CENED-OD-R (1145-2-303b) 13 March 1992

MEMORANDUM FOR Director of Civil Works, HQ, USACE
20 Massachusetts Ave, Washington, D.C. 02314

SUBJECT: Regional Interpretation of the 1987 Wetland Manual

1. REFERENCES:

A. Memorandum, HQ, USACE, CECW-OR, 20 Feb 92, subject: Regional Interpretation of the 1987 Manual.

B. Memorandum, CENED-OD-R, 5 Mar 92, subject: Staff Paper - Regional Interpretation of the 1987 Manual.

C. Draft Memorandum, CENED-OD-R 9 Sep 92 subject: Guidance for the Interpretation of Wetland Boundaries Using the 1987 Manual in the Six New England States.

2. In response to your Memorandum of 20 February 1992 referenced above, I am transmitting the New England Division's Regional Datasheets for wetland delineation pursuant to the 1987 Corps Manual for review and approval. Additionally, NED has prepared an analysis of the regional datasheets relative to its consistency with the 1987 Manual to facilitate OCE's review. NED finds the datasheets valid and consistent with the Manual.

3. NED's regional datasheets are long standing. They were first developed in 1988 for use with the 1987 Corps Wetland Manual to insure consistency from consultants and to expedite review by Corps' staff. They were revised to comply with the 1989 Federal Manual, and again in 1991 to revert to the 1987 Manual. Several public notices have been issued, and the datasheets reflect comments received from the public. They have been fully coordinated with the Federal agencies and well received by the public. They provide needed consistency and repeatability, and save applicants considerable time and costs. The datasheets have been provided to OCE and WES periodically for review.

4. Although the new datasheet included in your Memorandum of 6 March 1992 is very close in substance and format to NED's datasheet, NED's datasheet still provides supplemental guidance needed to insure consistency and ease of review. To introduce this new datasheet would cause considerable disruption to the regulated public and result in more time and costs to applicants and Corps staff. There would be a substantial increased burden on Corps' staff to coordinate with the agencies, reeducate the public, and verify submittal.

5. My staff and I are available if any further coordination is needed. Staff questions may be referred to Mr. Mike Sheehan, 617-647-8673.

PHILIP R. HARRIS
Colonel, Corps of Engineers
Division Engineer

Enclosure

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CENED-OD-R (1145-2-303B) 12 March 1992

MEMORANDUM THRU Chief, Policy Analysis Section
Chief, Regulatory Division
Director, Operations Directorate
District Engineer

FOR Division Engineer, U.S. Corps of Engineers, New England Division

SUBJECT: Staff Paper -- Clarification and Interpretation of the 1987 manual.

1. References:

A. Memorandum, Directorate of Civil Works (CECW-OR), 6 March 1992, subject: Clarification and Interpretation of the 1987 Manual.

B. Memorandum, CENED-OD-R, 6 March 1992, subject: Staff Paper -- Regional Interpretation of the 1987 Manual.

2. I just reviewed the memorandum from the Directorate of Civil Works and I offer the following supplement to the CENED-OD-R memorandum. The cited paragraphs refer to the 6 Mar 92 memorandum from CECW-OR.

A. Vegetation:

(1) The dominance method employed in the New England protocol is specifically approved at paragraph 2b.

(2) The 5-stratum approach used in the New England protocol is specifically approved at paragraph 2c.

(3) Paragraph 2d discusses and advises caution applying an obscure approach mentioned in the section on comprehensive data collection on page 79 of the 1987 manual. In summary, the approach allows the delineator to consider the plant community to be hydrophytic whenever he observes two or more dominant species that "exhibit morphological adaptations or have known physiological adaptations to wetlands." I am not comfortable with the broadened application of paragraph 79 of the Manual; the New England protocol does not refer to this approach, but it does not disallow it either.

(4) Paragraph 2e offers the FAC-neutral test to bolster weak indicators of wetland hydrology or hydric soil. I have recommended against this in the past, fearing that the procedure adds complexity without improving reliability. Implementation would invariably cause confusion and I believe that it is more likely to increase, rather than decrease, the extent of areas interpreted as wetlands in New England, particularly where the FAC-neutral test is used as a surrogate for hydric soils. During our field testing of this option in 1986, 1987 and again in 1991, we concluded that it did not offer any reliable information about the plant community. It must be EMPHASIZED that the National List of Plant Species that Occur in Wetlands specifically cautions that, "wetland indicator categories should not be equated to degrees of wetness." I believe that the FAC-neutral test contradicts this warning and is contrary to information theory. I recommend that the District exercise its discretion in this matter and not endorse the use of the FAC-neutral option as a normal course in this region.

