St. Paul District REGULATORY

US Army Corps of Engineers®

Minnesota Board of Water & Soil Resources

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Guidance for Submittal of Delineation Reports to the St. Paul District Army Corps of Engineers and Wetland Conservation Act Local Governmental Units in Minnesota, Version 2.0

Introduction – Purpose and Background of 2015 Guidance

This guidance provides specific standards and expectations for conducting wetland delineations and submitting wetland delineation reports for regulatory purposes in Minnesota. It supplements and emphasizes information in the 1987 *Corps of Engineers Wetland Delineation Manual* (Manual) and applicable regional supplements. In 1996, the Corps of Engineers (the Corps), St. Paul District Regulatory Branch issued *Guidelines for Submitting Wetland Delineations to the St. Paul District Corps of Engineers and Local Units of Government in the State of Minnesota* jointly with the Minnesota Board of Water and Soil Resources (BWSR). Significant improvements to the application of the science behind wetland and aquatic resource delineation have been made since 1996: regional supplements have been published incorporating the *Field Indicators for Hydric Soils in the U.S.*, the *National Wetland Plant List* (NWPL) has been updated, Version 2.0 of the *Corps of Engineers Wetland Delineation Manual* is being finalized, and techniques and approaches to delineation have been refined and improved over the past 18 years. This guidance replaces the 1996 and 2013 guidance and defines wetland regulatory agency expectations for submittal of delineation reports in Minnesota (significant 2015 updates indicated by highlights).

Numerous court cases involving aquatic resource identification and regulation have emphasized the need for accurate and defensible documentation of site conditions. Although wetland delineation is the focus of this guidance, it is important to recognize that other aquatic resources affected by regulated activities include waters of both the U.S. and Minnesota. Wetlands are both a subset of and affected by the aquatic resources that make up the greater hydrologic landscape, along with lakes, rivers, streams, ditches and ponds; it is important that delineation reports include the identification of the entire hydrologic landscape.

Providing standards for wetland delineation reports common to all wetland regulatory agencies in Minnesota increases the efficiency of regulatory review. Using the guidance will help regulatory review agencies more efficiently review delineation reports for essential components and more readily identify reports that are poorly documented. **A delineation report that does not comply with this guidance will not be approved for wetland regulatory purposes.**

Section 1. Wetland Delineation Updates since 1996

1.1 Update to Corps Manual (Version 2.0)

Although an update to the 1987 *Corps of Engineers Wetland Delineation Manual* has been under development, a notice requesting public comment on Version 2.0 is not expected to be published in the Federal Register in the near future. This guidance would be updated as necessary once any public review process for Version 2.0 has been completed and adopted for regulatory implementation.

1.2 Regional Supplements

The current Manual provides technical guidance and procedures, from a national perspective, for identifying and delineating wetlands. A three-factor approach examining indicators of hydrophytic vegetation, hydric soils and wetland hydrology is employed. In 2005, a process to develop field indicators, guidance and methods specific to geographic regions of the United States was initiated. This was a recommendation of the National Academy of Sciences (National Research Council, 1995) because regional differences in climate, geology, soils, hydrology, plant communities, and other factors, cannot be adequately considered in a single national manual. The result was the development of 10 "regional supplements" to the Manual based on the geographic regions as shown in Figure 1. These regional supplements increase the regional sensitivity of wetland delineation methods.

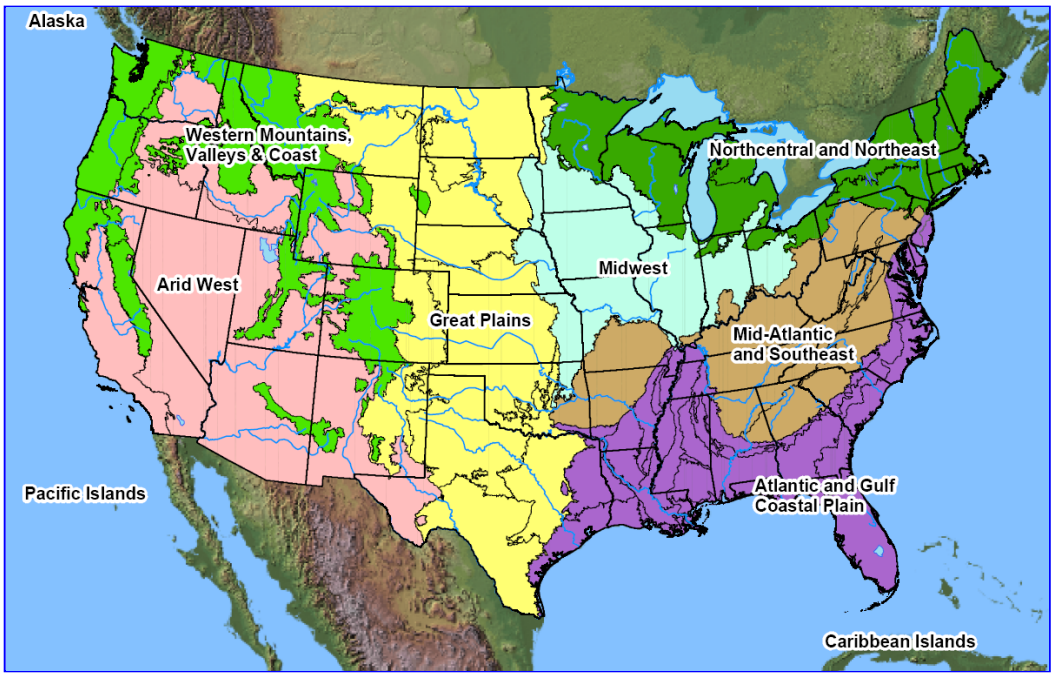

Figure 1. Geographic Regions used for Regional Supplements and NWPL

Three regional supplements apply to Minnesota and the current versions (Version 2.0) were published on the dates shown: *Great Plains* (March 2010), *Midwest* (August 2010) and *Northcentral/Northeast* (January 2012). These documents are available on the Corps website: http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/reg_supp.aspx.

Field indicators in the Manual for hydrophytic vegetation, hydric soil, and wetland hydrology were replaced by new field indicators in the regional supplements. For example, there are 25 to 29 hydrology field indicators in each of the regional supplements, replacing the 10 that were in the 1987 Manual. (Refer to Appendix A for a list of the hydrology indicators used in Minnesota.)

Regionally-based "Field Indicators for Hydric Soils in the U.S." were also developed in the mid-1990's by the Natural Resources Conservation Service (NRCS), in conjunction with the National Technical Committee for Hydric Soils (NTCHS) and other agencies and have been incorporated into the regional supplements. Refer to Appendix A for a comparison of the Field Indicators for Hydric Soils in the three regional supplements used in Minnesota. Other important changes include the definition of "growing season" and the hydrology technical standard for highly disturbed or difficult wetland situations. Other portions of the Manual remain in effect including the methods section. Where differences occur in the Manual and a regional supplement, the supplement takes precedence. For example, each regional supplement includes a data sheet for documentation of site conditions, and these replace the data sheets in the 1987 Manual. Periodic updates to the regional supplements are anticipated (e.g., every 2 to 5 years) and will be posted on the Corps website.

Boundaries between regional supplement regions should be considered broadly (i.e., miles wide). Wetland delineations are not likely to differ along these boundaries regardless of which abutting regional supplement is used. Figure 2 shows regional supplement boundaries to the closest township for Minnesota. A larger scale high-resolution map is available on the Corps' and BWSR's websites. In transitional areas, investigators must use experience and best professional judgment to select the regional supplement and indicators that are appropriate for a site based on its physical and biological characteristics. For example, methods in one regional supplement may address a particular difficult or disturbed situation better than another. If in doubt about which regional supplement to use in a transitional area, apply each supplement, compare the results, and clearly document the ultimate decision of the wetland line. Appendix A tables list the indicators for use in each regional supplement. An indicator from an abutting supplement can be used if adequate documentation and justification of its applicability is provided.

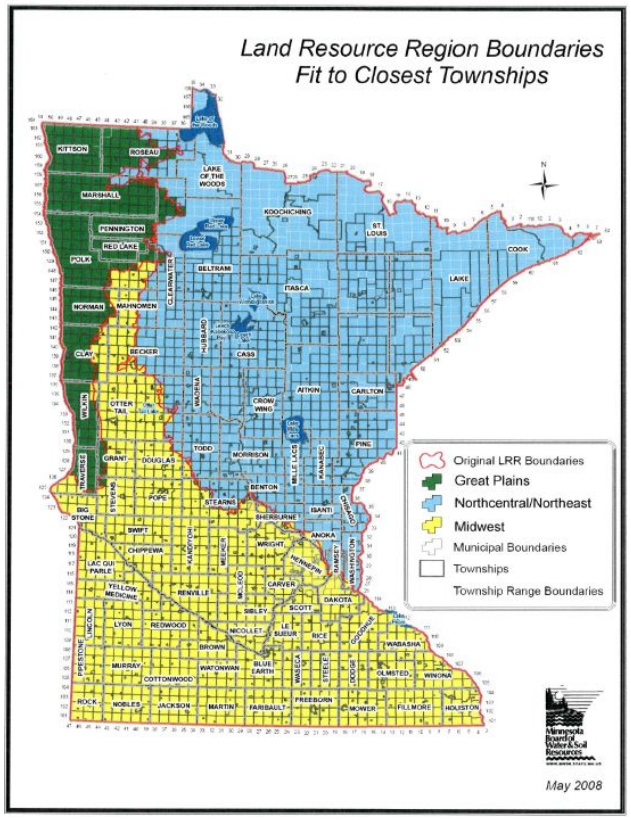

Figure 2. Regional Supplement Boundaries to Closest Townships in MN

1.3 National Wetland Plant List (NWPL)

From 1988 to June 2012, the official NWPL used for wetland delineation purposes was a 1988 list published by the U.S. Fish and Wildlife Service (USFWS). In 2006, responsibility for the NWPL was transferred to the Corps. From 2008 to 2012 the NWPL underwent a formal review and revision process before being finalized for use in the updated format on June 1, 2012. The current NWPL is posted at: http://rsgisias.crrel.usace.army.mil/NWPL/

Important changes in the updated NWPL compared to the 1988 NWPL include:

