NWI Wetlands and Deepwater Map Code Diagram

System: M - Marine

- **Subsystem: 1 - Subtidal**
  - Class: RB – Rock Bottom
    - Subclass: 1 Bedrock; 2 Rubble
  - Class: UB – Unconsolidated Bottom
    - Subclass: 1 Cobble-Gravel; 2 Sand; 3 Mud
  - Class: AB – Aquatic Bed
    - Subclass: 1 Algal; 3 Rooted Vascular
  - Class: RF – Reef
    - Subclass: 1 Coral; 3 Worm
- **Subsystem: 2 - Intertidal**
  - Class: AB – Aquatic Bed
    - Subclass: 1 Algal; 3 Rooted Vascular
  - Class: RF – Reef
    - Subclass: 1 Coral; 3 Worm
  - Class: RS – Rocky Shore
    - Subclass: 1 Bedrock; 2 Rubble
  - Class: US – Unconsolidated Shore
    - Subclass: 1 Cobble-Gravel; 2 Sand; 3 Mud; 4 Organic

System: E - Estuarine

- **Subsystem: 1 - Subtidal**
  - Class: RB – Rock Bottom
    - Subclass: 1 Bedrock; 2 Rubble
  - Class: UB – Unconsolidated Bottom
    - Subclass: 1 Cobble-Gravel; 2 Sand; 3 Mud; 4 Organic
  - Class: AB – Aquatic Bed
    - Subclass: 1 Algal; 3 Rooted Vascular; 4 Floating Vascular
  - Class: RF – Reef
    - Subclass: 2 Mollusk; 3 Worm
- **Subsystem: 2 - Intertidal**
  - Class: AB – Aquatic Bed
    - Subclass: 1 Algal; 3 Rooted Vascular; 4 Floating Vascular
  - Class: RF – Reef
    - Subclass: 2 Mollusk; 3 Worm
  - Class: SB – Streambed
    - Subclass: 1 Bedrock; 2 Rubble; 3 Cobble-Gravel; 4 Sand; 5 Mud; 6 Organic
  - Class: RS – Rocky Shore
    - Subclass: 1 Bedrock; 2 Rubble
  - Class: US – Unconsolidated Shore
    - Subclass: 1 Cobble-Gravel; 2 Sand; 3 Mud; 4 Organic
  - Class: EM – Emergent
    - Subclass: 1 Persistent; 2 Non-persistent; 5 *Phragmites australis*
  - Class: SS – Scrub-Shrub
    - Subclass: 1 Broad-Leaved Deciduous; 2 Needle-Leaved Deciduous; 3 Broad-Leaved Evergreen; 4 Needle-Leaved Evergreen; 5 Dead; 6 Deciduous; 7 Evergreen
  - Class: FO – Forested
    - Subclass: 1 Broad-Leaved Deciduous; 2 Needle-Leaved Deciduous; 3 Broad-Leaved Evergreen; 4 Needle-Leaved Evergreen; 5 Dead; 6 Deciduous; 7 Evergreen

System: R - Riverine

- **Subsystem:** 1 - Tidal; 2 – Lower Perennial; 3 – Upper Perennial; 4* - Intermittent
  - Class: RB** – Rock Bottom
    - Subclass: 1 Bedrock; 2 Rubble
  - Class: UB – Unconsolidated Bottom
    - Subclass: 1 Cobble-Gravel; 2 Sand; 3 Mud; 4 Organic
  - Class: AB – Aquatic Bed
    - Subclass: 1 Algal; 2 Aquatic Moss; 3 Rooted Vascular; 4 Floating Vascular
  - Class: SB***– Streambed
    - Subclass: 1 Bedrock; 2 Rubble; 3 Cobble-Gravel; 4 Sand; 5 Mud; 6 Organic; 7 Vegetated
  - Class: RS – Rocky Shore
    - Subclass: 1 Bedrock; 2 Rubble
  - Class: US – Unconsolidated Shore
    - Subclass: 1 Cobble-Gravel; 2 Sand; 3 Mud; 4 Organic; 5 Vegetated
  - Class: EM – Emergent
    - Subclass: 2 Nonpersistent

