

**Comments of the Independent Peer-Review Team for the Draft  
Interim Regional Supplement to the Corps of Engineers Wetland  
Delineation Manual, Caribbean Islands Region, Including Responses  
by the U.S. Army Engineer Research and Development Center  
(ERDC) and the Caribbean Islands Working Group**

The following individual reports were submitted by the four members of the Independent Peer-Review Team for the draft interim Caribbean Islands regional supplement. Their comments were compiled, sorted, and summarized by José A. Cedeño-Maldonado, U.S. Army Corps of Engineers, Antilles Regulatory Section. Responses to the peer-review comments were developed by ERDC in cooperation with the Caribbean Islands working group and are shown in *blue italic type* on the following pages.

The Corps of Engineers thanks the Peer-Review Team for their thoughtful and well-reasoned comments.

Peer Review Team Report  
Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation  
Manual: Caribbean Islands Region (Draft for Peer Review and Field Testing 7-1-2008)

September 2008

I. Peer Review Team Members:

- Luis U. Pérez-Alegría, PhD, Professor, Agricultural & Biosystems Engineering, University of Puerto Rico, Mayagüez, Puerto Rico
- Jorge L. Coll-Rivera, CRE, Environmental Consultant, Puerto Rico
- Antonio A. Vázquez-Berrios, PhD, Environmental Consultant, Puerto Rico
- Amy Claire Dempsey, BiolImpact, Environmental Consultant, U.S. Virgin Islands

II. Background

On July 10, 2008, each of the members of the Peer Review Team was provided with a copy of the Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region (Draft for Peer Review and Field Testing 7-1-2008). The members of the team were asked to individually review the document and within 45 days provide a report including their questions, comments or recommendations about any of its contents and sections.

The first report from the Peer Review Team was received on August 6, 2008. The last report was received on September 3, 2008. Copies of the individual reports are attached hereto for reference.

José A. Cedeño-Maldonado, Project Manager from the Antilles Regulatory Section, Jacksonville District, U.S. Army Corps of Engineers, served as Peer Review Team Leader. Mr. Cedeño-Maldonado coordinated with the members of the team during the review process and received, edited and consolidated their individual comments into the present summary report.

III. Summary of Comments and Recommendations

A. General Comments and Recommendations

1. Two reviewers recommended conducting a validation study of the proposed changes to determine their impacts on JDs in the region, with the participation of personnel from the Corps, as well as from other agencies.

*Response: We agree. The draft regional supplement will be field-tested by interagency teams coordinated by the Corps of Engineers Antilles Regulatory Section. Field testing will follow a protocol developed by the National Advisory Team, and any changes in wetland boundaries will be identified and evaluated.*

2. One reviewer recommended that the Corps should conduct a series of workshops to educate personnel from other agencies and the public about the contents and stipulations of the Supplement.

*Response: We agree. The Corps' Jacksonville District, Antilles Regulatory Section, is responsible for training its own personnel on the new regional supplement before it is implemented. At the same time, the District will offer one or more orientation sessions for the general public and personnel of other agencies.*

3. One reviewer recommended including in the Supplement a table comparing the changes and differences between the 1987 Manual and the Supplement. The reviewer stated that the differences in the indicators from the two protocols are not clear from reading the Supplement, and that an explicit comparison of those differences would help the readers.

*Response: The supplement does not include such a comparison because it would be superfluous and possibly confusing for new users who do not need to know about previous guidance. However, such a comparison would be a valuable teaching tool in training sessions oriented toward more experienced delineators.*

4. One reviewer recommended that the Supplement should allow using the 1987 Manual protocol if the delineation could be performed with relative ease. The reviewer opined that the protocol proposed in the Supplement is somewhat close to a comprehensive delineation, which is time consuming and costly.

*Response: The supplement does not negate or supersede the 1987 Manual's sampling guidance. Routine approaches described in the 1987 Manual are still applicable to relatively simple delineations. The supplement provides additional recommendations based on local conditions and sampling preferences, and provides expanded and updated wetland indicators (which do replace those given in the 1987 Manual).*

5. One reviewer recommended that a Regulatory Guidance Letter should be issued before or once the Supplement is in use, to make clear that it describes the new methods and approaches that would be used to delineate wetlands for jurisdictional determinations.

