United States Department of Agriculture

Indiana Natural Resources Conservation Service

7 CFR Part 12

Guidance for Indiana Wetland Determinations, Including the use of Offsite Methods, To Identify Wetlands, Wetland Types, and Their Size For the 1985 Food Security Act, as amended.

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INTRODUCTION

The National Food Security Act Manual (NFSAM) provides internal agency policy related to the Highly Erodible Land Conservation and Wetland Conservation provisions of the 1985 Food Security Act, as amended (FSA*). Part 514.7 of the NFSAM explains that the FSA wetland determination process requires a technical determination of whether the site (sampling unit) is a wetland, then a separate, independent determination of whether any exemptions to the provisions apply. Based on these two decisions, a certified wetland determination map is prepared with an appropriate Wetland Conservation (WC) label assigned to each sampling unit. The size of each area with a WC label is provided. Thus, the FSA wetland determination decision includes three independent steps: Step 1: Wetland Identification, Step 2: Assignment of WC Labels and Step 3: Sizing.

STEP 1: WETLAND IDENTIFICATION

To accomplish the first step (wetland identification), the Secretary of Agriculture directed the Natural Resources Conservation Service (NRCS) to develop and use offsite and onsite wetland identification procedures (7 CFR 12.30(a)(4)). The NRCS responded by providing such procedures in the NFSAM.

The NFSAM Part 527 FSA Wetland Identification Procedures, as distributed through Circular 6 in December 2010, directs that NRCS will utilize Part IV: Methods, contained in the Corps of Engineers Wetland Delineation Manual (Corps Manual) for onsite and offsite determinations. The NFSAM explains that the on-site procedures contained in the

* To properly differentiate between the Food Security Act and the Farm Service Agency, "FSA" will refer to the 1985 Food Security Act and "Farm Services Agency" will be spelled out.

Corps Manual are supplemented by the Corps Regional Supplements and the FSA variances to the Corps Methods, as provided in Part 527 FSA Wetland Identification Procedures.

STEP 2: ASSIGNMENT OF WETLAND CONSERVATION LABELS

The second step (Assignment of Wetland Conservation Labels) assigns labels identified in NFSAM Part 514 to each sampling unit. The methodology for this step involves taking the Step 1: Wetland Identification, which is either "Yes, the site meets the FSA definition of a wetland" or "No, the site does not meet the FSA definition of a wetland", reviewing the data for activities that have affected the wetland nature of the site and assigning a FSA label to the sampling unit in response to the disturbances, if any, done to the area within the sampling unit. This assigning of FSA labels is a straight forward determination that the data reviewed indicates that the site meets the definition of the FSA label.

STEP 3: SIZING

The third step is to review the ecological conditions of the site for a change in the overall size from the Step 1: Wetland Identification, to the present day with an analysis of the correctness of a specific Wetland Type Label for a specific size.

This step is designed to take notice of sample units meet a FSA label of a type of wetland that then may have decreased in size after December 23, 1985, and may require a change in label to document that the sampling unit was manipulated or converted.

On the other hand, an increase in the size of a sampling unit may also indicate the change in a FSA label from a type of non-wetland to wetland where an exemption still applies to the increased size and can be converted into land suitable for crop production.

The FSA Wetland Identification Procedures provide that the US Army Corps of Engineers (USACE) offsite procedures found in Part IV, Section D, Subsection 1 – "Onsite Inspection Unnecessary" can be augmented with the development of State Offsite Methods (SOSM). The purpose of this document is to provide procedures that the NRCS in Indiana will use for rendering decisions when onsite inspection (field indicators) is unnecessary. Additionally, this document provides guidance related to the assignment of FSA labels and sizing.

The SOSM incorporates by reference the current versions and pertinent sections of the following Documents (and their location):

1. National Food Security Act Manual (NFSAM)
2. 20101 Food Security Act Wetland Identification Procedures (NFSAM Part 527 Appendix)
3. 1987 United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (on-line edition)
4. USACE Regional Supplements Eastern Mountains and Piedmont, Midwest, and North Central and Northeast Regions to the '87 Manual (on-line editions)
5. Hydrology Tools for Wetland Determination (Title 210 Engineering, National Engineering Handbook (NEH), Part 650, Engineering Field Handbook (EFH), Chapter 19)

The Assignment of Wetland Types and The Sizing of Wetlands Procedures (WTSP) can be used either offsite or on-site, and both incorporate by reference the current versions and pertinent sections of NFSAM Parts 514 (Labels) and 515 (Minimal Effect and Mitigation Exemption). These labels were developed to account for all of the various kinds of wetlands defined in 7CFR12.2-*Wetland determinations* and the different exemptions to be applied to those wetlands as found in 7CFR12.5(b)-*Exemptions for wetlands and converted wetlands.* The sizing of wetlands is a procedure to ensure that the label is correct for the entire area of the sampling unit based on the aforementioned references used for the Assignment of Wetland Types. NRCS has used Part IV of the 1987 USACE Delineation Manual as the base document for the development of SOSM while incorporating the variances from the FSA Wetland Identification Procedures without any alterations, so it is anticipated that there will be few, if any, differences with the existing wetland determination system.

Paragraph (2-14) of the FSA Wetland Identification Procedures defines SOSM as "*Methods developed by the NRCS for the sole purpose of supplementing the offsite methodology in the Corp Manual* (decisions made using Level 1 or Level 3) *for use in identifying wetlands for FSA purposes. The adoption process for State Offsite Methods will include solicitation of State Technical Committee recommendations. These methods may replace or supplement methods provided for in State Mapping Conventions.*"

Indiana NRCS presented the SOSM to the Indiana State Technical Committee on February 24, 2015 and April 9, 2015 to solicit feedback and recommendations as required in paragraph (2-14) of the FSA Wetland Identification Procedures. NRCS also presented

the WTSP to the committee to demonstrate how the FSA label assignment and sizing procedure carries on the information collected to make the Wetland Identification. All of the methodologies and procedures developed for Indiana take into account unique regional, state, and local wetland characteristics. This document adheres to regulations and policies in effect as of the date of this document but may be subject to change. Specific changes required by CFR will be implemented without concurrence from other agencies while changes in methodology and procedures will be vetted with the committee.

For FSA 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) <u>Under normal circumstances</u> supports a prevalence of such vegetation.

According to paragraph (3-2) of the FSA Wetland Identification Procedures, "*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 Wetland Conservation 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)).*"

Wetland identification decisions are based on conditions that are expected to occur under Normal Circumstances. The FSA Wetland Identification Procedures paragraph (2-10) defines 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 wetland definition requires that decisions be based not on anomalies, but rather what would normally occur on the sampling unit during NEC (FSA Procedures paragraph 3-3). In the 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 called “normal environmental conditions” (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 agency expert will determine the normal circumstances (NC) of the sampling unit as those that would be expected to occur,

(1) In the absence of post-December 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.

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.” The presence or lack of indicators can be determined using remotely sensed data sources or onsite observations. USACE, United States Environmental Protection Agency (EPA), and NRCS use 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 and

criteria 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 a Food Security Act 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 1

1.0 - FSA WETLAND DETERMINATION PROCESS STEP 1: WETLAND IDENTIFICATION

On-site Visits Required by Regulation:

7CFR12(a)(6) is cited in NFSAM Part 514.1.A(3)(v) as requiring an on-site investigation of FSA-569 "NRCS Report of HELC and WC Compliance" requests or whistleblower complaints. Other situations that require an on-site investigation include a specific request for an onsite determination; as a condition of withholding program benefits; servicing an appeal; or a request for a pre-conversion minimal effect determination.

In addition, an on-site visit is *required* any time an agency expert:

1) Cannot accumulate enough offsite data to complete the decision-making process, or

2) Finds that the accumulated data do not give a clear and definitive determination.

At each significant decision-making point in the offsite procedure, the agency expert will consider whether an on-site inspection procedure is needed. It is not the intent of the SOSM to always provide a determination answer. The intent of the SOSM is to provide a body of data to the agency expert that can be used to make an offsite determination if the data is of sufficient quantity and quality. If not, then the offsite data will be used to assist in making an on-site determination.