B. Hydrology: In paragraph 3c the FAC-neutral test is again suggested to support the hydrology parameter in groundwater-driven systems. And again, I don't endorse this procedure as being reliable or efficient. Paragraph 3d offers oxidized rhizospheres as a hydrologic indicator and warns against relics. Their warning may miss the mark a bit. In this region, oxidized rhizospheres appear to be quite responsive to the seasonal changes in the water table. I have observed them to come and go from year to year in the same observation plot. I suspect that "relics" are quickly obliterated by the action of worms and other pedoturbation during periods when the soil is not reduced. On the other hand, oxidized rhizospheres may form in non-wetlands in an agricultural setting, particularly in transitional meadows, as the consequence of bio-reducing conditions in the watershed following the application of organic fertilizers.

C. Soil: Paragraph 4d is misleading. The paragraph refers to an over-simplification of the concept of an aquic moisture regime for most soil orders. In its context, the phrase "certain problem soils" suggests that other morphology associated with an aquic moisture regime is unusual; I am among the majority of New England's soil scientists and wetland practitioners when I disagree.

D. Methods: I am confident New England's alternative plot sizes and dominance measures are sound sampling procedures and consistent with the 1987 Manual; Paragraph 5a does not specifically identify our methods, but acknowledges ours as potentially acceptable.

3. The 3/92 dataform enclosed with the CECW-OR memorandum is a tremendous improvement over the forms offered in the 1987 Manual -- I am tickled that it is so similar to the form we developed for New England. Nevertheless, with a supportive and constructive intent, I offer the following criticism:

A. Forms identification: A two-sided or multiple paged form requires sufficient identification on every page to minimize disorder when completed forms are photocopied or archived.

B. Vegetation: The form does not solicit or offer space to record the actual dominance measurements. Repeatable data is a fundamental strength to the New England protocol. In real life, when data is reduced to an inventory, the data collection assumes similar form. The vegetation data is crowded by a an unnecessary sequence of numbers and lines; for several months each year, we work with fingers cramped by the cold and sheets smudged by dampness -- at the suggestion of several hundred practitioners, our regional dataform offers relatively unconstrained space or check boxes. Unlike the dataform published with the Manual, observed morphological adaptations to wetlands are not acknowledged on the 3/92 dataform.

C. Soil: I applaud the addition of a soil profile description to the 3/92 dataform. This is consistent with my philosophy that accountability improves with the precision of the record. However, the space devoted to a soil profile and the horizontal lines are a bit too confining for many of us. The design of the New England dataform reflects the suggestions of hundreds of practitioners who called for unconstrained space or check boxes. The New England checklist employs a hierarchy that is directly from the National Technical Committee's (NTCHS) hydric soil criteria: Soil Taxonomy, Drainage Class, and Watertable. The elements in the 3/92 checklist are built into our drainage classes.

4. Physical Organization: As a former infantryman and a practicing wetland scientist, I kept field records since 1966; I offer the following lessons from my own failures: multiple-paged forms are a real handicap in the field -- a flip-sided form is an acceptable compromise. Check off boxes are superior to written text or shapes, particularly when the forms are damp or wet and produced on 20lb. paper. Wide margins are poor substitutes for writing space within the form. People will always try to fill out forms without referring to the instructions, so the form must be pretty self-explanatory or offer enticement for reading the instructions -- our supplemental definitions and performance standards offer a ready reference for the delineator. It is unrealistic to expect folks to sacrifice their "basic load" to carry the 1987 Manual to the field; therefore, routine concepts and procedures must be simple enough to memorize.

5. I would be pleased to demonstrate, offer further explanation or provide additional substantive evidence on any points that I have made herein. My professional network is roughly 1000-strong, I would be pleased to present other practitioners or views from New England's regulated community. I am available at 617-647-8306.

MICHAEL J. SHEEHAN
Senior Wetland Scientist

CENED-OD-R (1145-2-303B) 5 March 199x2 MB

MEMORANDUM THRU CHIEF, POLICY ANALYSIS BRANCH
CHIEF, REGULATORY DIVISION
DIRECTOR, OPERATIONS DIRECTORATE
DISTRICT ENGINEER

FOR DIVISION ENGINEER, U.S. CORPS OF ENGINEERS, NEW ENGLAND DIVISION

SUBJECT: Staff Paper -- Regional Interpretation of the 1987 Manual

1. REFERENCES:

A. Memorandum, HQ, USACE, CECW-OR, 20 Feb 92, subject: Regional Interpretation of the 1987 Manual.

B. Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, US Army Engineer Waterways Experiment station, Vicksburg, Miss.

C. Regulatory Guidance letter 90-6, HQ, USACE, CECW-OR, 14 Aug 90, subject: Expiration Dates for Wetlands Jurisdictional Delineations, paragraph 6.