*Response: When the regional supplement is finally approved and published, the Corps District will issue a Public Notice implementing the supplement for all wetland delineations done for Clean Water Act permits. The draft supplement has already been released on a Public Notice for comments and field testing.*

6. One reviewer stated that overall the Supplement is excellent and addresses many important concerns and issues that are specifically applicable to wetlands delineations in Puerto Rico and the Virgin Islands. The reviewer further indicated that many of wetland systems in this region have been highly altered due to the extensive sugar cane cultivation, and that it is very positive that the effects of those practices are directly addressed in the Supplement.

*Response: No response is needed.*

## B. Introduction

1. One reviewer stated that contrary to the statement provided at the Introduction, Page 5, paragraph 1, line 8, *Stahlia monosperma* is neither common or characteristic of any area in Puerto Rico. The reviewer indicated that this species is very rare, to the point that it has been included in the list of endangered species, and that in most cases, when present, is usually because it has been planted for propagation. The same reviewer further stated that *Stahlia monosperma* is classified as OBL in the National List of Plant Species that Occur in Wetlands, when it is in fact a dry coastal forest species and not an exclusive wetland species. The reviewer recommended revising the “Physical and Biological Characteristics of the Region” section of the Introduction, according to current literature and reports about the distribution of the species listed.

*Response: We will drop Stahlia monosperma from this list of “common or characteristic” species. Concerns about the indicator status of Stahlia monosperma are beyond the scope of this regional supplement. However, there is an ongoing review and update of the Caribbean wetland plant list that may result in changes to the indicator status of certain species.*

2. One reviewer recommended that Page 4 of the Introduction should state that Sugar Cane was also the dominant factor in the Virgin Islands, and that its agriculture shaped many of the habitats remaining today.

*Response: We will make the recommended change.*

3. One reviewer recommended that Page 4 of the Introduction should be revised to clarify that although the primary current land use in Puerto Rico may be agriculture, the existing situation in the Virgin Islands is different, even in St. Croix, where most of the land has been allowed to fallow and recuperate into secondary growth forest. The reviewer stated that there is very limited agriculture on St. Thomas and St. John, and that although St. Croix still has some grazing, it is diminishing rapidly. The reviewer further indicated that Residential Use is the primary land use in St. Thomas and in St. John outside the National Park.

*Response: We will make the recommended change.*

4. One reviewer recommended that Page 6 of the Introduction should be revised to clarify that inland fresh water wetlands in the Virgin Islands are rare, and that although a few natural ones can be found, they are usually associated with the damming of intermittent streams for agricultural ponds, which can be found scattered throughout the islands.

*Response: We will make the recommended change.*

### C. Hydrophytic Vegetation Indicators

1. One reviewer stated that the proposed vegetation index is too complicated and cumbersome to carry out in the field, and recommended that it should be kept simple.

*Response: It is not clear which hydrophytic vegetation indicator is of concern. The indicators range from very simple (Rapid Test for Hydrophytic Vegetation) to more complex (Prevalence Index). For most delineations, one of the simpler indicators should be applicable. However, one of the goals of the supplement is to increase the quality and reliability of the data submitted to the Corps in permit applications. Therefore, the supplement requires somewhat more thorough documentation of wetland determinations.*

2. One reviewer opined that having to mark (and leave the marks for future field verification) the many plots in the field that a Dominance Test would require could be overly costly and time consuming.

*Response: There is no requirement in the supplement to mark plot locations for future use. However, this would be useful to Corps wetland staff when they visit project sites to verify wetland boundaries and could avoid costly re-sampling of questionable areas.*

3. One reviewer recommended that FAC species should be included in the Rapid Test for Hydrophytic Vegetation (Indicator 1), so that there would be no need to go to the Dominance Test (Indicator 2), if all species are identified and ranked according to Reed (1988).

*Response: Indicators 1 and 2 represent different levels of effort and reliability in vegetation sampling. The Rapid Test is intended to minimize sampling time in obvious cases where only OBL and FACW plants dominate. In more borderline situations, the standard Dominance Test is needed to provide a more thorough analysis and more complete documentation of the hydrophytic vegetation decision. Including FAC plants in the Rapid Test would not negate the need for the Dominance Test, because wetlands often contain FACU or even occasional UPL dominants.*

4. One reviewer opined that a 5 feet radius plot for herbaceous species is too small, a recommended the establishment of a standard 30 feet radius plot for all strata. The same reviewer further indicated that although the Dominance Test could be more accurate, the 1987 Manual method of walking along a transect is faster and requires less field marking.