- **a.** **Regionalization**: The NWPL is regionalized based on the regional supplement boundaries (Figure 1) in contrast with the USFWS regional boundaries used for the 1988 list that were based on state boundaries. Users have the option of printing state-specific or regional supplement-specific plant lists from the NWPL website.
- **b.** **Nomenclature**: Changes in the scientific names of hundreds of plant species have occurred since 1988. The NWPL will be updated regularly as science-based changes are made.
- **c.** **Elimination of No Occurrence (NO) and No Indicator (NI)**: The NO and NI indicator status categories have been eliminated in the new NWPL.
- **d.** **Facultative Categories**: The [+] and [-] modifiers for the facultative categories (FACW, FAC, FACU) in the 1988 list have been eliminated because insufficient data exist for this level of precision in assigning an indicator status. Note that this change had been previously implemented by some of the regional supplements.
- **e.** **Sub-species**: The NWPL assigns indicator statuses at the species level only. Subspecies and varieties are not assigned a different indicator status because there is insufficient data for this level of precision. For example speckled alder (*Alnus incana* ssp. *rugosa*) [synonym: *Alnus rugosa*] and European alder (*Alnus incana* ssp. *incana*) are common plant species in wetland-upland transition areas in Minnesota. Both subspecies are lumped as *Alnus incana*.
- **f.** **Updates**: A process for updating the NWPL has been adopted by the Corps. Updates are anticipated on an annual basis to keep the nomenclature up-to-date and to stay consistent with the evolving science. Check the NWPL web site to stay current.
- **g.** **Challenge Procedure**: A procedure to petition a change in an assigned indicator status has been adopted.
- **h.** **NWPL Indicator Rating Definitions**: The NWPL places plant species into one of five categories based on qualitative ecological descriptions (see Table 1). Previous lists categorized species based on estimated percentages representing the frequency they occur in wetlands. Quantitative frequency categories (numerical percentages) are now used only for field-based studies designed to challenge a species' wetland rating.

Table 1. Wetland indicator status ratings based on ecological descriptions

Wetland Indicator Status	Definition
Obligate Wetland (OBL)	Almost always occur in wetlands
Facultative Wetland (FACW)	Usually occur in wetlands, but may occur in non-wetlands
Facultative (FAC)	Occur in wetlands and non-wetlands
Facultative Upland (FACU)	Usually occur in non-wetlands, but may occur in wetlands
Obligate Upland (UPL)	Almost never occur in wetlands

Table 2 below lists a few commonly identified plant species in Minnesota and compares their old 1988 indicator status with their updated statuses between regions.

Table 2. Updated NWPL Example Species

Species	1988 List Region 3	Updated NWPL		
		NC/NE	MW	GP
Abies balsamea (Balsam Fir)	FACW	FAC	FACW	FAC
Alnus incana (Speckled Alder)	OBL	FACW	FACW	FACW
Andropogon gerardii (Big Bluestem)	FAC-	FACU	FAC	FACU
Eurybia macrophylla (Large-leaved Aster)	UPL	UPL	FACU	FACU
Frangula alnus (Glossy Buckthorn)	FAC+	FAC	FACW	FAC
Poa pratensis (Kentucky Bluegrass)	FAC-	FACU	FAC	FACU
Rhamnus cathartica (Common Buckthorn)	FACU	FAC	FAC	FACU
Rubus idaeus (American Red Raspberry)	FACW-	FAC	FACU	FACU

Consult the NWPL web site for more information. All related documents are posted as well as distribution maps, photographs and ink drawings of the approximately 8,200 species on the NWPL.

1.4 Jurisdictional Determinations

In 2008 following a landmark Supreme Court decision affecting the Corps' jurisdiction over wetlands (*Rapanos)*, the Corps provided guidance to delineators in Minnesota for providing documentation of site conditions to assist Corps staff in determining if the Corps has jurisdiction over a particular wetland (jurisdictional determination). This guidance remains relevant and should be referred to by delineators in completing delineation reports. This document can be found at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/MN-Special/publicJDguidanceSN.pdf

Delineation reports should focus solely on the identification and delineation of wetlands and other aquatic resources. The purpose of the report is to identify and delineate wetlands and other aquatic resources as they relate to a proposed activity (project) or a potential project subject to regulatory decisions. It should not be the used to make premature regulatory conclusions on the identified aquatic resources and wetlands.

Several factors, including different state and federal rules, will determine the jurisdictional status of any particular wetland or aquatic resource. Delineation reports that provide a thorough and complete analysis of site conditions will often facilitate state and federal jurisdictional determinations, but these determinations should remain separate from the technical delineation report. For example, if a wetland appears to be an isolated basin with no inlets or outlets (and thus potentially a non-jurisdictional wetland under Section 404 of the Clean Water Act), the delineation report may indicate these facts, but the basin's jurisdictional status is determined separately from the approval of the delineation report by the Corps, in coordination with the Environmental Protection Agency (EPA). Similarly, evidence that an identified wetland was created in upland (potentially an "incidental wetland" under WCA regulations) can be included in the delineation report, but a determination of its WCA regulatory status is made by the WCA LGU separate from the delineation report approval. **Including regulatory policy determinations in a wetland delineation report that otherwise accurately identifies and delineates wetlands and aquatic resources on a site will result in the report not being approved by one or more of the regulatory agencies**.

The appropriate attachments of the Joint Notification/Application form should be used to request jurisdictional determinations from the Corps as well as the WCA regulatory status of wetlands and aquatic resources. These determinations normally require a wetland delineation report to identify the resources in question.

Section 2. Delineation Report Content

A complete delineation report will, at minimum, include the following components (refer to Appendix B for the BWSR checklist that should be submitted with the delineation report):

- **Clear identification of the site location and assessment area.** This is typically the property line for most projects, although linear projects such as roadways or utility lines are usually evaluated within a designated right-of-way or corridor width. Regardless of project type, the report must clearly identify the boundary of the area investigated on maps that are part of the report.
- **Description of field conditions at the time of review.** When a field review is conducted, the report must include the date(s) of review, recent climatic conditions and any other factors potentially influencing the interpretation of wetland-related field characteristics.
- **Identification of who conducted the review and for whom the review was conducted.**
- **Purpose of the review.** This is important in determining the general approach and methods used for identifying and delineation wetlands and other aquatic resources on the site. Delineations are almost always conducted for the purpose of some type of regulatory compliance.
- **Methodology.** The report should identify the specific methods, techniques and data sources used to complete the delineation. The current version of the Manual and regional supplements describe a variety of different approaches and data sources that can be used depending on the site conditions and other circumstances. The report should discuss which methods and data sources were used and why.
- **Mapping Resources.** The report should include readily available mapping products that provide clear and useful information related to wetlands and aquatic resources. The boundaries of the review area, north arrow, scale and legend must be identified on each map, which must also be at a scale allowing for identification of relevant information. At a minimum, the following figures must be included in the report (may be combined, as appropriate):
    - Site location, with adequate detail providing a reviewer directions to the site
    - Topography data from sources such as USGS quads, a topographic survey or LiDAR data
    - NRCS Web Soil Survey (WSS) map
    - National Wetland Inventory (NWI), Minnesota Public Waters Inventory (PWI) and any other available local inventory mapping, including storm sewer mapping
    - Recent aerial photography, and historical imagery if that data facilitates a complete delineation report
    - A final Delineation Figure, **overlaid on current aerial imagery**, depicting the wetland size, and labeling the identified wetland or aquatic resources and sampling points referenced to corresponding data forms. All wetlands and aquatic resources should be shown on the final delineation figure regardless of their presumed jurisdictional status in relation to any regulatory program.
- **Data Forms.** For delineations involving onsite field assessment, supporting data forms from the applicable regional supplement are required. The data forms provide the supporting field documentation for report conclusions. These forms must be fully completed and correspond to

sample point locations identified on one or more mapping resources in the report. Photographs of the sampling locations and overall site conditions can often provide further documentation of observed conditions. Locations of photographs must be referenced.

- **Results and Discussion.** Basic conclusions should be discussed and described in the report. This includes a physical description of the site in terms of vegetation, soils and hydrology. The report should thoroughly describe wetlands, other aquatic resources and non-wetland areas in terms of their vegetation (plant community type), landscape position, hydrology and soils. The report should also discuss the consistency of the delineation with the mapping resources. For example, if the field delineation fails to identify wetlands in mapped hydric soil areas, the report should discuss this inconsistency and possible reasons for it. Areas fulfilling all three wetland parameters should be shown on the final delineation figure, regardless of the delineator's opinion related to potential agency jurisdictional responsibilities.

Section 3. Delineation Methods and Data Collection

This section is intended to emphasize and augment some methods and data sources discussed in the Manual, regional supplements and Corps guidance that have proven to be problematic in the past. Additional guidance on selecting an appropriate overall delineation method is provided in *Wetland Delineations: Choosing the Appropriate Method* found at the following link:

http://www.bwsr.state.mn.us/wetlands/wca/Wetland_Delineation_Method_Guidance7-1-10.pdf

3.1 Off-Site Method

Off-site methods are employed in every delineation. They involve the use of mapping products such as aerial photographs and soils maps to identify potential aquatic resources. An offsite review can provide the basis for the determination when a site-visit is not possible or deemed necessary, otherwise offsite methods will help direct onsite investigations and identify sampling units. Sampling units are typically distinguished by differences in landscape position, vegetation, soils, hydrology and/or disturbance relevant to the aquatic resource determination. Often the simplest and most efficient approach is to identify and map vegetation units. Vegetation units typically reflect spatial variations in geomorphology, hydrology, soils and other factors that are important to the formation and maintenance of wetlands. However, when natural vegetation is absent or disturbed, sampling units based on other factors may be used if properly documented and justified. Sampling units should be identified on a base map with each unit assigned an identifying name or number (Figure 3).

