Peer Review Summary for Arid West Supplement to 1987 Corps of Engineers Wetland Delineation Manual

The Peer Review Team (the Team) consisted of George Ruffner, Richard McEldowney, Michelle Stevens, David Blauch, Maryann McGraw, Nancy Keate, Charlie Newling, and Terri Skadeland. In addition to the reviewers on the Team, Stephanie MacDonald provided critical assistance with organizing comments into the attached Excel spreadsheet. Team members were selected to represent a cross-section of the physical diversity-e.g. landscapes, elevation, climate-found in the Arid West Region and for their experience and areas of expertise in delineating wetlands. The Team met through a series of five conference calls. Each conference call focused on a particular chapter or chapters of the Arid West Supplement (the Supplement). Applicants who were not selected for the Team were notified by either email or U.S. Postal Service mail.

This summary will present the major points from each chapter as well as a section on overall comments on the Supplement. All comments submitted by individual Team members are in the attached spreadsheet.

Responses to the Peer-Review Team's (PRT) detailed comments were developed by the U.S. Army Engineer Research and Development Center (ERDC) in cooperation with the Arid West Working Group, and are shown in column G of the accompanying spreadsheet. In addition, general responses to the PRT's summary comments are inserted below in italics. See the accompanying spreadsheet for details.

Preface: Two reviewers commented on the composition of the group who authored the Supplement. Although there was not consensus in the specific comments, most of the group thought some non-government representatives would have been an asset on the group.

Response: Private sector wetland experts were given the opportunity to contribute to this document by serving on the PRT and providing individual comments during the public comment period. The Corps recognizes that considerable wetland expertise exists in the private community and appreciates the input it has received, which has resulted in a number of revisions to the document. These are addressed in the spreadsheet.

Chapter 1, Introduction: The Team would like to see clarification on appropriate use of the Supplement in two ways. First, we wondered if the delineator has the authority to pick the best suited Supplement for locations that don't fit in the regions delineated on the maps or if deviation from mapped regions requires Corps of Engineers approval. Second, although the Supplement clearly states the Supplement supersedes the 1987 Manual where differences occur, we were concerned that delineators with little or no experience using the 1987 Manual

may pick up the Supplement and attempt to use it as a stand-alone document, not knowing when they need to refer back to the 1987 Manual. Cross-references to the 1987 Manual, where material from that Manual is still in effect, would improve ease of use of the Supplement.

Response: Chapter 1 of the Regional Supplement has been revised to clarify (1) what limited portions of the 1987 Manual are replaced by guidance given in the Regional Supplement, and (2) in what locations the Arid West Regional Supplement is applicable and in what locations the Western Mountains, Valleys and Coast Regional Supplement (in preparation) is applicable. Corps Districts have final authority over the use and interpretation of these supplements in their areas of responsibility. The Regional Supplement is designed to be used with the 1987 Manual and should not be used as a stand-alone document for identifying wetlands.

Reviewers provided numerous comments on how to improve the Irrigated Wetlands section in the Introduction. Suggestions for improvement ranged from total elimination of the section to complete re-writing. Although the Team didn't agree, on how to re-write this section, we did agree to recommend paring the section down to a short discussion (one or two paragraphs) on irrigated wetlands. This short discussion should not attempt to describe all the different types of irrigation systems.

Response: The section on irrigated wetlands has been shortened.

Chapter 2, Vegetation: The Team generally did not like the number one definition of growing season that begins, "The growing season has begun in spring when plants comprising…" The Team majority opinion was to keep the existing definition (#2) or, if both definitions are used, make #2 the higher priority definition. The reasons for this recommendation are that growing season beginning and ending dates are readily available in local soil surveys and in WETS tables (ftp://ftp.wcc.nrcs.usda.gov/support/climate/wetlands/), and that length of growing season is currently used to make wetland hydrology calculations. The link to WETS tables should be included.

Response: The growing season definition based on observed growth of vascular plants has been revised using wording developed by the National Advisory Team (NAT). Both the NAT and the Arid West Working Group believe that direct observation of plant growth should be given the same status as direct measurement of soil temperature in on-site determinations of the start of the growing season. Air-temperature data given in WETS tables will continue to be the standard for off-site growing-season determinations. Length of growing season is no longer needed for wetland hydrology decisions. The Regional Supplement adopts the National Academy of Sciences recommendation of a fixed 14-day duration requirement for inundation or saturation when long-term hydrologic measurements are needed on highly disturbed or problematic sites.