*Response: The consensus of the working group is that a 5-ft-radius plot for herbs is large enough in most cases, unless the vegetation is very patchy or diverse. However, this is only a recommendation and the user is free to use alternative plot sizes, if desired. A 30-ft-radius plot for all strata would be an acceptable alternative. The Dominance Test can be applied to data derived from plot sampling or more broadly based visual sampling of the entire vegetation unit, which is also allowed under the supplement. In each case, percent cover estimates are needed for all species that are observed. This does represent an increase in sampling rigor over the recommendations in the 1987 Manual, which only required that investigators identify and record the dominant species in the sampled area.*

#### D. Hydric Soil Indicators

1. One reviewer stated that some of the new Hydric Soil Indicators will result in a significant increase in wetland areas, because in many areas soils that did not meet the Hydric Soil Indicators of the 1987 Manual will now be able to meet the Hydric Soil Indicators of the Supplement. The reviewer said that for instance, soils in most of Puerto Rico's coastal and interior valleys planted in sugarcane with prolong growing season (up to five or six years) would now be considered hydric mainly due to the *Redox Depression* indicator, but that those same soils would not meet the current criteria of hydric soils.

*Response: The Redox Depressions (F8) hydric soil indicator is explicitly restricted to "closed depressions subject to ponding." Therefore, it would not be widely applicable to "soils in most of Puerto Rico's coastal and interior valleys ...." In general, the NTCHS hydric soil indicators are more stringent in their wording than those in the 1987 Manual and should result in fewer mistaken hydric soil determinations.*

2. One reviewer recommended including a reference to the USDA web site for the field indicators of hydric soils ([ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric\\_Soils/FieldIndicators\\_v6\\_0.pdf](ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric_Soils/FieldIndicators_v6_0.pdf)), as it would direct users to the most up-to-date descriptions of hydric soils indicators).

*Response: We agree. We cite the NRCS hydric soils web site in the introduction to the soils chapter (page 19 of the peer-review draft) for the latest version of the hydric soil indicators.*

3. One reviewer indicated that based on field experience in Puerto Rico and Texas, soil mottling on some sandy loam soils will disappear when the soils remain saturated for a significant period of time; however, soil mottling reappears once the soils dry out. Based on the above, the reviewer recommended that the Supplement should advise users to allow soil samples to dry before attempting to look for mottles in situations where vegetation and hydrology indicators are present but hydric soil indicators appear to be absent.

*Response: We agree. This advice is given in the first paragraph of page 24 and is repeated in the User Notes for many of the indicators that require redox concentrations (e.g., A11, A12, F3, F6).*

4. One reviewer opined that the recommended soil pit depth to at least 20 inches if no indicators are found in upper levels is too deep. The reviewer further indicated that the Supplement even recommends soil pits as deep as 40 inches in some cases, and that this could prove unnecessary, impractical and very difficult to achieve in many sites, especially during the dry season.

*Response: As explained in the supplement (page 23), excavation beyond a depth of 20 inches is relevant to only one indicator, A12-Thick Dark Surface, which is applicable only to soils with thick, very dark surface layers in which redoximorphic features near the surface are masked by organic matter. For all other soils, the maximum recommended excavation depth is 20 inches. A shallower soil pit may be sufficient for some indicators, but describing the soil profile to the full recommended depth can be important if a soil scientist must be consulted to assist in a hydric soil determination.*

## E. Wetland Hydrology Indicators

1. One reviewer opined that Surface Soil Cracks are not a good Secondary Indicator of Wetland Hydrology for Puerto Rico. The reviewer explained that heavy soils with high content of expansive clays will show cracks as a natural process. The reviewer added that most soils in the Lajas Valley crack due to that processes of expansion and contraction that renovates the soils, breaking hardpans and compacted layers due to heavy machinery. The reviewer stated that those soils are not located in wetlands. The reviewer recommended that if the purpose of this indicator is to identify shallow sediment deposition that shows cracks, it would be better to use the sediment deposition pattern as an indicator and not the existence of cracks in the soils.

