DRAFT COPY

State of California

The Resources Agency

DEPARTMENT OF FISH AND GAME

A KEY TO THE IDENTIFICATION AND CLASSIFICATION OF THE WETLANDS OF CALIFORNIA

by

Robert A. Radovich

Associate Fisheries Biologist

ENVIRONMENTAL SERVICES DIVISION

Administrative Report No._____

June 12, 1989

FORWARD

This report, and the accompanying key, are intended for use by Department of Fish and Game personnel in the identification of wetlands and wetland types. The key utilizes the wetland identification parameters contained in the U.S. Fish and Wildlife Service (USFWS) publication "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al., 1979). The key and the accompanying text are compatible with the USFWS wetland definition which was adopted for Department use by the Fish and Game Commission in conjunction with the Commission's adoption of its Wetland Resources Policy. It is the intent of this report to engender a commonality of wetland terminology in intradepartmental and extradepartmental communications regarding wetlands. This report is also intended to translate the USFWS wetland classification system into a more easily understood and more commonly employed wetland vernacular.

Relatively minor departures from the USFWS classification system are incorporated into the key regarding the means by which wetland types are subdivided. However, an effort has been made to use essentially the same criteria for the purposes of subdividing wetland types. The result is that anyone familiar with both the attached key and the USFWS system will easily be able to translate key wetland types into USFWS parlance, and vice versa.

INTRODUCTION

The Fish and Game Commission adopted the USFWS wetland definition (as contained in Cowardin et al., 1979) 1/ for Department use in conjunction with application of the Commission's Wetland Resources Policy. For this reason, it is imperative that the Department identify wetlands in a manner which is consistent with that definition. Additionally, it is highly desirable that all Department personnel consistently apply the same parameters and standards during wetland identification procedures. Further, it is important that all Department personnel use the same wetland terminology so that intradepartmental communications involving wetlands convey clearly defined information regarding the wetland type under consideration. Lastly, it is important that the terminology which the Department uses to describe wetlands is easily understood by federal, state, and local agencies as well as the general public. This report and accompanying wetland identification key are intended to form the vehicle through which these goals may be achieved.

1/ The USFWS wetland definition as contained in Cowardin, et al., 1979 is as follows: "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: 1) at least seasonally, the land supports predominantly hydrophytes; 2) the substrate is predominantly undrained hydric soil; and 3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year."

"An oligosaline, circumneutral, semipermanently flooded, emergent, palustrine wetland, with 43 percent vegetative cover", conveys a fairly precise description of a wetland type, but, unless one is familiar with the USFWS classification system, the image conveyed is anything but clear. The accompanying key would indicate that this wetland is a "saline marsh". The term "saline marsh", as used in the attached key, means that this wetland is more than 30 percent vegetated aerially; that this vegetation is dominated by plants characteristic of a brackish water marsh; that the area is either inundated periodically or that the substrate is sufficiently saturated periodically to convey competitive advantage to brackish water wetland vegetation; that water salinity is sometimes or always in the range 0.5 ppt - 30 ppt; that the area has no physical connection with the sea; and that the area is a wetland by the standards set forth in the USFWS definition. This is a considerable amount of information for two words to convey, and the term "saline marsh" is easily recognizable by federal, state, and local agencies with which the Department deals. The attached key is intended to simplify wetland terminology while simultaneously conveying sufficient information to result in an acceptably clear statement of the hydrologic, vegetative, and salinity factors involved in a given wetland area.

TECHNICAL STANDARDS FOR WETLAND IDENTIFICATION

The identification of wetlands revolves around essentially two parameters: requisite vegetation and/or requisite hydrology. The

hydric soil parameter common to many wetland classification/ identification systems is, of course, indicative of the existence of requisite hydrology rather than a truly independent parameter.

Wetlands consist of the union of those areas which are at least seasonally dominated by plants which are adapted to life in saturated soils (i.e., hydrophytes), and those areas which are not deepwater habitats and which are at least periodically inundated or in which the substrate is at least periodically saturated. An intertidal salt marsh is a wetland by virtue of requisite vegetation and hydrology. A salt flat, lacking vegetation but seasonally inundated nonetheless, is a wetland by virtue of its seasonal inundation. A high pickleweed-dominated salt marsh area at a supertidal elevation may very rarely be inundated, but is identifiable as a wetland because the dominant vegetation is characteristic of a salt marsh.