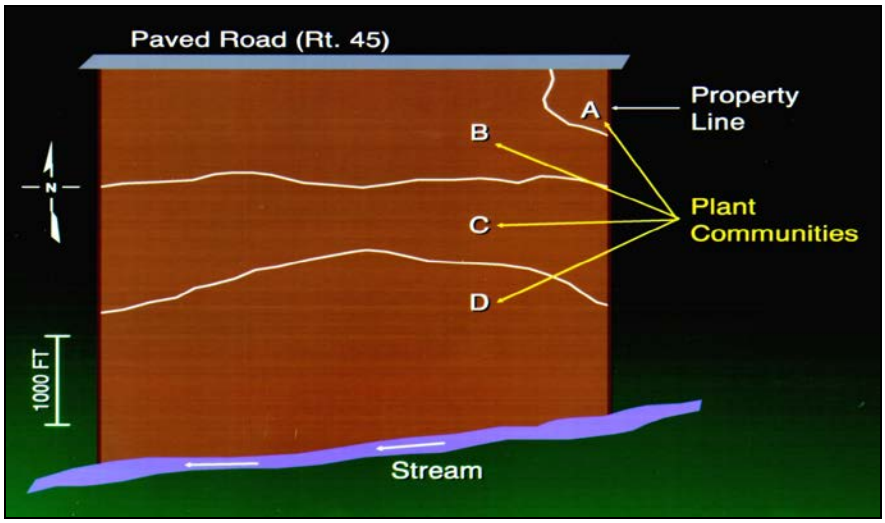

Figure 3. Example depicting determination of sampling units

The use of offsite-only methods may limit the utility of a wetland determination for regulatory purposes in situations where the precise location and size of wetlands is necessary for determining regulatory compliance. This level of wetland identification is typically not appropriate for delineating wetland boundaries, except in cases where a site has been significantly altered or disturbed (e.g., expansive filling or leveling at a site that obliterated all evidence of the site's original condition – see Section 3.3.4 for Normal Circumstances considerations). If an off-site review is the sole basis for which the delineator wishes to obtain regulatory concurrence or a Section 404 jurisdictional determination, a statement must accompany the report explaining that it is based on remote sensing techniques and does not constitute a field-based delineation of the edges of the wetland.

The development of LiDAR (Light Detection and Ranging) and terrain analysis techniques have made it easier to identify and delineate landscape features, including wetlands. Although LiDAR may produce contour lines with sub-meter accuracy, a wetland boundary based solely on LiDAR is not acceptable unless supplemented by appropriate field observations and documentation, see Section 3.2.

3.2 On-Site Data Collection and Field Demarcation

On-site data collection should focus on representative sampling locations in identified sampling units. Sampling units can be identified using offsite resources prior to a field review, as discussed above, but they are often adjusted during the field investigation based on observed field conditions. Selecting appropriate sample point locations within sampling units is critical in adequately documenting site conditions and justifying delineation decisions. Although there is a tendency to sample in areas that are more accessible and/or areas with characteristics that are relatively easy to interpret and record, sample locations should be selected that are representative of identified sampling units. A more systematic sampling approach may be required if sampling units are unclear or highly interspersed.

In wetland-upland transition areas, sampling points and associated data forms from the upland and wetland sides of the boundary are used to document and show differences between upland and wetland in the transition area. However, data forms do not need to show a contrast in all characteristics (soils, vegetation and hydrology) from wetland to upland. In fact, it is common that one or more characteristics will be the same for both wetland and upland sample points when sampling near the transition. In general,

the transition from wetland to upland is often identified when any one of the three parameters is no longer met when moving upslope from a known wetland point.

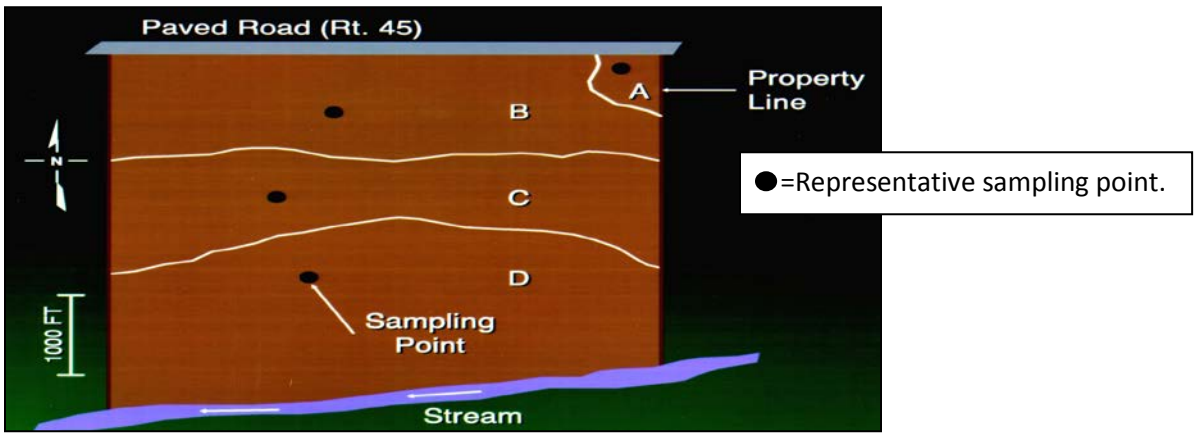

Figure 4. Sampling points located in each sampling unit

Figure 5 shows a typical sampling layout for a wetland boundary.

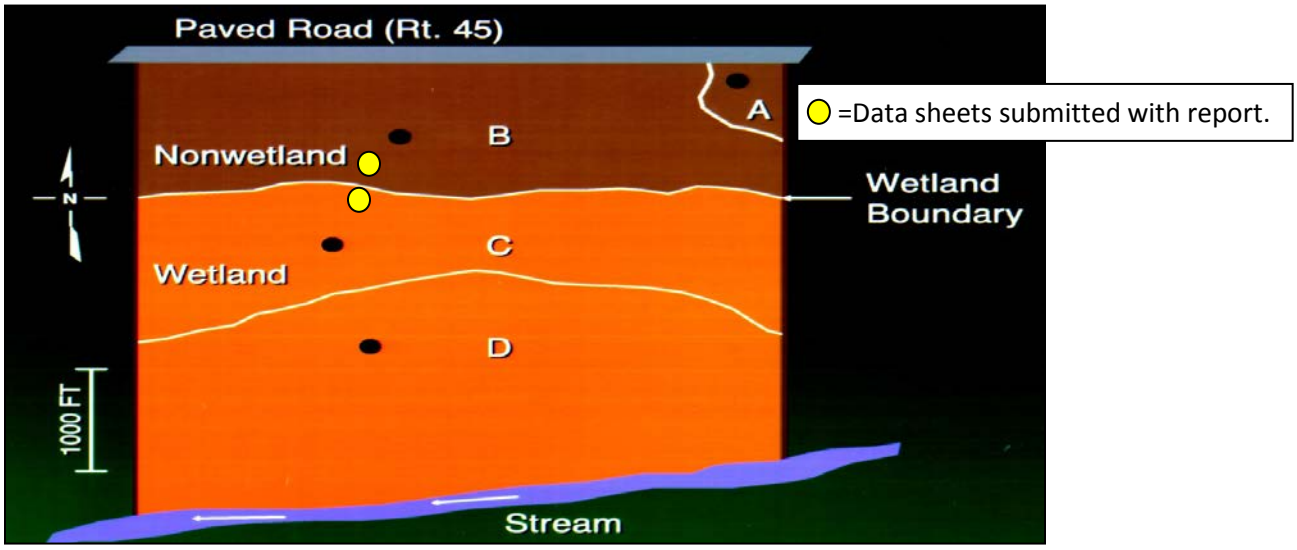

Figure 5. Data points upslope and downslope of wetland line submitted with report

Figure 6 represents a more complex site where several transects are deemed necessary to adequately characterize the site. In this example, transects start at the midpoint of the established baseline segment except the most upstream transect, which was repositioned to include community type A. An explanation of the sampling approach and sample point selections is an important component of a wetland delineation report.

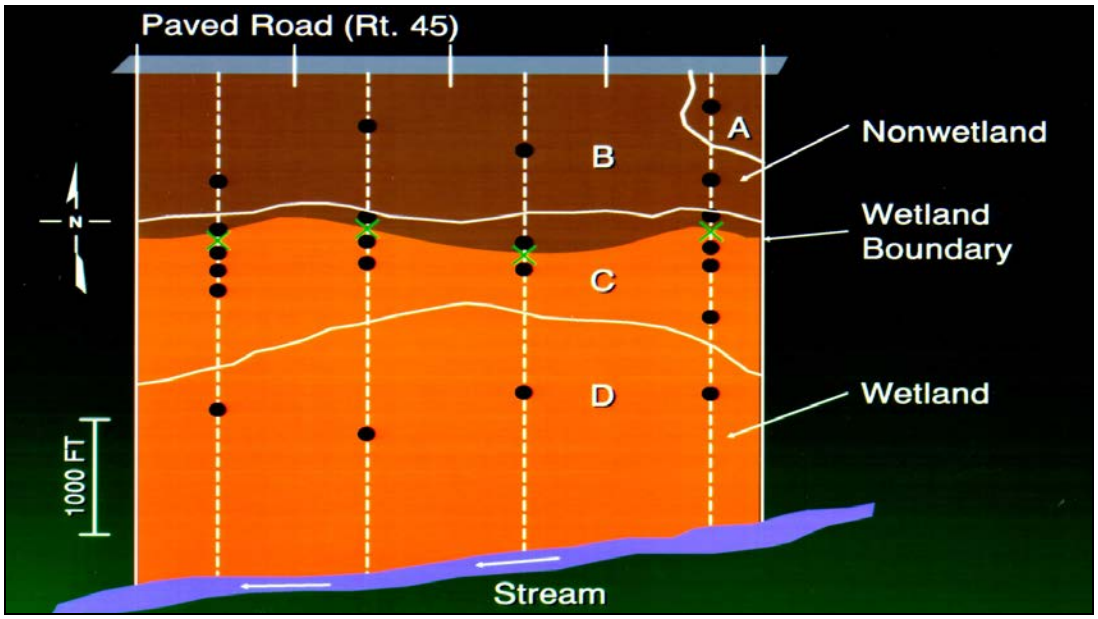

Figure 6. Additional transects and sampling points for more complex sites (X=wetland line).

The physical marking of a wetland boundary is the final step in the field delineation after sampling has been completed. The spacing of flags or other markers used to identify the wetland boundary should be in accordance with the implied precision of the delineation, i.e., a more detailed delineation would require more sampling and more flagging. A general rule of thumb for marking wetland boundaries in the field is to locate markers so that at each point adjacent markers in each direction are visible, either by a surveyor marking the flags or a reviewer assessing the boundary. Delineation boundaries will often be reviewed in the field, so it is important to choose the appropriate type of marker (flags, wooden lath, steel posts, etc.) for the situation. Consideration should be given to the time of year when a delineation is anticipated to be reviewed and other factors that may affect the relative permanence of the marker. For example, the use of short flags along a wet meadow edge in the early portion of the growing season may be obscured by the time of a mid to late growing season field review. Wooden lathe used to mark a boundary in an active pasture are likely to be lost within one field season as cattle rub and lean against them.

These physical markers can be located with a Global Positioning System (GPS) unit capable of submeter accuracy and depicted on a mapping product such as an aerial photograph. If applicable, wetland boundary markers can be located as part of a legal boundary survey conducted by a Registered Land Surveyor (RLS). Some local units of government may have specific requirements for locating and depicting wetland boundaries based on the circumstances related to the wetland delineation. For example, some cities may require that the approved wetland boundary be depicted on a legal boundary survey if construction plans will be developed for a project on the parcel. Wetland boundaries may change over time, so wetland delineation boundaries, whether on legal boundary surveys or not, are subject to change.