*Response: Shallow surface cracking is good evidence that surface water was present in the recent past and, thus, is a reliable indicator of recent wetness. However, as explained in the User Notes, this indicator can also be found in nonwetlands that are wet only briefly or infrequently. Under the 1987 Manual and this supplement, such areas are not wetlands unless indicators of hydrophytic vegetation and hydric soil (and at least one additional secondary hydrology indicator) are present. The 3-factor*

*approach ensures that areas with indicators of only one or two but not all three factors will not be mistaken for wetlands. Thus, the nonwetland areas of the Lajas Valley will be identifiable by the lack of hydric soil or hydrophytic vegetation indicators even if surface soil cracks are present. Note that the Surface Soil Cracks indicator specifically excludes deep cracks due to shrink-swell action in clay soils. The indicator also applies to existing soils that pond water and not just to areas of new sediment deposition.*

2. One reviewer stated that as proposed the Dry-Season Water Table indicator may not always yield accurate results. To support this statement the reviewer explained that it should not be assumed that a 12 - 24 inch deep dry season water table will always become a 0 - 12 inch wet season water table. The reviewer added that water table and saturation fluctuate with weather patterns, and those fluctuations could occur within or outside wet or dry seasons. The reviewer further opined that wetland hydrology indicators should be resilient and maintained throughout the growing season (i.e. 365 days in PR).

*Response: The reviewer is correct that water tables fluctuate in response to weather patterns and that a dry-season water table of 12-24 inches may not always reflect a wet-season water table of 0-12 inches. However, this is the case often enough to justify the secondary status on this indicator, and the User Notes further recommend caution following unusually heavy rainfall events. In addition, the 3-factor approach ensures that areas with indicators of only one or two but not all three factors will not be mistaken for wetlands. A number of wetland hydrology indicators are seasonal (e.g., Surface Water, High Water Table, Saturation) and many can be erased by subsequent natural events and human disturbance. Therefore, it is not true that reliable indicators of wetland hydrology should be present throughout the growing season.*

3. One reviewer expressed complete concurrence with the Supplement statement that *the lack of an indicator is not evidence for the absence of wetland hydrology* and that in some cases the presence of a primary indicator, for example flooding or saturation, may also not be evidence of wetland hydrology. The reviewer indicated that this is a very important rule of thumb and should be stressed to insure that persons conducting the field investigations gather as much evidence as possible regarding hydrology before and during the site inspection.

*Response: We agree.*

4. One reviewer recommended advising the public to be careful in the use of aerial imagery for the interpretation of Hydrology Indicators. The same reviewer further recommended advising the public that the date and weather conditions prior to the time the imagery was taken should be carefully investigated and related to the observations in the images.

*Response: The User Notes to these indicators (B7 and C9) express the same cautions.*

5. One reviewer opined that the description of Wetland Hydrology Indicators in the Supplement is very clear and not very different from the 1987 Manual.

*Response: No response is needed.*

6. One reviewer commented that the discussion of the difference between land crabs and fiddler crabs on page 84 is excellent, because people often mistakenly assume wetlands when they see land crab (*Cardisoma*) burrows.

*Response: No response is needed.*

#### F. Difficult Wetland Situations

1. One reviewer indicated that some recommendations provided in the Supplement for managing “Specific Problematic Vegetation Situations” are impractical and should be reconsidered. As an example, the reviewer indicated that returning to a site during the wet season, removing livestock, and stopping agricultural practices to evaluate if hydrophytic vegetation indicators become present would be very costly, time consuming and difficult to achieve in most situations. The reviewer further stated that those actions could also bring other changes within the landscape, resulting in even more difficult delineations.

*2. Response: We don't agree that these options are always impractical. That depends on the circumstances. If a decision is not needed immediately, waiting until the wet season to evaluate wetland indicators on a difficult site is often a viable option. Exclusion of livestock from even a few square meters with a small, fenced enclosure is not costly although it would take time for vegetation to respond. We do not understand the comment that “those actions could also bring other changes within the landscape, resulting in even more difficult delineations.”*

3. One reviewer recommended that the procedures for managing Problematic Hydrophytic Vegetation should establish that sites with strong or primary hydric soil and wetland hydrology indicators are wetlands even if no hydrophytic vegetation indicators are present, without the need of any further detailed analytical steps. If only weak or secondary hydric soil or wetland hydrology indicators are present, then additional analytical steps, such as the ones recommended in the Supplement should be conducted.

