C. Lee & Associates, Inc. 1994). Wetland nomenclature for the inventory of types followed an earlier version of our modified Cowardin approach.

State agencies also have undertaken efforts to classify California's vegetation, habitats, and ecosystems. The California Department of Parks and Recreation initiated a project in 1979 to conduct an inventory of "terrestrial and semiterrestrial vegetation" included on their lands (Barry 1982; Barry 1985; Jenson 1983). Most state efforts are agency specific and do not consider lands outside the jurisdiction of a specific agency. The vegetation classification is part of a multi-hierarchical classification system of ecosystem, biotic communities, and habitats. The Natural Diversity Data Base of the California Department of Fish and Game has made several efforts at conducting inventories and assessments and at improving the classification of vegetation. Jenson

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(1983) conducted an inventory using Cheatham and Haller's classification and produced a document on their occurrences for The Nature Conservancy entitled, *The Status of California's Natural Communities: Their Representation on Managed Areas*.

Perhaps the most important and widely-used addition to the classification efforts has been contributed by the Department of Fish and Game, *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Holland's treatment is based on a thorough reorganization of Cheatham and Haller, resulting in a hierarchical, numerical classification with element codes, names, descriptions, and characteristic species presented for each community. Approximately 68 wetland community types are identified in this statewide effort. Although this document and classification has been the most useful to date, many wetland types were omitted or grouped with other types. For example, no clear separation of wetland and upland riparian was established. Portions of the Holland classification follow:

40000 GRASSLANDS, VERNAL POOLS, MEADOWS, OTHER HERB COMMUNITIES

- 44000 Vernal Pool
 - 44100 Northern Vernal Pool
 - 44110 Northern Hardpan Vernal Pool
 - 44120 Northern Claypan Vernal Pool
 - 44130 Northern Volcanic Vernal Pool
 - 44300 Southern Vernal Pool
 - 44310 Southern Interior Basalt Flow Vernal Pool
 - 44320 San Diego Mesa Vernal Pool
- 45000 Meadow and Seep
 - 45100 Montane Meadow
 - 45110 Montane Wet Meadow
 - 45120 Montane Dry Meadow
 - 45200 Subalpine Meadow
 - 45300 Alkali Meadows and Seep
 - 45400 Freshwater Seep
- 46000 Alkali Playa Community

50000 BOG AND MARSH

- 51000 Bog and Fen
- 52000 Marsh and Swamp
 - 52100 Coastal Salt Marsh
 - 52200 Coastal Brackish Marsh
 - 52300 Alkali Marsh
 - 52400 Freshwater Marsh
 - 52500 Vernal Marsh
 - 52600 Freshwater Swamp

60000 RIPARIAN AND BOTTOMLAND HABITAT

- 61000 Riparian Forests
 - 61100 North Coast Riparian Forests
 - 61200 Central Coast Riparian Forest

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61300 Southern Riparian Forests
61400 Great Valley Riparian Forests
61500 Montane Riparian Forests
61600 Modoc-Great Basin Riparian Forests
61700 Mojave Riparian Forests
61800 Colorado Riparian Forests
62000 Riparian Woodlands
63000 Riparian Scrubs

90000 ALPINE HABITATS

91000 Alpine Boulder and Rock Field
91200 Alpine Talus and Scree Slope
91210 Wet Alpine Talus and Scree Slope

Currently the California Department of Fish and Game, in conjunction with the California Native Plant Society Plant Communities Committee, has undertaken the task of producing a new classification to supercede Holland (1986). The draft document (Sawyer and Keeler-Wolf 1994) is entitled, *A Manual of California Vegetation: Series-Level Descriptions*. We have worked with the Committee in an attempt to coordinate our efforts so that the two classifications have some compatibility. Information provided in Ferren (1989), "A Preliminary and Partial Classification of Wetlands in Southern and Central California with Emphasis on the Santa Barbara Region," provided a vehicle to discuss some level of coordination. One result of the interest in wetlands was the organization of the information in Holland into a "Preliminary Key to California Wetland Vegetation" (Keeler-Wolf 1992). The coordination also has been useful in that Sawyer and Keeler-Wolf (1994) incorporates some Cowardin terminology and provides keys that separate wetland from upland series. In addition, keys to wetlands are provided that separate: (1) series dominated by herbaceous plants; (2) series dominated by shrubs; and, (3) series dominated by trees. Also present in the description of each series are mention of flooding regimes, water chemistry, habitats, and Cowardin et al. classes. The proposed list of series that contain wetland examples follow:

WETLAND SERIES DOMINATED BY HERBACEOUS PLANTS

Alkali sacaton series
Kentucky bluegrass series
One-sided bluegrass series
Cordgrass series
Ashy ryegrass series
Creeping ryegrass series
Saltgrass series
Sedge series
Spikerush series
Bulrush-cattail series
Bulrush series
Cattail series

Darlingtonia series
Pickleweed series
Duckweed series
Mosquito fern series
Bur-reed series
Pondweed series
Yellow pond-lily series
Ditch-grass series
Quillwort series

WETLAND SERIES DOMINATED BY SHRUBS

Mountain alder series
Sitka alder series

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[Wetland Series Dominated by Shrubs
(cont.)]

Arrow weed series
Buttonbush series
Mexican elderberry series
Mountain heather-bilberry series
Mule fat series
Catclaw series
Mesquite series
Arroyo willow series
Black willow series
Hooker willow series
Narrowleaf willow series
Pacific willow series
Red willow series
Sandbar willow series
Sitka willow series
Mixed willow series
Montane willow series
Subalpine willow series

WETLAND SERIES DOMINATED BY
TREES

[One Dominant Conifer Species]

Alaska yellow-cedar stands
Port Orford-cedar stands
Douglas-fir stands
Engelmann spruce stands
Sitka spruce stands
Mountain hemlock stands
Western hemlock stands
Incense-cedar stands
Redwood series
Beach pine series
Lodgepole pine series

[One Dominant Non-conifer Species]

Aspen series
Black cottonwood series
Fremont cottonwood series
California sycamore series
Hinds walnut series
Oregon white oak series
Valley white oak series
Arroyo willow series
Black willow series
Hooker willow series
Pacific willow series
Red willow series
Sitka willow series
Mixed willow series
Birchleaf mountain
-mahogany series
California bay series

Fan palm series
Coast live oak series
Engelmann oak series
Interior live oak series

[Forests Where More Than One Species
Important]

Engelmann oak series
Black cottonwood series
Fremont cottonwood series
Valley oak series
California walnut series
Santa Lucia fir series
Douglas-fir--tanoak series
Port Oxford-cedar series
Redwood series
Sargent cypress series
Sitka spruce series
Blue palo verde-ironwood-smoke
tree series
Mixed willow series
Enriched stands in the Klamath
Mountains
Mixed subalpine forest series

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This list, taken from the keys, represents the first time there has been an effort to provide a statewide listing of vegetated wetland dominance types or series. The scope of the classification, however, does not include wetlands not dominated by vascular plants; does not provide hierarchical organization above the series; and, other than mention of systems, classes, and some habitat information in the description, does not separate wetland and upland types when they occur in the same series. Throughout the volume there is an uneven application of the water regimes. Nonetheless, Sawyer and Keeler-Wolf (1994) attempts to bridge the gap between the traditional superficial treatment of wetlands in California and the nationwide movement to classify wetlands differently than uplands, such as has been spearheaded by Cowardin et al. (1979).

Other efforts that have contributed toward a better understanding and classification of wetlands in North America and particularly the American West include classifications of: (1) aquatic plant life forms (Schuyler 1984); (2) the "riparian system" (Johnson et al. 1987); (3) California vegetation (Holland and Keil 1989); (4) inland waters of California (Moyle and Ellison 1991); (5) marine and estuarine natural communities of Washington (Dethier 1992); (6) meandering glide and spring streams in Idaho (Rabe et al. 1994); (7) aquatic and semiaquatic wetland natural areas in Idaho and western Montana (Rabe and Chadde 1994); (8) the flora of California (Hickman 1993); and, (9) wetlands of the United States (Wilén and Tiner 1993). To the continuing effort to understand and conserve our wetland resources, and with great appreciation for all those who have worked to provide insights for the documentation effort herein, we offer the following methodology for the classification and description of wetlands of the central and southern California coast and coastal watersheds.

A MODIFIED COWARDIN ET AL. APPROACH

We have modified the Cowardin et al. (1979) approach to classification of wetlands in a number of significant ways:

- (1) elements have been added to the original classification such as new subsystems to the Riverine System and new subclasses to various classes;
- (2) a numerical code has been applied to the modified original classification;
- (3) the original classification has been expanded to include the Cowardin et al. modifiers and others for water regimes and water chemistry, plus a few new categories;
- (4) a classification of hydrogeomorphic units created for this hierarchy has been added to the numerical code; and,

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(5) a classification of substrate, dominance, and/or characteristic types has been created and added to the code.

The result is a hierarchical classification with multiple descriptors (elements) and descriptor states (specific examples) that includes a code generally composed of a 14 digit number, with decimal points and parentheses separating various descriptors, which identifies a particular type of wetland. An explanation of the code follows and is diagrammed in Figure III-1:

"00.000(00.0.000.000)"⁵

"00" = the system and subsystem descriptor	(Table III-1)
00."000" = the class and subclass descriptor	(Table III-1)
00.000("00") = the water regime descriptor	(Table III-2)
00.000.(00."0") = the water chemistry descriptor	(Table III-3)
00.000.(00.0."000") = the hydrogeomorphic descriptor	(Tables III-4 to III-6)
00.000.(00.0.000."0000") = the substrate, dominance, and/or characteristic type descriptor	(Tables III-7, III-8)

The hydrogeomorphic descriptor (.000) includes the "hundreds" level (e.g., .100) categories, "tens" level series (e.g., .110), and the "ones" level units (e.g., 111). Substrate/Dominance/Characteristic types (.0000) include hierarchies for substrates, biotic kingdoms, physiognomy, persistence, families, genera, and species.

Example Wetland Code Number: **41.125(28.3.442.1800, 5241, 5554, 5559)**

"41" = System: **Lacustrine** (40); Subsystem: **Littoral** (41)
41."125" = Class: **Unconsolidated Bottom** (120); Subclass: **Vegetated** (125)
41.125("28") = Water Regime: **Intermittently-Flooded** (28)
41.125(28."3") = Water Chemistry: **Alkali** (3)
41.125(28.3."442") = Hydrogeomorphic Unit: **Montane-Lake-Bed** (442)
41.125(28.3.432."1800, 5241, 5554, 5559") = Substrate and Dominance Types:
Mud (1800), **Heliotropium** (5241), **Chenopodium** (5554), and **Suaeda** (5559)

⁵ [zeros = empty descriptor states]

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Nomenclature for this wetland includes the name of the descriptor states in hierarchical order as presented in the wetland number code, except for types of substrates and dominance or characteristic species that help describe the wetland, which are placed in parentheses following the subclass names. The above example reads as follows:

Lacustrine-Littoral Unconsolidated-Bottom-Vegetated (Mud, Heliotropium, Chenopodium, Suaeda) Alkali Montane-Lake-Bed Wetland

This example is an actual type of lacustrine wetland at Baldwin Lake in the San Bernardino Mountains (see Figs. VIII-9 and VIII-10). If a user of the classification does not have information for each of the descriptors, then an abbreviated version of the classification can be employed. For example, if the lake water chemistry were unknown and the lake-bed either was: (A) not colonized by nonpersistent plants; or, (B) the names of them were unknown; or, (C) the user wanted only to describe the wetland class and its corresponding hydrogeomorphic unit, the classification and nomenclature alternatives would be as follow:

Example A: 41.125(28.0.442.1800)

Lacustrine-Littoral Unconsolidated-Bottom (Mud) Intermittently-Flooded Montane-Lake-Bed Wetland

Example B: 41.125(28.0.442.1800,7200)

Lacustrine-Littoral Unconsolidated-Bottom (Mud, Mixed-Nonpersistent Vascular-Plants) Intermittently-Flooded Montane-Lake-Bed Wetland

Example C: 41.125(28.0.442.0000)

Lacustrine-Littoral Unconsolidated-Bottom Intermittently-Flooded Montane-Lake-Bed Wetland

Refer to Figure III-1 for a diagram of the wetland hierarchy.

