Non-normal Site Conditions

CHAPTER 6

The field method for routine applications where normal circumstances exist was discussed in Chapter 5. However, a variety of non-normal site conditions, both natural and human-induced, occur in Michigan. This chapter discusses some general types of non-normal site conditions and approaches for evaluating a site with those condtions for the presence or absence of wetlands. Non-normal circumstances include atypical situations (the vegetation, soils, and/or hydrology of the site have been altered by a recent or severe change) or problem areas (wetlands that are inherently difficult to identify because the vegetation, soils, and/or hydrology of the site are absent or misleading, at least during certain times of the year).

The atypical situations discussed in this chapter are:

- Alteration or removal of vegetation.
- Removal of the original soil.
- Significant alteration of the original soil profile.
- **Fill material** has been placed on the site.
- Hydrology has been altered.

The problem areas discussed in this chapter are:

- Problem soils.
- Bedrock.
- Other problem areas.

Any combination of these situations may occur, and several methods and sources of information may be necessary to properly evaluate the site.

The information and methods provided in this chapter should only be used after the user has determined that positive indicators of wetland vegetation and/or hydrology, including soils, cannot be identified due to non-normal site conditions. The user of this manual may encounter problem areas or atypical situations during an on-site inspection that are not discussed in this chapter. Additional information for evaluating sites exhibiting atypical conditions and problem areas is provided in the 1987 USACE Wetlands Delineation Manual, Section F.

When confronted with a site where normal circumstances do not exist, the user should first identify the natural and/or human-induced conditions or impacts that may affect the identification of wetland and

non-wetland areas. If one or more of the wetland parameters are not identifiable, the user should determine if there is sufficient evidence that hydrophytic vegetation, hydric soils, and/or wetland hydrology were present prior to the evaluation. The user can then return to the routine method described in Chapter 5 to characterize parameters not significantly influenced by the non-normal site conditions.

A. Alteration or Removal of Vegetation.

A variety of activities can effectively remove vegetation from the site including, but not limited to, fire, flooding, and other natural disasters, agricultural practices, or site preparation for development. These activities can result in the total removal of vegetation that makes on-site identification of plant species impossible. In other circumstances, activities can lead to the removal of one vegetation layer or a particular dominant species. Although wetland vegetation may be altered or removed, wetland identifications can still be performed by determining the type of vegetation that previously occurred on site, from historical evidence or by identifying the hydrologic conditions that are still evident on a site.

An on-site inspection can provide information on the type of vegetation that would have occurred before the disturbance. Some surviving vegetation may exist on site around obstacles and in remote areas. Remaining brush and stump piles may also provide information about the plant species that were present, although the user may not be certain that they originated on site or whether they represented the predominant vegetation. Evidence of the type of vegetation that previously occurred on site can be obtained by examining adjacent areas with the same topography, soils and hydrology. Recolonization of vegetation on the disturbed site may or may not be helpful in determining if wetland vegetation was present. Invasion by upland vegetation may occur in wetland areas, depending on the time of year and climatic conditions when the disturbance occurred.

If available, historical records, soil surveys, remote sensing data, etc., can assist in determining pre-disturbance conditions. Aerial photographs, MIRIS maps, or NWI maps can be used to document the type of vegetation that was previously found on the site. In addition to soil and hydrologic information, soil surveys include a general description of the plant community associated with each soil type. The wetland vegetation parameter can be met if there is sufficient on-site or historical evidence.

It can be assumed that, under normal circumstances, wetland plant species can, and eventually will, reestablish in areas that retain

wetland hydrology. The user should look for visible evidence of wetland hydrology and/or indicators of wetland hydrology in the soil profile during an on-site inspection. If hydric soils and/or wetland hydrologic characteristics are present and the vegetation has been altered or removed, the area should be considered wetland.

B. Removal of the Original Soil.

Activities that may result in the alteration or removal of the soil include, but are not limited to, excavation for mineral extraction, earth moving for site development, or natural circumstances such as flooding or mud slides. These activities may also remove the vegetation from the site. The hydrology, however, may or may not be altered. For example, wetland hydrology may occur as ponding within excavated areas or be entirely absent because surface water has been diverted around the excavated areas.