D. Public Notice, CENED-OD-R, Environmental Resource Unit, 4 Jul 89, subject: Use of the Technical Criteria for Hydrophytes, Hydric Soils, and Wetland Hydrology....

E. Disposition Form, CENED-OD-R, Environmental Resource Unit, 1 Oct 87, subject: Transmittal of Routine and Atypical Wetland Delineation Materials.

F. Memorandum, CENED-OD, 4 Mar 88, subject: Wetland Delineation Procedures.

G. Letter, Regulatory Branch, 12 Apr 88, (a transmittal of operational guidance to Normandeau Associates).

H. Memorandum, CDR, CENED, CENED-OD-R, (undated copy), subject: FOA Technical comments on the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (Manual)

I. Memorandum, CENED-OD-R, Environmental Resource Unit, 4 Mar 91, subject: Staff Guidance for the Interpretation of wetland Boundaries in the Six New England States.

J. Memorandum, CEWES-ER-W, 3 Feb 92, subject: Review of "Consistent Delineation Using the 1987 Corps of Engineers manual in the North Atlantic Division" dated 22 January 1992.

K. Draft Memorandum, CENED-OD-R, Environmental Resources Section, 9 Sep 91, subject: Guidance for the Interpretation of Wetland Boundaries Using the 1987 Corps manual in the Six New England States.

L. Memorandum, CECW-OR, 16 Sep 91, subject: Questions and answers on the 1987 Manual.

2. BACKGROUND:

A. This staff paper is prepared in response to MG Williams Memorandum (HQ, USACE, 20 Feb 92). In New England, in the normal course of project development, wetland boundaries are identified on the site plans used for state, local and federal permits. New England's regulatory program has relied heavily upon the technical excellence of the environmental services community in our region. Routinely, wetland boundaries are documented by agents for the applicant and verified or corrected in the field by the Corps.

B. The 1987 Manual (Environmental Laboratory, 1987) was prepared primarily for use by Corps of Engineers field inspectors, see 1987 Manual, Part I, Para 17. While the manual is a useful tool for others, our experience is that, without regional supplementation, inordinate costs and energy can be expended by a project proponent producing delineation documentation that is incomplete, inaccurate and which fails to substantiate the Corps decision. Since 1986, New England Division has worked with experts throughout the region in the public and private sector to develop a standard sampling and documentation protocol that is consistent with regulations and technical guidance. The evolution of this protocol is evidenced in numerous records of correspondence (CENED-OD-R, 1 Oct 87; CENED-OD, 4 Mar 88; Regulatory Branch, 12 Apr 88; CENED (undated copy); CENED-OD-R, 4 Mar 91)

C. The protocol referred to throughout the rest of the text is New England's most recent adaptation to the 1987 Manual (CENED-OD-R, 9 Sep 91). While this protocol is not explicitly described in the 1987 Manual, it is consistent with the manual and does not alter the basic approach for making wetland determinations, i.e. the determination is based upon the dominant plant species, soil characteristics and hydrologic characteristics of the area in question, see 1987 Manual, Part I, Para 23.

In the spirit of Regulatory Guidance letter 90-6, Para 6, (HQ, USACE, 14 Aug 92), the protocol ensures documentation that is complete, accurate and substantiates the Corps decision. The comments by the Wetlands Research Team (CEWES-ER-W, 3 Feb 92), are credible testimony to the technical strengths of the New England protocol.

D. The regional protocol was never imposed upon the regulated sector; in practice, we are open-minded and prepared to acknowledge any reasonable boundary which is supported by sound sampling procedures and is clearly and accurately recorded. Our organizational framework permits us to commit a wetland scientist specializing in delineations to verify the accuracy of less traditional approaches.

E. The New England dataform also allows reasonably accurate replication of the delineation at a future date. The minimal performance standards have fostered a competitive market for data collection services while permitting the Corps to use its manpower most efficiently. Over the years, this Division has openly solicited comment and suggestions from all interested or affected persons and distributed copies of draft protocols to Regulatory staff in OCE and elsewhere.

F. The New England Division has resolutely kept the regulated sector well-informed and encourages them to offer comments and suggestions. Through numerous professional societies, our outreach program has enabled us to offer hands-on field training to more than 500 wetland professionals and lay persons.

3. <u>REGIONAL PERFORMANCE STANDARDS AND SUPPLEMENTAL DEFINITIONS FOR USE WITH THE 1987 CORPS MANUAL</u> -- There are many voids, omissions and complexities in the 1987 Manual which require supplementation and clarification before the manual can be applied consistently and fairly in the northeast. The following discussion relates to standards and supplemental definitions (in smaller font). Many of these standards and terms were distributed by New England Division in correspondence with the public dating back to 1987 and in a public notice dated July 4, 1989.

