# ENVIRONMENTAL ASSESSEMENT AND FINDING OF NO SIGNFICIANT IMPACT FOR THE ALASKA REGIONAL SUPPLEMENT TO THE 1987 WETLAND DELINEATION MANUAL

## Purpose and Need

The purpose and need for this supplement to the 1987 Manual is to use the best available scientific and technical information for improving precision in delineating upland/wetland boundaries in Alaska for purposes of Section 404 of the Clean Water Act and provide a procedure for continual future updates as more data are gathered and analyzed.

## Background

The U.S. Army Corps of Engineers Wetland Delineation Manual was published in 1987 (Environmental Laboratory, 1987) and identified a three-parameter approach to delineating wetlands – hydric soils, wetland hydrology and hydrophytic plants. Use of this manual for wetland delineation by Corps Districts has been mandatory since 1991.

Since the manual was first published, the U.S. Fish & Wildlife Service (FWS) proposed updating the 1988 National Plant List and the Natural Resources Conservation Service (NRCS) has published newer versions of the "Hydric Soils of the United States". In addition, wetland science has advanced the understanding of the processes (e.g., biochemical) in these systems.

In 1993, the U.S. Congress requested that the Environmental Protection Agency (EPA) ask the National Academy of Sciences, National Research Council (NRC) to create a committee to study the scientific basis for the characterization of wetlands. The committee was asked to review and evaluate the consequences of alternative methods for wetland delineation and to summarize the scientific understanding of wetland functions (National Research Council, 1995). One of the recommendations of this committee was to develop regional supplements to the 1987 Manual and that the regions should be defined on the basis of physiography, climate, vegetation and prevailing land use and should be used by all agencies for wetland characteristics.

The Corps Engineer Research and Development Center (ERDC) was asked to identify and discuss the technical issues relevant to regionalization of the manual (Wakeley, 2002). The Corps, as the lead Federal agency and author of the 1987 Manual, invited the other three Federal agencies that assess wetlands (EPA, NRCS and FWS) to participate in the development of regional supplements, as recommended by the NRC. A National Advisory Team consisting of representatives of all four Federal agencies was created to oversee the regional supplements to provide quality control, consistency on national issues and decisions regarding the timing and defining of "regions". This regional supplement was developed by a Regional Working Group consisting of experts from Federal/state/local agencies and academia. The availability of the draft supplement was announced through the Corps public notice process for public comment and field-testing, and underwent an independent peer review as discussed below. When

finalized, the interim supplement will be implemented with additional field-testing for one year before a final version of the supplement is published by ERDC.

This document discusses the factors considered by the Corps during the development process for the Alaska Regional Supplement. This Environmental Assessment/Finding of No Significant Impact contains: (1) a discussion of the environmental consequences necessary to comply with the National Environmental Policy Act, and (2) creation of an independent peer review, their report and the Corps response to their comments as required by the Office of Management and Budget (2004).

Alternatives

We considered three alternative methods with respect to the 1987 Manual. The No Action Alternative would result in the continued use of 1987 Manual without scientific or technical changes. The preferred alternative would be to develop regional supplements that identify a narrower list of indicators appropriate for that ecological region, include more helpful local photographs and descriptions and more detailed guidance on problem areas. The third alternative considered was to update and republish the 1987 Manual.

Affected Environment

This supplement is applicable to the Alaska Region, which is defined as the entire state of Alaska. Alaska is characterized by a humid temperate climate along the southeastern coast and a polar climate across the rest of the state. The polar climate is controlled mainly by polar and arctic air masses; in general the temperatures are low, winters are severe and annual precipitation is low, much of it occurring during the summer. Although day length during the summer can be long, the intensity of solar radiation and potential for evapotranspiration are relatively low. Soils are usually frozen during the winter and the growing season is short (USACE, 2005).

Alaska's land surface covers more than 586,000 square miles. Climate, geology and landforms are highly variable across the region. The northern portions are underlain by continuous permafrost, which become discontinuous, isolated, and fade away toward the south. Plant communities are spatially variable, ranging from the grass, sedge, lichen, and dwarf-shrub communities of the arctic tundra to the coniferous rainforests of southeastern Alaska. Wetlands are more abundant in Alaska than in any other region of the United States, comprising more than 43% of the state's surface area. Wetland types include salt marshes, bogs, muskegs, fresh marshes, swamps, and wet and moist tundra (USACE, 2005).

The identification of the upland/wetland boundary can be difficult since this is, by definition, a transition area between land and water. When completing a wetland delineation, the collection of hydrology, hydric soils and hydrophytic plant data may not always occur at the optimal time of the year to identify clear indicators. Local conditions (wet or dry climate cycles, fire, heavy or light snow packs) must be considered. Once an upland/wetland boundary has been identified, the

question of Section 404 jurisdiction based on hydrologic connections to other waters of the U.S. must be determined and is a separate policy issue not addressed in this supplement

Environmental Consequences

The No Action alternative would not achieve one of the goals of the Corps, which is to use the best scientific/technical information available in the Clean Water Act Section 404 program or the purpose and need of this project. The No Action alternative would result in continued heavy use of the "problem areas" section of the manual without additional science-based guidance. Although the 1987 Manual is updated to incorporate some other technical information such as use of updated National Plant Lists and the Natural Resources Conservation Service Hydric Soils Manual, newer information such as alternative procedures for calculating plant dominance may not be used consistently. Use of the 1987 Manual with no changes would result in continued confusion and lack of clarity, predictability, precision and consistency in the region. For example, there is no information or guidance in the 1987 Manual that addresses permafrost underlain wetlands or wetlands dominated by bryophytes, both common wetland types in Alaska. No changes to wetland delineation methods or boundary lines would occur with this alternative.

The preferred alternative, to develop regional supplements to the 1987 Manual using the best available scientific data, is expected to result in more consistent, science-based upland/wetland boundary determinations by Federal, tribal, state and local government delineators as well as private parties. Region-specific issues such as new hydric soils indicators (if they were developed for specific technical problems such as permafrost in Alaska) would be included in the appropriate regional supplement. Also, region-specific technical problems such as plant cover of bryophytes or morphological adaptations of certain plant species can be described and photographs and guidance will be included in each regional supplement. This results in a more user friendly and region-specific document. Also, if changes in a particular region of the country need to be made, then the entire country does not need to change versions.

Changes to this supplement would be much easier that continuous changes to a national manual. There will be some training requirements for both agency personnel and private companies as this supplement is finalized. A transition period of one year will occur when the interim document is published and additional data will be collected on perceived changes to upland/wetland boundaries based on the new supplement. Additional needed changes will be made prior to publishing a final document. It is not expected that the regional supplement will have the net effect of increasing or decreasing the total amount of wetlands in Alaska, although site-specific boundary changes may occur. These changes may occur due to more refined plant indicators (e.g., bryophytes) or the use of new soils or hydrology indicators. The testing period using the interim document will allow for further identification of the types and reasons that changes to wetland boundaries occur, prior to finalization of the document. If significant changes to wetland boundaries of specific types or in specific geographic locations occur, an analysis would be completed to determine the acreage of wetland affected and the indicator(s) responsible for the change. However, all areas must continue have all three parameters – wetland

hydrology, hydric soils and hydrophytic vegetation – in order to be determined to be a wetland that may be regulated under Section 404 of the Clean Water Act.

The third alternative would be to update and republish the 1987 Manual. Some overlap in supplements is expected as they are developed from west to east and common themes may eventually develop, resulting in changes and republication of the 1987 Manual for national issues such as changes to procedures for plant dominance calculations that may be identified. However, without identifying specific technical problems by developing regional supplements, it is difficult to articulate national issues. There would be a difficulty in answering problem area questions across the country without a systematic approach to identifying technical problems and solutions. This alternative would likely take an addition 5-6 years to identify all of the national technical problems and result in continued difficulty updating a single document.

Coordination with Others

Copies of the comments received during the public comment period are attached to this document. A 60-day comment period was announced by public notice by the Alaska District on June 28, 2005 with a correction notice issued on July 6, 2005. The second notice was issued to correct the e-mail address for submitting comments. Comments were received from the following individuals:

Alaska Miners Association: The commenter does not believe the supplement clarifies the delineation process, but makes it more subjective and wants it withdrawn and the 1987 Manual used or significantly changed and re-noticed. The Corps did not identify which parts of the 1987 Manual are superceded. In some cases the new tests are extremely expansive and go far beyond what is a wetland under the current criteria. The three-parameter approach is abandoned. Guidance on isolated waters is needed. The draft does not comport with the NRC study.

*We disagree that this supplement should be withdrawn or significantly changed and re-noticed. The supplement was field-tested in 2004 to determine if the proposed clarifications significantly change the wetland/upland boundary line. A table was added that identified which parts of the 1987 Manual will be replaced by information in the supplement. We disagree that the supplement is inconsistent with the NRC report or with the Energy & Water Act of 1993. However, we have decided to issue the supplement as an interim document for one year and require it be used on new projects (case-by-case exceptions can be granted by the District Engineer). We will continue to accept field-testing from agency and private individuals and will make any necessary changes before issuing the final version through a public notice.*

Alaska Railroad Corporation: The commenter raised several issues including the use of hydric soils indicators listed for testing. The commenter believes that all three parameters are not longer required in the Problem Areas section of the supplement. The identification of hydrophytic plants has been expanded.

*The hydric soil indicators in Chapter 3 of the draft supplement are identical to those approved*

*by the NTCHS. In addition, four test indicators are presented in the supplement that can be used in problematic hydric soil situations according to the procedure in Chapter 5. These test indicators may only be used if hydrophytic vegetation is present, at least one primary indicator of wetland hydrology is present, and the site is in an appropriate landscape position. Alaska NRCS has tested these indicators and is confident of their reliability when the described procedure is followed. Use of the hydric soil indicators in the supplement should help prevent false-positive hydric soil determinations due to gray colors of many Alaskan parent materials.*

*The supplement does not expand the identification of hydrophytic vegetation beyond what is already allowed under the 1987 Manual and does not disregard the plant lists. Hydrophytic vegetation indicators in the 1987 Manual include visual observation of plant species growing in areas of prolonged inundation or saturation, morphological adaptations, technical literature, and physiological and reproductive adaptations. Similar but more specifically defined indicators are retained in the supplement. In addition, the supplement attempts to clarify and make more objective the procedures used to identify known problematic wetland vegetation types. Some vegetation problem situations may be caused by incorrect wetland indicator status ratings. However, revisions to the plant list are a separate matter beyond the scope of this supplement. Concerning the procedure in Chapter 5 for "Plants growing on hummocks" [p. 81], this item will be dropped from the supplement. If hummock tops do not qualify as wetlands, then the procedure for Wetland/Non-Wetland Mosaics should be used.*

*Test hydric soil indicators TA4 (Alaska Color Change) and TA5 (Alaska Alpine Swales) are listed in Chapter 5 because they have not yet been approved for general use by the NTCHS. When they are approved, they will be moved to Chapter 3. However, Alaska NRCS is confident that these indicators are reliable. Therefore, they may be used as part of the procedure to identify problematic hydric soil types.*

Amodio Stanley & Reeves: The draft supplement will have a significant affect on one large project in which wetland data are already being collected. The effective date for implementation of the draft supplement should be no earlier that 2020.

*The public notice announcing the interim supplement will indicate that applicants who document to the appropriate Corps district that they started a wetland delineation using the 1987 manual and receive district concurrence are not required to use the supplement to complete that project delineation.*

State of Alaska, Department of Environmental Conservation: The draft supplement fails to provide guidance on whether a wetland is jurisdictional.

*The supplement deals specifically with the upland/wetland boundary lines and is independent of policy regarding the SWANCC court case and jurisdiction under Section 404 of the Clean Water Act.*

Natural Resources Conservation Service: A number of technical soils comments were provided by a member of the Regional Working Group.

*The technical comments were considered and changes made as appropriate.*

Independent Peer Review:

The purpose of the Office of Management and Budget Information Quality Guidelines (2004) is to enhance the quality and credibility of the government's scientific information, recognizing that different types of peer review are appropriate for different types of information. A copy may be obtained at http://www.whitehouse.gov/omb/inforeg/peer2004/peer_bulletin.pdf . The Federal agencies were granted broad discretion to weigh the benefits and costs of using a particular peer review mechanism; however, agencies strive to ensure that their peer review practices are characterized by both scientific and process integrity. Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community and involves the review of a draft product for quality by specialists in the field who were not involved in producing the draft. The peer review report is an evaluation or critique that is used by the authors of draft information that contains important scientific determinations to improve the product. The selection of participants in a peer review is based on expertise, with due consideration of independence and conflict of interest. In some cases, reviewers might recommend major changes to the draft, such as refinement of hypotheses, modifications of data collection or analysis methods, or alternative conclusions. However, the peer review does not always lead to specific modifications in the draft product. In some cases, the authors do not concur with changes suggested by one or more reviewers.

A peer review is considered completed once the agency considers and addresses the reviewers' comments and incorporated where relevant and valid. In cases where there is a public panel, the agency publishes the peer review report(s) and the agency's response to the peer review comments. Agencies prepare a written response to the peer review report explaining: the agency's agreement or disagreement, the actions the agency has undertaken or will undertake in response to the report, and (if applicable) the reasons the agency believes those actions satisfy and key concerns or recommendations in the report. A copy of the peer review report, including the responses to the comments, is included as an attachment to this document.

Finding of No Significant Impact:

In compliance with the National Environmental Policy Act (NEPA) and its implementing regulations at 40 CFR parts 1500 – 1508, an Environmental Assessment has been prepared for this rule. The Corps prepares appropriate NEPA documentation, including Environmental Impact Statements when required, for all permit decisions. The environmental review process undertaken for this rule has led me to conclude that the publication of this supplement will not have a significant effect on the human environment, and therefore an Environmental Impact Statement is not required by §102(2)(C) of NEPA or its implementing regulations. A copy of

this Environmental Assessment with attachments is available from the U.S. Army Corps of Engineers, HQUSACE, Operations and Regulatory Community of Practice, 441 G Street, NW, Washington, DC, 20314-1000 and on the Regulatory Homepage at http://www.usace.army.mil/inet/functions/cw/cecwo/reg/reg_supp.htm.

Gerald W. Barnes, P.E.
Chief, Operations
Directorate of Civil Works

Literature Cited

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

National Research Council (NRC). 1995. Wetlands Characteristics and Boundaries. National Academy Press (Washington, DC). 308 pp

Office of Management and Budget. 2004. Final Information Quality Bulleting for Peer Review.

U.S. Army Corps of Engineers (2005). "Interim Regional Supplement to the Corps of engineers Wetland Delineation Manual: Alaska Region." J.S. Wakeley, R.W. Lichvar and C.V. Noble, eds. Technical Report **, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Wakeley, J. S. (2002). "Developing a "Regionalized" Version of the Corps of Engineers Wetlands Delineation Manual: Issues and Recommendations," ERDC/EL TR-02-20, U.S. Army Research and Development Center, Vicksburg, MS.

# Public Notice

**US Army Corps**
**of Engineers**
Alaska District
Regulatory Branch (1145b)
Post Office Box 6898
Anchorage, Alaska 99506-0898

Date:
28 June 2005
Identification No
SPN 2005-10
In reply refer to above Identification Number

SPECIAL PUBLIC NOTICE 05-10
Draft Alaska Regional Supplement

The U.S. Army Corps of Engineers, Alaska District, announces the availability of the Draft Alaska Regional Supplement to the 1987 Wetland Delineation Manual (Environmental Laboratory 1987). This draft was developed by regional expert delineators with input from state and Federal agencies, academia and other local experts. It is being peer reviewed by a panel of independent scientists (report will be available upon request). This draft is also being field tested by interagency teams of state and Federal agencies to determine the clarity and ease of use of the document and whether its use will result in any spatial changes in wetland jurisdiction for Clean Water Act Section 404 purposes

We are specifically seeking public input, including scientific information/data, on the proposed hydrology, soils and vegetation indicators and data collection procedures in this draft document. Reviewers may wish to field test this manual as part of the public comment procedure. The protocol for this testing is to perform wetland delineations using both the 1987 Wetland Delineation Manual and this draft regional supplement on the same data points. Reviewers should include data sheets from both the manual and draft supplement, maps indicating data collection points (upland and wetland) and a completed questionnaire for each delineation point. The draft, along with the testing protocol and questionnaire, are available at
ftp://erdc-ftp.wes.army.mil/pub/outgoing/wakeley/wetlands/Alaska/

Comments may be submitted to Ms. Katherine Trott (CECW-LRD), U.S. Army Corps of Engineers, 441 G. Street, NW, Washington DC 20314-1000 or by e-mail to 87Manual@usace.army.mil. The comment period will expire 60 days from the date of thie Special Public Notice. Another public notice will be issued by this district announcing the publication of the final supplement and the implementation date of this supplement.

District Engineer
U.S. Army, Corps of Engineers

Attachment(s)

US Army Corps
of Engineers
Alaska District

Regulatory Branch (1145b)
Post Office Box 6898
Elmendorf AFB, Alaska 99506-0898

# Public Notice of Application for Permit

**REVISION** **06 July 2005**

Special Public Notice SPN 2005-10

On June 28, 2005, the Alaska District Corps of Engineers published a Public Notice entitled SPN 2005-10 for the Draft Regional Supplement to the 1987 Wetland Delineation Manual.

The notice listed the e-mail address for comments as "87Manual@usace.army.mil"

This e-mail address is incorrect and should instead read: 1987Manual@usace.army.mil

All other information contained in the previous notice remains the same. Please bring this announcement to the attention of anyone you know who is or may be interested. Please contact Katherine Trott (CECW-LRD), U.S. Army Corps of Engineers, 441 G. Street, NW, Washington DC 20314-1000 or by e-mail to 1987Manual@usace.army.mil, if further information is desired concerning this notice. For additional information about our Regulatory Program, visit our web site at www.poa.usace.army.mil/reg.

District Engineer
U.S. Army, Corps of Engineers

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August 25, 2005

Katherine Trott (CECW-LRD)
U.S. Army Corps of Engineers
441 G. Street, NW
Washington, DC 20314-1000 87Manuel@usace.army.mil.

RE: Draft Alaska Regional Supplement to 1987 Wetlands Delineation Manual (Notification No: SPN 2005-10)

Dear Ms. Trott,

Thank you for the opportunity to comment on this important issue. Wetlands management and permitting are extremely important issues for the Alaska Miners Association.

The Alaska Miners Association is a non-profit membership organization established in 1939 to represent the mining industry. The AMA is composed of individual prospectors, geologists and engineers, vendors, small family mines, junior mining companies, and major mining companies. Our members look for and produce gold, silver, platinum, diamonds, lead, zinc, copper, coal, limestone, sand and gravel, crushed stone, armor rock, etc. Our members live and work throughout the state and have been involved in the dialogue over wetlands for more than two decades.

The AMA is very disappointed with the Draft Alaska Regional Supplemental to 1987 Wetlands Delineation Manual (Draft). This Draft does not clarify the delineation of wetlands but rather makes the process even more subjective than it already is in the 1987 Manual.

**The AMA requests that the Draft Alaska Regional Supplement be withdrawn and, either significantly changed and re-noticed for public comment, or that the 1987 Wetlands Delineation Manual be left as it is for future use.**

The AMA and its members have suffered for years through the current regulations and the agency process of applying and interpreting the 1987 Manual. Now is the time to correct the problems of the current Manual and make the entire process clear and transparent for both the agencies and the regulated public. The goal must be a precise, objective and repeatable methodology for wetlands delineations.

The Draft does not correct the problems. Rather, it adds more wordage which is sometimes contradictory and will lead to delineation that is even more subjective than at the present time. Each of the indicators should allow the public to walk through a logical and repeatable process to determine what is and is not wetland.

The Draft is intended to supersede parts of the 1987 Manual and add to other parts of the Manual. However, the Corps has not identified which parts supercede and which parts are meant to be new material. The Draft states the where there are differences, the Draft supersedes the 1987 Manual. This approach is guaranteed to create new problems. The Corps must specify by section, paragraph and line exactly which parts and words are to be replaced. To do anything less is guaranteed to create expanded problems and expand the

avenues for challenges, both by the permittees and by third party litigants.

In some cases the new tests proposed in the Draft are extremely expansive and go far beyond what is wetland under the current criteria. One such example is use of "wetland tolerant" species as an indicator. This is an extremely broad criteria and the result will be that much more land area will become "wetlands" if this is used. It also appears that in some cases the long-standing three parameter approach of the 1987 Manual is being abandoned. This is very troubling.

The entire process for each indicator should also be shown in a decision-tree format that will allow everyone to know exactly what the steps are and how they fit together. Such a decision-tree will also greatly aid in discussing wetlands delineation between the agencies and the public because it will allow reference to a specific location on the tree. Such a decision-tree will also lend itself to development of a checklist or "score card" for each area being evaluated to aid in field studies.

A glossary of terms with the definition of each is needed.

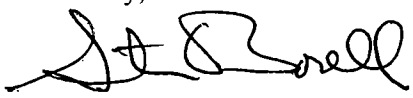
The Corps has spent a tremendous amount of time, money and effort pursuing regionalization of the 1987 Manual. However, the Corps has not provided written guidance on the most basic question and that is whether or not the wetland is isolated or under the jurisdiction of the agency.

Before the next draft is released, the Corps should test apply the Draft to be certain the results are consistent, precise, objective, and repeatable. The test should include several knowledgeable individuals being assigned to use the Draft and 1987 Manual and do wetlands delineations for the 8 or 10 major types of land encountered. The results of this test should be part of the public notice process.

Finally there is the question of legality. In the Energy & Water Development Act of 1993 Congress directed that the Corps and EPA follow the 1987 Manual. Congress also directed the National Academy of Sciences to study the issue. The resulting National Research Service report is titled "Wetlands Characterization and Boundaries" dated 1995. However, the Draft does not comport with this NAS report. Indeed, many of the problems defined in the study are not addressed and not corrected in the Draft. How then can the Draft supersede any part of the 1987 Manual? It appears that if this Draft is followed, it would usurp Congressional authority in that it does not follow the NAS report.

Thank you for the opportunity to comment. **The AMA requests that the Draft Alaska Regional Supplement be withdrawn and either significantly changed and re-noticed for public comment or that the 1987 Wetlands Delineation Manual be left as it is for future use.**

Sincerely,



Steven C. Borell, P.E.
Executive Director

cc: Senator Ted Stevens
Senator Lisa Murkowski
Congressman Don Young
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August 26, 2005

Ms. Katherine Trott (CECW-LRD)
U.S. Army Corps of Engineers
441 G Street, NW
Washington, DC 20314-1000

Subject: Regional Supplement to the Corps of Engineers Delineation Manual: Alaska Region Comments

Dear Ms. Trott:

I would like to submit comments about the Alaska Regional Supplement to the Corps Delineation Manual (5-12-2005). To briefly give you my background, I spent three years in Minnesota as an environment scientist for a consulting agency performing wetland delineations across the Midwestern states of Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Iowa, Missouri, Illinois, Indiana, and Wisconsin for various fiber optic, railroad, mining, DOT, and many other private clients. I have a B.S. Degree in Environmental Science from the University of Minnesota with minors in water resources and soil science. I am a Soil Scientist in Training for the state of Minnesota. I was heavily involved in the Wetland Delineators Association in Minnesota during that time. I have since spent 5 years doing wetland delineations in Alaska mainly in Southcentral and the Interior, but I have also performed delineations in Southeast and Western Alaska.

Overall, I believe it will be very beneficial for the wetland delineation to reference specific indicators for each site. It would also lend more validity to the documentation as well. I do have some comments and questions about the document as follows:

How do these soil indicators compare to those listed in NRCS's Field Indicators of Hydric Soils in the United States (1998)? I did not go through all of the soils indictors, but I did notice that some of the ones listed for testing in Alaska are now incorporated in this regional supplement and some are not. Has enough testing been done to document the validity of these test indicators?

I am having a hard time with Chapter 5 – Difficult Wetland Situations in Alaska. The 1987 Manual (Section G-Problem Areas) specifically states that "this section is not intended to bring non-wetland areas having wetland indicators of two, but not all three, parameters into Section 404 jurisdiction." Chapter 5 of this manual seems to do just the opposite; provided that if you have two of the three indicators, this section allows a way to call the site wetland. I think situations 3 and 4 have validity, but I can't see the validity in situation 1 and have some questions with situation 2. Let's go through these three situations listed in this chapter:

1. Lacking indicators of hydrophytic vegetation
Each of these circumstances listed provides the user a way to disregard the National List of Plant Species that Occur in Wetlands: Alaska. This List was put together to "apply the wetland classification system accurately and consistently in the field". It took years and years of development and refinement to get this list, and this manual is discounting it entirely. Can we arbitrarily call any plant FAC for these circumstances? If these plants are FAC in these circumstances, shouldn't they always be, meaning the

National List should be revised? When the dominant vegetation is FACU and UPL plants on hummocks, why wouldn't this be a wetland/non-wetland mosaic?

It also says that hydrophytic vegetation should be considered present when the soil is saturated within 12 inches for $\geq$ 14 consecutive days during the growing season. Hydrophytic vegetation is from when saturation exerts a controlling influence on the plant species present. If the plant species are predominantly UPL or FACU, the saturation has not exerted a controlling influence on the vegetation, and it should not be considered a wetland according to the 1987 Manual. Same is true for each of these: reference sites, technical literature, vigor and stress, and point-intercept sampling. Each of these situations disregards the National List of Plant Species for Alaska. As mentioned in the 1987 Manual, "the presence of a few individuals of a hydrophytic species in a community dominated by upland species is not a sufficient basis for concluding that the area has hydrophytic vegetation." This situation seems to take that one step further in saying those upland species really aren't, so call them hydrophytic.

2. Problematic hydric soils
Some of the circumstances in this section have validity. The current definition of hydric soils (differing from the 1987 Manual) is "A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part." Why haven't the two USDA Alaska test indicators (TA4 and TA5) been included in the earlier part of the document in they are true here?

3. Periodically lack indicators of wetland hydrology
Hydrology is the one indicator that is difficult to document at all periods in the growing season. I have seen many situations where wetland hydrology is missing during the period that the delineation was performed, because of one of the reasons listed in this section.

Additionally, I would hope this document would be available as a field manual on water-resistant paper since the delineator would have to refer to it for the specifications of many of the field indicators.

Thank you for the opportunity to provide comments on this document. I hope the testing of this document has gone well in Alaska and that you have gotten a lot of feedback from other wetland professionals. I believe this public review process is beneficial to all of us in future use of this document. Please contact me at (907) 265-2376 if you have questions or require additional information about my comments.

Sincerely,

Christie M. Kearney
Environmental Permits Analyst

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August 29, 2005

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**Via Email:** 87Manuel@usace.army.mil.

RE: Draft Alaska Regional Supplement to 1987 Wetlands Delineation Manual
SPN 2005-10
Comments of Northern Dynasty Mines Inc.

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Dear Ms. Trott:

This letter transmits comments on the Draft Alaska Regional Supplement (Draft Supplement) to the 1987 Wetlands Delineation Manual (1987 Manual) on behalf of our client, Northern Dynasty Mines Inc. ("NDM"). We appreciate the opportunity to comment.

Implementation of the Draft Supplement would have a significant impact on NDM's Pebble Project. NDM continues to conduct environmental and other scientific investigations in anticipation of development of its Pebble Project, an open-pit gold, copper, molybdenum and silver mine in the Iliamna Lake/Bristol Bay region of Alaska.

The Pebble Project is the largest known gold deposit and the second largest copper deposit in North America. The project will have very significant positive economic impact on the region and the state. NDM is developing its project plan in such a way as to sustain subsistence activities and fishery resources and minimize potential impacts on the environment. NDM understands that permitting authorities, including the US Army Corps of Engineers ("Corps"), will scrutinize the proposed project during the permitting phase.

In anticipation of filing permit applications with the Corps, NDM has completed extensive environmental baseline studies, including significant data collection for wetlands delineation. NDM has spent approximately $2.5 million on wetlands delineation and mapping. In 2004 alone, over 100,000 acres of wetlands were field verified. Additional work is being conducted this year. The collection of baseline data and digital mapping in preparation of a Section 404 permit is anticipated to take several more years. All of this work is being prepared in accordance with the standards set forth in the 1987 Manual.

The 1987 Wetlands Delineation Manual has been utilized successfully for purposes of evaluating wetlands. NDM, in planning its Pebble Project, relied on the standards set forth in the 1987 Manual and the recommendations of its experts with respect to issues relating to wetlands that may exist in the vicinity of the project. To require it to re-do work or require it to undertake additional work based on newly established, but not yet tried, standards would impose a tremendous hardship on NDM, would be not be feasible economically and would add to the cost and uncertainty of this substantial project. It would be extremely difficult and costly for NDM to modify its methodology at this stage of its work on the Pebble project. Further, it could delay the Pebble Project.

NDM (and others similarly situated) should be able to use and to rely on work performed under the 1987 Manual. NDM has engaged Three Parameters Plus, a consulting firm with considerable expertise and experience evaluating wetlands, to assist it with its investigations. Three Parameters Plus, in turn, relies on its many years of experience, working with the 1987 Manual and its many discussions with Corps staff, interpreting the provisions of the 1987 Manual.

NDM planned its investigations based on the 1987 Manual. NDM has worked for over two years to collect the baseline data necessary to apply for permits and has several more years of data collection planned. NDM's 2004 study plan was reviewed by state and federal agencies and the 2005 program incorporates comments from those agencies. These agencies are in agreement with the wetlands methodology currently being used. To impose revisions to the 1987 Manual that would require NDM to re-do the work previously performed, that is in the process of being performed, or that is anticipated to be performed over the next five years, would impose an extreme hardship on NDM (and on other future applicants in the same stage of investigation).

NDM recognizes that the Corps has the authority to revise its regulations and guidance from time to time. That being said, it is unreasonable for NDM, and others similarly situated, to lose the value of work done to date, because of such revisions. NDM suggests that all work performed prior to the effective date of any such revisions, as well as work that is anticipated to be performed should be "grandfathered" under the 1987 Manual and that the effective date of any such revisions should be advanced to avoid unreasonable impacts on the regulated community. NDM suggests that the 1987 Manual (and not the Draft Supplement) should be

applied to all work performed to date, as well as that anticipated to be performed between now and 2020.

NDM, therefore, asks the Corps to consider setting the effective date for any Supplement to be no earlier than 2020, in order to protect those persons and projects that have been proceeding under the current regulations. Proposing a future effective date is appropriate and has been done in the past. For example, the statutes and related regulations requiring tank vessels carrying oil through open waters in the U.S. to have double hulls (part of the Oil Pollution Act of 1990, as amended) established a deadline of January 1, 2015 for a majority of the vessels presently in operation, for the double hull requirements. Congress dictated that final rules would provide that prior to January 1, 2015, these affected vessels would merely comply with structural and operational requirements that would provide "as substantial protection to the environment as is economically and technologically feasible." See, P.L 101-380, Section 4115.

Regarding the substantive changes to the 1987 Manual, NDM is extremely concerned that the Draft Supplement, rather than clarifying any issues relating to the delineation of wetlands, would create ambiguity, decrease certainty and complicate the process. In short, the changes would make the delineation process more subjective. As a result, the possibility of arbitrary decisions by the Corps and the likelihood that decisions by Corps staff would be challenged as "arbitrary and capricious" would significantly increase. This would not benefit the Corps or the regulated community.

The regulated community, the Corps and the public must be able to rely on clarity in the language of the applicable law and guidance documents and in the consistency in the regulatory process. The regulations and guidance in effect must be specific enough to ensure that that their application will provide clear, logical, consistent and repeatable results and to assure that the Corps will apply them consistently.

The Corps has provided no explanation whatsoever of what portions of the 1987 Manual are superseded by the Draft Supplement. It is difficult, if not impossible to determine what exactly has been changed by this Draft Supplement and how individual Corps permitting staff would be asked or told to apply those changes. The likelihood of confusion, challenges to the decisions asserting "arbitrary and capricious" decisions or a failure to follow the manual (based on alleged ambiguities) increase as a result. There is no detailed description, demonstrating which provisions of the Draft Supplement are intended to supersede specific provisions of the 1987 Manual. Without such a document, the potential ambiguity increases.

