State Guidance for Wetland Determinations
Including State Offsite Methods
South Dakota Natural Resources Conservation Service

For the 1985 Food Security Act, as amended.
Revised March 2018

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SECTION 1

1.0 INTRODUCTION

The purpose of this document is to provide guidance to agency experts to maximize consistency and accuracy of wetland determinations. Included in this document are supplemental wetland identification procedures defined as State Offsite Methods (SOSM). The SOSM contain "state procedures" which are used in addition to existing NRCS methods for rendering decisions under either of these situations:

1) Routine - onsite inspection is unnecessary,
2) Section F situations, and/or
3) Section G situations, including Chapter 5 of the Regional Supplements.

Additionally, this document provides guidance related to the assignment of WC labels and sizing.

1.1 OVERVIEW OF USDA WETLAND IDENTIFICATION PROCEDURES

The 1985 Food Security Act (FSA), as amended, (Act) requires producers participating in most USDA programs to comply with the Wetland Conservation (WC) Compliance Provisions at 7 CFR, Part 12. The 2014 Farm Bill re-linked the WC Compliance provisions to crop insurance premium subsidies. To remain eligible for USDA program benefits, producers must not plant an agricultural commodity on a wetland converted after December 23, 1985, or convert a wetland to make possible the production of an agricultural commodity after November 28, 1990. The Natural Resources Conservation Service (NRCS) assists producers with meeting their WC Compliance responsibilities by issuing certified wetland determinations. Certified wetland determinations identify the location of all wetlands on their land and the scope of protection that must be provided in order for a producer to maintain eligibility for USDA program benefits.

The NRCS completes certified wetland determinations for the purpose of implementing the Act. This document incorporates, by reference, the current versions and pertinent sections of the following documents:

1) National Food Security Act Manual (NFSAM)
2) FSA Wetland Identification Procedures ("FSA Procedures" are within the NFSAM)
3) 1987 United States Army Corps of Engineers (USACE) Wetland Delineation Manual, Technical Report Y-87-1 ('87 Manual)
4) USACE Regional Supplements (Great Plains, Northcentral\Northeast and Midwest) to the '87 Manual
5) Title 210 Engineering, National Engineering Handbook (NEH), Part 650, Engineering Field Handbook (EFH), Chapter 19 - Hydrology Tools for Wetland Determination

1.2 OVERVIEW OF STATE OFFSITE METHODS (SOSM)

The NRCS has established wetland identification procedures in the NFSAM. Part 527 of the NFSAM, titled "Food Security Act Wetland Identification Procedures," explains how the NRCS utilizes methods contained in portions of the 1987 Corps Manual, the USACE Regional Supplements, the regulations found in 7 CFR, Part 12, and the procedures (Part 527 of the NFSAM).

The procedures in this document take into account unique regional, state, and local wetland characteristics. As directed by the Secretary of Agriculture, this document was developed to be consistent across the states in the Northern Plains portion of the Prairie Pothole Region . This document adheres to regulations and policies in effect as of the date of issuance of this document, but may be subject to change.

1.3 OVERVIEW OF FOOD SECURITY ACT WETLANDS

As defined by Congress in Section 1201(b) of the Act, "*the Secretary shall develop:*

(1) Criteria for the identification of hydric soils and hydrophytic vegetation; and

(2) *Lists of such soils and such vegetation*."

Pursuant to this statutory framework, the NRCS procedures for making a wetland determination follow a basic three-step process:

<u>Step 1 – Wetland Identification – Normal Circumstances</u>
During the first step of wetland identification, the NRCS determines whether the site (sampling unit(s)) meet the Act's definition of wetland "under normal circumstances." Normal circumstances are those conditions (vegetation, soils, and hydrologic conditions) that would occur in the absence of any post-1985 drainage actions, without regard to whether the vegetation has been removed or significantly altered, and during the wet portion of the growing season under normal climate conditions.

The NRCS consults two sources of information when making a decision whether an area would, under normal circumstances, meet the Act definition of a wetland:

1) Regulations found in 7 CFR, Part 12,
2) Food Security Act Wetland Identification Procedures, located in the National Food Security Act Manual (NFSAM) Appendix

The Food Security Act Wetland Identification Procedures do not contain wetland determination methods. Therefore, the NRCS utilizes existing methodology found in the 1987 Corps Manual and its Regional Supplements. The NRCS adopted portions of the 1987 Corps Manual which include Paragraph 23 of Part I: Introduction, and Part IV: Methods.

<u>Step 2 – Determination of Act Exemptions/Labels</u>
In this step the agency expert (AE) uses the wetland/non-wetland map produced from Step 1 (wetland identification) and labels each of the polygons on the wetland map based on Act exemptions. Each exemption has specific "conditions," many of which tie back to the date of enactment of its various provisions (i.e., December 23, 1985, and November 28, 1990).

<u>Step 3 – Sizing of Wetlands</u>
Size of the wetland/non-wetland areas and the areas meeting Act exemptions is determined by examining data sources and the information gathered in a site visit, if one was made.

1.4 OVERVIEW OF DEFINITIONS USED BY THE NRCS TO IMPLEMENT THE ACT

Wetland:
For Act purposes, the term "wetland" is defined in 16 U.S.C. Section 3801(a)(18) as land that—

A) Has a predominance of hydric soils.
B) Is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.
C) Under normal circumstances supports a prevalence of such vegetation.

For the purposes of FSA and any other act, this term does not include lands in Alaska identified as having high potential for agricultural development, and that have a predominance of permafrost soils.

"*This definition is unique to the statute, and all decisions regarding the identification of FSA wetlands must be based on this definition. The statute adds further clarity to the concept of an FSA wetland by defining "hydric soil" and "hydrophytic vegetation" (as those concepts will be applied to the WC provisions) and by the specific direction given to the Secretary as to the hydric soils and hydrophytic vegetation criteria that must be developed by USDA (16 U.S.C. Section 3801(b)(1)).*"

Normal Circumstances
Wetland identification decisions are based on conditions that are expected to occur under Normal Circumstances. The FSA Procedures paragraph (2-10) define Normal Circumstances (NC) as, "*The soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed (7 CFR Section 12.31(b)(2)(i)). For FSA wetland identification purposes, this concept is the consideration of normal and abnormal climate-based site changes and natural and artificial disturbance-based site changes that can create wetland identification challenges. "Normally present" is further explained as the vegetative, soil, and hydrologic conditions that occur under both of these conditions:*

a. *Without regard to whether the site has been subject to drainage actions (see drainage definition) after December 23, 1985, and without regard to whether the vegetation has been removed or significantly altered.*
b. *During the wet portion of the growing season under normal climatic conditions (normal environmental conditions)."*

The FSA Wetland Identification Procedures paragraph (2-11) defines Normal Environmental Conditions (NEC) as. "*The climate-based concept of NC, defined as the physical conditions, characteristics (hydrology, soil, and vegetation), or both that would exist in a typical situation (2-12) on a site during the wet portion of the growing season in a normal climatic year.*"

Normal Circumstances, as used in the FSA Procedures wetland definition, requires that decisions be based not on anomalies, but rather what would normally occur on the sampling unit in the absence of post-December 23, 1985, disturbance, and during Normal Environmental Conditions (NEC). In the 1987 Army Corps of Engineers Wetland Manual and Regional Supplements (Corps methods), the concept of "normal" is separated into the disturbance-based concept of normal circumstances (typical/atypical situations) and the climate-based concept of

normal circumstances (NEC). The NRCS adopts this concept that a determination of "normal" is a two-pronged consideration (FSA Procedures paragraph (3-4)). For FSA purposes the AE will determine the normal circumstances (NC) of the sampling unit as those that would be expected to occur,

(1) In the absence of post-12/23/1985 drainage actions that alter the normal soil or hydrologic conditions.
(2) In the absence of an alteration (removal or change) in the plant community such that a decision cannot be made if the site would support a prevalence of hydrophytic vegetation if undisturbed.
(3) During the wet portion of the growing season during a year experiencing normal weather patterns.