How To Use This Classification Methodology

Our original goal was to develop a classification and inventory of the wetland types of the study region. Following the first year's effort, we realized that the great richness of the wetland types would make it difficult to achieve our goal for completeness, which in the end may not be the best way to demonstrate the richness of wetland types in central and southern California. Thus our

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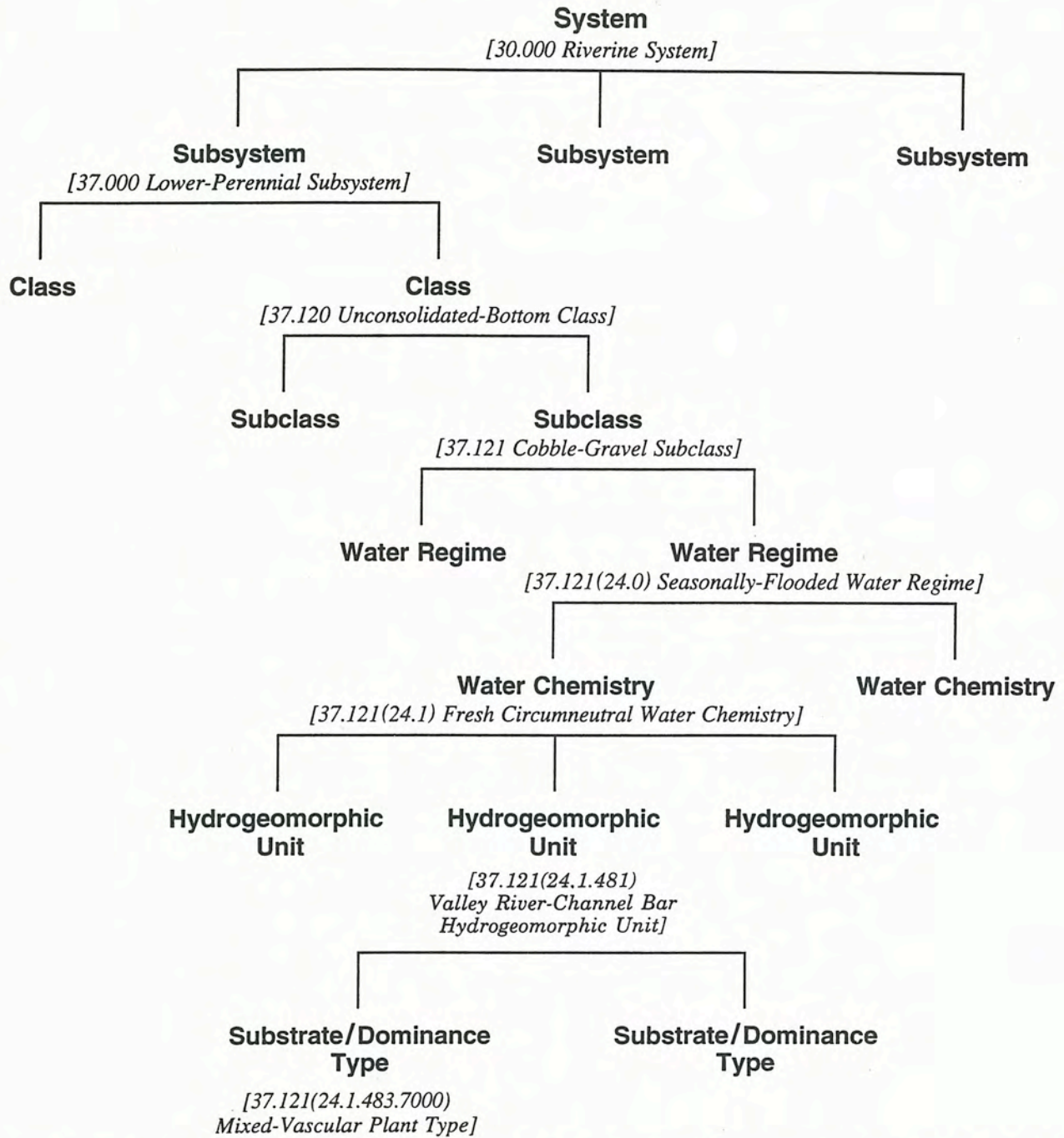


FIGURE III-1. A DIAGRAM OF THE WETLAND CLASSIFICATION HIERARCHY. Selected elements of the sample hierarchy are in bold face and examples are in small italic. The example provided demonstrates a riverine wetland with the corresponding numerical and written elements taken from the riverine system classification (see Section VII). The wetland example is identified as follows: No. 37.121(24.1.483.7000) = Riverine Lower-Perennial Unconsolidated Bottom (Cobble-Gravel) Seasonally-Flooded Valley-River Channel-Bar Wetland.

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product developed into: (1) a methodology on how to classify wetlands; (2) an illustrated catalogue of examples of the types from each subclass and various hydrogeomorphic units within the five systems of wetlands; and, (3) an assessment of the origin, functions, and restoration potential of wetlands in a watershed context (Section X) instead of a system context as described in Sections V-IX.

There are five approaches to the methodology:

(1) *use of Section III, Classification, for review of Cowardin hierarchies (Table III-1), hydrogeomorphic unit hierarchies (Tables III-4 to III-6), and substrate, dominance, and characteristic type hierarchies (Tables III-7 and III-8);*

(2) *use of Section III, Classification, for review of water regimes and water chemistry alternatives (Tables III-2 and III-3), hydrogeomorphic unit hierarchy alternatives (Tables III-4 to III-6), and substrate, dominance, and characteristic type alternatives (Tables III-7 and III-8);*

(3) *use of Section IV, Keys, to determine the system, subsystem, and class to which a particular wetland belongs;*

(4) *use of Sections V through IX, the system sections (Marine, Estuarine, Riverine, Lacustrine, and Palustrine, respectively), to key to classes; to apply the hydrogeomorphic tables to establish the water regimes and their corresponding hydrogeomorphic units; and to select the substrate, dominance, and characteristic types;*

(5) *use of Sections V through IX, the system section, to locate wetland types in the respective chapter catalogues of wetlands and to review illustrated examples to determine if a particular wetland is located in the catalogue or is new to the classification.*

A sixth part of the methodology is the assessment of wetland ecosystem functions and socioeconomic values as related to a watershed, e.g., the Ventura River, in which they occur (see Section X).

Each of the components (tables, keys, catalogue, assessment) can be used individually to achieve a goal or answer a particular question. They also are designed to be combined to provide a methodology for the classification of wetlands and the compilation of a catalogue of the types. The hierarchical nature of the numerical code, classification tables, and catalogue allow the approach to

be open ended. This results in the ability in most cases for a user to add new elements to classification in virtually all levels of the hierarchy. Thus in the tradition of the Cowardin et al. approach, we have designed a classification scheme that can be tailored to the needs of the user, the complexity of the site, and the level of information available at the time the classification is applied.

Rationale for the Classification

To provide a review of the basis for the classification proposed herein, we return to the questions posed in the introduction to this volume. In review, they are: (1) What are the goals of the project or task? (2) What is the ecosystem context and wetland system under scrutiny? (3) At what scale will the classification be applied? (4) What are the class(es) and subclass(es) of wetlands that characterize the site? (5) What are the various hydrogeomorphic and geochemical attributes of the wetland? (6) What are the dominant substrate(s) and/or organism(s) that contribute to the character of the wetland? (7) What are the observed or inferred ecosystem functions and, if discernable, socio-economic values of the wetland or the ecosystem in which the wetland occurs?

Answers to these questions provide some of the basic information needed to identify a particular wetland and to relate it to other wetlands. Below, we provide additional discussion for each question.

1. Goals. If the goal of a project is to map and classify only vegetation, then some form of vegetation nomenclature and classification will be necessary. Such a project might generally ignore all of the non-vegetated wetland habitats. However, if the goal of a project is to identify hydrogeomorphic units and relate them to physical processes, then a more detailed analysis and nomenclature is necessary. Our modified Cowardin et al. approach provides the flexibility to consider various levels of detail to meet the goals of a wide variety of projects and tasks.

2. Ecosystem Context. It is essential for most projects that include classification to determine the context in which occur the particular elements that are to be classified. For the purposes of wetland classification it is important to identify the system of wetlands and deepwater habitats to which a wetland belongs (e.g., Marine, Estuarine, Riverine, Lacustrine, Palustrine) or with which a wetland is associated (e.g., a Palustrine Forested Wetland on a channel bar within the Riverine System). In addition, it may also be important to identify the broader ecosystem context within which smaller wetlands occur (e.g., vernal pools occurring within grassland or chaparral), to assess the various ecosystem functions the wetland may provide.

3. Scale. The scale of a site under consideration and the detail of the classification are important factors to communicate so that it is clear what has been identified or mapped, and what the wetland relationship is to the ecosystem context as well as the goals of a project. Using our modified Cowardin et al. approach regarding spacial scale, it is possible to identify both the coarser-scale hydrogeomorphic context (e.g., type of natural lacustrine environment such as a Montane-Alkali-Lake) and the finer-scale hydrogeomorphic unit (e.g., an intermittently-flooded, unconsolidated shore), as well as the wetland associated with the latter (e.g., Emergent Nonpersistent Wetland). In general, the finer the scale, the less variable the site and easier it is to classify and name the wetland (e.g., a riparian corridor may be mapped as forested wetland at a coarser-scale and yet perhaps contain four different types of forested wetland at a finer-scale, each characterized by a different water regime, hydrogeomorphic unit, dominance type, and ecosystem functions). There is a degree of fineness, however, that no longer reflects a wetland type, but reflects instead, the individual organisms or substrate types of a larger-scale wetland type. It is the best professional judgement of the classifier that is generally the source of this decision, and thus the more field experience one has the more accurate the decision becomes to split or lump hydrogeomorphic units or sites.

Temporal scale is another issue that can cause confusion, particularly in the Mediterranean climatic portions of the study region. Many wetlands types are flooded during part of the year and desiccated during another (e.g., vernal pools, vernal ponds, vernal lakes; margins of stream and rivers), or are only intermittently flooded (e.g., playa lakes, some streams). Because a site may be characterized by different flooding regimes and dominance types during different times of the year, a single wetland site could be classified differently depending on the time of year, which year, project purpose, or the person doing the classifying. Such also is the case for sites that receive periodic disturbance (e.g., streambeds, floodplains, and deltas), whereby one site characterized by wetlands from a particular system, class, or subclass could be converted to wetlands of another system, class, or subclass. Such conversion is a natural and characteristic process for the study region; thus temporal scale like spatial scale is important in classification and adds to the diversity and complexity of wetland types.

4. Classes and Subclasses. Because many wetland sites (e.g., river channels, lake shores, and marine beaches) can be characterized by episodes of natural or artificial disturbance, they may support a mosaic of components from different abiotic classes (e.g., unconsolidated shore) and biotic classes (e.g., emergent, scrub-shrub, and forested wetlands). It is important, therefore to have some metric by which to assess dominance, and to attribute a site or portions of a site to one or more classes and subclasses (e.g., cobble-gravel, emergent-persistent, broadleaved-deciduous) of wetland.

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Some sites or wetland types are problematic (e.g., how should one classify tenajas from the Santa Rosa Plateau?) or appear to be "hybrids" (e.g., the Tijuana Estuary has characteristics of river-mouth and bay types of estuaries); thus classification of the associated wetlands, including attribution of class and subclass, and a choice of scale or type of ecosystem context, also can be difficult to decide. However, by having a predetermined goal *and* some sense of appropriate scale and detail of classification needed, one can reduce the number of problems encountered in the classification process.

5. Physical Attributes. Differentiation among wetland types often is dependent upon knowledge of ecosystem processes reflected in the hydrogeomorphology and geochemistry of the ecosystem or wetland site. Differentiation of water regimes (e.g., intertidal, permanently flooded, seasonally flooded, and saturated) and chemistry regimes (e.g., alkali, hyperhaline, and euryhaline) can be important in distinguishing among related (e.g., proximally or structurally) but functionally different wetlands. Although identification of physical attributes may require some expertise, many clues (e.g., salt crusts, rack from flooding, dried algal mats, mottled soil, etc.) can be found in the field that reveal the physical characteristics of wetlands.

6. Dominant Substrates and Organisms. Descriptive terminology for wetlands often includes types of substrate (e.g., unconsolidated bottom, mud) and type of organism(s) (e.g., algae, mosses, vascular plants) or particular organisms (e.g., *Salicornia virginica* [Pickleweed]) that dominate or characterize the site or wetland. Some knowledge of substrates and organisms is essential for classification, and the level of detail in classification will depend on the specificity of the identifications. However, our modified Cowardin et al. approach allows for both generality (e.g., Class Forested Wetland) and specificity (e.g., Subclass Broadleaved Deciduous, Dominance Type *Alnus rhombifolia* [White Alder]). Animals as well as plants can be important components in the classification process, as exemplified by estuarine intertidal mud flats (Class Unconsolidated Bottom, Subclass Mud) that are dominated by hornsnails (*Cerithidea californica*).

7. Ecosystem Functions and Socioeconomic Values. One important goal in the classification of wetlands is to differentiate wetland types that perform different ecosystem functions (e.g., hydrology) or groupings of functions (e.g., food chain support, habitat, and hydrology/water-quality). Socio-economic values are an important attribute that many wetlands have, but the value to humans (e.g., Nonconsumptive - Recreation) generally does not directly affect the classification process. However, indirectly, human land use practices can greatly affect wetlands by transforming them from one class (e.g., Forested Wetland) to another (e.g., Emergent Wetland) as a result of deforestation, flood control, and other activities. Thus some knowledge of ecosystem functions and

socio-economic values is important for understanding the interface between wetland classification and the assessment of ecosystem functions and socioeconomic values, both at site-specific and ecosystem levels. Although we do not include coding or nomenclature for ecosystem functions directly in our modified Cowardin et al. approach, such information can be included with the description of wetland types, and can be used in the rationale for separating types that otherwise are similar in classification but significantly different in ecosystem function.

The wetland classification methodology presented herein is designed to accommodate differences among classification goals, scope, and degree of detail, depending on the immediate project needs or background of the classifier. We hope the flexibility to "lump up" or "split down" in the classification will meet the needs of many users; however, we also recognize that this "fluidity" may tend to exasperate others who may want fewer choices and more rigid application.

The Classification Tables

The remaining portion of this section is devoted to the presentation of eight tables of hierarchical information that are to be used during the classification of a wetland and in conjunction with the keys in Sections IV and V through IX, and the combined water regime and hydrogeomorphic unit tables presented in each wetland system section (Sections V through IX). We provide below an overview of these tables before they are presented.

TABLE III-1. SYSTEMS, SUBSYSTEMS, CLASSES, AND SUBCLASSES OF WETLANDS AND DEEPWATER HABITATS. This table provides a numerical, hierarchical listing of a modified version of the Cowardin et al. classification, with the addition of some units of classification such as several new riverine subsystems, and various new subclasses.

TABLE III-2. WATER REGIMES: WETLANDS AND DEEPWATER HABITATS. This table provides a numerical, hierarchical listing of water regimes, modified from Cowardin et al., which are ranked by tidal water-regimes and nontidal water-regimes and from which a type would be selected for the classification.

TABLE III-3. WATER/SOIL CHEMISTRY: WETLANDS AND DEEPWATER HABITATS. This table provides a numerical listing of nine alternatives for water chemistry from which a type would be selected for the classification.

TABLE III-4. HYDROGEOMORPHIC UNITS (HIGH-ORDER LEVELS): Marine, Estuarine, Riverine, Lacustrine, Palustrine Wetlands. This table provides an overview of the high-order levels or categories (hundred-level series) of the hydrogeomorphic (HGM) units for all wetland systems of the study region. Specific HGM units for the combined marine and estuarine systems and the combined riverine, lacustrine, and palustrine systems are presented in Tables III-5 and III-6, respectively.