NDM is also concerned that some of the new tests described in the Draft Supplement substantially change the criteria upon which they have relied. Some of the changes allow for one- or two-parameter tests for determining wetlands under normal circumstances, as opposed to the three-parameter test of the 1987 Manual. This creates confusions and the opportunity for inconsistent and subjective, arbitrary and capricious, decisions by the Corps as to what constitutes wetlands.

NDM questions whether the Corps has the authority to implement the Draft Supplement. Pursuant to the Energy & Water Development Act of 1993, Congress directed the Corps and the EPA to utilize the 1987 Manual. In addition, Congress required the National Academy of Sciences to study this issue. That study, "Wetlands Characterization and Boundaries," was published in 1995. Others have questioned whether the Draft Supplement is consistent with the direction of Congress. NDM questions whether the Corps should move forward to implement the Draft Supplement, if it is subject to legal challenge.

NDM recommends that the Draft Supplement be withdrawn or substantially modified in the manner discussed above. In addition, and for the reasons discussed above, NDM recommends that Chapter 5, dealing with "Difficult Wetlands Situations in Alaska" be eliminated, as well as all references to the usage of one- and two-parameter tests for the identification of wetlands under "normal circumstances".

In summary, the Draft Supplement does not address any problems that have arisen related to the 1987 Manual. In fact, it creates ambiguity as to the procedures to be used to determine wetlands and creates too much discretion on the part of the regulators. Furthermore, by changing substantive language and thereby changing a process that has been in place for nearly 20 years, the Draft Supplement will create uncertainly that will lead to challenges to decisions by Corps staff. The likelihood of arbitrary decisions and challenges to permitting decisions increase. This helps no one.

The Draft Supplement should be withdrawn or substantially modified to assure a clear, consistent, repeatable and reliable process for evaluating wetlands. If the Corps proceeds to develop the Draft Supplement, it should have an effective date of no earlier than 2020 and any implementing language should provide that work performed as of the date of the Draft Supplement, as well as work in progress at that time, should be "grandfathered" under the 1987 Manual.

Thank you for considering our comments.

Sincerely,

Susan E. Reeves

cc: NDM
Alaska Miners Association, Inc.

STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

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August 26, 2005

Ms. Katherine Trott (CECW-LRD)
U.S. Army Corps of Engineer
441 G. Street, NW
Washington DC 20314-1000

Subject: Draft Alaska Regional Supplement, 1987 Wetlands Delineation Manual
Special Public Notice 05-10

Dear Ms. Trott:

Thank you for the opportunity to comment on the Draft Alaska Regional Supplement to the 1987 Wetlands Delineation Manual (Supplement). The Alaska Department of Environmental Conservation appreciates the tremendous level of effort by the U.S. Army Engineer Research and Development Center (ERDC) for leading and coordinating the Alaska Regional Working Group in the development of the Draft Supplement.

The Department understands the intent of the Draft Supplement is to provide agency representatives and other users with Alaska-specific and sub-regional information that will improve the accuracy and efficiency of wetland delineations. However, once an area is determined to be a wetland the Draft Supplement fails to provide guidance to the Corps of Engineers and others on whether the wetland falls within federal jurisdiction under the Clean Water Act. The Department strongly recommends that the Corps of Engineers and the U.S. Environmental Protection Agency complete rulemaking initiated in 2003 to resolve the continuing scientific and legal issues raised in the wake of the Solid Waste Agency of Northern Cook County *(Solid Waste Agency of Northern Cook County v. Corps of Engineers, 531 U.S. 159, 51 ERC 1833 (2001); 32 ER 86, 1/12/01*; known as the "SWANCC" decision.

Many of the Department's technical comments have been incorporated into the Draft Supplement during the development process. The Department agrees with the establishment of six sub-regions for Alaska, given the broad ranges of climate and habitats across the state. Sub-regions will assist the user of the manual in a variety of ways, such as identifying indicator plants by using the sub-region common plant list. Other useful elements include the detailed descriptions, photographs and images of hydric soils which should aid the user in properly identifying them. The updated data sheets provide improved check lists and Alaska-specific terms.

The Department suggests that an additional primary wetland hydrology indicator be added to the data sheets. This indicator is for barren ground devoid of plants within a larger wetland complex. This condition should be added to the list of primary wetland hydrology because it is indicative of ponding early in the growing season and a strong seasonal indication of hydrology.

Department staff participated in field trials in the Juneau area and are familiar with field trials that occurred in the Anchorage area. With one exception, the field trial delineation results using the 1987 manual and the Draft Supplement correlated well i.e. the results were essentially the same. The one exception resulted in a minor reduction in an area determined to be a wetland when using the Draft Supplement.

If the Draft Supplement were to result in areas not currently considered wetlands under the 1987 manual to be considered wetlands under the Draft Supplement, the Department would be quite concerned. Given the rather small field trial data set, the Department suggests that more sites be compared using the 1987 manual and the Draft Supplement, prior to taking final action on adopting the Draft Supplement. Additional field trials in northern areas are particularly warranted.

We understand the Corps of Engineers already plans to run a second public notice on the proposed final Supplement and the Department requests the second public notice period remain a part of your adoption process.

If you have questions regarding our comments please call me or contact Jim Powell at 907-465-5321, email jim_powell@dec.state.ak.us.

Sincerely,

Lynn J. Tomich Kent

Lynn J. Tomich Kent
Director

CC: Michiel Holley, Corps of Engineers
Jackie Timothy, DNR/OHMP
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Ms. Katherine Trott
(CECW-LRD)
U.S. Army Corps of Engineers
441 G. Street, NW
Washington, DC
20314-1000

June 29, 2005

Dear Ms. Trott

Please find attached my comments regarding the draft Alaska supplement to the 1987 Wetlands Manual. The majority of my comments, reflecting my background, focus on hydric soils related issues. Although I was a member of the Alaska regional working group that helped initially formulate the draft, the current version has been revised significantly since our group met last November. As such, some of my comments are based on what the working group agreed on several months ago.

My comments are based on my discussions as part of the Alaska Regional Working group, on field testing I have done using the draft supplement, and in general conversations with other wetland specialists. Field testing has shown me that overall, the specific indicators used in the draft supplement do work and cover most wetland situations. They do not alter the size of an area determined to be a wetland, they simply give the specialist clearer indicator guidelines. I have noted any exceptions in the 'SPECIFIC COMMENTS' in the attached file. I believe that proper use of the supplement, if appropriate revisions are made, will reveal many less 'problem' wetland areas in Alaska.

Sincerely,

Joe Moore
MO Leader/State Soil Scientist

enc: Comments

# Review Comments
# Draft Alaska Regional Supplement
**(Joe Moore 6/29/2005)**

## GENERAL COMMENTS

- The supplement is a needed document that can help to significantly improve the quality and consistency of wetland determinations made in Alaska. It focuses on indicators that are known to occur in Alaska and defines those indicators much more objectively than the 1987 Manual did. The majority of the technical information presented in the current version is sound; however, it also introduces confusion due to some technical inconsistencies and editorial problems. Without some good technical and editorial revisions it will probably not be well received by perspective users.

- To be a useful field tool, the supplement needs to be organized. General information applicable to all parameters or indicators is scattered throughout the text. Often material relevant to several indicators is found in the description for one specific indicator. Put all relevant general information together up front. If it is relevant to all three parameters, place it near the beginning of the document before individual parameters and indicators are discussed. If it is relevant to all indicators under a given parameter, place it at the beginning of the chapter for that parameter. Place all information on indicators for a given parameter in the same chapter. As an example, indicator information for hydric soils is located both in the Hydric Soil chapter as well as in sections of the Difficult Wetland Situations chapter. Place the proven hydric soil indicators, the test indicators, and the hydric soil Problem Situation procedures all together in one chapter. That is how a field person will apply the information. They don't need to be searching all through a document for related information. Do the same for vegetation and hydrology.

- The Alaska Regional Working Group was given the goal to come up with clear technically sound indicators that could be readily applied in the field. A secondary goal was to align these to the extent possible with the hydric soil indicators published by the National Technical Committee for Hydric Soils (NTCHS). Evidently that goal changed and the supplement now presents indicators from the latest NTCHS revision. Some of these match the efforts of the working group, others do not. Some NTCHS indicators previously used specifically for Alaska have been changed, although the working group was not aware of those changes. Although technically sound, many of the NTCHS indicators are poorly worded and use excessive technical jargon. Most users, unless fully trained soil scientists, are not going to clearly understand them. I suggest that the supplement link to the NTCHS indicators as a national standard, but present the indicators in clear concise, easy-to-understand terminology. Combine and simplify NTCHS indicators, where appropriate (e.g., Histosols and Histic epipedons). If a user cannot understand the supplement, they won't accept it or use it.

- The use of alpha-alpha dipyridyl is a valid test for many soils that are currently reduced. The Alaska Regional working group proposed this as an indicator for the supplement and it is used in the 1987 Manual. Evidently since the NTCHS does not recognize the dye as a true soil morphology indicator, it has now been relegated to a tool for problematic soil situations. The usefulness of the dye is well documented by research and can be used for most hydric soils that are currently reduced. Place it back as a valid indicator so that user's know to use it when appropriate.

- Each parameter should stand on its own with its' own set of clear, unique indicators. The current draft supplement allows the same indicators to overlap parameters (e.g., soil indicators are also used as hydrology indicators). There are already sufficient clear indicators for each parameter so there is no need for the overlap. Prove the presence of each parameter using unique indicators. This follows the principle of a true three-parameter approach to identifying a wetland.

- Credits should be noted for photographs obtained from other agencies or the University of Alaska.

- 'Abrupt Boundary Color" was proposed by the Alaska Regional Working groups as a soil indicator for Southeast Alaska. Evidently this was completely dropped since it is not recognized by the NTCHS. Is it the goal that only NTCHS indicators be used? If so, this was never made clear at the outset of this effort. At the least, this indicator should be designated as a 'test indicator'.

**SPECIFIC COMMENTS**

**Page 1, Introduction, 1st para.**
*"... identification of wetlands in most cases is based on a three-factor approach..."*
What are the exceptions?

**Page 1, Introduction, last para.**
*"Amendments to this document will be issued periodically in response to new scientific information and user comments...."*
What is the role, if any, of the Alaska Regional Working group? The members have been in the dark since the beginning of the year.

**Page 8, first para.**
*"...sea level* to *18,008 feet..."*

**Page 11, Growing Season**
Need to be specific that this information applies only to hydrology. Growing season is also mentioned in the soil sections but is never defined. The legal definitions are different.

Since this information does refer to the growing season during which hydrology is determined, why is it contained in the Hydrophytic Vegetation chapter? It belongs at the beginning of the Hydrology chapter.

The referenced map used to estimate growing season dates for hydrology is a very generalized work dated 1984. There are much better data sources available today. Use of this map will only continue to generate needless controversy in the state.

**Page 22, Soils**
Put all of the soils information together – typical indicators, test indicators, and 'Difficult Area' procedures. They are currently scattered in the document.

**Page 22, Soils, Introduction, 1st para.**
*"...during the growing season..."*
The hydric soil growing season definition needs to follow here. Otherwise there will be confusion with the hydrology growing season provided in the Hydrophytic Vegetation chapter.

**Page 22, Introduction, 2nd para.**
*"...knowledge...of soil survey procedures is necessary"*
Wetland specialists need to understand soil/landscape/vegetation relationships but not soil survey procedures. They are not required to document a soil survey.

**Page 28, 4th para.**
*"Depths...measured from the muck or mineral surface soil surface..."*
This differs from the standard depth measurements used in most soil science work. The emphasis on muck is unclear, since saturated soils may have peat or mucky-peat layers. Why not use the published definitions in the "Field Book for Describing and Sampling Soils" or the organic surface for saturated organic soils or histic epipedons, and the first mineral layer for all others.

**Page 30, Indicator A1**
The working group had proposed combining this and Indicator A2 as "saturated organic surfaces greater than 8 inches (20 cm) thick". This meets the technical intent of the NTCHS indicators with simple, clear language and does not require knowledge of Soil Taxonomy.

**Page 30, Indicator A1, 2nd para.**
Needs to be reworded with proper grammar. Also non-saturated organic surfaces can be found on both convex and plain landform positions, not just convex.

**Page 30, Indicator A1, 3rd para.**
Need to differentiate between saturated and non-saturated organic materials. The decomposition status and organic carbon content requirements are the same, but different textural nomenclature is used for non-saturated organics.

**Page 30, Indicator A1, 3rd para.**
*"...in these soils".*
Which soils? – the ash deposits?

**Page 30, Indicator A1, Interior Alaska.**
*"..lats..."*
flats

**Page 30, Indicator A2**
The working group had proposed combining this and Indicator A1 as "saturated organic surfaces greater than 8 inches (20 cm) thick". This meets the technical intent of the NTCHS indicators with simple, clear language and does not require knowledge of Soil Taxonomy.

**Page 30, Indicator A2, User Notes**
Now that the definition of the indicator has changed, all references to organic soil material in the user notes needs to be prefaced by the word 'saturated'.

The second part of this section refers back to Indicator A1 for more information. Either combine the indicators or provide sufficient information to stand alone.

**Page 34, Indicator A4, User Notes**
Reword the technical description. It is not clear that the odor has to emit from some part of the soil which lies within 12 inches of the soil surface.

The depth measurement standard here should be from the mineral soil surface.

**Page 35, Indicator A12**
The indicator (NTCHS) shown here has been expanded beyond what has been tested and successfully used in Alaska (see previous drafts). Also, this is an excellent example of the problem with the NTCHS indicators – the wording is too complicated for most users, especially non-soil scientists, to understand. Why not provide a clear, simple, yet technically correct description of the indicator. Then the full NTCHS technical description can be provided either at the end of the section or in an Appendix. As presented, it is the first thing a user sees and the first thing to discourage the user.

**Page 35, Indicator A12, User Notes, 2nd para.**
A lengthy definition and description of a 'depleted' matrix is provided. This belongs either in the glossary or in a general information section near the front of the supplement, not within information for a specific indicator. If information is important for understanding overall soil morphology, put it where it can be found.

**Page 35, Indicator A12, User Notes, 3rd para.**
This introduces more technical jargon that is unnecessary to the use of this or other indicators. Iron/manganese concretions have not been commonly found in Alaska – it is not necessary to describe them here or introduce terms such as plinthite.

**Page 37, figure 3-10**
The tape shown is metric. The caption should be revised to *"A depleted matrix begins at approximately 14 inches (35 cm) and underlies dark surface mineral horizons"*

**Page 38, Indicator A12, User Notes, figure 3-11.**
This belongs either in a general information section or in the glossary.

**Page 39, Indicator A12, User Notes, Table 3-1.**
This belongs either in a general information section or in the glossary. Actually it is unnecessary technical information. In a general info section simply specify the basic colors needed for 'gleyed', 'depleted', or 'concentrations'. Faint, distinct, and prominent only introduces more confusing jargon and is really not necessary. Faint concentrations may be all that you see in the gleyed matrix of many cold hydric soils.

**Page 40, Indicator A13**
The '... 50 percent or more..." requirement is too high. During testing, several obviously hydric soils that met the concept of this indicator did not meet the requirement of greater than 50% gleyed matrix in a given layer. Given the cold soil temperatures and slower bio-chemical processes, a requirement of about 25% would be more realistic.

**Page 41, figure 3-12.**
This belongs either in a general information section or in the glossary.

**Page 44, Indicator A14.**
The indicator proposed in previous drafts and taken verbatim from the NTCHS indicators only required redox concentrations, not 'distinct or prominent' redox concentrations. Not only does this eliminate many cold or high pH hydric soils from consideration, but it also requires the need to define 'faint', 'distinct', and 'prominent'. Why the change?

**Page 49, Use of Existing Soil Data**
If the intent of the supplement is to assist in 'on-site' work, this section is not needed. On-site examination of hydric soil properties and indicators is much more reliable for a specific site or area than soil survey data.

**Page 49, Use of Existing Soil Data, 2nd para.**
Change *"Exploratory Soil survey of Alaska should not..."* to *"...can not..."*

**Page 49, Hydric Soils Lists, para 1.**
Change *"Hydric soils lists are very useful"* to *"Hydric soils lists are very useful for off-site work or as preliminary information for on-site work."*

Add, at end of paragraph *"Hydric soil lists should only be relied on when on-site data collection is not possible."*

**Page 50, Introduction, 2nd para.**
*"Wetland situations that may lack hydrology indicators are discussed further in Chapter 5..."* Handle this information in this hydrology chapter, at the end, rather than in some other section. The user should be able to get all the information they need in one location.

**Page 51, 2nd para.**
*"Other evidence of wetland hydrology may also be used with appropriate documentation."* What does this mean, what is the minimum standard for appropriate documentation?

**Page 53, Table 4-1.**
C1, C2, and C4 are soil indicators. Each parameter should stand on its own. There are sufficient true hydrology indicators without including soil indicators here. Otherwise you are back to a two-parameter approach.

**Page 68, Indicator C1**
This is already used as a soil indicator and should not be used again for hydrology, either as a primary or secondary indicator. The description and user notes all relate to its use as a soil indicator.

**Page 69, Indicator C2**
This is also a soil indicator and should not be used for hydrology. Further, its' use as a soil indicator (Alaska Redox) also requires the presence of gley colors in the matrix to avoid confusion with relict concentrations. Relict concentrations are quite common in permafrost or seasonal frost affected regions of the state. As written, not only is a soil indicator being used for hydrology but it also has a lower criteria standard than what hydric soils require.

**Page 71, Presence of reduced iron.**
This is also a soil indicator property and is already referenced in several of the soil indicators used in the supplement. It should not be used. There are already several good hydrology indicators that will cover the state.

**Page 80, Difficult Wetland Situations in Alaska**
This chapter is split out into separate sections on hydrophytic vegetation, hydric soils, and hydrology. Take those sections and place them back in the appropriate vegetation, soil, and hydrology chapters. Then all relevant information is in one location for the user.

**Page 80, Wetlands that lack indicators of hydrophytic vegetation**
Place at end of Hydrophytic vegetation chapter.

**Page 83, Problematic Hydric Soils**
All of this section, subject to the additional revisions noted below, should be move to the end of the Hydric Soils chapter. Put all relevant information in one location for the user.

**Page 83, Introduction**
*"In some cases, these hydric soils may appear non-hydric due to the color of the parent material from which the soils developed."* This is not the case. Rather some non-hydric soils may appear hydric due to parent material colors. This has already been addressed by the specific requirements of the *Alaska Gleyed*, *Alaska Redox*, and *Alaska Gleyed Pores* soil indicators. This is not a problem soil situation.

**Page 85, Soils that change color upon exposure to air**
This is not a Problematic Hydric soil. Rather, this is a soil indicator which has been noted as a 'test indicator' by the NTCHS. Put it in the Hydric Soil chapter, following the regular soil indicators, and label it as a 'Test Indicator".

**Page 86, Soils of Alpine Swales.**
This is not a Problematic Hydric soil. Rather, this is a soil indicator which has been noted as a 'test indicator' by the NTCHS. Put it in the Hydric Soil chapter, following the regular soil indicators, and label it as a 'Test Indicator".

**Page 88, Procedure, 1.**
The original draft, as prepared by the Alaska Regional Working group, required that a 'primary' indicator of hydrology be present. That requirement has been removed. Doing so removes the strict standard for this procedure and opens the door for erroneous field decisions.

**Page 88, Procedure, b.**
The use of alpha-alpha dipyridyl dye is a valid, tested indicator for hydric soils that are currently reduced. It was supported as a hydric soil indicator by the Alaska Regional Working and is used as an indicator in the 1987 Manual. Why was it moved to being only an alternative procedure for problematic soils? Keep it as a primary hydric soil indicator.

**Page 89, para 1, last sentence**
*"..growing season."* What growing season does this refer to? Hydrology or Soils? The hydrology growing season is defined in the hydrophytic vegetation chapter but the soils growing season is not defined anywhere in the supplement. Put both definitions either up front in a general information section or define in the glossary. When the term 'growing season' is used in the text, be specific as to which definition is being used.

**Page 89. Wetlands that Periodically..."**
Place this section at the end of the Hydrology chapter so all relevant information is in one location.

**Page 92. Description of Problem, 2nd para.**
*Change "Wetland/non-wetland mosaics also occur..."* to *"Wetland/non-wetland mosaics also occur in areas of discontinuous permafrost and on discharge slopes in South central Alaska."*

**Page 95 References**
Substantial information in the hydric soils sections is taken directly from the following, please reference and cite:

> USDA Natural Resources Conservation Service (In press). Field Indicators of Hydric Soils in Alaska." Palmer, AK. (ftp://ftp-fc.sc.egov.usda.gov/AK/AKFieldIndicators.pdf)

**FIELD FORM**
**Soil**
Leave *"Alaska Color Change (TA4)* and *Alaska Alpine Swales (TA5)* in second column but change heading to ***"Test Hydric Soil Indicators"***. Move *"Alaska Redox with 2.5Y Hue" to* third column and provide a column heading such *as* ***"Meets Problematic Hydric Soil Procedure"***

Note that the field data form does not require any 'soil survey' or 'hydric soil list' information as previously agreed by the Alaska Regional Working group. As such there really is no need to discuss soil survey procedures or hydric soil lists in the supplement text.

**Hydrology**
As discussed previously, drop C1, C2, and C4 as indicators.

# ALASKA PEER REVIEW TEAM FINAL REPORT TO THE US ARMY CORPS OF ENGINEERS FOR THE ALASKA REGIONAL SUPPLEMENT TO THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL OCTOBER 7, 2005

Responses to the comments made the Peer-Review Team were developed by the Corps of Engineers in cooperation with the Alaska Working Group and are given in this document in blue lettering following each comment.

ACKNOWLEDGEMENTS

The contents and preparation of the peer review of the Draft Alaska Supplement to the 1987 Corps Of Engineers Wetland Delineation manual, was made possible through the volunteer efforts of the private team members and the companies of which they own or are employed. Without the time and dedication of these individuals and organizations this document would not have been possible.

The USDA Natural Resources Conservation Service (NRCS), Alaska, provided time and salary allocation which supported supplement review, technical input, document development and peer review team coordination. We thank the State Conservationist of Alaska for supporting this effort and making the experience work-schedule friendly.

We want to convey our appreciation and respect to the cadre of professionals on the Supplement development team, for a largely outstanding body of scientific work. With few exceptions, much of the totality of information, fundamental as well as unique considerations of Alaska wetland conditions, has been well captured.

Finally, we thank the Corps Of Engineers for allowing the Peer Review Team (PRT) the flexibility and latitude of a hands-off process and report development environment, as well as technical support in teleconference hosting. Additionally, we commend the Corps for establishing the Peer Review Team among regional experts with long and successfully established Alaska wetland experience and professional responsibilities.

The following individuals and organizations constituted the Alaska Regional Supplement Peer Review Team. We gratefully thank them for their professional and personal time and involvement.

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TABLE OF CONTENTS

## PREFACE

In early April, 2005 the Natural Resources Conservation Service, Alaska was requested by the US Army Corps Of Engineers, Headquarters Division to coordinate a peer review of the Draft Regional Supplement to the Corps Of Engineers, 1987 Wetland Delineation Manual. A process for the selection of peer review team member candidates was developed, and an all volunteer group of an original nine individuals was selected. Those not selected were notified by either email or personal phone call. Eight individuals constituted the final group of participating scientists and the following report is derived from their individual and collective reports and input.

The Peer Review Team (PRT) received the review copy (.pdf format) of the Draft supplement on May 27, 2005. Copies were distributed electronically, with instructions developed by the team coordinator for a three phase review approach. Additionally, new field testing protocols and documents were also distributed with a request for two trials by team members located in the greater Fairbanks and Anchorage areas, respectively. Two teleconferences were held to provide real-time input and feedback on issues, concerns and opportunities

Of significant concern by the team was the short time period for review and development requested by the Corps. Alaska's field season ranges in the neighborhood of 110 days +/ -, depending on location, seasonal variations and accessibility. All team members also retain full time field investigation requirements for their respective employers and had significant responsibilities in this regard. Thus, it is indeed remarkable that such extensive individual member contributions were realized.

There was no requirement by the Corps initially regarding the report format. After developing a first draft of the peer review via the commenting features of Adobe Acrobat™, it was decided to manually extract the review dialogue utilizing summarizing options, to an editable and trackable comments version of Microsoft Word 2003™.

With estimates of Alaska's vast and wildly varied wetland landscape comprising 43.3 % of its 403,247,700 acres (Society Of Wetland Scientists, Alaska Chapter, 1998), it is a daunting task to attempt capture and purvey diagnostics for such unique and dynamic conditions. However it is an effort well warranted for the advancement of scientific principles and understanding, as well as the application of land use management strategies, ecological protections and regulatory recognition. Notwithstanding that 88 % of Alaska's wetlands are publicly owned, while only 26 percent of the wetlands in the 48 contiguous States are publicly owned (Alaska Wetland Conservation Act, SB 49, Jan. 21, 1997), there remains an increasing need to utilize the best science procedures in association with a comprehensive strategy to identify and delineate wetlands due to the accelerating impacts of human disturbances and development in private wetland areas. This is evidenced by approximately 98 %1 of all Alaskan communities, including 200 of the 209 remote villages in Alaska, being located in or adjacent to wetlands.

REPORT OVERVIEW

## General

Without equivocation, the lack of a specific standard recognizing geographical and climatic uniqueness, as well as regional wetland feature identification and tests for parameter expression, has long complicated the determination and delineation of wetlands for regulatory purposes. This has been particularly problematic for delineators, policy makers and the general public where underlying formative process's and wetland parameter expressions are moderately or significantly different, than the necessarily generalized approach and identification defined in the 1987 Corps Of Engineers Wetland Delineation Manual, used across the breadth and diversity of the entire United States. Although currently identified as a "Supplement to the 1987 Manual", to a member, the Alaska Peer Review Team (PRT) believes the supplement concept in its present iteration, should be reformatted and presented as a stand-alone delineation manual for Alaska wetlands. Some suggestions to this end are presented in the content of comments in the body of this report.

We believe whatever the decision to address the above paragraphs recommendation, that at a minimum, there should be a consolidation of the manuscript incorporating all features from the "Difficult Wetland Situations In Alaska" section, problematic, atypical or otherwise, into their respective chapters of soil, vegetation and hydrology. This would likely help produce a smaller and more user-friendly process and document. Additionally, it is paramount that if the document is retained as a true "Supplement", clear instructions are provided where, when and how data or process is coordinated/ substituted/ negated with/ for/ by the 1987 Manual (and vice-versa). All Team members appreciated the section developments and inclusion of new information, especially in the soils chapter. We've also agreed that the document is in most ways more complex (not entirely avoidable) and will require a higher degree of expertise, more familiarity/ experience with Alaska wetlands and greater skill and ability in interpreting variances of wetland conditions respective of supplement data and procedure. However, we strongly suggest that any new formatting and methodology structure should be tasked to simplify the application of the Supplement in a step-by-step process.

Generally, we have felt the review, test and report construction process was not given enough time to discover, digest and present suggestions, approvals or alternatives, etc. to the merit of the report effort. This is especially concerning given the short field application period in Alaska.

This report has attempted to a great degree to avoid commenting on purely Corps policy related issues. For example, in no uncertain terms all reviewers postulated that newly presented procedural steps, when applied, appeared to be an effort to capture more wetland areas for regulatory control, even where wetland characteristics were often extremely marginal or in some cases, seemed to specifically not meet the criteria established in the 1987 Manual. A similar situation exists where reviewers repeatedly point out what they believe is a greater emphasis by the procedures to generate positive wetland identification and acceptance through only a two parameter expression (some might say even less). It was not possible in many circumstances to separate the potential or alleged influences of data or procedures presented as technical information, from the implications or apparent pursuit of regulatory policy. When these observations were encountered in reviewer's comments, they were left intact to the degree the report coordinator felt relevant to the technical relationship of the comment. In some individual reports (appendix A) important context background observations regarding Corps policy are specifically related to these technically associated "crossover" comments. Reviewer comments in the body of this report were intentionally left unassociated with a reviewer's identity for several reasons, often specifically because the same comment was received from multiple individuals.

## Hydrophytic Vegetation Indicators

A concern the entire PRT has noted, are referrals in the Supplement to references and publications which have not been published or are so unobtainable that it is impossible to obtain data, determine important relevancies or establish significance. Thus the Supplement is significantly less acceptable as a tool of the scientific process.

There is still deep concern regarding the tools (i.e. reference data and source) and application strategy determining growing season. Reviewers feel more site specific features for determining growing season are required and express a strong willingness to collect the empirical data and/ or perform the necessary steps. The extreme geographic, climatic and air temperature variances associated with wetland site location (micro and macro), the paucity of WETS tables climate data acquisition points, and adapted responses of plants to Alaskan photoperiod vs. air temperature, suggest a more site-specific defined method of determining this condition is required.

Another prominently discussed concern has been the use of FACU and UPL plant species on a broadly expanded scale to positively identify wetland vegetation. The PRT believes utilizing convoluted and complex procedural mechanisms and site information to extend wetland boundaries and/ or include areas which it is believed the 1987 Manual would have declared non-wetland due to lack of the hydric vegetative parameter expression, does not have well founded or scientifically presented background support, is ambiguous and could lead to an increasingly litigious situation. The Team believes the procedures of the 1987 Manual already recognize ample opportunity for sites to achieve hydrophytic vegetation status through the definition and methodological inclusion of FAC designated plant qualification. Advancing FACU and UPL plant inclusion without a clear, readily demonstrable and scientifically grounded basis determining expression of adaptation to life in a saturated, flooded or ponded environment, is unwarranted.

Almost all reviewers constructively offer suggestions for improvement or alternatives to enhance the vegetation section regarding, sampling methodology, hydric plant list development and updating, cryptogam consideration and growing season measurement.

## Hydric Soil Indicators

The hydric soil section of the supplement is by PRT consensus, the most welcome collection of well-discussed new indicators and information covered in the Supplement. We are especially appreciative of the "Cautions and User Notes" paragraph subsection for each indicator, that helps clarify or raise flags about certain features. We would however suggest, that this subsection also include as simply and distinctly as possible, mechanisms to resolve any potential ambiguous, complicated conditions which may be misinterpreted by users with less than a high level of initial soils background expertise. This will help make better and more efficient decisions regarding feature expressions and provide a more user-friendly experience for the Supplement.

The soils section contains perhaps the greatest collection of jargonistic terms and relatively complex concepts for wetland feature expression. Where possible the Team encourages a simplification of terms and connection to principles and procedures for users to consider. It would be helpful to include more of the less easily understood terms and concepts in an expanded glossary.

Of particular reoccurring concern were references to measuring from, or relationships to, the "soil surface" in varying soil profile conditions. Some members expressed confusion in using the information provided to determine where the soil surface was in these different profiles. Due to the fundamental importance of determining the soil surface specific to the profile, we would suggest adding clarifying explanations of where and how users should expect to find them.

Often background included narrative on soil morphology, formation and ancillary data is informative and educational, but may unnecessarily increase the length of the section, and may not provide pertinent information relative to making a determination call or assist in using the Supplement. The Supplement development team or the Corps may be interested in editing in this vein. We also would suggest a careful rewrite of the section paying particular attention to improving sentence structure, spelling and completeness.

Reviewers encourage the developers of the soils section to include easily identifiable scales of measurements in photos. This is especially important where the photo's themselves are providing important information regarding a hydric soil determination.

Finally, the Team noted it would be especially important to develop a mechanism for updating the Supplement when the NTCHS concurs with, develops and released replacements or updates to accepted hydric soil indicators.