* **Intermittent** is limited to the **Streambed** Class;
** **Rock Bottom** is not permitted for the **Lower Perennial** Subsystem;
*** **Streambed** is limited to **Tidal** and **Intermittent** Subsystems

Classification of Wetlands and Deepwater Habitats of the United States, Cowardin *et al.* 1979

August, 2015

NWI Wetlands and Deepwater Map Code Diagram

System: L - Lacustrine

Subsystem: 1 - Limnetic

Class	RB – Rock Bottom	UB – Unconsolidated Bottom	AB – Aquatic Bed
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular

Subsystem: 2 - Littoral

Class	RB – Rock Bottom	UB – Unconsolidated Bottom	AB – Aquatic Bed	RS – Rocky Shore	US – Unconsolidated Shore	EM – Emergent
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent

System: P - Palustrine

Class	RB – Rock Bottom	UB – Unconsolidated Bottom	AB – Aquatic Bed	US – Unconsolidated Shore	ML – Moss-Lichen	EM – Emergent	SS – Scrub-Shrub	FO – Forested
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent 5 *Phragmites australis*	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

MODIFIERS

In order to more adequately describe the 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.

Water Regime			Special Modifiers	Water Chemistry		Soil
Nontidal	**Saltwater Tidal**	**Freshwater Tidal**		**Halinity/Salinity**	**pH Modifiers for Fresh Water**	
A Temporarily Flooded	L Subtidal	S Temporarily Flooded- Fresh Tidal	b Beaver	1 Hyperhaline / Hypersaline	a Acid	g Organic
B Seasonally Saturated	M Irregularly Exposed	Q Regularly Flooded-Fresh Tidal	d Partly Drained/Ditched	2 Euhaline / Eusaline	t Circumneutral	n Mineral
C Seasonally Flooded	N Regularly Flooded	R Seasonally Flooded-Fresh Tidal	f Farmed	3 Mixohaline / Mixosaline (Brackish)	i Alkaline	
D Continuously Saturated	P Irregularly Flooded	T Semipermanently Flooded-Fresh Tidal	m Managed	4 Polyhaline		
E Seasonally Flooded / Saturated		V Permanently Flooded-Fresh Tidal	h Diked/Impounded	5 Mesohaline		
			r Artificial Substrate	6 Oligohaline		
F Semipermanently Flooded			s Spoil	0 Fresh		
G Intermittently Exposed			x Excavated			
H Permanently Flooded						
J Intermittently Flooded						
K Artificially Flooded						