3.3 General Considerations During Data Collection

3.3.1 Landform and Local Relief

Data forms provided in the regional supplements require that landform and local relief be identified at sample points. Landforms are features on the earth's surface that have characteristic shapes and composition, such as floodplain, outwash plain, till plain and moraine. This information explains the general setting of an area in regards to slopes and soil composition and can be obtained from the Soil

Survey. The slope position is the position on any landform feature, such as summit, shoulder, backslope, footslope, and toeslope (Figure 7a). Each slope position will have a shape such as concave, convex, or linear (none) at the chosen data point (see Figure 7b). For example, on the data sheet, at "Landform" input the landform and slope position of the sample plot, such as "outwash plain/footslope," and at "Local Relief" document the shape with "Concave." A cross-section sketch of the transect may also be helpful.

Figure 7a is a cross-section showing different slope positions and associated descriptors. This set of terms is best applied to transects or points, and is ideally designed for describing differences between data points. The NRCS *Field Book for Describing and Sampling Soils* (Version 3.0, 2012) provides additional detailed descriptors that can also be used to describe the landform.

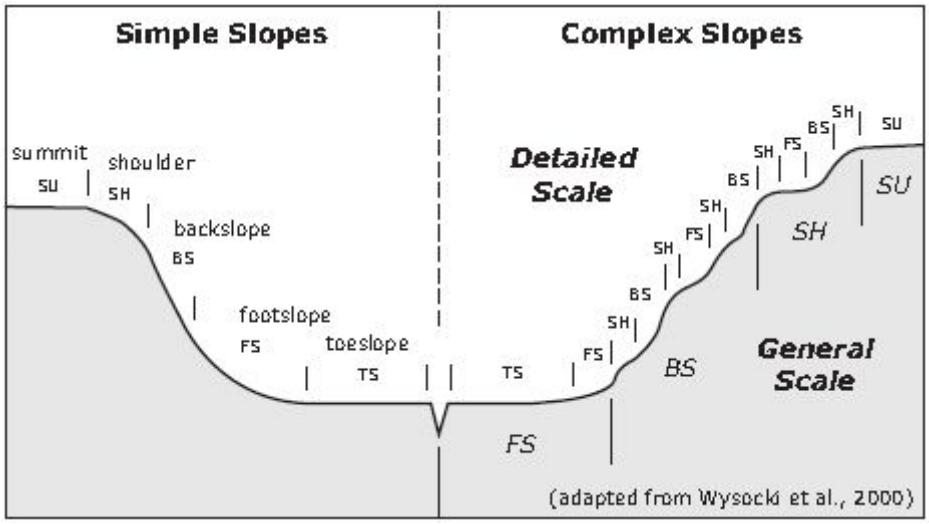

Figure 7a[1]. Recording landform on data forms: slope position terms

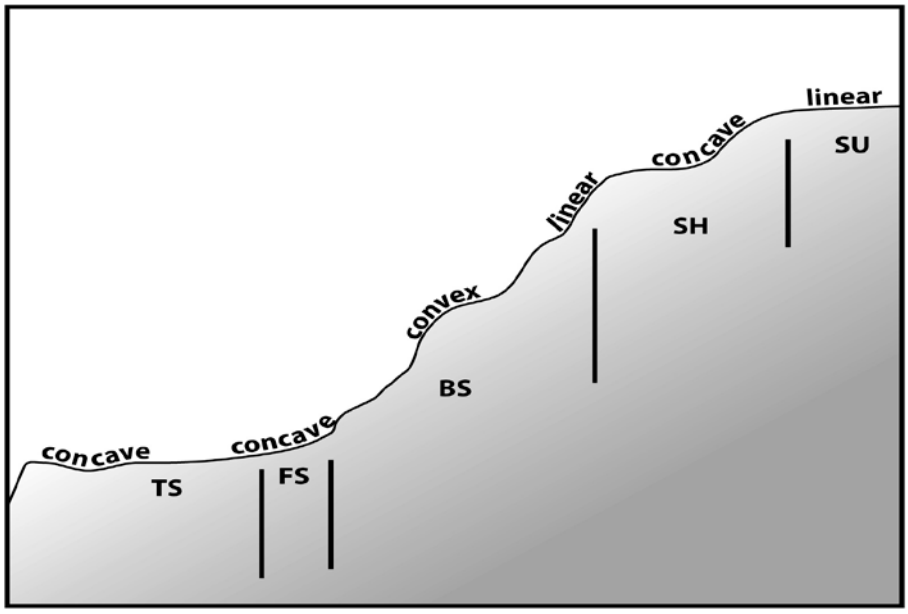

Figure 7b. Recording landform on data forms: local relief descriptors

[1] Source: Schoeneberger, P.J., D.A. Wysocki, I.D. Benham, and Soil Survey Staff. 2012. Field book for describing and sampling soils, Version 3.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE

3.3.2 Growing Season

Identification of the growing season is important for determining the applicability of some observed hydrology indicators (A1-Surface water, A2-High water table, and A3-Saturation) as well as hydrologic monitoring associated with the hydrology technical standard. The regional supplements include a field observation-based approach for determining the start and end of the growing season. This approach uses the biological activity/growth of non-evergreen plants as the indicator. The growing season can also be determined by soil temperature; growing season is the period when soil temperatures reach or exceed 41F measured at 12 inches (30 cm) below the ground surface. When the start of vegetative growth, or soil temperature, are unknown and on-site data collection is not practical, the growing season can be approximated by using a table of average dates (50% probability) of the first and last 28 degree F. temperature (provided on what is referred to as the WETS Table; county-specific tables can be found at the following link: http://www.wcc.nrcs.usda.gov/climate/wetlands.html

It should be noted, USDA has not populated WETS tables for all Minnesota locations. Growing season data does not vary greatly across a county line, so missing data can be estimated from adjacent counties. Alternatively, growing season data can be obtained from soil surveys.

3.3.3 Conducting delineations outside of the growing season

Depending on the situation, some sites can be adequately evaluated for wetlands and other aquatic resources outside the growing season, although severe limitations are often encountered. Trees, shrubs and certain herbaceous vegetation can sometimes be identified by those proficient in winter botany. Certain hydrology indicators may be determined at any time, such as geomorphic position, water marks, drift lines and groundwater springs and seepages that flow year round. Landscape position and potential surface water connections may be more readily observed without the dense cover of vegetation. However, the onset of frozen soil conditions and snow cover generally preclude identification of soils and most herbaceous vegetation which are often both critical to making an accurate determination. Off-site techniques such as examining aerial photography and other mapping resources may provide a reasonable determination of the presence of wetland that can suffice until an on-site delineation can be conducted during the growing season (see Section 3.2).

Regulatory review agencies should be consulted to determine if site reviews conducted outside of the growing season are acceptable in particular situations. Site reviews conducted outside of the growing season will usually require field-verification during the growing season prior to final acceptance of a delineation report for regulatory purposes. As stated in Section 3.2 above, the use of offsite-only methods may limit the utility of the determination for other regulatory situations, i.e., this level of wetland identification is typically not appropriate for potential projects directly adjacent to a wetland where the activity is likely to require a permit.

3.3.4 Normal Circumstances

A determination of what constitutes normal circumstances must be made when conditions at a site have been physically manipulated or disturbed (i.e., atypical situation: indicators of one or more of the three wetland parameters have been removed, obscured or become misleading due to human activity or a natural event). The Corps/EPA wetland definition originally included the phrase “under normal circumstances” to account for instances where vegetation is altered or cleared for the purpose of evading regulatory authority. The concept is more broadly interpreted today with consideration given to other

kinds of human activities and natural events that can obscure one or more of the required wetland parameters. It requires an evaluation of the extent and relative permanence of the physical alteration.

In general, wetland delineations on sites that represent normal circumstances are based on current conditions, whereas wetland delineations on sites that do not exhibit normal circumstances are usually based on conditions that would exist in the absence of the manipulation or disturbance. In general, normal circumstances can be described as:

1. The long-term or stable condition of a site including any authorized or other legal alterations, such as highways, dams, and other relatively permanent infrastructure and development.
2. The conditions indicated by the soils and hydrology normally present on a site in cases where the vegetation has been altered or removed.
3. The conditions that would exist on a site in the absence of any active and discretionary manipulation of hydrology.

Normal circumstances are present on sites that are undisturbed, including those with naturally problematic wetlands (one or more wetland parameters obscured or missing due to natural characteristics or natural variability). Examples of normal circumstances where site alterations have occurred include, but are not necessarily limited to, the following:

1. Alterations that occurred before implementation of the Clean Water Act.
2. Alterations that were authorized, exempt, or did not require authorization.
3. Hydrologic modifications, such as functioning ditches or subsurface drains, that were installed legally, are relatively permanent, are maintained, and operate by gravity without any artificial input of energy or manpower.
4. Ongoing hydrologic manipulation that is permanent and non-discretionary, such as pumping of surface or groundwater for municipal water supply, done under a court order, or required for public safety.

Examples of site alterations that are not the normal circumstances (and suggestions for documentation) include, but are not necessarily limited to, the following:

1. Unauthorized or illegal activities or activities done with the intent of evading Clean Water Act jurisdiction (check which parameter(s) is "significantly disturbed" and describe in Remarks).
2. Total or partial clearing of vegetation, or selective removal of plant species (check vegetation as "significantly disturbed" and describe in Remarks).
3. The presence of a crop, tree farm, improved pasture, other planted or managed vegetation such as a lawn, or cultivars (check vegetation as "significantly disturbed" and describe in Remarks).
4. Destruction of hydric soil indicators by cultivation or mixing of soil layers (check soil as "significantly disturbed" and describe in Remarks).
5. Irrigation (check hydrology as "significantly disturbed" and describe in Remarks).
6. Discretionary pumping of surface or groundwater, such as pumping for agricultural purposes (check hydrology as "significantly disturbed" and describe in Remarks).
7. Active and discretionary manipulation of water tables, such as sub-irrigation and other active water-table management for crop production or management of soil moisture and nutrients (check hydrology as "significantly disturbed" and describe in Remarks).

Note: A wetland parameter is "significantly disturbed" when the determination of the presence or absence of an indicator cannot be made. For example, if a soil is plowed with a chisel plow but still exhibits morphological characteristics of a hydric soil field indicator; then it is not significantly disturbed. However, if the surface

horizons of a soil have been scraped and removed by a bulldozer that obscures the evaluation of it for hydric soil indicators, then the soil parameter would be considered significantly disturbed.