Another seemingly viable means of recognizing a wetland is to become familiar with what a wetland is not. Nonwetland is definable as deepwater habitats together with those areas which are <u>not</u> at least periodically inundated or saturated <u>and</u> which are <u>not</u> at least seasonally dominated by hydrophytic vegetation. Wetlands, by exclusion, are all areas which are not nonwetlands.

The recognition of wetlands requires that we clearly define the pivotal terms which are used. What is vegetative dominance? What is periodic inundation? What are deepwater habitats? Which plants are

adapted to life in saturated soils? Given adequate responses to these, and other, questions, accurate wetland recognition should become a consistent result of requisite vegetation and/or hydrologic parameters. A discussion of each of these terms, other critical terms used in the attached key and accompanying text, and appropriate definitions are contained in the next section.

A DISCUSSION OF TERMS USED IN THE ACCOMPANYING KEY

For the proposes of clarity, important terms are discussed and/or defined as follows:

Chroma - Soil chroma refers to that aspect of the soil's color, pursuant to the Munsell color system, by which a soil sample appears to differ from a gray of the same lightness or brightness. 1/

1/ Soil Conservation Service, 1975

Deepwater Habitats - Aquatic areas which exist below the mean annual low spring tide 1/ elevation in areas which are subject to tidal influence. Additionally, deepwater habitats, in a nontidal setting, are aquatic areas which exist below -6 feet mean annual low water level and which are devoid of rooted vascular hydrophytes.

Dominant Vegetation - The vegetation controlling the environment. With respect to wetland identification, the term "dominant" relates to whether hydrophytes or the union of mesophytes and xerophytes control a given area. This determination is to be based upon percent aerial coverage. If the union of "obligate wetland," "facultative wetland," and "facultative" indicator species (per the periodically up-dated USFWS "List of Plant Species That Occur in Wetlands - Region 0") cover a greater area than obligate and facultative upland indicator species (per the USFWS listing) in a given area at least seasonally, then the area is a wetland by virtue of dominance by hydrophytes.

1/ The term "mean annual low spring tide" means the mean of all annual extreme low tides, and has nothing to do with the spring season. Spring tides occur at or shortly after the new or full moon.

Hydric Soil - Soil that is wet enough, long enough, and often enough to periodically produce anaerobic conditions. Hydric soils may be inferred if the substrate of an area in question is known to be periodically inundated or saturated; if the soil contains a mottled soil horizon (the result of iron ion migration during anaerobic soil conditions) with a chroma of 2 or less; or if the area is otherwise known to contain a soil association classified as hydric pursuant to standards which have been established by the Soil Conservation Service (adapted from Huffman, 1981). Identification of hydric soils within a given area may be used to infer that the area possesses a hydrologic regime which is adequate to designate the area as wetland. Such an inference will prevail unless there is conclusive evidence that the area does not support at least seasonal dominance by hydrophytes, and that the area is not periodically inundated or saturated as those terms are defined herein. In this regard, and consistent with USFWS wetland definition and classification system, an area in which hydric soils are indicative of former hydrologic conditions rather than the existing hydrologic conditions within that area, and in which the substrate is neither inundated nor saturated at least periodically, and in which hydrophytic vegetation is not at least periodically dominant, is not a wetland.

Hydrophytes - Plants which appear on the USFWS list of hydrophytes for Region "O" (i.e., California), and which are either "obligate wetland", "facultative wetland", or

"facultative" indicators (OBLW, FACW, or FAC) according to that listing. Additionally, because the USFWS list of wetland plants for Region O may omit certain plants characteristic of wetland areas. The term "hydrophytes" is hereby expanded to include plants not on the USFWS list if such plants are known to occur in wetlands rather than in upland settings at least 50 percent of the time. However, for practical purposes associated with the determination of hydrophytic dominance, the extensive USFWS species listing for California (i.e., Region "O") will almost undoubtedly be thoroughly adequate in all but the most exceptional of circumstances.

