

## **Point Module IX—Wetlands**

Information was collected in the 1992 National Resources Inventories (NRI) on the Food Security Act (FSA) wetland system and in the 1982 and 1992 NRIs on the Cowardin wetland system.

### ***Definitions***

Two working definitions of wetlands apply to NRI data collection; data are collected separately for each.

1. *Wetlands*. Transitional lands 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 attributes:

- Periodically, the land supports predominantly hydrophytes.
- The substrate is predominantly undrained hydric soil.
- The substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. [USFWS]

2. *Wetlands*. Areas that have a predominance of hydric soils and that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions. [NFSAM]

### ***Importance***

Information about the gain or loss of wetlands, and the influence of wetlands on water quality are important to national resource and conservation issues. Collection of these data allow conditions to be monitored.

### ***Guidelines and Clarification***

The most widely used wetland classification system and the one recognized by the Federal Geographic Data Committee is the system described in *Classification of wetlands and deepwater habitats of the United States* (Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. U. S. Fish and Wildlife Service. FWS/OBS - 79/31, 131 pp.). This publication is available over the Internet at the following URL address: <http://www.nwi.fws.gov/more.html>, and is also available for sale by the U.S. Government Printing Office, Washington, DC. This classification system is commonly referred to as the Cowardin system. An abbreviated version is used in the NRI.

The 1997 NRI will collect data for both the FSA and Cowardin classification systems.

### ***Documentation Required in PSU File Folder***

Retain all photographs, maps, and other ancillary materials used to determine wetlands for the 1997 NRI.

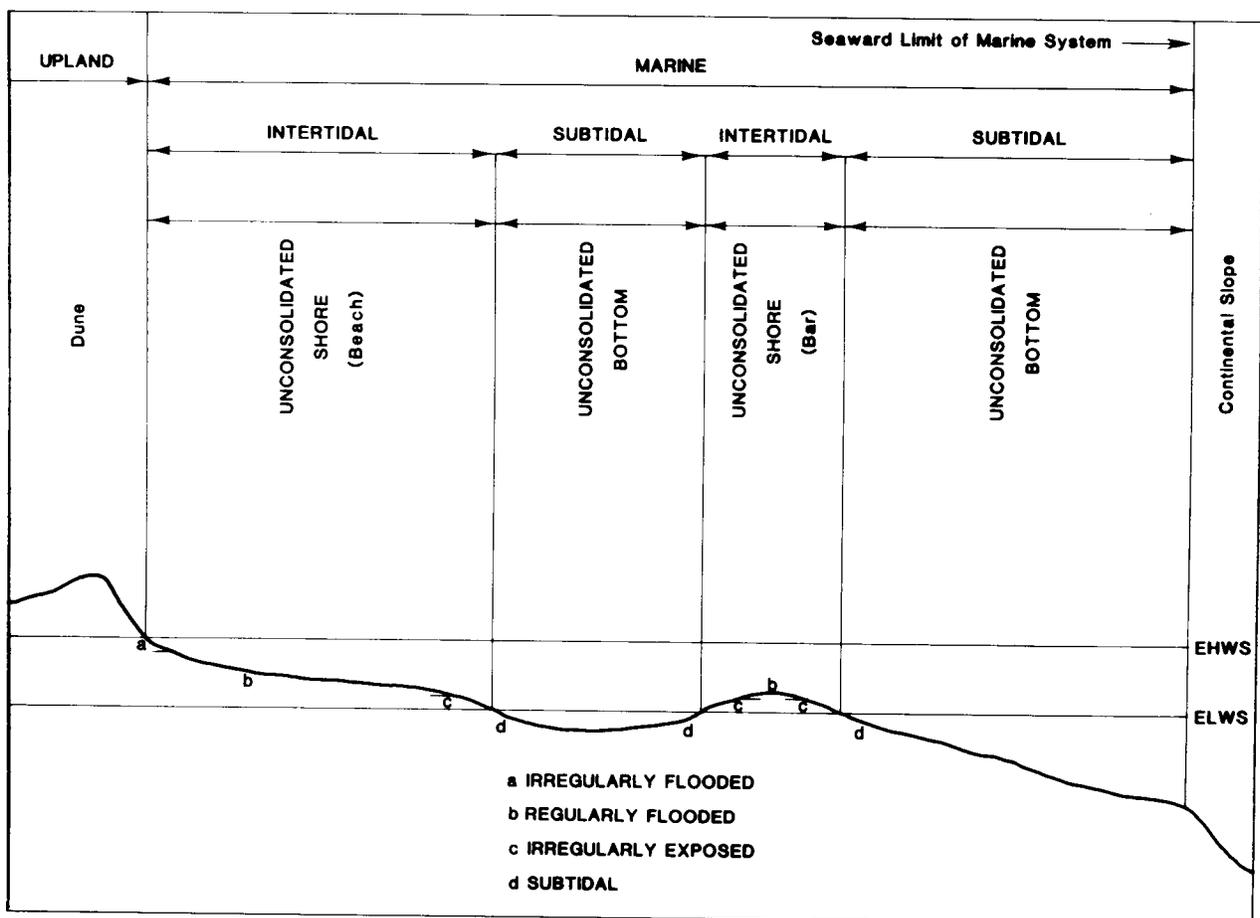
## **A. Cowardin Classification System**

