Technical Wetland Delineation
Today’s Talk

• Wetland Definitions and Importance of Wetlands
• Overview of the Wetland Delineation Approach
• Vegetation Parameter
• Soils Parameter
• Hydrology Parameter
• Some Wetland Permits of the Past
What is a Wetland?

Lands that occur in the zone between terrestrial and aquatic systems where the water table is at or near the soil surface for portions of the year, or the land is covered by shallow water.
What is a Wetland – USACE Definition

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.
Wetlands Differ from Uplands in their Physical, Chemical and Biological Characteristics

- Wetland Soils
- Wetland Plants
- Wetland Animals
- Wetland Soil Microbes
Why Are Wetlands Important?

They provide habitat for many species and support high biodiversity.
Why Are Wetlands Important?

Filter impurities from water – improve water quality

Store Carbon

Layers of Undecomposed plant matter (high carbon content)
Why Are Wetlands Important?

Recreation opportunities for nature viewing.
Why Are Wetlands Important?

- Promote groundwater recharge
- Reduce erosion
Why Are Wetlands Important?

Buffer wave energy from storm surge
Dramatic Historical Loss of Wetlands in CA
Overview of the Wetland Delineation Approach
Many Different Types of Wetlands
Wetland Delineation
Typical Delineation

Property Line

Local Pond

100’ Buffer

Proposed Development
1987 USACE Manual

1. Presents the technical guidelines for identifying wetlands and distinguishing them from aquatic habitats and other non-wetlands.

2. Provides the methods for applying the technical guidelines.

3. Provide supporting information useful in applying the technical guidelines.
Wetland Parameters

1. Wetland Vegetation (Hydrophytes)
2. Wetland Soils (Hydric Soils)
3. Wetland Hydrology
Different Wetland Definitions for Different Agencies

US Army Corps of Engineers

Three parameter approach
Vegetation, Soil and Hydrology Parameters must be satisfied

California Coastal Commission/ The USFWS/ CDFG Commission

One parameter approach:
Vegetation or Soils or Hydrology under certain conditions.
Does the Hydrology Parameter Apply?

Salt pan wetland
San Elijo Lagoon

Mud puddle
Not a wetland
Field Indicators

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.
Field Indicators

- Mima mounds
- Aquatic Invertebrates
- Algal Mats
- Soil Mottles
- Shallow Water Table
- Peaty Soils
### The USACE Wetland Delineation Data Form

#### Site Description and Sampling Date

- **Indicators**
  - Hydrology Parameter
  - Soil Parameter
  - Vegetation Parameter

#### Vegetation Parameter

- **Indicators**
  - % Cover
  - Species
  - Status

#### Hydrology Parameter

- **Indicators**
  - % Bank Gravel
  - % Cover of Static Crust
  - Vegetation Present
  - Yes
  - No

#### Soil Parameter

- **Indicators**
  - Sandy Redox (SS)
  - Stripped Matrix (SK)
  - Layered Muck (MF)
  - Red Parent Material (TF)
  - Other (Explain in Remarks)

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**US Army Corps of Engineers**

**Arid West – Version 2.0**
California Regions: Regional Supplements

Arid West

Western Mountains, Valleys, and Coast Region
Vegetation Parameter
• Tolerant to fluctuations in water level
• Tolerant to low soil oxygen and frequent saturation
• Marine influenced plants are tolerant to saline or brackish water
### Plant Classifications

<table>
<thead>
<tr>
<th>Indicator Code</th>
<th>Indicator Status</th>
<th>Frequency of Occurrence in Wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBL</td>
<td>Obligate Wetland</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>FACW</td>
<td>Facultative Wetland</td>
<td>67% - 99%</td>
</tr>
<tr>
<td>FAC</td>
<td>Facultative</td>
<td>33% - 66%</td>
</tr>
<tr>
<td>FACU</td>
<td>Facultative</td>
<td>1% - 33%</td>
</tr>
<tr>
<td>UPL</td>
<td>Obligate Upland</td>
<td>&lt;1%</td>
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**Upland Plant**

**Hydrophyte**
Obligate (OBL) 
(found in wetlands >99% of the time)

Smooth Cordgrass
*Spartina alterniflora*

California Bulrush
*Schoenoplectus californicus*
Facultative Wetland (FACW)
(found in wetlands 67 - 99% of the time)

Umbrella Sedge
*Cyperus eragrostis*

Spreading Rush
*Juncus patens*
Facultative (FAC)
(found in wetlands 33 - 67% of the time)

Fragile Sheath Sedge  
*Carex fracta*

Western Larkspur  
*Delphinium hesperium*
Upland Species (UPL)
(found in wetlands >1% of the time)

Coyote Brush
*Baccharis pilularis*

California Sage
*Artemisia californica*
Plant Layer: Grass/Herb Layer

Species 1 (25%)
Species 2 (22%)
Species 3 (35%)
Species 4 (10%)
Species 5 (8%)

10 feet
Determining the Vegetation Parameter

**50/20 Rule**
- Species that make up 50% of each layer
- Any species with 20% or more cover.

### Vegetation Layers

**Tree**
- (Plot size: ________)
  - % Cover
  - Species?
  - Status

**Shrub**
- (Plot size: ________)
  - % Cover
  - Species?

**Herb**
- (Plot size: ________)
  - % Cover

**Vine**
- (Plot size: ________)
  - % Cover

% Bare Ground in Herb Stratum ________  % Cover of Biotic Crust ________

Remarks:
Assessing Predominance

Dominance Test

There is a predominance of hydrophytes if more than 50 percent of the dominant species are classified as FAC, FACW, or OBL.