At the upper margins of clearly defined wetland areas or in the case of marginal wetland areas, an area is wetland on the basis of the vegetation parameter alone if the aerial coverage of the union of OBLW, FACW, and FAC indicators exceeds the aerial vegetative cover of FACU species, OBLU species, and upland species not on the USFWS list of wetland indicators for Region "O" at least seasonally.

It is generally advisable to conduct field wetland determinations in the season in which you would be most likely to observe seasonal dominance by hydrophytic vegetation as well as maximized seasonal inundation. Those who conduct field vegetative surveys during August, for example, tend to minimize the likelihood of observing both normal inundation/saturation

patterns and seasonal presence of hydrophytic plants. Such poorly timed wetland identification efforts, especially in marginal wetland areas, are generally prone toward underestimation of wetland acreage.

Mesophytes and Xerophytes - For practical purposes associated with the use of the attached key, let the union of mesophytes and xerophytes simply be interpreted as "all rooted, vascular, nonhydrophytic vegetation."

Periodic inundation (or saturation) - The question of how often an area must be inundated (or saturated) to qualify as a wetland, pursuant exclusively to the inundation or saturation standards previously discussed, continues to be a somewhat perplexing issue. An intertidal area is clearly inundated often enough, but at least portions of a 250-year flood event zone for example, probably are not inundated or saturated often enough to support their identification as wetlands based exclusively upon inundation/saturation criteria. However, our approach to wetland identification centers upon two parameters operating either in union or independently: requisite hydrology or requisite vegetation or both. This approach assumes (with considerable justification) that areas which support at least seasonal dominance by wetland vegetation (hydrophytic

vegetation) are wet enough, long enough to competitively preclude year-round dominance by mesophytic and xerophytic vegetation, and are, therefore, classifiable as wetlands. Using the previously introduced example of a 250-year flood plain, the portions of the flood plain which contain dominant stands of hydrophytic vegetation on at least a seasonal basis are wetlands irrespective of the periodicity of inundation or substrate saturation.

But, what of areas which are not at least seasonally dominated by vascular hydrophytic vegetation or which are devoid of vegetation - how often must these areas be inundated or saturated? They must be inundated or saturated often enough to retain a complement of animals or plants which are adapted for life in an aquatic environment, or often enough to retain hydric soils. For example, desert vernal pools which may be inundated only infrequently - say once every 5 years or so, and which may or may not contain hydric soils, but which retain the eggs and/or other desiccation resistant life stages of fairy shrimp, tadpole shrimp, clam shrimp, cladocerans, ostracods, etc., which are "activated" when the depression fills with water are wetlands by virtue of the fact that they maintain a complement of animals which are adapted to life in an aquatic environment. Further, areas in which the existing hydrology is sufficient to support the maintenance of hydric soils are inundated or saturated often enough for classification as wetlands.

Seasonal(ly) - The term seasonal(ly) means that the event occurs at least yearly during years of at least normal precipitation.

Tidal - The term "tidal" presumes that the area under consideration is contiguous with marine and/or estuarine areas (i.e., that an unbroken connection to marine or estuarine areas subject to the ebb and flow of the tide exists). For example, consider a river flowing into an embayment. Presume that the embayment is marine or estuarine in nature and that the water in the embayment rises and falls with the marine tide. The embayment is "tidal" because it is subject to the ebb and flow of the marine tide. Portions of the river are also subject to the ebb and flow of the marine tide and are "tidal" in nature. The primary question which arises is: What is the upper limit of the descriptive term "tidal"? Rather than assign a minimum tidal fluctuation as the upper limit, it seems more descriptive of the biological communities and individual organisms likely to be found a given area, to consider the level of ocean derived salts in water associated with the area. Further, as previously stated, we have made a conscious effort to produce a wetland key which is responsive to the wetland classification considerations contained in the USFWS "Classification of Wetlands and Deepwater Habitats of the United States". Therefore, the upper limit of the application of the adjective "tidal" is "upstream and/or landward to where ocean-derived salts measure less than 0.5 percent (or 5 ppt TDS in water) during the period of average annual low flow" (Cowardin, et al., 1979, in reference to the upper limit of the estuarine system).

