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WETLAND DETERMINATION RECORD

Owner/Operator:	Legal Description:	County:
Field Investigator/Title:		Date:
Farm No., Tract No., Field No.(s):	Were all fields reviewed? ☐Yes ☐No (if "No" then document in previous box which fields are included/excluded) [5]	

Hydrology Influences

Were there any significant dry or wet periods or external influences that may affect the area under review? ☐Yes ☐No (if "Yes" then document in adjacent box what the influence may be and which fields are affected)	

Site/ Field No.	Hydric Soil Indicator[1]	Playa or pothole (Y or N)	Hydrology[2,3]	Vegetation Observed[4]	Determin-ation Label

[1] See Appendices A & B: Hydric Soil Indicators sheet for guidance and Munsell Soil Help Charts.
[2] See Appendix C: Hydrology Indicators sheet for guidance.
[3] Note any hydrologic manipulations. Document manipulations on Scope and Effect Worksheet.
[4] See Appendices D & E. For each stratum: list dominant species, percent cover, and wetland indicator. State if meets 50/20 rule. Note corresponding reference site, if applicable.
[5] See Appendix F: Making Off-Site Determinations

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Remote Sensing Summary

For use with Primary Indicator B7 – Inundation visible on aerial imagery OR with Secondary Indicator C9 – Saturation visible on aerial imagery

Investigator/Title:	**Date:**

Primary Indicator B7 – Inundation visible on aerial imagery: Care must be used in applying this indicator because surface water may be present on a non-wetland site immediately after a heavy rain or during periods of unusually high precipitation, runoff, tides, or river stages.

Secondary Indicator C9 – Saturation visible on aerial imagery: If >50% of "normal" year slides reviewed show a wetland signature then a secondary hydrology indicator verified.

Wetland Signatures:

CC= crop change: flooded or drowned-out crops, stressed or yellow crops due to wetness, differences in vegetation due to different planting dates, inclusion of wet areas as set-aside, unharvested crops, isolated areas that are not farmed with rest of field,

CT=color tone difference: hydrophytic vegetation, patches of greener vegetation (especially during dry years)

SW= Inundation: (surface water) this is the only signature applicable when reviewing for indicator B7-Inundation visible on aerial imagery

PHM= potential hydrological manipulation: Potential hydrological manipulations (e.g. permanent or plow ditches, pits, newly installed tile lines, potential tile discharge locations) should be noted to factor into labeling decision but NOT for use as a hydrology indicator.

NS=no signature

Date Mo./Yr	Climate Condition: Wet, Dry, or Normal[1]	List Wetland Signature(s) Observed. Site being reviewed must correspond to locations on an attached map.								Additional Notes: e.g. FSA slide, Color, IR or B/W
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	

[1] As per applicable WETS table in the Monthly Wetness Evaluation section.

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HYDRIC SOIL INDICATORS

This flowchart MUST be used with "Field Indicators of Hydric Soils in the United States, Version 6.0" to verify the indicator chosen for the soil meets all criteria.

If there is an organic layer and one of the below indicators does not seem to fit then refer to indicators A1, A2, A3, & A4.

Dig a hole to a depth of at least 20 inches.

Is the soil **Sandy**?
Texture of loamy fine sand and coarser.

Yes → **Refer to Sandy Soil Indicators (Next Page)**

No

Is the soil loamy with a gleyed color (Hue N, 10Y, 5GY, 10GY, 5G, 10G, 5BG, 10BG, 5B, 10B, or 5PB, **with value 4 or more**) within 12 inches of the surface?

→ **Use Indicator F2: Loamy Gleyed Matrix**

No

Is upper layer above depleted matrix has a value ≤3 and chroma ≤2? AND Starting within 12 inches of the surface, a layer at least 6 inches thick with a depleted[1] "grayer" color of value ≥4 and chroma ≤2. IF the soil color in the depleted layer are 4/1, 4/2, or 5/2 then redox concentrations required.

→ **Use Indicator A11: Depleted Below Dark Surface**

No

Is entirely within 12 inches of the surface there a layer of value ≤3 and chroma ≤2 at least 4 inches thick with redox concentrations? AND 2% or more redox concentrations if value ≤3 and chroma ≤1. OR 5% or more redox concentrations if value ≤3 and chroma ≤2.

→ **Use Indicator F6: Redox Dark Surface**

No

Is the soil in a closed depression and have a 2 inch layer of 5% or more redox concentrations entirely within 6 inches of the surface?

→ **Use Indicator F8: Redox Depressions**

No

Does upper 12 inches has value ≤2.5 and chroma ≤1? AND A layer at least 6 inch thick with depleted[1] "greyer" color of value ≥4 and chroma of ≤2 starting anywhere 12 inches below the surface. IF the soil color in the depleted layer are 4/1, 4/2, or 5/2 then redox concentrations are required. Any layer between the two (surface & depleted layer) has value ≤3 and chroma ≤1.