Modifying the procedure -

The FSA wetland determination process makes use of two parts of the 1987 USACE Wetland Delineation Manual; Paragraph 23 of the Introduction and Part IV minus the comprehensive method (NFSAM, Part 527(5-3). Paragraph 23, entitled "Flexibility", addresses the possibility of the need to modify the procedures.

NRCS has developed modifications to the process as required by the FSA and its amendments. These modifications are incorporated into the "2010 Food Security Act Wetland Identification Procedure" (FSA Wetland Identification Procedure) as variances and are used in the SOSM and other procedures in this document. Paragraph 23 requires all modifications to be explained so that all variances will be cited when used. No further modifications to the SOSM or other procedures are authorized. Any need to modify the SOSM or other

offsite procedures themselves is an indication that a Level 2 or Level 3 on-site determination is necessary.

Locally produced evidence –

7CFR12.5(b)(7) "Responsibility to provide evidence" states it is the person who is seeking an exemption listed in 7CFR12.5(b)(1-5) to a converted wetland (any time before or after December 23, 1985) to provide evidence in seeking that exemption. It is not the NRCS' responsibility to search for such evidence outside of this procedure; rather, it is the NRCS' responsibility to see if the participant-provided evidence can be confirmed and to ensure that the person has had such an opportunity.

Locally produced evidence will be considered as a source of data alongside all other data used to make the offsite determination. NOTE: In this instance the use of the word "converted" is in reference to 7CFR12.2(3), meaning a manipulation creating ground suitable for crop production at any time before or after December 23, 1985. This is not referring to the use of the FSA Labels "Converted Wetland" or "Converted Wetland +Year".

INDIVIDUALS QUALIFICATIONS TO USE THESE SOSM

As stated in the NFSAM in Part 514.1, "Certified wetland determinations must be completed by a qualified NRCS employee, as determined by the State Conservationist. Qualified employees (i.e., agency experts) must meet all of the following criteria:

1. Have completed all the required training, including updated courses.
2. Have the appropriate job-approval authority.
3. Have demonstrated proficiency in making certified wetland determinations.

Persons using these SOSM must have the appropriate "Wetland Job Approval Authority(s)" delegated and documented in accordance with current NRCS policy.

IDENTIFYING THE PRESENCE OF WETLANDS

The first step in the wetland identification process is to subdivide the project into different areas called **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. For each sampling unit, the agency expert must decide which level of determination outlined in "Section C: Selection of Method" of the USACE 1987 Wetland Delineation Manual is most appropriate as follows-

- Level 1 is rendering a decision using offsite resources for each of the three factors. The assessment of each factor must be independent of the other factors and a different remote data source must be used for each factor. NOTE: A single resource document (tool) can contain multiple data sources. Each can be used as an indicator for a different factor. For example, a soil survey contains multiple data sources (soils map, hydrology data, vegetative data, and use limitation data). High-accuracy Digital Elevation Models (DEMs) derived from Light Detection and Ranging (LIDAR) data and United States Geological Survey (USGS) topographic maps are sources for elevation data, land use data, and hydrology data (i.e. water symbols). The mandate is that a single remote data source (i.e. soil map unit) cannot be applied to more than one factor.
- Level 2 is rendering a decision using on-site data, along with any useful offsite data. The exception is if Section F (Atypical Situation) or G (Problem Area) of

the USACE Manual is needed. Those sections are only applied after a decision is made to use onsite methods (even if remote data sources are eventually used to render a decision).

- Level 3 is rendering a decision using offsite resources (i.e. soils maps, DEMs derived from LIDAR data, etc.) for 1 or 2 factors and using onsite indicators (i.e. soil pits, drift lines, plant dominance tests) for the other factor(s).

Wetland determinations are a technical decision resulting from the determination of whether an area is a wetland or non-wetland (wetland ID), including the determination of appropriate *wetland type* (WC compliance label) and *size* (FSA Wetland Identification 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.

NOTES:

- All agency decisions 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.

1.1 DEVELOPEMANT OF SAMPLING UNITS BASED ON NORMAL CIRCUMSTANCES (NC)

Identification of Sampling Units

Gather all available sources of data and create a base map using available geospatial data to determine if wetlands exist within each sampling unit.

Users will graphically subdivide the area of interest into sampling units on a base map image using resources A through F (as available) listed below. The base map needs to be large enough to read and record multiple sampling units in one location. Sampling unit boundaries do not need to correspond exactly to a boundary indicated by any of the resources listed below. The agency expert determines sampling unit validity. Sampling units will be located using the following remote resources:

A. Based on knowledge of local conditions, review the FSA slides from prior to 1987 (regardless of annual precipitation). Each signature listed below may indicate a unique sampling unit:

- Trees, saplings, shrubs and other non-agricultural vegetation.
- Surface water.
- Saturated conditions.
- Flooded or drowned-out crops.
- Stressed crops due to wetness.
- Differences in vegetation due to different planting dates.
- Inclusion of wet areas as set-aside or idled.
- 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 (especially during dry years).

B. Review the US Fish & Wildlife Service (US FWS) National Wetland Inventory (NWI) maps. While each NWI polygon not matching the other indicators may be a

sampling unit, care should be taken to notice when the NWI is simply displaced from the location where other indicators are showing a unique sampling unit. This "off-center" displacement has been observed when matching up the Indiana NWI sites with certified wetland boundaries.

C. Review DEMs derived from LIDAR data for differences in elevation indicating significant differences in land forms that may collect and hold water.

D. Review the soil survey and the county hydric soils list from the NRCS Web Soil Survey. Identify listed hydric soil map units, map units with hydric soils as part of their name, soils with hydric inclusions, and map units with conventional wetland symbols. Each soil survey feature not matching the other resources above may be a sampling unit.

E. Locally-produced information from individuals involved with the property related to manipulations and conversions prior to December 23, 1985.

F. Review other inventory tools, if available.

NOTE: The more indicators that can be assigned to a specific area, the greater the probability that the area qualifies as a unique sampling unit.

NOTE: All land within the requested area will be assigned a sampling unit designation of "Y" (yes, a wetland) or "N" (no, not a wetland); therefore all land within the requested area will be part of a sampling unit.

- Proceed to the Section 1.2. F**or each sampling unit –**

1.2 DETERMINE REMOTE INDICATORS FOR HYDRIC SOILS

The term hydric soil means soil that, in its undrained condition, is saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that

supports the growth and regeneration of hydrophytic vegetation (16 U.S.C. section 3801(a)(12)). Refer to Part V, subpart C, paragraphs 5-49 through 5-53, of the FSA Wetland Identification Procedures for further information and allowable variances from the Corps methods.

Title 7 CFR § 12.31(a)(1) states, "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)(2) states, "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:"

i. "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."
ii. "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."
iii. "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."

The following remote indicators are suggestive (indicates) that the hydric soils definition is met:

1. Soils Maps (data) and County Hydric Soils Lists.

<u>Hydric Soils Decision Threshold (the factor is met if:</u>

1. The sampling unit meets 7 CFR § 12.31(a)(2) as described above. 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 a depressional area viewed on remote data) of the sampling unit is consistent with the landform (such as closed depression or swale) of the hydric component or inclusion; **<u>or</u>**,
    b. Using the soil series.

- Proceed to Section 1.3.

1.3 DETERMINE REMOTE INDICATORS FOR WETLAND HYDROLOGY

Wetland Hydrology means 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. Refer to Part V, subpart C, paragraphs (5-56) through (5-60), of the FSA Wetland Identification Procedures for further information and allowable variances from the Corps methods.

The NFSAM defines inundation as meaning "the ground is covered by water due to ponding, flowing, or flooded water." Depth of the inundation is not part of the identification of the presence of hydrology. Rather, the focus of data collection and interpretation is on the time of year the inundation occurs, the length of time the inundation lasts, and how frequently it occurs over time on an annual basis.

