New Hampshire NRCS
State Off-Site Methods for Wetland Determinations
September 23, 2014 reviewed by New Hampshire State Technical Committee
New Hampshire NRCS  
State Off-Site Methods for Certified Wetland Determinations  
for  
Food Security Act (FSA)

PURPOSE

Definition

1. From NATIONAL FOOD SECURITY ACT MANUAL (NFSAM) 180-CPA Circular No.6, Part 527

(2-14) State Offsite Methods (SOSM). Methods developed by NRCS for the sole purpose of supplementing the off-site methodology in the [USA Corps of Engineers wetland delineation] manual 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] SMCs. The use of "Hydrology Tools for Wetland Determination" contained in Title 210, National Engineering Handbook (NEH), Chapter 19, Part 650 shall be considered to be a SOSM. The SOSM must contain the objective criterion that defines wetland hydrology for each of the hydrology tools in Chapter 19.

INTRODUCTION

New Hampshire’s State Off-Site Methods (SOSM) outline the supplemental materials, methods, and criteria that NRCS will use in New Hampshire to prepare certified wetland determinations (CWD) for the Wetland Conservation (Swampbuster) provisions of the Food Security Act of 1985, as amended. SOSM are specific procedures developed to interpret off-site and remotely sensed data to identify wetlands, and to assign FSA wetland labels at the field level for USDA program participants. SOSM criteria will enable NRCS “agency experts” to evaluate wetland diagnostic factors independently. These SOSM are subordinate to and based on: rules and policies outlined in 7CFR 12, NFSAM Circular No. 6; and methods and criteria outlined in the USACOE 1987 Wetland Delineation manual, and the Northeast-Northcentral Regional Supplement (version 2.0) – with variances outlined in Circular No. 6. These documents should be consulted as needed, because only the supplemental materials and methods specific to New Hampshire’s FSA responsibilities are intended to be addressed in these SOSM.

From 7CFR12 - a wetland, defined for FSA purposes, is;

“Wetlands, except when such term is a part of the term “converted wetland”, means land that-
(1) Has predominance of hydric soils;
(2) Is inundated or saturated by surface or ground at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
(3) Under normal circumstances does support a prevalence of such vegetation, except that this term does not include lands in Alaska identified as having a high potential for agricultural development and a predominance of permafrost soils.

*Wetland determination* means a decision regarding whether or not an area is a wetland, including identification of wetland type and size.

Furthermore, from Circular No. 6 – the 3 wetland diagnostic factors that must be met for an FSA wetland are defined:

(2-9) **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)(13)).
(2-19) **Wetland Hydrology** - 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.
(2-8) **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)).

**BACKGROUND**

The *FSA Procedures* ( Code of Federal Regulations, “Circular 6”, and the National FSA Manual) explain that NRCS will utilize exclusively the protocols contained in Part IV: Methods of the Corps Manual (1987 Manual), as replaced or supplemented by Corps regional supplements. The use of the supplements is limited to what is directly provided for in Chapter 1, Table 1, of each supplement. What is provided by the Corps in Part IV: Methods (as replaced/supplemented) is, in specific cases, altered by a “FSA Variance” provided in the FSA Procedures. The FSA Procedures provide an option to States to develop State Off-site Methods (SOSM) to supplement the Corps Manual off-site procedures (for Level 1 or Level 3 Determinations). Per the Corps Manual, Part IV: Methods – the user (agency expert) can make a decision for each sampling unit from the exclusive use of remote data sources (Level 1 determination) or a combination of off-site and on-site indicators if needed for one or more of the 3-factors (Level 3 determination). SOSM supplement the Corps Methods by independently addressing each of the wetland diagnostic factors (identifying specific signatures or indicators for each factor).

**GENERAL INFORMATION**

Off-site wetland determination reference materials include: soil survey maps, hydric soil lists, National Wetlands Inventory (NWI) maps, State wetland mapping, USGS topographic maps, digital elevation models, FEMA flood maps, Farm Service Agency (FSA) color slides, color infrared (CIR) aerial imagery, color or black and white aerial imagery, precipitation data to
determine if normal environmental conditions were present for imagery, biological growing season maps, and personal knowledge of an area.