→ **Use Indicator A12: Thick Dark Surface**

No

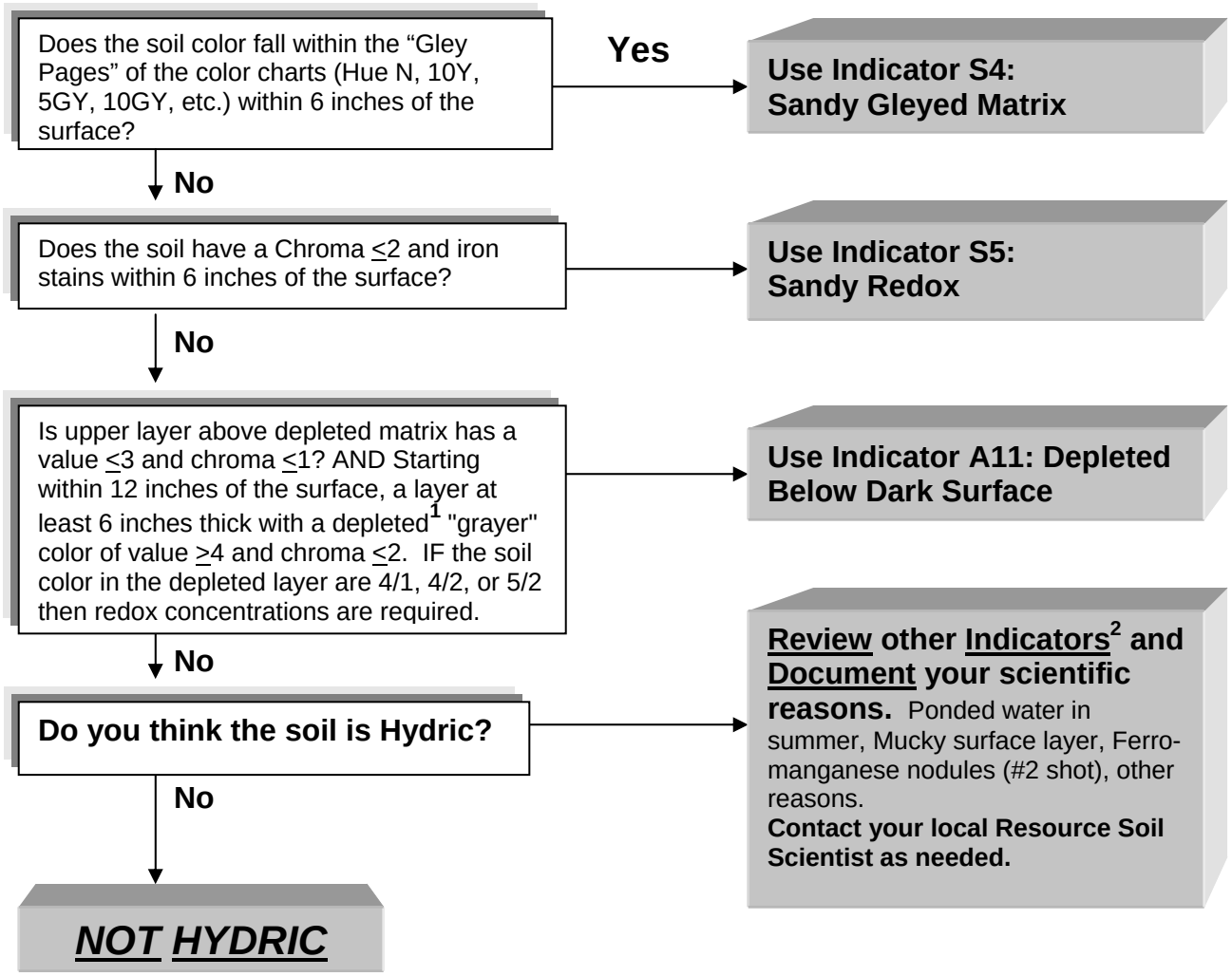
Do you think the soil is Hydric?

→ **Review other Indicators[2] and Document your scientific reasons.** Ponded water in summer, Mucky surface layer, Ferro-manganese nodules (#2 shot), other reasons.
Contact your local Resource Soil Scientist as needed.

No

NOT HYDRIC

Sandy Soil Indicators



[1] **A, E, and calcic horizons may have low chromas and high values and may therefore be mistaken for a depleted matrix; however, they are excluded from the concept of depleted matrix unless the soil has common or many distinct or prominent redox concentrations occurring as soft masses or pore linings.**

[2] **Other indicators to be used in Nebraska are:**

Region G: A1, A2, A3, A4, A9, S1, S2, S6, F1, F3, F7, A16 (test), S7 (test), TF2 (test)
Region H: A1, A2, A3, A4, A9, S1, S2, S6, F1, F3, F7, F16, A16 (test), TF2 (test)
Region M: A1, A2, A3, A4, A5, A10, S1, S3, S6, F1, F3, F7, F12 (test), A16 (test)

Hydric Soil Determination Guidelines

The National Technical Committee on Hydric Soils has issued version 6.0 of "Field Indicators of Hydric Soils in the United States." This new version has combined the old indicators F4 and TS4 into indicator A11 (Depleted Below Dark Surface). The new version also combined the old indicators TS2, F5, and TF7 into indicator A12(Thick Dark Surface). Test indicator TF5 was deleted.

Field experience has shown the reliability of indicator A12 (old TF7) is very dependent on landscape and landform. Experience has shown that many sites in linear, flood plain, slope, and open drainage landforms have a plant community that is not hydrophytic, hydrology is not present, the soils do not meet indicator F6, yet still meet indicator A12

If a soil in a depressional landform does not meet field indicator, A11 (Depleted Below Dark Surface), F6(Redox Dark Surface), or F8 (Redox Depressions), and does not meet any other indicator, the site will need to be investigated to see if it meets indicator A12(Thick Dark Surface). However, because the depth to the depleted matrix is deeper than 12 inches when using this indicator, A12 is not an approved secondary indicator of hydrology in depressional landforms.

The Hydric Soil Indicators flowchart was designed to reflect these changes and was created by field request, as a quick one-page reference guide for the most common hydric soil indicators in Nebraska. It does NOT list all possible indicators for the state. It also does not carry a complete description of the indicators. The complete description for all indicators can be found in the publication "Field Indicators of Hydric Soils in the United States, Version 6.0" at: ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric_Soils.

When determining hydric soils, use a spade or shovel to investigate the top 20 inches. The use of a spade will help make those determinations much easier. It allows you to see more surface area than can be seen using a push probe or auger. Also, remember that when using any of the hydric indicators, in any landscape, investigate starting from the edge of the suspected hydric area. If needed, a push probe or hand auger maybe used to investigate below the 20 inch depth. When using Field Indicator A12, remember that **no** layers above the depleted or gleyed matrix may have a moist value greater than three, or a moist chroma greater than one. Go no deeper than 48 inches from the soil surface. If the soil is dark colored to more than a depth of 48 inches, move closer to the edge of the depressional landform until the dark soil is less than 48 inches thick. If the upper edge of the landform has a hydric soil indicator, then all lower elevations within the landform are hydric soils.

