WETLAND IDENTIFICATION AND DELINEATION MANUAL

VOLUME II

FIELD METHODOLOGY

by

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PREFACE

According to Corps of Engineers and Environmental Protection Agency (EPA) regulations (33 CFR Section 328.3 and 40 CFR Section 230.3, respectively), wetlands are ". . . areas that are inundated or saturated with surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." Although this definition has been in effect since 1977, the development of formal guidance for implementing it has been slow, despite the fact that such guidance could help assure regional and national consistency in making wetland jurisdictional determinations. Moreover, a consistent, repeatable operational methodology for determining the presence and boundaries of wetlands as defined under the federal regulations cited above would alleviate some concerns of the regulated public and various private interest groups; it would also substantially reduce interagency disputes over wetland jurisdictional determinations. Therefore, this Wetland Identification and Delineation Manual was developed to address the need for operational jurisdictional guidance.

The basic rationale behind EPA's wetland jurisdictional approach was initially conceived in 1980 with the issuance of interim guidance for identifying wetlands under the 404 program (Environmental Protection Agency, 1980). In 1983 the rationale was expanded and a draft jurisdictional approach was developed consistent with the revised rationale. EPA distributed the 1983 draft rationale and approach to about forty potential peer reviewers. Because the responses were, for the most part, favorable, further revisions were made and a second draft was circulated to about sixty potential peer reviewers in 1984. Individuals receiving the drafts for review were associated with federal, state, and regional governmental agencies, academic institutions, consulting firms, and private environmental organizations; they represented a wide range of wetland technical expertise. The 1984 draft also went through EPA regional review, as well as formal interagency review by the U.S. Fish

and Wildlife Service, Corps of Engineers, National Marine Fisheries Service, and Soil Conservation Service. Based upon the 1984 peer review comments, the comments from the federal agencies, and EPA field testing over the last few years in bottomland hardwoods, pocosins, and East Coast marshes and swamps, the document was further developed into this 2-volume Wetland Identification and Delineation Manual. Volume I presents EPA's rationale on wetland jurisdiction, elaborates on the three wetland parameters generally considered when making wetland jurisdictional determinations, and presents an overview of the jurisdictional approaches developed by EPA in Volume II, the Field Methodology. Thus, it lays the foundation for the "simple" and "detailed" jurisdictional approaches presented in Volume II.

This Wetland Identification and Delineation Manual has been approved by EPA as an interim final document to be field tested by EPA regional and headquarters' personnel for a one year period. During this same review period, the Corps of Engineers has agreed to conduct field review of its wetland delineation manual (Environmental Laboratory, 1987). After the respective reviews, both agencies have agreed to meet, consider the comments received, and attempt to merge the two documents into one 404 wetland jurisdictional methodology for use by both agencies.

The author truly appreciates the efforts of the many peer reviewers who commented on one or both of the drafts that preceded this interim final document, including Greg Auble, Barbara Bedford, Virginia Carter, Harold Cassell, Lew Cowardin, Bill Davis, Dave Davis, Doug Davis, Frank Dawson, Mike Gantt, Mike Gilbert, Frank Golet, Dave Hardin, Robin Hart, John Hefner, Wayne Klockner, Bill Kruczynski, Lyndon Lee, Dick Macomber, Ken Metsler, John Organ, Greg Peck, Don Reed, Charlie Rhodes, Charlie Roman, Dana Sanders, Bill Sanville, Hank Sather, Jim Schmid, Joe Shisler, Pat Stuber, Carl Thomas, Doug Thompson, Ralph Tiner, Fred Weinmann, and Bill Wilen. Their many constructive comments and recommendations have been very helpful in refining this document. The author also appreciates the help of EPA's Regional Bottomland Hardwood Wetland Delineation Review Team (Tom Glatzel, Lyndon Lee, Randy Pomponio, Susan Ray, Charlie Rhodes,

Bill Sipple, Norm Thomas, and Tom Welborn) in field testing the basic rationale underlying the Field Methodology at a number of bottomland hardwood sites in 1986. The vegetation sampling protocol in the Field Methodology is to a large extent an outgrowth of that effort. Helpful review and administrative guidance was provided by Suzanne Schwartz, John Meagher, and Dave Davis of EPA's Office of Wetlands Protection. Comments and suggestions received during the federal interagency review were also instrumental in further refining the manual. In fact, in addressing the soil and hydrology parameters in this manual, the author relied heavily upon materials already developed by the Corps of Engineers in their wetland delineation manual cited above. Stan Franczak ably handled the huge typing load associated with the interim final, as well as the earlier drafts.

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SECTION I: INTRODUCTION

This Field Methodology is intended for use by Environmental Protection Agency field personnel in making wetland jurisdictional determinations. It was developed as a separate volume to facilitate its use in the field. The Field Methodology includes four sections and five appendices. Section I is an introduction which indicates the purpose of the document, outlines its contents, and explains its relationship to Volume I (Rationale, Wetland Parameters, and Overview of Jurisdictional Approaches). Section II addresses scoping and preliminary data gathering, two steps that are generally necessary prior to making jurisdictional determinations. A simple approach for making more or less routine jurisdictional determinations is outlined in Section III. A detailed approach for making jurisdictional determinations for large and/or controversial sites or projects is presented in Section IV. Appendix A is a Jurisdictional Decision Flow Chart; Appendix B is a Jurisdictional Decision Diagnostic Key. Both of these appendices are tools that will expedite and conceptually guide decisions about jurisdiction for vegetation units and sample plots once the field data have been collected. They closely track each other and will lead to the same conclusions; one's preference for use will be solely a matter of choice. Some field investigators may find the flow chart easier to use than the key, especially if they have had limited experience using diagnostic keys. Appendices C and D include field data forms for the simple and detailed approaches, respectively. Lists of necessary and optional equipment for both approaches are included in Appendix E.

Volume II should not be utilized in isolation from Volume I. Users should first become very familiar with the rationale, wetland parameters, and overview of the jurisdictional approaches presented in Volume I. It is also very important to thoroughly review the glossary in Volume I, since a good understanding of the terms used in the methodology is imperative. Thus, Volume I should be thought of, in part, as a prerequisite training document on the use of Volume II, in that an understanding of the former will help assure the proper use of the jurisdictional approaches presented in the latter.

SECTION II: SCOPING AND PRELIMINARY DATA GATHERING

A. General

Prior to making a wetland jurisdictional determination, it is generally necessary to gather preliminary data on the site or project and scope out the task. This will allow the field investigator to determine whether the simple or detailed jurisdictional approach is appropriate.

B. Steps for Preliminary Data Gathering and Scoping

1. Obtain and review any aerial photographs, vegetation maps, wetland maps, topographic maps, soil surveys, technical reports, or other pertinent information depicting and/or describing the site.

2. Estimate the size of the site.

3. Determine the site's geomorphological setting (e.g., floodplain, isolated depression, ridge and swale complex) and its habitat or vegetative complexity (i.e., the range of habitat or vegetation types).

4. Determine whether a permit situation or an enforcement situation is involved.

5. If necessary, do a field reconnaissance to complete Steps 2-4.

6. Based upon Steps 1-5, determine whether the simple jurisdictional approach (Section III) or the detailed jurisdictional approach (Section IV) is appropriate. This step assumes that a field investigator is already familiar with the simple and detailed jurisdictional approaches and the types of projects or sites that would generally be applicable to them as described in Sections III A and IV A of this Field Methodology.

SECTION III: SIMPLE JURISDICTIONAL APPROACH

A. General

The simple jurisdictional approach is generally applicable to sites or projects that are small in extent (e.g., a narrow fringe marsh along a shoreline or a small depressional wetland) and/or non-controversial in terms of public or private interests, ecological significance, potential jurisdictional challenges, enforcement status, etc. Discretion must be exercised in deciding whether a project is simple, however, since even small sites may be so vegetatively complex to require detailed examination; larger sites may be so uniform to allow for a simple examination. Significantly altered sites and controversial sites, particularly enforcement situations, will generally entail conducting a detailed field examination regardless of size.

The simple jurisdictional approach involves inspecting the majority of the site and making ocular vegetation estimates for the vegetation units as a whole (as opposed to detailed sampling along transects), and when appropriate, examining soil and hydrologic conditions as well. Because fourteen steps are potentially involved in the simple jurisdictional approach, on the surface it appears more complex than it really is. Actually, many jurisdictional determinations can be made without going through all fourteen steps. The simple jurisdictional approach will generally be applied only to smaller sites, which probably will have only one or at most, a few vegetation units. Furthermore, a field investigator will only have to proceed through Step 6 for any vegetation units dominated by one or more obligate plant species, assuming there is no evidence of significant hydrologic modifications. And if a vegetation unit is comprised of only herbaceous plants, which is the situation with most marshes, dominants will have to be determined just for those species. Thus, jurisdictional determinations for small herbaceous wetlands, especially those with dominant obligate wetland species, should be rather easy to conduct.

All sites or projects for which the simple jurisdictional approach is not appropriate, should be examined using the detailed jurisdictional approach (Section IV). Field data forms are included in Appendix C. A list of necessary and optional equipment is given in Appendix E.

B. Steps for Implementing Simple Jurisdictional Approach

1. Decide how the jurisdictional determination will be presented (e.g., ground delineation, delineation on aerial photographs or topographic maps, or written description in a technical report). Proceed to Step 2.

2. Inspect the entire site and horizontally stratify it into different vegetation units either mentally, or on an aerial photograph or a topographic map. Proceed to Step 3.