**OFF-SITE METHODS PROCEDURES**

**These are intended to be applied independently to assess the criteria for the individual diagnostic factors below:**

1. Hydrophytic Vegetation
2. Wetland Hydrology
3. Hydric Soils

Note that in the Corps manual, the order above is prescribed for wetland determinations. However, the order of completion for SOSM may be otherwise, often starting with hydric soils identification (from soil surveys) – this would be an exercise of the flexibility/professional judgment provision (paragraph 23) in the USACOE 87 Manual.

**HYDROPHYTIC VEGETATION**

A prevalence of hydrophytic vegetation may be ascertained using the following:

A. Confirmation of hydrophytic vegetation by direct observations at a comparison site (defined from Circular 6 to the NFSAM):

(2-4) **Comparison Site.** A site in the local area that has the same hydric soil map unit as the subject site. The comparison site is used to make a decision on the presence of hydrophytic vegetation when the subject site is altered and the plant community that occurred prior to the alteration cannot be determined from onsite inspection or remote sensing and other remote data sources. The comparison site should support hydrologic conditions that are similar to what existed on the subject site prior to the alteration.

Note that a comparison site for FSA wetland determinations generally equates with what the Corps manual calls a “reference site”, and to serve as an indicator of the “adjacent vegetation” for use in Atypical Situations (Section F) of the Corps manual. Comparison sites must be within the same MLRA as the subject site to be considered to be within the “local area”. Comparison sites should be based on the soil series concept transferred from the subject area, as used in the subject area’s specific soil map unit, or as amended from on-site observations of a soil scientist. They should correspond to Ecological Site Description (ESD) data for the respective soil series, where available.

B. Imagery showing plants growing in water during Normal Circumstances – Circular No. 6 (NC).
C. Imagery showing ponding or flooding in a cropland area (under NC the sampling unit would support plant growing in water or a reduced substrate).
D. Soil survey data suggestive that under NC, the site would support a prevalence of vegetation, including ESD data.
E. NWI maps suggestive that under NC, the site would support a prevalence of hydrophytic vegetation (plants growing in water or growing in a reduced substrate).

Positive identification of the vegetative factor should be made by confirming one or more of the items above.

WETLAND HYDROLOGY

Wetland Hydrology may be ascertained remotely using the 7 “Hydrology Tools for Wetland Determination and Analysis” (CH 19 of the National Engineering Handbook). To follow are objective criteria to be applied per the above:

1. Stream and Lake Gauges (and tidal data): Where applicable, 5/10 or higher normal or dry antecedent periods in growing seasons with 15 days or more indicating that saturation and/or inundation within 12” of the soil surface exists at the site.
2. Runoff volumes: SPAW or other tools can be used to estimate water budgets, applied where appropriate to wetland creation, enhancement, or restoration.
3. Remote sensing:
   a. Imagery indicating inundation/ponding during normal or dry antecedent conditions. More than 50% of 5 or more years.
   b. Imagery indicating plant stress from wetness during normal or dry antecedent conditions. More than 50% of 5 or more years. For example, using FSA leaf-on photography, yellow, shorter corn and/or areas of poor seed germination during the growing season.
   c. Using leaf-off photography- dark photo tones, showing areas of wetness creating darker soil colors on the surface caused by ponding.
   d. LiDAR-bare earth imagery showing depressions, stream channels, drainages or other irregular landscape surface features diagnostic of vernal pools.
   e. USGS Topographic maps (1:24,000 scale) showing various concave features, steep slopes which transition into flatter areas, and other areas which have flowages through forested areas.
4. DRAINMOD: may be applied to supplement observation well data per Chapter 19, and used for wetland creation, enhancement, or restoration per Chapter 19.
5. Scope and Effect: map is applied for specific Hydrogeomorphic Groups, currently limited to mineral and organic flats for effects of drainage tile and ditches.
6. Drainage Guides: N/A.
7. Observation Wells:
   a. 1 year of growing season data for normal or dry year with corroborating DRAINMOD model data.
b. 3/5 years of growing season data for normal or dry years’ antecedent data indicating 15 or more days of saturation w/in 12” and/or inundation per specifications in Chapter 19.

Positive identification of the hydrology factor should be made by confirming one or more of the items above as they apply to the factor diagnostics in the Corps 87 Manual/Supplements and the FSA Variances.