TABLE III-5. HYDROGEOMORPHIC UNITS: Marine and Estuarine Systems. This table provides a numerical, hierarchical listing of the various hydrogeomorphic (HGM) units determined by the authors to be characteristic of wetlands in the study region that are flooded by tidal water containing ocean-derived salts. Refer to the HGM classification tables specific to marine wetlands (Section V) and Estuarine Wetlands (Section VI) for a determination of which HGM units occur potentially in which water regimes of each system.

TABLE III-6. HYDROGEOMORPHIC UNITS: Riverine, Lacustrine, and Palustrine Systems. This table provides a numerical, hierarchical listing of the various hydrogeomorphic (HGM) units determined by the authors to be characteristic of wetlands in the study region that are not flooded by tidal water containing ocean-derived salts. Refer to the HGM classification tables specific to riverine wetlands (Section VII), lacustrine wetlands (Section VIII), and palustrine wetlands (Section IX) for a determination of which HGM units occur potentially in which water regimes of each system.

TABLE III-7. SUBSTRATE/DOMINANCE/CHARACTERISTIC TYPES: Marine and Estuarine Systems. This table provides a numerical, hierarchical listing of major substrate categories and dominant or characteristic species of marine and estuarine wetlands (i.e., tidal-flooding with water containing ocean-derived salts). This table is not repeated in the marine or estuarine chapters, but serves as the source of information when compiling a wetland numerical code and name. Most categories or types are either open-ended or contain open numbers for additions.

TABLE III-8. SUBSTRATE/DOMINANCE/CHARACTERISTIC TYPES: Riverine, Lacustrine, Palustrine. This table provides a numerical, hierarchical listing of major substrate categories and dominant or characteristic species of riverine, lacustrine, and palustrine wetlands (i.e., wetlands not flooded with tidal water containing ocean-derived salts). This table is not repeated in the riverine, lacustrine, or palustrine chapters, but serves as the source of information when compiling a wetland numerical code. Most

categories or types are either open-ended or contain open numbers for additions.

Classification Summary

This modified Cowardin et al. classification methodology provides a vehicle to prepare a numerical code and to name all wetlands along the central and southern California coastal and in the adjacent coastal watersheds from the Carmel River in Monterey County to the Tijuana River in San Diego County. Use of keys and classification tables contained in Sections III and IV and in the system Sections V through IX is intended to result in the development of a code (wetland type number) and wetland name that include information on: (1) the system, subsystem, class and subclass; (2) the water regime and water chemistry; (3) the hydrogeomorphic unit; and (4) the substrate, dominance, or characteristic type of the wetland in question. Many wetland types are listed in a catalogue presented in each system chapter and are provided both as a partial inventory of the wetland types with examples and as a guide to assist with the classification methodology. The classification tables for Chapter III are presented below.

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TABLE III-1. SYSTEMS, SUBSYSTEMS, CLASSES, AND SUBCLASSES OF WETLANDS AND DEEPWATER HABITATS. Nomenclature adopted or modified from Cowardin et al. (1979). Asterisk (*) indicates new subsystem, class, or subclass added to Cowardin et al. 1979.

I. THE SYSTEMS AND SUBSYSTEMS

- 10.000 System Marine
 - 11.000 Subsystem Intertidal (Wetlands)
 - 12.000 Subsystem Subtidal (Deepwater Habitats)
- 20.000 System Estuarine
 - 21.000 Subsystem Intertidal (Wetlands)
 - 22.000 Subsystem Subtidal (Deepwater Habitats)
- 30.000 System Riverine
 - 31.000 Subsystem Tidal (Wetlands)
 - 32.000 Subsystem Upper Intermittent (Wetlands)*
 - 33.000 Subsystem Mid Intermittent (Wetlands)*
 - 34.000 Subsystem Lower Intermittent (Wetlands)*
 - 35.000 Subsystem Upper Perennial (Wetlands)
 - 36.000 Subsystem Mid Perennial (Wetlands)*
 - 37.000 Subsystem Lower Perennial (Wetlands)
 - 38.000 Subsystem Limnetic (Deepwater Habitats)
- 40.000 System Lacustrine
 - 41.000 Subsystem Littoral (Wetlands)
 - 42.000 Subsystem Limnetic (Deepwater Habitats)
- 50.000 System Palustrine
 - 50.000 There are no subsystems; all habitats are wetlands.

II. THE WETLAND CLASSES AND SUBCLASSES

00.100 Abiotic Classes and Subclasses

- 00.110 Class Rock Bottom
 - 00.111 Subclass Bedrock
 - 00.112 Subclass Rubble/Boulder
- 00.120 Class Unconsolidated Bottom
 - 00.121 Subclass Cobble-Gravel
 - 00.122 Subclass Sand
 - 00.123 Subclass Mud
 - 00.124 Subclass Organic
 - 00.125 Subclass Vegetated

- 00.130 Class Streambed
 - 00.131 Subclass Bedrock
 - 00.132 Subclass Rubble/Boulder
 - 00.133 Subclass Cobble-Gravel
 - 00.134 Subclass Sand
 - 00.135 Subclass Mud
 - 00.136 Subclass Organic
 - 00.137 Subclass Vegetated Streambeds

- 00.140 Class Rocky Shore
 - 00.141 Subclass Bedrock
 - 00.142 Subclass Rubble/Boulder

- 00.150 Class Unconsolidated Shore
 - 00.151 Subclass Cobble-Gravel
 - 00.152 Subclass Sand
 - 00.153 Subclass Mud
 - 00.154 Subclass Organic
 - 00.155 Subclass Vegetated

00.200 Biotic Classes and Subclasses

- 00.210 Class Aquatic Bed
 - 00.211 Subclass Attached Algal*
 - 00.212 Subclass Floating Algal*
 - 00.213 Subclass Aquatic Moss
 - 00.214 Subclass Rooted Vascular
 - 00.215 Subclass Floating Vascular

- 00.220 Class Reef
 - 00.221 Subclass Coral
 - 00.222 Subclass Mollusk
 - 00.223 Subclass Worm

- 00.230 Class Moss-Lichen Wetland
 - 00.231 Subclass Moss
 - 00.232 Subclass Lichen

- 00.240 Class Emergent Wetland
 - 00.241 Subclass Persistent
 - 00.242 Subclass Nonpersistent

- 00.250 Class Scrub-Shrub Wetland
 - 00.251 Subclass Broadleaved Deciduous
 - 00.252 Subclass Needleleaved Deciduous
 - 00.253 Subclass Broadleaved Evergreen
 - 00.254 Subclass Needleleaved Evergreen
 - 00.255 Subclass Mixed Deciduous*
 - 00.256 Subclass Mixed Evergreen*
 - 00.257 Subclass Mixed Deciduous and Evergreen*
 - 00.258 Subclass Dead

- 00.260 Class Woodland and Forested Wetland
 - 00.261 Subclass Broadleaved Deciduous
 - 00.262 Subclass Needleleaved Deciduous
 - 00.263 Subclass Broadleaved Evergreen
 - 00.264 Subclass Needleleaved Evergreen
 - 00.265 Subclass Mixed Deciduous*
 - 00.266 Subclass Mixed Evergreen*
 - 00.267 Subclass Mixed Deciduous and Evergreen*
 - 00.268 Subclass Dead
-
-

TABLE III-2. WATER REGIMES: WETLANDS AND DEEPWATER HABITATS.

Nomenclature adopted or modified from Cowardin et al. (1979). See Glossary for definition of water regimes. Asterisk (*) indicates new water regime added to Cowardin et al. 1979.

(10.0) Tidal Water-Regimes

- (11.0) Subtidal Regime
- (12.0) Irregularly-Exposed Regime
- (13.0) Regularly-Flooded Regime
- (14.0) Irregularly-Flooded Regime
- (15.0) Seasonally-Exposed Regime*
- (16.0) Seasonally-Flooded Regime*

(20.0) Nontidal Water-Regimes

- (21.0) Permanently-Flooded Regime
 - (22.0) Intermittently-Exposed Regime
 - (23.0) Semipermanently-Flooded Regime
 - (24.0) Seasonally-Flooded Regime
 - (25.0) Permanently-Saturated Regime*
 - (26.0) Seasonally-Saturated Regime*
 - (27.0) Temporarily-Flooded Regime
 - (28.0) Intermittently-Flooded Regime
 - (29.0) Phreatophytic Regime*
-

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TABLE III- 3. WATER/SOIL CHEMISTRY: WETLANDS AND DEEPWATER HABITATS.
See Glossary for definition of water/soil chemistry.

- (00.1.000) Fresh Water (Circumneutral)
 - (00.2.000) Fresh Water (Acidic)
 - (00.3.000) Fresh Water (Alkaline)
 - (00.4.000) Saline, Haline
 - (00.5.000) Brackish (Mixosaline, Mixohaline)
 - (00.6.000) Eurysaline, Euryhaline
 - (00.7.000) Hypersaline, Hyperhaline
 - (00.8.000) Sulfur-Affected
 - (00.9.000) Petroleum-Affected
-

TABLE III- 4. HYDROGEOMORPHIC UNITS: MARINE, ESTUARINE, RIVERINE, LACUSTRINE, AND PALUSTRINE WETLANDS. High-order categories (hundred-level series) of hydrogeomorphic units for all wetland systems of the central and southern California coast and coastal watersheds. See Glossary for definition of hydrogeomorphic units.

- (00.0.100.000) Water Bodies (Hydrogeomorphic Context)
 - (00.0.200.000) Channels, Fissures, Drainages, Inverts, Falls
 - (00.0.300.000) Shores, Beaches, Banks, Benches, Margins
 - (00.0.400.000) Beds, Bottoms, Bars, Reefs
 - (00.0.500.000) Flats, Plains, Deltas, Washes, Floodplains, Terraces
 - (00.0.600.000) Headlands, Bluffs, Slopes, Fans
 - (00.0.700.000) Seeps, Springs
 - (00.0.800.000) Pools, Ponds, Lakes, Meadows, Marshes, Swales
 - (00.0.900.000) Artificial Structures
-

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TABLE III-5. **HYDROGEOMORPHIC UNITS: MARINE AND ESTUARINE SYSTEMS**

("00") = Water Regime
(00."0") = Water Chemistry
(00.0."000") = Hydrogeomorphic Unit
(00.0.000."0000") = Substrate/Dominance/Characteristic Types

(00.0.100.0000) Water Bodies (Hydrogeomorphic Context)

- (00.0.110.0000) Oceans
- (00.0.120.0000) Exposed Bays
 - (00.0.120) Large Exposed Bays
 - (00.0.122) Small Exposed Bays
- (00.0.130.0000) Estuaries
 - (00.0.131) Bay-Estuaries
 - (00.0.132) Lagoonal Estuaries
 - (00.0.133) River-Mouth Estuaries
 - (00.0.134) Canyon-Mouth Estuaries
 - (00.0.135) Structural-Basin Estuaries
 - (00.0.136) Dune-Stream Estuaries
 - (00.0.137) Agricultural Drainage Mouths
 - (00.0.138) Urban Drainage Mouths
- (00.0.140.0000) Coves
 - (00.0.141) Coves
- (00.0.150.0000) Lagoons
 - (00.0.151) Lagoons
- (00.0.160.0000) Harbors/Ports
 - (00.0.161) Large Harbors/Ports
 - (00.0.162) Small Harbors/Ports
- (00.0.170.0000) Tidal Ponds
 - (00.0.171) Tidal Dune-Swale Ponds
 - (00.0.172) Tidal Marsh Ponds
- (00.0.180.0000) Tide Pools
 - (00.0.181) Large Tide Pools
 - (00.0.182) Small Tide Pools

(00.0.200.0000) Channels, Fissures, Caves

- (00.0.210.0000) Surge Channels
 - (00.0.210 Large) (Wide/Long) Surge Channels
 - (00.0.220 Small) (Narrow/Short) Surge Channels
- (00.0.220.0000) Estuarine Channels
 - (00.0.221) Deep (Subtidal) Natural Estuarine Channels

- (00.0.222) Shallow (Intertidal) Natural Estuarine Channels
- (00.0.223) Deep (Subtidal) Artificial Estuarine Channels
- (00.0.224) Shallow (Intertidal) Artificial Estuarine Channels

- (00.0.230.0000) Tidal-River Channels
 - (00.0.231) Deep (Subtidal) Main-Stem River Channels
 - (00.0.232) Shallow (Intertidal) Main-Stem River Channels
 - (00.0.233) Deep (Subtidal) Distributary River Channels
 - (00.0.234) Shallow (Intertidal) Distributary River Channels

- (00.0.240.0000) Tidal-Stream Channels
 - (00.0.241) Deep (Subtidal) Canyon-Stream Channels
 - (00.0.242) Shallow (Intertidal) Canyon-Stream Channels
 - (00.0.243) Deep (Subtidal) Dune-Stream Channels
 - (00.0.244) Shallow (Intertidal) Dune-Stream Channels

- (00.0.250.0000) Tidal-Marsh Channels
 - (00.0.251) Deep (Subtidal), Large, Tidal-Marsh Channels
 - (00.0.252) Shallow (Intertidal), Large, Tidal-Marsh Channels
 - (00.0.253) Deep (Subtidal), Intermediate, Tidal-Marsh Channels
 - (00.0.254) Shallow (Intertidal), Intermediate, Tidal-Marsh Channels
 - (00.0.255) Deep (Subtidal), Small, Tidal-Marsh Channels
 - (00.0.256) Shallow (Intertidal), Small, Tidal-Marsh Channels

- (00.0.260.0000) Fissures
 - (00.0.261) Large (Wide/Long) Fissures
 - (00.0.262) Small (Narrow/Short) Fissures

- (00.0.270.0000) Sea Caves
 - (00.0.271) Large Sea Caves
 - (00.0.272) Small Sea Caves