3. Determine the dominant plant species for each vegetation unit.

   a. Visually estimate the percent areal cover (by species) of the graminoids, forbs, ferns, fern allies, bryophytes, woody seedlings, and non-woody vines in the herbaceous understory and record it on Data Form C-1. This should be done by estimating the area of the vegetation unit covered by the foliage of a given plant species projected onto the ground.

   b. Indicate the cover class into which each herbaceous species falls and its corresponding midpoint. The cover classes (and midpoints) are: T=<1% (none); 1=1-5% (3.0); 2=6-15% (10.5); 3=16-25% (20.5); 4=26-50% (38.0); 5=51-75% (63.0); 6=76-95% (85.5); 7=96-100% (98.0).

   c. Rank the herbaceous species according to midpoints. If two or more species have the same midpoints, use the actual recorded percent areal cover as a tie-breaker. If two or more species have the same midpoints and actual recorded percent areal cover, equally rank them.

   d. Sum the midpoint values of all herbaceous species.

   e. Multiply the total midpoint values by 50%.

   f. Compile the cumulative total of the ranked species in the herbaceous understory until 50% of the sum of the midpoints for all herbaceous species is reached or initially exceeded. All species contributing cover to the cumulative 50% threshold should be considered dominants. If two or more of these species have the same midpoints and actual recorded areal cover, consider them all dominants.

g. Visually estimate the percent areal cover of the shrub species and record it on Data Form C-2. Follow the same procedure used for herbaceous species in Step 3a-f (page 9).

h. Visually estimate the percent areal cover of the woody vines (other than seedlings) independent of the strata in which they occur and record it on Data Form C-2. Follow the same procedure used for herbaceous species in Step 3a-f (page 9).

i. Visually estimate the percent areal cover of the saplings and record it on Data Form C-3. Follow the same procedure used for herbacecous species in Step 3a-f (page 9).

j. Visually estimate the relative basal area of the tree species (exclusive of saplings) and record it on Data Form C-3. This should be done by considering both the size and number of individuals of a tree species and comparing that species to other tree species in the vegetation unit. Note: The total relative basal area for all the species in a vegetation unit will always equal 100%.

k. Rank the trees species by relative basal area.

l. Compile the cumulative sum of the ranked tree species until 50% of the total relative basal area for all tree species is reached or initially exceeded. All species contributing relative basal area to the cumulative 50% threshold should be considered dominants. If the threshold is reached by two or more species with equal relative basal area values, consider them all dominants, along with any higher ranking species. If all the species have equal relative basal area values, consider them all dominants. Proceed to Step 4.

4. Determine the indicator status of the dominant plant species in each vegetation unit using the appropriate regional list of plants that occur in wetlands. Proceed to Step 5.

5. Determine whether the vegetation units have been hydrologically modified (e.g., whether a vegetation unit with dominant obligate wetland species has been ditched or a vegetation unit with dominant obligate upland species has been impounded).

a. In the presence of one or more dominant obligate wetland species or one or more dominant obligate upland species in a vegetation unit, and in the absence of hydrological modifications, a jurisdictional determination can be made without further consideration of hydrology. If hydrological modifications are evident, however, the significance of these modifications must be determined before making the jurisdictional determination. Proceed to Step 6.

b. In the presence of only dominant facultative species (i.e., facultative wetland, straight facultative, and/or facultative upland) in a vegetation unit, proceed to step 7.

c. If both situations exist at a site, steps 6 and 7 must be completed.

6. Using the data summary sheets (Data Form C-5) and either the Jurisdictional Decision Flow Chart (Appendix A) or the Jurisdictional Decision Diagnostic Key (Appendix B), decide whether the vegetation units supporting one or more dominant obligate wetland species or one or more dominant obligate upland species, are wetland units. Note: In a situation involving multiple vertical strata in which the only dominants in a given stratum occur sparsely because the total percent areal cover for that stratum is low, more weight should be given to the dominants in any strata that have substantially greater overall percent areal cover. For example, if a vegetation unit in a herbaceous wetland (e.g., a marsh) has one shrub species represented by a few scattered individuals, the shrub species would be considered the dominant shrub species present and thus a dominant under this methodology. However, that shrub species should be given relatively little weight in comparison with the dominant herbaceous species, which are obviously more abundant overall. This can be particularly significant if the shrub species is either an obligate wetland species or an obligate upland species and its indicator status is inconsistent with the indicator status of the herbaceous species that are more abundant overall (i.e., both obligate wetland species and obligate upland species occur as dominants in the same vegetation unit). This situation would usually result from anomalous conditions (e.g., man-induced disturbance), natural disturbance, or the presence of microsites. Proceed to Step 14.

7. If the dominant plant species in any vegetation units are all facultative (i.e., facultative wetland, straight facultative, and/or facultative upland), examine the soils and hydrology as indicated in Steps 8-13.

8. Check the appropriate county soil survey to determine the soil series or phases for the vegetation units containing only facultative species. Proceed to Step 9.

9. Check the national list of hydric soils or the pertinent state hydric soils list to determine whether the soil series or phases for the vegetation units are considered hydric. Proceed to Step 10.

10. Dig soil pits in the vegetation units and examine the soil profiles to confirm whether they fit the soil series or phase descriptions in the soil survey. This is necessary due to the possibility of inclusions of other soil series or phases and to check for possible mapping errors. Also some mapping units may be hydric (e.g., tidal marsh) but will not be on the list of hydric soils because they do not yet have series names for the area in question. Proceed to Step 11.

11. Determine whether field indicators of hydric soil conditions exist in the vegetation units and record them on Data Form C-4. The presence of one or more of the following indicators is indicative of the presence of hydric soils. Note: The soil examination can be terminated when a hydric soil indicator is encountered.

    a. Organic soils (Histosols) or mineral soils with a histic epipedon.

    b. Gleying or mottling with a soil matrix chroma of < 2 in mineral soils. Using Munsel Soil Color Charts, record the soil matrix color and mottle color (i.e., the hue, value, and chroma) of a soil sample by matching the sample with the appropriate color chips. Note: The soil should be moistened if it is dry when examined. For example, a soil sample with a hue of 10YR, a value of 6, and a chroma of 2 would be recorded as 10YR6/2. Also determine whether the soil is gleyed by matching the soil sample with the color chips on the gley page of Munsel Soil Color Charts. These samples should be taken at approximately a 25 centimeter (10 inch) depth, or immediately below the A horizon, whichever is higher in the soil profile. Apply the following diagnostic soil key to confirm whether the colors in the soil matrix are indicative of hydric soil conditions:

1a. Soil is mottled:

2a. Matrix is gleyed.....hydric.

2b. Matrix is not gleyed:

3a. Chroma of matrix is ≤ 2.....hydric.

3b. Chroma of matrix is > 2.....not hydric.

1b. Soil is not mottled:

4a. Matrix is gleyed.....hydric.

4b. Matrix is not gleyed and chroma is ≤ 1.....hydric.

4c. Matrix is not gleyed and chroma is > 1...not hydric.

Because of their high organic content, some mineral soils (e.g., Mollisols) may not meet these hydric criteria. However, in such dark (black) soils, the presence of gray mottles within 25 centimeters (10 inches) of soil surface is considered indicative of hydric conditions. For the most part in the United States, Mollisols are mainly the dark colored, base-rich soils of the Prairie Region. Because of the color of the parent material (e.g. the red soils of the Red River Valley) some soils will not meet any of these color characteristics. Soil color is also generally not a good indicator in sandy soils (e.g., barrier islands). When problematic parent materials or sandy soils are encountered, hydric soil indicators other than color may have to be relied on in the field.

c. Sulfidic materials. The smell of hydrogen sulfide (rotten egg odor) is indicative of the presence of sulfidic materials. Hydrogen sulfide forms under extreme reducing conditions associated with prolonged soil saturation or inundation.

d. Iron or manganese concretions. These are usually black or dark brown and occur as small aggregates near the soil surface.

e. Ferrous iron. This is chemically reduced iron, the presence of which can be determined using a colorimetric field test kit.

f. Other organic materials. In sandy soils (e.g., on barrier islands) look for any of the indicators listed below.

(1) A layer of organic matter above the mineral surface or high organic matter content in the surface horizon. The mineral surface layer generally appears darker than the mineral

material immediately below it due to organic matter interspersed among or adhering to sand particles. Note: Because organic matter also accumulates in upland soils, in some instances it may be difficult to distinguish a surface organic layer associated with a wetland site from litter and duff associated with an upland site unless the plant species composition of the organic material is determined.

(2) A thin organic layer of hardened soil (i.e., an organic pan or spodic horizon) at 30-75 centimeter (12-30 inch) depths.

(3) Dark vertical streaking in subsurface horizons due to the downward movement of organic materials from the surface. When the soil from a vertical streak is rubbed between the fingers, a dark stain will result.

Proceed to Step 12.

12. Make hydrologic observations in the vegetation units and record them on Data Form C-4.

a. Record any evidence of surface inundation, such as drift lines, water marks, sediment deposition, standing water, surface scouring, drainage patterns, etc.

b. After sufficient time has passed to allow water to drain into the soil pit dug in Step 10, examine the pit for evidence of standing water. Note: Because of the capillary zone, the soil will be saturated higher in the soil profile than the depth of standing water in the soil pit.

c. Record any plant species that have morphological adaptations (e.g., buttressed tree bases and adventitious roots) to saturated soil conditions or surface inundation.

d. When necessary, additional information on hydrology should be obtained from recorded sources, such as stream gauge data, tide gauge data, flood predictions, soil surveys, and the national or state lists of hydric soils.

Note: It is not necessary to directly demonstrate that wetland hydrology is present. It is only necessary to show that the soil or its surface are at least periodically saturated or inundated, respectively. Specifically, with a vegetation unit dominated by one or more dominant obligate wetland plant species, it is necessary to show either (1) that there have been no significant hydrologic modifications or (2) that there is one or more hydrologic indicators

at least periodically present during the growing season. With a vegetation unit dominated by only facultative species (i.e., facultative wetland, straight facultative, and/or facultative upland) occurring on a hydric soil, it is necessary to demonstrate that there is one or more hydrologic indicators at least periodically present during the growing season. Indicators of surface inundation and the presence of saturated soils in the major portion of the root zone are considered hydrology indicators. Plant morphological adaptations are also considered hydrology indicators, unless the vegetation unit has been significantly altered hydrologically. Other hydrology indicators include the various recorded sources listed in Step 12d (page 14). Proceed to Step 13.

13. Using the data summary sheets (Data Form C-5) and either the Jurisdictional Decision Flow Chart (Appendix A) or the Jurisdictional Decision Diagnostic Key (Appendix B), decide whether the vegetation units dominated by facultative species (i.e., facultative wetland, straight facultative and/or facultative upland) are wetland units. See the note in Step 6 (page 11) and proceed to Step 14.

14. Indicate the extent of wetlands at the site either on a topographic map or aerial photograph, in a written description, or by a ground delineation (or any combination of the above). The geographic extent of wetlands at the site will coincide with the distribution of the various wetland vegetation units determined in Steps 6 and/or 13, as applicable. Therefore, any upland-wetland boundaries at the site will coincide with the boundaries between the upland vegetation units and the wetland vegetation units that are present.