NWI Water Regime Restriction Table

Class/Subclass	Code	Marine: Subtidal M1	Marine: Intertidal M2	Estuarine: Subtidal E1	Estuarine: Intertidal E2	Riverine: Tidal R1	Riverine: Lower Perennial R2	Riverine: Upper Perennial R3	Riverine: Intermittent R4	Lacustrine: Limnetic L1	Lacustrine: Littoral L2	Palustrine: P
ROCK BOTTOM	RB	L		L		T V		F G H		V G H K	T V F G H K	F G H K
Bedrock	RB1	L		L		T V		F G H		V G H K	T V F G H K	F G H K
Rubble	RB2	L		L		T V		F G H		V G H K	T V F G H K	F G H K
UNCONSOLIDATED BOTTOM	UB	L		L		T V	F G H	F G H		V G H K	T V F G H K	T V F G H K
Cobble-Gravel	UB1	L		L		T V	F G H	F G H		V G H K	T V F G H K	T V F G H K
Sand	UB2	L		L		T V	F G H	F G H		V G H K	T V F G H K	T V F G H K
Mud	UB3	L		L		T V	F G H	F G H		V G H K	T V F G H K	T V F G H K
Organic	UB4			L		T V	F G H			V G H K	T V F G H K	T V F G H K
AQUATIC BED	AB	L	M N	L	M N	Q T V	C F G H	C F G H		V G H K	Q T V C F G H K	R T V C F G H K
Algal	AB1	L	M N	L	M N	T V	F G H	F G H		V G H K	T V F G H K	T V F G H K
Aquatic Moss	AB2					T V	F G H	F G H		V G H K	T V F G H K	T V F G H K
Rooted Vascular	AB3	L	M	L	M	Q T V	C F G H	C F G H		V G H K	Q T V C F G H K	R T V C F G H K
Floating Vascular	AB4			L	M N	Q T V	C F G H	C F G H		V G H K	Q T V C F G H K	R T V C F G H K
REEF	RF	L	M N	L	M N							
Coral	RF1	L	M N									
Mollusk	RF2			L	M N							
Worm	RF3	L	M N	L	M N							
STREAMBED	SB				M N P	Q			A C J			
Bedrock	SB1				M N P	Q			A C J			
Rubble	SB2				M N P	Q			A C J			
Cobble-Gravel	SB3				M N P	Q			A C J			
Sand	SB4				M N P	Q			A C J			
Mud	SB5				M N P	Q			A C J			
Organic	SB6				M N P	Q			C			
Vegetated	SB7								A C J			
ROCKY SHORE	RS		M N P		M N P	Q	A C	A C			Q A C J K	
Bedrock	RS1		M N P		M N P	Q	A C	A C			Q A C J K	
Rubble	RS2		M N P		M N P	Q	A C	A C			Q A C J K	
UNCONSOLIDATED SHORE	US		M N P		M N P	Q	A C E J	A C E J			Q A C E J K	R S A C E J K
Cobble-Gravel	US1		M N P		M N P	Q	A C J	A C J			Q A C J K	R S A C J K
Sand	US2		M N P		M N P	Q	A C J	A C J			Q A C J K	R S A C J K
Mud	US3		M N P		M N P	Q	A C J	A C J			Q A C J K	R S A C J K
Organic	US4		M N P		M N P	Q	E	E			Q E	E
Vegetated	US5						A C J	A C J			Q A C J K	A C J K

Saltwater Tidal = **BROWN** Water Regimes; Freshwater Tidal = **BLUE** Water Regimes; Nontidal = **RED** Water Regimes.

Table Revised January 1, 2016

Class/Subclass	Code	Marine Subtidal M1	 Intertidal M2	Estuarine Subtidal E1	 Intertidal E2	Riverine Tidal R1	 Lower Perennial R2	 Upper Perennial R3	 Intermittent R4	Lacustrine Limnetic L1	 Littoral L2	Palustrine P
MOSS-LICHEN	ML											B C D E
Moss	ML1											B C D E
Lichen	ML2											B C D E
EMERGENT												
Persistent	EM1				N P							R S T A B C D E F J K
Non persistent	EM2				N P	Q T V	F G H				Q T V F G H K	T V F G H K
Phragmites australis	EM5				P							R S T A B C D E F K
SCRUB-SHRUB												
Broad-Leaved Deciduous	SS1				P							R S T A B C D E F J K
Needle-Leaved Deciduous	SS2				P							R S T A B C D E F J K
Broad-Leaved Evergreen	SS3				N P							R S A B C D E K
Needle-Leaved Evergreen	SS4				P							R S A B C D E K
Dead	SS5				M N P							T V F G H K
Deciduous	SS6				P							R S T A B C D E F J K
Evergreen	SS7				N P							R S A B C D E K
FORESTED												
Broad-Leaved Deciduous	FO1				P							R S T A B C D E F K
Needle-Leaved Deciduous	FO2				P							R S T A B C D E F K
Broad-Leaved Evergreen	FO3				N P							R S A B C D E K
Needle-Leaved Evergreen	FO4				P							R S A B C D E K
Dead	FO5				M N P							T V F G H K
Deciduous	FO6				P							R S T A B C D E F K
Evergreen	FO7				N P							R S A B C D E K

Saltwater Tidal = **BROWN** Water Regimes; Freshwater Tidal = **BLUE** Water Regimes; Nontidal = **RED** Water Regimes.