### ***Definition***

*Cowardin system*

**Marine System.** The Marine System consists of open ocean overlying the continental shelf and its associated high-energy coastline. Marine habitats are exposed to the waves and currents of the open ocean, and the water regimes are determined primarily by the ebb and flow of oceanic tides (fig. 1). Salinity exceeds 30 parts per thousand, with little or no dilution except outside the mouths of estuaries. Shallow coastal indentations or bays without appreciable freshwater inflow and coasts with exposed rocky islands that provide the mainland with little or no shelter from wind and waves are also considered part of the Marine System because they generally support typical marine biota. [USFWS] Marine subtidal habitats (M1 on NWI maps) are all deepwater, while Marine intertidal habitats (M2 on NWI maps) are classified as wetland. If the NRI land cover/use is not bay or gulf, but is a non-water cover/use (i.e., beach, sand dune, bare exposed rock, mixed barren, or mud flat), then the point must be classified as a wetland. If the point is permanently covered with water (the NRI land cover/use is bay or gulf), the point must be classified as a deepwater habitat. [NRI-97]

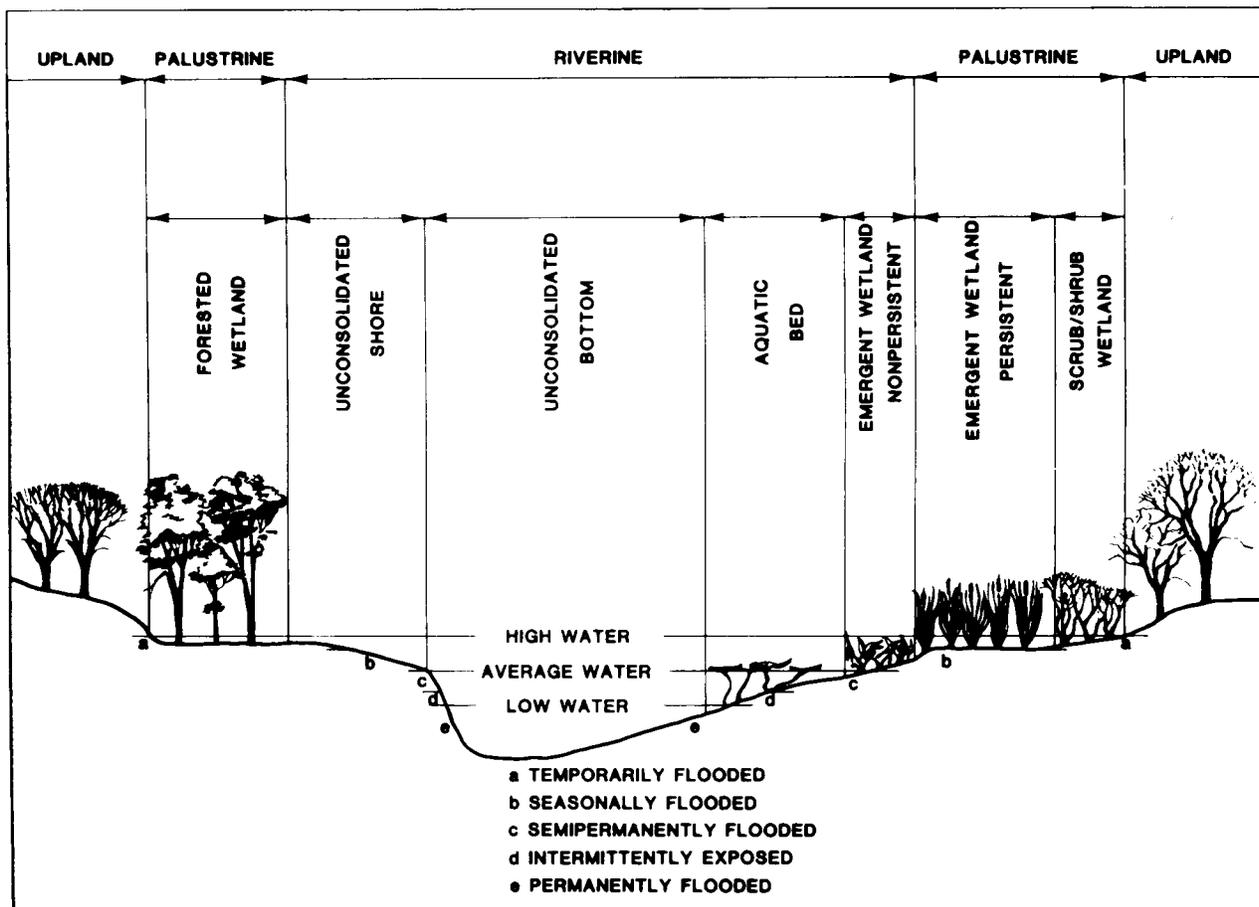
**Figure 1** Distinguishing features and examples of habitats in the Marine System (EHWS=extreme high water of spring tides; ELWS=extreme low water of spring tides) [Cowardin, et al. 1979]



*Estuarine System.* The Estuarine System consists of deepwater tidal habitats and adjacent tidal wetlands that are semi-enclosed by land, but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land (fig. 2). The salinity (at least 0.5 parts per thousand) may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines, dilution of sea water is appreciable. Offshore areas with typical Estuarine plants and animals, such as red mangroves (*Rhizophora mangle*) and eastern oysters (*Crassostrea virginica*), are also included in the Estuarine System [USFWS]. Estuarine subtidal habitats (E1 on NWI maps) are all classified as deepwater while Estuarine intertidal habitats (E2 on NWI maps) are classified as wetlands. If the NRI land cover/use is non-water (i.e., beach, sand dune, bare exposed rock, mixed barren, mud flat, or marsh), or if the point is above water at the extreme low water of spring tide, the point must be classified as a wetland. If the point is permanently covered with water (the NRI land cover/use code is estuary or other water code), the point would be classified as a deepwater habitat. [NRI—97]