Definitions

Depleted matrix: For loamy and clayey material, a depleted matrix refers to the volume of a soil horizon or subhorizon in which the processes of reduction and translocation have removed or transformed iron, creating colors of low chroma and high value. A, E, and calcic horizons may have low chromas and high values and may therefore be mistaken for a depleted matrix; however, they are excluded from the concept of depleted matrix unless the soil has common or many distinct or prominent redox concentrations occurring as soft masses or pore linings.
Redox concentration: Bodies of apparent accumulation of Fe-Mn oxides. Redox concentrations include soft masses, pore linings, nodules, and concretions. For the purposes of the Indicators, nodules and concretions are excluded from the concept of redox concentrations unless otherwise specified by specific Indicators.

Munsell Soil Help Charts

In general, start with Soil Color Chart pages 10YR, 2.5Y, and 5Y.
10YR is used in the examples below

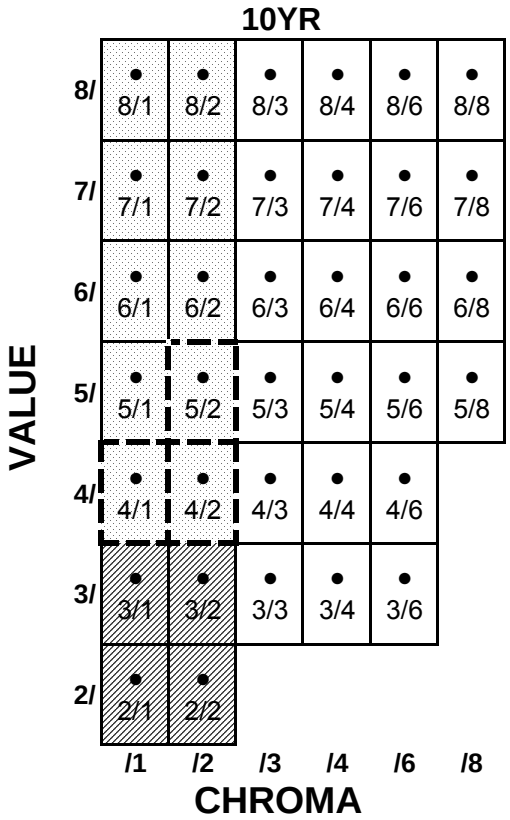
A11: Depleted Below Dark Surface

Upper layer above depleted matrix has a value ≤3 and chroma ≤2 (≤1 for sandy soils).

AND

Starting within 12 inches of the surface, a layer at least 6 inches thick with a depleted "grayer" color of value ≥4 and chroma ≤2.

IF the soil color in the depleted layer are 4/1, 4/2, or 5/2 then redox concentrations are required.



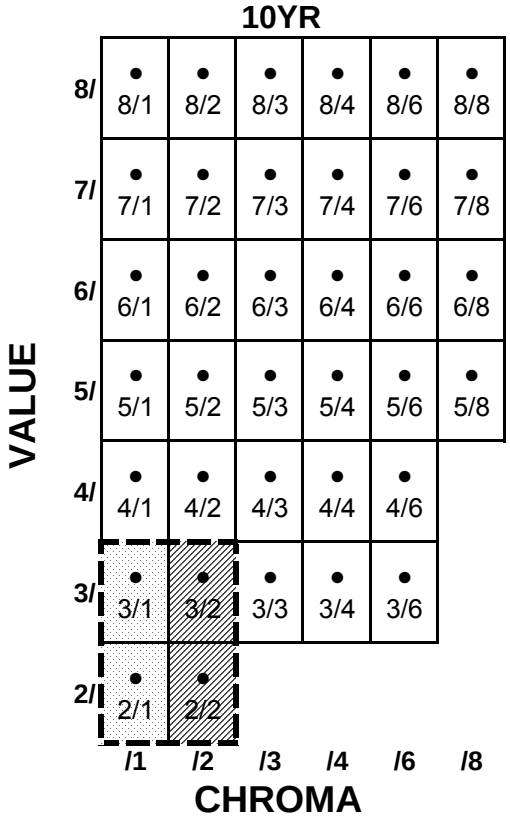
F6: Redox Dark Surface

Entirely within 12 inches of the surface there is a layer of value ≤3 and chroma ≤2 at least 4 inches thick with redox concentrations.

AND

2% or more redox concentrations if value ≤3 and chroma ≤1.

5% or more redox concentrations if value ≤3 and chroma ≤2.



Munsell Soil Help Charts

In general, start with Soil Color Chart pages 10YR, 2.5Y, and 5Y.
10YR is used in the examples below

A12: Thick Dark Surface

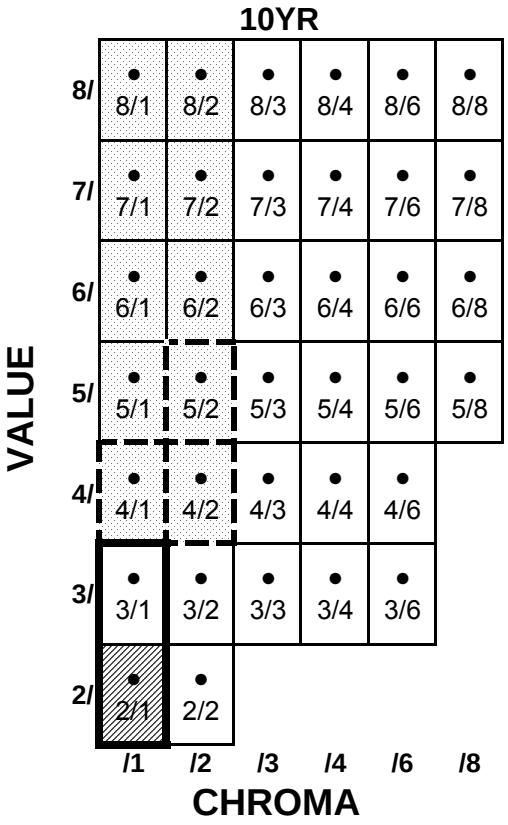
Upper 12 inches has value ≤2.5 and chroma ≤1.