**Wetland Hydrology Indicators**

The PRT feels obligated to again point out what seems to be an apparent loosening of the three parameter approach requirement regarding the expression of wetland hydrology features, even when fairly great latitude is already codified in the 1987 Manual. Arguably hydrology can be the most difficult of the three parameters to specifically find during the regulatory and physically influencing time period for the flooding, ponding or saturation requirement. Many of the indicators identified in the Supplement are in themselves difficult and complex to ascertain and source. The ambiguity of the situation is compounded when positive assumptions of hydrology presence are made based upon sometimes indirect feature expressions of the other two parameters. Should the Corps be steadfast in it's willingness or expectations for this type of an approach of hydrology determination, all firm explanations and procedural methodology should be employed to help build defensible (scientifically and legally) rationales.

Several reviewers have made suggestions about the category designations of some of the hydrology indicators. We would draw attention to the difficulty of determining seasonality, source and duration of some of the indicators, with the observation that some of the indicators are simply to difficult or ambiguous to make reliable calls of their origins and/ or presence. As a result, in some cases reviewers have firmly suggested the indicator be removed from consideration.

Alaska delineators are especially disadvantaged by the lack and consistency of good aerial photography to assist in identifying the possible presence of the flooding, ponding or saturation status of any given project wetland site. Problems associated with the time of the year of the photography, foliage presence and lack of repeated images of the project assessment areas, often relegate the viability of aerial photography to an unfortunately minor position in the delineation process. Yet it is among the first and most important requirements for project information. Some reviewers have suggested that due to these situations only on-site investigations should be utilized

to provide the reliability necessary to determine the hydrologic status of a site.

**Difficult Wetland Situations In Alaska**

Reviewers tended to have different experiences with the content and intent of this section. Two reviewers felt the section was adequate, informative and appreciated. All reviewers fundamentally felt that the information presented in this section should be incorporated into the respective soils, hydrology and vegetation chapters to which a concept was related.

Notably though, the majority of reviewers described their dissatisfaction with this section, characterizing inconsistencies with the premise of Problem Areas (pp 84) in the 1987 Manual. The majority of the commentary centered around the belief that this section functionally translated into increased efforts to make positive wetland determination calls utilizing a two parameter approach, where one parameter simply could not provide the necessary expression required by the regulatory definition. This seemed particularly apparent in the discussion about hydrophytic vegetation where the Supplement, begins the subsection by stating, "Some wetlands in Alaska are difficult to identify because their plant communities are dominated by FACU species, causing them to fail both the dominance test and prevalence index." This is in diametric opposition to the italicized note on page 84 of the 1987 Manual in the first paragraph under "Types of problem areas" which states, "This section is not intended to bring non-wetland areas having wetland indicators of two, but not all three, parameters, into Section 404 jurisdiction." Further aggravating this situation was any discussion about plant response to cold soils, altitude, windy or other conditions which could account for plant stress responses to other non-hydrology related features. Another prominent lack of this section was cited references for procedure or data presented.

Due to the potentially highly subjective nature of the interpretation and application of some of the data and methodology of the section, it calls into question the consistency and repeatability of decisions which may be based on the non-standard procedures and/ or ambiguous site conditions. The Team feels this should be a significant warning flag to the Corps as being exceedingly difficult to defend from any position and lacks the predictability of a needed method which will be utilized by a broad range of individuals with varying degrees of skills and experience, regardless of which side of the regulatory aisle is trying to make the call.

# PEER REVIEW TEAM COMMENTS

## Page: cover page

Sequence number: 1
Location: cover page

Alaska Peer Review Group Draft Report to the US Army Corps Of Engineers

*Response: We do not understand the nature of this comment.*

## Page: Preface

Sequence number: 1
Location: Preface page, last paragraph, second to last sentence

The statement regarding use of OMB guidelines for peer review is incorrect. Please remove. The Corps provided no direction for the use of any particular procedure or standards.

*Response: We disagree that the reference to the OMB guidelines is incorrect. The peer review committee was assembled according to the guidelines and the Department of Defense supplemental regulations. The OMB guidelines do not identify procedures or standards for the final peer review report; this is left to the discretion of the committee. The reference will be retained in the final version of the supplement.*

## Page: 1

Sequence number: 1
Location: Introduction section general comment

One reviewer comments; It seems that the document is longer than it needs to be. If this is a regionalization of the national manual, could it be written as a short supplement to the national manual and rendered more concise ? One approach would be to append the background information, then base the main body of the report around a table or list of specific differences between the national and regional approaches (perhaps one list for each region of Alaska). Since the primary audience for a document like this is a person who will apply the methods in the field, the backup information probably adds little or nothing as part of the body of the text, yet it makes the text much longer.

*Response: The supplement as written provides useful information for the less experienced wetland delineator. Shortening it significantly would reduce its value as a reference. For the experienced field person, the two-page data form is all that is needed. We agree that a reduced field version of the supplement would also be useful. A user-friendly field manual could be developed by the local agencies or by a private vendor.*

Whether or not the report is shortened, a table summarizing differences between the regional approach and the national approach would be useful. Another table summarizing how this manual will change jurisdictional wetlands in Alaska, and/or providing specific examples, would be very useful.

*Response: A table indicating the replacement sections of the regional supplement will be added to the document. It is not the intent of this supplement to change the jurisdictional reach of the 1987 Manual either positively or negatively. The purpose of the supplement is to bring the Manual up to date with current knowledge and practice in Alaska and not to change wetland boundaries. Field testing of the supplement has shown no significant changes in the locations of wetland boundaries compared to current practice in the Corps Regulatory Program in Alaska. Any potential effects on jurisdiction will also be evaluated during a 1-year interim period of implementation by the Corps.*

Sequence number: 2
Location: para 2, line 3

One user comments; The identification of Alaska as a region is not sufficiently explained, and recommends a statement further clarifying it according to whatever methodology was used.

*Response: The selection of the entire State of Alaska for development of this supplement was due in part to its geographic isolation from the rest of the United States and in part to its climate compared with other*

*regions. This will be clarified in the supplement.*

Sequence number: 3
Location: para 3, line 4

The Peer Review Team (PRT) believed the approach of the Supplement was to be in a conjoined/ complimentary use with the 87 Manual and where different, supersede. We find no identified or clear instruction when or where to distinctly include or consider data or procedure from either document, or how to blend information as needed. We do find many instances of seeming disparate information or procedure between the documents.

*Response: We agree and will clarify how the supplement is to be used with the 1987 Manual in a table.*

A primary consensus recommendation from the PRT, is to suggest that the Corps develop a one manual approach to include the final accepted information from the regional supplement, into a single stand-alone document (excluding reference data and plant lists), at a regional ecologically distinct wetland level. Or, incorporate the regional "Supplement" information into a central manual with specific guidance identifying when and where the appropriate features/ characteristics/ criteria should substitute for general provisions. The difficulty, confusion and inefficiency of multiple documents (Supplement and 1987 Manual) require unnecessary challenges to users and defeat's the effort for a more simplified approach. Many following recommendations throughout the PRT report will point to a more combining approach to the supplement format. This combining approach we believe, facilitates a more easily read and applied procedural document.

*Response: The decision to publish separate regional supplements to the existing Corps Manual was made by the National Advisory Team. Consideration of publishing a document combining the national manual and regional supplements will be made following the decision on whether to issue a new version the 1987 Corps Manual. The latter decision will be made following completion of all of the regional supplements.*

As a consensus opinion by the PRT, we admonish the Corps for citing publication which are not available for use or verification of text and data referenced specifically in the Supplement. No documentation should be referenced which is not published (and received approved relevant peer review) and/ or commonly available to any user of the Supplement or 1987 Manual.

*Response: We agree that important supplemental documents needed to perform wetland delineations (e.g., plant lists) must be readily available to users. One reference that may not have been available at the time the draft supplement was peer reviewed was the "Technical Standard for Water-table Monitoring of Potential Wetland Sites," which has since been finalized and is available on the Corps website. We will ensure that all required supplemental documents are available. However, we are not responsible for the availability of general technical literature cited in the supplement.*

## Page: 1 (cont.)

Sequence number: 4
Location: para 3, line 5

The PRT suggests revising this sentence to remove references to any other uses of the Manual or supplement other than resource inventory and the regulatory wetland definition and determination process. Choices of land management and use are not a function of the procedure.

*Response: We disagree with the comment. While this manual was developed for purposes of Section 404 of the Clean Water Act, it has uses in other state and Federal programs and the use of it for these purposes promotes consistency among planning and regulatory programs. However, we have deleted "land-use planning" from the list of examples.*

## Page: 2

Sequence number: 1
Location: para from preceding page, top line

What other recently approved versions and supplements are there ?

*Response: This sentence was intended to indicate that users of this supplement should use the most*

*recently approved plant lists, soils references, etc., without the need to re-publish this supplement each time a new publication year or version of these reference materials becomes available.*

## Page: 3

Sequence number: 1
Location: graphic

Suggest referencing source document. Include rest of Aleutian island chain.

*Response: After considering the comments of the peer-review team and re-examining the lists of indicators, the Alaska Working Group has decided to drop the identification of subregions from the supplement. The Working Group determined that formal descriptions of subregions only lengthened and complicated the supplement, and were not needed to apply the indicators correctly. Where subregional considerations are useful, these are covered sufficiently in User Notes accompanying each indicator. Therefore, the subregion descriptions on pages 4 through 9 of the peer-review draft will be deleted. This information is available in NRCS (2004) if needed. Figure 1-1 will be moved to the appendix to accompany the lists of common wetland plants presented there. These changes will simplify the organization and use of the supplement, in accordance with peer-review team suggestions.*

## Page: 4

Sequence number: 1
Location: para 2, line 1

Identify MLRA's for all subregional divides or remove them, OR explain why you aren't being consistent. Some regional subsections note both total precipitation and snowfall, others differ. Please include consistent data categories for each subregion wherever possible.

*Response: Subregion descriptions will be deleted. See response to item on Page 3.*

## Page: 5

Sequence number: 1
Location: para 4, last line

Please correct this species spelling to reflect the North American accepted spelling of "tremuloides".

*Response: Subregion descriptions will be deleted. See response to item on Page 3.*

Sequence number: 2
Location: para 5, line 5

One reviewer suggests; It is better to refer to continuous sunlight and sunset-in the winter months, there is quite a bit of twilight without sunrise in Barrow, and very little (if any) total continuous darkness.

*Response: Subregion descriptions will be deleted. See response to item on Page 3.*

## Page 6:

Sequence number: 1
Location: para 6, line 3
Please modify references to the "Cook Inlet Mountains" to use the commonly accepted names for the mountain ranges, or refer to the "mountains in the Cook Inlet region".

*Response: Subregion descriptions will be deleted. See response to item on Page 3.*

## Page 8:

Sequence number: 1
Location: preceding page para, line 7

We note there is a missing a word here before 18,008.

*Response: Subregion descriptions will be deleted. See response to item on Page 3.*

## Page 10:

Sequence number: 1
Location: para 3, line 5

A reoccurring concern among the PRT is an apparently increasing effort of including more FACU and UPL species as potential hydrophytic vegetation indicators in a wider variety of "problem" circumstances. Many reviewers think the changes proposed for hydrophytic vegetation indicators are strongly biased toward finding more sites to have hydrophytic vegetation and to define more areas as wetland.

The 1987 indicators for vegetation require only that the site vegetation be found to be neutral with respect to soil saturation for the site to be considered wetland. The most commonly used indicator for hydrophytic vegetation in the 1987 manual, requires that the delineator find vegetation that strongly indicates wetland conditions (more FACW and OBL species), or find vegetation that is neutral with respect to wetland conditions (mostly FAC species, or equally balanced on both sides of FAC) or even tending toward dry (mix of FAC and FACU and U species). This 1987 indicator is already biased toward finding neutral vegetation to be "hydrophytic". Several reviewers believe many of the methods proposed in the regional supplement really obviate the requirement to have hydrophytic vegetation if indicators of the two other parameters are present.

It also seems there is a more vigorous trend, especially in the problem section methodologies, to use dependencies on characteristics of other parameters to substantiate the presence or absence of a specific parameter. This seems to lead to circular considerations which are always somehow co-dependent on some other feature for the qualifying decision. It is the consensus of the PRT this approach seems an attempt to codify the determination of a wetland on something less than the required three parameter approach recognized by law.

*Response: We do not agree that there is a bias in the 1987 Manual "toward finding neutral vegetation to be hydrophytic." As a general rule, most plant species in the United States are given, by default, an upland (UPL) indicator status. There are more than 22,000 plant species in the U.S. and fewer than 7,000 are listed on the Fish and Wildlife Service's List of Plant Species that Occur in Wetlands (including OBL, FACW, FAC, and FACU). Plants rated OBL, FACW, and FAC are commonly found in wetlands. When evaluating the guidance for determining hydrophytic vegetation, it is important to remember that FACU plants also occur in wetlands at up to 33% frequency under natural conditions. Therefore, it is logical that some wetlands will be dominated by FACU species. One goal of the supplement is to identify these unusual wetland communities where they clearly exist. We agree that FACU-dominated plant communities usually indicate nonwetlands. The three-factor approach, involving indicators of hydric soil and wetland hydrology as well as hydrophytic vegetation, ensures that these areas will be identified as wetlands only where multiple lines of evidence support the determination. In problematic vegetation situations, the additional evidence of an appropriate landscape position is needed along with a hydric soil and wetland hydrology indicators. As an aside, the peer-review team is incorrect when they say that the three-parameter approach is "recognized by law." Rather, it is guidance used to implement regulations.*

To several reviewers this has also pointed out that the process of assigning indicator status to plants in Alaska, over such a broad range of ecological conditions, across such a vast and diverse landscape causes one to wonder about the scientific basis for some of these assignments. If there was something less than a rigorous standard testing process utilized, one might question if all indicator assignments were appropriate. And, it seems nothing less than remarkable that the plant list has not received updates since 1988.

*Response: The indicator status of plants is from a National Plant List which is currently in the process of being updated. It is a separate and distinct process from these supplements, but the most recently approved plant list will be used when it is finalized.*

Sequence number: 2
Location: para3, line 8

One reviewer asks; If species are identified as FACU why does the Corps insist on calling these wetland plants ?

*Response. As stated above, even FACU species can occur in wetlands up to 33% of the time. The 1987 manual recognizes that in rare instances some FACU-dominated communities can be considered as wetlands if they satisfy one or more of the "other indicators" listed in paragraph 35b. The supplement simply*

*provides a refinement and tightening of the indicators given in the 1987 manual. To apply the indicators and suggested methods proposed in the supplement, the site must first have indicators of hydric soils and wetland hydrology. This prerequisite alone prevents most FACU-dominated communities from being identified as hydrophytic. In addition, the community must satisfy the restricted conditions of the specific indicator. These procedures do not expand the concept of hydrophytic vegetation beyond that given in the 1987 manual. Also, in these instances, changing the indicator status of certain species with FACU ratings to FAC isn't the solution since this would not accurately reflect the species' overall frequency of occurrence in wetlands in the region. The issue lies in the fact that certain FACU species in Alaska are well documented to have dual capability for life in wetlands and uplands.*

Sequence number: 3
Location: para 3, line 12

Please provide references for these wetland adapted upland ecotypes.

*Response: The concept of hydrophytic vegetation has been reviewed by Tiner (1991, "The Concept of a Hydrophyte for Wetland Identification," Bioscience 41: 236-247) and by Tiner (1999, "Wetland indicators: A guide to wetland identification, delineation, classification, and mapping," Lewis Publishers).*

Sequence number: 4
Location: para 3, line 14

One reviewer refers to this sentence as a "snake-oil" comment because it purportedly prescribes a way to justify an unsubstantiated problem. It does seem difficult to determine what this statement is attempting to explain.
Another reviewer suggests the statement is demonstrating the supplement's bias toward defining more vegetation as hydrophytic and more land as wetland. At a minimum the PRT would like an explanation of the intent behind this direction of discussion, and would suggest that the Corps provide scientific substantiation or published study references which support the Corps premise and intent.

*Response: We concur and will drop the sentence. There is no intent to expand the extent of hydrophytic vegetation beyond that described in the 1987 manual. This statement was intended to make users aware that an upland species can and on occasion does occur in wetlands and likewise the same is true for wetland species in upland locations.*

## Page 11:

Sequence number: 1
Location: para 1, line 2

Most PRT reviewers believe; The plants lists presented in Appendix A are incomplete and unnecessary and should be deleted. It is misleading to show UPL and NI and FACU plants as "common plants that occur in wetlands". If the lists are retained, they should be entitled: "Wetland Indicator Statuses of Common Plants in Alaska."

*Response: These lists are intended to help delineators with modest field skills. We will change the table titles.*

Sequence number: 2
Location: para 1, line 5

The PRT believes this effort is long overdue.

*Response: We agree.*

## Page 11: (cont.)

Sequence number: 3
Location: para 1, line 8

If there is another document to which this statement is referring, please identify and provide access information, other wise simply state what is the most recent resource information a delineator should be using.

*Response: Currently the COE uses the 1988 plant list except in the Seattle and Portland Districts, where a public notice procedure was used to accept the revised 1992 plant list (later referred to as the 1996 list). The intent of this sentence is to alert users of the supplement to use the latest approved plant lists, without the need to re-publish the supplement when new versions of the plant list are approved.*

Sequence number: 4
Location: para 2, line 3

Basic reference material used to generate the Alaska Supplement discourages the use of the 28 F 'frost free period' in Alaska. Additionally, the underlying assumption that air temperature is related to soil temperature is false in areas underlain by gelisols (Ch. 17 of *Soil Conditions and Plant Growth, 10th Edition; Russel E.W. 1973*). Since the technical literature used by the Corps appears to discourage its use (*National Research Council. 1995, Wetlands: Characteristics and Boundaries. National Academy Press Washington DC; pp99-100 Growing Season; pp102 Resolving Problems)*, on what scientific basis is the Corps defining growing season for both vegetation and hydrology on a demonstrably false assumption that there is a relationship between air temperature and soil temperature in areas underlain by gelisols?

While air temperature guidance is helpful -- determinations need to be based on when a particular site has soil temperatures warmed sufficiently for plant growth to occur. This is much easier to measure in the field when you are actually there. The PRT encourages the Alaska District to add the use of soil temperature data when air temperature data are not site specific, and to allow delineators to use actual observation criteria such as 10-30% of the dominants are at green-up or something of that nature), in making a determination that growing season has started on that particular site. Failure to modify this definition could allow vast areas of Alaska to be excluded from the wetland definition because they simply do not meet the air temperature criteria. Further, it's supposed to be the mean daily air temperature is warmer than 28 degrees. Many sites warm above 28 degrees in February for a few hours each day but it's obviously not the growing season. Referencing the NRCS map as site specific guidance is also misguided. NRCS provides this map with numerous caveats about its applicability for site specific determinations. Indicators are needed that can be documented in the field at the time site visits are made. Regulators should not make observations of hydrology before the growing season starts ("because it was warmer than 28 degrees") and all delineators would know that they must have their delineation work done during certain time periods with documented field conditions present at the time of the visit (in order for it to be defensible). Alaska weather is highly variable, and what constitutes spring in some regions can change by as much as a month from year to year. Setting specific dates for broad regions is highly problematic due to these annual variations and generally not, or only marginally useful.

*Response: We agree with many of these comments. The Alaska Working Group has decided to develop an alternative procedure for identifying growing season dates based on biological activity as indicated by vegetation growth and green-up at two hierarchical levels: (1) dates of initial green-up based on remote sensing in broad zones of the State as described by Markon (2001, "Seven-year phenological record of Alaskan ecoregions derived from advanced very high resolution radiometer normalized difference vegetation index data," U. S. Geological Survey Open-File Report 01-11, 58 pp.) and (2) onsite observations of plant growth and green-up. In Alaska, this procedure can be used in lieu of the temperature-based methods described in the Corps Manual. In addition, because it is relevant mainly to evaluation of wetland hydrology observations and data, the growing season discussion will be moved to Chapter 4 (Wetland Hydrology).*

Sequence number: 5
Location: para 2, line 6

An examination of the WETS data tables for the Interior Region indicates that there are approximately 18 low-elevation sites potentially available for this landmass approximately the size of Texas. On what scientific basis does the Corps intend to replace the necessity of a site-specific measure of growing season with a growing season based on a station density of one station per 12,500 square miles (8 million acres) ?

NRCS, Alaska does not support the premise or map display identified in SPN 03-05 and believes that more appropriately, data from the Alaska Green-Up Index more scientifically and observed accurate.

*Response: See the previous response.*

Sequence number: 6
Location: para 3, line 1

One reviewer offers this anecdotal observation; "One of the opportunities I've had in working on so many large mapping projects across the state has been the ability to compile data and look at the results by plant community or vegetation mapping type. The construction of two relational databases to facilitate these mapping projects has allowed the combination and review of data from hundreds of sample points simultaneously. The vegetation parameter doesn't work the way it was intended to in much of Alaska. In proof of point, in two projects, one of which covered 4 major ecoregions, probably less than 3% of the plots sampled failed to meet the hydrophytic prevalency test - even though probably more than 60% of the plots sampled were not determined to be jurisdictional wetlands. I have two additional projects in other regions where the data have not all been compiled yet, but all indications are the results will be the same. Even the most upland of the plant communities will likely have a strong prevalence of hydrophytic vegetation the way the 1987 manual guidelines and the 1988/1995 indicator plant lists for Alaska are working.

*Response: Point well made and acknowledged but line 1 in the supplement is in reference to the standard sampling procedure given in the 1987 manual for determining hydrophytic vegetation for a specific site. Some of the issues described by the reviewer may be resolved with an updated wetland plant indicator list. Furthermore, the reviewer's comment provides strong justification for a three-factor test, as presented in the Supplement.*

## Page 11: (cont.)

The reason for these phenomena is really quite simple. The plants that are consistently dominant in our plant communities are dominants not because they are water tolerant or in-tolerant, it is because they are photo-period sensitive and have developed the ability to go dormant based on photo-period, even when the air temperature or water table are not telling them it is time to shut down. This is a tremendous advantage in a climate with as much variability as Alaska has in the spring and fall, when the failure to shut down in time (or start up too early) can result in irreparable damage. Most of these plants are correctly classified as facultative species - but of course they are then used in the prevalence calculation.

*Response: This may be, but please provide a reference supporting the position that plant responses to wetness are influenced by photo-period since they were assigned indicator statuses based on frequency of occurrence in wetlands. The process of determining if the vegetation is hydrophytic relies on a two-step process. First, plant species in the regional vegetation need to have been adequately assigned wetland indicator statuses. The second step involves applying an indicator of hydrophytic vegetation. If the regional plant list is weak or out of date, the outcome of applying an indicator can be questionable. The updating of the plant list is critical for accuracy, but resolving those issues goes beyond the scope of this supplement.*

I have thought long and hard about how this can be fixed. I do think that regionally plant lists could be developed wherein certain plants that are true hydrophytes could be used as real indicators of hydrophytic vegetation. However, knowing what I know and having seen the same kind of results in so many regions of the state, I am aghast at the language in this new manual that seems to imply that our regulators are going to be making wetland determinations based simply on the presence of what is now classified as hydrophytic vegetation. I think that plant communities dominated by obligates are likely the only truly hydrophytic plant communities in most of the areas of Alaska where I've worked, although I'd want to review the facultative wet species and their occurrence rates in a few regions before excluding them as well.

*Response: The process of determining hydrophytic vegetation is defined in the 1987 manual and subsequent guidance documents. There is no proposed change to this approach. The reviewer's point is well made but the issues may be more with the plant list and not the hydrophytic vegetation determination method. Furthermore, the three-factor approach ensures that these areas will not be mistakenly identified as wetlands.*

While we collect data on the vegetation parameter and report the results dutifully, we pretty much concede the parameter is met everywhere except a few mixed forest or closed broadleaf forest types. However, the 1987 manual process that we use to delineate areas larger than 5 acres (virtually all our projects) requires analysis by vegetation type, so we continue to collect these data and analyze them accordingly."

Sequence number: 7
Location: para 4, line 6

If this is a required procedure by the Supplement to perform vegetative sampling, please so state. What sections in the 1987 Manual is this to replace ? Is it a complete substitution for procedures in the 1987 Manual ? What is the reference source for this procedure ?

*Response: This statement represents no change from current practice under the 1987 manual. It is offered as guidance on plant sampling and is not mandatory. We will clarify what parts of the Supplement are intended to replace sections of the 1987 Corps Manual and what parts are simply intended to augment the 1987 Manual. In addition, the Alaska Working Group has decided to revise this section to provide more locally adapted sampling methods.*

## Page 12:

Sequence number: 1
Location: figure 2-1

Do not mix metrics. Provide display in consistent units and observe throughout entire publication. Consider editing to make sure that both are provided at all times, but always in the same order (English first, Metric follows in parenthesis or visa versa). If metric will be used as the units of measure for field measurements, have the COE Individual Permit Application Forms been updated nationally to ask for measurements in metric?

*Response: This document has not yet been edited by ERDC; however, this suggestion will be incorporated into the final version. Throughout the document, we intend to use English units followed by metric units in parentheses.*

## Page 13:

Sequence number: 1
Location: numbered items below para 1

One reviewer asks; How were the suggested plot sizes selected? Is this "guidance" meant to represent an optional or mandatory method? I do not think it is necessary for the Corps to specify plot sizes - only that the plot sizes, shapes, locations, and numbers should be selected to allow efficient and accurate sampling.

*Response: As stated above, ERDC and the Alaska Working Group are currently revising this section to provide more flexibility and local interpretation of plant sampling methods.*

Sequence number: 2
Location: Strata subsection

Several PRT members have pointed out that this is a stratification model not used in the 1987 Manual. Because we haven't had the opportunity to field test the methodology past two initial exercises, as a group we wonder what are the implications for percent cover values/ species dominance and combinations of any stratum less than 5% with the next lower stratum. Until study data can be reviewed according to accepted scientific procedure we have a concern about the acceptance of the new strata "definitions".

*Response: Based on PRT comments, strong recommendations of the Alaska Working Group, and approval by the National Advisory Team, the Regional Supplement will be revised to make the prevalence index (PI) the preferred indicator of hydrophytic vegetation in Alaska. The plot-based PI procedure does not require strata and considers all species present on a site, not just a few dominants. All discussion of strata, the 50/20 rule, and the dominance test will be moved to an appendix and used only at the discretion of the Alaska District in areas where clear vegetation stratification exists, such as in some riparian forests and in portions of southeast Alaska. Additional testing of these revised procedures will be done during an interim period of implementation of the Supplement.*

One reviewer comments; "...it would be nice if we could use either the Viereck or HGM strata definitions, rather than adopting yet another set. If we are changing strata definitions, then the Indicator list MUST be updated with the manual to allow for the percent cover by stratum process to work correctly..." Data collection for DBH will be a new requirement for this methodology, if employed.

*Response: See the previous response.*

Another reviewer notes; "I agree with the proposed changes."

## Page 13: (cont.)

Sequence number: 3
Location: Strata subsection

A reviewer suggests; The point-intercept sampling approach should be described in this section as an option for use on any delineation where a higher level of objectivity is desired. The answer provided by the point-intercept method should have precedence over the answer found using the plot method, whichever answer it provides (hydrophytic or not).

*Response: The 1987 manual uses plot-based vegetation sampling that is focused around the location of the soil pit to ensure that soil, vegetation, and hydrology information describes a common location on the ground. Point-intercept sampling requires transects that may average over the variability in soils, hydrologic conditions, and other factors that they cross. The supplement already allows the use of point-intercept sampling, but not as the preferred approach. Point-intercept sampling does not necessarily provide a more objective approach in all cases.*

## Page 14:

Sequence number: 1
Location: para 1, line 5

This is an unpublished study not peer reviewed and/ or commonly available for reference investigation. This study should not be cited nor information/ data incorporated in the Supplement for regulatory determinations, without study/ review for accuracy, concurrence or acceptance according to scientific procedure. Some may view one-off privately contracted science investigations as sometimes less than defensible for regulatory purposes.

*Response: A future ERDC publication will describe all aspects of the research supporting the cryptogam indicator.*

A reviewer asks; In what proportion of the Laursen study's wetland plots would the listed taxa have great enough cover to allow use of the cryptogam indicator ? How useful would this indicator be; would it be worth scientists' and regulators' time to be trained in its use? Even with training, how many practicing wetland professionals, including regulators, could competently implement this Indicator ?

*Response: Based on field research done during 2005, species within the stratum sorted more reliably if data were collected separately from the tops and bottoms of hummocks. However, using relative cover for cryptogams and a >50% frequency of occurrence, the statistical results indicate an approach that is >90% reliable. These results will be presented in the ERDC publication. One of the goals in the development of the cryptogam indicator was to select "more common and easy to identify" species. We hope with limited training most delineators will be able to use this indicator. However, we also suspect that this indicator will be used infrequently since a site will have had to fail the PI but have hydric soils and wetland hydrology indicators. For these uncommon situations, we have developed an indicator that statistically appears to be very strong.*

Sequence number: 2
Location: para 2, line 3

One reviewer notes; For cryptogam delineation, the second paragraph on page 14, is very weak. While I do not see any reason that a good naturalist could not come up with a cryptogam list, hiding behind "probability and multivariate techniques on paired wetland and non wetland test sites" detracts from the value of this section.

*Response: The methods and results will be presented in the ERDC publication. We agree that the paragraph needs to be reworded to focus on the application of the indicator.*

Sequence number: 3
Location: para 2, line 8

Procedures and formulas used to determine the significance of these of these values need wide endorsement from the wetland science community.

*Response: We agree.*

Sequence number: 4
Location: para 2, line 12

The Team feels this discussion is indicative of another reference to an unpublished and un-reviewed report unavailable to the wetland scientific community. To substantiate one unknown and unobtainable "reference" document with another similarly problematic one, is not an acceptable approach for making regulatory decisions.

*Response: We agree and will reword this section.*

Another reviewer comments; "Adding a few plants that virtually a handful of people in the state can correctly identify will only create more problems, and potentially create more opportunities for misuse. What private land owner is going to be able to stand up to a regulator who pronounces a certain moss occurs on their property and therefore it is a wetland? Where can they go for confirmation? If you can't provide a list of the "local experts" that we can go to for help then I don't think this section belongs in the body of the manual. After 25 years of working in natural resource management in the state of Alaska, I can only think of two people who could make these calls with confidence. As a compromise, perhaps these data could appear in a section for dealing with atypical situations (where remnants of these mosses might remain and provide good indicators of plant communities that have been
disturbed, etc.)"

*Response: We have been in the field with Alaskan delineators who already have an existing and reasonable knowledge of the cryptogam flora. The literature is rich with field guides to identify common taxa.*

And still another reviewer comments; In general, I favor the addition of bryophytes and lichens as optional strata to be used for wetland determination. This will require long-term development of wetland indicator statuses for at least the common species likely to be dominants. (1) It is inappropriate to base an indicator on draft documents that have not been peer-reviewed and are not available to reviewers. (2) I do not think this indicator should be applied outside of the plant community types and regions in which it was developed or where it is tested. (3) In what proportion of the Laursen study's wetland plots would the listed taxa have great enough cover to allow use of the cryptogam indicator? How useful would this indicator be; would it be worth scientists' and regulators' time to be trained in its use? Even with training, how many practicing wetland professionals, including regulators, could competently implement this

*Response: Number 1 response: The ERDC publication may resolve some of these questions. It is intended that a more comprehensive paper will be submitted to a scientific journal for review. Response to Number 2: We agree and will make the statement clear that these species are for a certain vegetation types and regions. Response to Number 3: It has been determined that if the cover values are used as relative cover and >50% of the indicator species were present, the indicator has a >90% reliability. Use of this indicator is intended for very specific situations. Therefore, it would have limited use but when it is needed it would be highly reliable.*

## Page 14: (cont.)

indicator? (4) If a cryptogam indicator is going to be used, please also provide a similar list of upland-indicating cryptogams that can be used the same way.