**Riverine System.** The Riverine System (fig. 3) includes all wetland and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean derived salts in excess of 0.5 parts per thousand. A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water." [USFWS] In braided streams the system is bounded by the banks forming the outer limits of the depression within which the braiding occurs. Upland islands or Palustrine wetlands may occur within the channel, but they are not included in the Riverine System. The boundary between wetland and deepwater habitat in the Riverine System lies at a depth of 2 meters (6.6 ft) below the water surface. Riverine habitats in the Classes of rock bottom, unconsolidated bottom, or aquatic bed may be either wetland or deepwater habitats, while all other classes within the Riverine System are wetlands. If the NRI land cover/use is river wash, mud flats, beach, mixed barren, or the water is obviously less than 2 meters (6.6 feet) deep, then the area must be assigned as a wetland. [NRI-97]

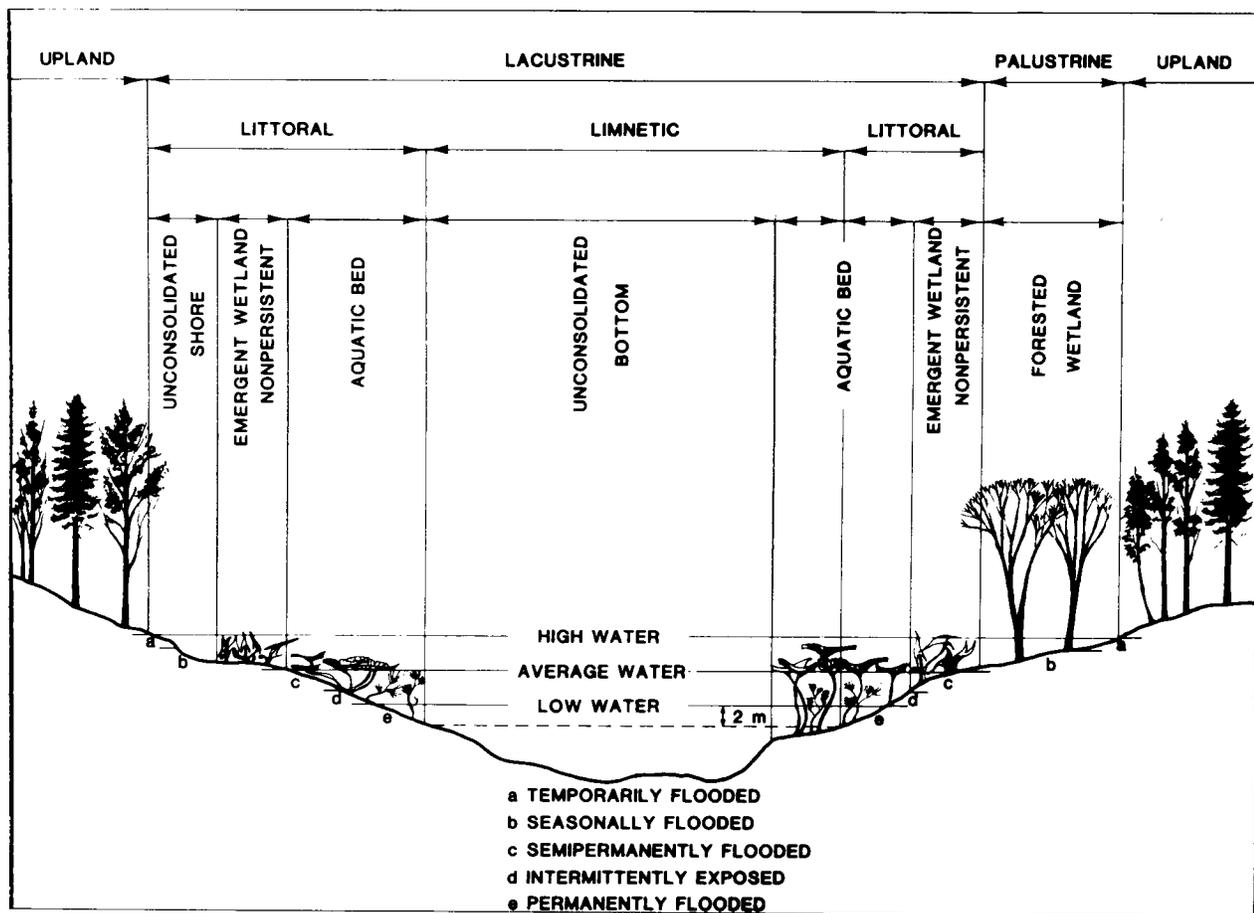
**Figure 3** Distinguishing features and examples of habitats in the Riverine System [Cowardin, et al. 1979]



**Lacustrine System.** The Lacustrine System (fig. 4) includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent areal coverage; and (3) total area exceeds 8 ha (20 acres). Similar wetland and deepwater habitats totaling less than 8 hectares are also included in the Lacustrine System if an active wave formed or bedrock shoreline feature makes up all or part of the boundary or if the water depth in the deepest part of the basin exceeds 2 meters (6.6 feet) at low water. Lacustrine waters may be tidal or nontidal, but ocean-derived salinity is always less than 0.5 parts per thousand. The boundary between wetland and deepwater habitats lies at a depth of 2 meters (6.6 feet) below water; however, if emergents, shrubs, or trees grow beyond this depth, their deepwater edge is the boundary. [USFWS]

Lacustrine limnetic habitats (L1 on NWI maps) are classified as deepwater, while Lacustrine littoral habitats (L2 on NWI maps) are wetlands.

**Figure 4** Distinguishing features and examples of habitats in the Lacustrine System [Cowardin, et al. 1979]



*Palustrine System.* The Palustrine System includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 percent. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 meters (6.6 feet) at low water; and (4) salinity due to ocean-derived salts less than 0.5 parts per thousand. [USFWS]

**Figure 5** Distinguishing features and examples of habitats in the Palustrine System [Cowardin, et al. 1979]



For NRI purposes Cowardin, et al. wetlands and deepwater habitats are further classified according to the life form of vegetation that occurs.