WETLAND TYPES

The accompanying key is intended first to identify a given area as a wetland or a nonwetland (either upland or deepwater communities). If an area is a wetland, the key then dichotomizes along hydrologic, vegetative, and salinity parameters. The terms used to describe hydrologic, vegetative, and salinity parameters are defined as follows:

Hydrologic and Vegetative Terminology

Aquatic - The term "aquatic" is used to denote wetlands which are permanently inundated.

Marsh - The term "marsh" is used to denote wetlands which are at least 30 percent vegetated from an aerial perspective and in which herbaceous (nonwoody) hydrophytes are dominant.

Vegetated flat - The term "vegetated flat" is used to denote vegetated wetlands which are less than 30 percent vegetated from an aerial perspective and in which hydrophytes are dominant.

Flat - The term "flat" is used to denote unvegetated wetlands which are not permanently inundated.

Riparian wetland - The term "riparian wetland" is used to denote wetlands which are at least 30 percent vegetated from an aerial perspective and in which woody hydrophytes are dominant.

Salinity Terminology

Fresh - The term "fresh" is used to denote the presence of salts in water, at levels always less than 0.5 ppt TDS.

Brackish - The term "brackish is used to denote the presence of salts in water, at levels sometimes or always between 0.5 and 30 ppt TDS, in areas subject to tidal influence.

Marine - The term "marine" is used to denote the presence of salts in water, at levels always in excess of 30 ppt, in tidal areas (sea water, in temperate latitudes, normally contains 34 to 35 ppt TDS).

Saline - The term "saline" is used to denote the presence of salts in water, at levels sometimes or always between 0.5 ppt TDS and 30 ppt TDS, in areas not subject to tidal influence.

Hypersaline - The term "Hypersaline" is used to denote the presence of salts in water always at levels in excess of 30 ppt TDS, in nontidal areas.

The terms defined above are used in various combinations to describe the wetland types contained in the attached key. The key provides for the description of 23 distinct wetland types and also includes "unclassified vegetated wetland" and "unclassified vegetated flat" classifications to incorporate sufficient flexibility for the inclusion of all wetland types not specifically referenced in the key. When faced with a situation where the wetland under consideration falls into an "unclassified" wetland category (and this is likely to be only a comparatively rare occurrence) the user of the attached key is encouraged to describe the wetland using terminology as consistent as possible with that contained in this report. For example, if the user is faced with a periodically inundated rock outcropping covered with sea lettuce, he/she should, by key construction, describe this area as a marine flat (covered with sea lettuce). If instead of sea lettuce an intertidal marine area contained rooted vascular hydrophytes not characteristic of a salt marsh, and these rooted vascular hydrophytes covered more than 30 percent of the area from an aerial perspective, then the user of the attached key would arrive at the "unclassified vegetated wetland" classification. In light of the marine setting it would be reasonable for the user to describe the area as a "marine marsh" even though this classification does not appear in the attached key.

Lastly, it will generally be desirable to describe a wetland in somewhat more detail than simply reporting its identity as one of wetland types specifically referenced in the attached key. In this

regard, it is generally advisable to include a description of the hydrology of the area; and a description of either the substrate (primarily in unvegetated wetlands) or the vegetative composition if the wetland area is vegetated.

If you were dealing with an intertidal salt marsh, it would be desirable to indicate the intertidal nature of the area and to indicate the dominant and subdominant hydrophytes involved. For example, you might refer to this area as "an intertidal salt marsh dominated by Salicornia virginica with Distichlis spicata and Frankenia grandifolia subdominant". If you were dealing with a wetland which keys out as a freshwater flat (and is therefore devoid of vegetation) you should mention the hydrology of the area for clarity and you should mention the type of substrate involved. For example, you might refer to such an area as "a seasonally inundated freshwater flat with a cobble (or gravel, or mud, or sand, etc.) substrate." Such relatively minor additional descriptive effort as that mentioned in these examples contributes greatly to the clarity of the information conveyed, and is, for this reason, strongly recommended.