- (00.0.280.0000) Culverts
 - (00.0.281) Large (Wide/Long) Culverts
 - (00.0.282) Small (Narrow/Short) Culverts

- (00.0.290.0000) Tidal Ditches
 - (00.0.291) Deep (Subtidal) Large Tidal-Ditches
 - (00.0.292) Shallow (Intertidal) Large Tidal-Ditches
 - (00.0.293) Deep (Subtidal) Intermediate Tidal-Ditches
 - (00.0.294) Shallow (Intertidal) Intermediate Tidal-Ditches
 - (00.0.295) Deep (Subtidal) Small Tidal-Ditches
 - (00.0.296) Shallow (Intertidal) Small Tidal-Ditches

- (00.0.300.0000) Shores, Beaches, Banks, Benches**

- (00.0.310.0000) Shores
 - (00.0.311) Ocean Shores
 - (00.0.312) Exposed Bay Shores
 - (00.0.313) Estuary Shores
 - (00.0.314) Cove Shores

- (00.0.315) Lagoon Shores
- (00.0.316) Harbor Shores

- (00.0.320.0000) Beaches
 - (00.0.321) Ocean Beaches
 - (00.0.322) Exposed Bay Beaches
 - (00.0.323) Estuary Beaches
 - (00.0.324) Cove Beaches
 - (00.0.325) Lagoon Beaches
 - (00.0.326) Harbor Beaches

- (00.0.330.0000) Banks
 - (00.0.331) Estuary Banks

- (00.0.340.0000) Benches
 - (00.0.341) Ocean Benches
 - (00.0.342) Exposed Bay Benches
 - (00.0.343) Estuary Benches
 - (00.0.344) Cove Benches
 - (00.0.345) Lagoon Benches
 - (00.0.346) Harbor Benches

- (00.0.350.0000) Terraces
 - (00.0.351) Estuary Terraces

- (00.0.360.0000) Ledges/Ridges
 - (00.0.361) Ledges
 - (00.0.362) Hogback Ridges

- (00.0.400.0000) Bottoms, Beds, Bars, Reefs, Sea Stacks, Islets**

- (00.0.410.0000) Beds/Bottoms/Floors
 - (00.0.411) Deep (Subtidal) Beds/Bottoms/Floors
 - (00.0.412) Shallow (Intertidal) Beds/Bottoms/Floors

- (00.0.420.0000) Bars
 - (00.0.421) Deep (Subtidal) Bars
 - (00.0.422) Shallow (Intertidal) Bars

- (00.0.430.0000) Reefs
 - (00.0.431) Large Reefs
 - (00.0.432) Small Reefs

- (00.0.440.0000) Sea Stacks
 - (00.0.441) Large Sea-Stacks
 - (00.0.442) Small Sea-Stacks

- (00.0.450.0000) Islets
 - (00.0.451) Large Islets
 - (00.0.452) Small Islets

(00.0.500.0000) Flats, Deltas

- (00.0.510.0000) Flats
 - (00.0.511) Mineral (Mud, Sand) Flats
 - (00.0.512) Precipitate (Salt) Flats, Pannes
 - (00.0.513) Vegetated-Algal Flats
 - (00.0.514) Vegetated-Plant Flats

- (00.0.520.0000) Deltas
 - (00.0.521) Deltas

(00.0.600.0000) Headlands, Bluffs, Slopes

- (00.0.610.0000) Headlands
 - (00.0.611) Large Headlands
 - (00.0.612) Small Headlands

- (00.0.620.0000) Cliffs/Bluffs
 - (00.0.621) Cliffs/Bluffs

- (00.0.630.0000) Slopes
 - (00.0.631) Ocean Slopes
 - (00.0.632) Exposed Bay Slopes
 - (00.0.633) Estuary Slopes
 - (00.0.634) Cove Slopes
 - (00.0.635) Lagoon Slopes
 - (00.0.636) Harbor Slopes

(00.0.700.0000) Seeps, Springs

- (00.0.710.0000) Seeps
 - (00.0.711) Seeps

- (00.0.720.0000) Springs
 - (00.0.712) Springs

(00.0.800.0000) Marshes

- (00.0.810.0000) Salt Marshes
 - (00.0.811) Low-Intertidal Salt Marshes
 - (00.0.812) Middle-Intertidal Salt Marshes
 - (00.0.813) High-Intertidal Salt Marshes
- (00.0.820.0000) Brackish Marshes
 - (00.0.821) Low-Intertidal Brackish Marshes
 - (00.0.822) Middle-Intertidal Brackish Marshes
 - (00.0.823) High-Intertidal Brackish Marshes

- (00.0.830.0000) Fringe Marshes
 - (00.0.831) Low-Intertidal Fringe Marshes
 - (00.0.832) Middle-Intertidal Fringe Marshes
 - (00.0.833) High-Intertidal Fringe Marshes

CLASSIFICATION

Table III-5 (Continued)

- (00.0.840.0000) Diked Marshes
 - (00.0.841) Low-Intertidal Fringe Marshes
 - (00.0.842) Middle-Intertidal Diked Marshes
 - (00.0.843) High-Intertidal Diked Marshes

(00.0.900.0000) Artificial Structures

- (00.0.910.0000) Stationary Artificial Structures
 - (00.0.911) Jetties/Breakwaters
 - (00.0.912) Sea Walls/Revetment
 - (00.0.913) Dams/Levees
 - (00.0.914) Earthen Berms/Dikes
 - (00.0.915) Dredge Spoils
 - (00.0.916) Pilings/Piers
 - (00.0.917) Oil Platforms
 - (00.0.918) Boat Ramps
 - (00.0.919) Wreckage

- (00.0.920.0000) Floating Artificial Structures
 - (00.0.921) Hulls
 - (00.0.922) Docks
 - (00.0.923) Buoys
 - (00.0.924) Logs
-

CLASSIFICATION

TABLE III-6. HYDROGEOMORPHIC UNITS: RIVERINE, LACUSTRINE, AND PALUSTRINE SYSTEM.

("00") = Water Regime
(00."0") = Water Chemistry
(00.0."000") = Hydrogeomorphic Unit
(00.0.000."0000") = Substrate/Dominance/Characteristic Types

(00.0.100.0000) Water Bodies (Hydrogeomorphic Context)

- (00.0.110.0000) Pools
 - (00.0.111) Vernal Pools
 - (00.0.112) Tenajas
 - (00.0.113) Main Channel Pools
 - (00.0.114) Scour Pools
 - (00.0.115) Backwater Pools
- (00.0.120.0000) Riffles
 - (00.0.121) Riffles
 - (00.0.122) Rapids
 - (00.0.123) Cascades
 - (00.0.124) Runs
 - (00.0.125) Falls
- (00.0.130.0000) Springs
 - (00.0.131) Cold Springs
 - (00.0.132) Hot Springs
- (00.0.140.0000) Palustrine Ponds, Lakes, Reservoirs
 - (00.0.141) Dune Ponds (and "Lakes")
 - (00.0.142) Coastal Ponds
 - (00.0.143) Fault Sag Ponds
 - (00.0.144) Glacial Ponds (and "Lakes")
 - (00.0.145) Vernal Ponds
 - (00.0.146) Palustrine Vernal Lakes
 - (00.0.147) Agricultural Ponds, Reservoirs
 - (00.0.148) Recreational Ponds, Reservoirs
 - (00.0.149) Diked Estuarine Basins/Lagoons
- (00.0.150.0000) Lacustrine Lakes, Reservoirs
 - (00.0.151) Montane Freshwater Lakes
 - (00.0.152) Montane Alkali Lakes
 - (00.0.153) Playa Lakes
 - (00.0.154) Montane Reservoirs
 - (00.0.155) River-Valley Reservoirs
 - (00.0.156) Canyon Reservoirs
- (00.0.160.0000) Streams
 - (00.0.161) Montane Streams

- (00.0.162) Foothill/Terrace Streams
- (00.0.163) Valley Streams
- (00.0.164) Coastal-Plain Streams
- (00.0.165) Canyon Streams

- (00.0.170.0000) Rivers
 - (00.0.171) Montane Rivers
 - (00.0.172) Foothill Rivers
 - (00.0.173) Valley Rivers
 - (00.0.174) Coastal-Plain Rivers
 - (00.0.175) Canyon Rivers

- (00.0.180.0000) Drainages
 - (00.0.181) Montane Drainages
 - (00.0.182) Coastal Canyon Drainages

(00.0.200.0000) Channels, Drainages, Inverts, Falls

- (00.0.210.0000) Stream Channels
 - (00.0.211) Montane/Plateau Stream Channels
 - (00.0.212) Foothill/Terrace Stream Channels
 - (00.0.213) Valley Stream Channels
 - (00.0.214) Coastal Plain Stream Channels
 - (00.0.215) Distributary Channels
 - (00.0.216) Canyon Stream Channels

- (00.0.220.0000) River Channels
 - (00.0.221) Montane River Channels
 - (00.0.222) Foothill River Channels
 - (00.0.223) Valley River Channels
 - (00.0.224) Coastal Plain River Channels
 - (00.0.225) Distributary Channels
 - (00.0.226) Canyon River Channels

- (00.0.230.0000) Backbar Channels
 - (00.0.231) Stream Backbar Channels
 - (00.0.232) River Backbar Channels

- (00.0.240.0000) Drainage Channels
 - (00.0.241) Vernal Drainage Channels
 - (00.0.242) Montane Drainage Channels

- (00.0.250.0000) Inverts
 - (00.0.251) Montane Drainage Inverts

- (00.0.260.0000) Falls
 - (00.0.261) Montane Stream Falls
 - (00.0.262) Foothill Stream Falls
 - (00.0.263) Montane River Falls
 - (00.0.264) Foothill River Falls

(00.0.270.0000) Lacustrine Channels

(00.0.280.0000) Artificial Ditches

(00.0.300.0000) Shores, Beaches, Banks, Margins

(00.0.310.0000) Palustrine Pond Shores

(00.0.311) Dune Pond Shores

(00.0.312) Coastal Pond Shores

(00.0.313) Fault Sag Pond Shores

(00.0.314) Glacial Pond ("Lake") Shores

(00.0.315) Vernal Pond Shores

(00.0.316) Agricultural Pond Shores

(00.0.317) Recreational Pond Shores

(00.0.320.0000) Palustrine Lake/Reservoir Shores

(00.0.321) Vernal Palustrine-Lake Shores

(00.0.322) Agricultural Palustrine-Lake Shores

(00.0.323) Recreational Palustrine-Lake Shores

(00.0.330.0000) Lacustrine Lake/Reservoir Shores

(00.0.331) Montane Freshwater Lacustrine-Lake Shores

(00.0.332) Montane Alkali Lacustrine-Lake Shores

(00.0.333) Playa Lacustrine-Lake Shores

(00.0.334) Montane Reservoir Shores

(00.0.335) River-Valley Reservoir Shores

(00.0.336) Canyon Reservoir Shores

(00.0.340.0000) Stream-Shores

(00.0.341) Montane Stream-Shores

(00.0.342) Foothill/Terrace Stream-Shores

(00.0.343) Valley Stream-Shores

(00.0.344) Coastal-Plain Stream-Shores

(00.0.345) Canyon Stream-Shores

(00.0.350.0000) River-Shores

(00.0.351) Montane River-Shores

(00.0.352) Foothill River-Shores

(00.0.353) Valley River-Shores

(00.0.354) Coastal-Plain River-Shores

(00.0.355) Canyon Rivers-Shores

(00.0.360.0000) Beaches

(00.0.361) River Beaches

(00.0.362) Lake Beaches

(00.0.370.0000) Stream-Banks

(00.0.371) Montane Stream-Banks

(00.0.372) Foothill/Terrace Stream-Banks

(00.0.373) Valley Stream-Banks

(00.0.374) Coastal-Plain Stream-Banks
(00.0.375) Canyon Stream-Banks

(00.0.380.0000) River Banks
(00.0.381) Montane River-Banks
(00.0.382) Foothill River-Banks
(00.0.383) Valley River-Banks
(00.0.384) Coastal-Plain River-Banks
(00.0.385) Canyon River-Banks

(00.0.390.0000) Margins
(00.0.391) Stream Margins
(00.0.392) River Margins
(00.0.393) Estuary Margins
(00.0.394) Pool Margins
(00.0.395) Pond Margins
(00.0.396) Swale Margins
(00.0.397) Lake Margins
(00.0.398) Seep, Spring Margins
(00.0.399) Meadow, Marsh Margins

(00.0.400.0000) Beds, Bottoms, Bars

(00.0.410.0000) Pool Beds/Bottoms
(00.0.411) Vernal Pool Beds/Bottoms
(00.0.412) Tenaja Beds/Bottoms
(00.0.413) Main-Channel Pool Bottoms
(00.0.414) Scour Pool Bottoms
(00.0.415) Backwater Pool Bottoms

(00.0.420.0000) Palustrine Pond Beds/Bottoms
(00.0.421) Dune Pond (and "Lake") Beds/Bottoms
(00.0.422) Coastal Pond Beds/Bottoms
(00.0.423) Fault Sag Pond Beds/Bottoms
(00.0.424) Glacial Pond (and "Lake") Beds/Bottoms
(00.0.425) Vernal Pond Beds/Bottoms
(00.0.426) Agricultural Pond/Reservoir Beds/Bottoms
(00.0.427) Recreational Pond/Reservoir Beds/Bottoms

(00.0.430.0000) Palustrine Lake Beds/Bottoms
(00.0.431) Palustrine Vernal Lake Beds/Bottoms
(00.0.432) Palustrine Perennial Lake Beds/Bottoms
(00.0.433) Palustrine Agricultural Lake Beds/Bottoms
(00.0.434) Palustrine Recreational Lake/Reservoir Beds/Bottoms