50 % of Species
- Species 3 ............ 35%  ______ FACW √
- Species 1 ............ 25%  ______ FACU
- Species 2 ............ 22%  ______ OBL √
- Species 4 ............ 21%  ______ UPL

\[ \frac{1}{3} \text{ Dominant species are FAC, FACW or OBL} = 50\% \]

Therefore, wetland vegetation parameter is met.

35
Soil Parameter
Identifying Hydric Soils
Upland and Wetland Soils

Dry Upland Soil

Air exchange with the atmosphere

Saturated Wetland Soil

Air exchange with the atmosphere
Happens only at the surface

Soil pore spaces

Pore spaces are filled with water
Switch in the Microbial Community After Soil Wetting

Aerobic Bacteria and Fungi  →  Anaerobic Bacteria and other Micro-organisms
Accumulation of Organic Materials in Frequently Saturated Soils – Organic Soils

Muck

Peat
Observable Chemical Changes in Hydric Soils

- Gleyed soil horizon
- Translocated iron in soil
- Red soil mottles
Munsell Soil Color Book

<table>
<thead>
<tr>
<th>HUE 7.5YR</th>
<th>SOIL COLOR NAMES</th>
<th>CHROMA</th>
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<tr>
<td>8/</td>
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<td>0/</td>
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### Soil Parameter

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Redox Features</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
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### Soil Matrix

**Mottle Attributes**

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### Field Indicators for Hydric Soils

- Hydrogen Sulfide
- Sandy Mucky Matrix

**Hydric Soil Indicators:** (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide
- Stratified Layers
- 1 cm Muck (A9)
- Depleted Below 60 cm
- Thick Dark Surface
- Sandy Mucky Matrix
- Sandy Cleyed Matrix

**Restrictive Layer (if present):**

- Type: 
- Depth (inches): 
- Hydric Soil Present? Yes ______ No ______

**Remarks:**

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1. **Type:** C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  
2. **Location:** PL=Pore Lining, M=Matrix.
Hydrology Parameter

Looking for Evidence of Saturation or Ponding
Evidence of Hydrology

- Soil Cracking
- Algal Mats
- Debris Piles
- Mima Mounds
Evidence of Hydrology: Oxidized Rhizosphere and Shallow Water Table

Oxidized Rhizosphere  Water Table Near Surface
Evidence of Hydrology: Wetland Species

- Vernal Pool Tadpole Shrimp
- Santa Rosa Fairy Shrimp
- CA Tiger Salamander Metamorphic Stage (Early Stage of Development)
## Hydrology

### Hydrology Parameter

<table>
<thead>
<tr>
<th>Primary Indicators (minimum of one required; check all that apply)</th>
<th>Secondary Indicators (2 or more required)</th>
</tr>
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<tbody>
<tr>
<td>__ Surface Water (A1)</td>
<td>__ Water Marks (B1) (Riverine)</td>
</tr>
<tr>
<td>__ High Water Table</td>
<td>__ Crayfish burrows</td>
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<tr>
<td>__ Saturation (A3)</td>
<td>__ Shallow aquitard</td>
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<tr>
<td>__ Water Marks (B1)</td>
<td>__ Water stained leaves</td>
</tr>
<tr>
<td>__ Sediment Depos</td>
<td></td>
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<tr>
<td>__ Drift Deposits (B)</td>
<td></td>
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<tr>
<td>__ Surface Soil Cra</td>
<td></td>
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<tr>
<td>__ Inundation Visibl</td>
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<tr>
<td>__ Water-Stained Leaves (B6)</td>
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### Field Observations:

- **Surface Water Present?**  
  - Yes ____  No ____  Depth (inches): ____________
- **Water Table Present?**  
  - Yes ____  No ____  Depth (inches): ____________
- **Saturation Present?** (includes capillary fringe)  
  - Yes ____  No ____  Depth (inches): ____________

**Wetland Hydrology Present?**  
- Yes ____  No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

### Remarks:

**Primary Hydrology Indicators (Need 1)**
- High water table
- Drift deposits
- Surface soil cracks

**Secondary Hydrology Indicators (Need 2)**
- Crayfish burrows
- Shallow aquitard
- Water stained leaves
Factors that Influence the Reliability of Field Indicators of Hydrophytic Vegetation

• Atypical situations where the vegetation has been removed or altered by human activities

• Facultative (FAC) species dominate the vegetation

• Community characterization based on only one or two species

• Delineation during the dry season when upland species may be abundant in seasonal wetlands

• Vegetation present following disturbance may not be characteristic of the long-term community
Coastal Commission Approach to Problem Areas

• Species listed as OBL, FACW, or FAC are presumed to be growing as “hydrophytes”

• Where there is a predominance of OBL, FACW, or FAC species, the area is presumed to be a wetland

• In problem areas, the wetland presumption is rebuttable by compelling evidence of upland conditions.

• All pertinent evidence may be brought to bear on problem situations, but direct observations of hydrology during normal or unusually wet rainy seasons is most useful.
Highway 90 Median Area

Sand Spurry

Rabbit's foot Grass
Kirkorowicz Permit Application

From CDP W8a – 10 - 1997

From Google Earth ~ May 1994

Appeal to Coastal Commission

Unanimous Coastal Commission Denial on Appeal

Coastal Commission Decision Upheld in Court of Appeals
Thank You