NWI Water Regime Nontidal Modifiers

Temporarily Flooded (A) Surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for the most of the season.

Seasonally Saturated (B). The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent, but may occur for a few days after heavy rain and upland runoff.

Seasonally Flooded (C). Surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the depth to substrate saturation may vary considerably among sites and among years.

Continuously Saturated (D) The substrate is saturated at or near the surface throughout the year in all, or most, years. Widespread surface inundation is rare, but water may be present in shallow depressions that intersect the groundwater table, particularly on a floating peat mat.

Seasonally Flooded-Saturated (E) Surface water is present for extended periods (generally for more than a month) during the growing season, but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.

Semipermanently Flooded (F). Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.

Intermittently Exposed (G) Water covers the substrate throughout the year except in years of extreme drought.

Permanently Flooded (H) Water covers the substrate throughout the year in all years.

Intermittently Flooded (J) The substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity. Weeks, months, or even years may intervene between periods of inundation. The dominant plant communities under this Water Regime may change as soil moisture conditions change. Some areas exhibiting this Water Regime do not fall within our definition of wetland because they do not have hydric soils or support hydrophytes. This Water Regime is generally limited to the arid West.

Artificially Flooded (K) The amount and duration of flooding are controlled by means of pumps or siphons in combination with dikes, berms, or dams. The vegetation growing on these areas cannot be considered a reliable indicator of Water Regime. Examples of Artificially Flooded wetlands are some agricultural lands managed under a rice-soybean rotation, and wildlife management areas where forests, crops, or pioneer plants may be flooded or dewatered to attract wetland wildlife. Neither wetlands within nor resulting from leakage from man-made impoundments, nor irrigated pasturelands supplied by diversion ditches or artesian wells, are included under this Modifier. The Artificially Flooded Water Regime Modifier should not be used in the Riverine system or for impoundments or excavated wetlands unless both water inputs and outputs are controlled to achieve a specific depth and duration of flooding.

Determining Soil Texture by the "Feel Method"

Texture Classification

C	= Coarse
MC	= Moderately Coarse
M	= Medium
F	= Fine

Start

Place approximately one tablespoon of soil in palm. Add water a drop at a time and knead the soil to break down all aggregates. Soil is at the proper consistency when plastic and mobile, like moist putty.

Does soil remain in a ball when squeezed?

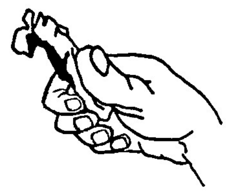
NO → Is the soil to dry? YES → (back to start box)

NO → Is the soil too wet? YES → Add dry soil to soak up water. → (back to start box)

NO 0 -10% ** → SAND C*

YES

Place ball of soil between thumb and forefinger, gently pushing the soil with the thumb, working it upward into a ribbon. Form a ribbon of uniform thickness and width. Allow the ribbon to emerge and extend over the forefinger, breaking from its own weight.



Does the soil form a ribbon?

NO 0 -15% ** → LOAMY SAND C *

YES

Does the soil make a weak ribbon less than 1" long before breaking?

YES → Excessively wet a small pinch of soil in palm of hand and rub with forefinger.

Does the soil feel very gritty? YES 0-20% → Sandy Loam MC

NO → Does the soil feel very smooth? YES 0-27% → Silt or Silt/ Loam M

NO → Neither grittiness nor smoothness predominates. YES 7-27% → Loam M

NO → Does the soil make a medium ribbon 1" to 2" long before breaking?

YES → Excessively wet a small pinch of soil in palm of hand and rub with forefinger.