See Appendix C for a key to the evaluation of normal circumstances.

Antecedent precipitation is not a factor in determining "normal circumstances." Analysis of recent precipitation helps to determine whether the site review is conducted during "normal environmental conditions" for that time of year, but it does not provide information on the long-term, stable hydrologic conditions that are a factor in determining normal circumstances. Methods for determining a site's antecedent condition are discussed later in this document (Section 3.7.5). Figure 8 shows where both normal environmental conditions and normal circumstances are recorded on the general information section of each regional supplement data form.

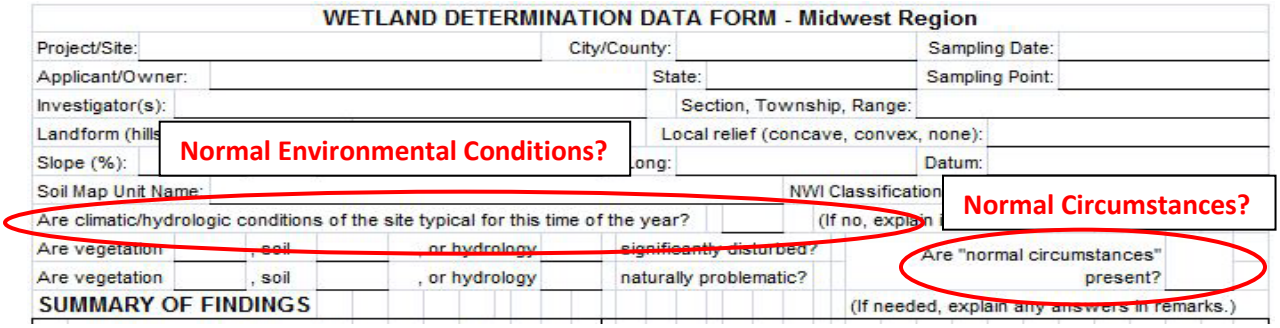

Figure 8. Recording Normal Circumstances and Normal Environmental Conditions

3.3.5 Use of Reference Wetlands

In significantly disturbed (atypical) situations, examining a comparable reference wetland area can be useful in making a wetland boundary determination. Depending on the parameter in question (hydrology, soils, vegetation), examining one or more parameters in a comparable but less altered or less difficult wetland-upland transition can provide support for boundary determinations in these difficult areas. For example, if making a determination in a depression where vegetation has been removed, a known depressional wetland basin with unaltered vegetation in an adjacent area could be examined and the documented wetland-upland transition used to make reasonable assumptions about the wetland boundary of the atypical area. In this example, it is important that the reference wetland have similar soil and hydrology characteristics and be in a similar landscape position as the atypical area being examined.

Reference wetland areas should be carefully selected to provide a reasonable representation of the area in question. Documentation of reference wetland conditions and characteristics via field sampling (and associated data forms), offsite data sources (soil mapping, topography, etc.) and general field observations is required. Justification for the use of a particular reference wetland area must be provided in the delineation report along with a detailed description of how it was used for a particular wetland determination/delineation.

3.4 Identify all aquatic resources

Starting with the off-site review of the project area, indications of aquatic resources other than wetlands should also be identified. Local water resource inventories should be used wherever available. Streams and ditches may be identified on the National Hydrography Dataset (NHD), the Minnesota Department of Natural Resources (MN DNR) Protected Waters Inventory, topographic maps and local water resource

inventories. Where available, community storm sewer mapping may provide information on the flow through, to and from aquatic resources and wetlands.

Thorough observations and reporting of potential connections and flow paths between aquatic resources (including those that extend off the subject site and are easily observable from public vantage points) can provide important information for determining regulatory jurisdiction and can facilitate a quicker review process in many instances. The location of these potential connections and flow paths (based on easily observable characteristics) should be surveyed, where possible, indicated in the report for the site and distinguished from the identified aquatic resources.

Refer to the *Jurisdictional Determination Request Guidance* as discussed in Section 1.4 for additional information.

When identifying the locations of aquatic resources other than wetlands, refer to information regarding the Ordinary High Water Mark (OHWM) for guidance on identifying the extent of the effect that water has had on the resource. (See Regulatory Guidance Letter (RGL) 05-05: http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl05-05.pdf)
The Corps defines OHWM as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of surrounding areas." The RGL lists physical characteristics, such as a bed and bank, to look for while collecting field data, to the extent that they can be identified and are deemed reasonably reliable. Observations should be made of indications that water has had an effect on any given landscape position. Photographs of key features and indicators provide excellent documentation for reporting.

Note: The Corps of Engineers and the Minnesota DNR both utilize the concept of an ordinary high water mark (OHWM) to establish the limits of jurisdiction for their respective regulatory programs. However, the methods the agencies utilize to identify the OHWM are different and, in some cases, may result in different OHWMs on the same water body. Therefore, an OHWM established by either agency should not be considered determinant for the other agency until both agencies have provided written approval.

3.5 Soils Guidance

Soil mapping information is an essential element in wetland delineations. In Minnesota, soil mapping data should be obtained from web-available soils data provided by NRCS. Older paper-bound or CD-ROM versions should only be used for historical perspective as they are out of date. NRCS soils data are available from several sources, including the USDA *Web Soil Survey* (WSS) site at: http://websoilsurvey.nrcs.usda.gov/app/

A mobile soil app developed by NRCS/UC Davis for smartphones is described at the following website: http://casoilresource.lawr.ucdavis.edu/drupal/node/886.

In most cases, delineation reports should not include extraneous soils-related information such as the definition of hydric soils, state or county hydric soil lists, Official Soil Series Descriptions (OSDs) and the text of hydric soil field indicators. Although this information has utility in helping understand the landscape, it is not useful for regulatory agency reviewers of delineation reports. The appropriate level of soil mapping information for delineation reports includes:

a. Soil map, overlaid on a recent aerial photograph, with a legend showing the names of the soil mapping units within the area of interest
b. Respective percentage of soil components within the map unit(s) (polygons on the soil map) and their hydric rating.

3.5.1 Hydric Rating

A soil's hydric rating can be obtained from the WSS through the "Soil Data Explorer" under the "Soil Reports" tab. The "Soil Reports" tab is preferred as it provides sufficient detail for a wetland delineation report.

1. At "Soil Reports", click on "Land Classifications"
2. Choose "Hydric rating by map unit (5 categories)" and
3. Select the "Include Minor Soils" option.
4. Click "View Soil Report" and the report will provide the hydric ratings based on the percentage of the soil map unit(s) that is (are) hydric.

Additional information on which components of a map unit are hydric can be obtained from the "Hydric Soils" report, also found under "Land Classifications." For wetland delineation, this information is preferred compared to the generalized hydric rating obtained from the "Suitabilities and Limitations for Use" tab.

The *Hydric Soil Category* rating indicates the proportion of a map unit that meets the criteria for hydric soils. Map units are composed of one or more components or soil types, each of which is rated as hydric or not hydric. Map units that are predominantly hydric soils may have small areas of minor non-hydric components in higher positions on the landform, and map units that are predominantly non-hydric soils may have small areas of minor hydric components in lower positions on the landform. Each map unit is designated as "all hydric," "predominantly hydric," "partially hydric," "predominantly non-hydric," "not hydric," or "unknown hydric," depending on the rating of its respective components.

- **All hydric** means that all components listed for a given map unit are rated as being hydric.
- **Predominantly hydric** means that more than 66 percent (i.e., $\geq$ 67%) to less than 100 percent of components are hydric.
- **Partially hydric** means that more than 33 percent to less than 67 percent of components are hydric.
- **Predominantly non-hydric** means that more than 0 percent and less than 34 percent (i.e., $\leq$33%) of components are hydric.
- **Not hydric** means that all components are rated as not hydric.
- **Unknown hydric** indicates that at least one component is not rated so a definitive rating for the map unit cannot be made.

Although soil maps can help identify where wetlands might be present on a site, field observations are necessary to confirm the presence/absence of hydric soil field indicators and wetlands. Soil maps should only to be used as an indicator of where potential wetland/hydric soils may be located and the types of soil textures you will encounter.

3.5.2 Guidance on Field Indicators of Hydric Soils

Field Indicators of Hydric Soils in the United States provides a description of regional indicators used on the soils portion of the data forms. These Field Indicators are incorporated for use in the regional

supplements. The following is additional guidance and clarification on the use of the Field Indicators in Minnesota:

a. **Indicators are subject to revision**: Revisions to the most recent published version are implemented through "errata", issued by NRCS. At this writing, Version 7.0 of the USDA field indicators is the most current published version. Errata to V. 7.0 were issued in July 2011 and March 2013. The following are among the changes cited in errata:
    1. Indicator F21: Red Parent Material replaced TF2 (July 2011). This change is significant for delineations in areas with red parent material soils. To provide geographic context for F21, guidance was developed and is included in Edition 4.0 of the *Pocket Guide to Field Indicators of Hydric Soils* available from the Wetland Delineator Certification Program, University of Minnesota.
    2. Indicator S7 changed from "testing" in LRRs K and M to regular use statewide.
       S7. Dark Surface. *For use in LRRs K, L, M, N, P, R, S, T, U, V and Z.* A layer 10 cm (4 inches) thick, starting within the upper 15 cm (6 inches) of the soil surface, with a matrix value of 3 or less and chroma of 1 or less. At least 70 percent of the visible soil particles must be masked with organic material, viewed through a 10x or 15x hand lens. Observed without a hand lens, the particles appear to be close to 100 percent masked. The matrix color of the layer directly below the dark layer must have the same colors as those described above or any color that has a chroma of 2 or less.
       User Notes: For this indicator, the content of organic carbon is slightly less than is required for "mucky." An undisturbed sample must be observed. Many wet soils have a ratio of about 50 percent soil particles that are masked with organic matter and about 50 percent unmasked soil particles, giving the soils a salt-and-pepper appearance. Where the coverage is less than 70 percent, a Dark Surface indicator does not occur.