SECTION IV: DETAILED JURISDICTIONAL APPROACH

A. General

The detailed jurisdictional approach is generally applicable to sites or projects that are large (e.g., an extensive riverine bottomland hardwood tract or a large depressional wetland) and/or controversial in terms of public or private interests, ecological significance, potential jurisdictional challenges, enforcement status, etc. In some instances, the detailed jurisdictional approach might also be appropriate for smaller sites or projects, especially those with complex vegetation. Likewise, significantly altered sites, as well as enforcement situations, will generally entail conducting a detailed field examination regardless of size. Under some circumstances, such as enforcement cases involving filled wetlands, it may be necessary to rely on alternative approaches. One option is photointerpretation of vegetation units on pre-project aerial photographs; another is peat analysis (Sipple, 1985; see Section V of Volume I for full citation).

The detailed jurisdictional approach involves standard quantitative vegetation sampling along transects and frequently an examination of the soils and hydrology as well. Field data forms are included in Appendix D. A list of necessary and optional equipment is given in Appendix E.

B. Steps for Implementing Detailed Jurisdictional Approach

1. Decide how the jurisdictional determination will be presented (e.g., ground delineation, delineation on aerial photographs or topographic maps, written description in a technical report). Proceed to Step 2.

2. If a reconnaissance survey was not done in the preliminary data gathering and scoping effort, it generally should be done here. Proceed to Step 3.

3. Horizontally stratify the site into different vegetation units. The approach used to stratify the site will be contingent upon how the jurisdictional determination will be presented. If the determination is to be presented using aerial photographs, then vegetation units should be tentatively delineated directly on the photographs or on photographic overlays prior to going into the field. These vegetation units should then be refined as appropriate in the field. If a ground delineation is planned, vegetation units can also be shown on aerial photographs or topographic maps, but the upland-wetland boundary will also have to be delineated on the ground using stakes or flagging tape. Proceed to Step 4.

4. Establish a baseline or baselines from which transects will extend into the site. A baseline might be the boundary of the site, a highway or unimproved road, or some other evident lineal feature. It should extend more or less parallel to any major watercourse at the site and/or perpendicular to the topographic gradient. Delineate the baseline on an aerial photograph or a topographic map and record its length and compass heading. Proceed to Step 5.

5. Establish transect locations. The number of transects necessary to adequately characterize a site will vary with the size of the site and the complexity of the vegetation. It is generally best to divide the baseline into segments (e.g., 100 foot, 500 foot, or 1000 foot intervals depending on the size of the site) and randomly select a point within each segment to begin a transect. Be sure, however, that each vegetation unit is included within at least one transect. Proceed to Step 6.

6. Establish each transect along a compass heading perpendicular to the baseline. Transects should extend far enough into the site to adequately characterize all of the vegetation units along the heading.

7. Following the compass heading, walk each transect to a point at which all of the vegetation units along the transect have been encountered. Frequently, this will be to the river or stream if the site is a floodplain. In the process, make any necessary adjustments to the tentatively delineated vegetation units or establish such units if they were not delineated in Step 3. Also record the length of the transects by either pacing or measuring. If aerial photographs or topographic maps are used, delineate the transects on them. Proceed to Step 8.

8. After a transect has been established and walked to its terminus, it should be traversed again in the opposite direction to do the quantitative sampling. The number of sample plots necessary will depend upon the length of the transect and the complexity of the vegetation. At least one 0.1 acre (0.04 hectare) circular sample plot should be established in each vegetation unit along a transect. Additional sample plots should be established within the unit at 91.5 meters (300 foot) intervals or sooner if a different vegetation unit is encountered. With exceptionally large vegetation units, however, a sampling interval larger than 91.5 meters may be more appropriate. Thus, a field investigator should exercise discretion in establishing sampling intervals. Sample plots should be shown on either the aerial photographs or topographic maps, or their distances from the baseline should be recorded in the absence of photographs or maps. Proceed to Step 9.

9. Select a point along the transect in the ultimate vegetation unit to center the first 0.1 acre sample plot. Flag the center of the plot and the four cardinal compass points of the perimeter of the circular plot. This will divide the plot into four quadrants, and the plot will have a 10.9 meter (35.8 foot) radius. Proceed to Step 10.

10. Determine the dominant plant species for the sample plot. There are a number of ways to effectively sample vegetation. Many procedures will produce essentially the same results and some procedures may be appropriate for certain vegetation types but not for others. The following procedure has proven effective in the field, but may have to be adjusted as appropriate depending upon site conditions and the nature of the vegetation.

    a. Randomly toss two $0.1m^2$ quadrat frames into the herbaceous understory of each quadrant of the 0.1 acre plot. On Data Form D-1, record the percent areal cover of each plant species (graminoids, forbs, ferns, fern allies, bryophytes, woody seedlings, and herbaceous vines) occurring soley within or extending into each quadrat frame when viewed from directly above it.

    b. Construct a species area curve to determine whether the eight $0.1m^2$ quadrats are sufficient to adequately survey the herbaceous understory. The number of quadrats necessary will correspond to the point on the curve where it first levels off (and remains essentially level), indicating that the quadrats after that point added few if any additional species. If eight $0.1m^2$ quadrats are not sufficient, do additional quadrats in increments of four (one in each quadrant) until the necessary number of quadrats is reached.

    c. For each species, sum the percent areal cover for all $0.1m^2$ quadrats and divide the total by the total number of quadrats sampled, which will give an average percent areal cover by species.

    d. Rank the species in the herbaceous understory by average percent areal cover. If two or more species have the same average percent areal cover, equally rank them.

    e. Sum the average percent areal cover for all the species in the herbaceous understory.

    f. Multiply the total average percent areal cover by 50%.

    g. Compile the cumulative sum of the ranked species in the herbaceous understory until 50% of the total average percent areal cover for all species is reached or initially exceeded. All species contributing cover to the cumulative 50% threshold should be considered dominants. If the threshold is reached by two or more species with equal average percent areal cover values, consider them all dominants, along with any higher ranking species. If all species have equal average percent areal cover values, consider them all dominants.

h. Determine the percent areal cover of the shrubs within the entire 0.1 acre sample plot and record the data on Data Form D-2. This should be done by traversing the plot a number of times, listing the shrub species present, and estimating the percent areal cover by shrub species for the entire plot.

i. Indicate the cover class into which each shrub species falls and its corresponding midpoint.

j. Rank the shrub species according to midpoints. If two or more species have the same midpoints, use the actual recorded percent areal cover as the tie-breaker. If two or more species have the same midpoints and actual recorded percent areal cover, equally rank them.

k. Sum the midpoint values of all shrub species.

l. Multiply the total midpoint values by 50%.

m. Compile the cumulative total of the ranked shrub species until 50% of the sum of the midpoints for all shrub species is reached or initially exceeded. All species contributing cover to the cumulative 50% threshold should be considered dominants. If two or more of these species have the same midpoints and actual recorded areal cover, consider them all dominants.

n. Determine the percent areal cover of the woody vine species (other than seedlings) within the entire 0.1 acre sample plot and record the data on Data Form D-2. This should be done by traversing the plot a number of times, listing the woody vine species present, and estimating the percent areal cover by species for the entire plot independent of the strata in which they occur. Follow the same procedure used for shrubs in Step 10i-m (page 19).

o. Determine the percent areal cover of the saplings with the entire 0.1 acre sample plot and record the data on Data Form D-3. This should be done by traversing the plot a number of times, listing the sapling species present, and estimating the percent areal cover by species for the entire plot. Follow the same procedure used for shrubs in Step 10i-m (page 19).

p. Determine the basal area of the trees (exclusive of saplings) using the point sampling (Bitterlich) system (Avery, 1967; Dillworth & Bell, 1978) and record the data on Data Form D-3. Since the Bitterlich system is a plotless method, both trees within and beyond the 0.1 acre plot should be tallied. This should be done using either a prism or an angle gauge. Note: An alternative plotless method for sampling trees is the point quarter method.

(1) Hold the prism or angle gauge directly over the center of the 0.1 acre plot and record all individual trees by species "sighted in" according to the prism or angle gauge while rotating 360 degrees in one direction. In the process, also measure the basal area of each individual tree using a basal area tape. If a basal area tape is not available, determine the diameter of each individual tree with a diameter tape and compute its basal area by the formula $A = \frac{\pi d^2}{4}$.

(2) Sum the individual tree basal areas by species.

(3) Rank the tree species by their basal areas.

(4) Sum the basal areas of all tree species.

(5) Multiply the summed (total) basal area by 50%.

(6) Compile the cumulative sum of the ranked tree species until 50% of the total basal area for all tree species is reached or initially exceeded. All species contributing cover to the cumulative 50% threshold should be considered dominants. If the threshold is reached by two or more species with equal basal area values, consider them all dominants, along with any higher ranking species. If all species have equal basal area values, consider them all dominants. If it is felt that a representative sample of the trees has not been obtained by the one Bitterlich tally, additional tallies should be obtained by offsetting perpendicularly from the center point of the plot in alternate directions and taking additional tallies. Otherwise, proceed to step 11.

11. Determine the indicator status of the dominant plant species in the vegetation unit using the appropriate regional list of plants that occur in wetlands. Proceed to Step 12.

12. Determine whether the vegetation unit has been hydrologically modified (e.g., whether a vegetation unit with dominant obligate wetland plants has been ditched or a vegetation unit with dominant obligate upland plants has been impounded).

    a. In the presence of one or more dominant obligate wetland species or one or more dominant obligate upland species in a vegetation unit and in the absence of hydrological modifications, a jurisdictional determination can be made without further consideration of hydrology. If hydrological modifications are evident, the significance of these modifications must be determined before making the jurisdictional determination. Proceed to Step 13.

    b. In the presence of only dominant facultative species (i.e., facultative wetland, straight facultative, and/or facultative upland) in a vegetation unit, proceed to step 14.

    c. If both situations exist at the site, steps 13 and 14 must be completed.