The NFSAM and the CFR do not define saturation other than being the presence of water within the soil profile that affects the presence of hydrophytic vegetation, and by inference, the absence of non-hydrophytic vegetation as a dominant plant community. Similar to the definition of inundation, the focus on data collection and interpretation is on the season, duration, and frequency of the saturation. However, saturation as a factor in affecting the prevalence of hydrophytic vegetation is dependent on proximity to the rooting depth of the plant.

The 1987 USACE Wetland delineation Manual defines "saturated soil conditions" in the glossary as "A condition in which all easily drained voids (pore) between soil particles in the root zone are temporarily or permanently filled with water to the soil surface at pressures greater than atmospheric."

Wetland hydrology is defined as inundation or saturation 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 NFSAM 514.6(1).

For the purposes of this method, procedure, and process, saturation is defined as the presence of groundwater or perched water at or near the surface of the soil profile within a depth of 12 inches from the soil surface during any time in the growing season.

In Indiana, a site under direct observation during the growing season that is dominated by hydrophytic vegetation on a hydric soil that is saturated to a depth within 12 inches of the surface is indicative of the site being either a wetland (W) or a manipulated wetland

(WX), indicating partially removed hydrology after 1985, rather than a non-wetland (NW), notwithstanding contradictory indicators.

The following remote indicators are suggestive (indicates) that the wetland hydrology definition is met:

1. Imagery showing surface water inundation by ponding or flooding under NC.
2. Imagery showing a Color Tone difference 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. **Refer to Attachment C**. Color tones provide clear distinctions in the condition of the sampling unit compared to the condition in the surrounding area including size and color. Color tones include:
    - Hydrophytic vegetation such as trees, saplings, shrubs, and other non-agricultural plants.
    - Saturated condition.
    - Stressed crops due to wetness.
    - Differences in vegetation due to different planting dates.
    - Inclusion of wet areas as set-aside or idled.
    - 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 (especially during dry years).
        - Users are advised that sampling units and wetness signatures in areas with perennial vegetation may not be readily visible. In such cases, ***field verification is required***.

3. The presence of mineral soil flats that have not been manipulated such that the microtopography of the soil surface has been leveled, or that the area has been altered by surface drain patterns or subsurface drainage. Clermont, Cobbsfork, and Peoga soils are currently the soil types that are included in the mineral soil flats reference site in Indiana.

Wetland Hydrology (including pre-1985 drainage) Decision Threshold is met with the proper combination of the following indicators:

1. The presence of water as indicated by signatures on imagery or a soil survey with the area labeled as "Water" or "Miscellaneous Water",

OR

2. The presence of mineral soil flats that have not been tilled or leveled, or altered by surface drain patterns or subsurface drainage. Clermont, Cobbsfork, and Peoga soils are currently the soil types that are included in the mineral soil flats reference site in Indiana,

OR

3. Wetness signatures found on greater than 50 percent of imagery reviewed with consideration given to the actual environmental conditions at the time of data collection (wet, dry, normal).
    - The imagery review will consist of all available imageries prior to 1988. The 1987 imagery is to be used only to verify subsequent effects of drainage installed prior to 1985. Imagery from 1979 to 1986 will be interpreted with consideration of whether it is reflective of normal, wet, or dry amounts of precipitation.

NOTE: Imagery from years that are considered wet or dry years are an indicator only if they have contrarian indicators (i.e. - wet signatures in a dry year or no signatures on a wet year). See attachment C "Hydrology Information" for information on the use of normal year data.

- Publically available high-resolution leaf-off imagery taken in the early spring can be used to determine presence of wetland signatures, taking care not to factor in any post-December 23, 1985 manipulations and conversions.
- NRCS is invoking Paragraph 23 of the 1987 USACE Wetland Delineation Manual for agricultural land determinations. For a sample unit that has been identified by the Farm Service Agency as having an agricultural commodity produced at least once prior to 1985 and does not support woody vegetation on 1985, the only FSA labels that are applicable are Prior Converted Cropland (PC), Non-Wetland (NW), and Farmed Wetland (FW). The absence of hydrology indicators on a majority of imagery taken prior to 1987 indicates either a PC or NW determination. Hydrophytic vegetation criteria can be by-passed by documenting that an agricultural commodity was produced prior to 1985. The soils map will indicate either a PC label for hydric soils or a NW label for non-hydric soils. The FW label will be used if a majority of the aforementioned imagery has the hydrology indicators of surface water or long-term inundation (10% consecutive days of inundation during the wet part of the growing season (i.e. - March, April, May) such as non-agricultural

herbaceous vegetation or bare soil with slow drawdown signatures. These labels can be applied without applying the remainder of the SOSM.

NOTE: Care will be taken to identify False Positive and Negative situations.

- An FW label will be changed to W if the site is abandoned for five consecutive years at any time after 1985.
- A NW label due to the conversion of a wetland prior to 1985 will be changed to W if the three criteria return.
- An herbaceous Wetland (W) or a Farmed Wetland Pasture (FWP) can present subtle signatures on the imagery such as simple vegetative color variation but with a consistent footprint.
- FWP's can also be abandoned to the W label,

OR

ANY TWO OF THE FOLLOWING INDICATORS:

1. High-accuracy Digital Elevation Models (DEMs) derived from LIDAR.
2. Depth Grid modeled from high accuracy digital elevation models.
3. Short term-inundation modelled from stream gauge data.
4. National Wetland Inventory (NWI) maps produced by the US FWS.
5. Soil Survey map with wetness spot symbols.
6. Soil Survey map with linear spot symbols associated with imagery wetness signatures.
7. USGS Topographical map with wetness spot symbol.

AND

Producer-provided records indicate that drainage has been installed or constructed prior to 1985,

a. And has been maintained and is functioning such that the lack of hydrology indicators can be explained, or that such indicators are potential false positive hydrology indicators.

b. If no producer-provided records are available, then the agency expert is to presume maintenance has been conducted on any drainage features installed prior to 1985 and any wetness signatures observed are valid (indicating any potential system has not adequately removed hydrology) and are not false positive indicators.

- Proceed to Section 1.4.

1.4 DETERMINE REMOTE INDICATORS FOR HYDROPHYTIC VEGETATION

Hydrophytic vegetation means a plant growing in (A) water; or (B) a substrate that is at least periodically deficient in oxygen during a growing season as a result of excessive water content (16 U.S.C. section 3801(a)(11)). Refer to Part V, subpart C, paragraphs (5-41) through (5-46), of the FSA Wetland Identification Procedures for further information and allowable variances from the Corps methods in identification of hydrophytic vegetation.

The following remote indicators are suggestive (indicates) that the hydrophytic vegetation definition is met. See Attachment A for a detailed description of each resource:

1. Ecological Site Descriptions (ESD).

2. Approved Indiana NRCS wetland reference site data as it is developed.
3. Indiana Hydric Soil and Vegetative Correlation List
4. Locally developed soil map units and plant association lists.
5. National Wetland Inventory (NWI) mapping.
6. Indiana Approved Official Soil Series Descriptions (OSD) plant data.
7. Prior land-based (on the ground) photography.

Hydrophytic Vegetation Decision Threshold (the factor is met if):

One or more of the listed resources will indicate the presence of hydrophytic vegetation.

NOTE: Attention should be given to the definition being "Plants growing in water or in a substrate that is as least periodically deficient in oxygen during the growing season as a result of saturation or inundation by water". Variance 5-42 of the FSA Wetland Identification Procedure states "For FSA purposes, the question is not as much the species, but rather how individual plants are behaving within any one sampling unit." Any individual plant meeting the definition is considered to be hydrophytic vegetation.

- Proceed to Step 1.5

1.5 FINALIZATION OF BASE MAP

The agency expert will analyze each sampling unit as defined in Steps 1.2, 1.3, and 1.4 and use a worksheet to complete the following steps:

- If all three factor 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 answer is "no" (a factor is not met) for a sampling unit then record an "N" (no) on the base map for the sampling unit.
- Provide a copy of the final base map to the case file.

