

IV. KEYS



California, Riverside County: Santa Rosa Plateau

KEY TO THE WETLANDS

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To facilitate the identification and classification of wetlands of the central and southern California coast and coastal watersheds, we have constructed dichotomous keys for the systems, subsystems and classes of wetlands. These keys are modifications of those presented by Cowardin et al. (1979). Keys to several subsystems that are deepwater habitats rather than wetlands are included for the purpose of comparison. Various classes for some systems are not included here because they do not occur in coastal central and southern California. Conversely, we have expanded the classification and accompanying keys when wetlands have been found to occur in California that are not represented in the Cowardin et al. hierarchy. Refer to Section III, Classification, for an explanation of the methodology for wetland identification presented herein.

KEY TO THE WETLAND SYSTEMS

Water regime of habitats is influenced (at least one episode seasonally or enough to establish functions of system related habitats) by oceanic tides; salinity due to ocean-derived salts (i.e., ocean-derived sodium chloride) is 0.5 ppt (parts per thousand) or greater:

Habitats are semi-enclosed by land, but are open to, partly obstructed from, or have sporadic access to the ocean and oceanic tides; halinity (concentration of sodium chloride) can vary widely within or between examples because of evaporation or because of mixing with fresh water from runoff from land**ESTUARINE SYSTEM**

Habitats are not obstructed, or have minor obstruction, to the open ocean; halinity usually euhaline or temporarily or seasonally less near the mouths of rivers.....**MARINE SYSTEM**

Water regime is not influenced by oceanic tides, or if water regime is influenced by ocean tides the salinity is less than 0.5 ppt (i.e., the approximate background salinity of runoff from watersheds):

Emergent mosses, persistent emergent vascular plants, shrubs, or trees cover 30% or more of the habitat; if nonpersistent emergents, other non-plant organisms, or no organisms

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KEY TO THE WETLANDS

dominate, the wetland is not a riverine nor a lacustrine habitat....**PALUSTRINE SYSTEM**

Emergent mosses, persistent emergent vascular plants, shrubs, or trees cover less than 30% of the substrate, but nonpersistent emergents may be widespread seasonally:

Habitat situated in a channel or along a channel shore; water when present is flowing (e.g., streams and rivers and the vegetation when present is nonpersistent).....**RIVERINE SYSTEM**

Habitat situated in a basin or on level but sloping ground; water when present is usually not flowing, but if in a channel the vegetation is persistent or nonpersistent:

Habitat area is generally 8 hectares (20 acres) or greater (e.g., large lakes).....**LACUSTRINE SYSTEM**

Habitat area is less than 8 hectares (e.g., ponds and pools):

Waved-formed or bedrock-shoreline habitat feature is present, or water depth is 2 meters (6 feet) or greater**LACUSTRINE SYSTEM**

No wave-formed or bedrock-shoreline habitat feature is present, and water is less than 2 meters deep.....**PALUSTRINE SYSTEM**

KEY TO THE MARINE SUBSYSTEMS AND CLASSES

Marine substrate is continuously submerged (i.e., subtidal habitats, which are not included in this volume).....**DEEPWATER HABITAT SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%:

Substrate formed by the colonization of sedentary (i.e., attached) invertebrates (e.g., corals, tube worms).....**Reef Class**

Substrate composed of rock or sediment; often colonized by invertebrates but not formed of sedentary types:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Bottom Class**

During the growing season of most years, percentage of habitat covered by vegetation (e.g., algae and marine aquatic flowering plants such as *Zostera*) is 30% or greater.....**Aquatic Bed Class**

Marine substrate is at least irregularly exposed and flooded by oceanic tides, or receives wave splash.....**INTERTIDAL SUBSYSTEM**

KEY TO THE WETLANDS

During the growing season of most years, areal cover by vegetation (algae and marine flowering plants such as *Phyllospadix*) is greater than 30%.....**Aquatic Bed Class**

During the growing season of most years, areal cover by vegetation is less than 30%:

Substrate is formed by the colonization of sedentary invertebrates (e.g., mussels)**Reef Class**

Substrate composed of rock or sediment; often inhabited by invertebrates but not formed by the colonization of sedentary types:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....**Rocky Shore Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Shore Class**

KEY TO THE ESTUARINE SUBSYSTEMS AND CLASSES

Estuarine substrate is continuously submerged (i.e., subtidal habitats, which are not included in this volume, except where emergent species dominate in subtidal channels).....**DEEPWATER HABITAT SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%:

Substrate formed by the colonization of sedentary (i.e., attached) invertebrates (e.g., mussels, oysters).....**Reef Class**

Substrate composed of rock or sediment; often colonized by invertebrates but not formed of sedentary types:

Substrate of bedrock, boulders, stones, or combinations of these covering 70% or more of the habitat.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 75% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Bottom Class**

During the growing season of most years, percentage of habitat covered by vegetation (e.g., algae and estuarine aquatic flowering plants such as *Ruppia*) is 30% or greater.....**Aquatic Bed Class**

Estuarine substrate is at least irregularly exposed and flooded by oceanic tides**INTERTIDAL SUBSYSTEM**

KEY TO THE WETLANDS

During the growing season of most years, areal cover by vegetation is less than 30%:

Substrate formed by the colonization of sedentary invertebrates (e.g., mussels)
.....**Reef Class**

Substrate composed of rock or sediment; often inhabited by invertebrates but not
formed by the colonization of sedentary types:

Habitat contained within a channel bed.....**Streambed Class**

Habitat along a shoreline:

Substrate of bedrock, boulders, rubble, or combinations of these
covering 70% or more of the habitat.....**Rocky Shore Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less
than 70% areal cover of bedrock, boulders, or rubble
.....**Unconsolidated Shore Class**

During the growing season of most years, percentage of area covered by vegetation (e.g.,
algae, aquatic and emergent vascular plants, or shrubs) is 30% or greater:

Vegetation composed predominantly by macrophytic algae.....**Aquatic Bed Class**

Vegetation composed predominantly of vascular species:

Vegetation herbaceous:

Vegetation tidally-submerged rooted-aquatic, floating-leaved, or
floating types (e.g., *Ruppia*, *Potamogeton*, *Lemna*).
.....**Aquatic Bed Class**

Vegetation emergent types:

During the growing season of most years, the vegetation is
composed largely of pioneering annuals and seedlings of
perennials that occur at the time of substrate exposure:

Vegetation occurs on unconsolidated bottom or bed
habitats.....
.....**Unconsolidated Bottom (Vegetated) Class**

Vegetation occurs on unconsolidated shore or bank
habitats.....
.....**Unconsolidated Shore (Vegetated) Class**

During most years, the vegetation is composed largely of
persistent species that dominant the substrate (e.g.,
Salicornia, *Scirpus*, *Spartina*).....**Emergent Wetland Class**

Vegetation shrubs or trees:

Dominant plants less than 5 meters (15 feet) tall and composed of
shrubs or stunted trees.....**Scrub/Shrub Wetland Class**

KEY TO THE WETLANDS

Dominant plants 5 meters tall or taller (does not occur in Calif.)
.....**Forested Wetland Class**

KEY TO THE RIVERINE SUBSYSTEMS AND CLASSES

Water gradient is low and under the influence of oceanic tides (there are no examples of this subsystem in the study area, but there are in large river systems to the north).....
.....**TIDAL SUBSYSTEM**

Substrates are continuously submerged (i.e., subtidal habitats):

During the growing season of most years, areal cover by vegetation is less than 30%:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....
.....**Unconsolidated Bottom Class**

During the growing season of most years, percentage cover by vegetation (e.g., algae and submerged aquatic vascular plants such as *Potamogeton*, *Zannichellia*, *Elodea*) is 30% or greater**Aquatic Bed Class**

Substrates are at least irregularly exposed and flooded by oceanic tides (i.e., intertidal habitats):

During the growing season of most years, areal cover by vegetation is less than 30%:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the substrate.....**Rocky Shore Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....
.....**Unconsolidated Shore Class**

During the growing season of most years, percentage of area covered by herbaceous vegetation (e.g., algae, aquatic and emergent vascular plants) is 30% or greater:

Vegetation tidally-submerged rooted aquatic, floating-leaved, or floating types (e.g., *Zannichellia*, *Najas*, *Lemna*).....**Aquatic Bed Class**

Vegetation intertidal, non-persistent emergent types (e.g *Sagittaria*, *Isoetes*, *Elatine*)**Emergent Wetland Class**

Water gradient is low, high, or intermittent, but there is no influence from oceanic tides:

Water flows in the channel for only part of the year; when water is not flowing surface water may be absent, or water may occur as isolated pools.....
.....**INTERMITTENT SUBSYSTEMS**

Channel occurs within a relatively high gradient (4-10%), where flows are often flashy and closely tied to specific rainfall events, and is entrenched with steep banks and poorly defined floodplains.....**UPPER INTERMITTENT SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%.....**Streambed Class**

During the growing season of most years, percentage of area covered by vegetation is 30% or greater, composed largely of pioneering annuals and seedlings of perennials that occur at the time of substrate exposure.....**Streambed (Vegetated) Class**

Channel occurs within a depositional landform, with a moderate gradient (1.5-4%) and low sinuosity, and is slightly entrenched**MID INTERMITTENT SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%.....**Streambed Class**

During the growing season of most years, percentage of area covered by vegetation is 30% or greater, composed largely of pioneering annuals and seedlings of perennials that occur at the time of substrate exposure.....**Streambed (Vegetated) Class**

Channel occurs within a depositional landform with a low gradient (1.5% or less), where the floodplain is moderate to well developed, the valley only slightly confined, and the channel only slightly entrenched.....**LOWER INTERMITTENT SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%.....**Streambed Class**

During the growing season of most years, percentage of area covered by vegetation is 30% or greater, composed largely of pioneering annuals and seedlings of perennials that occur at the time of substrate exposure.....**Streambed (Vegetated) Class**

Some water flows in the channel throughout the year.....**PERENNIAL SUBSYSTEMS**

Channel gradient is high (4-10%) and water velocity is at least seasonally or temporarily fast;substrates consist of rock, cobbles, or gravel with patches of sand; a floodplain is usually lacking or poorly developed.....**UPPER PERENNIAL SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%:

Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil; bottoms and beds:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....
.....**Rock Bottom Class**

Substrate of sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble
.....**Unconsolidated Bottom Class**

Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded; shores and banks:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....
.....**Rocky Shore Class**

Substrate of sand, gravel, or cobble with less than 70 % areal cover of bedrock, boulders, or rubble
.....**Unconsolidated Shore Class**

During the growing season of most years, percentage of area covered by herbaceous vegetation is 30% or greater:

Vegetation generally permanently-flooded algae, rooted aquatic, floating-leaved, or floating types.....**Aquatic Bed Class**

Vegetation dominated by nonpersistent emergent types:

During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.....
.....**Unconsolidated Bottom (Vegetated) Class**

Vegetation occurs on exposed, unconsolidated shore or bank habitats.....
.....**Unconsolidated Shore (Vegetated) Class**

During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded riverine habitat.....**Emergent Wetland Class**

Channel gradient is moderate (1.5-4%) and sinuosity low, and occurs in a depositional and form; substrate is variable but dominated by cobbles, gravel, and sand.....**MID PERENNIAL SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%:

KEY TO THE WETLANDS

Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil; bottoms and beds:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....
.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble**Unconsolidated Bottom Class**

Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded; shores or banks:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....
.....**Rocky Shore Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble**Unconsolidated Shore Class**

During the growing season of most years, percentage of area covered by herbaceous vegetation (e.g., algae, submerged aquatic and nonpersistent emergent vascular plants) is greater than 30%:

Vegetation generally permanently-flooded algae, rooted aquatic, floating-leaved, or floating types (e.g., *Potamogeton*, *Lemna*).....
.....**Aquatic Bed Class**

Vegetation dominated by nonpersistent emergent types:

During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.....
.....**Unconsolidated Bottom (Vegetated) Class**

Vegetation occurs on exposed, unconsolidated shore or bank habitats.....
.....**Unconsolidated Shore (Vegetated) Class**

During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded riverine habitat.....**Emergent Wetland Class**

Channel gradient (1.5% or less) and water velocity are low; substrates are mostly sand and mud; a floodplain is often well developed.....
.....**LOWER PERENNIAL SUBSYSTEM**

KEY TO THE WETLANDS

During the growing season of most years, areal cover by vegetation is less than 30%:

Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil; bottoms and beds:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....
.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble**Unconsolidated Bottom Class**

Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded; shores and banks:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....
.....**Rocky Shore Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble**Unconsolidated Shore Class**

During the growing season of most years, percentage of area covered by herbaceous vegetation (e.g., algae, submerged aquatic and nonpersistent emergent vascular plants) is greater than 30%:

Vegetation generally permanently-flooded algae, rooted aquatic, floating-leaved, or floating types (e.g., *Potamogeton*, *Lemna*)
.....**Aquatic Bed Class**

Vegetation dominated by nonpersistent emergent types:

During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.....
.....**Unconsolidated Bottom (Vegetated) Class**

Vegetation occurs on exposed, unconsolidated shore or bank habitats.....
.....**Unconsolidated Shore (Vegetated) Class**

During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded riverine habitat.....**Emergent Wetland Class**

KEY TO THE LACUSTRINE SUBSYSTEMS AND CLASSES

All habitats (i.e., deepwater habitats) in a lake extending below a depth of 2 meters (6.6 feet) below low water or below the maximum extent of nonpersistent emergent plants, if these grow below 2 meters (all such habitats are excluded from this volume, but are included in the key for the purpose of comparison).....**LIMNETIC SUBSYSTEM**

During the growing season of most years, areal cover by vegetation (i.e., submerged rooted-vascular, floating-leaved, and floating such as *Najas*, *Potamogeton*, *Myriophyllum*) is 30% or greater.....**Aquatic Bed Class**

During the growing season of most years, areal cover by vegetation is less than 30%:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Bottom Class**

All habitats (i.e., wetlands) in a lake extending from the shoreline boundary of the system to a depth of 6 meters (6.6 feet) below low water or to the maximum extent of nonpersistent emergent plants, if these grow at depths greater than 2 meters..... **LITTORAL SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%:

Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Bottom Class**

Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded:

Substrate of bedrock, boulders, rubble of combinations of these covering 70% or more of the habitat.....**Rocky Shore Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Shore Class**

During the growing season of most years, percentage of area covered by herbaceous vegetation (e.g., algae, submerged aquatic and nonpersistent emergent vascular plants) is 30% or greater:

Vegetation generally consists of algae, submerged rooted aquatic, floating-leaved, or floating types (e.g., *Najas*, *Potamogeton*, *Myriophyllum*).....**Aquatic Bed Class**

KEY TO THE WETLANDS

Vegetation dominated by nonpersistent emergent types:

During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.....**Unconsolidated Bottom (Vegetated) Class**

Vegetation occurs on exposed, unconsolidated shore or bank habitats.....**Unconsolidated Shore (Vegetated) Class**

During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded littoral habitat**Emergent Wetland Class**

KEY TO THE PALUSTRINE CLASSES (there are no subsystems)

During the growing season of most years, areal cover by vegetation is less than 30%:

Water regimes include seasonally flooded, temporarily flooded, saturated, or artificially flooded; substrate is often a soil.....**Unconsolidated Shore Class**

Water regimes include permanently or semipermanently flooded or intermittently exposed; substrate is usually not a soil:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.....**Rock Bottom Class**

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.....**Unconsolidated Bottom Class**

During the growing season of most years, percentage of area covered by vegetation is 30% or greater:

Vegetation composed predominantly of nonvascular plants (e.g., algae or bryophytes):

Vegetation predominantly macrophytic algae, mosses, or lichens in water or the splash zones of shores.....**Aquatic Bed Class**

Vegetation predominantly mosses or lichens usually growing on organic soils and always outside the splash zone of shores.....**Moss-Lichen Wetland Class**

Vegetation composed predominantly of vascular plant species:

Vegetation herbaceous:

Vegetation generally consists of submerged rooted aquatic, floating-leaved, or floating types (e.g., *Najas*, *Potamogeton*, *Myriophyllum*)..**Aquatic Bed Class**

Vegetation dominated by emergent types:

KEY TO THE WETLANDS

Vegetation composed of pioneering annuals, nonpersistent perennials, or seedlings of perennials that often are not hydrophytes and occur only at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.....**Unconsolidated Bottom (Vegetated) Class**

Vegetation occurs on exposed, unconsolidated shore or bank habitats.....**Unconsolidated Shore (Vegetated) Class**

Vegetation predominantly perennials or nonpersistent hydrophyte species occurring in natural, restored, or recreated habitats.....**Emergent Wetland Class**

Vegetation shrubs or trees:

Dominant plants generally less than 5 meters (15 feet) tall.....**Scrub-Shrub Wetland Class**

Dominant plants generally 5 meters (15 feet) tall or taller.....**Forested Wetland Class**