A. KNOWN STATION -- an easily recognizable, accessible and reasonably permanent cultural or natural feature used as a reference point for horizontal survey control and included with the plan of the project site. A known station must be available within 1000 feet of recorded observation plots. Where such reference points are not available, known stations should be established by land survey, visibly marked and illustrated on the plan view. The land survey must be verifiable with an accuracy of 1/500 ratio of error.

This ground control feature is not mentioned in the manual, but is consistent with the reproducible standard explicit in RGL 90-6, Para 6. The accuracy of a scaled drawing of the wetland boundary is not verifiable without sufficient ground controls. In the past, without a KNOWN STATION, the sites used for data collection were commonly unrecoverable.

B. BASELINE -- A wetland survey control feature used to establish and recover locations of transects and observation points. It is usually parallel to the water course or perpendicular to the hydrologic gradient. The length of the baseline may be used to guide the minimum number of transects.

A precise definition of the term BASELINE is not offered in the manual; yet, it is commonly referred to in Part IV of the manual. The frequency of inquiries regarding the concept precipitated our definition of the term.

C. TRANSECT -- A line on the ground along which observation are made. Transects are used to represent conditions along the boundary of federal jurisdiction. The number of transects must be sufficient to insure that all plant community types in the impact area along the wetland/non-wetland interface are revealed in the sampling. Generally, transects will be sampled at a rate of 3 per linear mile of baseline and increase at a rate of 1 transect per additional 0.5 mile of baseline length. Ideally, the intervals between transects should be equal; however, this consideration is subordinate to the stated need to sample all plant community types and represent conditions in close proximity to the areas of the most direct impacts.

A very high volume of inquiries from consultants and applicants persuaded us to supplement the definition of the term TRANSECT clarifying the concept, use and ideal frequency.

D. OBSERVATION PLOT -- Sites along a transect where the details about vegetation, soils and hydrology are observed and recorded. Minimally, one observation plot upgradient and another downgradient from the wetland boundary will be recorded. Together, these two points are the delineator's reasoning behind his wetland boundary. Consequently, it's important that these plots are fair representations of the site conditions along the boundary. It's also important that the two documented plots can be recovered and confirmed by the authenticating agency. Ideally, the centers of these 2 plots should be in the range of 5 to 15 feet from one another. Record plot locations must be recoverable from a known station.

The manual does not have a term with a precise definition to describe the point used to represent the soils, plants and hydrology. This term and the implicit method have eliminated a great deal of confusion and excessive effort.

E. VEGETATION SAMPLING: -- 6 strata are defined:

WOODY OVERSTORY: stems in 30-ft. radius from center of observation plot.
1. TREES -- woody, nonclimbing, at least 5.0in. dbh (diameter at breast height) and at least 20ft. tall.
2. LIANAS -- woody vines, climbing on trees, shrubs or saplings.

WOODY UNDERSTORY: foliage in 15-ft. radius from center of observation plot.
3. SAPLINGS -- woody, nonclimbing, at least 0.4in., but less than 5.0in. dbh,and at least 20ft. tall
4. SHRUBS -- woody, nonclimbing, at least 3ft.tall, but less than 20ft. tall

HERBACEOUS UNDERSTORY: foliage in 5-ft. radius from center of observation plot.
5. SEEDLINGS & HERBS -- woody, less than 3ft. tall, or nonwoody (any height)
6. MOSSES & LIVERWORTS -- Only when considered an important component of the community

In Section IV of the manual, several methods are suggested to characterize the vegetative communities. Which sampling method is recommended depends upon which level of data collection is considered appropriate. In New England, field experience has shown inconsistencies regularly occur when the recommended strata, quadrat dimensions, and dominance measures, are used. Several supplemental definitions were warranted to minimize inconsistencies and improve repeatability:

(a) Strata -- six distinct components are common divisions in the vertical structure of plant communities in our region. It is inappropriate to consider Saplings and Shrubs as part of the same stratum; such an approach is disposed against shrub species which are rarely, if ever, represented in the sapling or tree strata.

(b) Quadrat Dimensions -- in formerly glaciated regions, the hydrologic gradient is more commonly associated with stratigraphy and not the more apparent surface features; consequently, circular quadrats are the least bias means to sample the plant community along the wetland boundary. The 5-, 15- and 30-foot radius quadrats are consistent with the relative ranges of influence by the three major vertical subdivisions. While a small plot is usually quickly evaluated, in practice, it has proven nearly impossible to find representative 5-ft radius quadrats for the woody understory; on the other hand, the 15-ft quadrat is less sensitive to patchy structure and micro-relief near the relatively diverse edges of wetlands.