With one exception, all reviewers were concerned about ignoring the + and – modifiers to a plant's hydrophytic indicator status when deciding whether or not a plant is hydrophytic. This has the potential to change jurisdictional reach of the Supplement. The + and – were used when the plant lists were compiled by a panel of experts. It is not appropriate to ignore these parts of the plant lists. Any changes to the lists need to go through established procedures to change the status of a given plant. Only if the official plant list is revised and the + and – are removed is it appropriate to ignore them. A link to the "official" plant list is needed in this section. See: http://wetlands.fws.gov/plants.htm.

Response: The main problem with '+' and '-' modifiers is that they imply a level of accuracy in wetland-indicator-status assignments that does not exist in reality. Most of these assignments were made by consensus of plant panels in the absence of quantitative data. It is difficult enough to place each species in one of 5 categories (OBL, FACW, FAC, FACU, or UPL); it is unreasonable given existing data to place each species accurately in one of 11 categories (OBL, FACW+, FACW, FACW-, FAC+, FAC, FAC-, FACU+, FACU, FACU-, or UPL). Furthermore, the assignment of '+' and '-' modifiers was commonly used by plant panels simply to resolve differences of opinion among members. Dropping the '+' and '-' modifiers has the potential to affect hydrophytic vegetation decisions, particularly for FAC species. However, the overall effect on jurisdictional reach is likely to be neutral given the changes in other wetland indicators, particularly the adoption of the NTCHS Field Indicators of Hydric Soils, which are more narrowly worded than those in the 1987 Manual. Field testing will determine whether the simplification of wetland indicator categories will have any significant effect on wetland boundaries after soil and hydrology indicators are also taken into consideration. During initial field testing of the supplement, only 1 out of 24 test sites across the Arid West showed a change in the delineated wetland boundary due to dropping '+' and '-' modifiers. Further testing of the supplement is planned during the interim implementation period.

Most reviewers felt the species area curves would not be useful in making routine determinations and making the required calculations in the field would be burdensome. If the curves are relevant to the 50/20 rule or the Prevalence Index, the connection needs to be shown, otherwise they should be deleted.

Response: The Arid West Working Group has deleted the section on species-area curves.

We discussed plot size and shape and agreed only that the delineator needs to know how much flexibility is allowed. Generally, we felt the Supplement discussion on flexibility in plot shape is a positive addition and will more closely fit what delineators are already doing when attempting to find wetland boundaries.

Response: None needed.

Most reviewers wondered why the section on snow and ice was included in the Arid West Supplement where many parts of the region rarely or never see snow. We wondered how commonly delineators make off-site, preliminary determinations, as described in this section, if an on-site delineation must be made at a later date. If this section is retained, a reference to some procedures for making off-site determinations is needed. One such reference is the NRCS Engineering Field Handbook, Chapter 19, Remote Sensing section beginning on page 19-24 (http://www.info.usda.gov/CED/ftp/CED/EFH-Ch19.pdf).

Response: Snow and ice occur in some portions of the Arid West Region and, therefore, the section is relevant. Guidance for off-site wetland determinations is given in the 1987 Manual. In addition, the NRCS document "Hydrology Tools" is cited in Chapter 5 (Difficult Wetland Situations).

In the section on hydrophytic vegetation indicators, we had a couple of requests to make the Prevalence Index (PI) the preferred method used to decide if a wetland passes the hydrophytic vegetation test. Others didn't express an opinion on PI vs. 50/20 rule.

Response: The Arid West Working Group considered this issue and decided to leave the 50/20 rule and dominance test as the primary indicator of hydrophytic vegetation. This follows the format of the 1987 Manual.