*Response: The supplement does not recognize “strong” or “weak” hydric soil indicators. Furthermore, it is central to the 1987 Manual and the Corps/EPA wetland definition that wetlands support or be capable of supporting a hydrophytic plant community. Therefore, the supplement emphasizes procedures to evaluate vegetation even in disturbed and problematic situations. However, the 1987 Manual and the supplement*

*do allow wetland decisions based on hydric soils and wetland hydrology in limited cases where the undisturbed vegetation condition cannot be determined.*

4. One reviewer commented that as a result of sugar cane farming, which included repeated burning and deep plowing of the fields, extensive areas in the valleys and coastal plains of Puerto Rico present a confusing soil profile that often lacks horizons or has mixed horizons that include high contents of plant charcoal. The reviewer stated that in many cases the decomposing charcoal can leave signs that are very similar to hydric soil indicators, which complicate wetland delineations. The reviewer also indicated that very commonly the existing vegetation in those former sugar cane fields, whether wetlands or uplands, has very low diversity and is either almost exclusively dominated by Venezuelan grass (*Paspalum fasciculatum*), or by a maximum of two to four other species, the most common being Guinea grass (*Panicum maximum*), which is classified as FACU- in the National List of Plants that Occur in Wetlands. The reviewer added that for the most part there are very few FACU and almost no UPL species present in those areas. The reviewer alerted that if as proposed in the Supplement, a prevalence of FACU species is to be considered as a wetland indicator in those areas, the result would be essentially a two criteria method (i.e., soils and hydrology), rather than a three criteria method as is currently the case. Based on the above, the reviewer recommended expanding the discussion presented in the Lands Used for Agriculture and Silviculture section of the Difficult Wetland Situations chapter to address this particular situation in more detail. In addition, the reviewer recommended that if that change is implemented in the final Supplement, it should be publicized and explained in more detail, since it is the one with the greatest potential to cause problems in Puerto Rico.

*Response: We are aware that some soils in the islands contain charcoal and are otherwise highly disturbed due to long use for sugar cane production. However, it should still be possible to apply the hydric soil indicators given in the supplement or to use procedures given in Chapter 5 for problematic hydric soils. If the soil situation seems to be in conflict with the plant community and evidence of wetland hydrology, then a local soil scientist should be consulted. Venezuela grass (not listed) and Guinea grass (FACU-) have invaded disturbed areas, including wetlands, throughout the Puerto Rico coastal plain, displacing other wetland plants. One option given in the supplement (page 91) allows some of these areas to be identified as wetlands if (1) hydric soil indicators are present, (2) wetland hydrology indicators are present, (3) the site is in an appropriate landscape position, and (4) there is direct observational evidence that the site is inundated or saturated for 14 or more consecutive days during normal or drier-than-normal years. Depending upon the situation, other options may apply. These procedures are consistent with the 1987 Manual, which allows determinations based on soils and hydrology in situations where the plant community is highly disturbed or problematic.*

5. One reviewer stated that the Difficult Situations section is excellent. The same reviewer commented that the description of "Vegetation" on page 89 is very relevant to

the Virgin Islands, particularly to the south shore of St. Croix where extensive grazing has completely denuded vegetation, while adjoining lands still support black mangroves.

*Response: No response is needed.*

6. One reviewer recommended that the Difficult Wetland Situations chapter of the Supplement should be revised to include a discussion about a particular problematic situation, which is primarily present on outlying cays of the U.S. Virgin Islands, where the substrate of coastal mangrove wetlands consists of coral rubble and cobble with very limited soil, preventing the use of typical hydric soil indicators. The reviewer indicated that these types of wetlands can be found on Great St. James, Thatch Cay, and other cays in the region.

*Response: We agree and will add a description of “coral rubble and cobble soils” to Chapter 5.*

**Attachment 1**

**Individual Peer Review Team Members Comments**

**Antonio A. Vázquez-Berrios, PhD**

## **Comments about Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region**

### **Comments:**

**Introduction**, Page 5, paragraph 1, line 8

*Stahlia monosperma* is neither common nor characteristic of any area in Puerto Rico. It is very rare and has been included in the list of endangered species. In most cases, when present, is usually because it has been planted for propagation. Also, *Stahlia monosperma* is classified as **OBL** (*I don't quite agree with this classification*) in the most recent NWI plant list, hardly a dry coastal species. I recommend that this section, Biological Characteristics, be reviewed carefully regarding the species included in it in view of current conditions.