CHARACTERISTIC VEGETATION

The attached key relies, in part, upon the characteristics of the vegetation present within a given wetland area to assign that wetland area to a particular wetland type classification. Although it is not

the intent of this paper to provide the reader with an exhaustive list of plant species for each wetland type, and although this function is largely accomplished by the U.S. Fish and Wildlife Service (USFWS) wetland plant list for Region "0", it seems desirable to list the most common plants associated with each wetland type presented in the attached key. The following brief lists are not all-inclusive. However, most vegetated wetland types presented in the attached key tend to be dominated by the plants included in the plant lists, and the vast majority of vegetated wetlands in California include at least some of the plants listed for each vegetated wetland type.

Salt Marsh

Among the more common plants associated with California salt marshes are:

Atriplex patula	Fat hen, salt bush
Atriplex semibaccata	Australian salt bush
Batis maritima	Saltwort
Cotula coronopifolia	Brass buttons
Cressa truxillensis	Alkali weed
Cuscuta salina	Salt marsh dodder
Distichlis spicata	Salt grass
Frankenia grandifolia	Alkali heath
*Grindelia humilis	Gum plant
*Heliotropium curassauicum	Sea heliotrope
Juncus spp.	Rushes
Jaumea carnosa	Fleshy jaumea
Limonium californicum	Marsh rosemary
Monanthochloe littoralis	Shoregrass
Pluchea purpurascens	Salt marsh fleabane
Polypogon monspeliensis	Rabbitfoot grass
Salicornia bigelovii	Annual pickleweed
Salicornia subterminalis	Pickleweed, glasswort
Salicornia virginica	Common pickleweed
Salicornia spp.	Other pickleweeds
Spartina foliosa	Cordgrass

Suaeda californica	Sea-blite
Suaeda fruticosa	Sea-blight
Triglochin concinna	Utah arrowgrass
Triglochin maritima	Seaside arrowgrass
Triglochin striata	Arrowgrass
**Zostera maritima	Eelgrass

*Also occurs regularly in upland and/or transition zones.

**Also occurs regularly in deepwater habitat below mean annual spring tide.

*Brackish Marsh

Alisma triviale	Water-plantain
Juncus balticus	Baltic rush
Juncus bufonius	Toad rush
Juncus effusus	Common rush
Lilaeopsis occidentalis	Lilaeopsis
Phragmites communis	Common reed
Plantago hirtella	Plantain
Potamogetan pectinatus	Sago pondweed
Rupia maritima	Widgeongrass
Scirpus acutus	Common tule/Hardstem bulrush
Scirpus americanus	Three square bulrush
Scirpus californicus	California bulrush
Scirpus olneyi	Olney bulrush
Scirpus robustus	Alkali bulrush
Typha domingensis	Cattail

*The user of the attached key should be aware that considerable overlap exists between plant species which are characteristic of salt marshes and brackish water marshes. An attempt has been made in the plant listings for salt marshes and brackish water marshes to separate the two lists based upon relative salt tolerance but be aware of overlap especially from some salt marsh indicator species occurring in brackish water conditions.

Freshwater Marsh

**Callitriche spp.	Starwort
**Carex spp.	Sedges
**Eleocharis macrostachya	Spike-rush
Elodea spp.	Elodea
*Equisetum arvense	Horsetail, scouring rush
Hydrocotyle ranunculoides	Water pennywort
**Juncus spp.	Rush
Nuphar polysepalum	Yellow pond-lily
Oevanthe sarmentosa	Water parsley
Polygonum aviculare	Common knotweed
Polygonum punctatum	Water smartweed
Potamogeton spp.	Pondweed
Ranunculus spp.	Buttercup
Rorippa nasturtium-aquatic	Water-cress
Sagittaria latifolia	Arrowhead
Scirpus spp.	Bulrush
Sparganium eurycarpum	Bur-reed
Typha spp.	Cattail
Veronica americana	American brooklime

*Also commonly found in upland situations, but generally at least near water, and normally in shade most often provided by riparian trees.