- This final base map will be used to complete Section 2 and Section 3.

NOTE: Part IV of the 1987 USCAE Wetland Delineation Manual instructs the user to label the wetland "W" and the nonwetland "N". NRCS is using the label "Y" in place of the "W" so as not to cause confusion with the use of "W" as an FSA Wetland Type Label in section 2.

➢ Proceed to Section 2

SECTION 2

2.0 - FSA WETLAND DETERMINATION PROCESS STEP 2: ASSIGNMENT OF WETLAND CONSERVATION COMPLIANCE (WC) LABELS

Sampling units identified as a "Y" (wetland) or "N" (non-wetland) in Section 1 will be assigned the appropriate WC compliance label as determined by any applicable exemptions found in the current version of the NFSAM. The offsite process for this step is identified as the **State Offsite Wetland Type and Size Procedure (SOWTP)**. This is a separate procedure from the SOSM.

NOTE: Unless otherwise stated, the use of "1985" in this document refers to December 23, 1985.

2.1 VERIFICATION OF PRE-1985 CROPPING HISTORY

The following data will be used to indicate that pre-1985 cropping history ("agricultural commodity produced at least once before 1985" (7 CFR 12.2)) is met. This step may have already been carried out in step 1.3. If so then this section need not be used unless there is a possibility of a false positive or negative determination

1. Any imagery taken prior to 1986.
2. Farm Service Agency records of any kind.

3. Any record from a person who was involved in the farming operation before December 23, 1985 that demonstrates that the site was cropped and appears to be valid.
4. Areas that are in pasture or hay land that have a uniform topography that indicates suitability as a crop field in past years. This condition does not preclude the use of wetland labels.

Cropping History Decision Threshold (met if):

The threshold to use crop production as an eligible wetland exemptions has three parts:

1. The site is determined to be "N" (Non Wetland) on the Base Map.
   a. There may be situations with the Base Map being marked "Y" when the site may be determined to have cropping history with the use of steps #2 and #3 (resulting in a FW label).
2. The site was cropped at least once prior to December 23, 1985 -
   a. Evidence of Pre-1985 cropping appears on at least one piece of remote imagery.
   b. Pre-1985 imagery indicates that the site was cleared of woody vegetation and the mapped soil type is commonly suited for crop production (as indicated on "Use and Vegetation" section of the Official Soil Description).
   c. Farm Service Agency informs NRCS of cropping history.
   d. An individual provides a written statement of when the site was cropped or imagery demonstrating so.
3. The site was suitable for crop production on December 23, 1985 (can use a and/or b)–

a. 1985 or 1986 imagery indicates the site –

   i. Is being cropped, or

   ii. Is being used for pasture or hayland production absent of wetland indicators, or

   iii. Is not inundated with surface water, or

   iv. Does not contain woody vegetation such that:

      1. Only isolated individual specimens that would not hinder conventional row planting are observed, and

      2. There are not so many trees that a non-ag determination should be completed.

b. The Farm Services Agency informs NRCS of 1985 cropping history, "set-aside" history, or other status indicating that the site was suitable for crop production.

- Proceed to Section 2.2.

2.2 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.

The analysis related to pre-1985 manipulations has been completed in Step 1 - 1.1 DEVELOP A BASE MAP AND DETERMINATION OF NORMAL CIRCUMSTANCES (NC).

Evidence of pre-1985 manipulations presented during the following steps in the FSA label determination step should be applied to the steps in Section 1 (Developing the Base Map) to determine if the analysis completed in Section 2 needs reconsidered.

2.3A VERIFICATION OF POST-1985 POTENTIAL MANIPULATION AND/OR CONVERSION

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

- Post-1986 imagery/aerial photography showing a manipulation(s).
- Post-1985 NRCS or Farm Service Agency records showing a manipulation(s).
- Post-1985 producer-provided records showing a manipulation(s).
- Post-1985 land-based photographs showing a manipulation(s).
- DEMs derived from LIDAR data showing a manipulation.

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

1. The manipulation appears on at least one indicator from post-1985 data.

NOTE: A site visit is required for potential wetland violations and a FSA-569 will be issued. Refer to 7CFR12 and NFSAM 514.1 to determine the circumstances that require a site visit.

2.3B VERIFICATION OF POTENTIAL MANIPULATION OR CONVERSION BETWEEN DECEMBER 23, 1985 AND NOVEMBER 28, 1990

The following remote indicators will be used to indicate whether a potential manipulation or conversion occurred before or after November 28, 1990.

- Imagery/aerial photography showing a manipulation(s) after December 23, 1985 but before November 28, 1990 (NFSAM Part 514).

- NRCS or Farm Service Agency records showing a manipulation(s) after December 23, 1985 but before November 28, 1990.
- Producer-provided records showing a manipulation(s) after December 23, 1985 but before November 28, 1990.
- Land-based photographs showing a manipulation(s) after December 23, 1985 but before November 28, 1990.
- DEMs derived from LIDAR data indicating a manipulation after December 23, 1985 but before November 28, 1990.

Pre-1990 Potential Conversion Decision Threshold (the factor is met if):

1. The manipulation appears on at least one indicator from data representing conditions between December 23, 1985 and November 28, 1990.

NOTE: A site visit is required for potential wetland violations and a FSA-569 will be issued. Refer to 7CFR12 and NFSAM 514.1 to determine the circumstances that require a site visit.

2.3C VERIFICATION OF POTENTIAL MANIPULATION OR CONVERSION AFTER NOVEMBER 28, 1990

The following remote indicators will be used to indicate whether a potential manipulation or conversion occurred after November 28, 1990.

- Imagery/aerial photography showing a manipulation(s) after November 28, 1990 (NFSAM Part 514).
- NRCS or Farm Service Agency records showing a manipulation(s) after November 28, 1990.
- Producer provided records showing a manipulation(s) after November 28, 1990.

- Land-based photographs showing a manipulation (e.g. tile inlet/outlet) after November 28, 1990.
- DEMs derived from LIDAR data indicating a manipulation after November 28, 1990.

Post-1990 Potential Conversion Decision Threshold (the factor is met if):

1. The manipulation appears on at least one indicator representing conditions after November 28, 1990.

NOTE: A site visit is required for potential wetland violations and a FSA-569 will be issued. Refer to 7CFR12 and NFSAM 514.1 to determine the circumstances that require a site visit.

- Proceed to Section 2.4, 2.5, or 2.6 as appropriate. These sections identify land forms that meet the definition of depressional Farmed Wetlands, closed depressional Farmed Wetlands known as potholes, and Farmed Wetland Pastures. Proceed to section 2.7 if none of these are appropriate.

2.4 VERIFICATION OF CROPPED GLACIATED CLOSED DEPRESSIONAL LANDFORM

COMPLETE THIS STEP ONLY IF A Pre-December 23, 1985 MANIPULATION WAS DOCUMENTED

The following remote indicators are suggestive (indicates) that the site is a glaciated depression or land form that does not have topography that allows accumulated surface water to flow off-site such that it meets the definition of a Farmed Wetland pothole (FW).

1. Imagery, land-based photography, or other data show evidence that 7 consecutive days of inundation or 14 consecutive days saturation occurs in a closed topographic

depression in a glaciated upland (non-floodplain, non-drainage way) landscape during the growing season. The term upland follows the concept from the national Soil Survey Handbook (NSSH). Imagery evidence includes –

a. Surface water.

b. Flooded or drowned out crops.

c. Vegetative color variation.

d. Stressed crops.

e. Un-harvested crops.

f. Isolated areas not farmed with the rest of the field.

g. Non-agricultural vegetation.

2. DEMS derived from LIDAR show 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 show a depression, pothole, or closed topographic depression in a glaciated upland landscape position. Refer to Attachment B for further information.
5. A combination of US FWS NWI map and one other indicator from step 1.3.

<u>Glaciated Closed Depression Decision Threshold is met if:</u>

A. The landform appears on at least one of the five remote indicators. The more indicators that can be assigned to a specific area, the greater the probability that it qualifies as a glaciated closed depressional area that meets the definition of a Farmed Wetland (FW).