The Team was concerned about misuse of morphological adaptations where factors other than wetness may cause the same morphological response in plants. In the hands of an over zealous delineator, we were concerned morphological adaptations could be used to find hydrophytic vegetation where it really doesn't exist. The list of morphological adaptations should list specific adaptations that are acceptable and not leave this open ended as it currently is worded on page 19 ("Common morphological adaptations in the Arid West include but are not limited to"). This section should explain more completely how to determine whether wetness or other conditions are causing an observed morphological adaptation. If this cannot be done, then morphological adaptations should not be an indicator of hydrophytic vegetation.

Response: The 1987 Manual already uses plant morphological adaptations as an indicator of hydrophytic vegetation. The Regional Supplement attempts to reduce errors and prevent "overzealousness" by requiring that (1) most individuals of the species must show these adaptations within the potential wetland area and (2) the community as a whole must still pass the dominance test or prevalence index after the indicator status of a species showing such adaptations is reconsidered. Furthermore, the three-factor approach involving indicators of hydric soil and wetland hydrology ensures that areas containing species that have similar morphological characteristics for reasons other than wetness will not be identified as wetlands.

Several members of the Team felt the vegetation chapter was biased toward finding hydrophytic vegetation in cases when the indicators don't clearly point toward or against a predominance of hydrophytic vegetation.

Response: This is not intended and, we believe, is clearly wrong. The Regional Supplement adds only one additional hydrophytic vegetation indicator beyond those already given in the 1987 Manual: the prevalence index. The Regional Supplement also drops the Manual's ill-defined "physiological adaptations" and "reproductive adaptations" indicators. The Regional Supplement allows the use of the prevalence index and morphological adaptations only in areas that exhibit indicators of hydric soil and wetland hydrology but initially fail the dominance test. The prevalence index has a long history in the scientific literature and in applications by other agencies. It is known to be a conservative indicator (i.e., most plant communities that pass the prevalence index would also pass the Manual's dominance test). Its purpose in the Regional Supplement is to reduce certain "problem" wetland situations whose dominant species would fail the dominance test even though most of the species present (non-dominant plants included) are clearly hydrophytic. In addition, see the previous response concerning the tightening of the morphological adaptations indicator. The overall effect is greater accuracy and consistency of hydrophytic vegetation determinations. Furthermore, the three-factor approach involving indicators of hydric soil and wetland hydrology as well as hydrophytic vegetation ensures that areas containing one but not all three essential wetland factors will not be identified as wetlands.

Chapter 3, Soils: We thought the photographs showing hydric soil indicators are useful and add to this chapter. Photos of all the indicators would further enhance this chapter.

Response: We lack photos of some indicators taken within the region. However, we will reprint photos from the NTCHS Field Indicators publication.

Although we liked the photos of indicators, we had a concern with including a list of Field Indicators currently in effect in the Supplement. The Field Indicators of Hydric Soils change frequently, so the list in the Supplement may be outdated very quickly. If the current indicators are included in the Supplement, it should be explained that the newest list of Indicators (http://soils.usda.gov/use/hydric) needs to be consulted before using the ones in the Supplement to be sure they are still valid.

Response: We agree and have included the link to the NRCS hydric soils web site. Indicators are included in the Regional Supplement for completeness and to allow the User Notes for each indicator to be tailored to the region.

We had a general concern with this chapter and the use of circular reasoning/logic to determine if hydric soil is present. This is particularly evident on page 23 where six examples of additional site information are presented - hydrology, slope, slope shape, landform, soil materials, and vegetation – that may be used in making a hydric soils call. We were unsure if any one of these may be used alone, in the absence of hydric soil indicators, to determine that a site has hydric soils. If these are stand-alone measures of hydric soil, then this presents the same type of bias toward finding hydric soils as was noted in the vegetation chapter.

Responses: The items listed on page 23 are not hydric soil indicators. They are landscape factors that may help the delineator to understand why hydric soils develop in certain places in the environment, and are intended to help prevent erroneous hydric soil determinations. We will clarify the wording.

Reviewers had a number of suggestions on improving the readability or clarity of indicators. The Team generally agreed that these comments were valid and clarification is needed as noted in the comments on the spreadsheet.

Response: See detailed responses in the spreadsheet.