## Vegetation Description (life form)

**None**—Areas including shallow water with rock or unconsolidated bottom, unconsolidated shores, reefs, rocky shore, or streambeds. This may include farmed wetlands.

**Other: Aquatic beds**—Wetland and deepwater habitats dominated by plants (e.g., kelp *Laminaria* spp., eelgrass *Zostera marina*, stoneworts *Chara* & *Nitella* spp., and water hyacinth *Eichhornia crassipes*) that grow principally on or below the surface of the water for most of the growing season in most years. Water regimes include subtidal, irregularly exposed, regularly flooded, permanently flooded, intermittently exposed, semipermanently flooded, and seasonally flooded. [USFWS]

**Other: Moss/lichens**—A wetland class where mosses or lichens (e.g., sphagnum moss *Sphagnum* spp., reindeer moss *Cladina* spp.) cover substrates other than rock, and where emergents, shrubs, or trees make up less than 30 percent of the areal cover. The only water regime is saturated. [USFWS]

**Emergent** (two subclasses, persistent and nonpersistent)—The emergent wetland class is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed. [USFWS]

**Persistent**—Dominated by species that normally remain standing at least until the beginning of the next growing season. This subclass is found only in the Estuarine and Palustrine Systems. Examples include: cattails (*Typha* spp.), cordgrass (*Spartina* spp.), bulrushes (*Scirpus* spp.), sedges (*Carex* spp.), common pickleweed (*Salicornia virginica*) and common reed (*Phragmites australis*). [USFWS]

**Nonpersistent**—Areas dominated by plants that fall to the surface of the substrate or below the surface of the water at the end of the growing season so that, at certain seasons of the year, there is no obvious sign of emergent vegetation. Examples include: wild rice (*Zizania aquatica*), arrow arum (*Peltandra virginica*), pickerelweed (*Pontederia cordata*), arrowheads (*Sagittaria* spp.). Movement of ice in Estuarine, Riverine, or Lacustrine Systems often removes all traces of emergent vegetation during the winter. Where this occurs, the area should be classified as Nonpersistent Emergent Wetland. [USFWS]

**Scrub-Shrub**—A wetland class dominated by woody vegetation less than 6 meters (20 feet) tall including young or stunted trees and shrubs. Examples include: alder (*Alnus* spp.), willows (*Salix* spp.), coastal sweetbells (*Leucothoe axillaris*), Atlantic white cedar (*Chamaecyparis thyoides*). [USFWS]

**Forested**—A wetland class characterized by woody vegetation at least 6 meters (20 feet) tall. Examples include: red maple (*Acer rubrum*), bald-cypress (*Taxodium distichum*), black spruce (*Picea mariana*), sweetbay (*Magnolia virginiana*), mangroves (*Avicennia* spp. and *Languncularia racemosa*), northern white cedar (*Thuja occidentalis*), black spruce (*Picea mariana*). [USFWS]

### Note on classifying vegetation life forms:

If vegetation (except pioneer species) covers at least 30 percent of the substrate, classes are distinguished on the basis of the life form of the plants that constitute the uppermost layer of vegetation and that possess an areal coverage of at least 30 percent. For example, an area with 50 percent areal coverage of trees over a shrub layer with 60 percent areal coverage would be classified as Forested Wetland; an area with 20 percent areal coverage of trees over the same (60%) shrub layer would be classified as Scrub-Shrub Wetland. When trees or shrubs alone cover less than 30 percent of an area,

but in combination cover 30 percent or more, the wetland is assigned to the class Scrub-Shrub. When trees and shrubs in combination cover less than 30 percent of the area, but the total cover of vegetation (except pioneer species) is at least 30 percent, the wetland is assigned to the appropriate class for the predominant life form below the shrub layer (Cowardin et al., 1979, p. 13).

### ***Categories and Codes***

<b>Kind of System</b>	<b>Code</b>	<b>Vegetation (life form)</b>
Not wetland or deepwater	0	—
Marine	10	none, or other
Estuarine	20	none, or other
	21	emergent
	22	scrub-shrub
	23	forested
Riverine	30	none, or other
	31	emergent, nonpersistent
Lacustrine	40	none, or other
	41	emergent, nonpersistent
Palustrine	50	none, or other
	51	emergent
	52	scrub-shrub
	53	forested

**Note:** Wetlands that are farmed should be coded as 50 or 51, while cranberry bogs should be coded as 52.

### ***PDA Instructions***

From the choice list select the 1997 classification (descriptions of the systems and vegetation categories are given in the Glossary).

### ***Examples***

Plates 1 through 83 show photographs from *Classification of wetlands and deepwater habitats of the United States* with the NRI coding system. These plates are reproduced as exhibit 2 of this module.