OR

B. NRCS records show field-verified manipulations with an assessment of duration, such as drainage equations found in the National Engineering Handbook, Chapter 19.

- Document and proceed to the section 2.5.

2.5 VERIFICATION OF PASTURED OPEN-ENDED DEPRESSIONAL AREAS WITH CONSECUTIVE LENGTH (DURATION) OF PONDING AND/OR SATURATION DURING THE GROWING SEASON ON DECEMBER 23, 1985 IN MOST YEARS

COMPLETE THIS STEP ONLY IF A Pre-December 23, 1985 MANIPULATION WAS DOCUMENTED

The following remote indicators are suggestive (indicates) that sites that have been manipulated but still warrant a "Y" on the Base Map exhibit the duration of inundation or saturation required to meet the criteria for pasture and hay land that contains depressions or other topography sufficient to allow water to accumulate such that it meets the definition of a Farmed Wetland Pasture (FWP).

1. 1980 through 1986 Farm Service Agency aerial imagery (taken during the growing season as defined in Part 514.2 of the NFSAM) showing wetness signatures. Imagery evidence includes the following signatures –
   a. Surface water.
   b. Flooded or drowned out crops.
   c. Vegetative color variation.
   d. Stressed crops.
   e. Un-harvested crops.

f. Isolated areas not farmed with the rest of the field.

g. Non-agricultural vegetation.

2. DEMS derived from LIDAR show 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 show a depression, pothole, or closed topographic depression in a glaciated upland landscape position. Refer to Attachment B for further information.

5. A combination of FWS NWI map and one other indicator from 1-3.

<u>Pastured Open-ended Depressional Areas Decision Threshold is met if:</u>

A. The landform appears on at least one of the four remote indicators. The more indicators that can be assigned to a specific area, the greater the probability that the area qualifies as a glaciated open-ended depression that meets the definition of a Farmed Wetland Pasture (FWP).

OR

B. NRCS records show field-verified manipulations with an assessment of duration, such as drainage equations found in the National Engineering Handbook, Chapter 19.

2.6 VERIFICATION OF CROPPED OPEN-ENDED DEPRESSIONAL AREAS WITH CONSECUTIVE LENGTH (DURATION) OF PONDING AND/OR SATURATION DURING THE GROWING SEASON ON DECEMBER 23, 1985 IN MOST YEARS

<u>COMPLETE THIS STEP (2.6) ONLY IF A Pre-December 23, 1985 MANIPULATION WAS DOCUMENTED</u>

The following remote indicators are suggestive (indicates) that sites that have been manipulated but still warrant a "Y" on the Base Map exhibit the duration of inundation or saturation required to meet the criteria for cropland that contains depressions or other topography sufficient to allow water to accumulate in order to meet the definition of a Farmed Wetland (FW).

1. 1980 through 1986 Farm Service Agency aerial imagery (taken during the growing season as defined in Part 514.2 of the NFSAM) showing wetness signatures. Any other 1986 or earlier aerial photography may also be used. Imagery evidence is limited to –
   - Surface water.
   - Drowned out crops leaving bare soil indicating long-term inundation ("bulls-eye" pattern).
   - Non-ag vegetation on hydric soils.
2. NRCS records show field-verified manipulations with an assessment of duration, such as drainage equations found in the National Engineering Handbook, Chapter 19.
3. A combination of FWS NWI map and one other indicator from 1-3.

   <u>Open-Ended Depressional Decision Threshold is met if:</u>

   A. The landform appears on at least one of the three remote indicators. The more indicators that can be assigned to a specific area, the greater the

probability that the area qualifies as a glaciated open-ended depression that meets the definition of a Farmed Wetland Pasture (FWP).

OR

B. Results of analytical techniques (such as drainage equation(s)) show that inundation would not be removed within 15 days or consecutive days of 10% of the growing season.

- Document and proceed to section 2.7.

2.7 DETERMINATION OF THE REQUIRED CONDITIONS FOR THE FOLLOWING WC LABELS

Refer to Part 514 of the NFSAM, 7 CFR 12.2 and 7 CFR 12.5 for a full discussion of the requirements for various exemptions. The SOSM has determined whether the sampling unit is considered a Wetland (Y) or a Non-Wetland (N). 7CFR12 lists the possible Wetland Types –

- Artificial Wetland (AW) - 7CFR12.2(a) Wetland(1)
- Commenced Conversion Wetland (CC) - 7CFR12.2(a) Wetland(2) & 12.5(b)(2)
- Converted Wetland (CW or CW+Year) - 7CFR12.2(a) Wetland(3) & 12.4(a)(2)&(3)
- Converted Wetland not for the production of commodity crops (No label) - 7CFR12.5(b)(1)(iv)
- Farmed Wetland – depressional or pothole (FW) - 7CFR12.2(a) Wetland(4)
- Farmed-Wetland Pasture (FWP) - 7CFR12.2(a) Wetland(5)
- Minimal Effect Wetland (MW) - 7CFR12.5(b)(1)(v)

- Not-Inventoried Wetland (No label) - 7CFR12.2(a) Wetland(6)
- Non-Wetland (NW) - 7CFR12.2(a) Wetland(7)
- Prior-Converted Cropland (PC) - 7CFR12.2(a) Wetland(8)
- Wetland (W) - 7CFR12.2(a) Wetland(9)

All other WC compliance label assignments require the use of the NFSAM and on-site investigations. These include –

- Converted Wetland by Entity (CW) - 7CFR12.5(D)
- Converted Wetland Planting Violation (CW) - 7CFR12.2(a) Wetland(3) & 12.4(a)(2)
- Converted Wetland + Year (CW+Yr) - 7CFR12.2(a) Wetland(3) & 12.4(a)(3)
- Manipulated Wetland (WX) – 7CFR12.5(b)(1)(iv)
- Third Party Conversion (TP) - 7CFR12.5(D)

SECTION 3.0

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

The agency expert will analyze the final product to ensure that the size of the labeled area is accurate, particularly in response to post 1985 developments. Sample units and WC labeled areas will be adjusted to ensure that the labeled area accurately reflects the 1985 status and any changes created after that year.

3.1 TRANSFERRING BASE MAP SAMPLING UNITS TO WC COMPLIANCE LABELED POLYGONS

The agency expert 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 2 (e.g. closed depression/open depression, cropping history, manipulation, hydrology duration).

3.2 CERTIFIED WETLAND DETERMINATION (CWD) MAP

The Certified Determination Map will be depicted on the latest imagery that appears to be of normal precipitation. The map will contain labels for all areas that have certified determinations and preliminary determinations.

The map will be of sufficient scale so that the determined areas can be easily seen. Additional maps can be made to better show site location, location of farm, and past activities on the farm to show manipulation and conversion.

ATTACHMENT A

Hydrophytic Vegetation Information

The following resources are listed in Part IV of the USACE 1987 Wetland Delineation Manual or are resources developed after the issuance of the Manual.

Ecological Site Description (ESD)

As of the date of issuance of these SOSM, ESDs are currently being developed in Indiana. Once completed, a matrix correlating soil map unit components to ecological sites will be available in Section 1, State Offsite Methods, of the Indiana Field Office Technical Guide (FOTG).

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. This use of these data is authorized in Paragraph 55-Step 4(c) and (d) of the 1987 USACE Wetland Delineation Manual.

Approved Indiana NRCS wetland reference site data as it is developed.

Indiana NRCS will develop wetland reference site data through formal long-term water table monitoring and data demonstrating that a specific soil type has both positive hydrology and a plant community dominated by hydrophytic vegetation. These reference site data are currently being developed for Cobbsfork and similar soils in Southern Indiana. The use of these data is authorized in Paragraph 55-Step 4(d) and (h) of the 1987 USACE Wetland Delineation Manual.