*Response: We have tried to restrict the list to strong wetland cryptogam indicator species that are common and easier to identify. By adding upland species the need for identification skills begins to increase and dilute the usefulness of the indicator.*

Sequence number: 5
Location: para 3, last line

With all due respect to Laursen's cryptogam team, it appears to the PRT reviewer's that a conclusion has been made regarding lichens. Namely, that lichens dominate on upland sites. Additionally, the context of the statement implies that the data underlying the use of cryptogam strata is incomplete at best and potentially being used according to an unknown (and unsubstantiated, due to lack of availability) statistical context. What scientific basis is the Corps endorsing lichens being excluded from the cryptogam strata?

*Response: Lichen frequency in the data sets tends to increase in upland sites. We have been able to find*

*reasonably sound statistics to support the bryophytes but the lichen data set is much more variable. It may be that the lichens are responding to other environmental variables and we can't explain them with the data we have. We currently lack the ability to assign wetland indicator statuses to lichens.*

## Page 15:

Sequence number: 1
Location: Para 1, Plot Size

What is the reference source for this procedure ?

*Response: This will be discussed in the ERDC publication.*

Sequence number: 2
Location: para 2, line 1

The PRT suggests removal of the statement referring to future training opportunities for cryptogram identification. It is not germane to the Supplement's mission.

*Response: We agree and will revise the wording.*

Sequence number: 3
Location: para 2, line 3

One reviewer notes that a search for and procurement of this publication turned up one copy nationwide at a cost of $104.00, due to being out of print. Not likely a reference available to nearly anyone.

*Response: Scientific citations do not require that the documents be readily available, only that they are a source of reference.*

## Page 16:

Sequence number: 1
Location: para 2, line 1

The review team notes a disconcerting trend in the application of the hierarchy procedures to continuously cast a wider loop to include the presence of FAC and FAC-UP vegetation to suggest site-specific hydrophytic plant expression. Many have suggested they believe this is not scientifically grounded, but a mechanism to extend jurisdictional regulatory control. The Corps should absolutely and distinctly provide the scientific rationale for the inclusion of FAC and FAC-UP species in the hierarchy of Vegetative Indicator procedures.

*Response: The ability to consider certain FACU-dominated communities as hydrophytic already exists in the 1987 manual. This does not represent a change in current practice. Furthermore, the supplement requires that hydric soils and wetland hydrology indicators be present before you can proceed to evaluate the plant community further. We point out that when you are standing on a wet site with hydric soils and the dominant species is FACU, either the indicator status is incorrectly assigned or this is one of the times when a FACU species has the ability to express its 33% occurrence in wetlands. If this were not so, then the species would never have been observed previously in a wetland and it would have been assigned an upland status. This represents no jurisdictional change from the vegetation section in the 1987 manual and subsequent guidance. Furthermore, such problems with FACU-dominated wetland plant communities will likely be reduced by using the PI method, which considers all species present, as the preferred approach to determining hydrophytic vegetation.*

Sequence number: 2
Location: para 2, line 4

The PRT recommends identifying that there needs to be one test for prevalence for areas that contain normal circumstances. More comprehensive methods are only warranted under the 1987 manual when problem areas outlined in the 1987 manual or atypical situations exist. Not getting the answer you want or expect does not make an area a problem area under the 1987 manual. It is much easier to reclassify a few plants on the plant list based on their ability to dominate wetland communities based on landform than change the entire process.

*Response: We disagree that only "one test" for hydrophytic vegetation is appropriate in all cases, and this suggestion is contrary to the 1987 Manual, which lists several indicators of hydrophytic vegetation. However, by making the PI the preferred approach and de-emphasizing the 50/20 rule and dominance test, the Alaska Working Group has largely addressed the PRT's concern.*

The bias toward finding vegetation to be hydrophytic is shown in the procedure described starting on page 16 of the Supplement. That procedure instructs delineators to calculate the prevalence index only if it might cause vegetation initially found to be non-hydrophytic to become hydrophytic. To be fair and unbiased, this procedure should be employed (as a more rigorous test) **whenever** hydric soils and wetland hydrology have been found and the vegetation may be marginal. Then, the answer derived from the prevalence index method should be used - whether it indicates hydrophytic vegetation or not. This would eliminate the bias of the 50/20 method toward finding vegetation to be hydrophytic.

*Response: As described above, the Alaska Working Group and the National Advisory Team have agreed to use the PI as the preferred method for evaluating hydrophytic vegetation in Alaska.*

Sequence number: 3
Location: Dominance test procedure

Consider also developing a flow chart for visually biased learners.

*Response: The suggestion will be considered. However, the procedure will already be simplified by using the PI as the preferred approach.*

## Page 16: (cont.)

Sequence number: 4
Location: Item #2, line 2

For purposes of clarity, indicate the requirement for hydric soil primary or secondary indicators in this area of the sentence.

*Response: The supplement does not give or recognize "secondary" indicators of hydric soil.*

Sequence number: 5
Location: Item #3

The PRT suggests adding language that if procedurally forced to use indicators 3 and 4, it is mandatory that primary indicators for hydric soil and hydrology are both present.

*Response: See the previous response. Furthermore, we believe that, to use these hydrophytic vegetation indicators, the presence of one primary or two secondary indicators of wetland hydrology is sufficient and is consistent with other aspects of the three-factor approach to wetland identification.*

Sequence number: 6
Location: Indicator 1 Dominance Test, line 1

One reviewer remarks that Indicator 1 is a "species richness measure that does not address the overlying influence of each species on the study site in terms of shading or species life histories. Hence, Indicator 1 is neither definitive nor inherently accurate."

*Response: This comment is no longer relevant, now that the PI will be the preferred approach.*

Sequence number: 7
Location: Indicator 1 Dominance Test, Description

This is another point where the "new" strata concept may have unintended consequences without also altering the plant list indicator status.

*Response: Again, this comment is no longer relevant because the preferred approach (PI) will be done without regard to strata.*

One reviewer provides this example; Let's use black spruce as an example of the "tree" problem. I had sites up at Pogo where the DBH varied between 2 and 5 inches, heights from 10-15', canopy 95%. Under the HGM definition of trees 10' or greater, they were all trees. Under this proposed definition, half would be trees, half would be saplings. Under the NWI plant indicator list black spruce is listed as a tree (although I use the same list for the sapling strata and I think most people do). But, if you count them all as trees (as HGM would) then the species was a dominant (hands down). If you count them as part trees and part saplings, then they might both be dominants, counting the same species twice. But on a site with fewer trees, neither might be dominants when you split them apart. I've seen regulators "lump" the saplings with the trees in order to make certain species dominants, when according to the manual they should have been split into saplings and trees. Whatever happens, the guidance needs to be firm and clear that lumping is or isn't allowed, or provide guidance as to how and when.

*Response: Again, this comment is moot due to the decision to use the PI as the preferred approach, which will be calculated without regard to strata.*

## Page 17:

Sequence number: 1
Location: para 1, line1

One reviewer asks; Why is an estimate of percent cover adequate? Percent cover is easily measured in the field and well established objective methods are available (ref) for each stratum. Kent, M. and Coker, P. 1992. *Vegetation Description and Analysis: A Practical Approach.* CRC Press, Boca Raton, 363 pages.

*Response: The supplement follows the procedures already used in the 1987 manual. We agree with the comment in principle, but the additional time needed to make detailed measurements of cover cannot be justified for most routine wetland determinations.*

Sequence number: 2
Location: para 1, line 3

One reviewer comments; You say that "The 50/20 rule is a repeatable and objective procedure." If so, you should provide a reference that shows how repeatability was tested. Very few quantitative vegetation methods have been tested for repeatability.

*Response: Again, this comment is moot due to the decision to use the PI as the preferred approach.*

Sequence number: 3
Location: Item #4, line 3

Group selection - Please provide an example of the expression of this calculation.

*Response: Examples are provided in Table 2-2.*

## Page 17: (cont.)

Sequence number: 4
Location: Item #4, line 5

The PRT notes this requirement to be impossible during many times of the year and would require expensive and difficult revisits. We suggest adding an additional statement saying " When it's not possible to identify plants to species that they be assumed to be acting as FAC or wetter for the purposes of calculations and/ or prevalence."

*Response: The need to identify plants will not change under the supplement. Delineators must be able to identify common species and can obtain help if greater plant identification skills are required. We do not advocate making the assumption that unknown species are necessarily "FAC or wetter." This suggestion could potentially expand jurisdictional boundaries.*

## Page 18:

Sequence number: 1
Location: Indicator #2 Prevalence Index, Description

Most of the PRT believes the Prevalence Index the most accurate and reliable method of site-specific hydrophytic vegetation determination. We believe it should take precedence over the Dominance Indicator test. Many reviewers seem to prefer using a more intensive but representative calculation of plant species presence and abundance, rather than just "estimating" abundance in each strata. (suggested; Kent, M. and Coker, P. 1992. *Vegetation Description and Analysis: A Practical Approach.* CRC Press, Boca Raton, 363 pages.

*Response: As stated previously, we agree with the PRT that the PI should be the preferred approach for determining hydrophytic vegetation. We will make this change in the Supplement. We believe that it isn't necessary in most cases to take the extra time and effort to quantify plant abundance, although this may be needed in certain borderline cases. A web site link is provided for free downloading of software that was released by the COE that evaluates both the dominance test and plot-based PI methods simultaneously. Using this software gives the delineator an instant result for comparison in the field when using a laptop computer.*

## Page 19:

Sequence number: 1
Location: Item #2, line 7

Please cite Reed 1988 to clarify what list is being used. One reviewer suggests the following change: Species without a published indicator status for Alaska should not be used in the calculations.

*Response: As stated above, while the Corps currently uses the 1988 plant list, any approved updated lists will supersede the older list.*

## Page 20:

Sequence number: 1
Location: Indicator #3, User Notes, line 1

The PRT by consensus notes that the limited area of the test for application of the cryptogam indicator excludes mention of any other vascular plant communities except black spruce. Indeed this paragraph notes it was not even tested on other vegetation regimes. So, as one reviewer notes; Why would one resort to cryptogams if other vegetation was present? If the cryptogam list came from work in an area with extensive vascular plants, can it be applied in areas without vascular plants (where, if it works, it might be useful, but is likely to have different species assemblages and interactions)?

*Response: In many cases, the black spruce stands are limited to less than 40% cover but have 100% cryptogam cover. The ERDC publication and a final draft of this indicator will specifically identify that this indicator is for use in Black Spruce forest in the Anchorage and Fairbanks areas.*

Another reviewer comments; I strongly object to this section being implemented statewide across any vegetation type when there is only data presented on black spruce forests in two regions. Implementing this language for black spruce forests in the interior and south-central would be fine, so long as detailed descriptions and photographs are included in the appendices, so lay persons would have a reasonable chance of determining if these species occur on their property, without having to hire a Ph.D. Botanist for an expert level consult. As a point of emphasis, I recently had one (Ph.D. Botanist) out on a project crew and they were unable to tell me if most of those mosses occurred in that project area either.

*Response: We disagree. We know delineators in Alaska who know many of these species and they are not Ph.D. botanists. This doesn't require a Ph.D. to do but it may require some limited training for those who lack the identification skills.*

A reviewer suggests this indicator if accepted, should be optional, not a mandatory step after employing Indicators 1 and 2.

*Response: This indicator is designed to be used only under very limited and special conditions (i.e., hydric soils and wetland hydrology are present and the plant community has failed the previous 2 indicators). It does not apply in the vast majority of wetland determinations, therefore it will not burden the delineator even if mandatory. It is presented as a tool to assist in very unusual situations.*

## Page 21:

Sequence number: 1
Location: Indicator #4, User Notes, line 4

The members of the PRT recognize that "hydrophytic vegetation" is intended to comprise vegetation that would lead an experienced delineator to believe a site is strongly influenced by water at or near the soil surface (within the main rooting zone) for long periods during the growing season of most years. That is, apart from hydrology and soil evidence, the vegetation alone should indicate wet conditions; the dominant plants should be "typically adapted" ("normally or commonly suited", paragraph 31, WLD manual 1987) for life in saturated soil conditions. The 1987 WLD Manual appears not intended to include plant communities that are only rarely found in wet sites. The existing regulatory definition of wetlands refers to vegetation "typically adapted" not "exceptionally adapted" for life in saturated soil conditions.

*Response: We agree, but FACU dominated wetlands and unusual situations do occur in nature and we are attempting to provide a repeatable method to make hydrophytic vegetation decisions in those instances without expanding jurisdiction.*

## Page 21: (cont.)

One reviewer asks, "How does the Corps propose a wetland delineator differentiate between shallow root systems due to adverse soil thermal conditions and those that develop due to saturation ?"

*Response: The Alaska Working Group has agreed to delete shallow roots from the list of morphological adaptations for Alaska.*

Another reviewer asks; How does a delineator test for aerenchyma tissue in the field ?

*Response: Aerenchyma is common mainly in obligate wetland plants, which are not the target of this indicator. We agree to drop aerenchyma from the list of adaptations.*

Another reviewer comments; It is stated that a common morphological adaptation as a wetland indicator is "root systems much shallower than in upland areas." Yet on gravel bars and pads (constructed, ed.), willows (for example) send extensive roots across the surface or just below the surface, however these are clearly not wetlands.

*Response: See the comment above. We agree to drop shallow roots from the list. In any case, the three-factor approach involving indicators of hydric soil, wetland hydrology, and hydrophytic vegetation ensures that nonwetland sites are not identified as wetlands.*

Another asks; How does the Corps propose to determine if 50 percent or more of the sites tree roots are shallower than those in adjacent uplands? If the regulator disagrees with an assessment, will we bulldoze every tree to see who was right? Would we need a permit to disturb the soil before this determination can be made ? Many trees root shallowly in uplands as well as wetlands in Alaska because the soil temperatures are so cold. Again, this has nothing to do with the ability to tolerate water.

*Response: Again, we agree to drop shallow roots from the list.*

And still another reviewer offers this unedited paragraph that describes a pervasive concern among most members of the PRT; "..in two places, the supplement refers to wetlands along creeks that support paper birch and field horsetail. While these FACU plants commonly occur along creeks, I have not seen convincing evidence that such sites typically have wetland hydrology and hydric soils. While the tendency may be to **want** to call them wetlands because they are near creeks and are important ecologically, those sites do not meet the criteria laid out in the 1987 manual and may not experience prolonged saturation that leads to anaerobic conditions. I believe the supplement authors may have erred in calling those areas "wetlands", and then using the "wetland" status of those sites as evidence that certain FACU species commonly grow in wetlands. I believe that this reference to "FACU dominated wetlands" and procedures laid out in Chapter 5 would bring more areas under Section 404 jurisdiction than are truly wetlands according to the current definition. I agree that these may be ecologically and socially important areas, and deserve special management, but they are not necessarily wetlands."

*Response: Sites will only be identified as wetlands if three lines of evidence – vegetation, soil, and hydrology – support that decision. Whether or not the site is near a stream is irrelevant. Each site is unique*

*and would have to be evaluated carefully. The Supplement does not make preconceived judgments about the wetland status of a site.*

Sequence number: 2
Location: para 3, line 1

One reviewer recommends reiterating a requirement for presence of hydrology and hydric soils with primary, or a minimum of two secondary, indicators before applying indicator #4.

*Response: This requirement is already stated three times in the procedure on page 16. However, we will repeat it here.*

## Page 22:

Sequence number: 1
Location: general comment for chapter

Much of the Soils section could use rewriting, paying special attention to sentence construction and completion.

*Response: We appreciate the PRT's editorial comments. In addition, the supplement will be reviewed by Corps editors before publication.*

Sequence number: 2
Location: para 2, line 4

A reviewer recommends; Please clarify that, as the NTCHS updates indicators, those indicators shall supersede the ones described in the regional supplement. Apparently, the current NTCHS indicators have not legally superseded the hydric soil indicators in the 1987 manual.

*Response: Indicators in the supplement will supersede current hydric soil indicators in the 1987 Manual, and those in the supplement will correspond with NTCHS indicators. The purpose of this statement is to keep the supplement current with updates and to prevent the appearance of having two sets of indicators.*

Sequence number: 3
Location: para 4, line 2

The PRT agrees with the comment of this reviewer;
Put all the soils guidelines in the soils chapter (including "Difficult situations In Alaska"). If we evaluate using all the possible criteria for a hydric soil and still don't have any positive indicators --- and you've observed the area during the growing season under normal circumstances, then it's simply not hydric for the purposes of the regulatory program. Each parameter has to stand on its own. Let's give each parameter as many legs to stand on as we can but at the end of the test it has to stand on its own. I would also put the alpha alpha test in as a standard part of the evaluation. Alpha alpha is an inexpensive tool that anyone can carry and use with minimal training. Include the NRCS recipe and sources to obtain materials for the liquid.

*Response: Several points were made in this comment. First, the organization of this supplement was recommended by the National Advisory Team for two reasons: (1) the organization of the supplement should be consistent with that of the 1987 Manual, which puts the discussion of problematic situations at the end, and (2) these problematic situations need to be highlighted in a dedicated chapter. Second, there is a difference between the definition of a hydric soil and indicators of hydric soil. While most hydric soils exhibit indicators, some soils that meet the hydric soil definition lack indicators. This is recognized by the NTCHS and most wetland experts. The supplement provides special procedures to identify hydric soils that lack indicators. To say that these situations are "simply not hydric for the purposes of the regulatory program" is incorrect. These situations are potentially regulated under existing guidance and their jurisdictional status will not change under the supplement. Finally, the availability and use of alpha, alpha dipyridyl are described on an NRCS web site.*

You can't always understand redox development (or lack thereof) in transitional areas without understanding soil pH. Encourage soil pH data be submitted for each horizon, especially in problem/ transitional areas. Submittal of redox meter data should also be encouraged in ash areas, areas of high soil pH, and areas where dark parent materials exist.

*Response: pH data, redox probe readings, etc., are appropriate research tools for verifying that a soil meets the hydric soil definition or the NTCHS Technical Standard for Hydric Soils, but are not appropriate for the rapid, indicator-based approach to wetland identification described in the supplement. Meeting the Technical Standard for Hydric Soils is proof that a soil is hydric, but the procedure requires time and effort beyond the needs of routine wetland delineations.*

## Page 22: (cont.)

Sequence number: 4
Location: section comment, Organic Matter Accumulation

One reviewer recommends including a brief discussion of OM characteristics for saturated and non-saturated OM accumulations. Although this is discussed in Indicators A1 and A2, I think it should be briefly mentioned here, as it leaves the reader thinking "ok, so how do I tell?" Consider adding a graphic showing representative handful's of peat, mucky peat, and muck.

*Response: We concur and will clarify this section.*

Sequence number: 5
Location: para 5, line 1

Provide a reference here regarding histic epipedons and the requirement for saturation. For example provide the Soil Taxonomy quote that the histic epipedon must be saturated.

*Response: We agree and will clarify that a histic epipedon must be saturated. This is already evident in indicator A2.*

## Page 23:

Sequence number: 1
Location: para 1, line 1

We note this coolness and acidity is apparently presented as a "problem condition". However, it is not addressed in Section 5.

*Response: This is not intended as a problem condition. It is merely background information.*

Sequence number: 2
Location: para 4, line 1

One reviewer recommends an addition to this section; The spodosol section should indicate that spodosols are not uncommon in other parts of Alaska. Also mention that there are hydric spodosols as the discussion as presented might give a novice soils person the sense that spodosols = non-hydric. Some characteristics/pictures of cryaquods might also be useful in this section so there is a visual of how they might differ in appearance.

*Response: We will clarify that Spodosols may be hydric or nonhydric.*

## Page 25:

Sequence number: 1
Location: para 2, line 1

One reviewer asks; If this is a problem condition, why is it not referenced in Section 5 ?

*Response: This information is intended as background. These situations are not problematic for wetland delineators.*

Another reviewer suggests; Emphasize the importance of visiting these sites early in the growing season if at all possible, and potentially using alpha-alpha and redox meters during that time to help make the hydric soil determinations. Many of these sites will have a prevalence of hydrophytic vegetation because of the number of FAC species that occupy them. If a two-parameter test is allowed, these sites could now be

considered jurisdictional wetlands, even though the hydric soil conditions are likely developing outside of the growing season.

*Response: The recommendation to visit the site "...early in the growing season" is good. We will clarify. The use of redox meters and platinum electrodes is beyond the scope of the supplement. This discussion does not advocate a two-parameter approach. We would appreciate any references or information that redox features are developing outside the growing season.*

## Page 27:

Sequence number: 1
Location: para 3, line 1

Substitute the word "every" for "any"

*Response: We concur.*

## Page 28:

Sequence number: 1
Location: para 1, line 4

The PRT recommends the Corps provide clarifying discussion and suitable scenario implications for indicator discovery or reference when digging to 20" or deeper in soils with shallow permafrost. We note conditions below 20" in shallow permafrost settings will likely have little influence on whether the site is a wetland, given the permafrost's overriding nature.

*Response: We concur and will revise this passage.*

## Page 28: (cont.)

Additionally we recommend adding "unless bedrock, ice-rich permafrost, or other restrictive layer is identified higher in the profile", or something to that effect.

*Response: We concur. We recommend digging to at least 20 inches unless bedrock is present.*

The reviewer comments there is a lack of discussion of placics or ornsteins in the document. Photos of these and descriptions of where/how they occur would be appropriate as they are not that uncommon in some parts of Alaska.

*Response: These soil features are not discussed because they are not necessarily relevant to the hydric soil determination.*

## Page 29:

Sequence number: 1
Location: para 2, line 1

The PRT recommends that all Supplement photo's contain rods, tapes, or other measuring items allowing determination of scale values. Additionally, add a statement to any methodology instructions which would require the investigator to use such a scale instrument for documentation purposes.

*Response: We agree in principle but are limited by availability of photos. The Corps of Engineers would be willing to consider for inclusion in future versions of the supplement any photographs of hydric soil indicators or wetland landscapes submitted to it, along with appropriate captions.*

## Page 30:

Sequence number: 1
Location: Hydric Soils Section comment

The PRT commends the addition, pictorial representation and information of the Alaska hydric soil indicator section. Please closely review this section for sentence structure.

*Response: The supplement will be reviewed by Corps editors before publication.*

Sequence number: 2
Location: AI User Notes, line 1

One reviewer suggests; Suggest adding, the difference in soil surface for Histosols should be noted as it likely differs from the last discussion. It might be beneficial to describe the deep feather moss organic mats that develop in interior Alaska, often over relatively well drained soils, that are never saturated and are not histic epipedons.

*Response: We agree to clarify what is meant by the "soil surface" when evaluating indicators. The soils described by the reviewer are Folists and are not hydric Histosols or histic epipedons.*

Another reviewer asks; Please clarify "soil surface" in the first paragraph of this section. Does the organic material need to be saturated for any particular period, or during the growing season, for this indicator to be valid or for it to be a Histosol ?

*Response: We will clarify what is meant by the "soil surface."*

Sequence number: 3
Location: AI User Notes, para 2, line 1

This first sentence needs restructuring.

*Response: We concur.*

Sequence number: 4
Location: AI User Notes, para 3, line 2

Is the 12-18% reference pertinent to the determination of a histosol and therefore the wetland determination? Same question for indicator A2.

*Response: All User Notes are additional information that might be helpful to the user trying to identify the indicator in the field. However, we agree that this information is not useful and will be dropped.*

Sequence number: 5
Location: AI User Notes, para 3, line 4

Please provide the saturation depth requirement for users.

*Response: Saturation must be within the organic layer.*

Sequence number: 6
Location: AI User Notes, para 3, line 8

One reviewer asks about the significance of the last four or five sentences here and in the A2 indicator. Are they just for informational discussion or are they pertinent to the histosol for purposes of wetland determination ?

*Response: All User Notes are additional information that might be helpful to the user trying to identify the indicator in the field.*

Sequence number: 7
Location: Interior Alaska, line 2

Spelling and punctuation.

*Response: We will correct the errors.*

## Page 30: (cont.)

Sequence number: 8
Location: South Central Alaska, line 4

Syntax

*Response: We will correct the errors.*

## Page 34:

Sequence number: 1
Location: Technical Description

One reviewer asks; How will NRCS/ COE treat pits where reduced sulfur is identified below 12 inches from the soil surface ? Which soil surface will we use for this evaluation ?

*Response: The odor must be present within 12 inches of the surface. We will clarify that, to evaluate the indicator, the hole should be dug initially no deeper than 12 inches.*

## Page 35:

Sequence number: 1
Location: A12, Technical Description, line 1

One reviewer suggests; Clarify which soil surface. This is a tough indicator for people with minimal soils training. Does the 6" need to all be part of one horizon or can two dark horizons be combined to meet the depth requirement, if they both meet the other color requirements ?

*Response: As stated previously, we will clarify what is meant by the soil surface. Horizonation is not important with this indicator.*

Another reviewer suggests; In the technical description, please clarify what the "surface" is. Perhaps this technical description could be clarified with a diagram. Please clarify the reason for looking below 12 inches (i.e., hydric soil indicators are typically within the upper foot, and this one is allowing the investigator to find that evidence, why... ?).

*Response: We will clarify the definition of the soil surface.*

Sequence number: 2
Location: A12 User Notes, para 3, line 3

Rewrite with quotes to make sense.

*Response: We will clarify.*

## Page 36:

Sequence number: 1
Location: para 1, line 1

This is a good descriptive informational paragraph. One reviewer suggests moving it to the beginning of the User Notes to help clarify the basis of this indicator.

*Response: We agree and will make the change.*

## Page 39:

Sequence number: 1
Location: Table 3-1

One reviewer comments; Table 3-1 is not as clear as the equivalent series of tables in the *Field Book for Describing and Sampling Soils* (USDA NRCS 2002).

Another reviewer suggests this table might be meaningful to a wider variety of potential users if it was accompanied by text discussion regarding its application and significance.

*Response: This is a personal preference issue. We will continue to use the table but will also reference the Field Guide as another example.*

## Page 40:

Sequence number: 1
Location: A14, User Notes, line 1

A reviewer asks for clarification of the soil surface. Are soil surfaces always the same when determining this indicator?

*Response: As stated previously, we will clarify what is meant by the soil surface.*

## Page 40: (cont.)

Sequence number: 2
Location: A14, User Notes, line 3

More than any other parameter, soil discussions can be confusing and filled with jargonistic terms and references. One reviewer suggests either provide more easily understandable discussions, clarifying discussions for non-soil professionals or a more complete glossary of terms. Another reviewer ask for the definition of glauconitic.

*Response: The Alaska working group and the National Advisory Team both decided not to repeat glossary definitions that were found in reference documents, but only to include new or critical terms in the supplement. Including entire glossaries from several other documents would only lengthen the supplement and set the stage for conflicts if glossary terms change in the referenced documents. We will clarify where other relevant glossaries may be found.*

Sequence number: 3
Location: A13 User Notes, para 2, line 1

One reviewer asks; Is all this complex discussion necessary for the purposes of applying this indicator. It may provide interesting reading for those so inclined, but much of the dialogue does not provide a necessary component of applying the indicator. Reorganize into a simple step approach. Leave these deep technical ramblings for the publication from where they came (just cite the reference) and confine the indicator discussion to the pertinent information required for determining the indicators presence or lack thereof. Apply this concept across all of these types of indicator treatises and shorten the Supplement significantly.

Another reviewer suggest; Reorganize and break up the largest paragraph so it flows more logically.

*Response: An understanding of gley colors is critical to applying all indicators that require or allow gley colors.*

## Page 43:

Sequence number: 1
Location: Figure 3-14, line 2

A reviewer asks; Does the caption on Figure 3-14 reference 8 inches where it should reference 20 inches?

*Response: We will clarify the caption.*

## Page 44:

Sequence number: 1
Location: A14, Technical Description, line 1

One reviewer asks;
"As a point of clarification, is the Alaska District agreeing that if we have soils with a chroma of 1 or 2 (with or without redoximorphic features) that are not found on the hue pages listed in the first paragraph, and that do not meet the A12 depth criteria, are not hydric? If NRCS is saying hues of 10YR, 7.5YR, 2.5YR, etc. are not good indicators of hydric soils, but we record horizons with those hues and low chromas -- will the COE agree that the soil is not hydric or try to revert back to the 1987 manual to retain jurisdiction? Is this really just a supplement or will it replace the 1987 manual entirely in Alaska? If it's just a supplement, under what

circumstances can the COE revert back to the 1987 manual when these new criteria don't give them the answer they want/ expect? I realize these are broader questions, but they do need clarification somewhere in the document.

*Response: These hydric soil indicators will replace those currently found in the 1987 Manual and be the standard for Alaska. The Alaska District participated on the Working Group and concurs with its recommendations.*

Sequence number: 2
Location: A14, Technical Description, line 4

Please find a way to characterize the "soil surface" which will be meaningful for all sites to which this indicator is pertinent.

*Response: The definition of the soil surface will be clarified.*

## Page 49:

Sequence number: 1
Location: para 1, line 9

Although not specifically related to the science or methodology of the Supplement, a suggestion for the improvement of data access is captured by this reviewers' observation and is recommended by the PRT. Please apprise NRCS of this suggestion. "It would be useful if NRCS would develop a page on their web-site that summarizes the available surveys, mapping unit size, links to their local hydric soils list, applicable soil descriptions, and a link to the national hydric soils list if a local list isn't available. This could then be referenced in this section. I've had to go to the national page a number of times to get descriptions of specific soils in older surveys (generally out of print and unavailable to the general public), and that link should also be listed here."

*Response: The suggestion has been forwarded to NRCS.*

## Page 49: (cont.)

Sequence number: 2
Location: para 2, line 1

Please note that since 1999, **Soil Taxonomy** has changed and should be noted by users of the Exploratory Soil Survey if appropriate.

*Response: This does not affect the general information presented in the supplement.*

## Page 50:

Sequence number: 1
Location: Wetland Hydrology Indicators, section comment

Once again the PRT encourages the Corps to use the full extent of the three-parameter approach, and draws attention to the danger of relying on the expression of one parameters feature (s) as a certain character feature of a different parameter. We fully recognize the often inseparable interaction between the soil, hydrology and vegetation. However, there are enough complicating conditions that utilizing one parameter feature to judge the presence of another parameter is more than occasionally in Alaska, not correct. In this context another reviewer offers this comment; Don't use soil indicators as evidence of hydrology. It's a multi-parameter test. Each parameter must stand on its own. The new indicators give PLENTY of ways we can document wetland hydrology -- for the most part they are very good and well put together.

*Response: Like the 1987 Manual, this supplement uses a three-factor approach to wetland identification. We agree that wetland hydrology indicators are an important part of this approach. The purpose of wetland hydrology indicators is to ensure that a site has a <u>continuing</u> wetland hydrologic regime and that hydric soil indicators and hydrophytic vegetation indicators are not relicts of a past hydrologic regime. Therefore, any evidence of real-time hydrology is a potentially valuable indicator. Certain narrowly defined soil and vegetation characteristics are strong evidence of real-time wetland hydrology and do not simply duplicate indicators of hydric soil and hydrophytic vegetation. One example is the presence of ferrous iron (Fe++) in*

*the soil, which only occurs when the soil is currently saturated and reduced. The presence of ferrous iron is a stronger indicator of wetland hydrology than the observation of saturation alone, because the soil must have been saturated long enough for the chemical change to occur. We do not agree that potentially useful wetland hydrology indicators should be ignored simply because they are based on evidence from the soil or the vegetation. We will address specific comments about particular indicators in the following pages.*

Sequence number: 2
Location: para 4, line 3

One reviewer suggests; Group B indicators must be paired with some evidence that the inundation or saturation occurred during the growing season. (For the algal crust, that already exists.)

*Response: To provide timely response to applicants, Corps of Engineers regulatory personnel often must make wetland determinations outside of the growing season. For most wetland hydrology indicators, the supplement advises users to consider whether wet conditions typically occur during the growing season. It is important to understand that wetland determinations are based on three factors and never on wetland hydrology indicators alone. The three-factor approach, involving soils and vegetation as well as hydrology, insures that inundation or saturation regularly occurs during the growing season.*

Sequence number: 3
Location: para 4, line 4

One reviewer comments; I am skeptical of the validity of some of the hydrological parameters listed (surface soil cracks, stunted or stressed plants, micro-topographic relief, salt deposits).