HYDRIC SOILS

A predominance of hydric soils will be ascertained by the use of published soil survey information. From Circular No. 6:

(5-54) If soil mapping and hydric soil lists are used, the criteria in 7 CFR section 12.31(a) (2) will be followed:

NRCS must determine whether a sampling unit has a predominance of hydric soils that are inundated or saturated, as follows:

• 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.
• If a soil map unit is named for a miscellaneous area that meets the criteria for hydric soils (i.e., mixed alluvial, wet, tidal marsh, or water) the soil map unit will be determined to have a predominance of hydric soils.
• 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.

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Methods and definitions pertaining to FSA labels.

Agricultural Land - Cropland

Cropland refers to land which is used for the production of an agricultural commodity. Cropland also includes pasture or hayland in a commonly used rotation with an agricultural commodity.

Cropland which was planted to an agricultural commodity before 12/23/85 + as of 12/23/85 did not support woody vegetation + contains hydric soil map units + with or without wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides + does not flood or pond for 15 consecutive days during the growing season in most years = PC.

Requires documentation that the site does not pond or flood for greater than 15 consecutive days during the biological growing season in most years. PC label is valid as long as the field
remains in agricultural use, even though all 3 wetland criteria may return. If the land changes to a non-agricultural use, the PC determination is no longer applicable.

**Cropland** which was planted to an agricultural commodity before 12/23/85 + as of 12/23/85 did not support woody vegetation + contains non-hydric map units with hydric inclusions + wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides + does not flood or pond for 15 consecutive days during the growing season in most years = PC.

Requires documentation that the site does not pond or flood for greater than 15 consecutive days during the biological growing season in most years. PC label is valid as long as the field remains in agricultural use, even though all 3 wetland criteria may return. If the land changes to a non-agricultural use, the PC determination is no longer applicable.

**Cropland** which was planted to an agricultural commodity prior to 12/23/85 + as of 12/23/85 did not support woody vegetation + contains hydric soil map units and/or non-hydric map units with hydric inclusions + wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides + may pond or flood for at least 15 consecutive days during the growing season in most years = FW or PC.

PC requires documentation that the site does NOT pond or flood for greater than 15 consecutive days during the biological growing season in most years. PC label is valid as long as the field remains in agricultural use, even though all 3 wetland criteria may return. If the land changes to a non-agricultural use, the PC determination is no longer applicable.

FW requires documentation that the site ponds and/or floods for greater than 15 consecutive days during the growing season in most years to meet hydrology criteria. If baseline functions and values are documented, and the site remains in agricultural use, the label is valid even though all 3 wetland criteria may return.

**FW** + five years without annually planted crop + remains in agricultural use, managed as pasture or hayland at least once in five years = FWP.

**FW** + no documented baseline functions and values, + five years without annually planted crop + not managed as pasture or hayland at least once in last five years = W.

Cropland which was NOT planted to an agricultural commodity prior to 12/23/85 + contains hydric soil map units and/or non-hydric map units with hydric inclusions [OR non-hydric soil map units + wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides] + no manipulation after 12/23/85 + was manipulated and was managed as pasture or hayland prior to 12/23/85 = FWP.

Cropland which was NOT planted to an agricultural commodity prior to 12/23/85 + contains hydric soil map units and/or non-hydric map units with hydric inclusions OR non-hydric soil map units + wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides + no manipulation after 12/23/85 + herbaceous wetland farmed under natural conditions = W.

Cropland which was NOT planted to an agricultural commodity prior to 12/23/85 + contains hydric soil map units and/or non-hydric map units with hydric inclusions + no wet signatures + manipulated prior to 12/23/85 = NW (for Swampbuster only).
**Cropland** which was planted to an agricultural commodity prior to 12/23/85 + no hydric soil map units + no wet signature = **NW**.

**Cropland** which was NOT planted to an agricultural commodity prior to 12/23/85 + no hydric soil map units + no wet signature = **NW**.

**Agricultural Land - Pasture and Hayland**

Pasture and hayland are agricultural lands which are managed for grazing, hay or forage production. The term “permanent pasture or permanent hayland” refers to those fields which are not in a commonly used rotation with an agricultural commodity. These fields may be used to produce commodity crops if no further manipulations of a wetland occur.