Indiana NRCS Wetland Soils and Vegetative Correlation Data

Indiana NRCS will maintain and continually build a list of vegetative species observed, correlated with specific soil series, from past and future on-site determinations. In addition to this "master" correlated list, the certified agency experts may make use of their own accumulation of past determinations to indicate the presence of hydrophytic vegetation, particularly if a reference site is near the site to be determined. The use of these data is authorized in Paragraph 55-Step 4(d) and (h) of the 1987 USACE Wetland Delineation Manual.

Locally Developed Soil and Plant association lists

Certified agency experts can make use of previous determination data that demonstrates a correlation between specific soil types and observed plant communities dominated by hydrophytic vegetation. The use of these data is authorized in Paragraph 55-Step 4(d), (f), and (h) of the 1987 USACE Wetland Delineation Manual.

Fish and Wildlife Service National Wetland Inventory (NWI) Mapping

The U.S. Fish and Wildlife Service website "Wetland Mapper" contains a list of vegetative species correlated to their specific wetland classifications. The use of these data is authorized in Paragraph 55-Step 4(b) of the 1987 USACE Wetland Delineation Manual

Official Soil Series Descriptions (OSD)

The official soil series descriptions provide a description of the vegetation adapted to the soil in a section entitled "Use and Vegetation". The description of the vegetation can range from listing specific species to only providing a general description such as "Native vegetation is water tolerant sedges, reeds, grasses, and shrubs."

Indiana NRCS is in the process of developing a state-wide list of all of the listed soil series, indicating which descriptions can be used to indicate hydrophytic vegetation and which soil series descriptions are being updated to provide specific species information. The use of these data is authorized in Paragraph 55-Step 4(d) and (g) of the 1987 USACE Wetland Delineation Manual

ATTACHMENT B

DEFINITION OF POTHOLE

The NRCS will use the definition of pothole, playa, and pocosin 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, playa, or pocosin soils.

- Pothole – Pothole means a closed or partially closed depressional wetlands, generally circular or elliptical in shape, that were formed during the Wisconsin Glaciation. Potholes can occur in an outwash plain, a recessional moraine, lacustrine plain, or a till plain and commonly contain an intermittent or seasonal pond or marsh. Many pothole wetlands are seasonally dry, retaining water and saturated soil conditions due to snow-melt and precipitation runoff early in the growing season. Later in the growing season, evapotranspiration generally exceeds normal precipitation resulting in some potholes being dry for a significant portion of the year. The fluctuating hydrology, along with alterations implemented to improve farming, lead to a variety of vegetation characteristics including submergent and floating plants in deeper water, bulrushes and cattails in shallow water and sedges located near adjacent uplands. During dry periods, upland plant species can invade these sites and persist into wet seasons.

  NOTE: This definition is a mutually agreed-to definition by both Indiana and Illinois NRCS to describe the glaciated pothole region present in both states.

- Specific Indiana identification parameters are:
  - Occurs within the Wisconsin glaciated region.
  - Symmetrically closed depression.

- Ponds water greater than 1 foot in depth if not drained.
- Side slopes dominantly greater than 2%.
- Has a ≥50% chance of being ponded for at least 7 consecutive days or is saturated for at least 14 consecutive days during the growing season.

- In Indiana, Potholes are located primarily in the upper half of the Wisconsin Glaciated Region and include, but are not limited to, the following soil series with the modifier “pothole”:
  - Harpster sil, pothole
  - Milford msic, pothole
  - Milford sl, pothole
  - Milford sicl, pothole
  - Pella sicl, pothole
  - Peotone sicl, pothole
  - Walkill l, pothole
  - Warners sil, pothole

ATTACHMENT C

HYDROLOGY INFORMATION

1. Hydrology information will be developed using Chapter 19 of the NRCS National Engineering Field Handbook –
    I. Part 650.1901 - "Use of stream and lake gauges (pages 19-2 to 19-5)
        i. This part may be used whenever there are data developed for such use.
    II. Part 650.1911 - "Remote Sensing Applications" (pages 19-85 to 19-96)
        i. This part is to be used to determine the presence of hydrology.
    III. The use of the other parts of Chapter 19 will only be with the assistance of NRCS engineering specialists.
    IV. NRCS will use Purdue Extension Publication AY-300, June 2001, "Drainage and Wet Soil Management – Drainage Recommendations for Indiana Soils".
        i. The guide provides a tile spacing distance range for each group of soils with a similar drainage capability.
        ii. The guide will be used to determine how far back to set a tile line from an herbaceous wetland, a farmed wetland, or a farmed wetland pasture.
            1. Each person receiving such a guide will be advised to use the maximum spacing range as a setback distance.
            2. Each person receiving such a guide will be advised that wetland labels such as W-Wetland, FW-Farmed Wetland, or FWP-Farmed Wetland Pasture will be changed to CW+Year if they are affected by the installation of new tiles, even if laid according to the guide.

3. A Technical Assistance Note or a copy of the guide will be placed in the casefile of every person receiving the guide.

2. The use of Farm Service Agency aerial imagery will serve two purposes -

   I. The identification of wetlands and non-wetlands as of December 23, 1985. Consequently, the slides to be used are limited to those taken before 1987 as the intent of the interpretation is for the Wetland Identification prior to 1985. Slides and imagery post-1986, such as the 2005 infrared and other high resolution imagery, may be used to help identify ground and topographical conditions but not in the identification of wetlands under typical conditions.

   II. The occurrence of atypical activities in wetlands after December 23, 1985. Slides taken after 1986 are used for three purposes –

      i. To indicate if a wetland was manipulated.

      ii. To determine if a wetland was converted between December 23, 1985 and November 28, 1990, and if it was converted – what year, if any, was it used for the production of an annual commodity crop after the conversion.

      iii. To determine what year, if any, was a wetland converted after November 28, 1990, to make it suitable for the production of a commodity crop.

3. Normal Precipitation –

   The terms “normal precipitation imagery”, “normal precipitation”, or “normal years” is referring to a period of time where normal amounts of precipitation were received by the site. The time frame is normally 3 months. The amount of

precipitation received by a specific area is arrived by using the procedure outlined in Part 650.1903 - “Supplemental data for remote sensing” (pages 19-24 to 19-31). This same procedure is used to determine if a site, during a specific date or time frame, received precipitation amounts within the range of normal rainfall or outside of the normal range with excessive amounts of precipitation, considered “wet”, or low amounts of precipitation, considered “dry”.

ATTACHMENT D

DESCRIPTION OF AVAILABLE REMOTE SENSING TOOLS

Ten (10) potential sources of information are described within Part IV, Section B of the 1987 Manual. This section describes some of the sources listed in the manual, defines additional sources that NRCS may use to complete the CWD process. A source not being mentioned in this section should not be interpreted as that source being invalidated. The delineator should attempt to utilize all available sources of information when completing the SOSM.

United States Geological Survey (USGS) 7.5 Minute Series Quadrangle Maps

NRCS employees are provided with the official USGS topographic maps within agency Geographic Information Systems (GIS). USGS topographic maps and other spatial data may also be accessed at: http://nationalmap.gov/ via "The National Map Viewer." Topographic maps provide marsh or swamp symbols for wetter areas and the general agricultural status of the land relative to the date of the map (e.g. cleared ground that could be either cropland or pastureland, forested, or urban). Water bodies such as streams and ponds are identified and manipulations to those waters such as channelization or existing levees may be noted. Site relief is one of the most important aspects of the topographic map. Contours enable decisions relative to the site's ability to charge and retain wetness, and to recognize drainage patterns.

Topographic map limitations

1. Check the date on the map or in the metadata for the date of revision. This may help determine a time range when changes occurred.

2. USGS protocol was generally to delineate the wet areas mapped based on the driest season of the year, which may have missed several wetlands.

U.S. Fish and Wildlife Service National Wetland Inventory (NWI)

The National Wetland Inventory (NWI) is an offsite delineation of potential wetlands. The NWI is an available tool that mapped potential wetlands when wetland losses were accelerating in the 1970's and 80's due to agricultural conversions and other wetland stressors. The NWI is accepted by USFWS, USACOE, EPA and NRCS as a first cut indicator tool for the presence of wetlands. NRCS employees are provided with the most up to date version of NWI data that is compatible with agency Geographic Information Systems and tools. NWI data can also be obtained directly from USFWS at http://www.fws.gov/wetlands/.