13. Using the sample plot data summary sheet (Data Form D-5) and either the Jurisdictional Decision Flow Chart (Appendix A) or the Jurisdictional Decision Diagnostic Key (Appendix B), decide whether the vegetation unit supporting one or more dominant obligate wetland or one or more dominant obligate upland species, is a wetland unit. Note: In a multiple-strata setting in which the only dominants in a given stratum occur sparsely in the sample plot because the total percent area cover for that stratum in that plot is low, more weight should be given to the dominants in any strata that have substantially greater overall percent areal cover in the sample plot. For example, if a sample plot in a herbaceous wetland (e.g., a marsh) has one shrub species represented by a few scattered individuals, the shrub species would be considered the dominant shrub species present and thus a dominant under this methodology. However, it should be given relatively little weight in comparison with the dominant herbaceous species, which are obviously more abundant overall. This can be particularly significant if the shrub species is either an obligate wetland species or an obligate upland species and its indicator status is inconsistent with the indicator status of the herbaceous species that are more abundant overall (i.e., both obligate wetland

species and obligate upland species occur as dominants in the same plot). This situation would usually result from anomalous conditions (e.g., man-induced disturbance) or the presence of microsites. A second potential sampling problem may also occur. If a single large tree is recorded in a sample plot, it may be determined to be dominant for that plot under this methodology. Similarly to the example above, this species may have an indicator status that is inconsistent with the dominants in the other strata. Thus, when this situation is encountered, it is important to determine whether the individual tree is occurring under either anomalous conditions or on a microsite; in either case, it should be given relatively little weight in comparison with any overall more abundant species in the vegetation unit. Proceed to Step 21.

14. If the dominant plant species in the vegetation unit are all facultative (i.e., facultative wetland, straight facultative, and/or facultative upland), examine the soils and hydrology as indicated in Steps 15-19.

15. Check the appropriate county soil survey to determine the soil series or phases for the vegetation unit containing only facultative species. Proceed to Step 16.

16. Check the national list of hydric soils or the pertinent state hydric soils list to determine whether the soil series or phases for the vegetation unit are considered hydric. Proceed to Step 17.

17. Dig a soil pit near the center of the 0.1 acre sample plot and examine the soil profile in the vegetation unit to confirm whether it fits the soil series or phase descriptions in the soil survey. This is necessary due to the possibility of inclusions of other soil series or phases and to check for possible mapping errors. Also, some mapping units may be hydric (e.g., tidal marsh) but will not be on the list of hydric soils because they do not yet have series names for the area in question. If it is felt that

supplemental soil sampling should be done to adequately characterize the soils at the plot, additional samples can be readily obtained by randomly sampling in each quadrant with an Oakfield soil probe or similar device. Proceed to Step 18.

18. Determine whether field indicators of hydric soil conditions exist in the soil pits and record the data on Data Form D-4. The presence of one or more of the following indicators is indicative of the presence of hydric soils. Note: The soil examination can be terminated when a hydric soil indicator is encountered.

    a. Organic soils (Histosols) or mineral soils with a histic epipedon.

    b. Gleying or mottling with a soil matrix chroma of < 2 in mineral soils. Using Munsel Soil Color Charts, record the soil matrix color and mottle color (i.e., the hue, value, and chroma) of a soil sample by matching the sample with the appropriate color chips. Note: The soil should be moistened if it is dry when examined. For example, a soil sample with a hue of 10YR, a value of 6, and a chroma of 2 would be recorded as 10YR6/2. Also determine whether the soil is gleyed by matching the soil sample with the color chips on the gley page of Munsel Soil Color Charts. These samples should be taken at approximately a 25 centimeter (10 inch) depth or immediately below the A horizon, whichever is higher in the soil profile. Apply the following diagnostic soil key to confirm whether the colors in the soil matrix are indicative of hydric soil conditions:

        1a. Soil is mottled:

            2a. Matrix is gleyed.....hydric.

            2b. Matrix is not gleyed

                3a. Chroma of matrix is ≤ 2.....hydric.

                3b. Chroma of matrix is > 2.....not hydric.

        1b. Soil is not mottled:

            4a. Matrix is gleyed.....hydric.

            4b. Matrix is not gleyed and chroma is ≤ 1.....hydric.

            4c. Matrix is not gleyed and chroma is > 1...not hydric.

Because of their high organic content, some mineral soils (e.g., Mollisols) may not meet these hydric criteria. However, in such dark (black) soils, the presence of gray mottles within 25 centimeters (10 inches) of the soil surface is considered indicative of hydric conditions. For the most part, in the United States, Mollisols are mainly the dark colored, base-rich soils of the Prairie Region. Because of the color of the parent material (e.g., the red soil of the Red River Valley) some soils will not meet any of these color characteristics. Soil color is also generally not a good indicator in sandy soils (e.g., barrier islands). When problematic parent materials or sandy soils are encountered, hydric soil indicators other than color may have to be relied on in the field.

c. Sulfidic materials. The smell of hydrogen sulfide (rotten egg odor) is indicative of the presence of sulfidic materials. Hydrogen sulfide forms under extreme reducing conditions associated with prolonged soil saturation or inundation.

d. Iron or manganese concretions. These are usually black or dark brown and occur as small aggregates near the soil surface.

e. Ferrous iron. This is a chemically reduced iron, the presence of which can be determined by using a calorimetric field test kit.

f. Other organic materials. In sandy soils, look for any of the indicators listed below.

   (1) A layer of organic matter above the mineral surface or high organic matter in the surface horizon. The mineral surface layer generally appears darker than the mineral material immediately below it due to organic matter interspersed among or adhering to sand particles. Note: Because organic matter also accumulates in upland soils, in some instances it may be difficult to distinguish a surface organic layer associated with a wetland site from litter and duff associated with an upland site unless the plant species composition of the organic material is determined.

   (2) A thin organic layer of hardened soil (i.e., an organic pan or spodic horizon) at 30-75 centimeter (12-30 inch) depths.

   (3) Dark vertical streaking in subsurface horizons due to the downward movement of organic materials from the surface. When the soil from a vertical streak is rubbed between the fingers, a dark stain will result.

Proceed to Step 19.

19. Make hydrologic observations in the vegetation unit and record the data on Data Form D-4.

a. Traverse the 0.1 acre sample plot a number of times and record any evidence of surface inundation, such as drift lines, water marks, sediment deposition, standing water, surface scouring, drainage patterns, etc.

b. After sufficient time has passed to allow water to drain into the soil pit dug in Step 17, examine the pit for evidence of soil saturation. Note: Because of the capillary zone, the soil will be saturated higher in the profile than the standing water in the soil pit.

c. Record any plant species found that have morphological adaptations to saturated soil conditions or surface inundation.

d. When necessary, additional information on hydrology should be obtained from recorded sources, such as stream gauge data, tide gauge data, flood predictions, soil surveys, the national or state lists of hydric soils.

Note: It is not necessary to directly demonstrate that wetland hydrology is present. It is only necessary to show that the soil or its surface are at least periodically saturated or inundated, respectively. Specifically, with a vegetation unit dominated by one or more dominant obligate wetland plant species, it is necessary to show either (1) that there have been no significant hydrologic modifications or (2) that there is one or more hydrologic indicators at least periodically present during the growing season. With a vegetation unit dominated by only facultative species (i.e., facultative wetland, straight facultative, and/or facultative upland) occurring on a hydric soil, it is necessary to demonstrate that there is one or more hydrologic indicators at least periodically present during the growing season. Indicators of surface inundation and the presence of saturated soils in the major portion of the root zone are considered hydrology indicators. Plant morphological adaptations are also considered hydrology indicators, unless the vegetation unit has been significantly altered hydrologically. Other hydrology indicators include the various recorded sources listed in Step 19d (page 26). Proceed to Step 20.

20. Using the sample plot data summary sheet (Data Form D-5) and either the Jurisdictional Decision Flow Chart or the Jurisdictional Decision Diagnostic Key, decide whether the vegetation unit dominated by facultative species (i.e., facultative wetland, straight facultative and/or facultative upland) is a wetland unit. See the note in Step 13 (page 22) and proceed to step 21.

21. Proceed along the transect towards the baseline until another vegetation unit is encountered or 91.5 meters (300 feet), whichever comes first. Establish a second 0.1 acre sampling plot (plot two) at least 15.2 meters (50 feet) beyond the boundary of the new vegetation unit or at a distance 91.5 meters from the first plot if the same vegetation unit is encountered. Repeat the same procedures given in Steps 10-20. If the vegetation unit (including soils and topography) at the second plot is the same as the first, or if the second is different but they are either both wetlands or both uplands, proceed to Step 23. If the vegetation unit at the second plot is different and one of the units is upland and the other is wetland, then an upland-wetland boundary has been traversed. Proceed to Step 22.

22. Determine the upland-wetland boundary between the two plots.

    a. Move back along the transect at least 15.2 meters (50 feet) into what is obviously the vegetation unit encountered in the first sample plot. Repeat the same procedures given in Steps 10-20 for this sample plot (plot three).

    b. Look for a change in vegetation or topography between sample plots two and three. Information from the data forms for plots two and three will provide cues as to which parameters have changed. In a forested area, this will frequently involve changes in the shrubs or herbaceous plants. If there is a vegetation or topographic change or break, sample the soil at that point along the transect to see if it is hydric. If it is hydric, proceed towards the upland plot until a more evident change or break in the vegetation or topography is noted, and examine the soil again to see if it is hydric. If no evident change or break in vegetation or topography is initially noted,

the soil should be examined half way between plots two and three. If the soil is hydric at this point on the transect, sample the soil again half way between this point and plot two. By repeating either of these procedures, make as many additional soil samples as necessary to determine the location of the upland-wetland boundary (actually a point) along the transect. A soil probe (e.g., an Oakfield soil probe) is very helpful to do this intensified soil sampling. Note: At this point in the overall procedure, soils generally become more useful than vegetation in establishing the upland-wetland boundary, particularly if there is no evident vegetation change or break or when facultative species dominate two adjacent vegetation units. Therefore, a Data Form D-4 should be filled out for each additional soil sample taken between sample plots two and three. On the Data Form D-4's, also include any hydrology observations made in the immediate vicinity of the soil samples. Because quantitative vegetation data have already been obtained for 0.1 acre plots (sample plots two and three) centered approximately 15.2 meters (50 feet) to each side of the upland-wetland boundary, further detailed quantitative analysis of the vegetation is generally not necessary. Any vegetation breaks or changes in species composition in the immediate vicinity of the soil samples should be recorded, however, on a Data Form D-5. Data Form D-5's (including vegetation, soils and hydrology observations) must be completed at least for the areas immediately to each side of the upland-wetland boundary point (i.e., one form should be completed for an upland unit and one form should be completed for a wetland unit).

c. Once the upland-wetland boundary point is determined, indicate its location on the aerial photograph or topographic map with the letters "BP" and record its distance from one of the two 0.1 acre sample plots or the baseline. Proceed to step 23.