Wetland Indicators

In the absence of direct evidence, the decision if a sampling unit meets a particular diagnostic factor (wetland hydrology, prevalence of hydrophytic vegetation, and a predominance of hydric soils) is assisted by confirmation of the presence of indicators. The use of indicators to predict the conditions that would occur under NC is referred to as the "indicator-based approach to wetland identification." Indicators can be obtained from remote data sources, site visits, or both.

The NRCS utilizes the indicator-based approach to assist in decision-making. The ultimate decision if a site meets the FSA criteria for any of the three diagnostic factors is made from a preponderance of evidence, best professional judgment, and the FSA definitions, criteria, or both, of hydrophytic vegetation, hydric soils, and wetland hydrology (FSA Wetland Identification Procedures paragraph (4-3)).

According to Paragraph (4-4) of the FSA Wetland Identification Procedures, "*The decision if the site is an FSA wetland is ultimately rendered based on the determination of a presence or absence of each of the three factors under NC. Areas determined to support wetland hydrology, a prevalence of hydrophytic vegetation, and a predominance of hydric soils (all under NC), as each factor is defined by the FSA, are wetlands subject to the WC provisions of the act*."

SECTION 2

2.0 FSA WETLAND DETERMINATION PROCESS STEP 1: WETLAND IDENTIFICATION

Wetland determinations are technical decisions resulting from the determination of whether or not an area is identified as a wetland, including a determination of the appropriate WC Compliance label and size (FSA Procedures paragraph (2-18)). Therefore, the NRCS identifies three unique and separate steps to the wetland determination process. Within the first two steps each of the three wetland diagnostic factors must be assessed independently to determine if a decision can be rendered at the diagnostic factor level using offsite data sources.

The first step in the wetland identification process is to subdivide the project into sampling units (FSA Procedures (2-12)), and identify each sampling unit on a base map. For each sampling unit, an independent consideration of each of the three wetland diagnostic factors is made. When applying Section C: Selection of Method of the Corps Methods, the AE must decide which level of determination is most appropriate (Section D, Subsection 1, Subsection 2, or Subsection 3).

Selection of “Section D – Routine Determinations, Subsection 1 – Onsite Inspection Unnecessary,” procedures are not likely to occur in an actively cropped sampling unit. Within the agricultural landscape, decisions are sometimes rendered when one or more factor is either atypical (Section F), or climatically challenged (Section G). Therefore, AEs often supplement the procedures in “Section D – Routine Determinations, Subsection 2 – Onsite Inspection Necessary,” with those provided in Section F, G, and/or Chapter 5 of the Regional Supplements.

The AE selects the most appropriate method(s) to identify wetlands. This decision is not made at the project area (USDA tract/field) scale, but rather for each sampling unit identified and delineated on the wetland identification base map. The AE retains the sole responsibility to determine the level of routine determination required, and if Sections F or G will be utilized.

NOTES:

- All agency decisions made during Step 1 are made at the sampling unit level.

- The term “imagery” refers to all forms of remotely captured imagery or photography, digital or analog, at all resolutions.

- Unless otherwise stated, the use of “1985” in this document refers to December 23, 1985.

- A single resource document (tool) can contain multiple data sources. Each resource document can be used to support the decision for one or more wetland diagnostic factor. A soil survey contains multiple data sources (soils map, hydrology data, vegetative data, and use limitation data). The soil survey may be used to assist in a decision for one or more diagnostic factors. However, a single remote data source contained within the published county soil survey manuscript (i.e., hydric soils list, vegetative data table) can only be applied to a single factor.

2.1 DEVELOP A BASE MAP

The AE must utilize preliminary data gathering and synthesis in determining whether a typical or atypical situation exists (FSA Variance 5-9). The Corps Manual, “Section B (Preliminary Data Gathering and Synthesis),” Step 2; and “Section D, Routine Determination, Subsection 2 – Onsite Inspection Necessary,” Step 1 and Step 4, require the AE to identify the project area, make a base map, and identify sampling units.

2.1.1 Information Supplementing the Corps Manual and FSA variances:

- Users will graphically subdivide the project into sampling units on a base map image using resources A through E, as available, and as indicated below
- The base map shall be large enough to readily read and record multiple sampling units in one location (e.g., concentric circles).
- A sampling unit number will only be recorded once.
- Sampling unit boundaries do not need to match exactly between resources.
- The sampling unit boundary from resource B will be used, but can be adjusted using other resources, e.g., Light Detention and Ranging (LiDAR).

A. Review the NRCS wetland inventory maps **OR** previous non-certified determinations, if available. Each previously identified polygon may be a sampling unit.

B. Review appropriate imagery. Each signature listed below not matching resource A above is a sampling unit:
   - Hydrophytic vegetation
   - Surface water
   - Saturated conditions
   - Flooded or drowned-out crops
   - Stressed crops due to wetness
   - Differences in vegetation due to different planting or replanting dates
   - Inclusions of wet areas as set-aside or idled land
   - Circular or irregular areas of unharvested crops within a harvested field
   - Isolated areas that are not farmed with the rest of the field
   - Areas of greener vegetation

   Note: The term "appropriate" means that the AE will select the imagery year or years that best represents Normal Circumstances, including "Normal Environmental Conditions," to identify and size sampling units. To the extent possible, Section I of the NRCS Field Office Technical Guide will include designation of the image year(s) (2 to 4 different images) determined to reflect Normal Environmental Conditions for specific geographic locations.

   For sampling units without pre-1985 drainage manipulations, additional resources from C, D, and E may be used to develop the base map. Sampling units will be recorded on a base map using the imagery year which best reflects Normal Environmental Conditions as identified in Section I of the FOTG.

   For sampling units with pre-1985 drainage manipulations: in order to determine the best drained condition (BDC)[1] of the sampling unit, the agency expert must evaluate imagery which reflects Normal Circumstances with consideration of when the manipulation was installed, and the best drained condition[1] of the sampling unit that resulted from its installation. The imagery to be evaluated will consist of the years immediately following the approximate year of installation of the drainage manipulation. The year chosen for the base map image will be the closest year following the manipulation that most accurately reflects BDC. The base map image, resources listed in items C through F, below, and/or additional resources such as producer submitted drainage worksheets, drainage equations, watershed district maps, road culvert elevations, and/or county drainage maps may be used to determine the presence of sampling units and their size. The approximate year of manipulation will be identified on the base map or through an additional reference such as the NRCS offsite data form, producer provided drainage worksheets, drainage district maps, and drainage contractor's installation maps.