*Response: Comments provided by only "one reviewer" out of a panel of eight members are difficult to address because we do not know the consensus of the panel. However, we will respond to comments on individual indicators in the following paragraphs.*

## Page 53:

Sequence number: 1
Location: Cautions and User Notes comments

One reviewer suggests referencing the hydric soil indicator discussion regarding seasonal frost, as a reminder that along with best professional judgment, surface water A1, and high water table A2, observations may need special consideration on some sites.

Another reviewer suggests adding the term "spring break-up" to the list of conditions presented in the first sentence under "Cautions and User Notes".

*Response: We agree with both of these comments.*

## Page 56:

Sequence number: 1
Location: Caution and User Notes, line 4

One reviewer asks by what method can a delineator scientifically or reasonably distinguish between normal cyclic watermark extent of inundation and "extreme or abnormal" events ?

*Response: We cannot give a procedure that would make sense in all cases and prefer to allow users the flexibility to interpret indicators based on their training and experience in the local area. Furthermore, this is another situation where the three-factor approach, involving soil and vegetation indicators as well as hydrology indicators, ensures that areas subject only to infrequent or extreme events are not identified as wetlands.*

## Page 57:

Sequence number: 1
Location: Caution and User Notes, line 5

One reviewer asks, by what scientific method does the Corps propose to evaluate whether the sediment deposits were the result of "historic flow conditions or recent extreme events" and/or "sediment that may be

left following spring snowmelt" without multiple trips to the site?

*Response: This statement was intended only as a caution that should be considered by the user in interpreting observations of sediment deposits. No special procedures are needed because the three-factor approach already ensures that areas subject only to infrequent or extreme events are not identified as wetlands.*

## Page 58:

Sequence number: 1
Location: Caution and User Notes, line 5

One reviewer asks, by what scientific method does the Corps propose to evaluate whether the drift lines were the result of "extreme, infrequent, or very brief flooding events" without multiple trips to the site ?

*Response: Again, no special procedures are needed because the three-factor approach already ensures that areas subject only to infrequent or extreme events are not identified as wetlands.*

## Page 63:

Sequence number: 1
Location: Caution and User Notes, line 1

One reviewer recommends that this statement be qualified by adding that "hydric soil indicators must also be present".

*Response: The reviewer's point is valid, but the statement is unnecessary. The three-factor approach already requires evidence of hydric soils.*

Another reviewer asks how the mere presence of shallow surface soil cracks indicate the presence and longevity of hydrology during the required growing season?

*Response: Surface soil cracks indicate that an area was recently inundated. The reviewer is correct that, on their own, surface soil cracks do not necessarily indicate duration of ponding or flooding. However, the three-factor approach already ensures that areas only briefly or infrequently inundated are not identified as wetlands.*

## Page 65:

Sequence number: 1
Location: Category comment

Given the extensive conditional requirements for application of this indicator, the PRT recommends changing the indicator category to Secondary requiring a minimum of 2 years of photography.

*Response: The observation of inundation on an aerial photograph has the same cautions and should have the same status (Primary) as the direct observation of inundation during a site visit. The user should consider whether the observation represents normal conditions. Furthermore, the three-factor approach already ensures that areas only briefly or infrequently inundated are not identified as wetlands.*

Sequence number: 2
Location: General Description.

One reviewer asks; What is the definition of "recent" ?

*Response: "Recent" is unspecified but is implied in the statement that "Older imagery may be useful if there has been no known hydrologic change." In other words, the photography should post-date any significant hydrologic change (e.g., change in river course, tectonic activity, human alteration, etc.). We will clarify the wording.*

Sequence number: 3
Location: General Description

The PRT recommends the inclusion of a requirement for on-site visit for follow-up verification, if citing this

indicator for determination status.

*Response: We agree with the need for a site visit. A site visit is already required to evaluate the soil and vegetation, and to search for other indicators of wetland hydrology. This indicator was not intended or presented as an offsite procedure for wetland identification.*

Another reviewer recommends a requirement for minimum of two years aerial photography of the project assessment area (PAA) where the dates of the photo's are known to be during the growing season or otherwise clearly indicative of the presence of growing-season long PAA hydrologic conditions.

*Response: Again, these added requirements are unnecessary because the three-factor approach ensures that areas only briefly or infrequently inundated are not identified as wetlands.*

Sequence number: 4
Location: Caution and User Notes, line 2

Another reviewer suggests adding the term "spring break-up" to the list of conditions presented in the third sentence under "Cautions and User Notes".

*Response: We agree with this comment.*

## Page 66:

Sequence number: 1
Location: Indicator comment

One reviewer recommends deleting this indicator in Alaska. Other hydrology expressions identified should suffice, and this one is too difficult in many circumstances to discern its nature of origin.

Another reviewer comments: I have never felt that water-stained leaves are a even a good secondary indicator of persistent water. Anywhere it snows you are likely to have dark leaves, just because some ephemeral ponding does occur right after break up just about everywhere.

Another reviewer recommends; "At a minimum the Corps should qualify the Cautions and Users Notes section with additional information identifying the difference between leaf staining from snowfall, and leaf staining found in sites where they are indicative of the required ponding period lengths during the growing season.

*Response: Water-stained leaves are not difficult to recognize and, if present in depressions, flats, or along streams, are not confusing as to origin. They are appropriate as secondary indicators of wetland hydrology with the cautions mentioned in the supplement.*

## Page 67:

Sequence number: 1
Location: Caution and User Notes, line 3

One reviewer writes; the proposed evaluation method is site-specific but subjective. By what scientific method does the Corps propose to evaluate whether the drainage patterns are the result of "extreme or abnormal flooding or by brief, temporary flooding during the spring breakup period" without multiple trips to the site?

*Response: Again, no special procedures are needed because the three-factor approach already ensures that areas subject only to infrequent or extreme events are not identified as wetlands.*

## Page 68:

Sequence number: 1
Location: Indicator comment

The PRT notes this indicator serving for both parameters of hydric soil and hydrology. Is it the Corps intention to allow this feature ? We suggest that at a minimum the Corps improve the clarity of the discussion of this feature. The anaerobic condition forcing the soil microbes to feed on/ reduce sulphur is the result of the saturation of the soil. However, the feature is ascribed as a condition of soil. If this feature is to

satisfy as a primary indicator for the presence of both hydric soils and hydrology, please clearly identify how this is allowed.

*Response: The presence of reduced sulfur in the soil so obviously indicates real-time, long duration, soil saturation that we find the criticism of this indicator confusing. The goal of the supplement is to identify wetlands, and areas having this indicator are among the wettest situations in Alaska. The fact that hydrogen sulfide is detected by digging in the soil is not relevant to its value as a wetland hydrology indicator. One also observes a shallow water table by digging in the soil.*

## Page 69:

Sequence number: 1
Location: Category comment

One reviewer notes that this indicator should be a secondary categorical feature, due to the assumption of hydrology as a basis for a soil characteristic. Once again we note a feature serving as both indicator for hydrology and as an indicator of a hydric soil condition. We suggest trying to separate as discretely as possible, wetland parameter expressions according to their uniqueness to the parameter. While we realize that this is not possible with all expressions, perhaps a table could be created with columns for each parameter (soil, hydrology, vegetation) and the character features associated with each one. Overlap or integrated character expressions could also be included in the table to show the interdependence or relationship of the feature to the parameters. The table could also incorporate a concept classifying indicators by their strength and weaknesses. Strong and direct indicators would classify as "primary", marginal and indirect indicators as "secondary", and indicators that may be used in only exceptional circumstances as "tertiary". Use of secondary and tertiary indicators for a site should require that primary indicators of the other two parameters exist. As the supplement is presently written, a site could be determined to be wetland based on weak or no evidence of one or two parameters. A decision matrix could be developed from the table identifying how many and which qualifying features would serve as requirements for wetland presence.

*Response: Again, the fact that oxidized rhizospheres are found in the soil is completely irrelevant to their value as wetland hydrology indicators. Oxidized rhizospheres along living roots indicate that the soil was saturated with water for a long period within the lifetime of the plant. Furthermore, oxidized rhizospheres are often ephemeral; therefore, their presence may indicate very recent saturation. The emphasis on living roots ensures that wet conditions are contemporary. Oxidized rhizospheres are defined much more narrowly than other types of redox concentrations, and they do not duplicate any hydric soil indicator. However, the Alaska Working Group agrees to make Oxidized Rhizospheres a Secondary indicator. This is due to the possibility of relict rhizospheres in areas that have lost their permafrost, and their wetland hydrology, due to global climate change or fires that have destroyed the insulating moss layer. As an aside, the supplement does not list any "tertiary" indicators. Indicators considered unreliable were dropped entirely.*

Sequence number: 2
Location: General Description, line 3

The mineral soil surface ? Which one, if not ?

*Response: We agree that the "soil surface" is not well defined in the supplement. We will clarify.*

Sequence number: 3
Location: Caution and User Notes, line 6

When are dead roots not considered as "organic matter" ? The caution statement causes one to ask, do we consider oxidized rhizospheres around dead roots as relic features ? And if so, at what time point does the transition from current to relic occur ?

*Response: The indicator does not address dead roots. Pore linings surrounding dead roots do not count toward this wetland hydrology indicator.*

## Page 70:

Sequence number: 1
Location: Category comment

The PRT recommends the category indicator status be changed to Secondary; wet-season hydrology is assumed based on a dry season water table. What is the scientific basis for establishing the depths of ground water noted for mineral and organic soils? How does this indicator consider site-specific hydrology response to seasonal and landscape influences to determine the depths of ground water noted for mineral and organic soils?

*Response: The Alaska working group believes that the Primary designation is appropriate. In most wetlands in Alaska, water tables fluctuate seasonally. If an area has a water table a short distance below 12 inches of the surface (i.e., 12-24 inches in mineral soils or 12-40 inches in organic soils) during the drier portion of the growing season or during dry years, the water table is almost certain to be within 12 inches during the normal wet season. The water table in nonwetlands, and in many wetlands, generally drops well below these depths during dry periods after the spring thaw. The 24-inch and 40-inch thresholds are based on the experience of Alaska soil scientists and wetland specialists and are supported by monitoring data.*

Another reviewer notes; If this is going to be a primary indicator - industry needs a process by which we can dispute this as a primary indicator by means of shallow piezometers or other instrumentation.

*Response: The purpose of the supplement is to identify wetlands in Alaska accurately and consistently. The three-factor approach to wetland identification ensures that only areas with strong, multifaceted evidence of wetland conditions will be identified as wetlands. There is no reason to build "a process" to dispute the determination when indicators align properly.*

## Page 71:

Sequence number: 1
Location: Indicator comment

Same concern as seen previously where an indicator is defined as a wetland expression for two parameters.

*Response: The presence of reduced (ferrous) iron in the soil is very strong evidence of <u>current</u> soil saturation and reduction. It also indicates an active microbe community and timing during the growing season. The fact that this is a property of the soil does not negate its value as a wetland hydrology indicator. However, we agree to limit the list of acceptable evidence to the ferrous iron test and the observation of a color change in soils exposed to the air.*

## Page 72:

Sequence number: 1
Location: Caution and User Notes, line 1

One reviewer points out; There are many areas on the North Slope (typically disturbed areas) with salt crusts, often originating from "salty gravel" (i.e., gravel mined from an area that had sufficient brine to leave salt in the gravel). In some cases, precipitation flushes salts from these pads into the surrounding land, creating salt crusts that should not be considered secondary indicators.

*Response: We agree that, in these cases, the salt deposits should not be considered wetland hydrology indicators. However, this indicator is only applicable to "Interior Alaska and western portions of Southern Alaska, in areas of seasonal moisture deficit." Furthermore, the three-factor approach should ensure that nonwetlands are not mistaken for wetlands in such cases. We will also add a caution.*

The PRT recommends a qualifying statement in the "Cautions and User Notes" section acknowledging the potential for salt deposits to be associated with conditions other than as wetland expressions.

*Response: See the previous response.*

## Page 73:

Sequence number: 1
Location: category comment

One reviewer recommends; Due to the potential for confusion with patterned ground processes in Northern, Interior, and Western Alaska, Indicator D1 should only be a secondary indicator in these areas.

*Response: We prefer to give users the flexibility to consider the evidence in light of site characteristics. If not related to "patterned-ground processes", then the appropriate designation is Primary.*

Another reviewer comments; Indicator D1 should be put in Group B. It should note whether, when the concave surface is flooded, the water table would be high enough to be within the rooting zone of the surrounding vegetated areas.

*Response: We agree that the indicator belongs in Group B. However, extending the water table into surrounding areas seems problematic.*

Sequence number: 2
Location: Caution and User Notes, line 1

One reviewer suggests the Caution and User notes; Should include "sparsely vegetated" as well as un-vegetated (less than 5%) or the Corps will exclude by definition some of the areas they're trying to address. Discuss in the text that these areas may in fact be waters of the US rather than wetlands.

*Response: We agree that "sparsely vegetated" areas should also be mentioned in the User Notes in relation to these wetlands. The supplement, like the 1987 Manual, does not identify nonwetland "waters of the US." These areas must be identified using the Ordinary High Water Mark as described in regulations.*

## Page 74:

Sequence number: 1
Location: Indicator comment

Same concern as seen previously where an indicator is defined as a wetland expression for two parameters.

Another reviewer notes; This is a morphological plant adaptation as much or more than a hydrologic indicator - we see the same characteristics at high elevations or on severe wind blown sites. This needs to be in the vegetation section not the hydrology section.

Another review notes; Indicators D2 and D5 should be used as vegetation indicators and should not be used as hydrology indicators. If they are used, they should be secondary or tertiary indicators that require one or two other secondary or tertiary indicators.

*Response: Following additional discussions with the Alaska Working Group, it was agreed that indicator D5 would be dropped and morphological adaptations used only in the hydrophytic vegetation decision. However, Stunted or Stressed Plants (D2) will be retained as a secondary indicator of wetland hydrology. This does not duplicate the use of plant stunting as a hydrophytic vegetation indicator in problem situations, because that indicator is limited to FACU species. Wetland hydrology indicator D2 considers stunting in any species.*

Sequence number: 2
Location: Caution and User Notes, line 2

One reviewer suggests adding the term "shallow permafrost" to the list of conditions possibly causing a stunted vegetative expression in the second sentence of this section.

*Response: We agree and will make the change.*

## Page 75:

Sequence number: 1
Location: Category comment

One reviewer notes; Indicators D3 and D4 should not be used unless there are primary (not problem area) indicators of hydrophytic vegetation and hydric soils, and should require a clear explanation of why wetland hydrology would be expected during the growing season. They also should be tertiary indicators that require presence of one or two other secondary or tertiary indicators for determination purposes.

*Response: The Alaska working group does not agree with this one reviewer's opinion. In Alaska, landscape position and the presence of shallow restrictive layers are often critical to the development of wetlands in an*

*area. Wetlands develop in areas where water collects, converges, or discharges. Not all such areas are wetlands, but nearly all wetlands are found in such areas. The Secondary designation for these two indicators is appropriate and additional explanations or procedures are not needed.*

## Page 76:

Sequence number: 1
Location: Caution and User Notes, line 1

One reviewer writes; This section is supported by scientific data for sites that are not underlain by gelisols but the proposed evaluation method is poorly defined and highly subjective. Specific questions to be resolved include: 1) By what quantitative field method is the presence of the aquitard to be determined? 2) Must hydric soils be present above the aquitard?

*Response: The three-factor approach ensures that hydric soils must also be present to identify these areas as wetlands. Examples of aquitards are given in the User Notes and do not require quantitative methods.*

Another reviewer notes; Again this is more of a soils characteristic which contributes to hydric soil development. If you are going to keep it please define "relatively impermeable" with perk test requirements. Also, if you are going to keep this then the soil profile depth needs to be changed to 24 inches for all evaluations, so we can determine if this layer exists, rather than wondering about it later.

*Response: It is not necessary to evaluate this indicator at every sampling location, if other wetland indicators are present or the area is lacking indicators of hydric soil and/or hydrophytic vegetation. The indicator may be important in areas with hydric soils and hydrophytic vegetation but few other wetland hydrology indicators. In these cases, the presence or absence of an aquitard within 24 inches of the surface should be determined.*

## Page 77:

Sequence number: 1
Location: General Description comment

Again, the PRT notes that this indicator serves as a determination characteristic for the two parameters of hydrophytic vegetation and hydrology. Is it the Corps intention to allow this to be assessed in this fashion ?

Additionally a reviewer offers; "...If they (plant morphological adaptations, ed) are used, they should be tertiary indicators that require one or two other secondary or tertiary indicators."

*Response: As mentioned previously, this indicator will be dropped.*

## Page 78:

Sequence number: 1
Location: General Description, line 1

The PRT suggests the general description include the recognition and clarification that these features are an area-wide visual/ photographic signature for the potential presence of some wetland hydrologic conditions. The Corps own caution points toward this indicator as a likely problem area as a wetland/ non-wetland mosaic.

Another reviewer notes there may be a need to caution misinterpretation of areas where caribou migrations cause periodic trampling of vegetation giving the appearance of hummocks on aerial photography.

*Response: We agree with the above comments and will clarify the wording.*

Another reviewer says; Indicator D6 should be eliminated. The low areas, if wet, would exhibit some of the other hydrologic indicators. This indicator has too much potential for misuse. Areas with this type of micro-relief may or may not be wetlands, and they may or may not have developed under wetland conditions.

*Response: We disagree. Microtopographic relief of the kind described in this indicator is an important feature of many Alaska wetlands and such areas very often have wetlands within them. The reviewer is correct that not all such areas are wetlands. However, the three-factor approach ensures that only those areas with hydric soils, hydrophytic vegetation, and at least one more Secondary indicator of wetland*

*hydrology will be identified as wetlands. In areas where microhighs are nonwetland, the procedure for wetland / nonwetland mosaics in Chapter 5 should be used.*

Sequence number: 2
Location: General Description, line 2

A reviewer asks; Are frost circles only found in wetlands?

*Response: Frost circles like those pictured in Figure 4-22 are often part wetland (e.g., the areas dominated by birch and sedges in the photo) and part nonwetland (e.g., the areas dominated by lichens). Again, the three-factor approach ensures that only those areas with indicators of all three factors will be identified as wetlands.*

## Page 80:

Sequence number: 1
Location: Section comment

It is the consensus of the PRT that the text and content of this section be incorporated into the appropriate relevant hydric soils, hydrophytic vegetation and hydrology sections of the supplement. This will provide better continuity between principles and procedures, as well as be more physically efficient for the user to consider and apply.

*Response: The organization and format of this supplement are consistent with the 1987 Corps Wetland Delineation Manual, in which wetland indicators are presented up front and procedures for dealing with difficult situations (i.e., Atypical Situations and Problem Areas) are presented at the end. This organization should not confuse anyone familiar with the 1987 Manual. Furthermore, we think it is important to highlight these problematic situations by putting them in a separate chapter.*

Several members of the Team believe that this section introduces a liability for the Corps which will likely be repeatedly litigated by those who perceive the Corps is using features/ methodologies of the section to erroneously (allegedly, ed) extend the Corps jurisdictional control.

*Response: It is not the intent of this supplement to change the jurisdictional reach of the 1987 Manual either positively or negatively. Field testing of the supplement has shown no significant changes in the locations of wetland boundaries compared to current practice in the Corps Regulatory Program. Additional testing will be done during an interim implementation period.*

## Page 81:

Sequence number: 1
Location: Item 1

One reviewer notes; This situation appears to be no different from the wetland mosaic situation described later in Section 5. On what scientific basis is the Corps of advocating method steps a through e? Please provide the technical and scientific data supporting the contention that these areas are wetlands.

*Response: We agree and will delete the paragraph on "Plants growing on hummocks."*

Sequence number: 2
Location: Item 2a

One reviewer asks; Is the Alaska Supplement advocating reclassification of indicator species as a matter of practice?
Another reviewer points out; ...this problem can be resolved simply by reclassifying a few species on the indicator plant list with landform differentiation (when it's on a mountainside its FACU, when it's within a floodplain its FAC).

*Response: See the previous response.*

Another reviewer notes; There is already an allowance made for the presence of FACU plants growing on hummocks under the morphological indicators section in Chapter 2. There is further allowance for identifying lower areas surrounding hummocks as wetlands in a mosaic of wetlands and uplands. I do not think

paragraph 2a on page 81 of the draft regional supplement should be included. It is essentially a two-parameter approach.

*Response: See the previous response.*

It is the PRT's opinion that much of the issues and concerns of Section 5, seem pertinent to only problem sites located in the Anchorage Bowl. In addition to the scientific concerns of Team members, regarding the morphological expressions of plants on sites not displaying statutory hydrology requirements, in the words of one reviewer, "We need to be able to get the answer the first time, every time. Implementing new methods statewide that might work in the Anchorage Bowl, simply to address a few problem sites there, is putting an undo burden on the remainder of the state, and will have a definite affect on the costs and schedules of many projects that are important to rural Alaskans."

*Response: See the previous response.*

Sequence number: 3
Location: Item 2b, line 9

One reviewer notes; "I like the approach presented in paragraph 2b on page 81. The years of observation *must* be considered relative to the historic climatic record."

*Response: We agree this is important but do not want to limit the investigator's flexibility in a potentially complex situation.*

Sequence number: 4
Location: Item 2c

One reviewer suggests; The use of reference sites should be discouraged in all cases not involving a notice of violation where an adjacent reference site is appropriately used to characterize pre-disturbance characteristics.

*Response: The use of appropriate reference sites is relevant not only to enforcement cases, but also to routine wetland delineations in that it points out the effects of climate cycles and other local disturbances that affect larger areas that the site in question. Reference sites may also be used as case studies of situations where FACU plants may dominate certain wetland types.*

## Page 82:

Sequence number: 1
Location: Item 2d

A reviewer comments; I do not think paragraph 2d on page 82 is necessary because the 1987 manual already allows reference to technical literature. I think paragraph 2e is too broad in referencing unrefereed sources. "Published scientific literature" is a sufficient description; the information presented must be developed through scientific methods.

*Response: We agree that the use of technical literature is allowed under the 1987 Manual but it bears repeating in the supplement. We also agree to reword item 2d. Valuable nonrefereed sources might include other wetland delineations and unpublished reports prepared by wetland professionals.*

## Page 82: (cont.)

Another reviewer observes; This determination allowance is extremely subjective, open to significant misuse and lack of consistent application. By whose final approval will a literature source be acknowledged as a "reliable" source ? I recommend striking the "nonrefereed" allowance from this determination qualification. These plant community and FACU/ UPL plant considerations as expressing hydrophytic features, need broad scientific recognition and acceptance.

*Response: See the previous response.*

Sequence number: 2
Location: Item 2e

One reviewer comments;" I like the approach described under paragraph 2e (p.82). I suggest it be included under the morphological indicators in Chapter 2. However, I believe the indications of stress should be unequivocal and measurable, not subtle. The sentence about species showing increased vigor in wet sites should be deleted, as this paragraph is intended to address FACU and UPL species; I doubt any of these show increased vigor in wet sites. The sentence about "species-specific" and "easy to quantify" should also be deleted because this approach should require that the evidence of saturation-related stress be both species-specific and at least semi-quantitative."

*Response: We agree to incorporate vigor and stress responses into the morphological adaptations indicator in Chapter 2.*

Sequence number: 3
Location: Item f

A reviewer recommends; "The point-intercept method is a valid way of collecting vegetation data. It should be allowed to be used, and considered a highly rigorous method, during any wetland determination, not just at a problem area. Therefore, it should be deleted here, and referenced in Chapter 2 as an acceptable method of collecting plant cover data. If the cover data are disputed, data with a higher percentage of identified species should take precedence over data with a lower percent cover of correctly identified species."

*Response: We agree and will move the discussion on point-intercept sampling to Chapter 2.*

## Page 83:

Sequence number: 1
Location: Problematic Hydric Soils, Section comment

The PRT appreciates these examples of problem areas soils. However in several of the paragraph descriptions the problem is identified but no solution or procedures presented for resolution. We suggest reviewing these subsections and correcting this oversight when possible, specific to each issue.

*Response: We agree and will modify the "Procedure" for identifying problematic hydric soils to clarify the link with these specific problem soil situations.*

One reviewer comments; With the exception of "recently developed wetlands", the reviewer believes this section is supported by scientific data and proposed evaluation methods are both site-specific and objective. The reviewer cannot approve the "recently formed" wetlands section because there is an implicit forward-looking assumption that hydric soils will eventually form. This assumption can be neither be proven nor falsified and is therefore not a valid scientific position.

*Response: Under the 1987 Manual and the NTCHS criteria for hydric soils, we have always been able to accept as hydric any soil that meets certain hydrologic standards, even if it does not exhibit hydric soil morphology. For example, currently we accept soils that are flooded or ponded during the growing season as hydric under hydric soil criteria 3 and 4. Furthermore, a soil is hydric if it meets the hydric soil definition whether or not is exhibits indicators.*

Another reviewer comments (paraphrased) about the placement of this subsection and the information provided (Problematic Hydric Soils); Move the entire section to the end of the main soils section. We need all the soils information in one place. Describe how we will determine in the field if these soils are hydric rather than just saying they are problems. Saying something is a problem is of no help at all without providing a process by which we can apply to these areas to reach an answer.

*Response: As discussed in a previous response, the organization of this supplement was recommended by the National Advisory Team and is consistent with that of the 1987 Manual.*

Sequence number: 2
Location: Problematic Hydric Soils, Introduction

A reviewer comments; Use of the problem area approach for hydric soils should be limited to situations described by the paragraphs on pages 83-85, and evidence should be provided for relying on one of these explanations for lack of a hydric soil indicator. The reviewer also suggests; "... the problem area

explanations and indicators were worked in with the hydric soils information in Chapter 3. In the case of soils, I suggest that the problem area indicators described on pages 85 and 86 (not including the positive alpha, alpha dipyridyl test) be designated as secondary indicators of hydric soils. Perhaps such secondary indicators could be allowed to be used only when there are positive direct or primary indicators of hydrophytic vegetation and wetland hydrology, or when there are at least two positive secondary indicators for both wetland vegetation and hydrology. The data form could be set up to make this clear."

*Response: The procedure for identifying a hydric soil in problem situations will be clarified. The situations given on pages 83-85 are intended as examples, but other problematic situations may exist. As an aside, there is no such thing as a secondary indicator of a hydric soil.*

All members of the PRT have in one statement or another commented to agree with this reviewers note that; "I think that use of the problem area approach for one of the three parameters should require that the other parameters be met without use of a problem area approach. That is, a delineator should not use the problem area approach for more than one parameter."

*Response: We disagree. All combinations of problematic wetland factors are possible in nature and delineators must be able to address them under this supplement. Furthermore, the PRT's suggestion may not be possible if the site is disturbed by human activities or natural events.*

## Page 83: (cont.)

Sequence number: 3
Location: Problematic Hydric Soils, para 1, line 2

These features are already identified as a means of determination for both hydrology and hydric soil parameters. It would be assumed that the nature of the site conditions would have previously been taken into account. How can they now be identified as potential problem feature indicators of parameter (s) presence? One reviewer recommends removal of this sentence and of any subsequent concepts or procedures which are associated with this incongruity.

*Response: This paragraph simply ensures that these features are taken into consideration because they are critical to a hydric soil determination when soil morphology is problematic. This information is needed to support a conclusion that the soil in question meets the definition of a hydric soil even though it may lack morphological indicators.*

Sequence number: 4
Location: Soils with low organic-carbon content.

One reviewer asks; If microbial activity is insufficient to produce hydric soil indicators, might it also be insufficient to reduce the soil, and thus the soil is not hydric?

*Response: Perhaps, but not necessarily. In these cases, the assistance of an experienced soil scientist may be helpful.*

## Page 84:

Sequence number: 1
Location: line 1 of continued paragraph of preceding page

One reviewer suggests; Alpha, alpha dipyridyl should be included in the standard hydric soil indicators, unless there is evidence of false positive reactions within 30 seconds. The way this indicator is worked into the problem area approach is unnecessarily confusing.

*Response: A one-time application of alpha-alpha dipyridyl is proof that iron is reduced, but gives no indication as to the duration of anaerobic conditions. For this reason, the NTCHS and the National Advisory Team agree that a one-time application of alpha-alpha dipyridyl is best used in problem soil situations as support for the decision that the soil meets the definition of a hydric soil even though it may lack morphological indicators.*

## Page 88:

Sequence number: 1
Location: Procedure comment

There is so much disjointed discussion, procedure, caution, the Corps MUST consolidate all these sections within their respective parameter sections. It is simply impossible to keep flipping back and forth between these disconnected sections and ideas. PLEASE !

*Response: As stated previously, this format is consistent with the 1987 Corps Manual and would not confuse anyone familiar with that manual. Furthermore, the National Advisory Team recommends that problem wetland situations be highlighted in a dedicated Chapter.*

## Page 89:

Sequence number: 1
Location: Item c

One reviewer asks; Shouldn't there be some evidence that the soil is reduced? Is it possible to take dissolved oxygen readings in such water in the well or soil pit to document lack of oxygen?

*Response: No. These types of measurements are beyond the scope of an indicator-based procedure.*

Sequence number: 2
Location: Wetlands that Periodically Lack Indicators of Wetland Hydrology, Description of the Problem, para 1, line 7

One reviewer reminds the Corps of the previous concerns regarding the lack of meteorological data at sufficient resolution to apply in disparate site-specific determinations (one WETS site per 12,500 square miles).

*Response: We always encourage the use of the best data available and we understand the scarcity of some types of meteorological data in Alaska.*

## Page 90:

Sequence number: 1
Location: Item 1, line 1

One reviewer suggests emphasizing that the presence of strong primary indicators of hydrophytic vegetation and hydric soils be present.

*Response: This supplement does not classify indicators of hydrophytic vegetation or hydric soil as "strong" or "primary." All of these indicators are thought to be reliable. The relative strength of each indicator cannot be determined nor is it necessary.*

Sequence number: 2
Location: Item 2a, dry season list

One reviewer disputes the dates of the dry season for the Northern Alaska region, saying; In early June this year (and many years), we still had substantial snow cover on the Slope. Whether or not precipitation is high (which I think is how you defined dry season), as the snow melts the area floods. Early June through July is, for plants, the wet season, not the dry season, on the Slope.

*Response: We agree. After further discussion with the Alaska Working Group, we will change the suggested dry season dates in Northern Alaska to "no significant dry season."*

## Page 90: (cont.)

Another reviewer recommends; Steps 2a, 2b, and 2c should require data to support assertion that it is the dry season.

*Response: These steps do require an evaluation of data to determine whether the site visit occurred during a dry period. For convenience and consistency, Step 2a gives average dry season dates based on climatological data and the experience of working group members, but users are cautioned that "actual dates vary by locale and year." Step 2b requires evaluation of actual snowpack data in relation to long-term averages. Step 2c requires evaluation of actual rainfall data in relation to long-term norms. Results of these evaluations should be documented on data forms or in the delineation report.*

## Page 91:

Sequence number: 1
Location: para d

One reviewer comments; Step 2d has high potential to be misused and should be deleted.

*Response: See previous comments concerning the value of reference sites.*

## Page 92:

Sequence number: 1
Location: para e from preceding page, line 3 from top

Some members of the PRT recognize a potential problem with the development of water-monitoring wells in frozen soils and reliability of data indicating "natural" conditions. One member suggests it possible that; "As soon as the soil is disturbed (i.e., dig a hole, install a well, etc.) the ground ice changes, and, subsequently, the hydrology changes. Should there be a cautionary note here about using these monitoring wells in frozen soil?"

*Response: The "Technical Standard for Water-table Monitoring of Potential Wetland Sites" was reviewed by the National Technical Committee for Hydric Soils and by the Alaska Working Group. We agree that care is needed to apply the procedure in any local area. The Standard only specifies a (maximum) 15-inch well installed entirely above any restrictive layer, such as permafrost.*

However, another reviewer notes this procedure should be included as a standard indicator.