Plant community and hydrologic condition are key components of the NWI interpretation and these interpretations were made at a time critical for making decisions relative to the FSA. Because the first iterations of NWI were commenced in the 1970's, the historical data provides an indication of the status of wetlands around the critical December 23, 1985 date. Hydrologic condition was interpreted using several water regime modifiers. The 1987 Corps Wetland Delineation Manual states in Part IV, Section B chapter 54 that areas mapped as "wetter" than temporarily flooded and intermittently flooded have extremely high probabilities of meeting the wetland criteria (in excess of 90 percent). The historical NWI also indicates possible manipulations to wetlands that were photo-interpreted from the base map utilized in the evaluation.

NWI limitations

1. The NWI mapping protocol was developed prior to the accepted federal definition of wetlands contingent on the three parameters of soils, hydrology, and plants. Consequently, some of the early delineations may have only been based on the two parameters of hydrology and plant species. This was somewhat corrected with soils between the draft remote sensing interpretations and the final interpretations.
2. The inventory was remotely sensed with generally no more than 5% ground-truthing in any given state.
3. The inventory often fails to capture open land wetlands, such as farmed wetlands, as defined under the Food Security Act of 1985, as amended, because of cropping activities and/or disturbance of plant communities.

NRCS Soil Survey

Soils information is a primary tool for making offsite wetland determinations. NRCS employees and the general public have access to the most up to date soils data via agency GIS systems as well as Web Soil Survey (WSS) at http://websoilsurvey.nrcs.usda.gov.

Field office business software or the WSS have reports available that will produce both spatial and tabular reports/lists for hydric soils. Currently this report for individual parcels should be a subset of the “County Hydric Soils List” which is referenced in many documents. Field office business software rates each map unit. Map units are designated as "all hydric," "partially hydric," "not hydric," or "unknown hydric," depending on the rating of its respective components. "All hydric" means that all components listed for a given map unit are rated as being hydric, while "not hydric" means that all components

are rated as not hydric. "Partially hydric" refers to a soil that has at least one component of the map unit that is rated as hydric and at least one component that is rated as not hydric. "Unknown hydric" indicates that at least one component is not rated so a definitive rating for the map unit cannot be made.

In Web Soil Survey, there are multiple reports that provide hydric soil information. “Hydric Rating by Map Unit” indicates the cumulative percentage of soil components within each map unit that meet the criteria for hydric soils. A related report, “Hydric Rating by Map Unit (5 categories)” further designates a hydric category for each map unit based on the cumulative percentage of its hydric components. The “Hydric Soils List” provides the hydric/non-hydric status of all map unit components in the survey area. The “Hydric Soils” report lists only those map units that have at least one component that is hydric. The percentages of hydric or non-hydric soil components found in each report for any map unit are only an estimate. These estimates were derived from field observations taken by soil scientists during the soil survey but will vary for any map unit from one location to the next.

The decision to use SOSM (remote sensing) versus an onsite visit for possible hydric soil inclusions is a primary objective of this methodology.

Soil Survey limitations

The published soils data is a tool that provides evidence to the possible presence of a wetland. Some of the limitations to the published soil survey relative to offsite hydric soil determinations are as follows:

1. All soil surveys rely on data that were gathered during a specific period of time. Land use changes or manipulations from natural or human events may now result in inaccurate soils data. Additionally, some wetlands, such as floodplain wetlands, naturally evolve over time into non-wetlands.
2. A "hydric soil" component listed in the report may have properties that do meet hydric soil criteria. However, the entire range of characteristics of soil components classified to the series level may not be entirely within the range of properties for a "hydric soil." Hydric soil criteria were developed separately from Soil Taxonomy. Therefore, any given component (series) may have a range of characteristics that is not entirely within the range for hydric soils even though the series is poorly or very poorly drained.
3. Almost all of the soil maps in the state were originally drawn at a relatively small scale so some minor displacement of soil lines may be observed. Additionally, much of the digital spatial data available were created by recompiling and digitizing these hard copy maps. Errors such as mislabeled map units and spatial displacement are accidentally introduced as a result of the analog to digital conversion process. If an error is suspected for any reason, an original hard copy of the information should be consulted when available.

USGS Stream Gauge Data

Stream gauge data may be a useful tool in some parts of the state for determining the hydrologic criteria of potential riverine wetlands subject to long duration flooding. Sites subject to long duration flooding (or ponding) that occurs during the growing season for 14 or more consecutive days > 50% of years under normal circumstances will meet the

criteria of a wetland if the site also supports a prevalence of hydrophytic plants. Long duration periods of surface inundation meet both the hydrologic criteria of a wetland (14 or more days) and the hydric soil criteria of a wetland (7 or more days). Typically this method requires that the flood elevation be extrapolated across the landscape between gauges in order to analyze the potential of individual sites.

Stream Gauge Data Limitations

1. Current stream gauge data coverage and subsequent analyses are limited in Indiana.

Remote Sensing Including Farm Service Agency Aerial Photography

There are three basic film bands for the imagery available through the NHAP, NAPP, and NAIP: Color infrared (CIR), Natural Color (NC), and Black/White (BW).

The currently acquired imagery by Farm Service Agency, NAIP, is digital ortho-imagery acquired during the agricultural growing season (leaf on) and the Farm Service Agency uses this imagery as a tool primarily to verify agricultural conditions for USDA programs. The NAIP provides one meter ground sample distance (GSD) ortho-imagery rectified within +/- 6 meters to true ground at a 95% confidence level.

From the 1980s through the 1990s, the Farm Service Agency purchased county-wide high altitude flights for resource assessments and verification of fields planted and types of crops grown. The spring flights make these sources of imagery very valuable for wetland determinations because they occur during the normal hydrologic period of recharge for the majority of the wetlands in the state. The Farm Service Agency Aerial Photography Field Office

(http://www.FSA.usda.gov/FSA/apfoapp?area=apfohome&subject=landing&topic=landing) located in Salt Lake City, Utah, also houses and provides copies for a fee of paper aerial photographs (provided as a digital print) from past flights which were typically flown about every five to ten years.

The NAIP imagery is accessible as a digital data layer in Geographic Information Systems (GIS) and is available in all field offices, and certain flight years have the capability of being displayed either in natural color and CIR.

Because Farm Services Agency imagery may be available on or around the key years of 1985 and 1990, this imagery is one of the **most important tools available for making good offsite wetland determinations or decisions for requiring onsite investigations**.

In addition to Farm Service Agency, NRCS personnel have access to imagery from a number of sources. Imagery from the "Indiana Historical Aerial Photo Index" can be acquired from the Indiana Geological Website. Imagery can also be viewed on many County GIS websites that are operated in conjunction with the Assessor's office. These sources tend to offer variability in timing and season of photography which provides greater perspective when making a determination. Many of these sources are not geo-referenced and therefore cannot be added to a base map within a GIS. However, the information that they provide is often extremely valuable to the delineator.

Aerial Photography Limitations

Some of the limitations relative to use are:

1. Low crop producing counties may have fewer available years of imagery.
2. Many counties in the state have discarded early years of crop compliance slides.

3. Early year crop compliance slides not digitized may have no mapping index and consequently are hard to organize and use unless an index is developed.
4. Based on the actual flight date and the type of film, the imagery may be limiting relative to some interpretations. For example, flights in the growing season (e.g. leaf on) may result in misinterpretations of potential wetland features. In natural color images water, wetland understory plants, and drainage patterns may be obscured by the canopy of a mature forested cover.
5. Normal climatic conditions (i.e. pre-flight rainfall patterns) assessed for the flight may still not accurately reflect the actual onsite condition due to local variability.
6. Early year crop compliance slides may experience some fading of colors, although this rarely results in the masking of gross landscape features.