Does the soil feel very gritty? YES 20-35% → Sandy Clay Loam MC

NO → Does the soil feel very smooth? YES 27-40% → Silty Clay Loam F

NO → Neither grittiness nor smoothness predominates YES 27-40% → Clay Loam F

NO → Does the soil make a strong ribbon 2" or longer before breaking?

YES → Excessively wet a small pinch of soil in palm of hand and rub with forefinger.

Does the soil feel very gritty? YES 35-55% → Sandy Clay MC

NO → Does the soil feel very smooth? YES 40-60% → Silty Clay F

NO → Neither grittiness nor smoothness predominates YES 40-100% → Clay F

* Sand Particle size should be estimated (very fine, fine, medium, coarse) for these textures. Individual grains of very fine sand are not visible without magnification and there is a gritty feeling to a very small sample ground between the teeth. Some fine sand particles may be just visible. Medium sand particles are easily visible. Examples of sand size descriptions where one size is predominant are; very fine sand, fine sandy loam, loamy coarse sand.

** Cay percentage range.

Modified from: Thien, Steven J., Kansas state University, 1979 Jour. Agronomy education.

Field Test for Determining the Kind of Organic Matter

Being able to estimate the amount and describe the kind of organic matter in the soil are essential skills needed by a wetland scientist when making a hydric soil determination. The organic matter content in a soil is expressed as either organic carbon or organic matter (by dry weight). The correction factor for converting organic carbon to organic matter is approximately 1.7.

Soil material is divided into 3 categories depending upon the organic matter content within the soil: organic soil material, mineral soil material, and mucky mineral soil. **Organic soil material** associated with wetland soils and, excluding live roots, has 18 percent or more organic carbon with 60 percent or more clay or 12 percent or more organic carbon with 0 percent clay. Soils with an intermediate amount of clay have an intermediate amount of organic carbon. **Mineral soil material** has a higher mineral content and less organic matter than organic soil material. Mucky mineral soil is a mineral soil material that has an unusually high amount of sapric organic matter. Mucky modified mineral soil material that has 0 percent clay has between 5 and 12 percent organic carbon. Mucky modified mineral soil material that has 60 percent clay has between 12 and 18 percent organic carbon. Soils with an intermediate amount of clay have intermediate amounts of organic carbon. Where the organic component is peat (fibric material) or mucky peat (hemic material), mucky mineral soil material does not occur.

Depending on the degree of decomposition, soil organic matter is classified into four categories: undecomposed litter, fibric, hemic, or sapric material. The **Rubbed fiber content** is used when determining the degree of decomposition of soil organic matter. The rubbed fiber content is estimated in the field by first taking a moist sample (about the size of a marshmallow) and removing the live roots. Live roots do not count as soil organic matter and are not considered when determining the fiber content. The sample is then rubbed in the palm of one's hand using the thumb of the other for about 10 times using firm pressure. The rubbing shreds and breaks up any decomposed organic matter that is still intact. After rubbing, the sample is compressed into a round mass and then pulled apart into two halves. The percent fiber content is estimated by examining the broken face using a hand lens (10 power or more). If there is a question between unrubbed and rubbed fiber content, rubbed content is used.

Undecomposed litter is plant material that has not begun to decompose and has no observable evidence of decomposition. This most often occurs in woodland areas as a surface layer of loose, fluffy leaves and/or needles that can be easily brushed aside with one's hand or blown from one area to another by a strong wind. Undecomposed litter is not considered part of the soil. When present, depth measurements for a profile description start below the undecomposed litter and at the top of the organic material that has observable evidence of decomposition (i.e., fibric, hemic, or sapric). The thickness of the litter layer may be recorded as inches to zero (e.g., +3 inches to 0).
Fibric material is slightly decomposed organic material. Most often the original source of the organic matter (e.g., red maple) can be identified. Fibric material has a rubbed fiber content of 40 percent or more (by volume). Soil horizons composed of fibric material are designated Oi.
Hemic material is partially decomposed (intermediate decomposition) organic material. It often has the look and feel of mature compost. Hemic material has a rubbed fiber content of 17 to 40 percent (by volume). Soil horizons composed of hemic material are designated Oe.
Sapric material is highly decomposed organic material. It most often has a black or a very dark reddish black color with a massive or solid appearance. Sapric material has rubbed fiber content of less than 17 percent (by volume). Soil horizons composed of sapric material are designated Oa.