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[1] "Best Drained Conditions" are the hydrologic conditions (e.g., depth, duration, frequency, timing of soil saturation or inundation), as the result of pre-1985 drainage actions, that occur following this action during the wet portion of the growing season during the spring of a normal climatic year. The NRCS can use methods, such as aerial photo interpretation and evaluation of drainage equations, to assist in the determination of BDC.

C. Review the National Wetland Inventory (NWI) maps. Each NWI polygon not matching resources A or B above may be a sampling unit.

D. Review the soil survey and the county hydric soils list. Identify listed hydric soil map units with the hydric soil components as all or part of the name, soil map units with hydric soil inclusions, and map units with spot symbols indicating wetness. Each soil survey feature not matching resources A, B, or C above may be a sampling unit

E. Review other inventory tools, including other years of normal imagery and LiDAR if available. Note sampling units as applicable.

F. Identify a single representative non-wetland sampling unit for each project area (tract or field) using the soil survey resource. The AE will use best professional judgment to select a single representative observation point within this sampling unit.

2.1.2 Information Supplementing All Sections in the Corps Manual

- Representative Observation Points (ROP) will be utilized each time a sampling unit is identified.
- Typically, the ROP will be annotated approximately halfway between the edge of the sampling unit and the center of the sampling unit and will not be located within a surface ditch or pit, if present. However, unique site characteristics or remote data set quality (e.g. cloud cover) may require flexibility in the location of any ROP.
- Factor indicators (remote or field) must be identified in the approximate ROP location and Flexibility Paragraph 23 may be invoked.

State Procedure (S1-0):
When determining the number and locations of sampling units (defined in FSA paragraph (2-12)) the AE will utilize desktop (in the office) methods to meet the intent of "traversing the area" and will not be required to identify sampling units in the field.

2.2 STATE OFFSITE METHOD (SOSM) SUPPLEMENTING "SECTION D, ROUTINE DETERMINATIONS, SUBSECTION 1: ONSITE INSPECTION UNNECESSARY" AND SUBSECTION 3 (for factors that are adequately characterized)

"Section B, Preliminary Data Gathering and Synthesis," directs the user to determine whether the factor(s) are adequately characterized for the project area. The AE is to use the remote data to determine the characteristics that currently exist on the sampling unit, not what characteristics would exist at the sampling unit in the absence of disturbance.
If the user is attempting to predict the characteristics that would have existed prior to disturbance (e.g., cropping), then Subsection 1 is not appropriate. The use of "Section F: Atypical Situations" (disturbance-based challenges) and "Section G: Problem Areas" (climate-based challenges) are not designed to be applied when the user selects Subsection 1, but rather when the user selects Subsection 2.

2.2.1 Hydrophytic Vegetation (no pre-1985 drainage) and the vegetation is not significantly disturbed or problematic due to climate:

For each sampling unit, the dominant species in each layer of vegetation must be determined. Dominant species are those listed in any of the resources, below. Resources meeting one or more indicator test in the Corps Methods demonstrates that the hydrophytic vegetation factor is met.

State Procedure (S1-1) to Subsection 1, Step 2:
When determining "whether hydrophytic vegetation is present" from the summarized information in Section B, Step 4d, "Federal, state, or local government documents that contain information about the area vegetation," the AE will utilize the federal documents in the manner indicated below.

A. ESD – the Historic Plant Climax Community (or Reference Community) plant composition table indicates the sampling unit is composed of plants that meet the definition (meets any vegetation indicator from the appropriate Corps Regional Supplement). Refer to Attachment A for further information.

B. Approved SD NRCS wetland reference sites that are within the same soil map unit (or inclusion), in the same Major Land Resource Area (MLRA), and have similar precipitation zones. The selected reference site case file documentation indicates the sampling unit is composed of plants that meet the definition (meets any vegetation indicator from the appropriate Corps Regional Supplement).

C. OSD – Use this only if ESD information is not available. 1) The "Use and Vegetation" section lists specific hydric species or indicates the site has plants that meet the hydrophytic vegetation definition (i.e. states "species-tolerant of excessive wetness") and/or 2) Remarks indicates the vegetative zone of a Class of wetland as defined by Stewart and Kantrud, 1971 in Resource Publication 92. All species listed or vegetative zones of a Class are considered dominant for purposes of the vegetation indicator(s) from the appropriate Corps Regional Supplement.

State Procedure (S1-2) to Subsection 1, Step 2:
When determining "whether hydrophytic vegetation is present" from the summarized information in Section B, Step 4b, "NWI overlays or maps," the AE will utilize NWI maps in the manner indicated below.

NWI Maps – If any portion of the sampling unit (or the ROP) is mapped as emergent, shrub vegetation, forested, or aquatic bed on an NWI map (e.g., PEM, PSS, PFO, PAB or wetter) then all listed species are considered in any vegetation indicator test from the Corps Regional Supplement. If individual species are not listed under the NWI class (e.g., "emergent") then the sampling unit is considered to be dominated by hydrophytic vegetation and meets the definition.

2.2.2 Hydric Soils (with or without pre-1985 drainage):

The "NRCS shall identify hydric soils through the use of published soil maps which reflect soil surveys completed by or through the use of onsite reviews." (Title 7 CFR § 12.31(a)(1)). The "NRCS shall determine whether an area of a field or other parcel of land has a predominance of hydric soils that are inundated or saturated as follows." (Title 7 CFR § 12.31(a)(2)).

A. "If a soil map unit has hydric soil as all or part of its name, that soil map unit or portion of the map unit related to the hydric soil will be determined to have a predominance of hydric soils."

B. "If a soil map unit is named for a miscellaneous area that meets the criteria for hydric soils (i.e., riverwash, playas, beaches, or water) the soil map unit will be determined to have a predominance of hydric soils."

C. "If a soil map unit contains inclusions of hydric soils, that portion of the soil map unit identified as hydric soil will be determined to have a predominance of hydric soils."

State Procedure (S1-3) to Subsection 1, Step 5:
When determining "whether hydric soils are present," the AE will utilize Title 7 CFR § 12.31(a)(2) in the manner indicated below.

If a soil map unit has hydric soil as part of its name or contains a hydric inclusion, that portion of the hydric component (major or minor) in the soil survey can be verified by either:

a. Identifying that the landform (such as pothole/playa or non-pothole/playa) of the sampling unit is consistent with the landform (such as depression, closed depression, flats, swale, drainageway) of the hydric component or inclusion on the hydric soils list; **or**,
b. Using the soil series.

2.2.3 Wetland Hydrology (no pre-1985 drainage):

For each sampling unit, there must be documented evidence of frequent inundation or soil saturation during the growing season. The NRCS defines wetland hydrology (FSA Wetland ID Procedures 2-19) as inundation or saturation of the site by surface or groundwater during a growing season at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation.

State Procedure (S1-4) to Subsection 1, Step 3:
When determining "whether wetland hydrology is present" the AE will independently assess the hydrology factor by utilizing the NRCS imagery review methodology in the manner indicated below.