## **B. Wetland and deepwater**

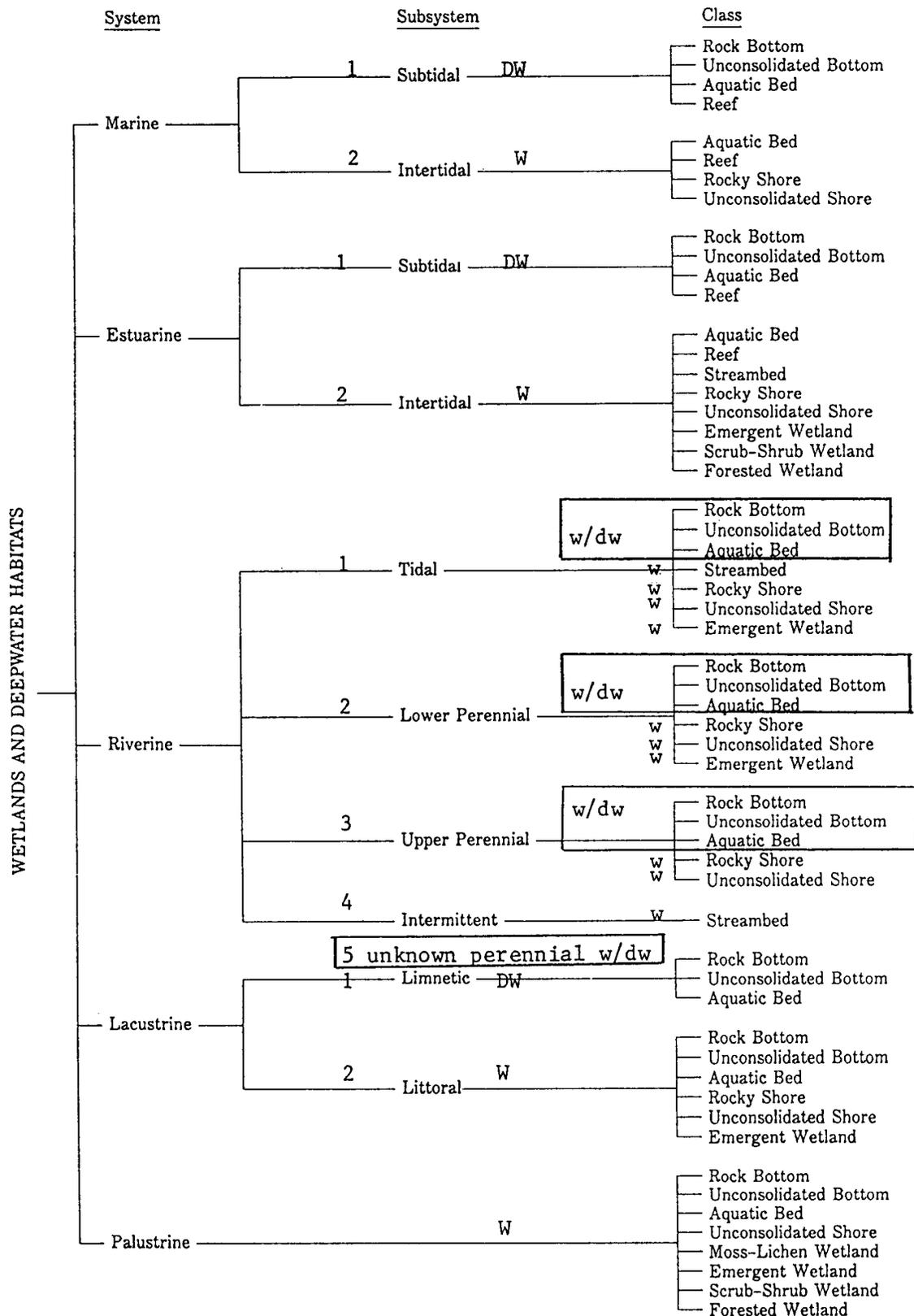
### ***Guidelines and Clarification***

If the point receives a Cowardin classification of Marine, Estuarine, Riverine, or Lacustrine, determine if the area is (a) wetland, or (b) deepwater habitat.

The boundary between wetland and deepwater habitat in the **Riverine** and **Lacustrine** Systems is defined by the depth of 2m (6.6 ft.) below water, unless emergents, shrubs, or trees grow beyond this depth at any time, in which case, their deepwater edge is the boundary.

The boundary between wetland and deepwater habitat in the **Marine** and **Estuarine** Systems is the water boundary at extreme low water of spring tide. Permanently flooded areas are considered deepwater habitats in these systems. Estuarine emergent, scrub-shrub, and forested areas are all classified as wetlands.

**Figure 6** Classification hierarchy of wetlands and deepwater habitats, showing systems, subsystems, and classes. The Palustrine System does not include deepwater habitats. (Modified from Cowardin, et al. 1979)



***PDA Instructions***

Select the appropriate reason from the choice list. If the choice **g** (other) is selected, enter a note describing change in the note section.

**D. USDA Programs**

***Guidelines and Categories***

Determine if the wetland restoration or creation is the intentional result of USDA Program activity such as the WRP. If construction activity associated with the wetland is observed on aerial photography, obtain information from the field office files.

***Categories and Codes***

Yes or No.

***PDA Instructions***

This question is only applicable if there was a change in the wetland status since 1992. Enter the appropriate response if applicable.

**E. Wetland size**

***Guidelines and Clarification***

Determine the size class of the wetland where size is the area within the wetted perimeter. The wetland area may extend outside the PSU boundary.

**Note:** The wetland area may include more than one vegetation life form.

***Codes and Categories***

Code	Category
a	≤ 1 acre
b	> 1 and ≤ 5 acres
c	> 5 and ≤ 20 acres
d	> 20 acres

***PDA Instructions***

Record the appropriate size class from the choice list.

Point 1:27013:010101R:1:Point Speci...

9. Wetlands Data

Wetland System (Cowardin)? Note

82	87	92	97

FSA classification?

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◆ Wetland or deepwater habitat .....

◆ Reason for gain/loss .....

◆ USDA program (WRP) .....

◆ Wetland size .....

Names Dates Extras Undo Find Assist

## **F. Food Security Act of 1985 (FSA) Wetlands and Exemption Categories**

### ***Definition***

*FSA wetland (Food Security Act).* FSA wetlands are defined under 2 on the first page of this module. FSA wetlands were defined by the Food Security Act of 1985. The principal difference between the FSA wetland definition and the Cowardin wetland definition is that FSA wetlands must have hydric soils, hydrology, and at least periodically must support or be able to support hydrophytic vegetation. Therefore, FSA wetlands will be a subset of Cowardin wetlands.