    The S7 indicator should be used with caution in Minnesota as this indicator has been observed in soils that do not have hydrology consistent with hydric soils in Minnesota. Landscape position and the presence/absence of hydrology and hydrophytic vegetation indicators must be considered before concluding that a soil is hydric based on S7 as the sole field indicator.
b. **The title of the hydric soil indicator does not fully describe the requirements**: The depth and morphology requirements of each indicator are described in the "Technical Description" of the hydric soil field indicators. These requirements cannot be construed from the title of the indicator. In particular, field indicators A11 and A12 both mention "Dark Surface" in their title, but they require observation of a depleted matrix below the dark surface. For A12, this may mean digging well below the typical 18"-24" soil pit to confirm observation of a depleted matrix.
c. **A soil profile meets or does not meet an indicator**: There is no 'almost meets an indicator' category. A data form that indicates a hydric soil indicator(s) has been met must have an associated soil profile description (depths, colors, textures, etc.) that matches the requirement of the indicator(s). The "Other" box and "Remarks" section of the soils data form should be used to provide additional information to support cases where a hydric soil determination is based on best professional judgment rather than the strict presence/absence of a field indicator, such as when employing the "Problematic Hydric Soils" procedures in Chapter 5 of a regional supplement.
d. **Observing more than one hydric soil indicator is common:** Although only one hydric soil indicator is needed to confirm that a hydric soil is present, the practice of identifying all

indicators observed adds additional support to the interpretation of a soil profile and provides information useful to reviewers.

e. **Test Indicators**: A wetland delineation relying on test indicators of hydric soils, or indicators for use with problem soils as they are called in Chapter 5 of the regional supplements, should be augmented with additional documentation including landscape position.

f. **Depth to Sample**: Professional judgment is involved when deciding the depth used to determine whether a soil is hydric. The regional field indicators for hydric soils state that the appropriate depth to sample is that by which a determination can be made whether or not a soil meets a field indicator. Where there is a "Thick Dark Surface" you may be required to dig several feet before determining if the soil is hydric. If the pit becomes too deep for examination, the only option is to check "Other" as the indicator, and note that you assume a depleted matrix at some depth below your pit. However, in general, soil pits should be a minimum depth of 24 inches[2] to allow for: (1) observation of an adequate portion of the soil profile to determine if the soil meets a field indicator; (2) observation of hydrology including depth to the water table and saturated soils; and (3) identification of disturbances such as a buried horizon, plow zone, etc. During portions of the dry season or drier than normal periods (see discussion in Section 3.7.2), the soil pit must be at least 24 inches deep in order to provide for observation of Hydrology Indicator C2 – Dry season water table.

g. **Field indicators are "test positive."** Failure to meet a field indicator does not necessarily mean the soil is not hydric because field indicators have not been developed for all hydric soils. If indicators of wetland hydrology and hydrophytic vegetation are present, professional judgment should be used to apply the procedure in Chapter 5 of the regional supplements on problematic hydric soils.

3.6 Vegetation Guidance

Proper plant identification is essential for accurate wetland delineation in accordance with the current Manual and regional supplements. Appendix D provides a list of botanical references for use in Minnesota. A qualitative assessment of plant identification guides can be found on the BWSR website at: http://www.bwsr.state.mn.us/wetlands/wca/plant_id_guides_MN.pdf

3.6.1 Recording vegetation data

All plant species observed in a particular sampling plot should be recorded on the corresponding data form, with at least 80% of areal cover correctly identified to species level; all dominants need to be identified to species level. If a species is unknown or unidentifiable, it should be identified as such on the data form. If a particular species is present due to planting, cultivation or some other anthropogenic factor, it should be noted as such on the data form. The hydrophytic vegetation testing sequence in the regional supplements using the indicator values in the NWPL must be followed. In those instances when wetland hydrology and hydric soil parameters are met, but planted vegetation is skewing the results of a data plot, refer to the procedures for analyzing difficult vegetation outlined in Chapter 5 of the supplements.

3.6.2 Subregions on the NWPL

For the purposes of the NWPL, the Northcentral/Northeast Region has been divided into two subregions, the western half of which includes Minnesota and Wisconsin (see Figure 9). This split is to accommodate

[2] Except for near-surface indicators such as F6, observations of field indicators are made below the A horizon (topsoil). Topsoil typically has value 3 or less. Rather than rely on arbitrary depths of observation, it is good practice to dig deeper than the topsoil.

the additional data that support a different indicator status for two common plant species in wetland-upland transition areas within the subregion: red raspberry (*Rubus idaeus*) and quaking aspen (*Populus tremuloides*), were assigned a different indicator status in the North Central Great Lakes sub-region (FAC) as compared to the remainder of the NC/NE region (FACU). For delineating wetlands in Minnesota, the indicator status from the North Central Great Lakes subregion supersedes those from the NC/NE region.

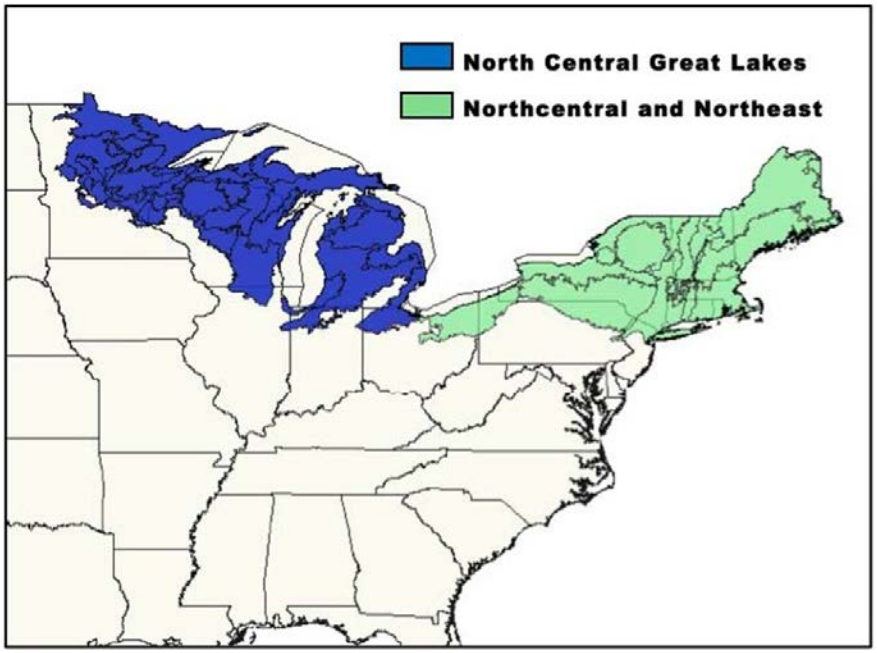

Figure 9. Subregions of Northcentral/Northeast Region

3.7 Hydrology Guidance

3.7.1 Documentation

Hydrology, or the presence of water, is the driving force for wetlands and aquatic resources. Hydrology is also the most variable of the three criteria used to identify wetland areas as it is subject to short- and long-term fluctuations. Furthermore, site visits are often conducted outside of the "wet" season (e.g., April-May), as well as during drought years, meaning that direct observation of inundation or saturation may not be made on the day of the site visit, or during short-term hydrologic monitoring (three-years or less) of shallow groundwater. Therefore, the Manual and regional supplements utilize a variety of indicators to verify the presence of hydrology. Using the regional supplements, the observation of one primary or two secondary indicators is sufficient to conclude that wetland hydrology is present. In addition, indicators of wetland hydrology are not limited to those listed in the regional supplements; other evidence of wetland hydrology, such as presence of an indicator from a different regional supplement, may also be used with appropriate documentation.

Hydrology indicators themselves are often ephemeral. Observation of surface water may only be present during the wet portion of the growing season in normal precipitation years for some wetlands. The question for wetland delineators is not whether a site has wetland hydrology on a given day or during a given growing season, but whether there are sufficient indicators that provide evidence that the site has a continuing wetland hydrologic regime and that hydric soils and hydrophytic vegetation are not relicts of a

past hydrologic regime. Recognizing the dynamic nature of wetlands, the criteria do not require that wetland basins or the upper boundary of wetlands be inundated or saturated to the surface every year. Therefore, once a wetland hydrology indicator is observed, it is an indicator and should be noted on the data form and in the delineation report. Subsequent observations with a different result do not cancel out the earlier observation, but provide context for understanding normal climatic variations.

It is important to adequately document field observation of the presence or absence of water. The observation of primary indicators such as surface water, or water within 12 inches of the surface, must be documented by recording the depth below or above the ground surface measured at the time of sampling. Even if water is observed below the depth to meet an indicator or not observed at all, the depth to water table or depth to bottom of sampling pit (usually provided in soil profile description) must be recorded.

Unlike vegetation and soil sampling, many of the hydrology indicators may not be associated with a specific sampling area or point. Professional judgment should be used in evaluating the location of observed indicators. For example, observation of a crayfish burrow (secondary indicator) should not be discounted simply because it is not located exactly at the location of the sampling plot. If the burrow is readily observed near the sampling location in an area with similar vegetation, soils and landscape position as the sample plot, then it should be recorded on the data form as a secondary indicator.

3.7.2 Dry Season Water Table - Hydrology Indicator C2

The normal 'dry season' is recognized as starting when evapotranspiration rates exceed precipitation values (typically beginning near the end of June). Refer to the monthly evapotranspiration rates at the following National Oceanic and Atmospheric Administration (NOAA) website:

http://www.cpc.ncep.noaa.gov/soilmst/eclim_frame/html

NRCS soil survey water table data were analyzed to obtain reasonable dates for the start of the normal 'dry season' for the Land Resource Regions (LRR) in Minnesota, which is generally set as follows:

LRR F (Great Plains): July 1
LRR M (Midwest): July 15
LRR K (Northcentral/Northeast): August 1

The dates will vary slightly depending upon antecedent precipitation conditions in a given year. Data collection during site visits conducted after these dates, or during abnormally dry (drought) conditions, must include soil pits dug to at least 24 inches (60 cm) in order to allow for observation of the water table between 12 and 24 in. (30 and 60 cm) below the surface.

This indicator is also applicable in the early part of the growing season during years that immediately follow extreme drought conditions. Online tools such as the Palmer Drought Severity Index or the USGS Waterwatch should be consulted when making determinations related to use of the C2 Hydrology Indicator.

3.7.3 Drainage Guidance

Drainage guidance was developed to complement Chapter 5 of the regional supplements, "Difficult Wetland Situations" and to offer additional information concerning the potential impact of a drain on wetland hydrology. "Drainage Setback Guidance" can be found under "Wetland Delineation" at the BWSR website:

http://www.bwsr.state.mn.us/wetlands/delineation/Drainage_setback_guidance.pdf

It is important to understand that the setback distance, which listed in the guidance, and lateral effect are not the same. The setback is the distance a drain must be from a wetland to have a minimal effect. If there is a functioning drain within that distance, it is assumed to have an effect to some degree, which is the question the delineator must answer.