Because indicators of the vegetation and hydrology parameters may be completely removed, a wetland identification may need to be based on the use of historical data such as soil maps, aerial photographs, and other information sources as described in Chapter 5. In some cases, however, an on-site inspection can provide evidence of wetland vegetation, as described in Section A above, or indicators of wetland hydrology that will allow the user to determine that the area was wetland before it was disturbed. The remaining portion of the soil profile can also be evaluated to determine if it matches hydric soil types in the area or displays hydric soil indicators.

C. Significant Alteration of the Original Soil Profile.

Activities that alter the soil profile include, but are not limited to, tilling for agricultural purposes or grading for construction. In situations where the profile has been recently and significantly altered, the indicators of wetland vegetation and hydrology will most likely be altered or removed. Given adequate time (i.e. several growing seasons), disturbed areas left fallow may have enough vegetative cover to allow evaluation of the vegetation parameter. In some situations, the hydrology of the area may not be significantly altered and visible evidence of wetland hydrology may still be interpretable regardless of the disturbance.

Hydric soil indicators are normally interpreted in the unaltered soil profile. Once disturbed, the soil profile may take many years to

redevelop to a point where hydrological conditions can be interpreted. However, soil surveys will indicate the typical profile of the soil in question and its rating as hydric or non-hydric soil. Field confirmation of the classification may be possible, and local NRCS offices may be able to provide advice about particular sites. In addition, there may be evidence of pre-disturbance conditions in the adjacent undisturbed soil profiles, assuming that both areas are the same soil series. In areas that the soil profile has been shallowly disturbed, for example in a plowed area, the soil should be examined for hydric soil indicators immediately below the disturbed zone.

D. Fill Material Has Been Placed on the Site.

Activities that may result in the deposit of material on top of the existing soil include, but are not limited to, spoil piles from dredging or mining operations, temporary storage during earth moving operations, natural deposition from flooding or mud slides, trash or other debris dumping, and construction grading. Depending on the depth and nature of the fill material, indicators of wetland vegetation and hydrology can be partially or completely altered or buried. Some trees and shrubs can survive minor quantities of fill at the base of the trunk; however, if the fill is deep enough, the vegetation will eventually die and be replaced by plant species better adapted to the new site conditions. In some cases where fill material is shallow and significant amounts of pre-disturbance vegetation remain, the vegetation parameter can be evaluated similar to before the fill. If the original vegetation is covered, the approaches discussed in Section A above may help in evaluating the vegetation prior to disturbance.

The pre-disturbance hydrology of the site can be determined if the depth of fill and underlying soil profile is investigated. Any type of fill will most likely influence the hydrology of the site. Historical data that show topography of the site may be helpful in determining the pre-disturbance hydrology. An attempt to dig a hole to reach the original soil should be made. Fill material will often be a different color or texture than the original soil when it comes from off-site. Decomposing vegetation, or an organic layer between the fill and the original soil, is often another sign that the original soil has been reached. If the original soil has not been altered then the soil should be examined for hydric soil indicators.

E. Hydrology Has Been Altered.

Changes to the hydrology of a site can occur from any of the human-induced or natural disturbances described in the above situations, as

well as a result of beaver dam construction, development of adjacent property, fill for road crossings, or other activities that raise water levels in one area and reduce water levels in other areas. Other activities such as seasonal droughts, drainage ditches, or agricultural drain tiles, or human-induced changes including fill that alters stream channel flow may change the original hydrology of a wetland towards that of a drier wetland or non-wetland area. Hydrologic conditions can also change significantly as a result of cyclical changes in Great Lakes or groundwater levels. In these situations, the user must consider whether the change is temporary or permanent.

In these situations, historical data and determinations of what normal circumstances might have been pre-disturbance can be used for wetland identifications. In some cases, visible evidence of wetland hydrology, such as watermarks or drift lines, may still be apparent. If adjacent undisturbed areas are in the same topographic position and influenced by similar hydrology, look for wetland indicators in those areas.

A hydric soil that has been recently or partially drained will still have characteristics within the soil profile that allow for evaluation of the hydrology parameter. If a soil has been drained sufficiently that the area will no longer support hydrophytic vegetation, determination of the pre-disturbance conditions can be based on visible evidence of wetland hydrology and/or hydric soil indicators. It is important to record a description of the evidence that indicates artificial drainage. On-site evidence of drained soils includes:

- The presence of ditches or canals of sufficient depth to lower the water table below the major portion of the root zone of the prevalent vegetation.
- The presence of **dikes**, **levees**, or similar structures that obstruct normal inundation of an area.
- The presence of an artificial system to promote subsurface drainage.
- The diversion of upland surface runoff from an area.