(00.0.440.0000) Lacustrine Lake/Reservoir Beds/Bottoms
(00.0.441) Montane Freshwater Lake Beds/Bottoms
(00.0.442) Montane Alkali Lake Beds/Bottoms
(00.0.443) Playa Lake Beds/Bottoms
(00.0.444) Montane Reservoir Beds/Bottoms

- (00.0.445) River-Valley Reservoir Beds/Bottoms
- (00.0.446) Canyon Reservoir Beds/Bottoms

- (00.0.450.0000) Stream Beds/Bottoms
 - (00.0.451) Montane Streambeds
 - (00.0.452) Foothill/Terrace Streambeds
 - (00.0.453) Valley Streambeds
 - (00.0.454) Coastal Plain Streambeds
 - (00.0.455) Canyon Streambeds

- (00.0.460.0000) River Beds/Bottoms
 - (00.0.461) Montane Riverbeds
 - (00.0.462) Foothill Riverbeds
 - (00.0.463) Valley Riverbeds
 - (00.0.464) Coastal-Plain Riverbeds
 - (00.0.465) Canyon Riverbeds

- (00.0.470.0000) Stream-Channel Bars
 - (00.0.471) Montane Stream-Channel Bars
 - (00.0.472) Foothill/Terrace Stream-Channel Bars
 - (00.0.473) Valley Stream-Channel Bars
 - (00.0.474) Coastal-Plain Stream-Channel Bars
 - (00.0.475) Canyon Stream-Channel Bar

- (00.0.480.0000) River-Channel Bars
 - (00.0.481) Montane River-Channel Bars
 - (00.0.482) Foothill River-Channel Bars
 - (00.0.483) Valley River-Channel Bars
 - (00.0.484) Coastal-Plain River-Channel Bars
 - (00.0.485) Canyon River-Channel Bars

- (00.0.490.0000) Lake Bars

- (00.0.500.0000) Flats, Plains, Washes, Bottomlands, Terraces**

- (00.0.510.0000) Flats
 - (00.0.511) Vernal Flats

- (00.0.520.0000) Plains
 - (00.0.521) Coastal Plains
 - (00.0.522) Montane-Valley Vernal Plains
 - (00.0.523) Alkali Vernal Plains
 - (00.0.524) Haline Vernal Plains

- (00.0.530.0000) Deltas
 - (00.0.531) Stream Deltas
 - (00.0.532) River Deltas
 - (00.0.533) Coastal Deltas
 - (00.0.534) Lake Deltas

- (00.0.540.0000) Washes
 - (00.0.541) Stream Washes
 - (00.0.542) River Washes
 - (00.0.543) Alluvial Washes

- (00.0.550.0000) Floodplains, Bottomlands
 - (00.0.551) Stream Floodplains, Bottomlands
 - (00.0.552) River Floodplains, Bottomlands
 - (00.0.553) Canyon Floodplains, Bottomlands
 - (00.0.554) Montane Floodplains, Bottomlands

- (00.0.560.0000) Terraces
 - (00.0.561) River Terraces
 - (00.0.562) Stream Terraces
 - (00.0.563) Valley Terraces
 - (00.0.564) Coastal Terraces

(00.0.600.0000) Headlands, Bluffs, Slopes

- (00.0.610.0000) Headlands

- (00.0.620.0000) Cliffs/Bluffs
 - (00.0.621) Coastal Cliffs/Bluffs
 - (00.0.622) Canyon Cliffs/Bluffs

- (00.0.630.0000) Slopes
 - (00.0.631) Coastal Plain Slopes
 - (00.0.632) Canyon Slopes
 - (00.0.633) Foothill Slopes
 - (00.0.634) Montane Slopes

- (00.0.640.0000) Alluvial Fans
 - (00.0.641) Montane Alluvial Fans
 - (00.0.642) Foothill Alluvial Fans
 - (00.0.643) Valley Alluvial Fans

(00.0.700.0000) Seeps, Springs

- (00.0.710.0000) Seeps
 - (00.0.711) Drainage Head Seeps
 - (00.0.712) Bluff and Slope Seeps
 - (00.0.713) Canyon Seeps
 - (00.0.714) Stream Bank/Bed Seeps
 - (00.0.715) River Bank/Bed Seeps
 - (00.0.716) Montane/Plateau Seeps
 - (00.0.717) Foothill Seeps
 - (00.0.718) Valley and Plain Seeps
 - (00.0.719) Lake Seeps

- (00.0.720.0000) Springs
 - (00.0.721) Drainage-Head Springs

- (00.0.722) Bluff and Slope Springs
- (00.0.723) Canyon Springs
- (00.0.724) Stream Bank/Bed Springs
- (00.0.725) River Bank/Bed Springs
- (00.0.726) Montane Springs
- (00.0.727) Foothill Springs
- (00.0.728) Valley and Plain Springs
- (00.0.729) Lake Springs

(00.0.730.0000) Hot Springs

(00.0.740.0000) Artificial Seeps

(00.0.750.0000) Artificial Springs

(00.0.800.0000) Palustrine Basins: Pools, Ponds, Lakes, Meadows, Marshes, Swales

- (00.0.810.0000) Vernal Pools
 - (00.0.811) Coastal-Terrace Vernal Pools
 - (00.0.812) Mesa Vernal Pools
 - (00.0.813) River-Terrace Vernal Pools
 - (00.0.814) Coastal-Valley/Plain Vernal Pools
 - (00.0.815) Foothill-Valley Vernal Pools
 - (00.0.816) Montane-Plateau Vernal Pools

- (00.0.820.0000) Palustrine Ponds, Lakes
 - (00.0.821) Coastal-Dune Ponds (and "Lakes")
 - (00.0.822) Coastal-Canyon Ponds
 - (00.0.823) Fault-Sag Ponds
 - (00.0.824) Glacial Ponds (and "Lakes")
 - (00.0.825) Valley Ponds
 - (00.0.826) Palustrine Vernal "Lakes"/Ponds
 - (00.0.827) Agricultural Ponds
 - (00.0.828) Recreational Ponds
 - (00.0.829) Palustrine Lagoons

- (00.0.830.0000) Meadows
 - (00.0.831) Montane Vernal Meadows
 - (00.0.832) Montane Perennial Meadows

- (00.0.840.0000) Marshes
 - (00.0.841) Vernal Freshwater Marshes
 - (00.0.842) Perennial Freshwater Marshes
 - (00.0.843) Saline Marshes
 - (00.0.844) Haline Marshes
 - (00.0.845) Stream-Channel Marshes
 - (00.0.846) River-Channel Marshes
 - (00.0.847) Lake-Shore Marshes
 - (00.0.848) Diked Estuarine Marshes
 - (00.0.849) Lagoon-Shore Marshes

CLASSIFICATION

Table III-6 (Continued)

- (00.0.850.0000) Swales
 - (00.0.851) Montane/Plateau Drainage Swales
 - (00.0.852) Coastal Terrace Drainage Swales
 - (00.0.853) Dune/Beach Swales
 - (00.0.854) Vernal Drainage Swales
 - (00.0.855) Artificial Drainage Swales

(00.0.900.0000) Artificial Structures

- (00.0.910.0000) Stationary Artificial Structures
 - (00.0.911) Jetties/Breakwaters
 - (00.0.912) Bank Revetments
 - (00.0.913) Dams/Levees
 - (00.0.914) Earthen Berms/Dikes
 - (00.0.915) Dredge Spoils
 - (00.0.916) Pilings/Piers
 - (00.0.917) Platforms
 - (00.0.918) Boat Ramps
 - (00.0.919) Wreckage
 - (00.0.920.0000) Floating Artificial Structures
 - (00.0.921) Hulls
 - (00.0.922) Docks
 - (00.0.923) Buoys
 - (00.0.924) Logs
-

CLASSIFICATION

TABLE III-7. SUBSTRATE/DOMINANCE/CHARACTERISTIC TYPES: MARINE AND ESTUARINE SYSTEMS.

("00") = Water Regime
(00."0") = Water Chemistry
(00.0."000") = Hydrogeomorphic Unit
(00.0.000."0000") = Substrate/Dominance/Characteristic Type

SUBSTRATE/DOMINANCE/CHARACTERISTIC TYPES (Categories)

(00.0.000.1000) Non-Organic and Non-Living Organic Dominance Types

(00.0.000.1100) Open Water Types
(00.0.000.1200) Bedrock Types
(00.0.000.1300) Boulder Types
(00.0.000.1400) Cobble Types
(00.0.000.1500) Mixed-Coarse Types
(00.0.000.1600) Sand Types
(00.0.000.1700) Mixed-Fine Types
(00.0.000.1800) Mud Types
(00.0.000.1900) Organic Types

(00.0.000.2000) Algal (Protista-Monera) Dominance Types

(00.0.000.2100) Bacillariophyta (Diatom) Types
 (00.0.000.2110) Estuarine Diatoms
 (00.0.000.2111) *Himphora* sp.
 (00.0.000.2112) *Nitachia longissima*
 (00.0.000.2113) *Pleurosigma estuarii*

(00.0.000.2200) Chlorophyta (Green Algae) Types
 (00.0.000.2210) Bladder Types
 (00.0.000.2220) Branching Foliose Types
 (00.0.000.2221) *Codium*
 (00.0.000.2230) Non-branching Foliose Types
 (00.0.000.2231) *Ulva*
 (00.0.000.2240) Turf Types
 (00.0.000.2241) *Bryopsis*
 (00.0.000.2242) *Cladophora*
 (00.0.000.2250) Encrusting Types
 (00.0.000.2260) Filamentous Types
 (00.0.000.2261) *Chaetomorpha*
 (00.0.000.2262) *Enteromorpha*
 (00.0.000.2263) *Ulothrix*

(00.0.000.2300) Phaeophyta (Brown Algae) Types
 (00.0.000.2310) Bladder Types
 (00.0.000.2311) *Cystoseira*

- (00.0.000.2312) *Egregia*
- (00.0.000.2313) *Halidrys*
- (00.0.000.2314) *Sargassum*
- (00.0.000.2320) Branching Foliose Types
 - (00.0.000.2321) *Desmarestia*
 - (00.0.000.2322) *Eisenia*
 - (00.0.000.2323) *Fucus*
 - (00.0.000.2324) *Hesperophycus*
 - (00.0.000.2325) *Pelvetia*
 - (00.0.000.2326) *Postelsia*
 - (00.0.000.2327) *Zonaria*
- (00.0.000.2330) Non-branching Foliose Types
 - (00.0.000.2331) *Alaria*
 - (00.0.000.2332) *Colpomenia*
 - (00.0.000.2333) *Dictyota*
 - (00.0.000.2334) *Laminaria*
 - (00.0.000.2335) *Pterogophora*
- (00.0.000.2340) Turf Types
 - (00.0.000.2341) *Pelvetiopsis*
- (00.0.000.2350) Encrusting Types
 - (00.0.000.2351) *Ralfsia*
- (00.0.000.2360) Filamentous Types
 - (00.0.000.2361) *Giffordia*
 - (00.0.000.2362) *Scytosiphon*
- (00.0.000.2400) Rhodophyta (Red Algae) Types
 - (00.0.000.2410) Bladder Types
 - (00.0.000.2420) Branching Foliose Types
 - (00.0.000.2421) *Botryoglossum*
 - (00.0.000.2422) *Gastroclonium*
 - (00.0.000.2423) *Gelidium*
 - (00.0.000.2424) *Gigartina*
 - (00.0.000.2425) *Gracilaria*
 - (00.0.000.2426) *Prionites*
 - (00.0.000.2427) *Rhodoglossum*
 - (00.0.000.2428) *Rhodomela*
 - (00.0.000.2430) Non-branching Foliose Types
 - (00.0.000.2431) *Halosaccion*
 - (00.0.000.2432) *Iridaea*
 - (00.0.000.2433) *Nemalion*
 - (00.0.000.2434) *Porphyra*
 - (00.0.000.2440) Turf Types
 - (00.0.000.2441) *Endocladia*
 - (00.0.000.2450) Encrusting Types
 - (00.0.000.2451) *Pseudolithophyllum*
 - (00.0.000.2460) Filamentous Types
 - (00.0.000.2461) *Bangia*
 - (00.0.000.2462) *Polysiphonia*
 - (00.0.000.2463) *Rhodochorton*
 - (00.0.000.2470) Erect Coralline Types
 - (00.0.000.2471) *Bossiella*

(00.0.000.2472) *Corallina*

(00.0.000.2500) Mixed Protista Type

(00.0.000.2600) Blue-Green Algal Type

(00.0.000.3000) Moss-Lichen, Fungal Types

(00.0.000.3100) Moss Types

(00.0.000.3200) Liverwort Types

(00.0.000.3300) Mixed-Bryophyte Types

(00.0.000.3400) Lichen Types

(00.0.000.3500) Moss-Lichen Types

(00.0.000.3600) Fungal Types

(00.0.000.4000) Pteridophyte Dominance Types

(00.0.000.4100) Quillwort Dominance Types

(00.0.000.4200) Horsetail Dominance Types

(00.0.000.4300) Fern Dominance Types

(00.0.000.4310) Aquatic Bed Types

(00.0.000.4311) *Azolla filiculoides*

(00.0.000.5000) Dicot Vascular-Plant Dominance Types

(00.0.000.5100) Aquatic-Bed Types

(00.0.000.5200) Persistent Emergent Types (Asteraceae)

(00.0.000.5210) *Jaumea*

(00.0.000.5211) *Jaumea carnosa*

(00.0.000.5220) *Euthamia*

(00.0.000.5221) *Euthamia occidentalis*

(00.0.000.5230) *Pluchea*

(00.0.000.5231) *Pluchea odorata*

(00.0.000.5300) Persistent Emergent Types (Chenopodiaceae)

(00.0.000.5310) *Arthrocnemum*

(00.0.000.5311) *Arthrocnemum subterminale*

(00.0.000.5320) *Atriplex*

(00.0.000.5321) *Atriplex watsonii*

(00.0.000.5330) *Salicornia*

(00.0.000.5331) *Salicornia virginica*

(00.0.000.5340) *Suaeda*

(00.0.000.5341) *Suaeda esteroa*

(00.0.000.5400) Persistent Emergent Types (Other)