Determining the Flight Date of the Imagery:

Determining the date of the imagery is critical when making photo-interpretations of imagery for wetland determinations. The actual date of the flight allows the reviewer to evaluate the climatic condition both for growing season decisions and for rainfall amounts and time of storm events. Actual days of the flight may be printed on the hard copy imagery or can be found in the metadata of digital imagery. Records of actual flight days may be available in the Farm Service Agency Aerial Photography Field Office as previously mentioned.

Evaluation of Imagery for Normal Climatic Condition:

The pre-flight climatic assessment (antecedent moisture condition) supports the quality of each flight year of imagery as a tool. By documenting that the normal condition relative to rainfall existed just prior to the flight, good wetland hydrology decisions can be made.

Flight dates that occur within the growing season support the wetland definition. However, imagery flown outside of growing seasons should still be considered tangible evidence for the hydrologic condition during the growing season if similar rainfall amounts are expected during growing season months. Such leaf off imagery may better display drainage patterns.

The methodology to complete this climatic assessment can be found in Chapter 19 of the NRCS National Engineering Field Handbook (Hydrology Tools for Making Wetland Determinations). Each month's rainfall amount is determined to be within the range of normal when it is within 30% to 70% of the monthly average. The three-month rainfall period is then assessed as a weighted average for the imagery, with more emphasis placed on the period just preceding the flight date. This assessment is used to determine the climatic condition prior to the flight.

There are a number of good sources of rainfall data by month. The NRCS CLIMSYS WETS table, available for most counties in the state, will post monthly rainfall amounts for the 30 years of records used to provide county averages (http://www.wcc.nrcs.usda.gov/cgibin/getwetco.pl?state=nc). However, this data is usually at least ten years old for most counties. Current climatic data may be acquired from the following sources:

- National Oceanographic and Atmospheric Administration (NOAA) cooperative site: may provide data to within two months of real time, and this data is recorded daily. The website does not have a static url and appears to have limited coverage

of the state. http://www.ncdc.noaa.gov/climate-information/statistical-weather-and-climate-information

- Indiana State Climate Office: offers hourly, daily and monthly reports. The site also offers access to additional data such as drought reports and long term moisture trends.

  -https://climate.agry.purdue.edu/climate/index.asp

- National Weather Service, Advanced Hydrologic Prediction Service: provides a variety of search and report options for gathering climatic data up to a year to date in duration.

  http://water.weather.gov/precip/

- Weather Underground: may provide real time rainfall amounts. This source may be limited by the lack of available stations providing data. The closest station may be some distance from the site. http://www.wunderground.com/history/

The weather station closest to the potential wetland site should be the first source of rainfall data. If rainfall data is unavailable for the needed period of assessment, analyze rainfall records from more than one station on each side of the site in order to bracket the site and support that the site received rainfall amounts similar to station data results.

<u>Wetness signature interpretations:</u>

Wetness signature is a change in appearance of a site from the surrounding land readily visible on aerial photography due to excessive moisture or wetness. Indicators of wetness signature include:

a. Surface water
b. Flooded or drowned out crops

c. Long-term inundation that leaves a distinctive “bulls-eye” or “bathtub ring” signature indicating very gradual percolation and/or evaporation.
d. Stressed vegetation (e.g. leaf yellowing, timber kills, etc.);
e. Differences in vegetation color due to management, such as delayed planting or harvesting;
f. Isolated, squared, and/or irregularly shaped areas not managed similar to rest of the agricultural field (i.e. not cropped, not harvested) ;
g. Patches of lush or greener vegetation, which may be especially pronounced in a drier than normal image or during a drought.
h. Unharvested crops in an otherwise harvest field
i. Non-agricultural vegetation in place of crops on hydric soils or inclusions.
j. A consistent land change or vegetative boundary outline, or footprint, can be indicative of a wetland of some type when the other characteristics, such as color or texture, may be too subtle to call for a different sampling unit or label on their own.

It is important to confirm the landscape position and relief of the site when making wetness signature interpretations. Recognize that similar irregular patterns on upland sloping agricultural areas may be such things as fertilizer skips, seeding skips, herbicide drift, gully erosion, a dry ridge top or hill crown, or exposed subsoil rather than wetness signature.

Ground-truthing, or on-site analysis, is not required to make an offsite wetland determination. However, it is an important consideration for making sound remote sensing interpretations and should be a part of the training protocol for any wetland

specialist using this method. While the policy is to do as many determinations as possible using offsite methods for both the identification of wetlands (SOSM) and the identification of wetland type (SOWTP), this process encourages the use of ground-truthing when needed for increased accuracy in the determination. Newly trained agency experts especially are encouraged to make an on-site analysis in order to better develop their ability to interpret offsite data.

Wetness signature is always easier to detect from imagery in open agricultural areas because of the physical responses of plant communities to wetness or dryness after periodic agricultural disturbances. In cropped areas, bare ground will periodically be the condition of the site in some flights. Forested areas are harder to remote sense for wetness signature due to leaf cover, shadows, lack of disturbance and lack of visible response by the forest community to minor changes in wetness. For that reason, the user may be able to interpret wetness signature within forested areas from the open agricultural areas adjacent to those areas when characteristics such as relief and drainage pattern are considered. Wetness signatures at the interface of woods and crops are a signature of wetness in the woods, indicating that the woods should be visited to determine how much of the woods is wet if it cannot be determined with the imagery.

Digital Elevation Models (DEMs)

A Digital Elevation Model (DEM) is a raster dataset that can be used as an elevation surface layer in a Geographic Information System (GIS) to display and analyze topographic and geomorphic characteristics within the extent of data coverage. For the Indiana SOSM process, DEMs refers to Digital Elevation Models that represent the bare earth surface of landscape, without buildings, vegetation, or other above ground features.

The most up to date DEMs in Indiana consist of a new generation of high accuracy data derived from LIDAR datasets. This set of Digital Elevation Models is capable of accurately mapping a 2-foot contour interval on the land. The DEM and other landscape based data derivatives are available to NRCS employees for use in offsite assessments for the SOSM process and prior to site visits. Derivative datasets generated from the DEM can include contours, slope, shaded relief or hillshade, fill, flow accumulation, landform curvature, and aspect. These datasets are able to be used as remote sensing tools to aid in determining potential wetland geomorphology and detailed local drainage patterns. They serve as a valuable tool for this methodology. All NRCS employees in Indiana that have approval to perform wetland determinations are provided with access to the data and software tools to utilize and interpret the data within agency based Geographic Information Systems

<u>Indiana DEM limitations</u>

1. The current set of Indiana DEMs was developed from LIDAR data collected between 2008 and 2013 across the state. As a result, the DEMs will sometimes, but not always, be useful in interpreting the presence or absence of manmade drainage features such as ditches prior to 1985.
2. DEMs from any source are similar to aerial imagery in that they store information about the state of the landscape at the time of the source data acquisition, in this case LIDAR collected between 2008 and 2013. This means that subsequent changes to the landscape are not depicted which could include ditch cleaning, diversions, terraces, etc.

Other Data Sources

There are a number of other valuable resources available to NRCS delineators. All credible data sources should be considered when making a CWD to ensure accuracy.

Additional years of orthorectified aerial imagery are available, including 1998 NAPP (1 meter, leaf-off), numerous years of NAIP (1 meter, leaf-on) from 2003 to the present, and multiple high-resolution local data sets (typically 1 foot, leaf-off, 4-band) collected by units of state and county government. More recent versions of the NAIP and high resolution local imagery include a 4th band of color infrared (CIR) data which can be displayed in a manner to further assist photo interpretation of wetness signatures.

The USGS topographic maps were created prior to the 1980's and provide a good historical indicator of land use. The contour interval on the historical USGS topographic maps is typically 5 or 10 feet which can be insufficient for landform geomorphology interpretations in relatively flat landscapes. The use of high-resolution Digital Elevation Models (DEMs) derived from new LIDAR products now enables all of Indiana to be covered by 2-foot contour interval data to provide much more detailed views of local topography and landforms.