Atypical Situations include:

- *Alteration or Removal of Vegetation.*
- *Removal of the Original Soil.*
- *Significant Alteration of the Original Soil Profile.*
- *Fill Material Has Been Placed on the Site.*
- *Hydrology Has Been Altered.*

F. Problem Soils

Problem soils include:

- Wet Entisols. Entisols are relatively young soils that have little or no change from the original or parent material. They may lack certain hydric soil indicators, such as low chroma colors.

- Wet soils from red or low-chroma parent materials. These soils may not exhibit typical hydric soil colors.

- Wet Spodosols. Spodosols are soils with a spodic (E) horizon. Even non-hydric Spodosols have low-chroma colors in the E horizon immediately below the A horizon. Use of the hydric soil indicators for sandy soils may be helpful.

- Wet Mollisols. Mollisols are soils with a mollic epipedon, a dark surface horizon with high base saturation. Even non-hydric Mollisols can have low-chroma matrix colors "immediately below the A-horizon or 10 inches (whichever is shallower)." The color is due to organic matter accumulation rather than reduction. Ten inches may not be sufficient to get below the thick A horizon. Hydric mollisols can often be recognized by landscape position, gray colors immediately below the mollic epipedon (even if deeper than 10 inches), and/or distinct or prominent redox concentrations in the mollic epipedon.

- Stony, gravel, or sandy soils. Hydric soil indicators, and sometimes visible evidence of hydrology, may be difficult to identify in these areas. This problem soil may be found in old gravel extraction pits, as well as interdunal wetlands, wet prairies, and other important rare wetland types.

In cases where visible evidence of hydrology is not apparent and the area has problem soils, both the hydric soil indicators from Chapter 4 and the Field Indicators of Hydric Soils in the United States provided in Appendix E may be used. If possible, the user should seek local NRCS advice. In some problem soil situations, however, the wetland vegetation parameter may need to be the primary basis for determining wetland and non-wetland boundaries.

G. Bedrock

Not all hydric soil indicators listed in Chapter 4 can be applied to areas with organic soil layers over bedrock. Thus, the MDEQ uses additional soil features as indicators of hydric soils over bedrock, including:

- High organic matter content in the surface horizon. Prolonged inundation or saturation creates anaerobic conditions that greatly reduce oxidation of organic matter. Organic matter of significant depths tends to accumulate above the bedrock layer.

- Organic sediment deposits on fractured bedrock. Organic matter is moved downward through the fractured rock material below the organic layer. The result is often a discoloration of the fractured material which, when checked for color, may indicate anaerobic conditions. Care should be taken to distinguish between the color of the parent material and the color changes as a result of

hydrologic processes. Color of the parent material does not indicate hydrologic conditions.

H. Other Problem Areas

Common problem areas in Michigan include:

- Wetlands which occur on slopes. These areas are rarely flooded, so visible evidence of hydrology is difficult to identify. However, downslope groundwater movement keeps the soil saturated for a sufficient portion of the growing season to produce anaerobic soil conditions and hydrophytic vegetation.

- Seasonal wetlands. These depressional areas can have indicators of wetland hydrology and wetland vegetation in the wetter portion of the growing season, but lack indicators of wetland hydrology and/or wetland vegetation during the drier portion of the growing season (or throughout a particularly dry year). This is often due to invasion of upland annuals into the wetland during the dry period. In other cases, including prairie pothole and vernal pond systems, seasonal wetlands are used as lawn areas or as agricultural fields which can make evaluations more difficult. Landscape position, watermarks, soil characteristics, and/or persistent plant remains can often help delineate the wetland boundaries in this type of problem area.

Problem Areas include:

- *Problem Soils (Wet Entisols, Wet soils from red or low-chroma parent materials, Wet Spodosols, Wet Mollisols, and Stony, gravel or sandy soils).*
- *Bedrock.*
- *Wetlands which occur on slopes.*
- *Seasonal wetlands.*

The user of this manual should take care during on-site evaluations so that the above areas are identified as potential wetland. A determination on whether the area is a wetland in accordance with Part 303 should be based on whether wetland indicators are normally present during a portion of the growing season, even if they are not evident during the on-site visit.