AND

A layer at least 6 inch thick with depleted "greyer" color of value ≥4 and chroma of ≤2 starting anywhere 12 inches below the surface.

IF the soil color in the depleted layer are 4/1, 4/2, or 5/2 then redox concentrations are required.

Any layer between the two (surface & depleted layer) has value ≤3 and chroma ≤1.



HYDROLOGY INDICATORS

These **two steps** are used to determine if wetland hydrology is met and not for disproving the presence of hydrology. If wetland hydrology requirements are verified in Step 1, Primary Indicators then it is NOT necessary to continue to Step 2, Secondary Indicators. This form provides authorized hydrology indicators that must also be used with form NRCS-CPA-36 Hydrology Data when comprehensive data recording is needed (e.g. appeals). On form NRCS-CPA-36 in the Wetland Hydrology Indicators section primary indicators can be recorded in the adjacent margin and secondary indicators recorded in the "Other" blank provided. In the "Remarks" section record the following reference "Hydrology indicators have been determined per the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual".

The Midwest Regional Supplement includes eastern Nebraska and MLRAs 102C, 106 & 107B. The rest of the state is included in the Great Plains Region. The differences in hydrology indicators are indicated in the below list.

Step 1. Wetland hydrology is met if **ONE** or more of the following Primary Indicators is present. **If a Primary Indicator is NOT met, then move to Step 2.**

Primary Indicators

Group A – Observation of Surface Water or Saturated Soils
A1 – Surface water **A2** – High water table **A3** – Saturation

Group B – Evidence of Recent Inundation
B1 – Water marks **B2** – Sediment deposits **B3** – Drift deposits
B4 – Algal mat or crust **B5** – Iron deposits
B7 – Inundation visible on aerial imagery (See Remote Sensing Protocol)
B8 – Sparsely vegetated concave surface (Midwest Region only)
B9 – Water-stained leaves **B11** – Salt crust (Great Plains Region only)
B13 – Aquatic fauna/invertebrates **B14** – True aquatic plants (Midwest Region only)

Group C – Evidence of Recent Soil Saturation
C1 – Hydrogen sulfide odor **C2** – Dry-season water table (Great Plains Region only)
C3 – Oxidized rhizospheres along living roots **C4** – Presence of reduced iron
C6 – Recent iron reduction in tilled soils (Midwest Region only) **C7** – Thin muck surface

Group D – Evidence from Other Site Conditions or Data
D9 – Gauge or well data (Midwest Region only)

Step 2. Wetland hydrology is met if **TWO** or more of the following Secondary Indicators are present.

Secondary Indicators

Group B – Evidence of Recent Inundation
B6 – Surface soil cracks **B10** – Drainage patterns
B8 – Sparsely vegetated concave surface (Great Plains Region only)

Group C – Evidence of Recent Soil Saturation
C2 – Dry-season water table (Midwest Region only)
C3 – Oxidized rhizospheres along living roots - where tilled (Great Plains Region only)
C8 – Crayfish burrows
C9 – Saturation visible on aerial imagery (See Remote Sensing Protocol)

Group D – Evidence from Other Site Conditions or Data
D1 – Stunted or stressed plants (Midwest Region only)
D2 – Geomorphic position
D5 – FAC-neutral test
D7 – Frost-heave hummocks (Great Plains Region only)

Remote Sensing Protocol

Engineering Field Handbook (EFH), Chapter 19 tools provide a wetland hydrology determination assuring that the preponderance of evidence requirement is met. Currently this is Procedure 2 as denoted in 650.1903 of Chapter 19 of the EFH. Remote sensing tools can **NOT** override the presence of field indicators in Steps 1 or 2 without clear documentation and explanation as to how the preponderance of evidence negates the onsite indicator(s) found (e.g., timing, duration, recorded data).

Evaluating Hydrology using Mapping Conventions

This method should be used in evaluating the two following indicators:

Primary Indicator, Group B – Evidence of Recent Inundation
B7 – Inundation visible on aerial imagery

Secondary Indicators, Group C – Evidence of Recent Soil Saturation
C9 – Saturation visible on aerial imagery

For an appeal document the remote sensed data on form NRCS-CPA-32, otherwise, you may use page 2 of the wetland determination record.

- if available, aerial slides or photographs from pre-1986 are used to provide the wetland delineator (prior to making the onsite determination) information regarding possible manipulations of the potential wetland(s) that could provide information regarding the appropriate label.
- climatological conditions, especially unusual precipitation events preceding the dates of photography should be considered.
- a minimum of five years of aerial photographs which indicate normal precipitation will be used, or when an insufficient number of normal years slides are available then an equal number of wetter and drier years are used. Precipitation tables that identify "normal", "wetter", and "drier" years are available for each county.
- Depending on quality and location, wetland signatures that may be observed on photography or slides include:
  - **SW** surface water (this is the only signature applicable when reviewing for indicator B7 – Inundation visible on aerial imagery)
  - **HV** hydrophytic vegetation
  - **SAT** saturated conditions
  - **FC** flooded or drowned-out crops
  - **SC** stressed crops due to wetness
  - **PD** differences in vegetation due to different planting dates
  - **WA** inclusion of wet areas as set-aside
  - **UC** unharvested crops
  - **NF** isolated areas that are not farmed with rest of field
  - **GV** patches of greener vegetation (especially during dry years)
  - **OT** other (must specify and include reasoning for use)
  - **PHM** Potential hydrological manipulations (e.g. permanent or plow ditches, pits, newly installed tile lines, potential tile discharge locations) should be noted to factor into labeling decision but NOT for use as a hydrology indicator.