23. Make additional wetland determinations along the transect in accordance with Step 21. The procedure described in Step 22 should be applied at every place along the transect where a wetland boundary occurs between successive 0.1 acre sampling plots. Proceed to Step 24.

24. Establish all other necessary transects and repeat the procedures in Steps 7-23. Proceed to Step 25.

25. Synthesize the sample data for all of the transects to determine the portion of the site that is wetlands.

a. Examine the sample plot data summary sheets (Data Form D-5) and indicate on the aerial photograph or topographic map all plots that are wetlands and all plots that are uplands.

b. If the sampling plots are all wetlands or all uplands, the entire site is either entirely wetlands or entirely uplands, respectively.

c. If some sampling plots are uplands and some are wetlands, then an upland-wetland boundary is present. Connect the upland-wetland boundary points ("BP's") on the aerial photograph or topographic map by following either the vegetation break or the topographic contour that corresponds with the upland-wetland boundary points. This interpolated line passing through the "BP's" is the upland-wetland boundary.

d. If the distances between transects are large or the vegetation breaks or the topographic contours do not consistently correspond with the upland-wetland boundary, it may be necessary to do additional soil sampling across the boundary in the areas between transects. The latter should done by walking the approximate upland-wetland boundary and periodically sampling across it. For each soil sample across the boundary, record soil data (and hydrology observations from the immediate vicinity) on a Data Form D-4. Data Form D-5's (including vegetation, soils and hydrology observations) must be completed at least for the areas immediately to each side of the upland-wetland boundary point (i.e., one form should be completed for an upland unit and one form should be completed for a wetland unit).

e. If the upland-wetland boundary is to be delineated on the ground, place stakes or flagging tape at all transect boundary points, as well as at any boundary points established by inter-transect sampling.

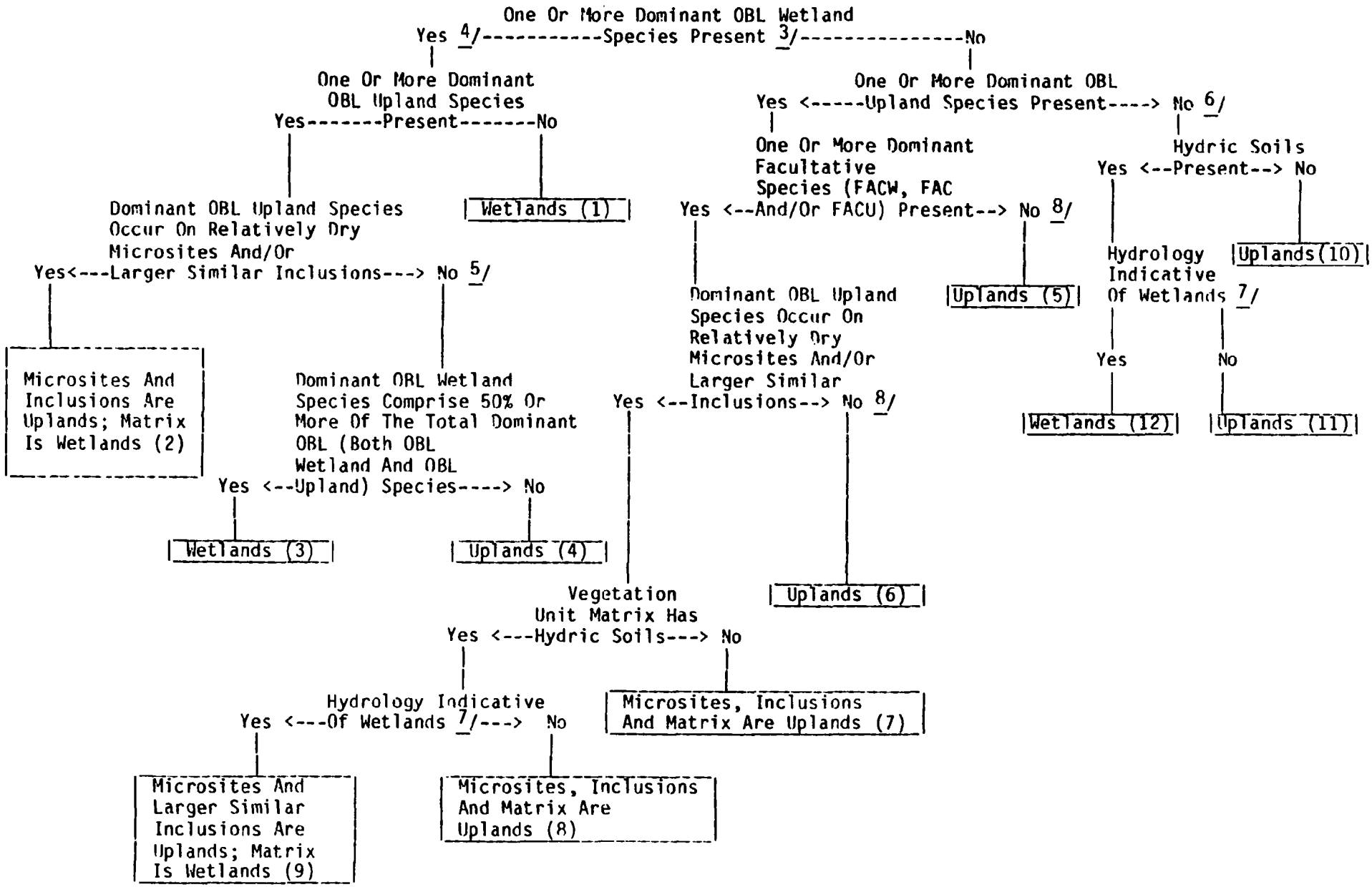
APPENDIX A

JURISDICTIONAL DECISION

FLOW CHART

APPENDIX A: JURISDICTIONAL DECISION FLOW CHART

PART A: DETERMINATIONS IN WHICH ONE OR MORE DOMINANT PLANT SPECIES OCCUR [1/2/]



Footnotes For Part A

1/ The methodology presented in this flow diagram relies hierarchically on vegetation, soils and hydrology. As pointed out by the Corps of Engineers (Environmental Laboratory, 1987), there are certain wetland types and/or conditions that may make application of indicators of one or more of the parameters difficult, at least at certain times of the year. This should not be considered atypical. Rather, it is due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events. The Corps gives four examples of this situation (wetlands in drumlins, seasonal wetlands, prairie potholes, and vegetated flats). For example, vegetated flats dominated by annual plants may appear only as unvegetated mudflats during the nongrowing season. Under such circumstances, an indicator of hydrophytic vegetation would not be evident. Likewise, a prairie pothole may not have inundated or saturated soils during most of the growing season in years of below normal precipitation. Thus, a hydrology indicator would be absent. Under these circumstances, a field investigator making a jurisdictional determination must decide whether or not wetland indicators are normally present during a portion of the growing season.

The Corps further points out that atypical situations may also exist in which one or more indicators of hydrophytic vegetation, hydric soils and/or wetland hydrology cannot be found due to the effects of recent human activities or natural events. For example, unauthorized activities such as (1) the alteration or removal of vegetation, (2) the placement of dredged or fill material over a wetland, and (3) the construction of levees, drainage systems, or dams that significantly alter hydrology. Under such circumstances, an investigation of the pre-existing conditions is necessary to determine whether or not a wetland existed prior to the disturbance. Recent natural events (e.g., impoundment of water by beaver) and man-induced conditions (e.g., inadvertent impoundment due to highway construction) may also result in atypical situations that effect wetland vegetation and hydrology in an area which was uplands prior to flooding. However, the area may not yet have developed hydric soil indicators. It is important in the latter two circumstances (i.e., natural events and man-induced conditions) to determine whether or not the alterations to the area have resulted in changes that are now the "normal circumstances." The relative permanence of the change and whether or not the area is now functioning as a wetland must be considered. A site with wetland vegetation and hydrology (other than from irrigation) that has not yet developed hydric soil characteristics due to recent flooding should be considered to have soils that are functioning as hydric soils.

2/ Non-dominant plants may be present as well.

3/ Dominant facultative species (FACW, FAC and/or FACU) may be present as well.

4/ In the presence of one or more dominant obligate wetland species, assume wetland hydrology is present (except for upland microsites and/or larger similar inclusions) unless evidence of disturbance suggests otherwise.

Footnotes for Part A (continued)

5/ This situation (both dominant obligate wetland species and dominant obligate upland species in the same vegetation unit under non-microsite/inclusion circumstances) should only occur in disturbed units, either naturally (e.g., a saltmarsh invading a pine forest due to sea level rise) or unnaturally (e.g., a ditched wetland with wetland obligates dying out and upland obligates invading). When it does occur, a 50% rule should be applied. An alternative to the 50% rule for forested sites would be to examine tree vigor and reproduction (e.g., seedlings and saplings), which may give a good indication of the direction of vegetation change at the unit or site. This alternative may apply to herbaceous sites as well.

6/ Under these circumstances, dominant FACW, FAC, and/or FACU species must be present.

7/ At this point, a field investigator must decide whether or not wetland hydrologic indicators are naturally present. If one or more are present, the vegetation unit is wetlands; if not, the unit is uplands. If the site has been hydrologically disturbed, the significance of the disturbance must be considered in deciding whether or not the unit is still wetlands hydrologically.