Peat, Mucky Peat, and Muck

Peat, mucky peat, and muck are terms used to describe fibric, hemic, and sapric materials associated with wetness. Key factors to consider when making this determination are landscape position and presence of indicators of wetland hydrology. These terms should only be considered in areas where there is a high probability of soil saturation, flooding, and/or ponding. Soils with organic horizons comprised of peat, mucky peat, and muck are most often found within depressions, swales, at the base of long slopes (footslope and toeslope), or in low areas adjacent to water bodies. Organic surface horizons (Oi, Oe, and/or Oa horizons) associated with Histosols, histic epipedons, and soils that are gleyed in the upper part of the subsoil are almost always peat, mucky peat, and/or muck. These areas most often have indicators of wetland hydrology (e.g., water-stained leaves, sediment deposits, etc.). There are some situations where the surface organic layers of a hydric soil are comprised of fibric, hemic, and/or sapric material. These typically occur in transitional areas.

Field Tips:
1. Another form of the strength test is to clean the face of a test pit and probe the soil. A finger or trowel will easily penetrate an organic horizon but there is strong resistence when probing a mineral horizon.
2. Never assume that a thick black surface layer is the same soil texture throughout. In many situations, a black surface layer of well decomposed organic matter (Oa horizon) is underlain by a black mineral soil (A horizon). Always check to confirm whether there is a dark mineral horizon (A horizon) directly underlying the surface organic layers (O horizon).
3. Before trying to estimate the kind (sands, silt, and/or clay) or amount of mineral soil in an organic rich surface layer, first determine the soil texture of the mineral horizon (E, B, or C) that directly underlies the organic rich layer. Assuming the mineral component of the soil is similar throughout the upper part of the soil, this makes for a good comparison (gritty feel and/or strength) when estimating the mineral content in an organic rich layer.
4. Laboratory analysis conducted at the University of Rhode Island by Dr. Mark Stolt confirms that the highest amount of organic carbon (OC) one might expect in soil organic matter is about 50 percent, and in most situations it is 40 percent. When estimating the OC in fibric material (Oi horizon), it is most often less than 40 percent. For hemic material (Oe horizon) the maximum OC content is typically 30 percent, and the maximum for sapric material (Oa horizon) is about 25 percent.

For additional guidance on describing, documenting and estimating the amount and kind of organic material in a soil refer to the following documents:
- U.S. Army Corps of Engineers, Regional Supplement to the Corp of Engineers Wetland Delineation Manual: Northcentral and Northeast Region
- Field Indicators for Identifying Hydric Soils in New England, Version 3, April 2004
- National Soil Survey Center, U.S. Department of Agriculture, Field Book for Describing and Sampling Soils, Version 3.0

USE OF THIS CHART: Depending on the site, determining the organic matter content of a soil can be difficult often with significant differences between experienced professionals. No field test alone is reliable enough to conclude with a high degree of confidence that a particular sample has a specified percentage of organic carbon/organic matter. The confidence level increases as additional tests are applied and results compared.