### ***Guidelines and Clarification***

Other FSA Wetland and Exemption Codes (p. 526-97 & 98, 180-V-NFSAM, Third Ed., Amend. 2, Nov. 1996) not listed will not be collected in the NRI because determinations have not been made for all sites on all land uses and would require detailed site history data not readily available to NRI data collectors.

*Non-wetland (NW).* Land that under natural conditions does not meet wetland criteria (sometimes called upland). Also includes wetlands that were converted to the extent that wetland criteria were not present as of 12/23/85, but were not cropped. [NFSAM]

*Wetlands farmed under natural conditions.* The production of an agricultural commodity on a wetland when allowed by natural conditions, such as drought, without destroying the natural wetland characteristics. For NRI purposes, these are included under the “Wetland (W)” category for FSA wetland classification. [NFSAM]

*Artificial wetland (AW).* An area that was formerly nonwetland or prior converted cropland, but now exhibits wetland characteristics because of human activities (NFSAM). For NRI purposes, this includes irrigation induced wetland (IW). [NFSAM]

*Farmed wetland (FW).* Wetlands that were manipulated and used to produce an agricultural commodity prior to December 23, 1985, but had not been converted prior to that date and, therefore, are not prior converted croplands. These areas include potholes and playas that still meet the wetland criteria, or areas that are seasonally flooded or ponded for an extended period of time. [NFSAM].

*Prior converted cropland (PC).* Wetlands that before December 23, 1985, were drained, dredged, filled, leveled, or otherwise manipulated for the purpose of, or to have the effect of, making the production of an agricultural commodity possible. [NFSAM]

*Converted wetland (CW).* A wetland that has been drained, dredged, filled, leveled, or otherwise manipulated, including any activity that results in impairing or reducing the flow, circulation, or reach of water, that makes possible the production of an agricultural commodity without further application of the manipulations described herein if: (1) such production would not have been possible but for such action, and (2) before such action such land was wetland and was neither highly erodible land nor highly erodible cropland. (For the NRI, also includes Commenced Conversions (CC), Third-party Conversions (TP), Minimal-effect Conversions (MW), and Converted Wetland to Non-Agriculture (CWNA). [NFSAM]

If the point is an FSA wetland (**W**), artificial wetland (**AW**), or farmed wetland (**FW**) then it must also be classified as a Cowardin wetland.

Wetland data for the FSA portion of the 1997 NRI must be obtained using the same criteria, methods, and technology as is being used to make wetland determinations required under the recent farm bills. The National Food Security Act Manual is the guidance document for making FSA wetland and exemption category determinations.

Wetland determinations for producers who participate in USDA programs have been made for many farms. These determinations may include the entire farm or may be limited to cropland and potential cropland. Generally, determinations have not been made in areas that are predominantly forest land, rangeland, or other land that has low potential for conversion from wetlands to agricultural use.

If an FSA wetland determination has been made for the area on which the point falls, this determination should be used for the 1997 NRI, unless,

- The area has been altered since the determination was made, in which case the current status should be recorded.
- The original determination does not meet the current requirements provided in the Food Security Act Manual, in which case a new determination should be made.

In many instances, a wetland determination has not been made for a given area. In these cases the following procedures must be followed:

- (1) Determine if an FSA wetland inventory using approved wetland mapping conventions has been developed for the area. If so, the inventory data may be used directly for NRI data entry.
- (2) If an approved inventory is not available, a determination should be made using locally approved mapping conventions developed for FSA purposes.

Local knowledge from the field office staff is extremely helpful in making FSA wetland determinations. If personnel responsible for NRI data collection are not experienced in the FSA inventory and determination process, they should receive training from qualified soil scientists, biologists, and engineers as appropriate.

**Table 1** Conversion of FSA codes to NRI codes

NRI Code	Category	Explanation
W	wetlands	Wetland definition #2 (from page 1) includes wetlands farmed under natural conditions, and WX.
AW	artificial wetland	Artificial or irrigation induced wetland.
FW	farmed wetland	Manipulated and planted before 12/23/85, but, still meets wetland criteria, includes FWP.
PC	prior converted cropland	Drained, filled, or manipulated before 12/23/85, and cropped before 12/23/85, but does not meet FW criteria.
CW	converted wetland	Converted anytime after 12/23/85, includes CW + year codes (e.g., CW90, CW93, etc.) CC, TP, MW, CWNA, CWTE, MIW, MWM.
NW	not wetland	Does not meet any of the above criteria.

Other FSA Wetland and Exemption Codes (p. 526-97 & 98, 180-V-NFSAM, Third Ed., Amend. 2, Nov. 1996) not listed above will not be collected in the NRI because determinations have not been made for all sites on all land uses and would require detailed site history data not readily available to NRI data collectors. Additionally some codes were used so infrequently that collecting them in a statistically designed sample frame would yield estimates where the margin of error may be larger than the estimate itself.

Note that AW/FW, AW/W and PC/NW are not collected in NRI because they are labels for areas that contain two categories, while the NRI collects point sample data that would specifically be a single category.

If the point is an FSA W, AW, or FW, then it must also be a Cowardin, et al. wetland.

### ***Categories and Codes***

See table 1 on page 16.

### ***PDA Instructions***

From the choice list, select the 1997 FSA classification.

Upon completion, tap the completion check box to verify data entry. Resolve any reported edit checks.

### ***Point Module IX Glossary***

(The following definitions were extracted from the 1997 National Resources Inventory glossary.)