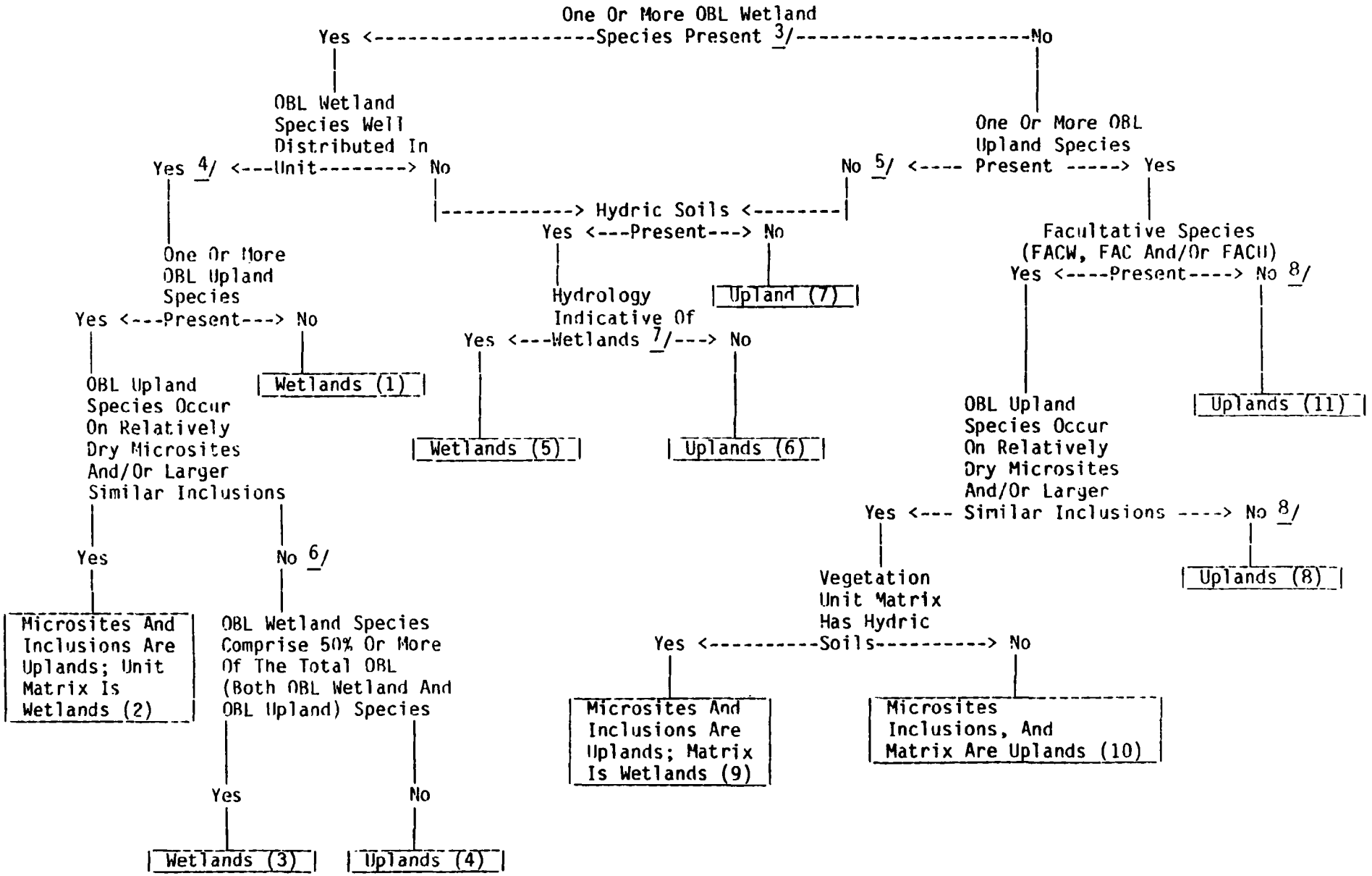
8/ In the presence of one or more dominant obligate upland species, assume upland hydrology is present (except for wetland microsites and/or similar larger inclusions) unless evidence of disturbance suggest otherwise.

Note: (1) - (12) are wetland determination points.

OBL = obligate
FACW = facultative wetland
FAC = straight facultative
FACU = facultative upland

APPENDIX A: JURISDICTIONAL DECISION FLOW CHART

PART B: DETERMINATION IN WHICH ONLY NON-DOMINANT PLANT SPECIES OCCUR 1/2/



Footnotes For Part B

1/ A situation in which no species is dominant will seldom occur. Consequently, this flow chart will not be utilized often.

2/ The methodology presented in this flow diagram relies hierarchically on vegetation, soils and hydrology. As pointed out by the Corps of Engineers (Environmental Laboratory, 1987), there are certain wetland types and/or conditions that may make application of indicators of one or more of the parameters difficult, at least at certain times of the year. This should not be considered atypical. Rather it is due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events. The Corps gives four examples of this situation (wetlands in drumlins, seasonal wetlands, prairie potholes, and vegetated fats). For example, vegetated flats dominated by annual plants may appear only as unvegetated mudflats during the nongrowing season. Under such circumstances, an indicator of hydrophytic vegetation would not be evident. Likewise, a prairie pothole may not have inundated or saturated soils during most of the growing season in years of below normal precipitation. Thus, a hydrology indicator would be absent. Under these circumstances, a field investigator making a jurisdiction determination must decide whether or not wetland indicators are normally present during a portion of the growing season.

The Corps further points out that atypical situations may also exist in which one or more indicators of hydrophytic vegetation, hydric soils and/or wetland hydrology cannot be found due to the effects of recent human activities or natural events. For example, unauthorized activities such as (1) the alteration or removal of vegetation, (2) the placement of dredged or fill material over a wetland, and (3) the construction of levees, drainage systems, or dams that significantly alter hydrology. Under such circumstances, an investigation of the pre-existing conditions is necessary to determine whether or not a wetland existed prior to the disturbance. Recent natural events (e.g., impoundment of water by beaver) and man-induced conditions (e.g., inadvertent impoundment due to highway construction) may also result in atypical situations that effect wetland vegetation and hydrology in an area which was uplands prior to flooding. However, the area may not yet have developed hydric soil indicators. It is important in the latter two circumstances (i.e., natural events and man-induced conditions) to determine whether or not the alterations to the area have resulted in changes that are now the "normal circumstances." The relative permanence of the change and whether or not the area is now functioning as a wetland must be considered. A site with wetland vegetation and hydrology (other than from irrigation) that has not yet developed hydric soil characteristics due to recent flooding should be considered to have soils that are functioning as hydric soils.

3/ Non-dominant OBL upland species and/or non-dominant facultative species (FACW, FAC and/or FACU) may be present as well.

4/ In the presence of one or more non-dominant obligate wetland species that are well-distributed in the unit, assume wetland hydrology is present (except for upland microsites and/or larger similar inclusions) unless evidence of disturbance suggests otherwise.

5/ Under these circumstances, non-dominant FACW, FAC, and/or FACU species must be present.

Footnotes for Part B (continued)

6/ This situation (both obligate wetland species and obligate upland species in the same vegetation unit under non-microsite/inclusion circumstances) should occur rather infrequently and only in disturbed units, either naturally (e.g., a saltmarsh invading a pine forest due to sea level rise) or unnaturally (e.g., a ditched wetland with wetland obligates dying out and upland obligates invading). When it does occur, a 50% rule should be applied. An alternative to the 50% rule for forested sites would be to examine tree vigor or reproduction (e.g., seedlings and saplings), which may give a good indication of the direction of vegetation change at the unit or site. This alternative may apply to herbaceous sites as well.

7/ At this point, a field investigator must decide whether or not wetland hydrologic indicators are naturally present. If one or more are present, the vegetation unit is wetlands; if not, the unit is uplands. If the site has been hydrologically disturbed, the significance of the disturbance must be considered in deciding whether or not the unit is still wetlands hydrologically.

8/ In the presence of one or more non-dominant obligate upland species that are well-distributed in the unit, assume upland hydrology is present (except for wetland microsites and/or similar larger inclusions) unless evidence of disturbance suggests otherwise.

Note: (1) - (11) are wetland determination points.

OBL = obligate
FACW = facultative wetland
FAC = straight facultative
FACU = facultative upland

APPENDIX B

JURISDICTIONAL DECISION

DIAGNOSTIC KEY

APPENDIX B: JURISDICTIONAL

DECISION DIAGNOSTIC KEY [1]

1a. Vegetation units are dominated by one or more plant species. Non-dominant species may also be present.

2a. One or more dominant obligate wetland plant species are present in the vegetation unit (or site if it is a monotypic site). Facultative species (facultative wetland, straight facultative and/or facultative upland) may occur as dominants as well.[2]

3a. Obligate upland dominants (one or more) are present.

4a. Dominant obligate upland species occur on relatively dry microsites (e.g., live tree bases, decaying tree stumps, mosquito ditch spoil piles, small earth hummocks) and/or on larger similar inclusions occurring in an otherwise topographically uniform unit containing dominant obligate wetland species. Under such circumstances, you should check to see if you correctly horizontally stratified the site and adjust accordingly by either: (a) showing these microsites and inclusions as local UPLANDS in a WETLANDS matrix or by (b) considering the unit to be all WETLANDS, but acknowledging the presence of the local UPLANDS in a written description of the site.(1)[3]

4b. Dominant obligate upland species do not occur on relatively dry microsites and/or larger similar inclusions; they occur rather uniformly intermixed with the dominant obligate wetland species. Under such circumstances, the unit and/or site is probably significantly hydrologically disturbed (naturally or by man) and successional vegetation changes are occurring.[4]

5a. 50% or more of the total dominant obligate species (both obligate wetland species and obligate upland species) are obligate wetland species.....WETLANDS (2)

5b. Less than 50% of the total dominant obligate species are obligate wetland species.....UPLANDS (3)

3b. Obligate upland dominants are not present.....WETLANDS (4)

2b. One or more dominant obligate wetland plant species are not present in the vegetation unit (or site if it is a monotypic site). Facultative species (facultative wetland, straight facultative and/or facultative upland) may occur as dominants as well.

6a. Obligate upland dominants (one or more) are present.

7a. One or more dominant facultative species (facultative wetland, straight facultative and/or facultative upland) are present.

8a. Dominant obligate upland species occur on relatively dry microsites and/or larger similar inclusions. Under such circumstances, you should check to see if you correctly horizontally stratified the site and determine whether the vegetation unit matrix (the area dominated by the facultative species in this instance) is wetlands by examining soils.[7]/

9a. Vegetation unit matrix has hydric soils.

10a. Hydrology of vegetation unit matrix is indicative of wetlands.....Microsites and inclusions are UPLANDS; matrix is WETLANDS (5).[5]/

10b. Hydrology of vegetation unit matrix is not indicative of wetlands....Microsites, inclusions and matrix are UPLANDS (6).

9b. Vegetation unit matrix does not have hydric soils...Microsites, inclusions, and matrix are UPLANDS (7).

8b. Dominant obligate upland species do not occur on relatively dry microsites and/or larger similar inclusions.....UPLANDS (8).[6]/

7b. One or more facultative species are not present.....UPLANDS (9).[6]/

6b. Obligate upland dominants are not present; one or more dominant facultative species (facultative wetland, straight facultative and/or facultative upland) are present.[7]/

11a. Hydric soils are present

8a. Hydrology is indicative of wetlands.....WETLANDS (10).[5]/

8b. Hydrology is not indicative of wetlands...UPLANDS (11).

