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California Coastal Commission
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Definition and Delineation of Wetlands in the Coastal Zone

Background Information Handout

How Does The California Coastal Act Protect Wetlands?

The California Coastal Act requires that most development avoid and buffer wetland resources. Policies include:

- **Section 30231**, which requires the maintenance and restoration (if feasible) of the biological productivity and quality of wetlands appropriate to maintain optimum populations of marine organisms and for the protection of human health.
- **Section 30233**, which limits the filling of wetlands to identified high priority uses, including certain boating facilities, public recreational piers, restoration, nature study, and incidental public services (such as burying cables or pipes). Any wetland fill must be avoided unless there is no feasible less environmentally damaging alternative, and authorized fill must be fully mitigated.

Why Do We Care About Wetlands?

Wetlands provide many important functions and values. These include:

- Supporting a large **diversity** of plant and animal species, including some that are found nowhere else except in wetlands.
- Providing **habitat** for hundreds of species of shore, wading, and migratory birds and for many commercial and non-commercial fish.
- Protecting **water quality** by serving as biological filters (a natural water treatment plant) absorbing and fixing certain chemical and mineral contaminants that would otherwise flow directly into lakes, rivers, streams, and the ocean.

- **Protecting the shoreline** by buffering the coast from waves and storms.
- Serving as a water conveyance and holding system, including providing **floodwater storage**.
- Allowing for **groundwater recharge**.
- Providing areas for **recreational activities** (fishing, boating, etc.).
- Enhancing viewsheds through contributing to **aesthetic values**.

How Do We Define Wetlands?

There is no single agreed-upon general definition of wetlands, although most definitions are similar. **Coastal Act Section 30121** defines the term "wetland" as:

> *[L]ands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.*

Similarly, the **U.S. Fish and Wildlife Service** (USFWS) uses a general definition from its wetlands classification system first published in 1979:

> *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 (Cowardin, et al. 1979).*

For purposes of implementing Section 404 of the federal Clean Water Act, the United States **Environmental Protection Agency** (EPA) and the **Army Corps of Engineers** (ACOE) define wetlands as:

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas (40 CFR 232.2).*

One Parameter Definition

Both the Coastal Commission and the federal government provide further specificity in their wetlands definitions to guide the process of wetlands delineation. The Coastal Commission's regulations (California Code of Regulations Title 14 (14 CCR)) establish a **"one parameter definition"** that only requires evidence of a single parameter to establish wetland conditions:

> *Wetland shall be defined as land where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent and drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salts or*

other substances in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deep-water habitats. (14 CCR Section 13577)

The Commission's one parameter definition is similar to the USFWS wetlands classification system, which states that wetlands must have **one or more** of the following three attributes:

(1) at least periodically 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.

Three Parameter Definition

In contrast, the Army Corps of Engineers generally uses a **three parameter definition** for delineating wetlands. As discussed in the 1987 ACOE Wetlands Delineation Manual:

The FWS system requires that a positive indicator of wetlands be present for any one of the three parameters, while the [ACOE] technical guideline for wetlands requires that a positive wetland indicator be present for each parameter (vegetation, soils, and hydrology)…(ACOE, 1987, p.3).

How Do We Delineate Wetlands?

As opposed to wetlands definitions, which describe the general **parameters** that must be shown to establish wetland conditions (hydrology, soils, and vegetation), the delineation of wetlands in the field typically requires substantial evidence of **indicators**, which are the physical, chemical, or biological features of an area that can be easily observed or assayed and that are usually correlated with the presence of a wetland parameter; and **methodologies** that guide the process of distinguishing wetland from non-wetland conditions. Such field tools are needed because the various characteristics of wetlands typically occur on physical gradients (i.e., wet to dry conditions, hydric to nonhydric soils, and hydrophytic to meso/xerophytic vegetation).

The Coastal Commission's regulations acknowledge these distinctions by specifying some general decision rules for establishing the upland boundary of wetlands:

…the upland limit of a wetland shall be defined as:

a. the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic or xerophytic cover;

b. the boundary between soil that is predominantly hydric and soil that is predominantly nonhydric; or

c. in the case of wetlands without vegetation or soils, the boundary between land that is flooded or saturated at some time during years of normal precipitation, and land that is not. (14 CCR Section 13577)

However, the Coastal Commission's regulations do not provide guidance on other specific concerns important to the delineation process for wetlands, such as:

- What are hydric soils?
- What is hydrophytic vegetation?
- How do we determine if land is saturated at some time during years of normal precipitation?
- What is a predominance of hydrophytic cover?

Therefore, additional scientific methods and guidance are required to facilitate the wetland delineation process in the field. A common source of guidance for wetland delineators is the ***1987 Army Corps of Engineers Wetland Delineation Manual***. In addition to discussion of definitions and scientific concepts applicable to wetlands delineation, this manual includes detailed discussions of potential data sources, various field methods such as vegetation mapping, and so forth. Efforts have been made to update and revise this manual, but the 1987 version remains the official delineation manual of the ACOE.

Another important guidance document is the U.S. Fish and Wildlife Service's ***List of Plant Species that Occur in Wetlands***. According to the USFWS, this document lists plant species "that have demonstrated an ability…to achieve maturity and reproduce in an environment where all or portions of the soil within the root zone become, periodically or continuously, saturated or inundated during the growing season." Similarly, guidance on the identification of hydric soils is provided by the Natural Resource Conservation Service in its ***Field Indicators of Hydric Soils in the United States***.