***Deepwater habitats.*** Permanently flooded lands lying below the deepwater boundary of wetlands. These habitats include environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the predominant organisms live, whether or not they are attached to the substrate. [USFWS]

***Emergent vegetation.*** A wetland class characterized by erect, rooted, herbaceous, hydrophytes (e.g., cattails, cordgrass, horsetail). [USFWS]

***Estuary.*** The seaward widened end or the funnel-shaped tidal mouth of a river valley where fresh water comes into contact with seawater and where tidal effects are evident. [USFWS]

***Hydric soil.*** A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part. [NFSAM]

***Hydrophytic.*** Any plant growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. [USFWS]

***Minimal effect wetland (MW).*** The production of an agricultural commodity on a converted wetland, in connection with all other similar actions in the area, would have minimal effect on the hydrological and biological functions of the wetland. [NFSAM]

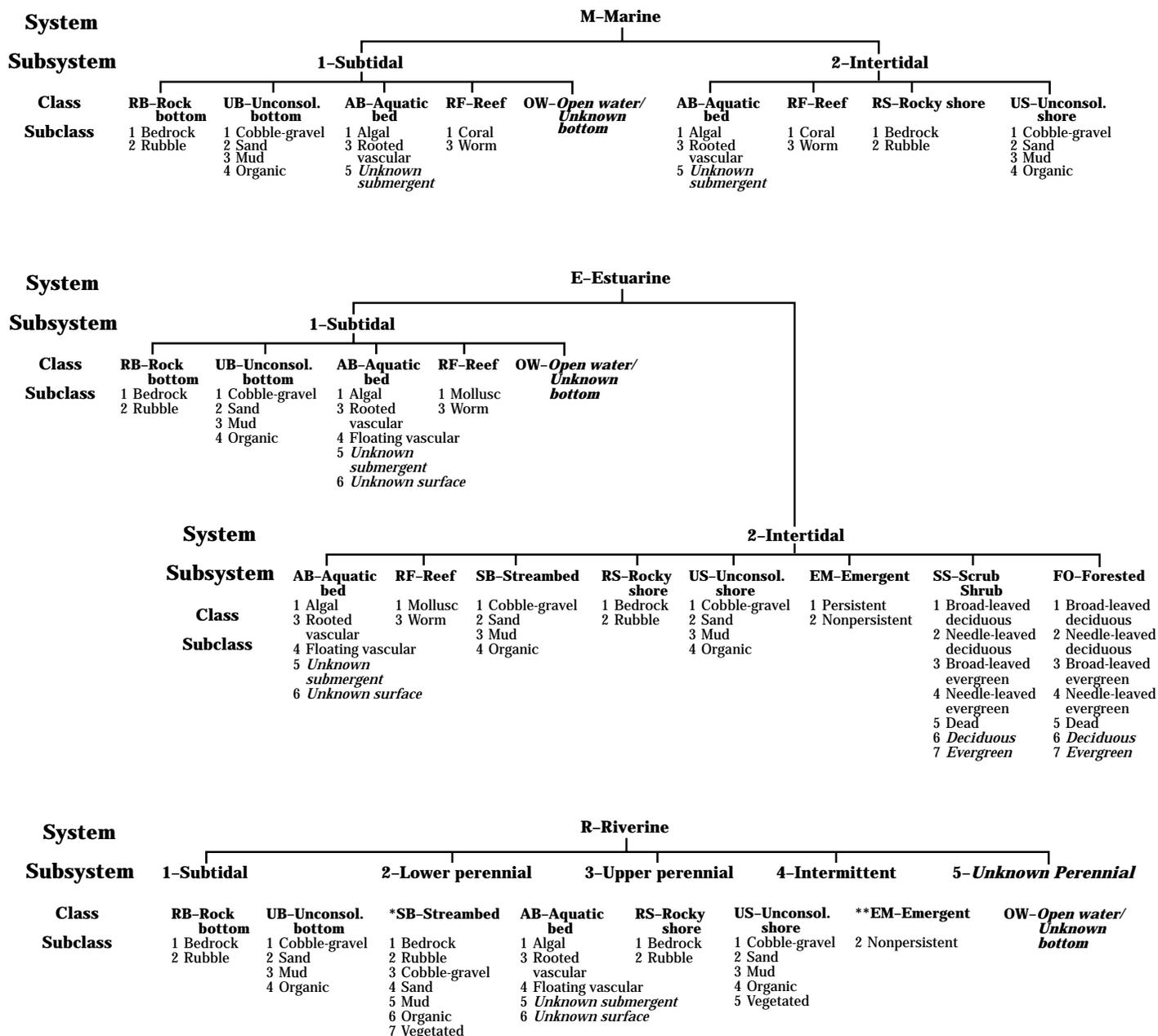
*Pioneer plants.* Herbaceous annual and seedling perennial plants that colonize bare areas as a first stage in secondary succession. [Cowardin, et al.]

*Remote sensing.* The science and art of obtaining information about an object, area, or phenomenon through the analysis of data acquired without physical contact with the object, area, or phenomenon under investigation. [BPI]

*Wetland basin.* The wetted perimeter of a wetland area. [NRI-97]