11b. Hydric soils are not present.....UPLANDS (12).

1b. Vegetation units are not dominated by one or more plant species.[8]/

12a. One or more obligate wetland species are present.

13a. Obligate wetland species are well-distributed in unit.[9]/

14a. One or more obligate upland species are present.

15a. Obligate upland species occur on relatively dry microsites and/or larger similar inclusions. Under these circumstances, the microsites and inclusions are UPLANDS and the vegetation unit matrix is WETLANDS (13).

15b. Obligate upland species do not occur on relatively dry microsites and/or larger similar inclusions; they occur rather uniformly intermixed with the obligate wetland species. Under such circumstances, the unit and/or entire site is probably significantly hydrologically disturbed (naturally or by man) and successional changes are occurring.[4]/

16a. 50% or more of the total obligate species (both obligate upland and obligate wetland) are obligate wetland species.....WETLANDS (14).

16b. Less than 50% of the total obligate species are obligate wetland species...UPLANDS (15).

14b. One or more obligate upland species are not present...WETLANDS (16).

13b. Obligate wetland species are not well-distributed in unit.

17a. Hydric soils are present.

18a. Hydrology is indicative of wetlands.....WETLANDS (17).[5]/

18b. Hydrology is not indicative of wetlands...UPLANDS (18).

17b. Hydric soils are not present...UPLANDS (19).

12b. One or more obligate wetland species are not present.

19a. One or more obligate upland species are present.

20a. Facultative species (facultative wetland, straight facultative and/or facultative upland) are present.

21a. Obligate upland species occur on relatively dry microsites and/or larger similar inclusions.

22a. Vegetation unit matrix has hydric soils...Microsites and inclusions are UPLANDS; matrix is WETLANDS (20).

22b. Vegetation unit matrix does not have hydric soils... ...Microsites, inclusions and matrix are UPLANDS (21).

21b. Obligate upland species do not occur on relatively dry microsites and/or larger similar inclusions.....UPLANDS (22).[10]/

20b. Facultative species are not present.....UPLANDS (23).[10]/

19b. One or more obligate upland species are not present; one or more facultative species (facultative wetland, straight facultative and/or facultative upland) are present.[7]/

23a. Hydric soils are present.

24a. Hydrology is indicative of wetlands.....WETLANDS (24).5/

24b. Hydrology is not indicative of wetlands...UPLANDS (25).

23b. Hydric soils are not present.....UPLANDS (26).

Footnotes for Key

1/ The methodology presented in this diagnostic key relies hierarchically on vegetation, soils and hydrology. As pointed out by the Corps of Engineers (Environmental Laboratory, 1987), there are certain wetland types and/or conditions that may make application of indicators of one or more of the parameters difficult, at least at certain times of the year. This should not be considered atypical. Rather, it is due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events. The Corps gives four examples of this situation (wetlands in drumlins, seasonal wetlands, prairie potholes, and vegetated flats). For example, vegetated flats dominated by annual plants may appear only as unvegetated mudflats during the nongrowing season. Under such circumstances, an indicator of hydrophytic vegetation would not be evident. Likewise, a prairie pothole may not have inundated or saturated soils during most of the growing season in years of below normal precipitation. Thus, a hydrology indicator would be absent. Under these circumstances, a field investigator making a jurisdictional determination must decide whether or not wetland indicators are normally present during a portion of the growing season.

The Corps further points out that atypical situations may also exist in which one or more indicators of hydrophytic vegetation, hydric soils and/or wetland hydrology cannot be found due to the effects of recent human activities or natural events. For example, unauthorized activities such as (1) the alteration or removal of vegetation, (2) the placement of dredged or fill material over a wetland, and (3) the construction of levees, drainage systems, or dams that significantly alter hydrology. Under such circumstances, an investigation of the preexisting conditions is necessary to determine whether or not a wetland existed prior to the disturbance. Recent natural events (e.g., impoundment of water by beaver) and man-induced conditions (e.g., inadvertent impoundment due to highway construction) may also result in atypical situations that effect wetland vegetation and hydrology in an area which was uplands prior to flooding. However, the area may not yet have developed hydric soil indicators. It is important in the latter two circumstances (i.e., natural events and man-induced conditions) to determine whether or not the alterations to the area have resulted in changes that are now the "normal circumstances." The relative permanence of the change and whether or not the area is now functioning as a wetland must be considered. A site with wetland vegetation and hydrology (other than from irrigation) that has not yet developed hydric soil characteristics due to recent flooding should be considered to have soils that are functioning as hydric soils.

Footnotes for Key (continued)

2/ In the presence of one or more dominant obligate wetland species, assume wetland hydrology is present (except for upland microsites and/or larger similar inclusions) unless evidence of disturbance suggests otherwise.

3/ Numbers in parentheses represent jurisdictional decision points in the key.

4/ Where significant drainage has occurred, soils usually will not be diagnostic either since soil wetness characteristics (e.g., gleying and mottling) generally take many years to respond to hydrologic changes. Therefore, a 50% rule should be applied to the vegetation. An alternative to this 50% rule for forested sites would be to examine tree vigor and reproduction (e.g., seedlings and saplings), which may give a good indication of the direction of vegetation change at the unit or site. This alternative may apply to herbaceous sites as well.

5/ At this point, a field investigator must decide whether or not wetland hydrologic indicators are naturally present. If one or more are present, the vegetation unit is wetlands; if not, the unit is uplands. If the site has been hydrologically disturbed, the significance of the disturbance must be considered in deciding whether or not the unit is still wetlands hydrologically.

6/ In the presence of one or more dominant obligate upland species, assume upland hydrology is present (except for wetland microsites and/or larger, similar inclusions) unless evidence of disturbance suggests otherwise.

7/ Because facultative species are not diagnostic of wetlands or uplands, an examination of soil and hydrologic parameters is necessary to help determine whether the vegetation unit is a wetland.

8/ A situation without one or more dominants will seldom occur. Consequently, this part of the key should seldom be used.

9/ In the presence of one or more non-dominant obligate wetland species that are well-distributed in the vegetation unit, assume wetland hydrology is present (except for upland microsites and/or larger similar inclusions) unless evidence of disturbance suggests otherwise.

10/ In the presence of one or more non-dominant obligate upland species that are well-distributed in the vegetation unit, assume upland hydrology is present (except for wetland microsites and/or larger similar inclusions) unless evidence of disturbance suggests otherwise.

APPENDIX C

DATA FORMS FOR

SIMPLE JURISDICTIONAL DETERMINATIONS

DATA FORM C-1: HERBACEOUS SPECIES DATA
FOR SIMPLE JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____

Species	Indicator Status	Percent Areal Cover	Cover Class	Midpoint of Cover Class	Rank
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					

Sum of Midpoints _____
50% X Sum of Midpoints _____

1. Note: Herbaceous species include all graminoids, forbs, ferns, fern allies, bryophytes, woody seedings, and herbaceous vines.
2. Cover classes (midpoints): T<1% (none); 1=1-5% (3.0); 2=6-15% (10.5); 3=16-25% (20.5); 4=26-50% (38.0); 5=51-75% (63.0); 6=76-95% (85.5); 7=96-100% (98.0).
3. To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is reached or initially exceeded. All species contributing to that cumulative total should be considered dominants and indicated with an asterisk above.
4. Do the dominant herbaceous species indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconlusive _____.
5. Note: Inconclusive should be checked when only facultative (i.e., facultative wetland, straight facultative, and/or facultative upland) species dominate.
6. Comments: _____

DATA FORM C-2: SHRUB AND WOODY VINE DATA
FOR SIMPLE JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____

****

SHRUBS

Species	Indicator Status	Percent Areal Cover	Cover Class	Midpoint of Cover Class	Rank
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Sum of Midpoints _____
50% X Sum of Midpoints _____

****

WOODY VINES

Species	Indicator Status	Percent Areal Cover	Cover Class	Midpoint of Cover Class	Rank
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Sum of Midpoints _____
50% X Sum of Midpoints _____

****

1. Note: A shrub is usually less than 6.1 meters (20 feet) tall and generally exhibits several erect, spreading or prostrate stems and has a bushy appearance. Percent cover of woody vines should be estimated independent of strata and exclusive of seedlings.
2. Cover classes (midpoints): T<1% (none); 1=1-5% (3.0); 2=6-15% (10.5); 3=16-25% (20.5); 4=26-50% (38.0); 5=51-75% (63.0); 6=76-95% (85.5); 7=96-100% (98.0).
3. To determine the dominants, first rank the shrub species by their midpoints. Then cumulatively sum the midpoints of the ranked shrub species until 50% of the total for all shrub species midpoints is reached or initially exceeded. Do the same for woody vines. All species contributing to these cumulative totals should be considered dominants and marked with an asterisk above.
4. Do the dominant shrub species indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconlusive _____.
5. Do the dominant woody vine species indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconclusive _____.
6. Note: Inconclusive should be checked when only facultative (i.e., facultative wetland, straight facultative, and/or facultative upland) species dominate.
7. Comments: _____

DATA FORM C-3: TREE AND SAPLING DATA
FOR SIMPLE JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____

****

TREES

Species	Indicator Status	Relative Basal Area (%)	Rank
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

Total Relative Basal Area Equals 100%

****

SAPLINGS

Species	Indicator Status	Percent Areal Cover	Cover Class	Midpoint of Cover Class	Rank
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					

Sum of Midpoints _____
50% X Sum of Midpoints _____

****

1. Note: A tree is greater than 10 centimeters (4 inches) diameter breast height (dbh). A sapling is from 1-10 centimeters (0.4-4 inches) dbh.
2. Cover classes (midpoints): T<1% (none); 1=1-5% (3.0); 2=6-15% (10.5); 3=16-25% (20.5); 4=26-50% (38.0); 5=51-75% (63.0); 6=76-95% (85.5); 7=96-100% (98.0).
3. To determine the dominants, first rank the tree species by relative basal area. Then cumulatively sum the relative basal area of the ranked tree species until 50% of the total relative basal area for all tree species is reached or initially exceeded. Do the same for saplings using the sum of midpoints. All species contributing to these cumulative totals should be considered dominants and marked with an asterisk above.
4. Do the dominant trees indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconlusive _____.
5. Do the dominant saplings indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconclusive _____.
6. Note: Inconclusive should be checked when only facultative (i.e., facultative wetland, straight facultative, and/or facultative upland) species dominate.
7. Comments: _____