Compiled by Peter C. Fletcher Draft December 8, 2011

FIELD TEST	ORGANIC SOIL MATERIAL (OSM)	MUCKY MINERAL SOIL (MMS)	MINERAL SOIL MATERIAL (MSM)
1. **Soil Color Moist:** Organic matter is a strong coloring agent in the soil and as little as 3 to 5% can turn a mineral soil black. Dark and very dark colors confirm the presence of organic matter in soil. Soil color alone is not a definitive test for OSM or MMS.	Fibric and hemic material, typically have colors with values of 4 or less and chromas of 3 or less. Sapric material has very dark soil colors with values and chromas of 2 or less. Organic soils formed in tidal marshes often have higher values and chromas.	Has a very dark soil color most often with values and chromas of 2 or less.	Has a broad spectrum of soil colors including black. Soils that have colors with values of 3 or higher and chromas of 2 or more are most often MSM.
2. **Air-Dry Soil Color:** For this test smear a very moist soil sample onto a sheet of white paper and let dry.	The dry soil retains nearly all of its dark color.	The dry soil retains some of its dark color, typically with values of 4 or less and chromas of 2 or less.	The dry soil turns a light color with values of 4 or higher and any chroma, or values and chromas of 3 or higher.
3. **Rubbed Fiber Content:** The percentage of visible fibers observed with a hand lens after rubbing in one's palm approximately 10 times. Live roots do not count as soil organic matter and should be removed before conducting this test.	Fibric material has a rubbed fiber content of 40% or more by volume. Hemic material has rubbed fiber content of 17 to 40%. For Sapric material it is less than 17%. *Reliable test for fibric and hemic material when used in combination with Test 6.*	Typically lacks fibers or has low fiber content.	Most often lacks fibers or has a very low fiber content.
4. **Soil Strength:** For this test, remove a clod (undisturbed piece) of soil, about the size of a lemon, from the side of the pit. The sample should be very moist but not saturated. If dripping wet, wrap the sample in a paper towel to remove excess water. When conducting this test, the soil sample should be squeezed but not repeatedly worked within one's hand.	When squeezed firmly, soil material oozes out freely from between one's fingers. *Reliable test for sapric material when used in combination with Tests 1 and 5.* 	When squeezed firmly, soil material has a slight to moderate tendency to ooze between one's fingers. *Reliable test when used in combination with Tests 1, 2, and 5.*	When squeezed firmly, soil material forms a solid mass and no soil material oozes from between one's fingers. *Reliable test when used in combination with Tests 2, 5 and/or 6.*
5. **Gritty Feel:** For this test rub a saturated sample in one's palm using moderate thumb pressure. This test is unreliable if the mineral fraction of the soil is predominantly very fine sand, silt and/or clay size particles.	After 5 rubs retains its greasy, slippery feel with no grittiness.	Initially has a creamy, smooth feel that after 3 to 5 rubs has an underlying gritty feel. *Reliable test when the mineral soil is a sand, loamy sand, sandy loam or loam.*	Has a gritty feel after 1 or 2 rubs. This test only works well when there are sand size particles present. *Reliable test when the mineral soil is a sand, loamy sand, sandy loam or loam.*
6. **Air-dry Weight:** For this test form a moist sample of soil into a mass about the size of a lime and let dry for 1-2 days.	Soil sample becomes significantly lighter in weight and retains most of its original color. If sapric, the mass often shrinks in size.	May lose a noticeable amount of its original weight and retains some of its dark color. When held up to the light, one can often see a shiny reflection off the mineral soil particles.	Retains a significant amount of its original weight and turns considerably lighter in color.
7. **Squeezed Liquid:** For this test, place a saturated sample of soil about the size of a lemon in one's palm and squeeze using firm pressure. The extruded liquid and particulates are then examined. If there is a difference in results (fibric, hemic, or sapric) between this method and the rubbed fiber content, the rubbed fiber content is used. This method was originally developed by L.von Post and is described in more detail in ASTM Standard D 5715-00		The liquid extruded from fibric material is typically clear to brown with no organic solids. The liquid extruded from hemic material is dark and often turbid with as much as 1/3 of the sample squeezed out. For sapric material the liquid is very turbid or it is thick and pasty with most of the sample squeezed out. The test is not used for mineral soils or mucky mineral soils.	