*Response: Groundwater monitoring is not listed among the "standard" indicators because it can not be done quickly in a brief site visit. Furthermore, indicators are often better evidence that a site actually functions as a wetland.*

Sequence number: 2
Location: Wetland / Non-Wetland Mosaics, section comment

One reviewer comments; Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. Indeed, this may be the strongest overall approach to wetlands delineation in the entire Alaska Supplement. However it again appears that the discussion and procedure is attempting to justify the inclusion of marginal or questionable vegetative species as hydrophytic plant indicators.

*Response: The recommended procedure uses standard hydrophytic vegetation indicators and does not include "marginal or questionable vegetative species."*

Sequence number: 3
Location: Wetland / Non-Wetland Mosaics, para 2, line 1

Another reviewer comments that upland-wetland mosaics also occur in disturbed areas underlain by shallow permafrost. This is a condition in some agricultural settings in the interior.

*Response: The procedure would be applicable to these areas.*

Sequence number: 4
Location: Procedure paragraph, line 1

One reviewer notes; "I support the approach described for mosaics. However, I request that the Corps also consider an approach that looks at a parcel as a whole. In some cases, where the wetland parts of a mosaic are only marginally wet or are a very small proportion or have no off-site connections, I think it is appropriate to consider whether the site *overall* acts as a wetland. If it does not, it should not be defined as wetland and the Corps should not take jurisdiction. I believe this approach has been used in the past for individual properties where wetlands formed only a small proportion of a mosaic."

*Response: This is a policy issue beyond the scope of the supplement.*

## Page 93:

Sequence number: 1
Location: Item 4

One reviewer notes; One concern I had is when you are mapping large parcels (> 1000 acres), some of the procedures described (e.g., when dealing with wetland/non-wetland mosaics) are not designed to assist a mapping effort, they focus primarily on determining the ratio of wetland/ upland area. I am unclear as to how you translate this information into a map of wetland and upland boundaries.

*Response: The procedure is only intended for situations in which a "percentage of wetland" is sufficient to address regulatory questions, such as estimating the overall wetland impacts of a project. If a detailed map of all wetland boundaries is needed, this procedure would not be applicable.*

## Page 97:

Sequence number: 1
Location: glossary suggestions

Include more terms and definitions including; thermokarst; active layer; glauconitic

*Response: As stated previously, the Alaska working group and the National Advisory Team both decided not to repeat glossary definitions that were found in reference documents, but only to include new or critical terms in the supplement. Including entire glossaries from several other documents would only lengthen the supplement and set the stage for conflicts if glossary terms change in the referenced documents. We will clarify where other relevant glossaries may be found.*

## Page 98:

Sequence number: 1
Location: Appendix section comment

One reviewer comments; By giving users a short-list, users may try to fit what they are seeing into the list of plants on the short-list, and many plants may be misidentified by individuals conducting delineations that have not had formal training in botany (e.g. a wildlife biologist). It may be better to leave the list broad, have people say "I'm not sure," and bring a sample back to key out than to have species incorrectly identified.

*Response: These lists are intended to be helpful to delineators with modest skills. We can't be responsible for inadvertent or deliberate misuse of these lists.*

## Conclusion

The PRT takes this final opportunity to express our appreciation for the opportunity to provide review and recommendations to the US Army Corps of Engineers, on what we all agree is an important and much needed amended procedure for the identification and delineation of wetlands in Alaska. We encourage the Corps to continue to support the regionalization process across the rest of the United States.

We believe with this reports recommendation and considerations, a distinctly superior information and procedural document will result. Along with an appropriate training and testing process, future delineators will have a more complete, efficient and effective tool to investigate potential wetland ecosystems as well as assist private citizens, industry and government to meet regulatory requirements of pertinent state and federal laws. As a corollary, we also believe casual and mid-level users will gain a greater understanding of the recognized body of science and other information related to wetland formative and ecological processes.

Our final recommendation is that prior to legal implementation of any amendment, supplement, modification or new collective process for wetland determination and delineation, a period of at least one year (to include an entire field season) be utilized to test and determine efficacy of any chosen process. Funding an effort employing teams of Alaska testing delineators, with broad levels of skills and abilities, will assist the Corps in large measure to discover how accurately and effectively their potential process will function. This is not a suggestion for the letting of expensive private contracts. We believe simple payments offsetting personal time to do field investigations and complete field forms commensurate with site locations and access would be appropriate.

An alternative to the above process might be to phase in (year long with field season as above) the use of the new manual, methodology and field forms, requesting a comparative evaluation and documentation utilizing the 1987 Manual and documentation. Feedback from such a widespread implementation would provide similar analysis and repeated retesting of the procedure. However, this approach might miss some specific application by casual and mid-level users unless special precautions were taken. To make this alternative more agreeable, some type of financial incentive could be appropriate.

If in the future, the membership of the Alaska Supplement Peer Review Team can assist the Corps in any other facet of advancing this much needed effort, we would look forward to that opportunity.

## APPENDIX A

Steven Becker, CEP
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Fairbanks, Alaska

**Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region**
**Individual Peer Review**

Summary
The Regional Supplement is a good effort at tailoring the Corps 87 Manual to Alaska. The document contains some much-needed information on the application of the three parameters to Alaska conditions. Having performed wetland delineations in all but one of the subregions identified in the document, their identification and discussion under each of the indicators make sense. Also, the repeated statement that you must consider your findings in light of the 'big picture' and your best professional judgment is refreshing.

The Indicators are all appropriate, although caution must be used when relying on some of them as the sole positive indicator for meeting a wetland parameter. The section on difficult situations is very helpful, especially in providing standardized procedures for dealing with these situations.

This being said, the overall impression one gets in going through the document is that, instead of being a way to refine and tailor the process, the regional supplement is an effort to get "more" areas classified as wetlands in Alaska. Perhaps a lot of areas really are slipping through the regulatory cracks, but the public may perceive this to be a way for the Feds to stick their nose even further into an Alaskan's business. If we can figure out a way to alter the presentation and change this impression, I would recommend it.

Region and Subregions
I have worked and performed wetland delineations in every subregion except Southeast Alaska. Based on my experience, these divisions make sense, as does the recognition that the lines in between may not be distinct, and that if you are in a transition between two subregions that you should check the indicators for both.

Hydrophyic Vegetation
The discussion of disturbance factors is a good one, especially fire in black spruce areas. I have delineated areas where burns were so intense that all organic matter had been removed, and there was little question that the site was reverting to an upland site. I have been in others where the fire moved through so quickly that much of the insulating layer remained, and have made the call that the stand was not likely to convert.

I go back and forth on the appropriateness of including common wetland species by subregion in the Appendix. I can see the value, but my concern here is related to the fact that very seldom are a team consisting of a botanist, a soil scientist, and a hydrologist sent

to the field to conduct a wetland delineation. By giving folks a short-list, folks may try to fit what they are seeing into the list of plants on the short-list, and many plants may be misidentified by individuals conducting delineations that have not had formal training in botany (e.g. a wildlife biologist). It may be better to leave the list broad, have people say "I'm not sure," and bring a sample back to key out than to have species incorrectly identified. This may be a topic for further discussion.

The plot and sample size information, especially the graphics, are good to have. Keeping the woody plants separate from the herb stratum is an excellent move.

The use of cryptograms for delineations has long been debated. I will not take a stand on the appropriateness of the inclusion, but merely point out that on sites where this is necessary, it is likely to add substantially to the amount of time required to conduct the delineation. Also, I am not sure that the delineation manual is the appropriate place to discuss the potential future availability of specialized training (pg 15, ¶2).

The discussion of indicators is one of the areas that gives the impression that the supplement is an effort to classify more areas as wetlands, and therefore subject to Federal jurisdiction. Indicators 1 and 2 are fine; if it fails #1 yet it has hydric soils and positive hydrology, then try #2. That is pretty straightforward. Where it starts to give the impression of "reaching" for jurisdiction is in what follows. If #2 doesn't work, try #3. If #3 doesn't work, try #4. Only if #4 doesn't work do we concede that the site is uplands. It comes across as a pretty arduous process when compared to the 87 manual, especially if the positive hydrology call is made only on secondary indicators. May consider going to #3 and #4 only if hydric soils and primary hydrology indicators are present.

Hydric Soils

Under the Notes on Alaska Soils, Organic Matter Accumulation (pages 22 and 23), I recommend including a brief discussion of OM characteristics for saturated and non-saturated OM accumulation. Although this is discussed in Indicators 1 and 2, I think it should be briefly mentioned here, as it leaves the reader thinking "ok, so how do I tell?" Consider adding a graphic showing representative handfuls of peat, mucky peat, and muck.

I applaud the discussion of relict soil features and redox concentrations formed by seasonal frost. All too often I have been in the field with someone who sees a bit of contrasting orange and says "the soil is hydric" without considering other contributing factors.

The discussion of procedures for sampling soils is excellent. The observation and documentation of the site is critical and all too often overlooked. Pointing out the need to distinguish between types of OM in the profile is helpful. The discussion of microtopography and the need to look for the dominant condition on the site is much needed. All too often a delineator will look for the potentially "wettest" part of the site,

sample that, and base their overall delineation of that vegetation type on that sample point, when that point may or may not be representative of the dominant condition.

I agree that photo documentation is critical, and may save time, money, and frustration.

The color photos add tremendously to understanding the written text. The graphics of the Munsell charts and the tabular key for contrast determination are especially helpful.

The discussion of the use of soil surveys and hydric soils lists, and their limitations, is well done.

Wetland Hydrology Indicators

Add a discussion to intro of growing season and % of time during growing season to meet hydrology criteria. Consider including a discussion of wetter than normal years and extreme or abnormal flooding events in the introduction.

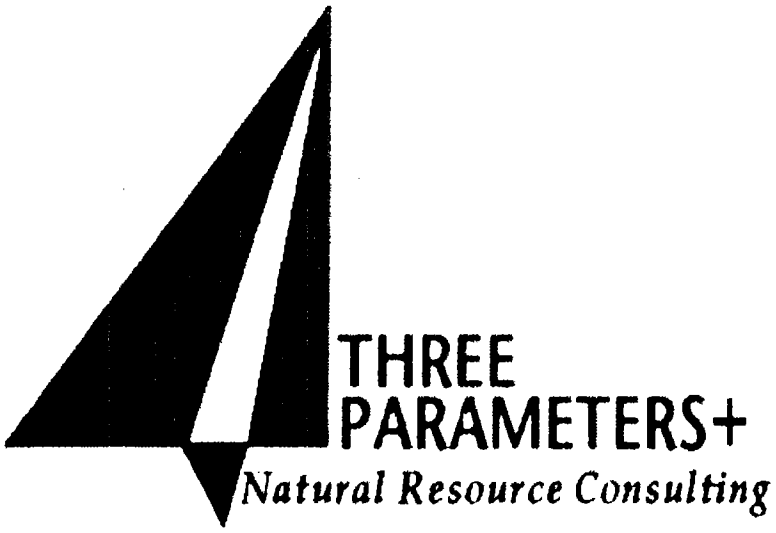
For Indicator A2 and A3, consider a discussion of water perched on seasonal frost during early-season delineations, and the use of BPJ or other site factors to determine if perching of water on seasonal frost is likely to be of sufficient duration to meet hydrology criteria.

Cautions on B1-3 regarding recent flood events are all warranted. All three of these indicators were present following the most recent flooding in Aniak on sites that were clearly uplands. If using these indicators to establish hydrology, a check of recent for recent flood information should be required.

Due to the potential for confusion with patterned ground processes in Northern, Interior, and Western Alaska, Indicator D1 should only be a secondary indicator in these areas.

Difficult Wetland Situations in Alaska

This is an excellent discussion. It is especially helpful that each section contains a detailed description of the situation, followed by a standard procedure for dealing with that situation. The standardized procedure for dealing with wetland/upland mosaics is especially welcome.




August 1, 2005

Mr. Bill Woods
Natural Resources Conservation Service
800 W. Evergreen, Suite 100
Palmer, Alaska 99645

RE: Peer Review Comments, *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region*

Dear Bill:

Thank you for the opportunity to review the proposed changes related to wetland delineations and determinations in Alaska. This letter begins with my general concerns and comments with the proposed revisions and their potential effect on my clients and the general public, and concludes with page and paragraph specific questions and concerns. The specific comments are based on the *DRAFT for Peer Review and Field Testing 5-12-2005* version.

**General Concerns/Comments:**

As we have discussed, my summer field and travel schedule has not allowed adequate time to thoroughly review or test the new procedures, nor to participate in the group teleconferences. It has, however, allowed me to spend a few field days with Joe Moore (NRCS Soil Scientist) and Anne Leggett (also a peer reviewer) discussing the new soils criteria as part of an inter-agency project specific field review, as well as provide some of the new criteria in the manual to my field crew for their consideration/testing. Where appropriate, I have included some of their concerns and insights in this document. It should be noted that our field testing was completed outside of the areas recommended for the new manual testing. Specifically, we worked with some of the new manual indicators in the Iliamna/Bristol Bay Region and the Donlin Creek/Kuskokwim Highlands Region.

As a wetland scientist who works all over Alaska (except the Aleutians) I remain concerned with the emphasis on formal manual testing only in the Anchorage Bowl and Fairbanks Area. The diversity of soils and plant communities in Alaska still amazes me, even after 25 years of concentrated work in natural resource inventory across the state. This has included over 5000 jurisdictional determinations based on the criteria found in the 1987 manual. It seems obvious to me that writing guidelines that are applicable and concrete for every region of the state will likely result in some of the same problems that applying the 1987 manual has. However, the need for some clarification on the 1987 manual, especially in soils and hydrology criteria, is clear. Clearer yet, I believe, is the need for continuing education classes for the regulators and consultants who must apply these guidelines. Better yet would be a certification program that requires regionalized testing and experience for anyone involved with wetland identification and their affiliated regulatory programs.

Having been in the private sector since 1990, providing virtually nothing but wetland related services to a broad base of predominantly private sector clients, I have listened and learned that the private/development sector really wants and needs only a few things from the regulatory process. Most importantly, they want predictability in their regulatory process. They want to be able to call someone like me up, tell them about their project, and in return receive an accurate quote as to how much work is involved, how much will it cost, and how long will it take (to complete the work, apply for a permit if necessary, and obtain the permit). While certain complications can always arise in Alaska (weather, access problems, short field season window, etc.) I find most of my clients do not find these complications exasperating – rather, it is the lack of consistency in how the regulations are applied, the inconsistency from regulator to regulator as to what is and isn't a wetland, and the inability to say that impacting this kind of a wetland will result in "x" kinds of mitigation requirements, etc. that frustrates them the most. As I will discuss in detail below, the new manual does NOTHING to improve on these problems, rather it appears it could greatly exasperate them. As such, I cannot recommend to my clients that they support this manual as written.

Secondly, my clients want defensibility. They need to know that when I give them map products and Preliminary Jurisdictional Wetland Determinations (PJDs) based on the criteria in the manual, that my staff will have the confidence and credentials to defend our work in a court of law, should it become necessary to do so. Having criteria that define what will and will not be regulated as a wetland clearly, with no room to waffle, is critical to that process. Having criteria that allow regulators to change the question when the results don't yield the answer they wanted, will force companies like mine to draft complex limitations statements on our work products, and take out additional insurance policies that will increase our operating expenses significantly. The bottom line is, if the question can change during the process – how can we possibly get the right answer the first time? And if we can't get the answer the first time, then our clients must be prepared to fund multiple trips to the same sites – or we must collect data according to every protocol in the manual every time, even if these data may never be used. Anyway you look at it, my costs to the private sector will likely double or triple if this manual is implemented as written. Even so, I may not be able to warrant the work the way I have in the past, which is something that troubles me greatly as a business professional.

Next, my clients need continuity. The Alaska District appears to be a rotational training ground for many younger regulators. Yes, we have some wonderful staff members who have made their careers in Alaska, but we have many more who spend just enough time in the state to get their feet wet and actually start to understand how our systems vary from other places in the

country, before moving on. Implementing a new manual for this region without mandating training in this manual BEFORE they start regulating here is going to be a regulatory nightmare. Many young regulators know little about soil development and classification, and these new soil criteria are a far cry from the 1987 manual 'recipe' for hydric soil determinations. Few people understand that detailed soil surveys are virtually non-existent in Alaska – making the collection of field data absolutely necessary if correct wetland determinations are going to be made. The new soils criteria in this manual are well tested and described for the most part. However, they are orders of magnitude more difficult to correctly apply than those in the 1987 manual.

Continuity also means that work that was done in good faith under the 1987 guidelines will be accepted as prepared. My clients need to know that 1) approved PJDs (hereafter AJDs) will not be revoked if the new manual is implemented, and 2) map products and data collection efforts for projects currently underway will be grandfathered under the 1987 manual criteria (unless they voluntarily choose to submit revised maps and documents based on these new criteria).

If the manual is implemented, there should be a process wherein interim map products and copies of field data sheets documenting ongoing work can be submitted to the COE as evidence of work in progress with a reasonable deadline for completion set for each project based on the total acreage being mapped and the degree of complexity of the project area. Three Parameters Plus (3PP) probably has more ongoing large mapping projects than most Alaska firms, but just in-house we have at least two clients with AJD's greater than 10,000 acres, one with an AJD greater than 80,000 acres, one client with approximately 25,000 acres of new mapping to append to an existing AJD, and two clients with on-going projects greater than 100,000 acres. The costs related to data collection on this scale can be in the millions of dollars, in part because they are relatively remote project locations and require significant travel, helicopter time, and field logistical support. While the 3PP data collection process is currently much more rigorous than required under the 1987 manual, it has not always been as rigorous as would be required to reinterpret data under this new manual. For example, while we have always noted redoximorphic features and matrix colors for all horizons within what we understand to be the control section of the profile, we have not always noted the exact percentage of those features, rather simply their abundance. There are many more examples like this one which could result in areas needing to be re-evaluated in order to determine if they now meet all the new criteria.

**Specific Concerns/Comments:**

Page 10, Third Paragraph: I would and will argue that there is no such thing as a FACU dominated wetland under normal circumstances. Page 14 of the 87 manual states "Except in certain situations defined in this manual [I find Section F, page 83 and Section G Problem Areas, page 93] , evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination". This new manual seems to try to skirt that guidance by double dipping (use of the same indicator in more than one parameter). I will encourage my clients to strongly oppose any language in this manual that leads to a one or two-parameter field test under any circumstances when the evaluation area in question has *normal circumstances*. Giving regulators the discretion to regulate areas that they "feel" should be wetlands but don't meet the regulatory definition is a recipe for arbitrary and capricious decisions. These types of calls are already happening in the Alaska District. This manual needs to put a stop to this behavior,

rather than encourage it. Repeatability is the foundation of good science. Allowing people to regulate what the feel or "think" should be a wetland is not defensible as not everyone would come to the same conclusion.

Page 11; Growing Season

While air temperature guidance is helpful -- determinations need to be based on when a particular site has soil temperatures warmed sufficiently for plant growth to occur. This is much easier to measure in the field when you are actually there. Therefore, I would encourage the Alaska District to add the use soil temperature data when air temperature data are not site specific, and to allow delineators to use actual observation criteria such as (10% of the dominants are green or something of that nature) in making a determination that growing season has started on that particular site. Failure to modify this definition could allow vast areas of Alaska to be excluded from the wetland definition because they simply do not meet the air temperature criteria. Further isn't it supposed to be the mean daily air temperature is warmer than 28 degrees? Many sites warm above 28 degrees in February for a few hours each day but it's certainly not the growing season where I live. Referencing the NRCS map as site specific guidance is also misguided. The NRCS staff person who created that map gives it out with numerous caveats about its applicability for site specific determinations. I would never want to go to court with that map as the basis for my growing season determination. We need indicators that we can document in the field at the time our site visits are made. This way regulators cannot make observations of hydrology before the growing season starts ("because it was warmer than 28 degrees") and the private sector knows that they must have their delineation work done during certain time periods with documented field conditions present at the time of the visit (in order for it to be defensible). Alaska weather is highly variable, and what constitutes spring in some regions can change by as much as a month from year to year. Setting specific dates for broad regions is inappropriate, in my opinion.

Page 13: List below First Paragraph & Manual in General

The manual goes back and forth between English and metric units. For consistency please edit to make sure that both are provided at all times, but always in the same order (English first, Metric follows in parenthesis or visa versa). If metric will be used as the units of measure for field measurements, have the COE Individual Permit Application Forms been updated nationally to ask for measurements in metric? Consistency within the program is important when setting up systems to manage large wetland delineation projects and databases.

Vegetation Section

One of the opportunities I've had in working on so many large mapping projects across the state has been the ability to compile data and look at the results by plant community or vegetation mapping type. The construction of two relational databases to facilitate these mapping projects has allowed me to combine and review data from hundreds of sample points simultaneously. I realize not everyone has had the opportunity to do this and what I am about to tell you is important. Quite simply, the vegetation parameter doesn't work the way it was intended to in much of Alaska. How do I know this? Well, in two projects, one of which covered 4 major ecoregions, probably less than 3% of the plots sampled failed to meet the hydrophytic prevalency test – even though probably more than 60% of the plots sampled were not determined to be jurisdictional wetlands. I have two additional projects in other regions where

the data have not all been compiled yet, but all indications are the results will be the same. Even the most upland of the plant communities will likely have a strong prevalence of hydrophytic vegetation the way the 1987 manual guidelines and the 1988/1995 indicator plant lists for Alaska are working.

The reason for these phenomena is really quite simple. The plants that are consistently dominant in our plant communities are dominants not because they are water tolerant or intolerant, it is because they are photo-period sensitive and have developed the ability to go dormant based on photo-period, even when the air temperature or water table are not telling them it is time to shut down. This is a tremendous advantage in a climate with as much variability as Alaska has in the spring and fall, when the failure to shut down in time (or start up too early) can result in irreparable damage. Most of these plants are correctly classified as facultative species – but of course they are then used in the prevalence calculation.

I have thought long and hard about how this can be fixed. I do think that regionally plant lists could be developed wherein certain plants that are true hydrophytes and could be used as real indicators of hydrophytic vegetation. However, knowing what I know and having seen the same kind of results in so many regions of the state, I am aghast at the language in this new manual that seems to imply that our regulators are going to be making wetland determinations based simply on the presence of what is now classified as hydrophytic vegetation. I think that plant communities dominated by obligates are likely the only truly hydrophytic plant communities in most of the areas of Alaska where I've worked, although I'd want to review the facultative wet species and their occurrence rates in a few regions before excluding them as well.

I realize this will likely be seen as blasphemous – but I've told my crews for years now that while we collect data on the vegetation parameter and report the results dutifully, we could pretty much concede the parameter is met everywhere except a few mixed forest or closed broadleaf forest types and save our clients a lot of money. However, the 1987 manual process that we use to delineate areas larger than 5 acres (virtually all our projects) requires analysis by vegetation type, so we continue to collect these data and analyze them accordingly.

Page 13: Strata

Most of my reference books are with my crew in Iliamna, so I may be remembering incorrectly -- but it would be nice if we could use either the Viereck or HGM strata definitions, rather than adopting yet another set. If we are changing strata definitions, then the Indicator list MUST be updated with the manual to allow for the percent cover by stratum process to work correctly (I'd recommend this anyway). Two of my clients have relational databases that are based on the indicator plant list and current stratum definitions. Adopting yet another definition for what a tree is will require additional programming and a re-evaluation of all of the vegetation dominance criteria by stratum, if we have enough DBH data to even perform the analysis. DBH has not been a data collection requirement of the 1987 manual and is something I've only collected to help my clients with cost estimates for clearing and grubbing.

Page 14: Cryptogams

I applaud the use of actual data to expand our knowledge/definitions for the plant lists -- but why are we only using data from this study to add a few species that few, if anyone that I know, can identify correctly? Between the BLM, USFS, NPS, NRCS, and private large scale mapping

projects of soils, wetlands, etc. we should be able to produce some vastly improved plant lists on a regional basis. This would improve the wetland delineation process and the predictability of that process greatly. I've heard rumors that the COE refused to use data when it was offered by various agencies and that troubles me greatly. If we are trying to make a regionalized manual, why not use data from the region -- and particularly data collected when making wetland determinations?

Adding a few plants that virtually a handful of people in the state can correctly identify will only create more problems, and potentially create more opportunities for misuse. What private land owner is going to be able to stand up to a regulator who pronounces a certain moss occurs on their property and therefore it is a wetland? Where can they go for confirmation? If you can't provide a list of the "local experts" that we can go to for help then I don't think this section belongs in the body of the manual. After 25 years of working in natural resource management in the state of Alaska, I can only think of two people who could make these calls with confidence, neither of whom is going to appreciate receiving moss sample after moss sample in the mail for confirmation.

As a compromise, perhaps these data could appear in a section for dealing with atypical situations (where remnants of these mosses might remain and provide good indicators of plant communities that have been disturbed, etc.).

Page 16; Paragraph 1

Under normal circumstances -- the vegetation parameter must stand alone. Do not tie it to any other indicator. There needs to be one test for prevalence for areas that contain normal circumstances. More comprehensive methods are only warranted under the 1987 manual when problem areas outlined in the 1987 manual or atypical situations exist. Not getting the answer you want or expect does not make an area a problem area under the 1987 manual. It is much easier to reclassify a few plants on the plant list based on their ability to dominate wetland communities based on landform than change the entire process.

Page 16; Paragraph 2 & Beyond

This appears to be an attempt to increase jurisdiction to me. I can think of a handful of places in south-central Alaska that are likely driving this change. It would be a simple matter to update the plant list, adding landform differentiation to solve the problem.

Page 16: Bottom

Again, the dominance by strata -- if you are going to change the strata -- change them in the plant list simultaneously.

Page 17: Number 4; "All dominants must be identified to species."

This can be impossible because of site visit timing and the fact that willows are not always identifiable at the same time as sedges and other forbs. The cost implications to the private sector from this statement alone could be staggering. Imagine if I have to charter a helicopter to visit a site 3 times before I can meet this mandate. What if the weather precludes my arrival at the right time on the last trip – do I have to tell my clients it will be a year before I can give

them an answer? I don't think that will fly the practicability test which is also important in our short Alaska field season. Suggest you add -- "but when they cannot be they should assumed to be FAC or wetter." This way we can give the area the benefit of the doubt but still come to an answer.

I also find the "group selection" terminology confusing. Are you saying that I would only count the percent cover of the group once or would I include it as many times as the individuals in the group?

Suggest that you exclude species that are "Trace" or less than 3% from being treated as dominants under any strata. In my opinion, dominant should mean that it occupies a significant percent cover in the plot, not just that a plant has found a microclimate that it can exist on in one or two places. You shouldn't have to go to a prevalence index to capture that nuance. I like prevalence index tests for those sites where you have many herbaceous plants all with similar percentages and so much overlap that you can't clearly differentiate absolute percent covers. Very few sites should really need one.

Page 20:

I strongly object to this section being implemented statewide across any vegetation type when there is only data presented on black spruce forests in two regions. Implementing this language for black spruce forests in the interior and south-central would be fine, so long as detailed descriptions and photographs are included in the appendices, so lay persons would have a reasonable chance of determining if these species occur on their property, without having to hire a PhD Botanist for an expert level consult. As a point of emphasis, I recently had one out on a project crew and they were unable to tell me if most of those mosses occurred in that project area either.

Page 21: Morphological Root Adaptations

I'm sorry but this seems ludicrous as written. How am I supposed to determine if 50 percent or more of the roots of a tree are shallower than those in adjacent uplands? If the regulator disagrees with my assessment will we bulldoze every tree to see who was right? It seems to me we'd need a permit to disturb the soil before this determination can be made! Many trees root shallowly in uplands as well as wetlands in Alaska because the soil temperatures are so cold. Again, this has nothing to do with the ability to tolerate water or not.

<u>Soils Section</u>

Page 22: General Organization, Soils Section

I have problems with paragraph 4. Let's put all the soils guidelines in the soils chapter. If we evaluate using all the possible criteria for a hydric soil and still don't have any positive indicators --- and you've observed the area during the growing season under normal circumstances, then its simply not hydric for the purposes of the regulatory program. Each parameter has to stand on its own. Let's give each parameter as many legs to stand on as we can but at the end of the test it has to stand on its own. I would also put the alpha alpha test in as a standard part of the evaluation. Alpha alpha is an inexpensive tool that anyone can carry and use with minimal training. Include the NRCS recipe and sources to obtain materials for the liquid.

You can't always understand redox development (or lack thereof) in transitional areas without understanding soil pH. Encourage soil pH data be submitted for each horizon, especially in problem/transitional areas. Submittal of redox meter data should also be encouraged in ash areas, areas of high soil pH, and areas where dark parent materials exist.

Page 22/23: Organic Matter Accumulation

Provide the quote from Soil Taxonomy that notes that a histic epipedon must be saturated. Talk about histic epipedons. Where there is crossover in terminology it will be much easier for younger delineators to make the transition and for people coming to Alaska with experience in other regions. The later sections do refer to histic epipedons and histosols, so keeping consistency in the document seems important.

Page 23: Spodosols

The spodosol section should indicate that spodosols are not uncommon in other parts of Alaska. In my experience, they are really not that much more common in southern Alaska, they are just more classically well developed. But I guess that depends on how you define southern. But you should also mention that there are hydric spodosols as the discussion as presented might give a novice soils person the sense that spodosols = non-hydric. Some characteristics/pictures of cryaquods might also be useful in this section so there is a visual of how they might differ in appearance.

Page 25: Seasonal Frost Affected Soils

Emphasize the importance of visiting these sites early in the growing season if at all possible, and potentially using alpha-alpha and redox meters during that time to help make the hydric soil determinations. Many of these sites will have a prevalence of hydrophytic vegetation because of the number of FAC species that occupy them. If a two-parameter test is allowed, these sites could now be considered jurisdictional wetlands, even though the hydric soil conditions are likely developing outside of the growing season.

Page 28: First Paragraph, Soil Pit Depth

"at least 20 inches (50cm) from the soil surface." – Suggest adding 'unless bedrock, ice-rich permafrost, or other restrictive layer is identified higher in the profile', or something to that effect. I also didn't note any discussion of placics or ornsteins in the document. I think photos of these and descriptions of where/how they occur would be appropriate as they are not that uncommon in some parts of Alaska.

Page 29

Suggest soils be photographed with a measuring rod or something for scale/reference in the pit.

Pages 30-33: A1/A2, User Notes.

The difference in soil surface for Histosols should be noted as it likely differs from the last discussion.

It might be beneficial to describe the deep feather moss organic mats that develop in interior Alaska, often over relatively well drained soils, that are never saturated and are not histic epipedons.

Page 34: A4 Hydrogen Sulfide

How will NRCS/COE treat pits where reduced sulfur is identified below 12 inches from the soil surface? Which soil surface will we use for this evaluation?

Page 35: A12 Thick Dark Surface Technical Description

Clarify which soil surface. This is a tough indicator for people with minimal soils training. Does the 6" need to all be part of one horizon or can two dark horizons be combined to meet the depth requirement, if they both meet the other color requirements

Page 44: A14 Alaska Redox

As a point of clarification, is the Alaska District agreeing that if we have soils with a chroma of 1 or 2 (with or without redoximorphic features) that are not found on the hue pages listed in the first paragraph, and that do not meet the A12 depth criteria, are not hydric? If NRCS is saying hues of 10YR, 7.5YR, 2.5YR, etc. are not good indicators of hydric soils, but we record horizons with those hues and low chromas -- will the COE agree that the soil is not hydric or try to revert back to the 1987 manual to retain jurisdiction? Is this really just a supplement or will it replace the 1987 manual entirely in Alaska? If it's just a supplement, under what circumstances can the COE revert back to the 1987 manual when these new criteria don't give them the answer they want/expect? I realize these are broader questions, but they do need clarification somewhere in the document.