**Also contains species associated primarily with vernal pools, freshwater marsh, brackish marsh, or salt marsh.

Riparian Wetland

Acer spp.	Maples
Acer negundo	Box elder
Alnus spp.	Alders
Athyrium spp.	Ferns
Baccharis spp.	Coyote bush
Betula fontinalis	Water birch
Cephalanthus occidentalis	Button willow
Cornus spp.	Dogwood
Juglans californica	Black walnut
Lonicera inuolucrata	Twinberry
Myrica californica	Wax-myrtle
Platanus racemosa	Sycamore
Populus spp.	Cottonwoods, aspens
Pteridium spp.	Ferns
Ribes menziessii	Canyon gooseberry
Rubus spectabilis	Salmon berry
Rubus ursinus	California blackberry
Salix spp.	Willows
Sambucus spp.	Elderberry
Umbellularia californica	California bay

Vernal Pool

Alopecurus spp.	Meadow foxtail
Brodiaea hyacinthina	White brodiaea
Deschampsia (Aira) spp.	Hair Grass
Downingia spp.	Downingia
Eryngium spp.	Button snakeroot
Isoetes spp.	Quillwort
Lilaea subulata	Lilaea
Limnanthes douglasii	Meadow-foam
Lythrium spp.	Loose-strife
Navarretia spp.	Skunkweed, Navarretia
Orcuttia californica	Orcutt-grass
Plagiobothrys acanthocarpus	Popcorn flower
Pogogyne spp.	Vernal pool mints
Psilocarphus spp.	Woolly marbles, other names
Tillaea (Crassula) aquatica	Pygmy-weed

ONE LAST WORD REGARDING THE KEY

As is generally the case, any attempt to classify or to define wetlands works best when the area under consideration is "obviously" a wetland of a "classic" nature. It requires little expertise to observe a pickleweed-dominated, intertidal salt marsh and to conclude that the area is, indeed, a wetland. Similarly, many upland and deepwater areas are easily identifiable. However, when a given area is not easily recognizable as a wetland (or upland), determining its wetland (or upland) nature requires the careful application of wetland identification standards. We believe that the accompanying key should lead the user to a proper determination of the wetland status of any area in question. This is a result of the excellence and the field-tested nature of the USFWS wetland definition and classification system upon which the accompanying key is firmly based.

If, at any time, the user finds that the accompanying key generates conclusions regarding the upland or wetland nature of a given area which are inconsistent with conclusions which would have been generated through use of the USFWS wetland definition and classification system, the user is instructed to resolve the disagreement in favor of the USFWS wetland definition. It is not the intent of this paper to produce a classification system which in any way conflicts or competes with the USFWS wetland definition. Rather it is our intent that this report and the attached key be used in a

manner which is in all ways compatible with the USFWS wetland definition and compatible with the direction of the Fish and Game Commission regarding the Department's use of the USFWS definition.

Under certain circumstances, the Corps of Engineers or the Environmental Protection Agency (pursuant to Clean Water Act Section 404) regulate activities in areas which do not presently function as wetlands by virtue of the perceived function of these areas under "normal circumstances". Further, the Corps may regulate uses in former wetland areas which at one time were navigable pursuant to Section 10 of the Rivers and Harbors Act of 1898. The attached key is not responsive to such considerations, and, therefore, the attached key is not meant to, in any way, interpret the peculiarities of some regulations related to wetland protection. On the contrary, the key is meant simply to identify presently functioning wetland areas and to classify them based upon vegetation, hydrology, and salinity parameters.

The wetland definition used by the Environmental Protection Agency and the Corps of Engineers for their Section 404 permit program is considerably less expansive than the USFWS definition. In this regard, only areas which exhibit hydric soils, and periodic inundation, and dominance by hydrophytic vegetation are wetlands pursuant to the Corps' interpretation of their wetland definition. However, all areas identified as wetlands pursuant to the USFWS definition (and the appended key) are "waters of the United States"

and are, therefore, subject to regulation pursuant to the requirements of the Federal Clean Water Act. In its communications with the Corps of Engineers and the Environmental Protection Agency (EPA) regarding the permit programs administered by these agencies, the Department should consistently indicate that all areas definable as wetlands pursuant to the USFWS definition and the attached key, be regulated either as wetlands or as waters of the United States. Lastly, and irrespective of the Corps/EPA wetland definition, the Fish and Game Commission's Wetland Resources Policy, and that of the Department, extends to all areas identifiable as wetlands pursuant to the USFWS definition and, therefore, identifiable as wetlands pursuant to the attached key.