(00.0.000.5410) Batidaceae

(00.0.000.5411) *Batis maritima*

(00.0.000.5420) Convolvulaceae

(00.0.000.5421) *Cressa truxillensis*

(00.0.000.5430) Cuscutaceae

(00.0.000.5431) *Cuscuta salina*

- (00.0.000.5440) Frankeniaceae
 - (00.0.000.5441) *Frankenia salina*
- (00.0.000.5450) Plumbaginaceae
 - (00.0.000.5451) *Limonium californicum*
- (00.0.000.5500) Nonpersistent Emergent Types
 - (00.0.000.5510) Asteraceae
 - (00.0.000.5511) *Cotula coronopifolia*
 - (00.0.000.5512) *Lasthenia glabrata*
 - (00.0.000.5520) Brassicaceae
 - (00.0.000.5521) *Hutchinsia procumbens*
 - (00.0.000.5530) Caryophyllaceae
 - (00.0.000.5531) *Spergularia marina*
 - (00.0.000.5540) Chenopodiaceae
 - (00.0.000.5541) *Atriplex triangularis*
 - (00.0.000.5542) *Chenopodium macrospermum*
 - (00.0.000.5543) *Salicornia europaea*
 - (00.0.000.5544) *Suaeda calceoliformis*
 - (00.0.000.5550) Scrophulariaceae
 - (00.0.000.5551) *Cordylanthus maritimus*
- (00.0.000.5600) Scrub-Shrub Types
 - (00.0.000.5610) Aizoaceae
 - (00.0.000.5611) *Carpobrotus edulis*
 - (00.0.000.5612) *Malephora crocea*
 - (00.0.000.5620) Asteraceae
 - (00.0.000.5621) *Baccharis douglasii*
 - (00.0.000.5622) *Baccharis pilularis*
 - (00.0.000.5623) *Baccharis salicifolia*
 - (00.0.000.5624) *Isocoma menziesii*
 - (00.0.000.5630) Chenopodiaceae
 - (00.0.000.5631) *Atriplex lentiformis*
 - (00.0.000.5632) *Suaeda californica*
 - (00.0.000.5633) *Suaeda taxifolia*
 - (00.0.000.5640) Salicaceae
 - (00.0.000.5641) *Salix exigua*
 - (00.0.000.5642) *Salix lasiolepis*
- (00.0.000.5700) Woodland Types
- (00.0.000.5800) Forest Types
- (00.0.000.6000) Monocot Vascular-Plant Dominance Types**
 - (00.0.000.6100) Aquatic-Bed Types
 - (00.0.000.6110) Lemnaceae
 - (00.0.000.6111) *Lemna gibba*
 - (00.0.000.6112) *Lemna minor*
 - (00.0.000.6113) *Lemna minuscula*

- (00.0.000.6120) Potamogetonaceae
 - (00.0.000.6121) *Potamogeton pectinatus*
 - (00.0.000.6122) *Ruppia cirrhosa*
 - (00.0.000.6123) *Ruppia maritima*
- (00.0.000.6130) Zannichelliaceae
 - (00.0.000.6131) *Zannichellia americana*
- (00.0.000.6140) Zosteraceae
 - (00.0.000.6141) *Phyllospadix scouleri*
 - (00.0.000.6142) *Phyllospadix torreyi*
 - (00.0.000.6143) *Zostera marina*
- (00.0.000.6200) Persistent Emergent Types (Cyperaceae - Sedges)
 - (00.0.000.6210) *Carex*
 - (00.0.000.6220) *Eleocharis*
 - (00.0.000.6221) *Eleocharis macrostachya*
 - (00.0.000.6230) *Scirpus*
 - (00.0.000.6231) *Scirpus americanus*
 - (00.0.000.6232) *Scirpus californicus*
 - (00.0.000.6233) *Scirpus maritimus*
 - (00.0.000.6234) *Scirpus pungens*
 - (00.0.000.6235) *Scirpus robustus*
- (0.0.000.6300) Persistent Emergent Types (Juncaceae - Rushes)
 - (00.0.000.6310) *Juncus*
 - (00.0.000.6311) *Juncus acutus*
 - (00.0.000.6312) *Juncus balticus*
- (00.0.000.6400) Persistent Emergent Types (Poaceae - Grasses)
 - (00.0.000.6410) *Distichlis*
 - (00.0.000.6411) *Distichlis spicata*
 - (00.0.000.6420) *Leymus*
 - (00.0.000.6421) *Leymus triticoides*
 - (00.0.000.6430) *Monanthochloe*
 - (00.0.000.6431) *Monanthochloe littoralis*
 - (00.0.000.6440) *Spartina*
 - (00.0.000.6441) *Spartina foliosa*
- (00.0.000.6500) Persistent Emergent Types (Other)
 - (00.0.000.6510) Juncaginaceae
 - (00.0.000.6511) *Triglochin concinna*
 - (00.0.000.6520) Typhaceae
 - (00.0.000.6521) *Typha domingensis*
- (00.0.000.6600) Nonpersistent Emergent Types
 - (00.0.000.6610) Juncaceae
 - (00.0.000.6611) *Juncus bufonius*
- (00.0.000.7000) Mixed-Vascular Types**

(00.0.000.8000) Animal Dominance Types

- (00.0.000.8100) Sponge Types
 - (00.0.000.8110) Encrusting Types
 - (00.0.000.8111) *Halichondria*
 - (00.0.000.8112) *Haliclona*
 - (00.0.000.8113) *Hymenamphiastra*
 - (00.0.000.8114) *Leucetta*
 - (00.0.000.8115) *Leucosolenia*
 - (00.0.000.8116) *Ophlitaspongia*
 - (00.0.000.8120) Erect Types
 - (00.0.000.8121) *Microciona*
- (00.0.000.8200) Coelenterate Types
 - (00.0.000.8210) Hydroid Types
 - (00.0.000.8211) *Aglaophenia*
 - (00.0.000.8212) *Anthopleura*
 - (00.0.000.8213) *Corynactis*
 - (00.0.000.8214) *Epiactis*
 - (00.0.000.8215) *Obelia*
 - (00.0.000.8216) *Tubularia*
- (00.0.000.8300) Mollusc Types
 - (00.0.000.8310) Gastropod Types
 - (00.0.000.8311) *Cerithidea*
 - (00.0.000.8312) *Haliotis*
 - (00.0.000.8313) *Littorina*
 - (00.0.000.8314) *Surpulorbis*
 - (00.0.000.8315) *Tegula*
 - (00.0.000.8320) Oyster Types
 - (00.0.000.8321) *Crassostrea*
 - (00.0.000.8322) *Ostrea*
 - (00.0.000.8330) Mussel Types
 - (00.0.000.8331) *Mytilus*
 - (00.0.000.8340) Clam Types
 - (00.0.000.8341) *Donax*
 - (00.0.000.8342) *Macoma*
 - (00.0.000.8343) *Mya*
 - (00.0.000.8344) *Penitella*
 - (00.0.000.8345) *Protothaca*
 - (00.0.000.8346) *Tagelus*
- (00.0.000.8400) Annelid Types
 - (00.0.000.8410) Burrow Dwelling Polychaete Types
 - (00.0.000.8411) *Euzonus*
 - (00.0.000.8420) Tube Building Polychaete Types
 - (00.0.000.8422) *Phragmatopoma*
 - (00.0.000.8423) *Polydora*
 - (00.0.000.8424) *Spirorbis*
 - (00.0.000.8425) *Surpula*

- (00.0.000.8500) Crustacean Types
 - (00.0.000.8510) Amphipod Types
 - (00.0.000.8511) *Megalorchestia*
 - (00.0.000.8520) Barnacle Types
 - (00.0.000.8522) *Balanus*
 - (00.0.000.8523) *Lepas*
 - (00.0.000.8524) *Pollicipes*
 - (00.0.000.8525) *Semibalanus*
 - (00.0.000.8526) *Tetraclita*
 - (00.0.000.8530) Crab Types
 - (00.0.000.8531) *Emerita*
 - (00.0.000.8532) *Hemigrapsus*
 - (00.0.000.8533) *Pachygrapsus*
 - (00.0.000.8534) *Pagurus*
 - (00.0.000.8535) *Uca*

 - (00.0.000.8600) Insect Types
 - (00.0.000.8610) Midge Types
 - (00.0.000.8620) Mosquito Types
 - (00.0.000.8630) Blackfly Types
 - (00.0.000.8640) Staphylinid beetles

 - (00.0.000.8700) Echinoderm Types
 - (00.0.000.8710) Sand Dollar Types
 - (00.0.000.8711) *Dendraster*
 - (00.0.000.8720) Sea Urchin Types
 - (00.0.000.8721) *Strongylocentrotus*

 - (00.0.000.8800) Other Invertebrate Types
 - (00.0.000.8810) Bryozoan Types
 - (00.0.000.8811) *Bugula*
 - (00.0.000.8812) *Thalamoporella*
 - (00.0.000.8820) Tunicate Types
 - (00.0.000.8821) *Botryloides*
 - (00.0.000.8822) *Ciona*
 - (00.0.000.8823) *Diplosoma*
 - (00.0.000.8824) *Styela*

 - (00.0.000.8900) Vertebrate Types
 - (00.0.000.8910) Fish Types
 - (00.0.000.8920) Bird Types
 - (00.0.000.8930) Mammal Types
 - (00.0.000.8931) *Phoca*
 - (00.0.000.8932) *Zalophus*
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CLASSIFICATION

TABLE III-8. SUBSTRATE/DOMINANCE/CHARACTERISTIC TYPES: RIVERINE, LACUSTRINE, AND PALUSTRINE SYSTEMS.

("00") = Water Regime
(00."0") = Water Chemistry
(00.0."000") = Hydrogeomorphic Unit
(00.0.000."0000") = Substrate/Dominance/Characteristic Types

SUBSTRATE/DOMINANCE/CHARACTERISTIC TYPES (Categories)

(00.0.000.1000) Non-Organismic Dominance Types

- (00.0.000.1100) Open Water Types
- (00.0.000.1200) Bedrock Types
- (00.0.000.1300) Boulder Types
- (00.0.000.1400) Cobble Types
- (00.0.000.1500) Mixed-Coarse Types
- (00.0.000.1600) Sand Types
- (00.0.000.1700) Mixed-Fine Types
- (00.0.000.1800) Mud Types
- (00.0.000.1900) Organic Types

(00.0.000.2000) Algal (Protista-Monera) Dominance/Characteristic Types

- (00.0.000.2100) Bacillariophyta (Diatom) Types
- (00.0.000.2200) Chlorophyta (Green Algae) Types
 - 00.0.000.2210 Bladder Types
 - 00.0.000.2220 Branching Foliose Types
 - 00.0.000.2221 *Chara*
 - 00.0.000.2222 *Nitella*
 - 00.0.000.2230 Non-branching Foliose Types
 - 00.0.000.2240 Turf Types
 - 00.0.000.2250 Encrusting Types
 - 00.0.000.2260 Filamentous Types
 - 00.0.000.2261 *Enteromorpha*
- (00.0.000.2300) Phaeophyta (Brown Algae) Types
- (00.0.000.2400) Rhodophyta (Red Algae) Types
- (00.0.000.2500) Mixed-Protista Types
- (00.0.000.2600) Blue-Green Algal Types

(00.0.000.3000) Moss-Lichen, Fungi Dominance/Characteristic Types

- (00.0.000.3100) Moss Types
- (00.0.000.3200) Liverwort Types
- (00.0.000.3300) Mixed Bryophyte Types
- (00.0.000.3400) Lichen Types

- (00.0.000.3500) Moss-Lichen Types
- (00.0.000.3600) Fungi Types

(00.0.000.4000) Pteridophyte Dominance/Characteristic Types

- (00.0.000.4100) Quillwort Types
 - (00.0.000.4110) *Isoetes*
 - (00.0.000.4111) *Isoetes howellii*
- (00.0.000.4200) Horsetail Types
 - (00.0.000.4210) *Equisetum*
 - (00.0.000.4211) *Equisetum hyemale*
 - (00.0.000.4212) *Equisetum laevigatum*
 - (00.0.000.4213) *Equisetum telmateia*
- (00.0.000.4300) Fern Types
 - (00.0.000.4310) Aquatic Bed Types
 - (00.0.000.4311) *Azolla filiculoides*
 - (00.0.000.4320) Emergent Types
 - (00.0.000.4321) *Adiantum capillus-veneris*
 - (00.0.000.4322) *Athyrium filix-femina*
 - (00.0.000.4323) *Marsilea vestita*
 - (00.0.000.4324) *Pilularia americana*
 - (00.0.000.4325) *Polystichum munitum*
 - (00.0.000.4326) *Pteridium aquilinum*
 - (00.0.000.4327) *Thelypteris puberula*
 - (00.0.000.4328) *Woodwardia fimbriata*

(00.0.000.5000) Dicot Vascular-Plant Dominance/Characteristic Types

- (00.0.000.5100) Aquatic-Bed Types
 - (00.0.000.5110) Callitrichaceae
 - (00.0.000.5111) *Callitriche heterophylla*
 - (00.0.000.5112) *Callitriche marginata*
 - (00.0.000.5120) Ceratophyllaceae
 - (00.0.000.5121) *Ceratophyllum demersum*
 - (00.0.000.5130) Elatinaceae
 - (00.0.000.5131) *Elatine californica*
 - (00.0.000.5132) *Elatina rubella*
 - (00.0.000.5140) Haloragaceae
 - (00.0.000.5141) *Myriophyllum aquaticum*
 - (00.0.000.5142) *Myriophyllum sibiricum*
 - (00.0.000.5150) Hippuridaceae
 - (00.0.000.5151) *Hippuris vulgaris*
 - (00.0.000.5160) Ranunculaceae
 - (00.0.000.5161) *Ranunculus aquatilis*
- (00.0.000.5200) Persistent Emergent Types (A-K Families)
 - (00.0.000.5210) Aizoaceae
 - (00.0.000.5211) *Tetragonia tetragonioides*