(c) Dominance Measures -- in practice, the use of cumulative height for the Sapling/Shrub (i.e. woody understory) is difficult, particularly when multiple-stemmed species are involved. Moreover, the scientific basis for the measure is highly questionable and is not found in any of the best recognized literature on the subject. Percent cover, a more traditional and widely used measure, is easily applied, produces repeatable results and corresponds well with delineation approaches mandated by other wetlands programs. Generally, the following dominance measures can be assessed accurately without leaving the central area of the plot, this is an important consideration related to effort and cost.

DOMINANCE MEASURES -- as indicated for the strata below:

Trees -- BASAL AREA (i.e. the cross sectional area at BREAST HEIGHT (4.5 ft.)

Lianas -- number of stems (i.e. at ground level) or basal area, as appropriate

Other Strata -- percent areal coverage (i.e. estimated peak growing season foliage)

F. DOMINANT VEGETATION -- Using the dominance measures (above), estimate and list the species in each stratum of the plot that, when ranked in descending order of abundance (i.e. Percent Dominance) and cumulatively totalled, immediately exceeds 50% of the total dominance measure for the stratum plus any additional species that comprise 20% or more of the dominance measure for that stratum.

Credible experts expressed concern over the over-simplified "routine method" for characterizing the plant community that is suggested in the 1987 Manual. In the vicinity of the boundary of most the commonly encountered wetlands in New England, the microhabitat reflected in the plant community has caused the routine method's "top three" approach to yield extremely inconsistent results estimating the DOMINANT VEGETATION.

While these inconsistencies could be eliminated by the sampling protocols suggested for the "comprehensive" methods, those protocols are too time-consuming to be justified by most projects. A relatively quick "rank-order 50/20" approach provides adequate sampling of the high diversity that typifies the dynamic wetness conditions near the upland-wetland interface.

G. TOTAL DOMINANCE MEASURE -- the sum of the dominance measure of all species in a stratum.

This term was added to eliminate some confusion in the prevalent vegetation concept.

H. PERCENT DOMINANCE -- The sum of the dominance measure of a species divided by total dominance measure for a stratum, expressed as a percent. For example -- the total cover by Carex stricta compared to the total cover of all species in the herb layer.

This term was added to eliminate some confusion in the prevalent vegetation concept.

I. HYDROPHYTES -- are considered to be prevalent when more than 50% of the list of dominant vegetation are within the range OBL through FAC on the current National List of Plant Species That Occur in Wetlands: Northeast (Region 1) NOTE: FAC-, FACU and UPL species are considered hydrophytes when observable morphological or physiological adaptations to wetland hydrology are found in the observation plot. Except FAC-, the other + and - signs may be ignored when processing the wetland indicator status data, i.e. FACW+, FACW-, FAC+, FACU+, FACU- are considered FACW, FAC and FACU, respectively.

On page 61 in Step 9 of the Routine protocol, the 1987 Manual generally describes the determination procedure in terms similar to these. Our supplemental definition expounds on two points: First, the use of certain observable adaptations and the use of FAC- indicator status.

Appendix C, Section 3, of the 1987 Manual describes observable morphological, or physiological adaptations that may enable a plant species to occur in areas having anaerobic soil conditions. When typically non-wetland species exhibit one of these adaptive features within the sample plot, that sample can be considered as a hydrophyte. The second point, the New England Division definition does not normally consider plants with a FAC- indicator status to be hydrophytes. Although this is not congruous with the 1987 Manual, the exclusion of FAC- is absolutely consistent with the answer to question 4 in the Q&A's from John Studt (CECW-OR, 16Sep91). When the definitions of the 1987 Manual are compared with those of the National List (Reed, 1988), it cannot be easily construed to exclude FAC- species as hydrophytes. To facilitate the readers' comparison, the following text is offered:

In the 1987 Manual, Table 1, Page 18 defines Facultative Plants (FAC) as "Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands." Compare that with the definition found on the National List (Reed, P.B., 1988). Reed defines Facultative (FAC) as, "Equally likely to occur in wetlands or nonwetlands (estimated probability 34%-66%). A positive(+) or negative(-) sign was used with the Facultative Indicator categories to more specifically define the regional frequency of occurrence in wetlands. A positive sign indicates a frequency toward the higher end of the category (more frequently found in wetlands), and a negative sign indicates a frequency toward the lower end of the category (less frequently found in wetlands)."