DATA FORM C-4: SOIL/HYDROLOGY DATA
FOR SIMPLE JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____

****

SOILS

Is the soil on the national or state hydric soils list? Yes _____ No _____
Series/phase: _____ Subgroup: _____
Is the soil a Histosol or is a histic epipedon present? Yes _____ No _____
Is the soil:
Mottled? Yes _____ No _____ Matrix Color: _____ Mottle Color: _____
Gleyed? Yes _____ No _____
Other Indicators _____

1. Note: Soils should be sample at about 25 centimeters (10 inches) or immediately below the A horizon, whichever comes first. If desired, use the back of the form to diagram or describe the soil profile.
2. Does the sampling indicate that the vegetation unit has hydric soils?
   Yes _____ No _____ Inconclusive _____.
   Rationale: _____

   Comments: _____

****

HYDROLOGY

1. Is the ground surface inundated? Yes _____ No _____ Depth of water: _____
2. Is the soil saturated? Yes _____ No _____ Depth to free-standing water: _____
3. List other field evidence of surface inundation or soil saturation _____

4. Are hydrology indicators present in the vegetation unit?
   Yes _____ No _____ Inconclusive _____.
   Note: It may be necessary to rely on supplemental historical data (e.g., soil surveys) during a dry season or drought year as long as a site has not been significantly modified hydrologically since data collection.
   Rationale: _____

5. Comments: _____

DATA FORM C-5: SUMMARY OF DATA
FOR SIMPLE JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____ _____

****

Dominant Species	Indicator Status
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

****

1. Is hydrophytic vegetation present? Yes _____ No _____ Inconclusive _____
2. Are hydric soils present? Yes _____ No _____ Inconclusive _____
3. Are hydrology indicators present? Yes _____ No _____ Inconclusive _____
4. Overall, is the vegetation unit wetland? Yes _____ No _____ Inconclusive _____
5. Comments: _____

APPENDIX D

DATA FORMS FOR

DETAILED JURISDICTIONAL DETERMINATIONS

DATA FORM D-1: HERBACEOUS SPECIES DATA
FOR DETAILED JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Transect #: _____ Plot #: _____

****

PERCENT AREAL COVER

Species	Status	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	$\bar{X}$	Rank
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											
13.											
14.											
15.											
16.											
17.											
18.											
19.											
20.											

Total of Averages (X's) of Percent Areal Cover ___
50% X Total of Averages (X's) of Percent Areal Cover ___

****

1. Note: Herbaceous species include all graminoids, forbs, ferns, fern allies, bryophytes, woody seedlings, and herbaceous vines.
2. To determine the dominants, first rank the species by their average percent areal cover. Then cumulatively sum the percent areal cover averages (X's) of the ranked species until 50% of the total of all the species averages is reached or initially exceeded. All species contributing to that cumulative total should be considered dominants and indicated with an asterisk above.
3. Do the dominant herbaceous species indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconclusive _____.
4. Note: Inconclusive should be checked when only facultative (facultative wetland, straight facultative, and/or facultative upland) species dominate.
5. Comments: _____

DATA FORM D-2: SHRUB AND WOODY VINE
DATA FOR DETAILED JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Transects #: _____ Plot #: _____

****

SHRUBS

Species	Indicator Status	Percent Areal Cover	Cover Class	Midpoint of Cover Class	Rank
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

Sum of Midpoints _____
50% X Sum of Midpoints _____

****

WOODY VINES

Species	Indicator Status	Percent Areal Cover	Cover Class	Midpoint of Cover Class	Rank
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

Sum of Midpoints _____
50% X Sum of Midpoints _____

****

1. Note: A shrub usually is less than 6.1 meters (20 feet) tall and generally exhibits several erect, spreading or prostrate stems and has a bushy appearance. Percent cover of woody vines should be estimated independent of strata and exclusive of seedlings.
2. Cover classes (midpoints): T=<1% (none); 1=1-5% (3.0); 2=6-15% (10.5); 3=16-25% (20.5); 4=26-50% (38.0); 5=51-75% (63.0); 6=76-95% (85.5); 7=96-100% (98.0).
3. To determine dominants, first rank the shrub species by their midpoints. Then cumulatively sum the midpoints of the ranked shrub species until 50% of the total for all shrub species midpoints is reached or initially exceeded. Do the same for woody vines. All species contributing to these cumulative totals should be considered dominants and marked with an asterisk above.
4. Do the dominant shrubs indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconclusive _____.
5. Do the dominant woody vine species indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconclusive _____.
6. Note: Inconclusive should be checked when only facultative (i.e., facultative wetland, straight facultative, and/or facultative upland) species dominate.
7. Comments: _____

DATA FORM D-3: TREE AND SAPLING DATA
FOR DETAILED JURISDICTIONAL DETERMINATION

COA Region: _____ Recorder: _____ Date: _____
oject/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Transect #: _____ Plot #: _____

****

TREES (Bitterlich Method)

Individual Tree (Species Name)	Indicator Status	DBH (cm/ft)	Basal Area Per Tree (sq ft)	Basal Area Per Species (sq ft)	Rank
1.		/			
2.		/			
3.		/			
4.		/			
5.		/			
6.		/			
7.		/			
8.		/			
9.		/			
10.		/			

Total Basal Area of All Species Combined _____
50% X Total Basal Area of All Species Combined _____

****

SAPLINGS

Species	Indicator Status	Percent Areal Cover	Cover Class	Midpoint of Cover Class	Rank
1.					
2.					
3.					
4.					
5.					

Sum of Midpoints _____
50% X Sum of Midpoints _____

****

1. Note: A tree is greater than 10 centimeters (4 inches) diameter breast height (dbh). A sapling is from 1-10 centimeters (0.4-4 inches) dbh.
2. Cover classes (midpoints): T<1% (none); 1=1-5% (3.0); 2=6-15% (10.5); 3=16-25% (20.5); 4=26-50% (38.0); 5=51-75% (63.0); 6=76-95 (85.5); 7=96-100% (98.0).
3. To determine the dominants, first rank the tree species by their basal areas. Then cumulatively sum the basal areas of the ranked tree species until 50% of the total basal area for all tree species is reached or initially exceeded. Do the same for saplings using the sum of midpoints. All species contributing to these cumulative totals should be considered dominants and marked with an asterisk above.
4. Do the dominant trees indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconlusive _____.
5. Do the dominant samplings indicate that the vegetation unit supports hydrophytic vegetation? Yes _____ No _____ Inconclusive _____.
. Note: Inconclusive should be checked when only facultative (i.e., facultative wetland, straight facultative, and/or facultative upland) species dominate.
7. Comments: _____

DATA FORM D-4: SOIL/HYDROLOGY DATA FOR
DETAILED JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Transect #: _____ Plot #: _____

****

SOILS

Is the soil on the national or state hydric soils list? Yes _____ No _____
Series/phase: _____ Subgroup: _____
Is the soil a Histosol or is a histic epipedon present? Yes _____ No _____
Is the soil:
Mottled? Yes _____ No _____ Matrix Color: _____ Mottle Color: _____
Gleyed? Yes _____ No _____
Other Indicators _____

1. Note: Soils should be sampled at about 25 centimeters (10 inches) or immediately below the A horizon, whichever comes first. If desired, use the back of the form to diagram or describe the soil profile.
2. Does the sampling indicate that the vegetation unit has hydric soils?
   Yes _____ No _____ Inconclusive _____
3. Rationale: _____
4. Comments: _____

****

HYDROLOGY

1. Is the ground surface inundated? Yes _____ No _____ Depth of water: _____
2. Is the soil saturated? Yes _____ No _____ Depth of free-standing water: _____
3. List other field evidence of surface inundation of soil saturation _____
4. Are hydrology indicators present in the vegetation unit?
   Yes _____ No _____ Inconclusive _____
   Note: It may be necessary to rely on supplemental historical data (e.g., soil surveys) during a dry season or drought year as long as a site has not been significantly modified hydrologically since data collection.
   Rationale: _____
5. Comments: _____

DATA FORM D-5: SUMMARY OF DATA
FOR DETAILED JURISDICTIONAL DETERMINATION

EPA Region: _____ Recorder: _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Transect #: _____ Plot #: _____

****

Dominant Species	Indicator Status
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____
7. _____	_____
8. _____	_____
9. _____	_____
10. _____	_____
11. _____	_____
12. _____	_____
13. _____	_____
14. _____	_____
15. _____	_____

****

1. Is hydrophytic vegetation present? Yes _____ No _____ Inconclusive _____
2. Are hydric soils present? Yes _____ No _____ Inconclusive _____
3. Are hydrology indicators present? Yes _____ No _____ Inconclusive _____
4. Overall, is the vegetation unit wetland? Yes _____ No _____ Inconclusive _____
5. Comments: _____
_____
_____

APPENDIX E

EQUIPMENT NECESSARY FOR MAKING WETLAND JURISDICTIONAL DETERMINATIONS

APPENDIX E

EQUIPMENT NECESSARY FOR MAKING WETLAND JURISDICTIONAL DETERMINATIONS

Item	Jurisdictional Approach [1/]
National or regional list of plants that occur in wetlands	1,2
National or state hydric soils list	1,2
Key to Soil Taxonomy (optional)[2/]	2
National List of Scientific Plant Names (optional)	1,2
State or regional plant identification manuals	1,2
Plant field guides	1,2
Spencer tape	2
Diameter tape or basal area tape	2
Two $0.1m^2$ quadrat frames	2
Prism or angle gauge	2
Vasculum or plastic bags	1,2
Sighting compass	2
Pens or pencils	1,2
Clip board and data sheets	1,2
Notebook	1,2
Flagging tape	1,2
Wooden stakes or wire flagging stakes (optional)	1,2
Increment borer (optional)	2
10X hand lens	1,2
Dissecting kit	1,2
Calculator	2
Aerial photographs or topographic map	1,2
Shovel	1,2
Bucket auger and/or soil probe	1,2
Munsel Color Soil Charts	1,2
Colorimetric field test kit (optional)	1,2

1/ 1 refers to equipment needed for simple jurisdictional approach.
2 refers to equipment needed for detailed jurisdictional approach.

2/ Optional items are not necessary, but may be useful in certain situations.