- (00.0.000.5220) Apiaceae (A-H)
 - (00.0.000.5221) *Apium graveolens*
 - (00.0.000.5222) *Berula erecta*
 - (00.0.000.5223) *Cicuta douglasii*
 - (00.0.000.5224) *Eryngium vaseyi*
 - (00.0.000.5225) *Foeniculum vulgare*
 - (00.0.000.5226) *Hydrocotyle ranunculoides*
- (00.0.000.5230) Apiaceae (I-Z)
 - (00.0.000.5231) *Oenanthe sarmentosa*
- (00.0.000.5232) *Perideridia*
 - (00.0.000.5233) *Sphenosciadium capitellatum*
- (00.0.000.5240) Apocynaceae, Asclepiadaceae
 - (00.0.000.5241) *Apocynum cannabinum*
 - (00.0.000.5242) *Asclepias fascicularis*
- (00.0.000.5250) Asteraceae (A-L)
 - (00.0.000.5251) *Artemisia douglasiana*
 - (00.0.000.5252) *Artemisia ludoviciana*
 - (00.0.000.5253) *Aster chilensis*
 - (00.0.000.5254) *Conyza canadensis*
 - (00.0.000.5255) *Euthamia occidentalis*
 - (00.0.000.5256) *Gutierrezia sarothrae*
 - (00.0.000.5257) *Helenium bolanderi*
 - (00.0.000.5258) *Helenium puberulum*
 - (00.0.000.5259) *Jaumea carnosa*
- (00.0.000.5260) Asteraceae (M-Z)
 - (00.0.000.5261) *Solidago californica*
 - (00.0.000.5262) *Solidago confinis*
 - (00.0.000.5263) *Solidago spathulata*
- (00.0.000.5270) Chenopodiaceae, Datisceae
 - (00.0.000.5271) *Arthrocnemum subterminale*
 - (00.0.000.5272) *Salicornia virginica*
 - (00.0.000.5273) *Datisca glomerata*
- (00.0.000.5280) Fabaceae
 - (00.0.000.5280) *Amorpha fruticosa*
 - (00.0.000.5280) *Hoita macrostachya*
 - (00.0.000.5280) *Hoita orbiculata*
 - (00.0.000.5280) *Lupinus* sp.
 - (00.0.000.5280) *Melilotus alba*
- (00.0.000.5290) Frankeniaceae
 - (00.0.000.5291) *Frankenia salina*
- (00.0.000.5300) Persistent Emergent Types (L-P Families)
 - (00.0.000.5310) Hypericaceae
 - (00.0.000.5311) *Hypericum anagalliodes*
 - (00.0.000.5320) Lamiaceae
 - (00.0.000.5321) *Mentha arvensis*
 - (00.0.000.5322) *Stachys ajugoides*
 - (00.0.000.5323) *Stachys albens*
 - (00.0.000.5324) *Stachys bullata*
 - (00.0.000.5325) *Stachys chamissonis*
 - (00.0.000.5325) *Stachys pycnantha*

- (00.0.000.5330) Lythraceae, Nyphaeaceae
- (00.0.000.5331) *Lythrum californicum*
- (00.0.000.5332) *Lythrum hyssopifolia*
- (00.0.000.5333) *Nuphar luteum* ssp. *polysepalum*
- (00.0.000.5334) *Nymphaea odorata*
- (00.0.000.5340) Onagraceae
 - (00.0.000.5341) *Epilobium ciliatum*
 - (00.0.000.5342) *Ludwigia hexapetala*
 - (00.0.000.5343) *Oenothera elata* ssp. *hookeri*
- (00.0.000.5350) Polygonaceae
 - (00.0.000.5351) *Polygonum*
 - (00.0.000.5352) *Polygonum*
 - (00.0.000.5353) *Polygonum hydropiperoides*
 - (00.0.000.5354) *Polygonum lapathifolium*
 - (00.0.000.5355) *Polygonum punctatum*
 - (00.0.000.5356) *Rumex conglomeratus*
 - (00.0.000.5357) *Rumex crispus*
 - (00.0.000.5358) *Rumex occidentalis*
 - (00.0.000.5359) *Rumex salicifolius*
- (00.0.000.5400) Persistent Emergent Types (R-U Families)
 - (00.0.000.5410) Ranunculaceae
 - (00.0.000.5411) *Delphinium glaucum*
 - (00.0.000.5420) Rosaceae
 - (00.0.000.5421) *Ivesia argyrocoma*
 - (00.0.000.5422) *Potentilla anserina*
 - (00.0.000.5430) Saururaceae
 - (00.0.000.5431) *Anemopsis californica*
 - (00.0.000.5440) Saxifragaceae
 - (00.0.000.5441) *Boykinia rotundifolia*
 - (00.0.000.5450) Scrophulariaceae, Solanaceae
 - (00.0.000.5451) *Scrophularia* spp.
 - (00.0.000.5452) *Datura wrightii*
 - (00.0.000.5453) *Nicotiana quadrivalis*
 - (00.0.000.5454) *Petunia parviflora*
 - (00.0.000.5460) Urticaceae
 - (00.0.000.5461) *Urtica dioica*
 - (00.0.000.5470) Verbenaceae
 - (00.0.000.5471) *Phyla nodiflora*
 - (00.0.000.5472) *Verbena bracteata*
 - (00.0.000.5473) *Verbena lasiostachys*
- (00.0.000.5500) Nonpersistent Emergent Types
 - (00.0.000.5510) Aizoaceae, Amaranthaceae, Apiaceae
 - (00.0.000.5511) *Glinus lotoides*
 - (00.0.000.5512) *Amaranthus* spp.
 - (00.0.000.5513) *Berula erecta*
 - (00.0.000.5514) *Eryngium aristulatum*
 - (00.0.000.5515) *Hydrocotyle ranunculoides*
 - (00.0.000.5516) *Oenanthe sarmentosa*

- (00.0.000.5520) Asteraceae (A-G)
 - (00.0.000.5521) *Anthemis cotula*
 - (00.0.000.5522) *Artemisia biennis*
 - (00.0.000.5523) *Artemisia douglasiana*
 - (00.0.000.5524) *Conyza coulteri*
 - (00.0.000.5525) *Cotula coronopifolia*
 - (00.0.000.5526) *Eclipta alba*
 - (00.0.000.5527) *Gnaphalium luteo-album*
 - (00.0.000.5528) *Gnaphalium palustre*
- (00.0.000.5530) Asteraceae (H-X)
 - (00.0.000.5531) *Helenium puberulum*
 - (00.0.000.5532) *Lasthenia californica*
 - (00.0.000.5533) *Lasthenia glabrata* ssp. *coulteri*
 - (00.0.000.5534) *Psilocarphus brevissimus*
 - (00.0.000.5535) *Xanthium strumarium*
- (00.0.000.5540) Boraginaceae, Brassicaceae, Campanulaceae
 - (00.0.000.5541) *Heliotropium curassavicum*
 - (00.0.000.5542) *Plagiobothrys undulatus*
 - (00.0.000.5543) *Plagiobothrys trachycarpus*
 - (00.0.000.5544) *Rorripa curvisiliqua*
 - (00.0.000.5545) *Rorripa nasturtium-aquaticum*
 - (00.0.000.5546) *Rorripa palustris*
 - (00.0.000.5547) *Downingia cuspidata*
 - (00.0.000.5548) *Lobelia dunnii* var. *serrata*
- (00.0.000.5550) Chenopodiaceae
 - (00.0.000.5551) *Atriplex* spp.
 - (00.0.000.5552) *Atriplex triangularis*
 - (00.0.000.5553) *Chenopodium berlandieri*
 - (00.0.000.5554) *Chenopodium macrospermum*
 - (00.0.000.5555) *Chenopodium rubrum*
 - (00.0.000.5556) *Kochia scoparia*
 - (00.0.000.5557) *Monolepis nuttalliana*
 - (00.0.000.5558) *Salicornia europea*
 - (00.0.000.5559) *Suaeda calceoliformis*
- (00.0.000.5560) Lamiaceae, Lythraceae
 - (00.0.000.5561) *Mentha arvensis*
 - (00.0.000.5562) *Mentha piperiodes*
 - (00.0.000.5563) *Pogogyne abramsii*
 - (00.0.000.5564) *Pogogyne douglasii*
- (00.0.000.5565) *Stachys albens*
 - (00.0.000.5566) *Ammannia coccinea*
 - (00.0.000.5567) *Lythrum hyssopifolia*
- (00.0.000.5570) Onagraceae, Malvaceae, Polygonaceae
 - (00.0.000.5571) *Ludwigia peploides* ssp. *peploides*
 - (00.0.000.5572) *Ludwigia hexapetala*
 - (00.0.000.5573) *Epilobium ciliatum*
 - (00.0.000.5574) *Oenothera elata* ssp. *hookeri*
 - (00.0.000.5575) *Malvella leprosa*
 - (00.0.000.5576) *Sidalcea* spp.
- (00.0.000.5580) Polygonaceae, Ranunculaceae
 - (00.0.000.5581) *Polygonum emersum* var. *emersum*

- (00.0.000.5582) *Polygonum emersum* var. *stipulaceum*
- (00.0.000.5583) *Polygonum lapathifolium*
- (00.0.000.5584) *Polygonum punctatum*
- (00.0.000.5585) *Polygonum* sp.
- (00.0.000.5586) *Rumex maritimus*
- (00.0.000.5587) *Myosurus* spp.
- (00.0.000.5588) *Ranunculus* spp.
- (00.0.000.5590) Scrophulariaceae
 - (00.0.000.5591) *Castilleja minor*
 - (00.0.000.5592) *Limosella aquatica*
 - (00.0.000.5593) *Lindernia dubia*
 - (00.0.000.5594) *Mimulus cardinalis*
 - (00.0.000.5595) *Mimulus guttatus*
 - (00.0.000.5596) *Mimulus* spp.
 - (00.0.000.5597) *Veronica americana*
 - (00.0.000.5598) *Veronica anagallis-aquatica*
 - (00.0.000.5599) *Veronica peregrina*
- (00.0.000.5600) Scrub-Shrub Types (A-M Families)
 - (00.0.000.5610) Aizoaceae, Anacardiaceae
 - (00.0.000.5611) *Carpobrotus edulis*
 - (00.0.000.5612) *Malephora crocea*
 - (00.0.000.5613) *Malosma laurina*
 - (00.0.000.5614) *Toxicodendron diversilobum*
 - (00.0.000.5620) Asteraceae
 - (00.0.000.5621) *Baccharis douglasii*
 - (00.0.000.5622) *Baccharis pilularis*
 - (00.0.000.5623) *Baccharis salicifolia*
 - (00.0.000.5624) *Brickellia californica*
 - (00.0.000.5625) *Isocoma menziesii*
 - (00.0.000.5626) *Lepidospartum squamatum*
 - (00.0.000.5627) *Pluchea sericea*
 - (00.0.000.5628) *Chrysothamnus nauseosus*
 - (00.0.000.5630) Caprifoliaceae
 - (00.0.000.5631) *Lonicera involucrata*
 - (00.0.000.5632) *Sambucus mexicana*
 - (00.0.000.5633) *Symphoricarpos mollis*
 - (00.0.000.5640) Chenopodiaceae
 - (00.0.000.5641) *Atriplex canescens*
 - (00.0.000.5642) *Atriplex lentiformis*
 - (00.0.000.5643) *Suaeda moquinii*
 - (00.0.000.5644) *Suaeda taxifolia*
 - (00.0.000.5650) Cornaceae
 - (00.0.000.5651) *Cornus sericea* ssp. *occidentalis*
 - (00.0.000.5660) Grossulariaceae
 - (00.0.000.5661) *Ribes divaricatum*
 - (00.0.000.5670) Lamiaceae
 - (00.0.000.5671) *Salvia mellifera*
 - (00.0.000.5680) Malvaceae
 - (00.0.000.5681) *Malacothamnus fasciculatus*

- (00.0.000.5690) Myricaceae, Oleaceae
 - (00.0.000.5691) *Myrica californica*
 - (00.0.000.5692) *Forestiera pubescens*
- (00.0.000.5700) Scrub-Shrub Types (N-Z Families)
 - (00.0.000.5710) Platanaceae
 - (00.0.000.5711) *Platanus racemosa*
 - (00.0.000.5720) Polygonaceae
 - (00.0.000.5721) *Eriogonum fasciculatum*
 - (00.0.000.5730) Ranunculaceae
 - (00.0.000.5731) *Clematis ligusticifolia*
 - (00.0.000.5740) Rhamnaceae
 - (00.0.000.5741) *Ceanothus oliganthus*
 - (00.0.000.5742) *Ceanothus spinosus*
 - (00.0.000.5743) *Rhamnus californica*
 - (00.0.000.5750) Rosaceae
 - (00.0.000.5751) *Prunus*
 - (00.0.000.5752) *Rosa californica*
 - (00.0.000.5753) *Rosa gymnocarpa*
 - (00.0.000.5754) *Rosa woodsii*
 - (00.0.000.5755) *Rubus ursinus*
 - (00.0.000.5756) *Rubus*
 - (00.0.000.5760) Salicaceae
 - (00.0.000.5761) *Populus balsamifera*
 - (00.0.000.5762) *Salix breweri*
 - (00.0.000.5763) *Salix exigua*
 - (00.0.000.5764) *Salix geyeriana*
 - (00.0.000.5765) *Salix laevigata*
 - (00.0.000.5766) *Salix lasiolepis*
 - (00.0.000.5767) *Salix lemmonii*
 - (00.0.000.5768) *Salix lutea*
 - (00.0.000.5769) *Salix scouleriana*
 - (00.0.000.5770) Solanaceae
 - (00.0.000.5771) *Nicotiana glauca*
 - (00.0.000.5780) Tamaricaceae
 - (00.0.000.5781) *Tamarix ramosissima*
 - (00.0.000.5790) Vitaceae
 - (00.0.000.5791) *Vitis girdiana*
- (00.0.000.5800) Woodland Tree Types
 - (00.0.000.5810) Fagaceae
 - (00.0.000.5811) *Quercus agrifolia* var. *agrifolia*
 - (00.0.000.5812) *Quercus agrifolia* var. *oxydenia*
 - (00.0.000.5813) *Quercus lobata*
 - (00.0.000.5814) *Quercus wislizenii*
 - (00.0.000.5820) Platanaceae
 - (00.0.000.5821) *Platanus racemosa*
 - (00.0.000.5830) Salicaceae
 - (00.0.000.5831) *Populus balsamifera* ssp. *trichocarpa*
 - (00.0.000.5832) *Populus fremontii* ssp. *fremontii*
 - (00.0.000.5833) *Salix laevigata*
 - (00.0.000.5834) *Salix lasiolepis*