J. OBSERVABLE PLANT ADAPTATIONS TO WETLAND HYDROLOGY:

Pneumatophore	Buttressed Trees	Hypertrophied Lenticels
Stooling	Adventitious Roots	Inflated Leaves, Stems, or Roots
Floating Leaves	Shallow Root Systems	Rhizospheric Oxidation
Floating Stems	Polymorphic Leaves	

This list is extracted from the 1987 Manual, Appendix C, Section 3 and consists largely of morphological adaptations to saturated soils. In practice, rhizospheric oxidation is the only physiological adaption that is readily observable in the field without any elaborate testing equipment. When a species within the observation plot exhibits one of these adaptive responses to wetness, that individual can be considered as a hydrophyte when coupled with strong indicators of hydric soils and hydrology. This is consistent with Paragraph 35b(2) of the 1987 Manual. In practice, this is of great utility during the interpretation of some of our common problematic species, such as: White pine, Eastern hemlock, Red spruce, and White ash. Near the wetland boundary it is not uncommon to find both hydrophytic and non-hydrophytic growth forms of the same species.

K. HYDRIC SOIL -- a soil that is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

This is not the definition of HYDRIC SOILS in the 1987 Manual. However, it IS the current definition developed by the U.S. Soil Conservation Service in cooperation with the National Technical Committee for Hydric Soils (NTCHS, SCS, 1991). This is consistent with the 16 September 1991 directive from John Studt (CECW-OR, 16Sep91).

L. SOIL SURFACE -- For organic soils (Histosols) or mineral soils with a thick organic surface layer (histic epipedon), the soil surface is the uppermost organic horizon or layer that is, or has been, saturated for prolonged periods. Otherwise, the soil surface is the top of the mineral soil (This will be used to describe the depth to the horizons or layers, and their thickness.)

The 1987 Manual does not define SOIL SURFACE. This is a fundamental concept necessary to describe and interpret soils. This definition is consistent with Soil Taxonomy (Soil Survey Staff, 1975, 1990) and modern soil survey mapping methodology.

M. WETLAND HYDROLOGY -- permanent or periodic inundation, or soil saturation for a significant period (usually two weeks or more) during the growing season.

Paragraph 48 and Table 5 of the 1987 Manual describe hydrologic zones modified from a system developed by the Workshop on Bottomland Hardwood Forest Wetlands of the Southeastern United States (Clark and Benforado, 1981 in Environmental Laboratory, 1987). In the answer to question 8 of the Studt Q&A's (CECW-OR, 16Sep91), emphasis is placed upon the upper and lower bounds of Hydrologic Zone V. The jury is still out on the scientific validity of these thresholds and their applicability to the formerly glaciated Northeast; nevertheless, they do have regulatory utility in this region. In New England's most common temperature regime -- mesic, the estimated agricultural growing season is 180 days between last and first killing frosts. Our caveat "usually two weeks or more" is comfortably near the median of Hydrologic Zone V (5%-12.5%).

It must be noted that "growing season" is a highly controversial issue among wetland scientists and there is substantial evidence that significant biological activity and reducing soil conditions are common whenever saturated soils are not frozen. Meanwhile, the agricultural growing season and "usually two weeks or more" are good rules of thumb and consistent with the hydric soil criteria (NTCHS, SCS, 1991).

4. DELINEATION DATAFORMS -- Since 1987, New England Division has used a detailed dataform to document wetland determinations. The forms found in the 1987 Manual are totally inadequate and misleading, so for nearly 5 years, our staff has used substantially improved regional versions to provide space to record additional information needed by Corps' projects managers to substantiate wetland boundaries delineated by agents for the applicant. The form is generally organized into six compartments: Forms Identification, Vegetation Data, Soils Data, Soils Determination, Hydrology Data and Determination and Conclusions. It is not necessary to complete all compartments on the dataforms.

A. FORMS IDENTIFICATION: The following fields are the minimum necessary to identify the relationship of data to a specific project and specific observation plot: Project Title, Transect & Plot, File Number and Date. Since the forms are double-sided all but the File Number is duplicated on each side to minimize disorder during photocopying and handling.

B. DATA -- VEGETATION: This compartment provides room to characterize the dominant plant community. This characterization consists of: Stratum and Species, the Dominance Ratio (i.e. the Dominance Measure for the species compared to the Total Dominance Measure for the stratum), the Percent Dominance (i.e. the Dominance Ratio expressed as a percent) and the Indicator Status. The value of these data is largely self-evident; however, the utility of Dominance Ratio may not be immediately apparent -- this is the record of the actual field estimates. This record facilitates verification and enables project managers to assess the data for reasonable accuracy. The Tally section records the calculation of percent hydrophytes. Space is also provided to describe vegetation disturbance or adaptations which warrant special consideration in the interpretation of the plant community.

C. DATA -- SOIL: This compartment provides room to represent the soil using modern-day conventions for describing soil profiles. Several fields are available to record soil taxonomy, drainage class and soil survey information when these details are known to the delineator. A remarks section and space to sketch the landscape position are useful to augment or explain the interpretation and/or relative location. The profile description provides sufficient information to substantiate the soil determination -- it provides enough clues to validate the aquic moisture regime, the drainage class and evidence of a water table.