Page 49: Hydric Soil Lists

It would be useful if NRCS would develop a page on their website that summarizes the available surveys, mapping unit size, links to their local hydric soils list, applicable soil descriptions, and a link to the national hydric soils list if a local list isn't available. This could then be referenced in this section. I've had to go to the national page a number of times to get descriptions of specific soils in older surveys (generally out of print and unavailable to the general public), and that link should also be listed here.

Hydrology Section

Page 50: Bottom Paragraph & General Section Comments

Don't use soil indicators as evidence of hydrology. It's a multi-parameter test. Each parameter must stand on its own. The new indicators GIVE PLENTY of ways we can document wetland hydrology -- for the most part they are very good and well put together.

Page 65: B7 Inundation Visible on Aerial Photography

Define "recent." What if the event photographed is a 50 or 100 year event? I question whether or not this should be a primary indicator. I think it fits better under Group D, as a secondary

indicator. Or, two years worth of photographic evidence could be used for a primary indicator, one year for a secondary indicator.

Page 66: B8 Water Stained Leaves

I would really get rid of this in Alaska. You don't need it with all the new ones and it's too hard to tell snow melt stains from water stains.

Pages 68 & 71

C1 and C4 are soil characteristics and are indicators of hydric soil, not direct evidence of hydrology. In a multi-parameter test each parameter should stand alone. These should not be included in this section.

Page 69: C2 Oxidized Rhizopheres Along Living Roots

Define which soil surface. Do we exclude relic (dead root) observations from our descriptions? How should we differentiate on our data forms?

Page 70: C3 Dry Season Water Table

I think this is a good indicator but recommend it be a secondary characteristic. If the water is there seasonally, there should be some reason it is there (landform, topography, etc.) and the area will have two or more secondary indicators. If it is going to be a primary indicator – industry needs a process by which we can dispute this as a primary indicator by means of shallow piezometers or other instrumentation.

Page 72: C5 Salt Deposits

Natural mineral licks occur outside of wetlands. Please make sure that these are differentiated and some means of proving a deposit is salt is provided. Personally, I'm not sure I want to stick any unknown white matter into my mouth. Perhaps a field test of some nature can be recommended?

Page 73: D1 Unvegetated Concave Surface

Should include "sparsely vegetated" as well as un-vegetated (less than 5%) or you'll exclude by definition some of the areas you're trying to address. Discuss in the text that these areas may in fact be waters of the US rather than wetlands.

Page 74: Stunted or Stressed Plants

This is a morphological plant adaptation as much or more than a hydrologic indicator – we see the same characteristics at high elevations or severe wind blown sites. This needs to be in the vegetation section not the hydrology section.

Page 76: D4 Shallow Aquitard

Again this is more of a soils characteristic which contributes to hydric soil development. If you are going to keep it please define "relatively impermeable" with perk test requirements. Also, if you are going to keep this then the soil profile depth needs to be changed to 24 inches for all evaluations, so we can determine if this layer exists, rather than wondering about it later.

Page 77: D5 Plant Morphological Adaptations

At the risk of sounding like a broken record, don't double dip. This is a vegetation characteristic that is particularly useful when looking at highly disturbed sites where a standard prevalency test may fail.

Page 78: D6 Micro-topographic Relief

Needs to be clarified to caution misinterpretation of areas where caribou migrations cause periodic trampling of vegetation giving the appearance of hummocks on aerial photography.

I think all information regarding hummocks/tussocks should be in this section. I see no reason for there to be a Chapter 5 at all.

Pages 80: Difficult Wetland Situations in Alaska

The 1987 manual provides clear guidance on what is a problem area and what is an atypical situation. This section of the manual is a major deviation of the 1987 manual and in my opinion needs to be abandoned entirely. What, by definition, is a "difficult wetland situation?" It appears to be when you thought you should have jurisdiction but you don't!

Problem areas are defined in the 87 manual as areas that are missing hydrology for certain parts of the year. The new hydrology indicators in this manual eliminate the need to introduce additional discretion because we just added a whole new host of indicators that address this phenomenon. As such, these areas will no longer problems.

This section of the new manual is going to be catastrophic for predictability and defensibility because there is no repeatability. Who are these people who are going to arbitrarily decide what areas should have had hydric soils or should have had hydrophytic vegetation? If the parameters are there then it's a wetland, and if they are not and the area has normal circumstances, then the COE does not have jurisdiction. Industry can and should fight you on this section of the manual because it does nothing but provide a platform for agency abuse and arbitrary and capricious decisions by individual regulators.

Page 81-82; Except "f"

I don't think so. If the COE wants to exert jurisdiction over sites that don't meet the multi-parameter test under normal circumstances then they need to monitor them seasonally and instrument the sites to prove they are wetlands -- just as industry has the burden of initial proof that they are not. I don't think this section is not consistent with anything in the 1987 manual and should be abandoned completely. It has to be a multi-parameter test if the site has normal circumstances. Most of the sites being discussed on this page do have normal circumstances -- but they simply don't meet the criteria for a wetland consistently because they are mosaics of

wetlands and uplands. Again, this problem can be resolved simply by reclassifying a few species on the indicator plant list with landform differentiation (when it's on a mountainside its FACU, when it's within a floodplain its FAC).

Page 83-89: Problematic Hydric Soils

Move the entire section to the end of the main soils section. We need all the soils information all in one place. Describe how we will determine in the field if these soils are hydric rather than just saying they are problems. Saying something is a problem is of no help at all. Providing a process by which we all agree we can apply to these areas to reach an answer is the solution.

Page 89-92: Hydrology

By adding the hydrologic indicators this problem should be resolved. Eliminate this section except as it pertains to areas that do not have normal circumstances.

Page 93: Mosaics

We need to allow estimation of mosaic percentages based on air photo interpretation. There is no way either of these methods is going to work when we have mapping polygons for alternative analysis work that include hundreds of acres of mosaic vegetation. The COE needs to remember that Alaska projects are often "large" by anyone's definition. Rarely are we delineating a 1 acre parcel for a gas station in the corner of suburbia. Rather we often are siting large projects (roads, pipelines, airports, mines, oil fields, ports, etc.) that require hundreds of acres of mapping to permit successfully. We need a process that allows this to be done in a reasonable fashion/time frame.

Implementation of the more detailed methods could then be applied in areas that will be directly affected, if there is a specific reason to think that the photo interpretation may be inadequate (dense canopy coverage, etc.).

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In closing I would like to say that, in my opinion, if Chapter 5 can be eliminated, along with other references allowing one and two-parameter test results to be positive for wetlands under normal circumstances, that I suspect the remainder of the document could likely be moved forward through rule making with minimal fuss and concern by industry. However, as long as such language remains in the document, industry will have no choice but to fight it, because it simply allows regulators too much flexibility to make decisions that remove what industry wants most from the process, which is predictability. Again, Alaskans want and need a method that allows one visit to each site that result in a conclusive answer under all but the most extraordinary circumstances – not a maybe.

My clients intend to fully comply with the regulatory program and all its requirements, but to do so they must have clear and concise definitions and technical guidance. Travel costs, short summer seasons, and ever-challenging weather conditions simply do not allow for multiple site visits in 99% of the state. We need to be able to get the answer the first time, every time. Implementing new methods statewide that might work in the Anchorage Bowl, simply to address a few problem sites there, is putting an undo burden on the remainder of the state, and will have

a definite affect on the costs and schedules of many projects that are important to rural Alaskans.

Again, thank you for the opportunity to review this important document.

Sincerely,
**Three Parameters Plus**

Cheryl Ann Moody
Professional Wetland Scientist No. 310

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8 September 2005

Comments on Alaska Supplement to the Draft Corps of Engineers Wetland Delineation Manual

Dear Bill.

I appreciate having been given the opportunity to review this document, I only wish I had more time to discuss further. I think the document is a great first step toward trying to address some of the challenges we face when applying the 1987 Wetland Delineation Manual to a place with such extremes in climate, precipitation, growing season as Alaska. I hope my comments are helpful and I look forward to seeing the revised version.

General comment-There is some great information in this document but to some extent it almost seems like rather than accepting that not all wetlands will fit neatly into the three parameters as described in the 1987 manual, the supplement tries to force the concepts by developing, in the case of the vegetation, a formulaic approach that will ultimately prove you have hydrophytic vegetation (or not). The reality is, plants are very plastic organisms that find all sorts of ways to adapt to environments that may have undesirable characteristics. For example, as mentioned in the section regarding the absence of hydrophytic vegetation, *Betula papyrifera* (which is FACU) can be found in areas where surface water may persist for an extended period (> 2 weeks), but the birch are growing on hummocks between the water tracks. Alternatively, *Carex aquatilis* (OBL) may be a dominant species in an area where the soil is not saturated simply because it may have been a very dry year. I feel that if you are able to indicate with direct observation or perhaps with supplementary data the rationale for calling an area a wetland, with the absence of one of the parameters, the regulatory regime is flexible enough to accept anomalous circumstances. I suppose the one problem with this approach is it does require that the USACE personnel reviewing wetlands determinations have sufficient experience to be able to make these judgment calls. The additional measures provided in the supplement would, I suppose, eliminate some of this guesswork.

One concern I had is when you are mapping large parcels (> 1000 acres), some of the procedures described (e.g., when dealing with wetland/non-wetland mosaics) are not designed to assist a mapping effort, they focus primarily on determining the ration of wetland/wetland area. I am unclear as to how you translate this information into a map of wetland and upland boundaries.

The list of common wetland plants for each region needs improvement (seems biased toward Southcentral Alaska)

1) Document is too long—while I appreciate the effort that was taken to provide a background on the basic ecosystems of Alaska, I think this should be pulled out as a separate document; something similar to what was done for the Wetland Evaluation Technique. For that project, they had a volume with the technical background for developing the method and then a separate volume for the actual method. Remember this document is supposed to serve as a supplement to the 1987 Manual, not a

replacement. I would have preferred a more concise supplement that just provides the key characteristics within each of the three parameters that practitioners should consider when dealing with wetlands in Alaska.

2) Hydrophytic vegetation

    a. I agree with the proposed changes in strata designation

    b. I think including selected cryptogams is a great idea

    c. Adding a place to include information on problematic vegetation is good, although the comments section on the current dataform also serves this purpose.

3) Hydric Soil Indicators

    a. I was confused with the recommendation to dig soils beyond 20 in for situations where you do not find soil hydric indicators within the top 18 in? If saturation is required within the top 12 in, it seems that you would want most of your hydric soil indicators to also be primarily within the plant rooting zone for plants (which in Alaska, is going to primarily be in the top 12 in (for most species).

    b. It seems like a lot of the information in this section is already describe in other soil classification publications, although I found the information on depleted matrices to be very helpful

4) Wetland Hydrology

    a. I have never felt that water-stained leaves are a even a good secondary indicator of persistent water. Anywhere it snows you are likely to have dark leaves, just because some ephemeral ponding does occur right after break up just about everywhere.

    b. In general, I thought it seemed like the number of primary and secondary indicators had grown too long

5) Difficult Wetland Situations in Alaska—I felt that this section of the supplement was probably the most useful and that you could greatly reduce the sections above, with perhaps incorporating some of the points discussed into the situations highlighted in this section.

6) Wetland Determination Data Form

    a. The soils section needs improvement. I think it is important to include horizon and mottle abundance and contrast.

    b. I am skeptical of the validity of some of the hydrological parameters listed (surface soil cracks, stunted or stressed plants, microtopographic relief, salt deposits)

Bill Streever, Ph.D.
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BP Exploration (Alaska) Inc.
Anchorage, Alaska 99519-6612

17 July 2005

**Bill Wood**
**NRCS**
**800 W. Evergreen, Suite 100**
**Palmer. Alaska 99645**

Dear Bill and others:

I am writing to provide comments on the draft Regional Supplement to the Corps of Engineers Wetland Delineation manual: Alaska Region (Draft for Peer Review and Field Testing 5-12-2005). Many thanks for giving me the opportunity to comment on this document. Overall, it was a pleasure to read and it represents real progress in regionalization of delineation methods.

As always, I have a number of comments that may help improve your document:

- It seems to me that the document is longer than it needs to be. If this is a regionalization of the national manual, I wonder if it could be written as a short supplement to the national manual and rendered more concise? One approach would be to append the background information, then base the main body of the report around a table or list of specific differences between the national and regional approaches (perhaps one list for each region of Alaska). Since the primary audience for a document like this is a person who will apply the methods in the field, the backup information probably adds little or nothing as part of the body of the text, yet it makes the text much longer.
- Whether or not the report is shortened, a table summarizing differences between the regional approach and the national approach would be useful. Another table summarizing how this manual will change jurisdictional wetlands in Alaska, and/or providing specific examples, would be very useful. As I was reading this, I kept wondering, "Now that we have a regional manual, how will our jurisdictional wetland acreage change in Alaska?"

- In the Preface, you say that "Independent peer reviews were performed in accordance with Office of Management and Budget guidelines." I am not familiar with these guidelines, but in general independent peer review means that reviewers worked independently of authors and of one another. In this case, many of the peer reviewers worked together in discussion groups and in some cases in field teams. While this sort of coordinated review can be very valuable (and often more valuable than independent reviews), it is not the same as an independent peer review.
- In the Introduction, the criteria used to select Alaska as a region are not clear. My guess is that the region was defined by political or administrative boundaries, rather than clear ecological parameters. If so, this should be clearly stated.
- In the Introduction, it is stated that "The determination that a wetland is subject to regulatory jurisdiction under Section 404 must be made independently of procedures described in this supplement." Is that right? It seems to me that delineation is a key part of jurisdictional determination, and that jurisdiction cannot be determined without delineation.
- On page 1, you refer users to the most recent approved versions of this document. Where could a user find the most recent approved version? Approved by whom?
- In the sections on subregions, you give total precipitation and snow fall for some subregions, but for others you only give total precipitation.
- On page 5, *Populus tremula* should probably be *P. tremuloides*. I think Hulten says that *P. tremula* is the Eurasiatic counterpart of the Alaskan *P. tremuloides*.
- On page 5, you refer to several weeks of continuous sunlight and darkness. It is better to refer to continuous sunlight and sunset—in the winter months, there is quite a bit of twilight without sunrise in Barrow, and very little (if any) total continuous darkness.
- On page 8, there is a missing word: "sea level 18,008 feet."
- On page 9, you say, "Wetlands are more abundant in Alaska than in any other region of the United States." This is a meaningless sentence, entirely dependent on how regions are defined.
- On page 11, you send users to "the latest plant lists." Where would users find these?
- The methods described on page 12 are not, in my experience, used in delineation. Same comment with regard to the methods described on page 15 for cryptogams.
- The section on use of cryptogams for delineation, especially the second paragraph on page 14, is very weak. While I do not see any reason that a good naturalist could not come up with a cryptogam list, hiding behind "probability and multivariate techniques on paired wetland and nonwetland test sites" detracts from the value of this section.
- On page 16, I suggest breaking the bulleted list into a flow chart.
- On page 17, you say that "The 50/20 rule is a repeatable and objective procedure." If so, you should provide a reference that shows how repeatability

was tested. Very few quantitative vegetation methods have been tested for repeatability.

- On page 20, you say that the wetland cryptogam assessment was done in black spruce forests. Why would one resort to cryptogams if other vegetation was present? If the cryptogam list came from work in an area with extensive vascular plants, can it be applied in areas without vascular plants (where, if it works, it might be useful, but is likely to have different species assemblages and interactions)?
- The percent cover estimation methods used with cryptogams and other plants need to be tested. Most cover estimation methods used in the field are not consistent from user to user (or even within users from one day to the next, in my experience).
- A common morphological adaptation cited on page 21 as a wetland indicator is "root systems much shallower than in upland areas." On gravel bars and pads, willows (for example) send extensive roots across the surface or just below the surface, yet these are clearly not wetlands. The same comment applies to page 77.
- On page 28, you suggest digging a soil pit to 20 inches. This would be tough going in shallow permafrost, and soil conditions below the active layer would probably have little bearing on whether or not the site is a wetland.
- On page 53, you note that water may be present in non-wetland sites during periods of high precipitation, etc. You may want to add "break-up" to this list; during break-up, rapid snow melt and ice dams on rivers (and even on slopes where melting snow drains down hillsides until it is trapped by snow and ice dams) can lead to flooding of areas that would not normally be thought of as wetlands. Same comment for page 65.
- Using some of the methods described before page 60, it seems to me that impoundments (such as those created by gravel roads) would be wetlands. This may be the intent, but if not you might want to consider situations in which roads or railroad berms, etc., trap water and cause flooding, especially in areas where roads are considered semi-permanent (mines, oil fields, logging).
- It is not clear to me how frozen water (i.e., in permafrost, lenses of frozen water, or segregated ice) would be treated when looking for a "water table between 12-24 inches . . . ." For example, see page 70, but there are other passages where this may be a concern. One example where a non-wetland (I think) could have ice shallower than 24 inches is a gravel pad. Few (including Corps regulators) seem to consider gravel pads to be wetlands, yet they sometimes have ice close to the surface. Apparently, the ice is not sufficient to act as an impermeable barrier to liquid water (at least not to the point at which it creates moist conditions in the root zone—in some cases, the liquid water probably flows through the gravel and across the shallow ground ice to discharge at the edge of the pad, and in other cases there is just not enough precipitation or snow melt to maintain liquid water above the ground ice).

- On page 72, you discuss salt crusts. There are many areas on the North Slope (typically disturbed areas) with salt crusts, often originating from "salty gravel" (i.e., gravel mined from an area that had sufficient brine to leave salt in the gravel). In some cases, precipitation flushes salts from these pads into the surrounding land, creating salt crusts that should not be considered secondary indicators.
- On page 74, you talk about stunted trees in wetland areas. I think trees can also be stunted in areas of shallow permafrost; usually, areas of shallow permafrost with trees are wetlands, but this may not always be the case. Also, as altitude increases trees can be increasingly stunted (probably by wind, which would strip the boundary layer around stomata (and cause other problems), but maybe also because of other factors).
- On page 90, you discuss dry season site visits, saying, "In many wetlands, direct observation of flooding, ponding, or a shallow water table would be unexpected during the dry season." You define the dry season for northern Alaska as early June through late July. In early June this year (and many years), we still had substantial snow cover on the Slope. Whether or not precipitation is high (which I think is how you defined dry season), as the snow melts the area floods. Early June through July is, for plants, the wet season, not the dry season, on the Slope.
- On page 92, you talk about the design of water-table monitoring wells. I doubt that these would work well in frozen soils. As soon as the soil is disturbed (i.e., dig a hole, install a well, etc.) the ground ice changes, and, subsequently, the hydrology changes. Should there be a cautionary note here about using these monitoring wells in frozen soil? (I may be way off base with this comment, but I think it is worth discussing with experts from the working group.)
- On page 92, you talk about upland-wetland mosaics. These also occur on disturbed (physical disturbance) areas where there is shallow permafrost.
- A glossary of terms about wetland delineation in Alaska should probably include terms like permafrost, thermokarst, and active layer.
- Appendix A-4 seems very short. Does the working group agree with all of the other national plant list classifications for species occurring on the Slope? Or are there lots of unknowns about North Slope plants? If there are lots of unknowns, this might be worth footnoting, if for no other reason than to encourage further work in this arena. (It is easy to imagine a study similar to the cryptogam study but for vascular plants on the Slope.)
- Throughout, or perhaps in a separate document, it may be useful to suggest research needs related to delineation in Alaska. A list of specific topics would be very useful. Often, it seems to me, researchers in Alaska are floundering in terms of identifying the most relevant questions to ask, and some guidance would be very useful.

I hope these comments are helpful. You have a very impressive list of reviewers and working group members, and it is hard to imagine that my comments will add much to

your efforts. Throughout, please note that I am not an expert on delineation; if some of my comments seem incorrect to your experts, I defer to your experts. Please let me know if you have any questions or if you would like me to expand on any of these comments.

In closing, I applaud the Corps and others for pursuing regional delineation in Alaska. Again, thank you for the opportunity to review this document.

Sincerely,

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**INDEPENDENT PEER REVIEW REPORT**

# REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: ALASKA REGION

Prepared for

U.S. Army Corps of Engineers
Headquarters Division
Washington, D.C.

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Submission Date: June 17, 2005

## TABLE OF CONTENTS

# 1.0 INTRODUCTION

The U.S. Army Engineer Research and Development Center (ERDC) generated a draft *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region* (Alaska Supplement) to the congressionally approved 1987 Corps of Engineers Wetland Delineation Manual. This document was prepared in partial fulfillment of the Office of Management and Budget (OMB) Independent Peer Review guidelines. The following sections provide information regarding the standards, scope, and approach used by the peer reviewer to evaluate the Alaska Supplement.

## 1.1 Peer Review Standards

As stated in the preface (page iii) of the Alaska Supplement, "Independent peer reviews were performed in accordance with Office of Management and Budget guidelines." Adhering to the precautionary principle, this review conforms to the Section III guidelines of the Final Information Quality Bulletin for Peer Review[1]. The Section III review for this document was made by the reviewer based on the following:

- The Alaska Supplement represents a precedent setting approach;
- The Alaska Supplement has significant interagency interest; and
- Implementation of the Alaska Supplement is expected to be controversial by the proponent agency.

## 1.2 Reviewer Charge

Pursuant to OMB guidelines, "Peer reviewers shall be charged with reviewing scientific and technical matters, leaving policy determinations for the agency."[2] Hence, this document examines only the scientific conclusions and not the larger policy, legal, or regulatory issues.

## 1.3 Review Rationale

In reviewing the Alaska Supplement, the reviewer has taken the following approach with each section:

- Are the statements/conclusions supported by scientific data?
- Are the statements/conclusions supported by technical references?
- Are the methods/procedures site-specific and objective? and
- Are the methods contradictory or redundant with other sections of the Alaska Supplement?

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[1] Office of Management and Budget, 2005. "Final Information Quality Bulletin for Peer Review". *Federal Register.* Vol. 70, Friday January 14, 2005. pages 2664 – 2677.
[2] *Ibid.* pg. 2675.

As a practical matter, Sections with which the reviewer has questions or comments will be addressed. Sections with which the reviewer agrees or has no comments will be noted. The general approach of the review is to outline scientific and methodological weaknesses. The reviewer provides questions and comments but views comment resolution to be the responsibility of the proponent agency (U.S. Army Corps of Engineers).

## 2.0 SECTION 1 – INTRODUCTION

Statement on page 1 states "This Regional Supplement is designed **for use with** the current version of the Corps Manual (Environmental Laboratory 1987) and all subsequent versions. Where differences in the two documents occur, this Regional Supplement ***supersedes*** the Corps Manual for applications in the Alaska Region." [Emphasis added]
*Does the Alaska Supplement supersede or supplement the 1987 Manual? By definition, it cannot simultaneously be both. If the document is intended to be both then sections that supersede the 1987 Manual must be clearly identified.*

Map on page 3
*Why is the figure not referenced to source document?*
*Why is the rest of the Aleutian chain not shown?*

## 3.0 SECTION 2 – HYDROPHYTIC VEGETATION INDICATORS

Second paragraph pg 10.
*Why is this apparently superfluous information included?*

### 3.1 GROWING SEASON

The use of the 28°F 'frost free period'
*Basic reference material used to generate the Alaska Supplement discourages the use of the 28°F 'frost free period' in Alaska. Additionally, the underlying assumption that air temperature is related to soil temperature is false in areas underlain by gelisols (The reader is directed to Chapter 17 of* ***Soil Conditions and Plant Growth***[3] *for further information). Since the technical literature appears to discourage its use, on what scientific basis is the U.S. Army Corps Engineers using to define growing season for both vegetation and hydrology on a demonstrably false assumption that there is a relationship between air temperature and soil temperature in areas underlain by gelisols?*

The use of WETS data in Alaska.
*An examination of the WETS data tables for the Interior Region indicates that there are approximately 18 low-elevation sites potentially available for this landmass approximately the size of Texas. A similar review of available WETS data for Texas indicated that for counties which names begins with T through those which names begin with Z, over 40 WETS stations are available. Further, it appears that the map referenced*

[3] Russel, E.W., 1973. *Soil Conditions and Plant Growth, 10th Edition.* Longman Group Limited, London., relevant pages 388 through 402.

*in SPN-03-05 is wholly based on the WETS data. On what scientific basis does the U.S. Army Corps Engineers intend to replace a site-specific measure of growing season (i.e. soil temperature) with growing season based on a station density of one station per 12,500 square miles (8 million acres)?*

## 3.2 VEGETATION SAMPLING

Plot and Sample Sizes 1st paragraph and figures on page 12.
*Why is this apparently superfluous information included?*

List Item No 4, page 14 "*Cryptogam stratum* – consists of all cryptogams (bryophytes, lichen, and fungi)".
*The basic strata definition conflicts directly with the final paragraph, which implies that only bryophytes will be examined as part of the cryptogam strata. This implies that the data underlying the use of cryptogam strata is incomplete at best or being used selectively at worst. Since the underlying interagency reports (Laursen et al., 2005 and Reed, 1996) were not made available to this reviewer despite repeated requests, on what scientific basis is the use of the cryptogam strata being endorsed by the U.S. Army Corps of Engineers?*

Statement Page 14 final paragraph "In general there was an inverse relationship between lichen coverage of wetland bryophytes. As the cover of lichens increased, there was a decline in wetland bryophytes and the site usually lacked hydrology and soil indicators. This concept will need further refinement."
*It appears to this reviewer that a conclusion has been made regarding lichens. Namely, that lichens dominate on upland sites. Again, this implies that the data underlying the use of cryptogam strata is incomplete at best or being used selectively at worst, on what scientific basis is the U.S. Army Corps of Engineers endorsing lichens being excluded from the cryptogam strata?*

## 3.3 HYDROPHYTIC VEGETATION INDICATORS

The proposed assessment hierarchy.
*The proposed assessment hierarchy will require different field sampling methods. The whole hierarchy appears biased towards 'proving' wetland vegetation.*

### 3.3.1 Indicator 1 – Dominance Test

*The most subjective and most easily biased by neutral (FAC) species is the first method. A long-term problem has been the use of FAC species in this calculation. In fact using the same rationale from a different perspective one could calculate the upland species as those with FAC, FACU, and UPL species and arrive at a different answer for the same plot. Indicator 1 is a species richness measure that does not address the overlying influence of each species on the study site in terms of shading or species life histories. Hence, Indicator 1 is neither definitive nor inherently accurate. Why does the U.S. Army Corps of Engineers persist in unduly biasing vegetation data towards 'proving' wetlands*

*by continuing to include FAC species as wetland indicators instead of the FACW and OBL versus FACU and UPL species comparison consistent with the 1987 Manual?*

### 3.3.2 50/20 Rule

Step 1
*Why is an estimate of percent cover adequate? Percent cover is easily measured in the field and well-established objective methods are available[4] for each stratum.*

### 3.3.3 Indicator 2 – Prevalence Indicator

*This reviewer believes that this is most objective and inherently accurate methods presented for sampling vegetation. It seems to defy logic that it is lower in the proposed hierarchy than less definitive or defensible sampling methods. Why was this method not the only proposed method used for vegetation sampling?*

*Why is an estimate of percent cover adequate? Percent cover is easily measured in the field and well-established objective methods are available[5] for each stratum.*

### 3.3.4 Indicator 3 – Wetland Cryptogams
*Please refer to reviewer's remarks in Section 3.2 of this review.*

User notes, Item 1 sampling method 1-meter square plots
*A highly objective and repeatable method here makes no sense in light of estimates being used elsewhere. If an estimated percent cover for vascular plants is acceptable, why can the percent cover for cryptogams not be estimated like other strata?*

### 3.3.5 Indicator 4 – Morphological Adaptations
Statement on page 21 that "Common morphological adaptations in Alaska include, but are not limited to...**root systems much shallower than in upland areas...**" [Emphasis added].
*How does the U.S. Army Corps of Engineers propose a wetland delineator differentiate between shallow root systems due to adverse soil thermal conditions and those that develop due to saturation?*

## 4.0 HYDRIC SOIL INDICATORS

Statement on page 23 that "Cool temperatures and acid conditions result in the slow decomposition of organic matter. **Many well drained soils in Alaska,** under aerobic conditions, **have thick organic surface layers.**" [Emphasis added]

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[4] Kent, M. and Coker, P. 1992. *Vegetation Description and Analysis: A Practical Approach.* CRC Press, Boca Raton, 363 pages.
[5] Kent, M. and Coker, P. 1992. *Vegetation Description and Analysis: A Practical Approach.* CRC Press, Boca Raton, 363 pages.

*Please note that this particular issue is not addressed in Section 5 under the subsection entitled "Problematic Hydric Soils". Since it is an obvious problem, why isn't it addressed in Section 5?*

Seasonal Frost Affected Soils
*Please note that this particular issue is not addressed in Section 5 under the subsection entitled "Problematic Hydric Soils". Since it is an obvious problem, why isn't it addressed in Section 5?*

## 4.1 PROCEDURES FOR SAMPLING SOILS

Bulleted List on page 27
*These are to be evaluated to determine whether a site is a suspected problem area yet there is no place for this information on the proposed data form in Appendix B under the soil evaluation portion of the form. Conventional notation exists for most of the topographic indicators referenced in the Alaska Supplement*[6].

## 4.2 INDICATOR A1 – HISTOSOL OR HISTEL

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 4.3 INIDCATOR A2 – HISTIC EPIPEDON

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 4.4 INDICATOR A4 – HYDROGEN SULFIDE

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 4.5 INDICATOR A12 – THICK DARK SURFACE

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 4.6 INDICATOR A13 – ALASKA GLEYED

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

[6] USDA, 2002. *Field Book for Describing and Sampling Soils.* USDA, Natural Resources Conservation Service, National Soil Survey Center, Government Printing Office, Washington D.C.