If drainage activity is located in or near the area of investigation, it is important to note the location and extent of drainage infrastructure (e.g. tile inlets or lines, ditches, outlets). This information can be important in explaining why hydrology indicators are lacking in an area that meets soil and vegetation criteria.

3.7.4 Hydrology Indicator D2 - Geomorphic Position

Hydrology indicator D2 - Geomorphic Position relates to the likelihood that a near-surface water table exists due to water accumulating in certain geomorphic positions. It also assumes there is minimal drainage influence nearby.

Cautions and User Notes for indicator D2 state "This indicator is not applicable in areas with functioning drainage systems." In many parts of Minnesota, functioning drainage systems often do not remove all of the hydrology supporting wetlands, especially during the early growing season. While "functioning drainage system" is not clearly defined, if a data point is within an area believed to be affected by a functioning system, a hydrologic analysis will be necessary to assess the effects of the system, and documentation provided as to why this indicator is not applicable.

Without documentation that a nearby drainage system removes the hydrology of a wetland, a sampling point that is noted as having 'concave' local relief would meet hydrology indicator D2 – Geomorphic Position, which should be checked on the data sheet. Furthermore, if hydrology indicator D5 - FAC-neutral test is also met at the sampling point, this is strong evidence that a nearby drainage system does not effectively remove all of a wetland's hydrology.

3.7.5 Antecedent Precipitation

Field observations and conclusions must consider antecedent precipitation conditions prior to the date of site review or aerial photography. Refer to the following guidance documents:

1. *Accessing and Using Meteorological Data to Evaluate Wetland Hydrology* (http://el.erdc.usace.army.mil/elpubs/pdf/wrap00-1/wrap00-1.pdf),
2. *Evaluating Antecedent Precipitation conditions for Assessing Wetland Hydrology* (http://www.bwsr.state.mn.us/wetlands/wca/antecedent-precip.pdf)
3. *Hydrology Tools for Wetland Determinations* (http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17556.wba).

The standard method for evaluating antecedent precipitation conditions (the "NRCS Method" described in documents 1 and 2 above) uses monthly precipitation data from the three months prior to the observation date (date of site visit or aerial photography). The method weights the months' precipitation by recency, as the most recent month's precipitation has the most impact on the site conditions. While the method is an excellent tool for a rapid determination of antecedent precipitation conditions, it has its limitations; namely, it does not consider data from the earlier part of the month of the observation date. For example,

for a September 25 site visit, the method evaluates antecedent precipitation using June, July and August for the prior three months, missing much of the information from the month of September.

Other methods described (documents 1 and 2 above) include the "30-Day Rolling Total" and the "Hybrid Method". The "Hybrid Method" combines the "NRCS-method" with the "30-Day Rolling Total". The "Hybrid Method" requires use of professional judgment in making the determination of whether the antecedent conditions have been dry, normal or wet, which must be justified in the report.

The Minnesota Climatology website (http://climate.umn.edu/wetland/) provides precipitation data from a vast network of weather monitoring stations throughout the State. It also provides a web-based tool for analyzing antecedent conditions for wetland delineations. The online tool is based on the "NRCS Method" described above, so it has the inherent limitation of not distinguishing mid-month dates: a date chosen within any month will be calculated as if it were the first of that month. Users may also note that the tool's worksheet can indicate "missing" data for very recent dates, because the precipitation database has not yet been populated following QA/QC. To overcome both of these limitations, use the "retrieve daily precipitation data" link below the worksheet to collect the data and recalculate the antecedent precipitation. Alternatively, delineators may use the "Hybrid Method", as described in references 1 and 2 above.

The Minnesota Climatology website uses the most current 30-year period (1981-2010) of precipitation records to assess the recent precipitation relative to normal with the worksheet tool. The worksheet also provides the results using the 1971-2000 period of record, which is still used by NRCS for Food Security Act (FSA) purposes. Therefore, there may be differences in the results of antecedent precipitation between the two procedures. For wetland delineations conducted for Section 404 and WCA purposes, using the most recent period of record (1981-2010) data on the Minnesota climatology website are appropriate for use in reviewing recent aerial photography.

Longer term drought conditions should also be considered using the USGS Waterwatch website (http://waterwatch.usgs.gov/) or other available tools.

Antecedent conditions should be addressed in the delineation report, but tables of annual precipitation data are not needed. A summary of antecedent conditions based on procedures in the recommended guidance documents is adequate in most circumstances.

3.7.6 Using Aerial Imagery to Assess Wetland Hydrology

Procedures have been updated and improved for the assessment of wetland hydrology based on aerial imagery. The interagency approach to off-site wetland determinations on agricultural lands (also referred to as the state "Mapping Conventions") is **required** for CWA and WCA purposes. Refer to the guidance developed by BWSR 2010 (http://www.bwsr.state.mn.us/wetlands/wca/Using_Aerial_Imagery_to_Assess_Wetland_Hydrology7-1-10.pdf). All aerial imagery and other resources, such as NWI maps and LiDAR information, used in the review, including those with either wet or dry antecedent conditions, must be provided with the report. While the signatures noted in aerials with wet or dry antecedent conditions may not be used in the calculations for the number of 'hits' (they are used when there are less than five years of imagery during normal conditions), those signatures provide valuable information in making the wetland determination. Finally, delineators are not limited to use of the available FSA aerials for off-site review; imagery available from other sources may also be used in making the determination.

The procedures described in this guidance document are most useful for interpreting wetland hydrology in agricultural areas, however, they can be useful in other situations (with appropriate caution) where hydrology is in question. In general, review of aerial imagery for assessing wetland hydrology is more accurate in agricultural fields that have been planted with annually seeded row crops such as soybeans and corn. These fields will often show signs of crop stress, standing water, or drowned out crops in summer aerial imagery when wetland hydrology is present. An aerial imagery review for signs of crop stress due to wetness is typically not as reliable for fields planted in perennial forage crops compared to those planted to row crops. There are some situations where air photo review can provide useful information in areas that are not cropped or hayed such as pastures and naturally vegetated seasonally flooded/saturated wetlands. Reviewing historical aerial imagery can also be useful in determining the extent, type and timing of disturbances that may affect wetland hydrology (e.g., ditching, tiling, filling, new road construction, etc.). However, greater emphasis should be placed on other data sources (such as those listed in the Manual and regional supplements) in these situations. It is important to remember that FSA aerials are not flown to make wetland determinations, but to determine crop status. Therefore, it is incumbent upon delineators to make every effort to accurately determine the hydrologic status of wetlands that are being farmed, which generally have hydrology during the early growing season but may be dry by mid-summer when the aerials are flown.

Please note: Wetland determinations conducted by USDA for Food Security Act purposes are based on different standards and policies than those used for federal and state wetland regulatory programs. These determinations may provide useful information, but are otherwise not to be used for wetland delineation and regulatory compliance in Minnesota.

3.7.7 Monitoring well guidance

On sites where the hydrology has been manipulated (e.g., with ditches, subsurface drains, dams, levees, water diversions, land grading) or where natural events (e.g., down-cutting of streams) have altered conditions such that hydrology indicators may be missing or misleading, direct monitoring of surface and groundwater may be needed to determine the presence or absence of wetland hydrology. The U. S. Army Corps of Engineers (2005) provides minimum standards for the design, construction, and installation of water-table monitoring wells, and for the collection and interpretation of groundwater monitoring data, in cases where direct hydrologic measurements are needed to determine whether wetlands are present on highly disturbed or difficult sites. The technical standard requires 14 or more consecutive days of flooding, ponding, and/or a water table 12 in. (30 cm) or less below the soil surface, during the growing season, at a minimum frequency of 5 years in 10 (50% or higher probability) unless an alternative standard has been established for a particular region or wetland type (none in Minnesota). A disturbed or difficult site that meets this standard has wetland hydrology. This standard is not intended (1) to overrule an indicator-based wetland determination on a site that is not disturbed or difficult, or (2) to test or validate existing or proposed hydrology indicators[3].

Numerous guidance documents have been developed and remain relevant for installation and interpretation of monitoring wells, including the Corps 2006 *Guidance on Design, Installation and Interpretation of Monitoring Wells for Wetland Hydrology Determinations* (http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/guidance_design.pdf).

[3] Chapter 5, Regional Supplements

Note: Based on experience since the above guidance was written, the final bullet on page 2 of this document should read that the “driven method” for installing wells in organic soils should be used with caution. With sapric organic soils, it is better to auger and backfill with the native organic soils, the driven method can smear organic soils and create a seal along the walls of the bore hole.

Additional guidance documents relating to wetland hydrologic monitoring can be found in Appendix E.

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LIST OF APPENDICES

APPENDIX A
HYDROLOGY AND HYDRIC SOIL FIELD INDICATORS FOR MINNESOTA

Table 1. Hydrology Indicators used in Minnesota

Hydrology Indicator	Great Plains Category		Midwest Category		Northcentral - Northeast Category	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
Group A – Observation of Surface Water or Saturated Soils						
A1 – Surface Water	X		X		X	
A2 – High Water Table	X		X		X	
A3 - Saturation	X		X		X	
Group B – Evidence of Recent Inundation						
B1 – Water Marks	X		X		X	
B2 – Sediment Deposits	X		X		X	
B3 – Drift Deposits	X		X		X	
B4 – Algal mat or crust	X		X		X	
B5 – Iron Deposits	X		X		X	
B6 – Surface soil cracks		X		X		X
B7 – Inundation visible on aerial imagery	X		X		X	
B8 – Sparsely vegetated concave surface		X	X		X	
B9 – Water-stained leaves	X		X		X	
B10 – Drainage patterns		X		X		X
B11 – Salt crust	X		Not in MW		Not in NC/NE	
B13 – Aquatic fauna (invertebrates in GP)	X		X		X	
B14 – True aquatic plants	Not in GP		X		Not in NC/NE	
B15 – Marl deposits	Not in GP		Not in MW		X	
B16 – Moss trim lines	Not in GP		Not in MW			X
Group C – Evidence of Current or Recent Soil Saturation						
C1 – Hydrogen sulfide odor	X		X		X	
C2 – Dry-season water table	X			X		X
C3 – Oxidized rhizospheres along living roots	X	X (Where tilled)	X		X	
C4 – Presence of reduced iron	X		X		X	
C6 – Recent iron reduction in tilled soils	Not in GP		X		X	
C7 – Thin muck surface	X		X		X	
C8 – Crayfish burrows		X		X		X
C9 – Saturation visible on aerial imagery		X		X		X
Group D – Evidence from Other Site Conditions or Data						
D1 – Stunted or stressed plants	Not in GP			X		X
D2 – Geomorphic position		X		X		X
D3 – Shallow aquitard	Not in GP		Not in MW			X
D4 – Microtopographic relief	Not in GP		Not in MW			X
D5 – FAC-neutral test		X		X		X
D7 – Frost-heave hummocks		X (LRR F)	Not in MW		Not in NC/NE	
D9 – Gauge or well data	Not in GP		X		Not in NC/NE	