(1) Depth -- the horizon boundaries as measured from the soil surface.

(2) Horizon -- the delineators interpretation of the pedogenic processes and parent materials are evident in their interpretation of the soil horizon.

(3) Matrix Color -- the dominant color of the moist soil as described using the Munsell Color Charts.

(4) Mottles Color -- in addition to the color of the mottles, their abundance and contrast are significant clues to the degree of wetness expressed by the morphology of the soil.

(5) Other Features: USDA Texture, iron or manganese nodules or concretions, restrictive layers, root distribution, oxidized rhizospheres, etc. -- while these features are important for the interpretation of the soils, they may also offer some insight into the adaptations of the plants in the vicinity of the soil pit.

D. SOIL DETERMINATION -- A NOTE in the headline is a caveat of three very important points. These points emphasize that the discriminative routine may miss some hydric soils; the routine was developed for use only in New England and there are circumstances where the discriminative routine is inappropriate. Fundamental to the interpretation of hydric soils are the criteria established by the National Technical Committee on Hydric Soils. The criteria is hierarchical in nature sorting on Soil Taxonomy, Drainage Class, and finally on evidence of a water table. The soil determination is consistent with the NTCHS criteria and is organized into the same basic hierarchy.

(1) Soil Morphology as the Basis for Drainage Class -- Interviews and field investigations with several hundred professional soil scientists in the New England revealed that there is close agreement on the morphology associated with modal concept for each drainage class within our region; however, ranging away from the widely-accepted central concepts, inconsistencies between practitioners become evident. Subtle differences frequently involved team members mapping the same series in the same county survey. However, using the modal concepts and in cooperation with practicing soil scientists, a system of precise morphological determinants were developed to facilitate the drainage class interpretations so fundamental to the hydric soil determination. The attached narrative and series of line drawings describe each of the drainage classes.

(2) Soils that are Flooded or Ponded for a duration longer than two weeks during the growing season -- this is consistent with the criterion in the 1987 Manual at Paragraph 37c. and 37d.

(3) The soil meets the Corps of Engineers regional criteria as a VERY POORLY DRAINED SOIL (VPD) and there is no evidence of altered hydrology -- this is consistent with the criterion in the 1987 Manual at Paragraph 37b.(2). In this region, a VPD soil has a water table at or near the surface for at least 30 days and commonly for most of the year. Generally speaking, the water table is subject to little fluctuation in these soils. As described in our regional criteria, these soils are Histosols or are in Aquic suborders of mineral soils with a high accumulation of organic matter in the epipedon. A1 through A4 describe and depict the range of characteristics of most Very Poorly Drained Soils encountered in New England.

(4) The soil meets the Corps of Engineers regional criteria as a POORLY DRAINED SOIL (PD) and there is no evidence of altered hydrology -- this is consistent with the criterion in the 1987 Manual at paragraph 37b.(2). In this region, a PD soil has a water table frequently at or near the surface for a significant period, usually two or more weeks during the growing season. As described in our regional criteria these are mineral soils in Aquic Suborders with markedly less organic matter than accumulates in the VPD soils. For most of the Poorly Drained Soils in New England, the range of characteristic is described and depicted in a sequence of seven illustrations, B1 through B3(c)(2).

(5) SOMEWHAT POORLY DRAINED SOILS (SPD) -- Commonly in New England, the boundary between wetland and non-wetland will occur within a zone described by our Somewhat Poorly Drained morphology. Because these zones are often relatively narrow in contrast to adjacent mapping units, they may have been mapped on county soil surveys with their Moderately Well Drained or Poorly Drained counterparts. Nevertheless, soils with SPD morphology are common and the accuracy of a wetland boundary is often directly related to a practitioner's ability to discriminate between the hydric and non-hydric components of this class.

(a) In this region, a SPD soil often has a widely fluctuating water table that is frequently within the upper 16 inches of the soil for at least two weeks during the growing season. The range of characteristics are described and depicted on C1 for Spodosols and on C2 for other mineral soils. Both Aquic suborders and Aquic subgroups can occur within this drainage class, but the class includes soils that are in a udic moisture regime as well. Therefore, New England's interpretive routine selects the hydric subset of Somewhat Poorly drained Soils based upon two lines of evidence that are consistent with the 1987 Manual Paragraph 37b.(1):

(b) The first line of evidence relates to one of the following morphological features when it is evident within 6 inches of the surface: the subsoil is mottled throughout and mottles are so pronounced that they can be seen within 6 inches from the surface despite of the masking effect of the topsoil; or, high contrasting mottles on a lower chroma matrix are sufficiently abundant within 6 inches from the surface; or, the subsoil is mottled throughout and high contrasting root mottles are evident within 6 inches from the surface.