A KEY TO THE IDENTIFICATION OF WETLANDS AND THE CLASSIFICATION OF WETLAND TYPES

I. Area is permanently inundated . . .

A. Area is nontidal in nature, water is greater than 6′ deep at mean annual low water and the substrate is devoid of rooted vascular hydrophytes; or the area is tidal in nature and, the substrate is below mean annual low spring tide[1/] . . . . . NOT WETLAND

A.′ Area is nontidal in nature, and water is not greater than 6′ deep at mean annual low water, or (irrespective of water depth) rooted vascular hydrophytes are present.

1. Water with salinity always less than 0.5 ppt TDS[2/] . . . FRESHWATER AQUATIC WETLAND

1.′ Water with salinity permanently or periodically in excess of 0.5 ppt TDS.

a.) Water with salinity always in excess of 30 ppt . . HYPERSALINE AQUATIC WETLAND

a′.)′ Water with salinity sometimes or always within the range 0.5 ppt TDS to 30 ppt TDS . . . . . SALINE AQUATIC WETLAND

[1/]The term "mean annual low spring tide" as used herein is the mean of all extreme annual low tides.

[2/]Parts per thousand, total dissolved solids. Estuarine and marine waters contain a complex solution of salts dominated by sodiun chloride (NaCl). Salinity in inland waters is controlled by the presence of four primary cations calcium (Ca), magnesium (Mg), sodium (Na), and potassium (K); and three primary anions carbonate (CO_3), sulfate (SO_4), and chloride (Cl). This key and the preceding detailed discussion, dichotomize salinities into "marine", "brackish", "hypersaline" and "saline" subsets based upon whether the subject areas are or are not under tidal influence rather than whether the salts present are of marine or other origin. consequently, some wetlands are identified as "saline" even though they possess salts of marine origin and even though they may exist adjacent to brackish or marine wetlands or deepwater habitat.

I.' Area is not permanently inundated . . .

A. Area is not periodically inundated nor are hydric soils present

1. Rooted vascular vegetation is present . . . . . .
a. Hydrophytic vegetative cover exceeds mesophytic and xerophytic vegetative cover at least seasonally . . . . . I', A'

a.' Mesophytic and xerophytic vegetative cover exceeds hydrophytic vegetative cover year-round . . . . . NOT WETLAND

1.' Rooted vascular vegetation absent . . . . . NOT WETLAND

A.' Area is known to be periodically inundated or hydric soils are present or you have arrived here through a positive response to item I.', A., 1., a.

1. Rooted vascular vegetation is present . . . . . .

a. Aerial vegetative coverage is equal to or greater than 30 percent of the area .

1.) Dominant vegetation is at least seasonally characteristic of a saltmarsh

a.) Area subject to tidal influence . . . . . TIDAL SALT MARSH
a.)' Area not subject to tidal influence . . . . . SALT MARSH

2.) Dominant vegetation is at least seasonally characteristic of a brackish water marsh . . .

a.) Area subject to tidal influence . . . . . BRACKISH WATER MARSH
a.)' Area not subject to tidal influence . . . . . SALINE MARSH

3.) Dominant vegetation is at least seasonally characteristic of a freshwater marsh . . . . . FRESHWATER MARSH

4.) Dominant vegetation is at least seasonally characteristic of a riparian wetland . . . . . RIPARIAN WETLAND

5.) Dominant vegetation is at least seasonally characteristic of a Vernal Pool . . . . . VERNAL POOL

6.) Area other than as described in 1.) through 5.) immediately above, hydrophytes are dominant at least seasoanlly . . . . . *UNCLASSIFIED VEGETATED WETLAND

a.' Aerial vegetative coverage is less than 30 percent of the area . . . . . .