If >50% of "normal" year slides reviewed show a wetland signature **then a hydrology indicator can be verified.**

Indicator Summaries

Group A – Observation of Surface Water or Saturated Soils

A1 – Surface water

- Surface water observed during the non-growing season may be an acceptable indicator if experience suggests that wet conditions normally extend into the growing season for sufficient duration in most years.
- Note that surface water may be absent from a wetland during the normal dry season or during extended periods of drought.

A2 – High water table

- Direct, visual observation of the water table 12 in. (30 cm) or less below the surface in a soil pit, auger hole, or shallow monitoring well.
- Includes water tables derived from perched water, through flow, and discharging groundwater (e.g., in seeps) that may be moving laterally near the soil surface.
- Sufficient time must be allowed for water to infiltrate into a newly dug hole and to stabilize at the water-table level. In some cases, the water table can be determined by examining the wall of the soil pit and identifying the upper level at which water is seeping into the pit.
- A water table within 12 in. of the surface observed during the non-growing season may be an acceptable indicator if experience and professional judgment suggest that wet conditions normally extend into the growing season for sufficient duration in most years.

A3 – Saturation

- Visual observation of saturated soil conditions 12 in. (30 cm) or less from the soil surface as indicated by water glistening on the surfaces and broken interior faces of soil samples removed from the pit or auger hole.
- This indicator must be associated with an existing water table located immediately below the saturated zone; however, this requirement is waived under episaturated conditions if there is a restrictive soil layer or bedrock within 12 in. (30 cm) of the surface.
- Glistening is evidence that the soil sample was taken either below the water table or within the saturated capillary fringe above the water table.
- A water table is not required below the saturated zone under episaturated conditions if the restrictive layer or bedrock is present within 12 in. (30 cm) of the surface. Note the restrictive layer in the soils section of the data form. The restrictive layer may be at the surface.

Group B – Evidence of Recent Inundation

B1 – Water marks

- Discolorations or stains on the bark of woody vegetation, rocks, bridge supports, buildings, fences, or other fixed objects as a result of inundation.
- Water marks (dark stains) on trees in a seasonally flooded wetland.
- When several water marks are present, the highest reflects the maximum extent of inundation.
- Use caution with water marks that may have been caused by extreme, infrequent, or very brief flooding events.

B2 – Sediment deposits

- Thin layers or coatings of fine-grained mineral material (e.g., silt or clay) or organic matter (e.g., pollen), sometimes mixed with other detritus, remaining on tree bark, plant stems or leaves, rocks, and other objects after surface water recedes.
- Silt deposit left after a recent high-water event forms a tan coating on these tree trunks (upper edge indicated by the arrow).
- Sediment deposits most often occur in riverine backwater and ponded situations where water has stood for sufficient time to allow suspended sediment to settle.
- Use caution with sediment left after infrequent high flows or very brief flooding events. This indicator does not include thick accumulations of sand or gravel in fluvial channels that may reflect historic low conditions or recent extreme events.

B3 – Drift deposits

- Consist of rafted debris that has been deposited on the ground surface or entangled in vegetation or other fixed objects.
- Debris consists of remnants of vegetation (e.g., branches, stems, and leaves), manmade litter, or other waterborne materials.
- Drift material may be deposited at or near the high water line in ponded or flooded areas, piled against the upstream side of trees, rocks, and other fixed objects (Figure 28), or widely distributed within the dewatered area.
- Use caution with drift lines that may have been caused by extreme, infrequent, or very brief flooding events, including areas with functioning tile drains. Use caution as drift material can persist for many years in a dry climate.

B4 – Algal mat or crust

- Consists of a mat or dried crust of algae, perhaps mixed with other detritus, left on or near the soil surface after dewatering.
- Algal deposits include those produced by green algae (Chlorophyta) and blue-green algae (cyanobacteria).
- They may be attached to low vegetation or other fixed objects, or may cover the soil surface. Dried crusts of blue-green algae may crack and curl at plate margins

B5 – Iron deposits

- Consists of a thin orange or yellow crust or gel of oxidized iron on the soil surface or on objects near the surface.
- Iron deposits form in areas where reduced iron discharges with groundwater and oxidizes upon exposure to air.
- The oxidized iron forms a film or sheen on standing water and an orange or yellow deposit on the ground surface after dewatering.

B6 – Surface soil cracks

- Surface soil cracks consist of shallow cracks that form when fine-grained mineral or organic sediments dry and shrink, often creating a network of cracks or small polygons.
- Surface soil cracks are often seen in recent fine sediments and in concave landscape positions where water has ponded long enough to destroy surface soil structure, such as in depressions, lake fringes, and floodplains. Use caution, however, as they may also occur in temporary ponds and puddles in non-wetlands; these situations are easily distinguished by the absence of hydrophytic vegetation and/or hydric soils. This indicator does not include deep cracks due to shrink-swell action in clay soils (e.g., Vertisols).

B7 – Inundation visible on aerial imagery

[See Remote Sensing Protocol, use with Surface Water (SW) application]

- Care must be used in applying this indicator because surface water may be present on a non-wetland site immediately after a heavy rain or during periods of unusually high precipitation, runoff, tides, or river stages.

B8 – Sparsely vegetated concave surface

- On concave land surfaces (e.g., depressions and swales), the ground surface is either unvegetated or sparsely vegetated (less than 5 percent ground cover) due to long duration ponding during the growing season.
- Ponding during the growing season can limit the establishment and growth of ground-layer vegetation.
- Sparsely vegetated concave surfaces should contrast with vegetated slopes and convex surfaces in the same area. A woody overstory of trees or shrubs may or may not be present.
- Examples in the region include concave positions on floodplains, potholes, and seasonally ponded depressions in forested areas.

B9 – Water-stained leaves

- Water-stained leaves are fallen or recumbent dead leaves that have turned grayish or blackish in color due to inundation for long periods.
- Water-stained leaves are usually found in depressional wetlands and along streams in shrub-dominated or forested habitats; however, they also occur in herbaceous communities.
- Water-stained leaves maintain their blackish or grayish colors when dry. They should contrast strongly with fallen leaves in nearby non-wetland landscape positions.