### **Hydrophytic Vegetation Indicators**

My only comment here is that most of the wetland areas in Puerto Rico are located in the coastal areas. These areas were for the most part used for sugar cane farming until about the mid-1970's, with a few being farmed for that purpose until the 1990's. Prior to harvesting the sugar cane plantations were burned. After harvesting the sugar cane plantations were deep plowed to bury the remains of the sugar cane plants. This process was repeated every year for at least 60 to 70 years in most coastal areas of Puerto Rico. As a result most of these areas present a confusing soil profile that many times lacks horizons or has mixed horizons that include lots of plant charcoal. In many cases the decomposing charcoal can leave signs that are very similar to hydric soil indicators. Many of these areas, whether wetland or upland, are currently almost completely dominated by Venezuelan grass (*Paspalum fasciculatum*) and, usually, are not dominated by a diverse plant community. In most cases the areas are **dominated** by a maximum of two to four species. In these areas the most common non-wetland species is Guinea grass (*Panicum maximum*) which is classified as **FACU**- in the NWI plant list. For the most part there are very few FACU and almost no UPL species present. If FACU species are to be considered as wetland indicators this would result in essentially a **two criteria method** for Puerto Rico, soils and hydrology, rather than a three criteria method as is currently the case. Most of the JD's in Puerto Rico are currently being done by consultants. Thus, I recommend that if this change is going to be implemented it be publicized and explained in more detail, as it is the one with the greatest potential to cause problems.

### **Hydric Soils Indicators**

Only two comments, first, I recommend that the following site be included in the document, [ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric\\_Soils/FieldIndicators\\_v6\\_0.pdf](ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric_Soils/FieldIndicators_v6_0.pdf). It directs users to the most current hydric soils indicators list. I'm very glad to see the proposed changes as this will bring us up to date on the most current scientific research on this matter. Second, it has been my experience in some sandy loam soils in Puerto Rico and Texas that soil mottling will disappear when the soils remain saturated for a significant period of time; however, soil mottling reappears

once the soils dry out. If hydrophytic vegetation and hydrology indicators are present but hydric soil indicators appear to be absent the soil sample should be allowed to dry out to determine if mottles are present.

### **Wetland Hydrology Indicators**

I totally concur that *the lack of an indicator is not evidence for the absence of wetland hydrology* and that in some cases the presence of a primary indicator, for example flooding or saturation may also **not** be evidence of wetland hydrology. This is a very important rule of thumb and should be stressed to insure that persons conducting the field investigations gather as much evidence as possible regarding hydrology before and during the site inspection.

The aerial imagery should also be used with great care. The date and weather conditions prior to the imagery should be carefully investigated.

## **Comments to Draft Interim Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region**

### **Hydrophytic Vegetation Indicators**

- ❖ I believe that having to mark (and leave the marks for future field verification) the many plots in the field that a Dominance Test would require is costly and time consuming.
- ❖ FAC species should be included in the Indicator 1: Rapid test for hydrophytic vegetation, so that there will be no need to go to the Indicator 2: Dominance test, if all species are identified and ranked according to Reeds (1988).
- ❖ If having to perform the Dominance Test, I think a 5 feet radius plot for herbaceous species is too small. A 30 feet radius for all strata should be better. In this regard, I think that the 1987 Manual method of walking along a transect is faster and requires less marking, nevertheless, the Dominance Test is more accurate.

### **Hydric Soil Indicators**

- ❖ I believe the recommended soil pit depth to at least 20 inches if no indicators are found in upper levels is too deep. The Supplement even includes going down to 40 inches deep. This is very difficult to achieve in many non obvious wetlands, especially in the dry season.

### **Wetland Hydrology Indicators**

- ❖ I think the Supplement is clear in this regard and it is not very different from the 1987 Manual.

## General Comments

- ❖ In general, I think the Supplement should give the freedom to use the 1987 Manual if the delineation can be performed with relative ease. The Supplement is somewhat close to a comprehensive delineation, which is time consuming and costly.
- ❖ There are some recommendations that need to be reconsidered or work differently. For instance, going back to the site during wet season; removal of livestock, and stop agricultural practices to evaluate if hydrophytic vegetation indicators became present might be very costly and time consuming. These actions may also bring other changes within the landscape resulting in even more difficult delineations.
- ❖ A site with strong or primary hydric soil and wetland hydrology indicators should be considered jurisdictional even if no hydrophytic vegetation indicators are found. If weak or only one of the secondary indicators is found, then it must have OBL or FACW species to be jurisdictional.
- ❖ Leaving the decision on soils and hydrology only may work well in contemporary wetlands. However, a determination of what constitute a contemporary wetland is needed (how old or recent it should be).