- Wetness signatures are found on 50 percent (%) or more of imagery reviewed.
- The imagery review will consist of all available normal years starting with the 2014 year image going back to 1980 (see Attachment C).
- Wetness signatures indicative of inundation are abbreviated as INU and are annotated as such on the data sheet.
- Wetness signatures indicative of saturation are abbreviated as WS and are annotated as such on the data sheet.
- All wetness signatures (INU and WS) are due to wetness that is reflective of NC that: a) was occurring on the date of the imagery, or b) that occurred previous to the imagery but the evidence of this wetness remains evident on 50% or more of imagery reviewed.
- Wetness signatures due to the presence of either or both surface water and saturated soil conditions, are considered to be present on the SU even if those signatures are partially or completely obscured by vegetation at the ROP.
- Wetness signatures (WS and INU) are not synonymous with field hydrology indicators, and the two should not be confused.
- Wetness signatures (WS and INU) are clear distinctions in the condition of the sampling unit compared to the condition in the surrounding field. These distinctions include, but are not limited to size and color.
- Wetness signatures (WS and INU) can result from a variety of conditions. The AE is not required to document the condition that led to the WS or INU designation on the data sheet.

Conditions that may result in the WS or INU designations include, but are not limited to: Hydrophytic vegetation; saturated conditions; flooded or drowned-out crops; stressed crops due to wetness; differences in vegetation due to different planting or replanting dates; inclusion of wet areas as set-aside or idled land; circular or irregular areas of unharvested crops within a harvested field; isolated areas that are not farmed with the rest of the field; areas of greener vegetation

Note: the term "all available" when used with aerial imagery or photography refers to those images or photos that have been; 1) made readily available to the AE in a coordinated and cataloged manner and; 2) other imagery approved for use by the NRCS State Office (SO) on a case specific basis

2.3 INFORMATION SUPPLEMENTING "SECTION F: ATYPICAL SITUATIONS"

"Section B, Preliminary Data Gathering and Synthesis," and "Section D, Routine Determinations," Subsection 1 and Subsection 2, directs the user to determine whether there is evidence of recent significant alteration due to human activity or natural events, and proceed to Section F for one or more factors, if applicable.

2.3.1 Hydrophytic Vegetation (no pre-1985 drainage, with or without post 1985 drainage):

For each sampling unit, the dominant species in each vegetation layer may not be known. Positive indicators of this factor could not be found (or would be misleading) due to effects of recent human activities or natural events.

State Procedure (S1-5):
When determining "the type of vegetation that previously occurred" ("Section F, Subsection 1," Step 3), "e. SCS records" are potential sources of such evidence. The FSA Variance 5-31 states the AE will consider NRCS records, such as ecological site descriptions and data from NRCS reference sites, as potential data sources in addition to soil survey data."

"Section F, Subsection 1,, Step 3, "e. SCS/NRCS Records" will be used as follows:

A. ESD – the Historic Plant Climax Community (or Reference Community) plant composition table indicates the sampling unit is composed of plants that meet the definition (meets any vegetation indicator from the appropriate Corps Regional Supplement). Refer to Attachment A for further information.

B. Approved SD NRCS wetland reference sites that are within the same soil map unit (or inclusion), in the same MLRA, and have similar precipitation zones. The selected reference site case file documentation indicates the sampling unit is composed of plants that meet the definition (meets any vegetation indicator from the appropriate Corps Regional Supplement).

C. OSD – Use this only if ESD information is not available. 1) The "Use and Vegetation "section lists specific hydrophytic species or indicates the site has plants that meet the hydrophytic vegetation definition (i.e., states "species tolerant of excessive

wetness") and/or 2) Remarks indicates the vegetative zone of a Class of wetland as defined by Stewart and Kantrud, 1971 in Resource Publication 92. All species listed or vegetative zones of a Class are considered dominant for purposes of the vegetation indicators from the appropriate Corps Regional Supplement.

"Section F, Subsection 1," Step 3, "h. NWI" will be used as follows:

If any portion of the sampling unit (or the ROP) is mapped as emergent, shrub vegetation, forested, or aquatic bed on an NWI map (e.g., PEM, PSS, PFO, PAB, or wetter) then all listed species are considered dominant in any vegetation indicator test from the Corps Regional Supplement. If individual species are not listed under the NWI class (e.g., "emergent") then the sampling unit is considered to be dominated by hydrophytic vegetation and meets the definition.

2.3.2 Hydrophytic Vegetation (with pre-1985 drainage, with or without post 1985 drainage):

Because of past drainage, which is often accompanied by disturbance of vegetation, for each sampling unit, the dominant species of vegetation may not typically be known, but rather must be inferred. Positive or negative indicators of this factor may not be found, or would be misleading, due to the effects of recent human activities or natural events, or from the pre-1985 drainage actions.

State Procedure (S1-6):
When determining "the type of vegetation that previously occurred" ("Section F, Subsection 1," Step 3), the AE may utilize the Regional Supplement Chapter 5 – "Problematic Vegetation Procedures."

- The AE will verify that the sampling unit is in a landscape position that is likely to collect or concentrate water. The landscape position may not include the drainage manipulation itself. If the drainage manipulation no longer allows the sampling unit to "collect or concentrate water" (Normal Circumstances/best drained conditions) then the hydrology factor cannot be met and therefore the hydrophytic vegetation definition cannot be met.

A. The Corps Methods, Regional Supplement Chapter 5 – "Problematic Vegetation Procedure" [Great Plains - (d); Midwest – (c) Northcentral and Northeast - (d)] "Areas affected by grazing," approach (4) is used.
   - Approach (4) states, "*if an appropriate ungrazed area cannot be located or if the ungrazed vegetation condition cannot be determined, make the wetland determination* (Step 1) *based on indicators of hydric soils and wetland hydrology*."

B. The Corps Methods, Regional Supplement Chapter 5 – "Problematic Vegetation Procedure" [Great Plains - (e); Midwest – (d) Northcentral and Northeast – (d)] "Managed plant communities," approach 4 (Great Plains) or 5 (Midwest) is used.
   - Approach (4 or 5) states, "*if the unmanaged vegetation condition cannot be determined, make the wetland determination* (Step 1) *based on indicators of hydric soils and wetland hydrology*."

C. Alternate verification may include use of the NWI, as described above in 2.3.1, when the sampling unit appears on the NWI with special drainage modifier (lower case "d" at end of label).

2.3.3 Wetland Hydrology (post 1985 drainage with no pre-1985 drainage):

Positive indicators of hydrology may be absent or misleading due to effects of recent human activities or natural events.

State Procedure (S1-7):

When characterizing "the hydrology that previously existed in the area," "Section F, Subsection 3," Step 3, does not include all "potential sources of information." Therefore, the AE may utilize the supplemental information below. Additionally, if the user is in a "Midwest County" and the "Midwest Regional Supplement Chapter 5 – Agriculture Lands" for (3) Hydrology or in a "Northcentral and Northeast" county, and the Northcentral and Northeast Regional Supplement Chapter 5 – Lands Used for Agriculture and Silviculture, is used then this information supplements tool 3.b. (aerial photography review) and tool 3.e. (hydrologic models), respectively.