B10 – Drainage patterns

- Consists of flow patterns visible on the soil surface or eroded into the soil, low vegetation bent over in the direction of flow, absence of leaf litter or small woody debris due to flowing water, and similar evidence that water flowed across the ground surface.
- Use caution in areas subject to high winds or affected by recent extreme or unusual flooding events.

B11 – Salt crust

- Salt crusts are hard or brittle deposits of salts formed on the ground surface due to the evaporation of saline surface water. Hard or brittle salt crusts form in arid and semi-arid regions in ponded depressions, seeps, and lake fringes when saline surface waters evaporate.
- This indicator does not include fluffy or powdery salt deposits or efflorescences resulting from capillary rise and evaporation of saline groundwater that may be derived from a deep water table.

B13 – Aquatic fauna/invertebrates

- Presence of live individuals, diapausing insect eggs or crustacean cysts, or dead remains of aquatic fauna, such as, but not limited to, clams, aquatic snails, aquatic insects, ostracods, shrimp, other crustaceans, tadpoles, or fish, either on the soil surface or clinging to plants or other emergent objects.
- Examples of dead remains include clam shells, chitinous exoskeletons, insect head capsules, aquatic snail shells (Figure 4-13), and skins or skeletons of aquatic amphibians or fish.Use caution in areas where invertebrate remains may have been transported by high winds, unusually high water, or other animals into non-wetland areas.
- Shells and exoskeletons are resistant to tillage but may be moved by equipment beyond the boundaries of the wetland. They may also persist in the soil for years after dewatering.

B14 – True aquatic plants

- This indicator consists of the presence of live individuals or dead remains of true aquatic plants.
- Aquatic plants include species that are normally submerged, have floating leaves or stems, require water for support, or desiccate in the absence of standing water.
- Examples in the region include watershield (*Brasenia schreberi*), water-milfoil (*Myriophyllum* spp.), cow-lily (*Nuphar luteum*), water-lily (*Nymphaea* spp.), American lotus (*Nelumbo lutea*), pondweeds (*Potamogeton* spp.), bladderworts (*Utricularia* spp.), and duckweeds (*Lemna* spp.).

Group C – Evidence of Recent Soil Saturation

C1 – Hydrogen sulfide odor

- A hydrogen sulfide (rotten egg) odor within 12 in. (30 cm) of the soil surface.
- To apply this indicator, dig the soil pit no deeper than 12 in. to avoid release of hydrogen sulfide from deeper in the profile. Hydrogen sulfide odor serves as both an indicator of hydric soil and wetland hydrology. This observation proves that the soil meets the definition of a hydric soil (i.e., anaerobic in the upper part), plus has an ongoing wetland hydrologic regime.

C2 – Dry-season water table

- Visual observation of the water table between 12 and 24 in. (30 and 60 cm) below the surface during the normal dry season or during a drier-than-normal year.
- A water table between 12 and 24 in. during the dry season, or during an unusually dry year, indicates a normal wet-season water table within 12 in. of the surface.
- The required time will vary depending upon soil texture. In some cases, the water table can be determined by examining the wall of the soil pit and identifying the upper level at which water is seeping into the pit.
- A dry-season water table below 24 in. does not necessarily indicate a lack of wetland hydrology. See Chapter 5 (section on Wetlands that Periodically Lack Indicators of Wetland Hydrology) to determine average dry-season dates and drought periods.

C3 – Oxidized rhizospheres along living roots

- Presence of a layer containing 2 percent or more iron-oxide coatings or plaques on the surfaces of living roots and/or ironoxide coatings or linings on soil pores immediately surrounding living roots within 12 in. (30 cm) of the soil surface.
- Oxidized rhizospheres are the result of oxygen leakage from living roots into the surrounding anoxic soil, causing oxidation of ferrous iron present in the soil solution Iron concentrations or plaques may form on the immediate root surface or may coat the soil pore adjacent to the root.
- In either case, the oxidized iron must be associated with living roots to indicate contemporary wet conditions and to distinguish these features from other pore linings. Iron coatings sometimes show concentric layers in cross section and may transfer iron stains to the fingers when rubbed.
- Oxidized rhizospheres must occupy at least 2 percent of the volume of the layer.
- Oxidized rhizospheres are a secondary indicator in areas that are mechanically plowed or tilled because they can form above plow pans in non-wetland soils that have been compacted by tillage or where a pan has developed due to plow shear.

C4 – Presence of reduced iron

- Presence of a layer containing reduced (ferrous) iron in the upper 12 in. (30 cm) of the soil profile, as indicated by a ferrous iron test or by the presence of a soil that changes color upon exposure to the air.
- The presence of ferrous iron can be verified with alpha, alpha-dipyridyl dye or by observing a soil that changes color upon exposure to air (i.e., reduced matrix).

C6 – Recent iron reduction in tilled soils

- Presence of 2 percent or more redox concentrations as pore linings in the surface layer of soils cultivated within the last two years.
- Cultivation breaks up or destroys redox features in the plow zone.
- Redox features often form around organic material incorporated into the tilled soil. Use caution with relict features that may be broken up but not destroyed by tillage. The indicator is most reliable in areas that are cultivated regularly, so that soil aggregates and older redox features are more likely to be broken up.

C7 – Thin muck surface

- This indicator consists of a layer of muck 1 in. (2.5 cm) or less thick on the soil surface. Muck is highly decomposed organic material.
- In a dry climate, muck accumulates only where soils are saturated to the surface for long periods each year. Thick muck layers can persist for years after wetland hydrology is effectively removed; therefore, a muck layer greater than 1 in. thick does not qualify for this indicator. However, thin muck surfaces disappear quickly or become incorporated into mineral horizons when wetland hydrology is withdrawn. Therefore, the presence of a thin muck layer on the soil surface indicates an active wetland hydrologic regime.

C8 – Crayfish burrows

- Presence of crayfish burrows, as indicated by openings in soft ground up to 2 in. (5 cm) in diameter, often surrounded by chimney-like mounds of excavated mud.