1.) Dominant vegetation is characteristic of a salt marsh . . . . . .

a.) Area subject to tidal influence . . . . VEGETATED TIDAL SALT FLAT
a.)' Area not subject to tidal influence . . . . . VEGETATED SALT FLAT

2.) Dominant vegetation is characteristic of a brackish water marsh . . . . .

a.) Area subject to tidal influence . . . . . VEGETATED BRACKISH FLAT
a.)' Area not subject to tidal influence . . . . VEGETATED SALINE FLAT

3.) Dominant vegetation is characteristic of a freshwater marsh or a riparian community . . . . VEGETATED FRESHWATER FLAT

4.) Dominant vegetation is characteristic of a vernal pool . . . . . VERNAL POOL

5.) Area other than as described in 1.) through 4.) immediately above . . . . . *UNCLASSIFIED VEGETATED FLAT

1'. Rooted vegetation absent year-round . . . . . .

a. Water with salinity always less than 0.5 ppt TDS . . . . . FRESHWATER FLAT

a.' Water with salinity permanently or periodically in excess of 0.5 ppt TDS

1.) Water with salinity always in excess of 30 ppt TDS

a.) Area subject to tidal influence . . . . . MARINE FLAT
a.)' Area not subject to tidal influence . . . . . HYPERSALINE FLAT

1.)' Water with salinity within the range 0.5 ppt TDS to 30 ppt TDS at least seasonally.

a.) Area subject to tidal influence . . . . . BRACKISH WATER FLAT
a.)' Area not subject to tidal influence . . . . . SALINE FLAT

* Because of the desirability of keeping the number of subdivisions of this key to a reasonable minimum, the "unclassified vegetated wetland" and "unclassified vegetated flat" designations encompass an array of fairly infrequently encountered wetland types. By key construction, the "unclassified vegetated wetland" is at least 30 percent vegetated aerially; is not among those wetland types specifically referenced; and either exhibits hydrophytic dominance at least seasonally and doe not possess either hydric soils or periodic inundation parameters, or it exhibits periodic inundation, saturation and/or hydric soils irrespective of whether the area is at least seasonally dominated by hydrophytes. The "unclassified vegetated flat" is similar in nature, but it is less than 30 percent vegetated from an aerial perspective. An example of such a wetland might be a periodically saturated wet pasture in which hydrophytic vegetation is not at least periodically dominant. In describing such a wetland, the user of this key is encouraged to use the common term for the area (i.e., "wet pasture" in this example) and to describe the reason for its wetland status (i.e., periodically saturated wet pasture). The "unclassified vegetated wetland/flat" designations are not meant to imply that these areas are either less valuable to fish and wildlife resources or "less wetland" than any other wetland classification used in this key. It should be only rarely necessary to use the "unclassified vegetated wetland/flat" designation.

BIBLIOGRAPHY

Cowardin, L.M., et al., 1979 - Classification of Wetlands and Deepwater Habitats of the United States, U.S. Fish and Wildllife Service, OBS - 79/31

Fabre, P.M., 1982 "Common Wetland Plants of Coastal California", Pickleweed Press, Mill Valley, CA

Huffman, R.T., 1981, "Multiple - Parameter Approach to the Field Identification and Delineation of Aquatic and Wetland Ecosystems", U.S. Army Corps of Engineer Waterways Experiment Station, Vicksburg, Mississippi

Mason, H.L., 1969, "A Flora of the Marshes of California", University of California Press, Berkely, CA

Munz, P.A. and D.D. Keck, 1973, "A California Flora", University of California Press, Berkeley, CA

Reimond, R.J. and W.H. Queens, 1974, "Ecology of Halophytes", Academic Press, New York, NY

U.S. Fish and Wildlife Service, National Wetland Inventory Staff, 1987, "List of Plant Species that Occur in Wetlands - Region 0", National Wetland Inventory, St. Petersburg, FL

U.S. Soil Conservation Service, Soil Survey Staff, 1975, "Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys", U.S. Soil Conservation Service, Agriculture Handbook 436