Imagery Review supplemental information:

- Wetness signatures must be found on 50% or more of imagery reviewed.
- The wetness signature review period will start from the year of drainage manipulation (e.g., potential conversion) and consist of all available normal years starting with the year of drainage manipulation (e.g., potential conversion) going back to 1980 (see Attachment C).
- Wetness signatures indicative of inundation are abbreviated as INU and are annotated as such on the data sheet.
- Wetness signatures indicative of saturation are abbreviated as WS and are annotated as such on the data sheet.
- All wetness signatures (INU and WS) are due to wetness that is reflective of NC that: a) was occurring on the date of the imagery, or b) that occurred previous to the imagery but the evidence of this wetting event remains evident on 50% or more of imagery reviewed.
- Wetness signatures due to the presence of either or both surface water and saturated soil conditions are considered to be present on the SU even if those signatures are partially or completely obscured by vegetation at the ROP.
- Wetness signatures (WS and INU) are not synonymous with field hydrology indicators, and the two should not be confused.
- Wetness signatures (WS and INU) are clear distinctions in the condition of the sampling unit compared to the condition in the surrounding field. These distinctions include, but are not limited to size and color.
- Wetness signatures (WS and INU) can result from a variety of conditions. The AE is not required to document the condition that led to the WS or INU designation on the data sheet.
- Conditions that may result in the WS or INU designations include, but are not limited to: Hydrophytic vegetation; saturated conditions; flooded or drowned-out crops; stressed crops due to wetness; differences in vegetation due to different planting or replanting dates; inclusion of wet areas as set-aside or idled land; circular or irregular areas of unharvested crops within a harvested field; isolated areas that are not farmed with the rest of the field; areas of greener vegetation

Note: the term "all available" when used with aerial imagery or photography refers to those images or photos that have been; 1) made readily available to the AE in a coordinated and cataloged manner and; 2) other imagery approved for use by the NRCS SO on a case specific basis

State Procedure (S1-8):
Hydrologic Modeling supplemental information:

- The Objective Criteria for wetland hydrology modeling is: 14 or more consecutive days of inundation (flooding or ponding) or saturation (a water table within 12" of the soil surface) during the growing season with a 50% or greater annual probability of occurrence.

Users are advised that sampling units and wetness signatures in field(s)/tract(s) with perennial vegetative cover, such as pasture, rangeland, CRP, and woodland, may not be readily visible. In such cases, ***field verification may be required***.

2.3.4 Wetland Hydrology (post 1985 drainage with pre-1985 drainage):

The AE will utilize the information from Section 2.3.3 within the context of FSA Variance (5-28). The supplemental information provided below explains how the AE utilizes FSA Variance (5-28).

- All imagery is to be used, regardless of the "slide indicator status." The agency expert must determine Normal Circumstances in consideration of when the manipulation was installed and the BDC of the sampling unit.
- To determine the best drained conditions, the AE must review any available imagery years immediately following the pre-1985 drainage manipulation year, through 1985 or further, if necessary.
- The AE must consider lack of maintenance (e.g., tile blowout) and recent maintenance when reviewing imagery.

2.4 INFORMATION SUPPLEMENTING "SECTION G: PROBLEM AREAS"

"Section D, Routine Determinations, Subsection 2," directs the user to determine whether normal environmental conditions are present (Step 5). If the area presently lacks hydrophytic vegetation or hydrologic indicators due to annual or seasonal fluctuations in precipitation or ground-water levels, or hydrophytic vegetation indicators lacking due to seasonal fluctuations in temperature to the user is directed to proceed to Section G for one or more factors, as applicable.

"Section D, Routine Determinations, Subsection 2," first asks the user if the sampling unit is an atypical situation before asking the user about normal environmental conditions (climate challenges). Therefore, when the AE identifies an Atypical Situation (Section F) and the sampling unit is "climatically challenged" (Section G), then the AE will utilize Section F procedures

2.4.1 Hydrophytic Vegetation (no pre-1985 drainage):

Refer to Section 2.3.1 for supplemental information and state variances.

2.4.2 Wetland Hydrology (no pre-1985 drainage):

The procedures in Section G are supplemented by Chapter 5 of the Regional Supplements, "Wetlands that Periodically Lack Indicators of Wetland Hydrology," Procedure 3.e. and 3.f.

State Procedure (S1-9):

When determining "whether wetland indicators are normally present during a portion of the growing season" the AE will assess the hydrology factor by utilizing the NRCS imagery review methodology in the manner indicated below.

A. Evaluating multiple years of aerial photography (Procedure 3.f.).

- Wetness signatures are found on 50% or more of imagery reviewed.
- The imagery review will consist of all available (see note) normal years starting with the 2014, year image going back to 1980 (see Attachment C).
- Wetness signatures indicative of inundation are abbreviated as INU and are annotated as such on the data sheet.
- Wetness signatures indicative of saturation are abbreviated as WS and are annotated as such on the data sheet.
- All wetness signatures (INU and WS) are due to wetness that is reflective of NC that: a) was occurring on the date of the imagery, or b) that occurred previous to the imagery but the evidence of this wetness remains evident on 50% or more of imagery reviewed.
- Wetness signatures due to the presence of either or both surface water and saturated soil conditions, are considered to be present on the SU even if those signatures are partially or completely obscured by vegetation at the ROP.
- Wetness signatures (WS and INU) are not synonymous with field hydrology indicators, and the two should not be confused.
- Wetness signatures (WS and INU) are clear distinctions in the condition of the sampling unit compared to the condition in the surrounding field. These distinctions include, but are not limited to size and color.
- Wetness signatures (WS and INU) can result from a variety of conditions. The AE is not required to document the condition that led to the WS or INU designation on the data sheet.
- Conditions that may result in the WS or INU designations include, but are not limited to: Hydrophytic vegetation; saturated conditions; flooded or drowned-out crops; stressed crops due to wetness; differences in vegetation due to different planting or replanting dates; inclusion of wet areas as set-aside or idled land; circular or irregular areas of unharvested crops within a harvested field; isolated areas that are not farmed with the rest of the field; areas of greener vegetation

Note: the term "all available" when used with aerial imagery or photography refers to those images or photos that have been; 1) made readily available to the AE in a coordinated and cataloged manner and; 2) other imagery approved for use by the NRCS SO on a case specific basis.

B. Hydrology Tools (Procedure 3.e.)

- Numerical hydrologic analysis methods which calculate that the frequency and duration of saturation and/or inundation meet the Objective Criteria.

- The Objective Criteria for wetland hydrology modeling is: 14 or more consecutive days of inundation (flooding or ponding) or saturation (a water table within 12" of the soil surface) during the growing season with a 50% percent chance or greater annual probability of occurrence.

Users are advised that sampling units and wetness signatures in field(s)/tract(s) with perennial vegetative cover (such as pasture, rangeland, CRP, and woodland) may not be readily visible. In such cases, ***field verification may be required***.

2.4.3 Wetland Hydrology (with pre-1985 drainage):

The AE will make the hydrology decision within the context of FSA Variance (5-9). The AE must determine Normal Circumstances in consideration of when the manipulation was installed and the BDC of the sampling unit. To determine the BDC, the AE must review all available imagery years regardless of "slide indicator status" following the pre-1985 drainage manipulation year through 1985 or further, if necessary. Consideration of years after 1985 may be needed when the manipulation was installed in the years immediately preceding 1985. The AE must consider lack of maintenance (e.g., tile blowout) and recent maintenance when reviewing imagery.

The supplemental information provided below explains how the AE utilizes FSA Variance (5-9).