Notwithstanding the availability of various technical guidance documents on wetlands and delineation methods, it is important to recognize that the application of scientific methods and the observations of indicators in the field are subject to uncertainty and error. This is particularly the case in atypical situations such as areas where wetlands hydrology, soils, or vegetation have been sufficiently altered to preclude the presence of an indicator of a particular parameter. Therefore, wetland delineators must also exercise **professional judgment** in the wetland delineation process.

What Are Some Important Wetland Terms?

[Definitions are adapted from ACOE's *1987 Army Corps of Engineers Wetland Delineation Manual* unless otherwise noted.]

Aerobic
A situation in which molecular oxygen is a part of the environment.

Anaerobic
A situation in which molecular oxygen is absent (or effectively so) from the environment.

Atypical situation
Areas in which one or more parameters (vegetation, soil, and/or hydrology) have been sufficiently altered by recent human activities or natural events to preclude the presence of wetland indicators of the parameter.

False Negative
"Type II" error of not rejecting a null hypothesis ("no wetland") when the alternative hypothesis is the true state of nature. For example, failing to identify a wetland when it is present.

False Positive
"Type I" error of rejecting a null hypothesis ("no wetland") when it is the true state of nature. For example, falsely concluding a non-wetland area is a wetland.

Hydric soil
Soil that is formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation (NRCS, http://soils.usda.gov/use/hydric/intro.html).

Hydrologic zone
An area that is inundated or has saturated soils within a specified range of frequency and duration of inundation and soil saturation.

Hydrophyte
Any plant growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content (Cowardin et al, 1979).

Wetland Plant Indicator Categories:
(U.S. Fish & Wildlife Service National Wetlands Inventory (http://www.fws.gov/nwi/bha/l96_intro.html))

- **Obligate Wetland (OBL).** Occur almost always (estimated probability >99%) under natural conditions in wetlands.
- **Facultative Wetland (FACW).** Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
- **Facultative (FAC).** Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
- **Facultative Upland (FACU).** Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
- **Obligate Upland (UPL).** Occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.

Indicator
An event, entity, or condition that typically characterizes a prescribed environment or situation; indicators determine or aid in determining whether or not certain stated circumstances exist. Field indicators are physical, chemical, or biological features of an area that can be easily observed or assayed and that are usually correlated with the presence of a wetland parameter.

Macrophyte
Any plant species that can be readily observed without the aid of optical magnification. This includes all vascular plant species and mosses (e.g., *Sphagnum spp*.), as well as large algae (e.g. *Chara spp*., kelp).

Macrophytic
A term referring to a plant species that is a macrophyte.

Mesophytic
Any plant species growing where soil moisture and aeration conditions lie between extremes. These species are typically found in habitats with average moisture conditions, neither very dry nor very wet.

Mottles
Spots or blotches of different color or shades of color interspersed within the dominant color in a soil layer, usually resulting from the presence of periodic reducing soil conditions.

Oxidation-reduction process
A complex of biochemical reactions in soil that influences the valence state of component elements and their ions. Prolonged soil saturation during the growing season elicits anaerobic conditions that shift the overall process to a reducing condition.

Parameter
A characteristic component of a unit that can be defined. Vegetation, soil, and hydrology are three parameters that may be used to define wetlands.

Positive wetland indicator
Any evidence of the presence of hydrophytic vegetation, hydric soil, and/or wetland hydrology in an area.

Nonhydric soil
A soil that has developed under predominantly aerobic soil conditions. These soils normally support mesophytic or xerophytic species.

Plant community
All of the plant populations occurring in a shared habitat or environment.

Predominant (=prevalent) vegetation
The plant community or communities that occur in an area during a given period. The predominant vegetation is characterized by the dominant macrophytic species that comprise the plant community.

Redoximorphic features
Features formed by the processes of reduction, translocation, and/or oxidation of Fe and Mn oxides; formerly called mottles and low-chroma colors (USDA).

Saturated soil conditions
A condition in which all easily drained voids (pores) between soil particles in the root zone are temporarily or permanently filled with water to the soil surface at pressures greater than atmospheric.

Upland
Any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic characteristics associated with wetlands.

Wetland hydrology
The sum total of wetness characteristics in areas that are inundated or have saturated soils for a sufficient duration to support hydrophytic vegetation.

Wetland plant association
Any grouping of plant species that recurs wherever certain wetland conditions occur.

Wetland soil
A soil that has characteristics developed under reducing conditions, which exist when periods of prolonged soil saturation result in an anaerobic state. Hydric soils that are sufficiently wet to support hydrophytic vegetation are wetland soils.

Wetland vegetation
The sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present.

Xerophytic
A plant species that is typically adapted for life in conditions where a lack of water is a limiting factor for growth and/or reproduction. These species are capable of growth in extremely dry conditions as a result of morphological, physiological, and/or reproductive adaptations.

Selected References

Cowardin, L. M., Carter, V., Golet, F. C., and LaRoe, E. T. 1979. "Classification of Wetlands and Deepwater Habitats of the United States," FWS/OBS79/31, U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

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