A Regulatory Guidance Letter will be needed before or once the Supplement is in use, given that it will make clear that these are the new methods and approaches to wetland delineations. Also, field validation and trial of the Supplement with your personnel and other field agencies, as well as a future workshop is greatly recommended.

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August 23, 2008

Comments on Supplemental Delineation Manual

1. Page 4: Sugar Cane was also the dominant factor in the Virgin Islands and its agriculture shaped many of the habitats remaining today.
2. Page: The primary land use in Puerto Rico may be agriculture, but is not in the Virgin Islands, not even in St. Croix, most of the land has been allowed to go fallow and it has re-colonize into secondary growth forest. There is very limited agriculture on either St. Thomas or St. John. St. Croix still has some grazing, but even that is diminishing rapidly. Residential use is the primary land use in St. Thomas and in St. John outside the National Park.
3. Page 6. Inland fresh water wetlands in the Virgin Islands are usually associated with the damming of intermittent streams for agricultural ponds. These can be found scattered throughout the islands. There is also natural fresh water wetland which I am aware of near Coki Point in St. Thomas which was not the result of agricultural damming. This wetland is wooded and dominated by Pond Apple (*Annona glabra*).
4. The discussion of the difference between land crabs and fiddler crabs on page 84 is excellent. Inevitably people often assume wetlands when they see land crab (*Cardisoma*) burrows.
5. The Difficult Situations section is excellent. In the description of "Vegetation" on page 89 is very relevant to the south shore of St. Croix where extensive grazing has completely denuded vegetation, while in the next pasture over black mangroves grow along the fence line separating the two. An excellent example of wetlands affected by grazing are the coastal wetlands in Estate Longford on the south shore of St. Croix. I can provide photographs if needed.
6. I was hoping to see a discussion of the coastal mangrove wetland which occurs primarily on the outlying cays which have limited soil and the mangroves are growing in coral cobble. This type of wetlands can be found on Great St. James and Thatch Cay, and previously on Lovango. I can provide photographs if needed.

Overall I feel the Supplement is excellent and addresses many of the specific concerns I have seen here in the Virgin Islands as well as in Puerto Rico. Many of our systems have been highly altered by man due to the extensive sugar cane cultivation and it is good to see the effects of those practices addressed.

Respectfully submitted,

  
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## Comments about Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region

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### Introduction

I will narrow my comments primarily on two of the three wetland indicators described in both the Corps 1987 Manual and the Interim Regional Supplement, the Hydric Soils indicators and Wetland Hydrology.

Redox Depression. It seems that the propose change will reduce to 4 in within the top 6 in from soil surface where the indicator applies in a soil pit to meet most of the hydric soil indicators. This propose change will cause a significant increase in areas that did not meet the hydric soil requirement in the 1987 Manual. For instance, most of the coastal and interior valley planted in sugarcane with prolong growing season (up to five or six years) will develop *redox depression* in the top soil layer, but as it is now they do not meet the criteria of hydric soil by the same NTCHS.

On the other hand, it would be very helpful to conduct a validation study of the propose changes to determine their impacts on the territory.

### Hydrology

#### Surface Soil Craks

The document seems to indicate if the soil surface shows cracks is a good secondary indicator of wetland hydrology. I disagree. Heavy soils with high content of expansive clays shows cracks as a natural process. Most soils in the Lajas Valley crack due to that process of expansion and contraction that renovates the soils breaking hardpans and compacted layers due to heavy machinery. These soils are not wetlands.

If the purpose of this indicator is to identify shallow sediment deposition that shows cracks, it is better to use the sediment deposition pattern as indicator and not the existence of cracks in the soils.

#### Dry Season Water Table.

The document is proposing to monitor the water table and if within 12-24in from the surface during dry season the document “guess” that the water table will be within 12 in

during the wet season. Although it seems logical it is based on pure “educated guesses”. Water table and saturation fluctuates with weather pattern. But wetland hydrology indicators should be resilient and maintain throughout the growing season (i.e. 365 days in PR).

I would like to have seen a table comparing the 1987 Manual and the proposed changes in this document. It is not clear from reading this document what is the difference in the indicators. This would help the reader.

I also think the proposed vegetation index is complicated and very cumbersome to carry out in the field. The procedure should be kept simple to keep it strong.