- (00.0.000.5835) *Salix lucida* ssp. *lasiandra*
- (00.0.000.5900) Forest Tree Types
 - (00.0.000.5910) Aceraceae
 - (00.0.000.5911) *Acer negundo*
 - (00.0.000.5912) *Acer macrophyllum*
 - (00.0.000.5920) Betulaceae, Cupressaceae
 - (00.0.000.5921) *Alnus rhombifolia*
 - (00.0.000.5922) *Calocedrus decurrens*
 - (00.0.000.5930) Fagaceae
 - (00.0.000.5931) *Lithocarpus densiflorus*
 - (00.0.000.5932) *Quercus agrifolia* var. *agrifolia*
 - (00.0.000.5933) *Quercus agrifolia* var. *oxydenia*
 - (00.0.000.5934) *Quercus kelloggii*
 - (00.0.000.5935) *Quercus lobata*
 - (00.0.000.5936) *Quercus wislizenii*
 - (00.0.000.5940) Juglandaceae
 - (00.0.000.5941) *Juglans californica* var. *californica*
 - (00.0.000.5941) *Juglans californica* var. *hindsii*
 - (00.0.000.5950) Lauraceae, Myricaceae, Oleaceae
 - (00.0.000.5951) *Umbellularia californica*
 - (00.0.000.5952) *Myrica californica*
 - (00.0.000.5953) *Fraxinus velutina*
 - (00.0.000.5960) Pinaceae
 - (00.0.000.5961) *Abies concolor*
 - (00.0.000.5962) *Pinus contorta* ssp. *murrayana*
 - (00.0.000.5963) *Pinus jeffreyi*
 - (00.0.000.5970) Platanaceae
 - (00.0.000.5971) *Platanus racemosa*
 - (00.0.000.5980) Salicaceae
 - (00.0.000.5981) *Populus balsamifera* ssp. *trichocarpa*
 - (00.0.000.5982) *Populus fremontii* ssp. *fremontii*
 - (00.0.000.5983) *Populus tremuloides*
 - (00.0.000.5984) *Salix goodingii*
 - (00.0.000.5985) *Salix laevigata*
 - (00.0.000.5986) *Salix lasiolepis*
 - (00.0.000.5987) *Salix lucida* ssp. *lasiandra*
 - (00.0.000.5990) Taxodiaceae
 - (00.0.000.5991) *Sequoia sempervirens*
- (00.0.000.6000) Monocot Vascular-Plant Dominance/Characteristic Types**
 - (00.0.000.6100) Aquatic-Bed Types
 - (00.0.000.6110) Alismataceae
 - (00.0.000.6111) *Alisma plantago-aquatica*
 - (00.0.000.6112) *Echinodorus berteroi*
 - (00.0.000.6120) Cyperaceae
 - (00.0.000.6121) *Eleocharis parvula*
 - (00.0.000.6130) Hydrocharitaceae
 - (00.0.000.6131) *Egeria densa*
 - (00.0.000.6132) *Elodea canadensis*
 - (00.0.000.6133) *Elodea nuttallii*

- (00.0.000.6134) *Najas guadalupensis*
- (00.0.000.6135) *Najas marina*
- (00.0.000.6140) Lemnaceae
 - (00.0.000.6141) *Lemna gibba*
 - (00.0.000.6142) *Lemna minor*
 - (00.0.000.6143) *Lemna minuscula*
 - (00.0.000.6144) *Lemna trisulca*
 - (00.0.000.6145) *Spirodela polyrrhiza*
 - (00.0.000.6146) *Spirodela punctata*
 - (00.0.000.6147) *Wolffia* spp.
 - (00.0.000.6148) *Wolffiella* spp.
- (00.0.000.6150) Potamogetonaceae
 - (00.0.000.6151) *Potamogeton foliosa*
 - (00.0.000.6152) *Potamogeton pectinatus*
 - (00.0.000.6153) *Potamogeton*
 - (00.0.000.6154) *Ruppia cirrhosa*
 - (00.0.000.6155) *Ruppia maritima*
- (00.0.000.6160) Zannichelliaceae
- (00.0.000.6161) *Zannichellia palustris*
- (00.0.000.6200) Persistent Emergent Types (Cyperaceae - Sedges)
 - (00.0.000.6210) *Carex* (a-m)
 - (00.0.000.6211) *Carex alma*
 - (00.0.000.6212) *Carex barbarae*
 - (00.0.000.6213) *Carex multicaulis*
 - (00.0.000.6220) *Carex* (o-z)
 - (00.0.000.6221) *Carex obnupta*
 - (00.0.000.6222) *Carex praegracilis*
 - (00.0.000.6223) *Carex nutkatensis*
 - (00.0.000.6224) *Carex senta*
 - (00.0.000.6230) *Cyperus*
 - (00.0.000.6231) *Cyperus*
 - (00.0.000.6232) *Cyperus eragrostis*
 - (00.0.000.6233) *Cyperus involucratus*
 - (00.0.000.6234) *Cyperus strigosus*
 - (00.0.000.6240) *Eleocharis*
 - (00.0.000.6241) *Eleocharis acicularis*
 - (00.0.000.6242) *Eleocharis macrostachya*
 - (00.0.000.6243) *Eleocharis montevidensis*
 - (00.0.000.6244) *Eleocharis parishii*
 - (00.0.000.6250) *Scirpus*
 - (00.0.000.6251) *Scirpus acutus*
 - (00.0.000.6252) *Scirpus americanus*
 - (00.0.000.6253) *Scirpus californicus*
 - (00.0.000.6254) *Scirpus maritimus*
 - (00.0.000.6255) *Scirpus microcarpus*
 - (00.0.000.6256) *Scirpus pungens*
 - (00.0.000.6257) *Scirpus robustus*

- (00.0.000.6300) Persistent Emergent Types (Juncaceae - Rushes)
 - (00.0.000.6310) *Juncus* (a-n)
 - (00.0.000.6311) *Juncus acutus*
 - (00.0.000.6312) *Juncus balticus*
 - (00.0.000.6313) *Juncus dubius*
 - (00.0.000.6314) *Juncus effusus*
 - (00.0.000.6315) *Juncus falcatus*
 - (00.0.000.6316) *Juncus macrophyllus*
 - (00.0.000.6317) *Juncus mexicanus*
 - (00.0.000.6320) *Juncus* (o-z)
 - (00.0.000.6321) *Juncus occidentalis*
 - (00.0.000.6322) *Juncus oxymuris*
 - (00.0.000.6323) *Juncus patens*
 - (00.0.000.6324) *Juncus phaeocephalis*
 - (00.0.000.6325) *Juncus rugulosus*
 - (00.0.000.6326) *Juncus tenuis*
 - (00.0.000.6327) *Juncus xiphioides*

- (00.0.000.6400) Persistent Emergent Types (Poaceae A-E Grasses)
 - (00.0.000.6410) *Agrostis*
 - (00.0.000.6411) *Agrostis idahoensis*
 - (00.0.000.6412) *Agrostis scabra*
 - (00.0.000.6413) *Agrostis stolonifera*
 - (00.0.000.6414) *Agrostis viridis*
 - (00.0.000.6420) *Andropogon*
 - (00.0.000.6421) *Andropogon virginica*
 - (00.0.000.6430) *Arundo*
 - (00.0.000.6431) *Arundo donax*
 - (00.0.000.6440) *Cortaderia* spp.
 - (00.0.000.6450) *Cynodon*
 - (00.0.000.6451) *Cynodon dactylon*
 - (00.0.000.6460) *Danthonia*
 - (00.0.000.6461) *Danthonia californica* var. *americana*
 - (00.0.000.6462) *Danthonia californica* var. *californica*
 - (00.0.000.6470) *Deschampsia*
 - (00.0.000.6471) *Deschampsia caespitosa* ssp. *caespitosa*
 - (00.0.000.6480) *Distichlis*
 - (00.0.000.6481) *Distichlis spicata*

- (00.0.000.6500) Persistent Emergent Types (Poaceae F-O Grasses)
 - (00.0.000.6510) *Echinochloa*
 - (00.0.000.6511) *Echinochloa crus-galli*
 - (00.0.000.6520) *Elymus*
 - (00.0.000.6521) *Elymus glaucus*
 - (00.0.000.6522) *Elymus trachycaulus* ssp. *trachycaulus*
 - (00.0.000.6530) *Festuca*
 - (00.0.000.6531) *Festuca arundinacea*
 - (00.0.000.6532) *Festuca rubra*
 - (00.0.000.6540) *Glyceria*
 - (00.0.000.6541) *Glyceria elata*

- (00.0.000.6550) *Holcus*
- (00.0.000.6560) *Hordeum*
 - (00.0.000.6561) *Hordeum brachyantherum* ssp. *brachyantherum*
 - (00.0.000.6562) *Hordeum brachyantherum* ssp. *californicum*
 - (00.0.000.6563) *Hordeum jubatum*
- (00.0.000.6570) *Leptochloa*
 - (00.0.000.6571) *Leptochloa uninerva*
- (00.0.000.6580) *Leymus*
 - (00.0.000.6581) *Leymus condensatus*
 - (00.0.000.6582) *Leymus triticoides*
- (00.0.000.6590) *Muhlenbergia*
 - (00.0.000.6591) *Muhlenbergia andina*
 - (00.0.000.6592) *Muhlenbergia asperifolia*
 - (00.0.000.6593) *Muhlenbergia filiformis*
 - (00.0.000.6594) *Muhlenbergia rigens*
- (00.0.000.6600) Persistent Emergent Types (Poaceae P-Z Grasses)
 - (00.0.000.6610) *Paspalum*
 - (00.0.000.6611) *Paspalum dilitatum*
 - (00.0.000.6612) *Paspalum distichum*
 - (00.0.000.6620) *Pennisetum*
 - (00.0.000.6621) *Pennisetum clandestinum*
 - (00.0.000.6630) *Phalaris*
 - (00.0.000.6631) *Phalaris aquatica*
 - (00.0.000.6640) *Piptatherum*
 - (00.0.000.6641) *Piptatherum miliaceum*
 - (00.0.000.6650) *Poa*
 - (00.0.000.6651) *Poa pratensis*
- (00.0.000.6600) Persistent Emergent Types (Other Families)
 - (00.0.000.6610) Liliaceae
 - (00.0.000.6611) *Smilacina racemosa*
 - (00.0.000.6612) *Veratrum californicum*
 - (00.0.000.6620) Sparganiaceae
 - (00.0.000.6621) *Sparganium eurycarpum*
 - (00.0.000.6630) Typhaceae
 - (00.0.000.6631) *Typha angustifolia*
 - (00.0.000.6632) *Typha domingensis*
 - (00.0.000.6633) *Typha latifolia*
- (00.0.000.6700) Nonpersistent Emergent Types (Poaceae)
 - (00.0.000.6710) *Hordeum*
 - (00.0.000.6711) *Hordeum depressum*
 - (00.0.000.6712) *Hordeum marinum*
 - (00.0.000.6720) *Lolium*
 - (00.0.000.6721) *Lolium multiflorum*
 - (00.0.000.6730) *Orcuttia*
 - (00.0.000.6731) *Orcuttia californica*
 - (00.0.000.6740) *Paspalum*
 - (00.0.000.6741) *Paspalum distichum*

- (00.0.000.6750) *Polypogon*
- (00.0.000.6751) *Polypogon monspeliensis*
- (00.0.000.6760) *Vulpia*
- (00.0.000.6800) Nonpersistent Emergent Types (Other Families)
- (00.0.000.6810) Alismataceae
- (00.0.000.6811) *Alisma plantago-aquatica*
- (00.0.000.6812) *Echinodorus berteroi*
- (00.0.000.6820) Cyperaceae
- (00.0.000.6821) *Cyperus erythrorhizos*
- (00.0.000.6822) *Cyperus odoratus*
- (00.0.000.6823) *Cyperus squarrosus*
- (00.0.000.6824) *Cyperus*
- (00.0.000.6825) *Eleocharis bella*
- (00.0.000.6826) *Eleocharis macrostachya*
- (00.0.000.6827) *Eleocharis parishii*
- (00.0.000.6830) Juncaceae
- (00.0.000.6831) *Juncus bufonius*
- (00.0.000.6832) *Juncus xiphioides*
- (00.0.000.6840) Juncaginaceae
- (00.0.000.6841) *Lilaea scilloides*
- (00.0.000.6850) Liliaceae
- (00.0.000.6860) Orchidaceae
- (00.0.000.6861) *Epipactis gigantea*

(00.0.000.7000) Mixed-Vascular Plant Dominance/Characteristic Types

(00.0.000.8000) Animal Dominance/Characteristic Types

- (00.0.000.8100) Sponge Types
- (00.0.000.8200) Coelenterate Types
- (00.0.000.8300) Mollusc Types
- (00.0.000.8400) Annelid Types
- (00.0.000.8500) Crustacean Types
- (00.0.000.8600) Insect Types
- (00.0.000.8700) Echinoderm Types
- (00.0.000.8800) Other Invertebrate Types
- (00.0.000.8900) Vertebrate Types