C9 – Saturation visible on aerial imagery
[See Remote Sensing Protocol]

- Care must be used in applying this indicator because saturation may be present on a non-wetland site immediately after a heavy rain or during periods of abnormally high precipitation, runoff, tides, or river stages.

Group D – Evidence from Other Site Conditions or Data

D1 – Stunted or stressed plants

- In agricultural or planted vegetation located in a depression, swale, or other topographically low area, this indicator is present if individuals of the same species growing in the potential wetland are clearly of smaller stature, less vigorous, or stressed compared with individuals growing in nearby drier landscape situations.
- Agricultural crops and other introduced or planted species, such as corn (Zea mays), wheat (Triticum spp.), and alfalfa (Medicago spp.), can become established in wetlands but often exhibit obvious stunting, yellowing, or stress in wet situations.
- Use caution in areas where stunting of plants on non-wetland sites may be caused by low soil fertility, excessively drained soils, salinity, cold temperatures, uneven application of agricultural chemicals, or other factors not related to wetness. For this indicator to be present, a majority of individuals in the potential wetland area must be stunted or stressed. In this region, this indicator is restricted to agricultural or planted vegetation.

D2 – Geomorphic position

- This indicator is present if the area in question is located in a localized depression, linear drainageway, concave position within a floodplain, at the toe of a slope, on the low-elevation fringe of a pond or other water body, or in an area where groundwater discharges.
- Excess water from precipitation and snowmelt naturally accumulates in certain geomorphic positions in the landscape, particularly in low-lying areas such as depressions, drainages, toe slopes, and fringes of water bodies. These areas often, but not always, exhibit wetland hydrology. This indicator does not include concave positions on rapidly permeable soils (e.g., floodplains with sand and gravel substrates) that do not have wetland hydrology unless the water table is near the surface.

D5 – FAC-neutral test

- Can **NOT** be used to prove hydrology if reference site/off-site vegetation used.
- The FAC-neutral test is performed by compiling a list of dominant plant species across all strata in the community, and dropping from the list any species with a Facultative indicator status (i.e., FAC, FAC–, and FAC+).
- The FAC-neutral test is met if more than 50 percent of the remaining dominant species are rated FACW and/or OBL. This indicator may be used in communities that contain no FAC dominants. If there are an equal number of dominants that are OBL and FACW versus FACU and UPL, non-dominant species should be considered.
- This indicator is only applicable to wetland hydrology determinations.

D7 – Frost-heave hummocks

- Consists of hummocky microtopography produced by frost action in saturated wetland soils.
- In the Northern Great Plains, freeze/thaw action creates hummocky microtopography in saturated soils in and along the edges of wetlands.
- This indicator does not include pimple mounds, gilgai microrelief in clay soils (e.g., Vertisols), or other factors (e.g., trampling by livestock) that can produce hummocky topography.

D9 – Gauge or well data

- Stream or lake gauge data, or groundwater well data, indicate that the site is inundated or has a water table 12 inches or less below the surface for 14 or more consecutive days during the growing season in most years (at least 5 years in 10, or 50 percent or higher probability), or meets an alternative wetland hydrology standard established for a particular geographic area or wetland type.
- This indicator may be used in any area that is subject to flooding, ponding, or shallow water tables, and is not limited to highly disturbed or problematic wetland situations (U. S. Army Corps of Engineers 2005).
- Any combination of inundation or soil saturation is sufficient to meet the 14-day requirement.
- An evaluation of the normality of water levels or precipitation during the monitoring period is required if fewer than 10 years of recent gauge or well data are available. See Chapter 5 or U. S. Army Corps of Engineers (2005) for guidance. This hydrology standard is based on recommendations by the National Research Council (1995). Alternative standards for specific geographic areas or wetland types are also acceptable, if supported by appropriate scientific literature, field studies, or professional opinion. Alternative wetland hydrology standards are subject to approval by the appropriate Corps District. Sources of gauge or well data include the U. S. Geological Survey, Corps of Engineers, other federal and state agencies, cities, counties, and land developers.

Sampling Vegetation for Wetland Determinations

Hydrophytic Vegetation Criteria: National Food Security Act Manual (NFSAM) part 527.4.

The determination of prevalence of hydrophytic vegetation will be made in accordance with the Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1 (COE 87 Manual).

In the event, the vegetation has been altered or removed, NRCS will determine if a prevalence of hydrophytic vegetation typically exists in the local area on the same hydric soil map unit under non-altered hydrologic conditions.

Vegetation Sampling Procedures

Step 1. Stratify the site to be evaluated into representative plant communities.

Step 2. Sample the plant community (or communities) using either the routine or comprehensive methodology, as appropriate. The COE 87 Manual describes recommended methodologies.

Routine methodology involves simple, rapidly applied methods that result in sufficient qualitative data for making a determination. A visual assessment of the plant community is possible. This will entail documenting the species present and estimates of relative percent cover.

Comprehensive methods usually require significant time and effort to obtain the needed quantitative data. These methods are used on sites where the determination is complex or if rigorous documentation is required, such as appeals or sites where the plant community is difficult to evaluate using routine methods.

Step 3. Determine the dominant species within each community sampled.

Dominant species are usually identified using the 50/20 rule. See the help sheet for "Applying Vegetation Dominance: 50/20 Rule".

Step 4. Determine the wetland indicator status for each of the dominant species.

The plant indicator status for observed plant species is determined in Nebraska using the National List of Plant Species that Occur in Wetlands: Central Plains (Region 5), or a searchable database. If a plant is not on the main plant list, check the synonymy section. A plant not found on any of these lists is usually considered an upland plant, although exceptions have been found which have an indicator other than upland. Any questions you have regarding the indicator status of unlisted plants may be directed to the state biologist.

Step 5. Determine if the community sampled has a prevalence of hydrophytic vegetation.

Use the indicators outlined in the COE 87 Manual. The main indicator of a prevalence of hydrophytic vegetation is:

More than 50 percent of the dominant species are OBL, FACW, or FAC. (FAC^+ species are considered as wetter than FAC species, while FAC^- species are considered as drier than FAC species.) This refers to the number of species that are dominants: Relative percent cover and other measurements of abundance in the community are not considered in this step.