- If the sampling unit(s) exhibits a wetness signature, as identified in 2.4.2, on the normal year image the best represents BDC, it is indicative to support the presence of wetland hydrology. Wetland hydrology is positive.
- If the sampling unit(s) lack a wetland signature, as identified in 2.4.2, on the normal year image that best represents BDC, it is indicative of an absence of wetland hydrology. Wetland hydrology is negative.
- When there is limited information available for a selected image (e.g., the date and precipitation data are not available), the AE may use their professional judgement to determine if the image will be used to represent the BDC. If the area in question exhibits a wetness signature, wetland hydrology is positive.
- If a normal year image is not available from the time period being reviewed, the AE will use their best professional judgement to select the appropriate image year and make the hydrology decision using the following guidance;
    - I. On an image determined to reflect a wet-year, if the sampling unit lacks the presence of a wetness signature it is indicative that wetland hydrology is absent. Wetland hydrology is negative. If a wetness signature is present, the result is inconclusive.

    - II. On an image determined to reflect a dry-year, if the sampling unit exhibits a wetness signature it is indicative to support the presence of wetland hydrology. Wetland hydrology is positive. If a wetness signature is absent, the result is inconclusive.

Users are advised that sampling units and wetness signatures in field(s)/tract(s) with perennial vegetative cover (such as pasture, rangeland, CRP, and woodland) may not be readily visible. In such cases, ***field verification may be required***.

2.5 FINALIZATION OF BASE MAP

The AE will analyze each sampling unit answer to the three wetland diagnostic factors:

- If all three factor definition answers are yes (the factors are met) for a sampling unit then record a “Y” (yes) on the base map for the sampling unit.
- If any factor definition answer is no, then record an “N” (no) on the base map for the sampling unit.
- Include the final base map in the case file.

SECTION 3

3.0 FSA WETLAND DETERMINATION PROCESS STEP 2: ASSIGNMENT OF WC LABELS

Sampling units will be assigned the appropriate WC Compliance label found in the current version of the NFSAM.

3.1 VERIFICATION OF PRE- 1985 CROPPING HISTORY

The following indicate that production of an agricultural commodity occurred prior to December 23, 1985 (7 CFR 12.2).

1. Pre-1985 imagery shows cropping and/or attempted cropping.

2. Farm Service Agency records indicate that a crop was planted prior to December 23, 1985, and this finding is confirmed by review of aerial imagery.
3. Person provided records that document pre-1985 cropping history.

<u>Cropping History Decision Threshold (met if):</u>

1. Pre-1985 cropping history is documented on records or appears on at least one remote indicator.

- Document decision on the data sheet and proceed to Section 3.2.

3.2 VERIFICATION OF PRE-DECEMBER 23, 1985, MANIPULATION(S)

Manipulations are defined by regulation as an activity that drains, dredges, fills, levels, or otherwise manipulates (including the removal of woody vegetation or any activity that results in impairing or reducing the flow and circulation of water) for the purpose of or to have the effect of making possible the production of an agricultural commodity.

<u>Responsibility to provide evidence</u> (7 CFR 12.5(b)(7)) states*, “it is the responsibility of the person* *seeking an exemption related to converted wetlands under this section* ***to provide evidence*** *such as receipts, crop-history data, drawings, plans or similar information, for purposes of determining whether the conversion or other action is exempt in accordance with this section**.”***

The following remote indicators indicate that pre-1985 manipulation(s) occurred.

- 1985 or earlier aerial photography showing a manipulation(s) (NFSAM Part 514).
- USDA or person provided records showing a pre-1985 verified manipulation(s).
- Pre-1985 land-based photographs showing a manipulation (e.g., tile inlet/outlet)
- Imagery (pre-1985) shows open land, and the sampling unit is on a soil and\or landform that historically supported native vegetation (e.g,. woody vegetation is native to the ESD\OSD).

<u>Pre-1985 Manipulation Decision Threshold (met if):</u>

1. The manipulation is documented on records or appears on at least one indicator.

DOCUMENT DECISION ON THE DATA SHEET AND PROCEED TO THE NEXT SECTION.

3.3 VERIFICATION OF POST-1985 POTENTIAL CONVERSION

The most recent year of aerial photography available must be reviewed to determine if a recent potential conversion has occurred.

The following remote indicators are suggestive (indicates) that post-1985 a potential conversion occurred.

- Post-1985 imagery/aerial photography showing a manipulation(s) (NFSAM Part 514). If the manipulation is first visible in 1986 imagery, further investigation is needed to determine whether the manipulation occurred before or after December 23, 1985.
- Post-1985 NRCS or Farm Service Agency records showing a manipulation(s).
- Post-1985 producer provided reliable records showing a manipulation(s).
- Post-1985 land-based photographs showing a manipulation (e.g. tile inlet/outlet)
- United States Geological Survey (USGS) NED 1/9 Arc Second LIDAR data showing a manipulation.

Post-1985 Potential Conversion Decision Threshold (met if):

1. The manipulation appears on at least one remote resource, other than LIDAR.

2. The manipulation appears on LIDAR and a second dated indicator.

- A site visit is required for potential wetland violations.

- Document decision on the data sheet and proceed to the next section.

3.4 VERIFICATION OF POTHOLE LANDFORM

The following remote indicators are suggestive (indicates) that the site is either a pothole or playa.

For potholes:

1. Imagery and/or land-based photography shows ponding of water or evidence that ponding occurs in a closed topographic depression[2] in a glaciated upland (non-floodplain, non-drainage way) landscape. The term upland follows the concept from the National Soil Survey Handbook.

2. LIDAR shows a closed topographic depression in a glaciated upland landscape position.

3. USGS Topographic map or other land survey shows a closed topographic depression in a glaciated upland landscape position.

4. Soil Survey data shows a depression, pothole, or closed topographic depression in a glaciated upland landscape position. Refer to Attachment B for further information.

Pothole Decision Threshold (met if):

1. The landform appears on at least one remote indicator.

[2] A closed depression is one that, prior to any anthropogenic drainage, ponded water.

- Document decision on the data sheet and proceed to the next section.

3.5 VERIFICATION OF CONSECUTIVE LENGTH (DURATION) OF PONDING AND/OR SATURATION DURING THE GROWING SEASON ON DECEMBER 23, 1985, IN MOST YEARS (50% CHANCE OR MORE)

- COMPLETE THIS STEP (3.5) ONLY IF A MANIPULATION WAS DOCUMENTED IN STEP 3.2.

- If the sampling unit is a pothole/playa on which pre-1985 drainage manipulations have occurred, and is further determined to possess the three diagnostic factors in Step 1 (a "Y" on the base map), then the area is considered to be inundated for at least 7 days or saturated for at least 14 days during the growing season in most years..

- If the sampling unit is a pothole/playa on which pre-1985 drainage manipulations have occurred, pre-December 23, 1985, cropping history has been verified, and is further determined to be on a hydric soil map unit but does not possess the three diagnostic factors in Step 1 (an "N" on the base map), then the area will be considered to be inundated less than 7 consecutive days and saturated less than 14 days during the growing season in most years.

For all other geomorphic settings (landscape positions):

The BDC indicate that the duration required to meet the criteria for a specific WC Compliance label is met when:

1. Inundation is present on the sampling unit for the imagery year identified as representing the BDC. Wetness signature abbreviations include INU (Inundation). Or,

2. Results of analytical techniques (such as drainage equation(s)) show that ponding would not be removed from the sampling unit within 15 days.

- Document decision on the data sheet and proceed to the next section.

3.6 VERIFICATION OF PRESENCE OF WOODY VEGETATION AS OF DECEMBER 23, 1985

The following are indicators that the sampling unit supported woody vegetation on December 23, 1985. Woody vegetation is defined as perennial plants with woody stems large enough that normal agricultural cultivation or operations cannot remove.