# Exhibit 1—NWI Map Legend, Taxonomic and Modifier Codes

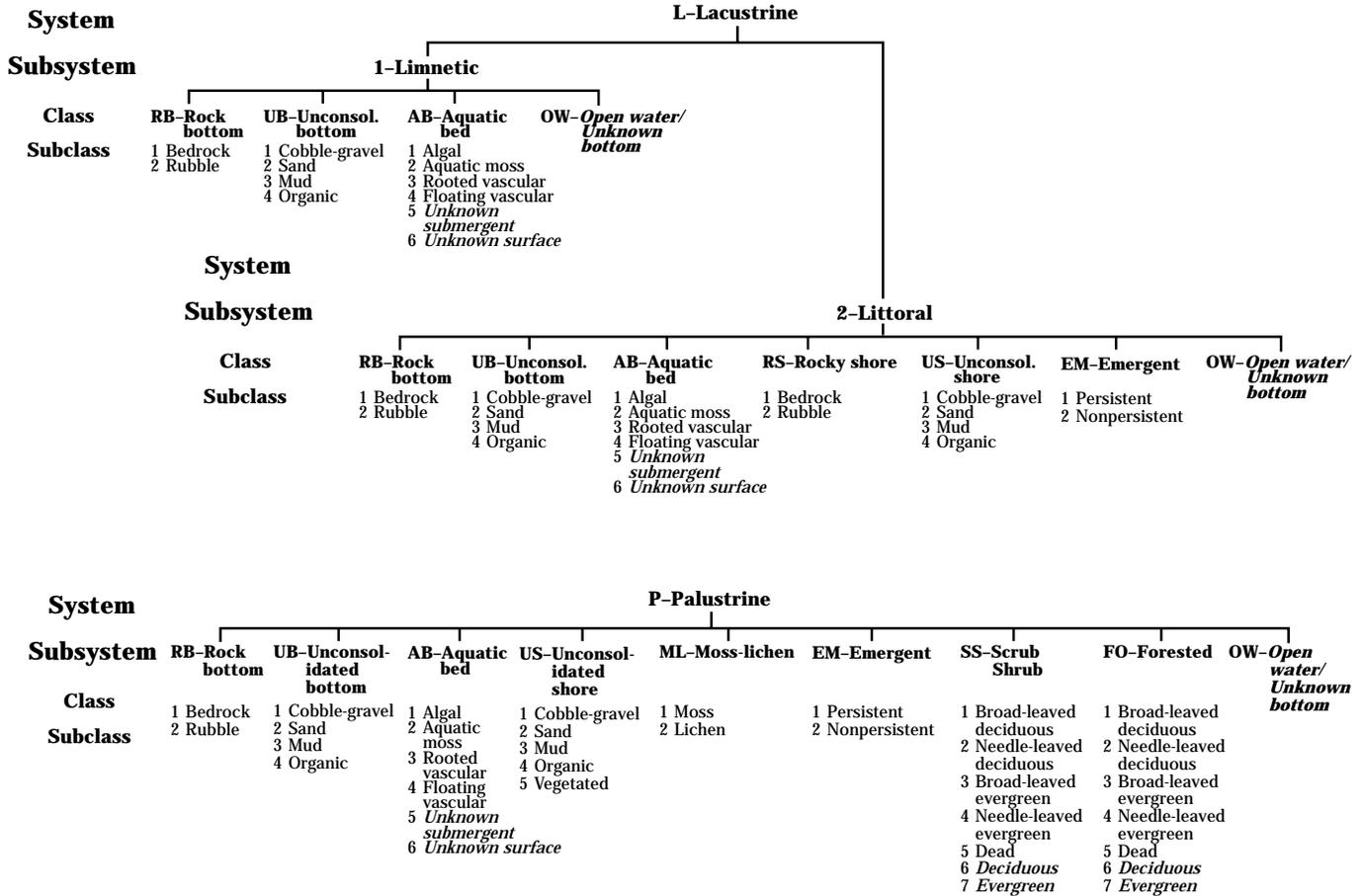
## Wetland and Deepwater Habitats Classification



\*Stream bed is limited and intermittent subsystems, and comprises the only class in the intermittent subsystem.  
 \*\*Emergent is limited to tidal and lower perennial subsystems.

Classification of Wetland and Deepwater Habitats of the United States  
 Cowardin et al. 1979 as modified for National Wetland Inventory Mapping Convention.

# Wetland and Deepwater Habitats Classification



Modifiers								
<p>In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.</p>								
Water regime								
<p><b>Non-tidal</b></p> <p>A Temporarily flooded B Saturated C Seasonally flooded D Seasonally flooded/ well drained E Seasonally flooded/ saturated F Semipermanently flooded G Intermittently exposed</p>	<p><b>Tidal</b></p> <p>H Permanently flooded J Intermittently flooded K Artificially flooded W Intermittently flooded/temporary Y Saturated/semipermanent/ seasonal Z Exposed/permanent U <i>Unknown</i></p>	<p>K Artificially flooded L Subtidal M Irregularly exposed N Regularly flooded P Irregularly flooded</p> <p>*S Temporary-tidal *R Season-tidal *T Semipermanent-tidal *V Permanent-tidal U <i>Unknown</i></p>						
Water chemistry	Soil	Special modifiers						
<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"><b>Coastal halinity</b></td> <td style="width: 33%;"><b>Inland salinity</b></td> <td style="width: 33%;"><b>pH modifiers for all fresh water</b></td> </tr> <tr> <td>1 Hyperhaline 2 Euhaline 3 Mixohaline (brackish) 4 Polyhaline 5 Mesohaline 6 Oligohaline 0 Fresh</td> <td>7 Hypersaline 8 Eusaline 9 Mixosaline 0 Fresh</td> <td>a Acid t Circumneutral i Alkaline</td> </tr> </table>	<b>Coastal halinity</b>	<b>Inland salinity</b>	<b>pH modifiers for all fresh water</b>	1 Hyperhaline 2 Euhaline 3 Mixohaline (brackish) 4 Polyhaline 5 Mesohaline 6 Oligohaline 0 Fresh	7 Hypersaline 8 Eusaline 9 Mixosaline 0 Fresh	a Acid t Circumneutral i Alkaline	<p>g Organic n Mineral</p>	<p>b <i>Beaver</i> d <i>Partially drained/ditched</i> f Farmed</p> <p>h <i>Diked/impounded</i> r Artificial substrate s <i>Spoil</i> x Excavated</p>
<b>Coastal halinity</b>	<b>Inland salinity</b>	<b>pH modifiers for all fresh water</b>						
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