## 4.7 INDICATOR A14 – ALASKA REDOX

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 4.8 INDICATOR A15 – ALASKA GLEYED PORES

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 4.9 USE OF EXISTING SOIL DATA

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. It should be noted that for vast tracts of Alaska, the Exploratory Soil Survey is the only source of soil information. Please also note that since 1999,* ***Soil Taxonomy*** *has changed and should be noted by users of the Exploratory Soil Survey if appropriate.*

## 5.0 WETLAND HYDROLOGY INIDCATORS

*This whole section is based entirely upon the presupposition of continuous saturation in excess of 12.5 percent of the growing season, which make the comments in Section 3.1 relevant to this entire section. If the growing season cannot be determined in a site-specific and scientifically supportable method then there is no point to evaluating hydrology in the field and the U.S. Army Corps of Engineers should state that hydrology is assumed for all wetland delineation purposes. Indicators that are used to assume hydrology are secondary not primary indicators of hydrology.*

## 5.1 INDICATOR A1 – SURFACE WATER

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 5.2 INDICATOR A2 – HIGH WATER TABLE

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 5.3 INDICATOR A3 – SATURATION

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 5.4 INDICATOR B1 – EVIDENCE OF RECENT INNUNDATION

*Reviewer believes this section is supported by scientific data. The proposed evaluation method is site-specific but subjective. By what scientific method does the U.S. Army Corps of Engineers propose to evaluate whether the watermarks were "caused by extreme or abnormal flooding events" and/or "brief, temporary flooding during spring breakup" without multiple trips to the site?*

## 5.5 INDICATOR B2 – SEDIMENT DEPOSITS

*Reviewer believes this section is supported by scientific data. The proposed evaluation method is site-specific but subjective. By what scientific method does the U.S. Army Corps of Engineers propose to evaluate whether the sediment deposits were the result of "historic flow conditions or recent extreme events" and/or "sediment that may be left following spring snowmelt" without multiple trips to the site?*

## 5.6 INDICATOR B3 – DRIFT DEPOSITS

*Reviewer believes this section is supported by scientific data. The proposed evaluation method is site-specific but subjective. By what scientific method does the U.S. Army Corps of Engineers propose to evaluate whether the drift lines were the result of "extreme, infrequent, or very brief flooding events" without multiple trips to the site? .*

## 5.7 INDICATOR B4 – MAT OR CRUST OF ALGAE OR MARL

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 5.8 INDICATOR B5 – IRON DEPOSITS

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. However, it is not clear what the difference between iron staining (which the reviewer has observed developing in less than five days during construction dewatering activities) and the iron crusts and deposits referenced in the Alaska Supplement.*

## 5.9 INIDICATOR B6 – SURFACE SOIL CRACKS

*With the addition that 'hydric soil indicators must be present', this reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 5.10 INDICATOR B7 – INNUNDATION VISIBLE ON AERIAL IMAGERY

*Reviewer believes this section is not supported by scientific data. How does aerial imagery, which is often taken following leaf fall or before green up, provide any*

*meaningful information about hydrology during the growing season? This is definitely not a primary indicator of hydrology and should be used only with field follow up to confirm. The only exception would be if 10 years of daily aerial imagery during the growing season exists for a site.*

## 5.11 INDICATOR B8 – WATER STAINED LEAVES

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective.*

## 5.12 INDICATOR B9 – DRAINAGE PATTERNS

*Reviewer believes this section is supported by scientific data. The proposed evaluation method is site-specific but subjective. By what scientific method does the U.S. Army Corps of Engineers propose to evaluate whether the drainage patterns are the result of "extreme or abnormal flooding or by brief, temporary flooding during the spring breakup period" without multiple trips to the site?*

## 5.13 INDICATOR C1 – HYDROGEN SULFIDE ODOR

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. However, as noted in text these soils are often permanently saturated or anoxic near the surface. If this is the case, why would Indicator A3 be insufficient for assessing hydrology especially since this measure is already an indicator (Soils A4) of hydric soils?*

## 5.14 INDICATOR C2 – OXIDIZED RHIZOSHPERES ALONG LIVING ROOTS

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. However, this is not a primary measure; rather hydrology is assumed based on soils characteristics.*

## 5.15 INDICATOR C3 – DRY SEASON WATER-TABLE

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. However, this is not a primary measure; rather wet-season hydrology is assumed based on a dry season water table. What is the scientific basis for establishing the depths of ground water noted for mineral and organic soils?*

## 5.16 INDICATOR C4 – PRESENCE OF REDUCED IRON

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. This is correctly characterized as secondary measure; hydrology is assumed based on soils characteristics.*

## 5.17 INDICATOR C5 – SALT DEPOSITS

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. However, in order for capillary rise to occur as noted in text, these soils are often permanently saturated near the surface. If this is the case, why would Indicator A3 be insufficient for assessing hydrology?*

## 5.18 INDICATOR D1 – UNVEGETATED CONCAVE SURFACES

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. How is this substantially different from Indicator B2?*

## 5.19 INDICATOR D2 – STUNTED OR STRESSED PLANTS

*Reviewer refers reader to Section 3.3.5 the same question on thermal versus saturation is pertinent for stressed or stunted vegetation.*

## 5.20 INDICATOR D3 – GEOMORPHIC POSITION

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. Reviewer believes this is correctly classified as a secondary indicator.*

## 5.21 INDICATOR D4 – SHALOW AQUITARD

*Reviewer believes this section is supported by scientific data for sites that are not underlain by gelisols but the proposed evaluation method is poorly defined and highly subjective. Specific questions to be resolved include: 1) By what quantitative field method is the presence of the aquitard to be determined? 2) Must hydric soils be present above the aquitard? and, finally, 3) What is the scientific definition of "potentially" as used in the Alaska Supplement?*

## 5.22 INDICATOR D5 – PLANT MORPHOLOGICAL ADAPTATIONS

*This indicator is substantially no different from Vegetation Indicator 4. Reviewer refers reader to Section 3.3.5.*

## 5.23 INDICATOR D6 – MICROTOPOGRAHIC RELIEF

*How does the Alaska Supplement defend using a problem area defined in Chapter 5 as an indicator wetland hydrology?*

## 6.0 DIFFICULT WETLAND AREAS IN ALASKA

*As a general question for this section, is the U.S. Army Corps of Engineers advocating abandonment of the three-parameter approach of the 1987 Manual?*

## 6.1 WETLANDS THAT LACK INDICATORS OF HYDROPHYTIC VEGETATION

*There are no citations or references for this section. The comments associated with the Anchorage situation appear to confirm the reviewer's comments in Section 3.3 of this document. Indeed this situation appears to be no different from the wetland mosaic situation described later in Section 5. On what scientific basis is the U.S. Army Corps of Engineers advocating method steps a through e? Please provide the technical and scientific data supporting the contention that these areas are wetlands.*

Procedure Step A
*Is the Alaska Supplement advocating reclassification of indicator species as a matter of practice?*

Procedure Step C
*The use of reference sites should be discouraged in all cases not involving a notice of violation where an adjacent reference site is appropriately used to characterize predisturbance characteristics.*

## 6.2 PROBLEM HYDRIC SOILS

*With the exception of "recently developed wetlands", the reviewer believes this section is supported by scientific data and proposed evaluation methods are both site-specific and objective. The reviewer cannot approve the recently formed wetlands section because there is an implicit forward-looking assumption that hydric soils will eventually form. This assumption can be neither be proven nor falsified and is therefore not a valid scientific position.*

## 6.3 WETLANDS THAT PERIODICALLY ALCK INDICATORS OF WETLAND HYDROLOGY

The final sentence of the first paragraph under Procedure
*This statement confirms the reviewer's comments regarding the use of meteorological data in Section 3.1 of this report.*

## 6.4 WETLAND/NON-WETLAND MOSAICS

*Reviewer believes this section is supported by scientific data and proposed evaluation method is both site-specific and objective. Indeed, this may be the strongest overall approach to wetlands delineation in the entire Alaska Supplement. It appears that the Alaska Supplement confirms the reviewer's comments in Section 3.3 regarding vegetation sampling methods.*

## 7.0 CONCLUSIONS

*Large sections of the Alaska supplement appear to have been lifted directly from other source material. However, poor reference citation and the use of materials without attribution is a real weakness. As a rule, if something, be it text, pictures, tables, or figures, can be found in a source predating your document, provide a reference. Additionally, as a general rule referencing unpublished materials that are in press is not recommended. Both of these detract from the professionalism of the report and leaves the reader wondering what other sections have been unreferenced. Also, importing other material into the Alaska Document has led to some incongruities between definitions contained in the 1987 Manual and Alaska Supplement. One example is the definition of soil surface. Definitional incongruity between the 1987 Manual must be thoroughly researched and rectified. Prudence suggests that procedures be reviewed for definitional consistency with the 1987 Manual as well.*

*Overall it appears that the Alaska Supplement is biased in favor of determining a site is wetlands. Indeed statements made make one wonder if the importance of some issues is being deliberately downplayed because findings are not conducive to delineating a 'wetland'. The patently unscientific method for determining growing season is especially disheartening. We can all agree that the scientific data supports a soil based temperature definition of growing season similar to that of the 1987 Manual. The Alaska supplement should draw on the existing body of data and identify the depth and temperature rather than abandon the concept. Growing season is important and must be discretely defined based on available science not assumptions. This holds true for vegetation sampling methods. The Alaska Supplement retains the worst characteristics of the 1987 Manual and proposes using a highly objective and repeatable method as a last resort. The commitment to using unbiased science and having clear and logical assessment methods must be clear in the reading of the Alaska Supplement.*

*In order to qualify as science and not opinion, delineation methods must be discreetly defined, objective, and repeatable by others. It is this reviewers opinion that the methods presented in the Alaska Supplement are generally poorly defined in terms of field steps required of the delineator. Indeed, in some sections the methods appear to be a series of if/then statements that do not allow assessment of some indicators without modification and in others wholly inconsistent with technical literature, methods, and definitions in the 1987 Manual. A field delineator needs to know that the approach and measurements they are making will be accepted by the U.S. Army Corps of Engineers. That simply is not possible with the procedures outlined in the Alaska Supplement. Poorly defined field*

*methods for assessing various indicators makes the question in Section 2.0 all the more pertinent.*

*One of the implications of the Alaska Supplement is that wetland delineators must have experience in Alaska and will be called upon to implement a high degree of region (Alaska) specific knowledge. Further, the presence of wetlands now has real economic impacts on property values. In order to protect the public interest, a program must be developed that requires Alaska experience as a prerequisite for wetland delineators in Alaska. Hence, I believe it is time that all public and private wetland delineators in Alaska become registered and licensed with the State of Alaska and move into the same licensed professional status as land surveyors, engineers, architects, real estate appraisers, manicurists, and hair stylists.*

## 8.0 PROFESSIONAL CERTIFICATION

*I certify under penalty of law that this document and all attachments were prepared in accordance with the guidelines for Independent Peer Review published by the Office of Management and Budget. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information and that this document will become part of the Public Record.*

Dr. Edmond C. Packee Jr.

Digitally signed by Dr. Edmond C. Packee Jr.
DN: CN = Dr. Edmond C. Packee Jr., C = US, O = Travis/Peterson Environmental Consulting, Inc., OU = Senior Scientist
Reason: I am the author of this document
Date: 2005.06.16 15:50:31 -08'00'

_____ Date: _____

Edmond C. Packee, Jr., Ph.D.
Senior Scientist
Travis/Peterson Environmental Consulting, Inc.
*Certified Professional Soil Scientist, No. 28100*
*Certified Professional in Erosion and Sediment Control, No. 2337*

## 9.0 STATEMENT OF QUALIFICATIONS

### STATEMENT OF QUALIFICATIONS

**Edmond Charles Packee Jr., CPSSc., CPESC.**

**EDUCATION**

| | |
|---|---|
| University of Pretoria, South Africa | Ph.D. Mining, 2005 |
| University of Alaska Fairbanks | M. Sc. Mine Reclamation Science 1995 |
| | B. Arts Biological Sciences 1992 |
| | B. Arts History 1992 |

**REPRESENTATIVE EXPERIENCE**

**Senior Scientist** **1998-Present**
Travis/Peterson Environmental Consulting, Inc.
Responsibilities: Project management and technical environmental support for consulting activities, including storm water pollution prevention plans, environmental liability assessments, permit applications, and geological and hydrological site investigations. I have been using the 1987 Wetland Delineation Manual on an almost continual basis for the past 6 years and have completed in excess of 60 wetland delineations as a private consultant. Within the framework of the 1987 Manual, I am professionally registered as a Soil Scientist by ARCPACS, have documented experience as a hydrologist, and am intimately familiar with vegetation sampling methods and the vegetation communities encountered in Alaska. In this position, I have performed wetland delineations in southeast and southwest Alaska, the Aleutian chain, central and south central Alaska, the Interior, western Alaska, and the North Slope.

**Surface Environment-Researcher** **1996-1998**
South African Council for Scientific and Industrial Research
Division of Mining Technology
Responsibilities: Develop a process to quantify the post closure environmental liabilities of collieries. The process developed is based on international environmental standards with special reference to the environmental standards in South Africa. The process is based on iterative risk assessment methodology and is designed to interface with the EIA, EIS, EMPR, and EA processes. Compensation and mitigation alternatives for non-compliance points are expressed in financial terms (on a site basis). The post-closure impact appraisal process allows the aftercare costs of mines to be determined at any point in the mining cycle. Additionally, surface mine design and environmental permitting was performed.

**ADDITIONAL SCHOOLING AND CERTIFICATIONS**
Certified Professional Soil Scientist, No. 28100
Certified Professional in Erosion and Sediment Control, No. 2337

Inter Agency Wetland Delineation Course, USACE, 2003
BMP Selection, Installation, and Maintenance, IECA, Fairbanks, 2001
Risk Assessment for Acid Mine Drainage, CANMET, Sudbury, Ontario, 1999
Wet and Dry Covers for Tailings Impoundments, CANMET, Sudbury, Ontario, 1999.
Acid Mine Drainage Prediction and Control ASSMR, Gillette Wyoming, 1995.
Mining Hydrology. 1998 SME Annual Meeting, Orlando, FL.

October 7, 2005

William W. Wood, State Biologist, Wetland Compliance Coordinator
Natural Resources Conservation Service
800 West Evergreen Avenue, Suite 100
Palmer, AK 99645-6539

Subject: Comments on the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region

Dear Mr. Wood:

Thank you for your leadership of the peer review team, and your willingness to synthesize our comments.

I applaud the federal effort to develop a regional supplement to the Corps' 1987 wetland delineation manual. It is clear that much work has been expended to develop this draft supplement. I value the inclusion of new indicators that might be useful throughout the U.S., indicators that are more specific to conditions found in Alaska, and the inclusion of guidance on how to treat situations like mosaics of wetlands and uplands. My comments on the draft supplement are presented below, grouped under several categories.

## SUPPLEMENT DEVELOPMENT PROCESS

I am pleased to be able to be part of the peer review process for this regional supplement. I believe that implementing the supplement may have important effects on many property owners and managers. I think the review and testing period has been too short to determine the effects of implementing the supplement. I have not been able to find the time I think is needed during this busiest time of year to review the manual, test it in the field, or prepare these comments. I recommend, first, that the supplement be implemented on an experimental basis for a year, and that, when the supplement is implemented as a "final" version, it have a set schedule for review and modification after its results are better understood.

## THE SUPPLEMENT IN GENERAL

**Use the best scientific information.** The last paragraph of Chapter 1 states that the delineator "should use the most recent approved versions of this document and supplementary information." Please define "approved." For well over a decade, wetland delineation in Alaska has been confused by the issuance and availability of guidance and scientific information that has not been officially or legally adopted by the Corps of Engineers for use by delineators. For example, since the National Technical Committee on Hydric Soils issued updated hydric soil

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indicators, it has been unclear which indicators should be used. The Corps (or the Courts?) seems to have ultimately chosen to continue to rely on the 1987 indicators, despite the availability of better information. I think it is important for the most scientifically valid indicators to be used, and for these indicators to be adopted through whatever process is necessary for them to be defensible in court. Further, I think that the delineation process should allow for a scientist to present scientific information that shows that a particular indicator is or is not relevant or valid in a particular case, and to use the best scientific information for the wetland determination. I think that some of the methods described in the supplement will allow use of better information than before, but they also open the door for misuse of that flexibility.

**Develop one regional manual.** The supplement does not clearly describe which parts of the 1987 manual would become obsolete upon adoption of the supplement. I believe that the supplement should be rewritten as an entirely new and self-contained manual. Also, important definitions should be included in the manual, rather than the user referred to another document. Delineators should not need to cross-reference between multiple documents to perform their work any more than is unavoidable. If, for some reason, the 1987 manual cannot be completely replaced, the supplement should be reorganized to constitute a replacement for large portions of the 1987 manual.

**Put all indicators for each parameter together.** The organization of the supplement is unnecessarily confusing. Please put all the indicators for each parameter together into one chapter.

**Classify indicators by their strength and limit use of weak indicators.** I propose classifying strong and direct indicators as "primary", marginal and indirect indicators as "secondary", and indicators that may be used in only exceptional circumstances as "tertiary". Use of secondary and tertiary indicators for a site should require that primary indicators of the other two parameters exist. As the supplement is presently written, a site could be determined to be wetland based on weak or no evidence of one or two parameters.

## INDIVIDUAL SECTIONS OF THE SUPPLEMENT

### Physical and Biological Characteristics of the Region

Please modify references to the "Cook Inlet Mountains" to use the commonly accepted names for the mountain ranges, or refer to the "mountains in the Cook Inlet region".

### Hydrophytic Vegetation Indicators and Vegetation Section of the Difficult Wetland Situations in Alaska Chapters (Chapters 2 and 5)

Overall, I think the changes proposed for hydrophytic vegetation indicators are strongly biased toward finding more sites to have hydrophytic vegetation and to define more areas as wetland. The 1987 indicators for vegetation require only that the site vegetation be found to be neutral with respect to soil saturation for the site to be considered wetland. The most commonly used

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indicator for hydrophytic vegetation in the 1987 manual requires that the delineator find vegetation that strongly indicates wetland conditions (more FACW and OBL species), or find vegetation that is neutral with respect to wetland conditions (mostly FAC species, or equally balanced on both sides of FAC) or even tending toward dry (mix of FAC and FACU or U species). This 1987 indicator is already biased toward finding neutral or even dry-trending vegetation to be "hydrophytic". The methods described in the supplement further that bias. Many of the methods proposed in the regional supplement really obviate the requirement to have hydrophytic vegetation if indicators of the two other parameters are present.

The 1987 manual already contains hydrophytic vegetation indicators that allow a scientist to reference literature, databases, and file notes to address exceptional circumstances of the presence of FACU species in an area the scientist believes is wetland. The regional supplement unnecessarily lowers the standards of proof required to show that the vegetation is hydrophytic.

**Statements unsupported by evidence.** Several statements used to justify the supplement's new methods seem to be unsupported by evidence. Because of their context, they demonstrate the supplement's bias toward defining more vegetation as hydrophytic and more land as wetland. For example: "Even though a species may frequently grow in wetlands, the species may be more common or widespread in uplands simply because there is more upland habitat available for colonization." (third paragraph of Section 2). I cannot readily think of a species for which this is true. Similarly, there is an unsupported statement about wetland-adapted "ecotypes" of FACU species.

**Wetland indicator status issues.** I suspect that some of the "FACU-dominated wetlands" referenced in the supplement would not be FACU-dominated if the wetland indicator statuses of Alaska plants were updated, particularly if the updates were regionalized. It is time to update the wetland indicator statuses of Alaska's plants, using existing datasets wherever possible to determine each species' likelihood of growing in wetlands or uplands. The U.S. Forest Service, National Park Service, and Natural Resources Conservation Service are three of the entities that now possess large datasets that could be used for re-working of the Indicator Status List.

**Plant lists.** The plant lists presented in Appendix A are incomplete and unnecessary and should be deleted. It is misleading to show UPL and NI and FACU plants as "common plants that occur in wetlands". If the lists are retained, they should be entitled: "Wetland Indicator Statuses of Common Plants in Alaska."

**Growing season.** Rather than identifying a mandatory source for growing season information, I believe that site-specific and current data should always be used when they are available. Easily observed indications of the beginning and end of the growing season are when more than half of the deciduous vegetation at a site has begun leafing out and the day of a killing frost, respectively. If an on-site wetland delineation is done during that period, it is done during the growing season for that year. The best available information should be used for defining the growing season at a site.

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**Plot and sample sizes.** How were the suggested plot sizes selected? Is this "guidance" meant to represent an optional or mandatory method? I do not think it is necessary for the Corps to specify plot sizes – only that the plot sizes, shapes, locations, and numbers should be selected to allow efficient and accurate sampling.

**Strata.** I am pleased to see guidance that allows delineators to not identify dominant species from strata with <5% total plant cover.

**Sampling method.** The point-intercept sampling approach should be described in this section as an option for use on any delineation where a higher level of objectivity is desired. The answer provided by the point-intercept method should have precedence over the answer found using the plot method, whichever answer it provides (hydrophytic or not).

**Cryptogams.** In general, I favor the addition of bryophytes and lichens as optional strata to be used for wetland determination. This will require long-term development of wetland indicator statuses for at least the common species likely to be dominants. Below are my thoughts on the use of cryptogams as described in the supplement.

(1) It is inappropriate to base an indicator on draft documents that have not been peer-reviewed and are not available to reviewers.
(2) I do not think this indicator should be applied outside of the plant community types and regions in which it was developed or where it is tested.
(3) In what proportion of the Laursen study's wetland plots would the listed taxa have great enough cover to allow use of the cryptogam indicator? How useful would this indicator be; would it be worth scientists' and regulators' time to be trained in its use? Even with training, how many practicing wetland professionals, including regulators, could competently implement this indicator?
(4) If a cryptogam indicator is going to be used, please also provide a similar list of upland-indicating cryptogams that can be used the same way.

**Applying hydrophytic vegetation indicators.**

(1) Indicators 1 and 2: The bias toward finding vegetation to be hydrophytic is shown in the procedure described starting on page 16 of the supplement. That procedure instructs delineators to calculate the prevalence index only if it might cause vegetation initially found to be non-hydrophytic to become hydrophytic. To be fair and unbiased, this procedure should be employed (as a more rigorous test) **whenever** hydric soils and wetland hydrology have been found and the vegetation may be marginal. Then, the answer derived from the prevalence index method should be used – whether it indicates hydrophytic vegetation or not. This would eliminate the bias of the 50/20 method toward finding vegetation to be hydrophytic.
(2) Indicator 2: Page 19, step 2: Please cite Reed 1988 to clarify what list is being used. I suggest the following change: Species without a published indicator status for Alaska should not be used in the calculations.
(3) Indicator 3: See comments above on use of the cryptogam indicator. I do not believe it can be employed competently in Alaska by more than very few individuals. If it is

accepted as an indicator, it should be optional, not a mandatory step after employing Indicators 1 and 2.

(4) Indicator 4: When indicator 4 is used, the adaptations must be carefully documented and evidence provided that the adaptation is related to soil saturation. That is, the Step 3 documentation of that species' equivalent characteristic on an adjacent upland site should be mandatory.

(5) Indicator 4: Use of this indicator should require that the site be found to have hydrophytic vegetation according to the prevalence index method after FACU species have been reconsidered to be FAC.

(6) In certain circumstances, stunting or other signs of physiological stress of FACU tree species relative to that species' size on adjacent upland sites should be a condition under which the species can be considered FAC for purposes of calculating the prevalence index. Stunting is a sufficient indicator that prolonged saturation has occurred if saturation is evident and no other explanation is reasonable.

**FACU- and UPL-dominated areas.** Is "FACU-dominated wetlands" an oxymoron? I believe that there are areas that have wetland hydrology and hydric soils, but FACU-dominated vegetation, that function as wetlands and are ecologically important. I also think that the use of these areas should be managed for the public good. However, I resist adoption of methods that allow sites with non-hydrophytic vegetation (using the traditional dominance-by-FAC-or-wetter-plants approach) to be considered wetlands. My concern is that people biased toward calling areas wetlands (including some regulators) and some inexperienced practitioners will take some new methods as license to call areas wetlands that have indicators of only one or two of the three required wetland parameters.

I believe that "hydrophytic vegetation" is intended to comprise vegetation that would lead an experienced ecologist to believe a site is strongly influenced by water at or near the soil surface (within the main rooting zone) for long periods during the growing season of most years. That is, apart from hydrology and soil evidence, the vegetation alone should indicate wet conditions; the dominant plants should be "typically adapted" ("normally or commonly suited", paragraph 31, WLD manual 1987) for life in saturated soil conditions. Hydrophytic vegetation is not intended to include plant communities that are only rarely found in wet sites. The existing regulatory definition of wetlands refers to vegetation "typically adapted" not "exceptionally adapted" for life in saturated soil conditions. The section on Difficult Wetland Situations describes sites that I suspect fail to meet the test for hydrophytic vegetation because they do not meet the regulatory definition of wetlands.

For example, in two places, the supplement refers to wetlands along creeks that support paper birch and field horsetail. While these FACU plants commonly occur along creeks, I have not seen convincing evidence that such sites typically have wetland hydrology and hydric soils. While the tendency may be to **want** to call them wetlands because they are near creeks and are important ecologically, those sites do not meet the criteria laid out in the 1987 manual and may not experience prolonged saturation that leads to anaerobic conditions. I believe the supplement authors may have erred in calling those areas "wetlands", and then using the "wetland" status of

those sites as evidence that certain FACU species commonly grow in wetlands. I believe that this reference to "FACU-dominated wetlands" and procedures laid out in Chapter 5 would bring more areas under Section 404 jurisdiction than are truly wetlands according to the current definition. I agree that these may be ecologically and socially important areas, and deserve special management, but they are not necessarily wetlands.

The existing primary indicator of hydrophytic vegetation, presented in paragraph 35a of the WLD manual (COE1987), already allows vegetation that is FAC-dominated to be considered hydrophytic; it even allows vegetation with nearly as many dominant FACU species as FAC species to be considered hydrophytic. Thus, this indicator is sufficiently broad to capture as "hydrophytic" situations where the vegetation is neutral or even dry-trending with respect to soil wetness. Further, the 1987 manual provides for use of information gleaned from literature and scientific observation to address exceptional circumstances of FACU species dominating in wetlands.

There is already an allowance made for the presence of FACU plants growing on hummocks under the morphological indicators section in Chapter 2. There is further allowance for identifying lower areas surrounding hummocks as wetlands in a mosaic of wetlands and uplands. I do not think paragraph 2a on page 81 of the draft regional supplement should be included. It is essentially a two-parameter approach.

I like the approach presented in paragraph 2b on page 81. The years of observation *must* be considered relative to the historic climatic record.

I think the approach under 2c is far too subject to personal interpretation. How would "substantially the same" be determined? If it is used, it must also reference current hydrology as being the same between the subject and reference sites.

I do not think paragraph 2d on page 82 is necessary because the 1987 manual already allows reference to technical literature. I think paragraph 2e is too broad in referencing unrefereed sources. "Published scientific literature" is a sufficient description; the information presented must be developed through scientific methods.

I like the approach described under paragraph 2e (p.82). I suggest it be included under the morphological indicators in Chapter 2. However, I believe the indications of stress should be unequivocal and measurable, not subtle. The sentence about species showing increased vigor in wet sites should be deleted, as this paragraph is intended to address FACU and UPL species; I doubt any of these show increased vigor in wet sites. The sentence about "species-specific" and "easy to quantify" should also be deleted because this approach should require that the evidence of saturation-related stress be both species-specific and at least semi-quantitative.

The point-intercept method is a valid way of collecting vegetation data. It should be allowed to be used, and considered a highly rigorous method, during any wetland determination, not just at a problem area. Therefore, it should be deleted here, and referenced in Chapter 2 as an

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acceptable method of collecting plant cover data. If the cover data are disputed, data with a higher percentage of identified species should take precedence over data with a lower percent cover of correctly identified species.

**Hydric Soil Indicators Chapter**

**Introduction.** Please clarify that, as the NTCHS updates indicators, those indicators shall supersede the ones described in the regional supplement. Apparently, the current NTCHS indicators have not legally superseded the hydric soil indicators in the 1987 manual.

**Procedures for Sampling Soils.** Page 28 includes this sentence: "Depths used in the indicators are measured from the muck or mineral soil surface unless otherwise indicated." This seems contrary to standard practice of soil investigation. It would also place the soil's morphological features indicating reduction well below the major rooting zone in many cases, and would identify more soils as hydric. My understanding is that the hydric soil indicators have been written to reference depths measured from the soil surface, which lies just below the litter layer unless otherwise stated.

**Indicator A1.** Under User Notes, please clarify "soil surface" in the first paragraph of this section. Does the organic material need to be saturated for any particular period, or during the growing season, for this indicator to be valid or for it to be a Histosol?

Please clarify the first sentence in the second paragraph.

Third paragraph: Please delete the last four or five sentences of this paragraph, or clarify their significance. Please do the same with these sentences under Indicator A2.

In the Interior Alaska and Western Alaska paragraphs, please add a comma after "zones" (if the groundwater discharge zones and the depressions and flats were intended to describe different situations). In the Southcentral Alaska paragraph, please complete the last sentence.

**Indicators A1 and A2.** Is there any way to detect 12 to 18 percent organic carbon content in the field? If so, please describe.

These sections reference "presence of a water table". Where should that water table be observed? Is this intended to mean that the depth to saturated soil equals the depth to the water table?

**Indicator A12.** In the technical description, please clarify what the "surface" is. Perhaps this technical description could be clarified with a diagram. Please clarify the reason for looking below 12 inches (i.e., hydric soil indicators are typically within the upper foot, and this one is allowing the investigator to find that evidence deeper because...?).

The paragraph beginning with "Accumulation..." could be moved to the top of the User Notes to help clarify the basis for this indicator.

Table 3-1 is not as clear as the equivalent series of tables in the Field Book for Describing and Sampling Soils (USDA NRCS 2002).

**Indicator A13.** Clarify "soil surface". Define "glauconitic". Reorganize and break up the largest paragraph so it flows more logically. Does the caption on Figure 3-14 reference 8 inches where it should reference 20 inches?

**Indicator A14.** Clarify "soil surface" in the technical description. From the user notes, it appears this indicator allows for observation of the redox feature well below 12 inches from the organic soil surface, which would have the effect of finding soils to be hydric that experience reduction well below the major rooting zone.

**Hydric Soils Section of Chapter 5**

(1) Soils with low organic carbon content – If microbial activity is insufficient to produce hydric soil indicators, might it also be insufficient to reduce the soil, and thus the soil is not hydric?
(2) I believe that a positive reaction with alpha, alpha dipyridyl should be included in the standard hydric soil indicators, unless there is evidence of false positive reactions within 30 seconds. The way this indicator is worked into the problem area approach is unnecessarily confusing.
(3) Use of hydrology information described under 3c on page 89: Shouldn't there be some evidence that the soil is reduced? Is it possible to take dissolved oxygen readings in such water in the well or soil pit to document lack of oxygen?
(4) I think that the supplement would be less confusing if the problem area explanations and indicators were worked in with the hydric soils information in Chapter 3. In the case of soils, I suggest that the problem area indicators described on pages 85 and 86 (not including the positive alpha, alpha dipyridyl test) be designated as secondary indicators of hydric soils. Perhaps such secondary indicators could be allowed to be used only when there are positive direct or primary indicators of hydrophytic vegetation and wetland hydrology, or when there are at least two positive secondary indicators for both wetland vegetation and hydrology. The data form could be set up to make this clear.
(5) Even if the problem area indicators are not called secondary or are not moved to the main hydric soil indicators section, I think that use of the problem area approach for one of the three parameters should require that the other parameters be met without use of a problem area approach. That is, a delineator should not use the problem area approach for more than one parameter.

**Hydrology Indicators Chapter**

(1) I am pleased to see addition of several new hydrology indicators.

(2) I am unsure whether hydrology indicators should be limited to those that directly indicate that the site is periodically inundated or has soils saturated to the surface at some time during the growing season.
(3) Group B indicators must be paired with some evidence that the inundation or saturation occurred during the growing season. (For the algal crust, that already exists.)
(4) Indicators C1, C2, and C4 are soil characteristics and should not be used as hydrology indicators. If they are used, they should be tertiary indicators that require presence of one or two other secondary or tertiary indicators.
(5) Indicator D1 should be put in Group B. It should note whether, when the concave surface is flooded, the water table would be high enough to be within the rooting zone of the surrounding vegetated areas.
(6) Indicators D2 and D5 should be used as vegetation indicators and should not be used as hydrology indicators. If they are used, they should be tertiary indicators that require one or two other secondary or tertiary indicators.
(7) Indicators D3 and D4 should not be used unless there are primary (not problem area) indicators of hydrophytic vegetation and hydric soils, and should require a clear explanation of why wetland hydrology would be expected during the growing season. They also should be tertiary indicators that require presence of one or two other secondary or tertiary indicators.
(8) Indicator D6 should be eliminated. The low areas, if wet, would exhibit some of the other hydrologic indicators. This indicator has too much potential for misuse. Areas with this type of microrelief may or may not be wetlands, and they may or may not have developed under wetland conditions.
(9) Indicator D6 - Are frost circles only found in wetlands?

**Wetlands that Periodically Lack Indicators of Wetland Hydrology Section of Chapter 5**

(1) Step 1 on page 90 should require strong primary indicators of hydrophytic vegetation and hydric soils.
(2) Steps 2a, 2b, and 2c should require data to support assertion that it is the dry season.
(3) Step 2d has high potential to be misused and should be deleted.
(4) Step 2e should be included as a standard indicator.

**Wetland/Non-Wetland Mosaics Section of Chapter 5**

I support the approach described for mosaics. However, I request that the Corps also consider an approach that looks at a parcel as a whole. In some cases, where the wetland parts of a mosaic are only marginally wet or are a very small proportion or have no off-site connections, I think it is appropriate to consider whether the site *overall* acts as a wetland. If it does not, it should not be defined as wetland and the Corps should not take jurisdiction. I believe this approach has been used in the past for individual properties where wetlands formed only a small proportion of a mosaic.

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Mr. Wood, thank you again for receiving and considering my comments. Please call me at (907) 644-2038 if you have questions about my comments.

Sincerely,

/signed al/

Anne Leggett
Senior Biologist, Professional Wetland Scientist #1512

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