VEGETATION WETNESS CONTINUUM

Wetter										Drier
OBL	$FACW^+$	FACW	$FACW^-$	FAC^+	FAC	FAC^-	$FACU^+$	FACU	$FACU^-$	UPL

EXAMPLE:

There are three dominant species in a community with indicator status of: FACW, FAC-, and FACU. There is only one dominant species that is FAC or wetter, therefore, predominance of hydrophytic vegetation is not met.

The **FAC-neutral test** may be used if the indicator status of FAC species is questionable. When FAC species occur as dominants along with other dominants that are not FAC (either wetter or drier than FAC), the FAC species can be treated as neutral and the vegetation decision can be based on the number of dominant species wetter than FAC, as compared to the number of species drier than FAC. When a tie occurs or all dominant species are FAC, the nondominant species must be considered. NRCS should do a comprehensive analysis at this point.

Comprehensive analysis generally uses point intercept sampling to compute a **prevalence index** value for the site. Prevalence index computations are described on an attached sheet. Use form NRCS-LTP-34 to document a comprehensive analysis.

Step 6. Compile plant community data on a simple map of the site (a sketch is satisfactory) that indicates approximate sampling locations.

Step 7. Record the dominant species, their indicator status, and the decision about whether the vegetation criteria is met on the “Wetland Determination Summary Sheet”.

Applying Vegetation Dominance

Selecting Dominant Species by the 50/20 Rule

Step 1. Estimate percent cover for each species (alternatively, estimate basal area or stem density for each species).

Step 2. Add these numbers to get total cover (this sum may exceed 100% if plant canopies overlap extensively).

Step 3. In descending order, identify species that contribute to more than 50% of total cover (species whose cover values are tied must be taken together).

Step 4. Include any other species that by itself is 20% or more of total cover. Species identified in (3) and (4) are the dominants for this stratum.

Step 5. Repeat steps (1) through (4) for all other strata. Determine the total number of dominants from all strata. A species may be counted more than once if it is a dominant in more than one stratum.

Example: Assume the following data came from a single stratum.

Species	Percent Cover
A	30
B	25
C	20
D	10
E	5
Total	90

Species A and B are dominants according to step (3) above, because together their sum (30 + 25 = 55) is more than 50 % of the total (50% of 90 = 45).

Species C is also a dominant according to step (4), because its coverage (20) is 20 % or more of the total (20% of 90 = 18). Thus, there are three dominants in this stratum A, B, and C. Repeat the procedure for each stratum.

***ALWAYS base your 50% from Step 3 and 20% from Step 4 relative to 100%. Adjust your percent cover accordingly so that the proper ratios are compared. You may need to adjust it up, as in the example, or down if your field findings percent cover total more than 100%.**

Making the hydrophytic determination

Step 6. Look up the wetland indicator status of all dominants. Hydrophytic vegetation is present if more than 50% of the total number of dominants are FAC or wetter.

Example

(Hydrophytic = OBL, FACW, FAC+, FAC) (NON hydrophytic = FAC-, FACU, UPL)

FAC Neutral Test

When FAC species occur as dominants along with other dominants that are not FAC (either wetter or drier), the FAC species (+ or -) can be treated as neutral and the vegetation decision can be based on the number of dominant species wetter than FAC, as compared to the number of species drier than FAC. When a tie occurs or all dominant species are FAC, the nondominant species must be considered. A comprehensive analysis should be done in this case.

Making Off-Site Determinations

The *Natural Resources Conservation Service, Northern Plains Region, Wetland Determination and Delineation Procedure 1998* outlines procedures to identify wetlands. Keep in mind that the size of an area is not part of the wetland criteria. Areas large enough to display evidence of wetland on inventory tools or that are noted in the field will be evaluated on-site. **If using this Off-Site method you must check the tools used and attach this to the NE-CPA-FSA-Worksheet-8.**

Tools used, where available, for wetland identification:

Clear Contents Print Save As

- ☐ National Cooperative Soil surveys
- ☐ State or Local wetland maps
- ☐ USDI, Fish and Wildlife Service National Wetland Inventory (NWI) Maps
- ☐ Farm Service Agency compliance slides
- ☐ Black and white aerial photography
- ☐ Color infrared aerial photography
- ☐ Digital orthoquads (DOQQ) imagery
- ☐ US Geological Survey topographic maps
- ☐ Landsat imagery
- ☐ Federal Emergency Management Agency (FEMA flood hazard maps
- ☐ Climatic data
- ☐ Field Office Technical Guide (FOTG) county hydric soils list. Areas with map units having hydric soils as inclusions, while not evidence, will receive extra attention.
- ☐ National Engineering Field Handbook, chapter 19, "Hydrology tools for Wetland Determinations"
- ☐ Stream gauge data
- ☐ Previous wetland determinations
- ☐ FSA crop certification information

Review ALL available tools listed above for evidence of the following signatures:

- Hydrophytic vegetation
- Surface Water
- Saturated conditions
- Mud flats
- Flooded or drowned-out crops
- Stressed crops due to wetness
- Differences in vegetation due to different planting dates
- Inclusion of wet areas as set-aside or idled
- Unharvested crops
- Isolated areas that are not farmed with the rest of the field
- Areas of greener vegetation (especially during dry years)
- Recurring cropping patterns that avoid wet areas

ALL areas displaying **ANY** wetland signatures on the maps and imagery reviewed will be considered potential wetlands. Conduct a field visit of all potential wetland areas.
Fields that display NO wetland evidence after review of all available tools may be determined as non-wetland (NW) without a field visit PROVIDED that a NW call is consistent with the reviewer's knowledge of the site's landscape conditions.
For example, an upland field containing no hydric soil map units or conventional wetland symbols, no NWI wetland areas, and no signatures on aerial photography could be determined non-wetland without a field visit if the reviewer knows site conditions are not likely to support a wetland.