Chapter 4, Hydrology: The 1987 Manual used 5% to 12.5% of the growing season as the minimum duration of wetland hydrology needed to meet hydrology criteria. Now we have a flat 14 days duration used throughout this chapter. There is no explanation or cross-reference back to the 1987 Manual, so we wondered if the 1987 Manual no longer applies or if 14 days is an additional option the delineator may use if he/she chooses. This needs to be clarified. We also wondered if there is a better way to determine minimum duration of hydrology that takes into account the arid conditions specific to the Region.

Response: As stated earlier, we have clarified in Chapter 1 the relationships between this Regional Supplement and the 1987 Manual. This includes the adoption of the National Academy of Sciences' recommended 14-day duration standard for wetland hydrology when direct hydrologic measurements are needed to determine whether wetland hydrology exists on highly disturbed or problematic sites. The Supplement allows for the development of alternative standards for wetland hydrology in a region, but the Arid West Working Group is not proposing any alternative regional standard at this time.

Reviewers had a number of comments on the indicators where more clarification is needed. For example, how does the delineator decide if drainage patterns are a result of wetland hydrology or just an isolated downpour that resulted in runoff? The Team generally agreed that these comments were valid and clarification is needed as noted in the comments.

Response: See detailed responses in the spreadsheet.

Chapter 5, Difficult Situations:
The Team was confused by the mention of Ordinary High Water (OHW) and Other Waters (OW) in this chapter (last 2 sentences on page 80 through page 82). OWs are outside the scope of this Supplement and the 1987 Manual, but, this part says these OWs should be identified if they are part of a wetland complex. If OWs are to be identified using this Supplement, then additional guidance on how to identify them needs to be included.

Response: The Arid West Working Group felt it necessary to mention other potentially regulated waters of the United States in the Regional Supplement because of the interspersion of wetlands and other waters on many sites in the Arid West. However, a description of OHW indicators is beyond the scope of this Supplement. If additional information is needed, investigators should consult the appropriate District regulatory office.

Several reviewers were concerned with the information on early season germination of upland plants on page 85. Again, this appears to be an attempt to expand the definition of hydrophytic vegetation, without regard to the indicator status on the National plant lists.

Response: That was not the intent. However, the Arid West Working Group has decided to delete this section from the Regional Supplement.

General Comments: The Team agrees with the concept of regionalizing the 1987 Manual in order to improve the quality of wetland delineations.

Response: None needed.

Throughout the Supplement the Team noted areas which seem to show a bias toward finding wetlands rather than objectively evaluating vegetation, soils, and hydrology. Examples are noted above in the soils and vegetation discussions.

Response: On the contrary, wetland indicators presented in the Regional Supplement usually incorporate greater quantification or greater documentation and less flexibility than those given in the 1987 Manual, particularly for hydric soil indicators and certain hydrophytic vegetation indicators. This will require better training of delineators and somewhat greater effort in the field. However, the goal is to improve both the accuracy and regional sensitivity of wetland delineations.

Additional suggested improvements to the Supplement follow.

We would like to have a glossary section added.

Response: This Regional Supplement relies on the glossary given in the 1987 Manual and other cited sources. We have added a glossary for the most important terms used in the Supplement.

Cross-references between the Supplement and the 1987 Manual need to be added where the 1987 Manual is intended to be used in addition to the Supplement. For example, the Routine Method is described in the 1987 Manual, but is not mentioned in the Supplement. We assumed the Routine Method is still expected to be used, but the Supplement should refer to it rather than just assuming everyone will know this. In places where the Supplement supercedes the 1987 Manual, this needs to be stated.

Response: As stated previously, Chapter 1 of the Regional Supplement has been revised to clarify its relationship to the 1987 Manual. The Regional Supplement does not replace the Routine or Comprehensive methods described in the 1987 Manual.

More references are needed, to both web pages and the scientific literature.

Response: Additional web links are provided and essential references are cited. However, the Regional Supplement is not intended to be a comprehensive reference on wetland types in the Arid West or on general ecological sampling methods. See detailed responses in the spreadsheet.

The Supplement needs one overall editor so that it sounds like one person wrote it rather than a committee.

Response: The Regional Supplement will be edited for consistency and format by ERDC editors.

This concludes the summary of Team comments on the Supplement. All Team members appreciated the opportunity to help improve the Supplement and make it into a useful, working document.

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