- Imagery from 1986 that shows the presence of woody vegetation.

IF IMAGERY FROM 1986 SHOWS THE PRESENCE OF WOODY VEGETATION, THE THRESHOLD IS MET, AND WOODY VEGETATION WILL BE CONSIDERED TO HAVE BEEN PRESENT ON THE SAMPLING UNIT AS OF DECEMBER 23, 1985

SECTION 4

4.0 FSA WETLAND DETERMINATION PROCESS STEP 3: DETERMINATION OF SIZE AND DEVELOPMENT OF CERTIFIED WETLAND DETERMINATION MAP

4.1 TRANSFERRING BASE MAP SAMPLING UNITS TO WC COMPLIANCE LABELED POLYGONS

The AE will, as appropriate, further divide or combine the sampling units identified in Section 2.0 into labeled polygons for the certified wetland determination map. This decision is based on the answers to the steps in Section 3.0 (e.g., pothole/non-pothole, cropping history, manipulation, hydrology duration).

For example, a sampling unit has the following characteristics:

- Step 1 - Meets all 3 factors (e.g., base map = “Y”)
- Step 2 - Has pre-1985 cropping history on the west half and no pre-1985 cropping history on the east half (in grass); has a pre-1985 manipulation in it; is a pothole; meets saturation duration.

The sampling unit has different pre-1985 cropping history on the east and west halves, yet all other characteristics (Step 1 and 2 answers) apply to the entire sampling unit. Therefore, the sampling unit will be divided into two labeled polygons for the certified wetland determination map.

The non-wetland polygon will represent the remainder of the project area acres.

4.2 CERTIFIED WETLAND DETERMINATION (CWD) MAP

The AE is reminded that size of an area is not part of the wetland criteria; there is no minimum size threshold. The NRCS determined that the labeled polygons on the CWD map are delineated using digitizing methods.

The suggested CWD map size is 1 square mile (section) on an 8.5” by 11” paper. Site number and acres will be labeled on the CWD map. A separate site map, at a higher quality scale, may be provided in addition to the labeled CWD map for clarity.

ATTACHMENT A

ECOLOGICAL SITE DESCRIPTION (ESD) INFORMATION

A matrix correlating soil map unit components to ecological site is available in Section 1, State Offsite Methods, of the SD Field Office Technical Guide (FOTG).

Where to find ESDs:

1. FOTG: 1) Select Section II; 2) Select Statewide Soil and Survey Information; 3) Select 2. Rangeland Interpretations; 4) Select a. Ecological Site Descriptions; 5) Select MLRA; 6) Select ESD

2. Web Soil Survey: 1) define area of interest; 2) Select Soils Data Explorer Tab; 3) Select Ecological Site Assessment Tab; 4) Select ESD

3. Ecological Site Description System/ESIS Web site: http://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=ESD

In the event there is no ESD, AEs may utilize the range site descriptions. Contact the state rangeland management specialist or state biologist for assistance locating ESDs.

Ecological site descriptions and range site descriptions are based on relative weight of component species, rather than the percent cover measure cited in the Corps Methods. Both measures are viable for determining the ecological significance of the species comprising the plant community. Relative weight is arguably a better measure but was not specified in the Corps Methods because it is not a rapid assessment technique. Applying the hydrophytic vegetation indicator tests to the ESD or Range Site data is allowed by the Corps Manual, paragraph 23, flexibility provisions.

ATTACHMENT B

SOILS INFORMATION

The NRCS will use the definition of pothole and the definition of playa as noted below. This definition is subject to change via the rule-making process. However, any change in definition will not change the soils the state considers pothole or playa soils.

1. Pothole – [glacial geology] A type of small pit or closed depression, generally circular or elliptical, occurring in an outwash plain, a recessional moraine, or a till plain; including lake plains**.**

   Note: A closed depression is one that, prior to any anthropogenic drainage, ponded water. Also, generally circular or elliptical does not preclude irregular shapes. Drainage is defined in the FSA Wetland ID Procedures.

1

Potholes in South Dakota are found east of the Missouri River. Pothole soils include, but are not limited to, the following soil series:

Nishon	Rimlap	Toko
Oldham	Shue	Tonka
Overshue	Southam	Venlo
Parnell	Tetonka	Worthing
Plankinton	Tiffany	

2. Playa - The usually dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those occurring on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation-runoff events. Playa deposits are fine grained and may or may not have high water table and saline conditions.

   Note: Usually dry means dry in a normal year.

Playas are found west of the Missouri River. Playa soils include, but are not limited to, the following:

Dimmick, Heil Variant, Hoven Variant, McKenzie, Scott, and Kolls

Where to find Landform and hydric soils:

1. Web Soil Survey: 1) Navigate to Your Area; 2) Define Area of Interest; 3) Select Soils Data Explorer Tab; 4) Select Soil Reports Tab; 5) Hydric Soils, then click on View Soil Report

2. Official Soil Series Descriptions: https://soilseries.sc.egov.usda.gov/osdnamequery.asp

ATTACHMENT C

HYDROLOGY INFORMATION

Note: the information contained in this attachment is for information purposes only. Detailed information on wetland hydrology is available through other NRCS reference documents which can be obtained by contacting the State Conservation Engineer.

If numerical analysis methods are used, wetland hydrologic conditions will be met in accordance with the criteria outlined below. In all instances, the agency reserves the option to implement techniques not outlined in this document provided the method results in computation of numbers that can be compared to the Objective Criteria.

I. Drainage Equations

Drainage equations can be used for sampling units subject to pre- and/or post-1985 surface and subsurface drainage. The wetland hydrology threshold is met for areas a distance from a drainage feature at which the groundwater table is at or above 12" from the surface for 14 or more consecutive days.

The equation generally used shall be the van Schilfgaarde Equation, although Kirkham's Equation may be necessary for surface ponding. The surface storage factor shall be 0.1", the distance to impermeable layer shall be 10 feet, and the time factor shall be 14 days. Soils data inputs shall be computed using Rosetta software. Rosetta data shall be computed using the "Best Possible Model," and Rosetta inputs shall be obtained from Soil Data Access for the analyzed map units. The NDDrain software shall be used to perform the van Schilfgaarde computations.

<u>For groundwater discharge landscape positions</u>, the lateral effect distance will be tripled.

II. Drainmod

Drainmod software can be used for either undrained sites or sites drained by subsurface tiling or surface ditching. The Drainmod model uses daily data for temperature and precipitation. For pre-1985 conditions, the period of record used shall be 1971-2000. For post 1985 drainage conditions, the period of record shall end with the calendar year nearest the conversion date. Soils data requirements are the same as for Drainage Equations.

III. SPAW Model

For Recharge Depressions, the SPAW model can be used to determine the depth, duration, and frequency of ponding. The weather data used for SPAW will consist of at least 20 years of continuous daily rainfall and temperature records from the closest NWS weather station. The model can be used for both pre-and post-drainage conditions. For pre-drained conditions, the period of record used shall be 1971-2000. For post drained conditions, the period of record shall end with the calendar year nearest the conversion date. The watershed conditions used for the field model shall be based on pre-1985 conditions for pre-drainage analysis. The watershed conditions shall be based on the conditions at the time of drainage for post-1985 conversions.