Table 2. Field Indicators of Hydric Soils used in Minnesota[4]

Field Indicator	Great Plains (LRR F)	Midwest (LRR M)	Northcentral/Northeast (LRR K)
All Soils			
A1: Histosol	X	X	X
A2: Histic Epipedon	X	X	X
A3 – Black Histic	X	X	X
A4 – Hydrogen Sulfide	X	X	X
A5 – Stratified Layers	X	X	X
A9 – 1 cm Muck	X	Not in MW	Not in NC/NE
A10 – 2 cm Muck	Not in GP	X	D
A11 – Depleted Below Dark Surface	X	X	X
A12 – Thick Dark Surface	X	X	X
A16 – Coast Prairie Redox	D	D	D
Sandy Soils			
S1 – Sandy Mucky Material	X	X	X
S3 – 5 cm Mucky Peat or Peat	X	X	D
S4 – Sandy Gleyed Matrix	X	X	X
S5 – Sandy Redox	X	X	X
S6 – Stripped Matrix	X	X	X
S7 – Dark Surface	X*	X*	X*
S8 – Polyvalue Below Surface	Not in GP	Not in MW	D
S9 – Thin Dark Surface	Not in GP	Not in MW	D
Loamy and Clayey Soils			
F1 – Loamy Mucky Mineral	X	X	X
F2 – Loamy Gleyed Matrix	X	X	X
F3 – Depleted Matrix	X	X	X
F6 – Redox Dark Surface	X	X	X
F7 – Depleted Dark Surface	X	X	X
F8 – Redox Depressions	X	X	X
F10 – Marl	Not in GP	Not in MW	X
F12 – Iron-Manganese Masses	Not in GP	D	D
F18 – Reduced Vertic	D	Not in MW	Not in NC/NE
F21 – Red Parent Material	D	D	D
F22 – Very Shallow Dark Surface	D	D	D

X = Recognized by the NTCHS for general use within geographic area of regional supplement

X*= Recognized by NTCHS for general use within geographic area of regional supplement. Use with caution and rely heavily on landscape position and indicators of hydrology and hydrophytic vegetation.

D = not recognized by NTCHS for general use within geographic area of regional supplement, but may be used in difficult wetland situations for that supplement area where there is evidence of wetland hydrology and hydrophytic vegetation, and the soil is believed to meet the definition of hydric soil despite the lack of other indicators of a hydric soil.

[4] Incorporates recent errata

APPENDIX B

WETLAND DELINEATION REVIEW CHECKLIST

Wetland Delineation Review Checklist for Minnesota

This document is intended to provide those reviewing wetland delineations for regulatory purposes with a checklist of basic components that should be considered when reviewing wetland delineations, and to serve as a useful guide for those conducting delineations and preparing reports. This checklist is for most routine wetland delineations in Minnesota. Other report components and review considerations may be applicable depending on the characteristics of the site being evaluated. Users should consult the 1987 Corps of Engineers Wetland Delineation Manual, applicable regional supplement and Board of Water & Soil Resources guidance documents for more specific information and explanations.

Basic Report Components (check to make sure these are in the report)

- ☐ Site location map
- ☐ National Wetland Inventory (NWI) map, (recent DNR update)
- ☐ Soil survey map (use web soil survey at http://websoilsurvey.nrcs.usda.gov/app/)
- ☐ MN DNR Protected Waters Inventory Map
- ☐ Recent air photo with sampling point locations and transects, site boundary, and wetland boundaries
- ☐ Survey map (optional depending on local requirements)
- ☐ Wetland delineation data forms corresponding to indicated sampling point locations

Report Contents (review report and data forms for these elements)

General

- ☐ Circular 39 wetland types and Eggers & Reed plant community types identified for each wetland
- ☐ Vegetation and landscape position of all adjacent upland areas identified and described
- ☐ Wetland-upland transitions described for each wetland in terms of vegetation, soils, and hydrology
- ☐ Methodology for identifying potential wetland areas described
- ☐ All potential wetlands from hydric soil, NWI, and other mapping sources adequately investigated and described in the report.
- ☐ If mapping convention procedure is needed, all imagery used for the review and the summary form as described in section 3.7.6.

Wetland Delineation Data Form Review:

- ☐ "Normal circumstances", "disturbed" and "problematic" designations properly identified
- ☐ Vegetation classified into appropriate layers (herb, shrub, tree, vine)
- ☐ Scientific name and indicator status identified
- ☐ 50/20 dominance rule applied properly for each vegetation layer
- ☐ Soils pits deep enough to document presence/absence of all potential hydric soil field indicators
- ☐ Soil textures and Munsell colors given for each soil layer in sample

Field Review (conduct a field review and verify the following elements):

- ☐ Appropriate number of sampling transects (see notes on page 2)
- ☐ Sample points representative of the plant community and landscape position being sampled (see notes on page 2)
- ☐ Appropriate vegetation sample plot sizes used (see notes on page 2)
- ☐ Vegetation properly identified and quantified
- ☐ Soil pits deep enough to document presence/absence of all potential hydric soil indicators
- ☐ Soil layers properly described in terms of texture, color, and redox features
- ☐ Hydric soil indicators properly applied
- ☐ Hydrology indicators properly applied (see notes on page 2)
- ☐ Delineation flag spacing appropriate (see notes on page 2)

Notes:

General Consideration - The wetland delineation report will be reviewed by someone who knows delineation procedures described herein but has likely not visited the site. The delineator is asking the reviewer to concur with the delineation based solely on the information provided in the delineation report. Therefore, consider this question: would a knowledgeable person accept the findings? Additional clarification or a comment—however brief—to explain inconsistencies or unusual site conditions is strongly recommended. It is not in the interest of reviewers or delineators to reject delineation reports. The majority of delineation reports that are initially rejected are corrected with the addition of clarifying comments, an additional photograph, map or revised data sheets.

Sampling Transects – Typically, sampling transects should be located at each major upland/wetland transition area on the site. This may result in several transects on a single wetland or a single transect for two similar wetlands depending on the characteristics of the site. Delineators should carefully choose transect locations that are representative of the major wetland-upland transitions. More standardized approaches for establishing sampling transects are detailed in the 87 Manual and its regional supplements.

Vegetation Sample Plot Sizes – Recommended sample plot sizes for vegetation are stated in the regional supplements. In general, sizes are 5 ft. radius for herbaceous layer, 15 ft. for shrub layer, and 30 ft. for tree and woody vine layers.

Soil Sample Point Locations – Soil sample points should be indicative of the landscape position of the upland, wetland, or transition area being sample. For example, soil sample pits located in a micro-depression or on a small hill in an otherwise uniform topographic area should not be considered representative.

Delineation Flag Spacing – The spacing of flags to delineate a wetland should be in accordance with the implied precision of the delineation. Wetlands with abrupt topographic and/or vegetative changes allow for more precise delineation and could result in spacing as low as 25 to 50 feet between flags. Wetlands with subtle topographic changes into upland and significant overlap of wetland and upland plant species generally result in wide spacing (50 to 100 feet) between flags. The greater the number of sampling transects documenting the upland-wetland transition, the closer together the flags can be.

Hydrology Indicators – Hydrology indicators are often ephemeral. For example, observation of surface water may only be present during the wet portion of the growing season in normal precipitation years for some wetlands. Once a wetland hydrology indicator is observed, it is an indicator and should be noted on the data form and in the wetland delineation report. For example, if water is observed within 6 inches of the soil surface after a heavy rain, it is an indicator of wetland hydrology even though subsequent observations after normal rainfall events may show a water table at 30 inches below the surface. These subsequent observations do not “cancel out” the first observation of the indicator. If the indicator is observed, then it should be recorded. However, these subsequent observations may help in understanding normal climatic variations that are important in *interpreting* hydrology indicators. Refer to the 87 Manual and its applicable regional supplement for sources and methodologies to interpret hydrology indicators in making wetland determinations.

APPENDIX C

NORMAL CIRCUMSTANCES DETERMINATIONS

Determination of Whether "Normal Circumstances" are Present

1. Soils, vegetation and hydrology are undisturbed ……..……**Normal Circumstances**
1. Physical alteration(s) to soils, vegetation and/or hydrology has occurred…….……..2

2. Physical alteration(s) to soils, vegetation and/or hydrology is minor, i.e., insufficient to remove or obscure field indicators……..…**Normal Circumstances**
2. Physical alteration(s) to soils, vegetation and/or hydrology is more than minor ("significantly disturbed" is checked on the data sheet)……..……...3

3. Physical alteration(s) is legally established, maintained and represents the long-term conditions of the site; OR is a newly-authorized physical alteration (e.g., permitted fill, new concrete dam)……..……..……...**Normal Circumstances**
3. Physical alteration(s) is due to:
   a. an unauthorized or illegal activity;
   b. activities done with the intent of evading wetland regulations;
   c. total or partial clearing of vegetation, or selective removal of plant species;
   d. the presence of a crop, tree farm, improved pasture, other planted vegetation or cultivars;
   e. destruction of hydric soil field indicators by cultivation or mixing of soil layers;
   f. irrigation;
   g. active and discretionary manipulation of water tables, such as subirrigation and other active water management for crop production (e.g., cranberry beds);
   h. discretionary pumping of surface or groundwater, such as pumping for agricultural purposes; and/or
   i. a major natural event (e.g., a river changes course)……..…**Not Normal Circumstances**

Notes

- The full range of pristine conditions to highly disturbed conditions may constitute the normal circumstances
- The extent, duration and relative permanence of the physical alteration(s) to the soils, vegetation and/or hydrology are key
- Maintenance is a factor – if a physical alteration (e.g., ditch system) is abandoned and wetlands reestablish, the normal circumstance is wetlands
- Ongoing hydrologic manipulation that is permanent and non-discretionary, such as pumping for a municipal water supply, is considered the normal circumstance
- Ditches and subsurface tile lines that were installed legally and are maintained constitute normal circumstances
- A planted crop is not the normal circumstance; rather, the normal circumstance is a plant community adapted to the site's normal soils and hydrology

APPENDIX D
BOTANICAL REFERENCES FOR USE IN WETLAND DELINEATION

Botanical References

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APPENDIX E
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