(c) The second line of evidence facilitates the interpretation of hydric SPD soils with thickened topsoils where the accumulation of organic matter by wet conditions has been so pronounced as to effectively mask any mottling, an interpolation to the 6 inch is facilitated. The recommended interpretation looks for strong redoximorphic features within 24 inches of the soil surface and at least 10% abundant high contrasting mottles on a lower chroma matrix immediately below the topsoil. Below a dark (organic-enriched) topsoil that is between 10 and 14 inches thick, cautious interpolation should consider both the strength of the plant community and hydrology information before reaching a hydric soil conclusion.

(5) The dataform acknowledges that other procedures are available for determining a hydric soil. When other procedures are used, a description is requested.

E. DATA & DETERMINATION OF HYDROLOGY -- A precautionary NOTE in the headline emphasizes three points: Hydrology is often the most difficult feature to observe; interpretations must consider the appropriateness of the observations in light of the season, recent weather conditions, and watershed alterations; and, interpretations of hydrology may require repeated observations over more than one season.

(1) RECORDED DATA -- When the delineator has had access to hydrologic records, he is requested to identify that source in a space provided; or, when hydrologic records are not reasonably available to the delineator, the delineator is requested to make that fact known on the dataform. The types of hydrologic records that are suggested are from the 1987 Manual, Paragraph 49a.

(2) FIELD DATA -- The list of field hydrologic indicators is directly from the 1987 Manual, Paragraph 49b. The list is also in the descending order of reliability suggested in the manual. Depths to free water and saturation are requested, as well as a description of any altered hydrology. As suggested by numerous practitioners, a remarks section provides the delineator with an opportunity to make additional comments or more fully explain his interpretation of the observations.

F. CONCLUSIONS: Within this compartment some of the forms identification information is repeated: Project Title, Transect, Plot and Date. This insures that there is adequate identifying information associated with the conclusions when the dataforms are photocopied or otherwise archived. Additionally, the identity of the delineator is requested and space is provided for remarks to augment or explain the conclusions. The actual conclusions require a "Yes" or "No" response:

(1) Greater than 50 percent Hydrophytes?

(2) Hydric soils criterion Met?

(3) Wetland Hydrology Present?

(4) IS THE DATAPOINT WITHIN A WETLAND?

5. ADDITIONAL RECORDS -- A site sketch is usually necessary as a long term record to identify the wetland boundaries and any ground controls which will facilitate the recovery and verification of the delineation data.

6. SETTING:

A. 33 CFR Part 320.1(a)(2) describes the Corps as a highly decentralized organization with most of the authority for administering the regulatory program delegated to the District and Division Engineers. In the 20 February 1992 Memorandum from the Director of Civil Works, Major General Williams suggests that there may have been a fundamental change in that philosophy and a diminution of the District Engineer's authority pursuant to 33 CFR Part 325.9. If applied literally, the directive could greatly reduce the flexibility that has enabled Districts to tailor jurisdictional delineation procedures to an ecology and constituency that is unique to each region.

B. Since 1987, the regulated public has been subjected to several major changes in the technical guidance relating to federal jurisdiction over wetlands. This has caused much upheaval in other regions of the country, but in New England, these transitions have been relatively smooth and jurisdiction has been relatively consistent. This is largely because we have promptly responded to the requests for technical precision from the public and enthusiastically presented detailed, well-founded guidance to our constituency. Through numerous professional associations and societies, our network of professionals and layman interested in New England wetland jurisdictional issues has grown to a directory of more than 1000. Particularly over the past six years, we have devoted an extraordinary effort to inform the public and educate the environmental services community. We are closely allied with scientists in each of those State and Federal agencies with wetlands interests in this region.

C. The delineation practitioners in the Environmental Resources Section are eager to discuss and/or demonstrate any of the concepts that are described herein. Our practical delineation experience is unbroken since 1980. The protocol that we practice in New England is the outgrowth of public involvement as well as our advanced education, research and experience in the areas of soil science, botany and wetland hydrology.

7. RECOMMENDATIONS:

A. The District Engineer is encouraged to make a finding on the Draft Memorandum dated 9 September 1991 and entitled, "Guidance for the Interpretation of Wetland Boundaries Using the 1987 Corps Manual in the Six New England States. It is recommended that he find: the memorandum is consistent with the 1987 Manual and does not alter the basic approach for making wetland determinations, i.e. the determination is based upon the dominant plant species, soil characteristics and hydrologic characteristics of the area in question and the protocol ensures documentation that is complete, accurate and substantiates the Corps decision.

B. The District Engineer is encouraged to request that the Division Engineer and the Director of Civil Works endorse his finding and reaffirm the authority of the District Engineer to determine the area defined by the term "waters of the United States," this term includes wetlands (33 CFR Part 325.9).

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