IV. Flood Inundation Modeling

For landscapes subject to stream flooding, such as riverine landscapes, wetland hydrology can be analyzed based on flooding inundation. Inundation can be analyzed either by hand computations, or by use of the HEC-EFM (Ecosystem Functions Model). Data inputs for HEC-EFM shall contain at least 20 years of continuous daily mean flow data, but no more than 30. This period of record shall end at the end of the available water year closest to the determination date. The analysis can be used for both pre and post drainage conditions. For pre-1985 conditions, the period of record shall be the longest available continuous record set within the 1971-2000 period. For post 1985 conversions, the period of record shall be the longest available continuous record set ending with the water year closest to the conversion date, but no longer than 30 years.

V. Groundwater Monitoring

For groundwater monitoring, a minimum of 10 years of continuously collected records shall be used, and the records must cover the dates within the wetland growing season for each year. Records on a more than daily time step shall be converted to daily records by straight line interpolation. The daily records shall be used to calculate the 50th percentile of the groundwater depths within 12" of the surface for 14 or more consecutive days during the wetland growing season on an annual basis.

VI. Other

Other numerical analysis methods are appropriate if the method results in computation of numbers that can be compared to the Objective Criteria. These methods can include, but are not limited to, monthly time-step water budgeting, combinations of methods to cover combinations of dynamic flooding, static ponding, and soil saturation, and others.

The State Conservation Engineer **may** approve analysis methods not specifically detailed in this document.

Scenarios for the use of numerical analysis methods are: Normal Conditions and Converted Conditions. The period of record for the Normal Conditions climate factors, as well as other analysis inputs shall be those during the 1971-2000 period. The period of record for the Converted Conditions scenario shall be the period just preceding the conversion date.

For all numerical analysis methods used, the areal extent of inundation and or saturation can be mapped using the best available techniques for topographic mapping. These techniques include, but are not limited to, HEC-RAS, HEC-GeoRAS, and appropriate GIS Spatial Analyst methods.

Development of National Weather Service Climate Station Rainfall Normalization Tables

1. National Weather Service (NWS) Climate Stations are taken from the stations listed in *Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1971-2000* (NOAA Climatography of the United States Report No. 81) and similar reports for Iowa, Minnesota, Nebraska, North Dakota, and South Dakota.
   - These climate stations meet the criteria set forth by Chapter 19, Part 650 (page 19-24), of the Engineering Field Handbook, **"Determine the climate station nearest to the site that has sufficient records to have had statistical information calculated for it."**

- These climate stations are reported and maintained with WETS tables through the NRCS National Water and Climate Center in Portland, Oregon.

2. The WETS table information is used to complete the Rainfall Normalization Tables (also called Rainfall Data Sheets) developed for each NWS Climate Station utilized in the NWS Climate Station Zone Map.
   - Climate Stations are listed by the Common Name and Station ID.
   - Other information taken from WETS table:
     i. Latitude, Longitude
     ii. County
     iii. Normal Precipitation for March through September for the 1971-2000 year period.
     iv. 30 percent Bounds (Dry and Wet) for March through September for the 1971-2000 year period.
     v. Actual Precipitation for March through September for all years from 1980 to the current year.

3. When data is missing, replacement data is taken from the NWS Climate Station reported in AgACIS WETS tables nearest to the station missing data. The replacement data is clearly identified and referenced on the Rainfall Normalization Table.

4. The NRCS will utilize the official NWS climate station information.
   - The NWS Climate Stations are used for precipitation normalization due to the data quality and the availability of statistical data.
   - If local and NWS station weather data exists, the NWS station data is used.
   - When a climate station no longer collects data or is “discontinued,” a replacement station may be identified for use.

5. The following is the procedure used for the Normalization.
   - Determine 30% lower and upper boundaries for antecedent precipitation for the 3 prior months from the WETS table, and assign antecedent monthly weighting factors.
   - Weighting Factors:
     i. 1st Prior Month = 3
     ii. 2nd Prior Month = 2
     iii. 3rd Prior Month = 1
   - Multiply the actual rainfall for each month by the weighting factor.
   - Sum the totals and compare this with the 30% bounds as multiplied with the weighted factor of the same period.
   - Apply a Normalization tag (Wet, Dry, Normal).

Development of NWS Climate Station Zone Map

1. Each station is located on a map, using its historical Latitude and Longitude as given for the station from 2003 WETS table data.
2. A map of Thiessen Polygons is created from the NWS Climate Station locations so that each station’s cell is divided into absolute Thiessen polygons.

Methodology of using Rainfall Normalization Tables

1. Determine the NWS Climate Station (with available slide normalization data) to use for your sampling units.
    - Utilize the most recent NWS Climate Station zone map that is available in ND Technical Guide (SDTG), Section 1, which spatially outlines the area closest to each station as shown in the NWS Climate Station Zone Map, or
    - Utilize the NWS Climate Station Zone layer by overlaying the file over the sites' locations in your GIS platform.
    - If more than one station overlays your sampling unit, choose the predominant station for the sampling unit area.

2. Determine what aerial photographs/images are available.
    - The date (month, year, and day - when available) that the image was captured or processed must be part of the image's record.

3. Review of all aerial imagery is suggested, regardless of whether the months preceding the image are dry, normal, or wet for precipitation.
    - In a dry year, a wetland may have the darkest green color as it has moisture available when surrounding areas do not.
    - In wet years, sampling units may drown out, may not be cropped, or may have standing water.
    - These help the user locate all sampling units so that each can be examined for possible wetness signatures.
    - Generally, only images taken during the growing season are used. Using professional judgment, and following applicable methods, a dataset of available slides is compiled.

4. Using the known or estimated date of the images, determine the "Normal" years based on the Rainfall Data Sheets for the selected NWS Climate Station for your sampling units.
    - ***Select all available normal years starting with the most current year that both imagery and normalization are available, back to 1980.***
    - If at least 5 normal years are not available, going back to 1980, then add an equal number of wet and dry years until a minimum of five years are obtained. Select wet and dry years that are nearest to the normal range. Do not select wet and dry years that are extremes.

    The normal years are determined by applying the flight month and year to obtain the slides that have a slide indicator status of "NORM" or normal. Typically, the previous 3 months before the month of the slide flight are used to categorize the slide; however, if the slide was flown late in the month (e.g., July 22 or later), the month of the flight should be used as one of 3 previous months.
    - For example, if a photo was taken on **July 1** then April, May, and June are the 3 prior months that will be used. Therefore, **select July from the Slide Indicator Status** heading of the appropriate rainfall data sheet file because July uses the precipitation from the three previous months of April, May, and June.

- For example, if the slide was flown on **July 22 or later;** then May, June, and July are the 3 previous months that are used. Therefore, select **August from the Slide Indicator Status** heading of the appropriate rainfall data sheet file because August uses the precipitation from the three previous months of May, June, and July

5. Prepare a Remotely Sensed Data form of normal years.
   - Indicate the year, month, and day (if available) of the imagery that has been selected for evaluation on the form.
   - Review the imagery, and record the observed wetness signature using the codes provided on the form.
   - Absence of a wetness signature can be noted with a dash.

6. Determine sampling unit hydrology.
   - Count the number of wetness signatures observed for each sampling unit.
   - Divide that total by the number of years reviewed to obtain a ratio or percentage.
   - Record the ratio or percentage on the form.