**Permanent pasture or permanent hayland** + contains hydric soil map units + with or without wet signature on CIR imagery, color or black and white imagery or other imagery or color slides + has not been abandoned = **FWP**.

FWP + abandoned + no baseline functions and values documented = **W**.

FWP + abandoned + with baseline functions and values documented = **FWP**.

**Permanent pasture or permanent hayland** + contains non-hydric soil map units with possible hydric inclusions + wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides + has not been abandoned = **FWP**.

FWP + abandoned + no baseline functions and values documented = **W**.

FWP + abandoned + with baseline functions and values documented = **FWP**.

**Permanent pasture or permanent hayland** + non-hydric soil map units with possible hydric inclusions OR non-hydric map units + no soil survey wetness symbols + no evidence of manipulation + no wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides = **NW**.

**Permanent pasture or permanent hayland** + was planted to an agricultural commodity prior to 12/23/85 + contains hydric soil map units and/or non-hydric units with possible hydric inclusions + with or without wet signature + manipulation prior to 12/23/85 = **PC**.

*PC label is valid as long as the field remains in agricultural use, even though all 3 wetland criteria may return. If the land changes to a non-agricultural use, the PC determination is no longer applicable.*

**Agricultural Land, Non-Forested**

This category includes orchards, vineyards, areas which support wetland crops such as cranberries, and other lands used to produce or support the production of livestock, where the natural vegetation has been removed.
Other agricultural land-Non-Forested (excluding pasture, hayland and cropland) + contains hydric soil map units or non-hydric map units with possible hydric inclusions OR has wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides = W.

Other agricultural land-Non-Forested (excluding pasture, hayland, and cropland) + non-hydric soil + no wet signature on CIR imagery, color or black and white imagery, or other imagery or color slides + no soil survey wetness symbols + no evidence of drainage = NW.

Non-Agricultural lands on hydric soils

This category includes lands which are not used for the production of food, fiber, or horticultural crops; used for haying or grazing; or, left idle in accordance with USDA program requirements. For the purposes of these off-site methods, forest land and abandoned agricultural lands (except Prior Converted cropland) are non-agricultural lands.

Forest land  Forest land + hydric soil\(^1\) or USGS "wet symbol" or NWI wetland = W

Idle land
Idle land + hydric soil\(^1\) or USGS "wet symbol" or NWI wetland = W

Pond
Pond on non-hydric soil = AW

Pond on hydric soil\(^1\) or USGS "wet symbol" or NWI wetland = W

Beaver Impoundment
Beaver impoundment on hydric soil\(^1\) = W

Beaver impoundment on any soil + existing for five years = W

\(^1\) Any soil map units that have hydric major components or hydric minor components; or, areas with soil survey special features symbols for marsh or swamp, miscellaneous water, wet spot, spring, or closed depression or sinkhole

Manipulated Wetlands

This category includes activities that do not violate the Swampbuster provisions of the Food Security Act although they may be regulated and may require permits from other agencies.

Any wetland that was manipulated after 12/23/1985, but the manipulation did not make production of an agricultural commodity possible = WX.
** Converted Wetlands

A converted wetland occurs when a wetland is manipulated to the extent that production of an agricultural commodity is possible, even if such a crop is not actually planted. Manipulation may include removal of woody vegetation and/or modification of wetland hydrology by draining, filling, ditching, etc.

**Any wetland** that was manipulated between 12/23/1985 and 11/28/1990 with or without permanent grass, which made the production of an agricultural commodity crop possible = CW.

*Any further conversion of a CW after 11/28/1990 will result in a CW+year.*

**Any wetland** that was manipulated after 11/28/1990 which made the production of an agricultural commodity crop possible = CW+year.

**Any wetland** that was converted after 12/23/1985 where the conversion or production of an agricultural commodity was a consequence of an incorrect NRCS determination = CWTE.

*Use of CWTE requires approval and input of State Conservationist for determining the degree of investment and subsequent authorized cropping. If a small investment was made to convert the wetland, then no agricultural production is allowed if site was formerly W. Production is allowed if site was formerly FW. If substantial investment has been made, no restrictions are placed on the converted wetland.*
Any wetland that was converted after 12/23/1985 by a third party without the person’s collusion, fraud, scheme or device = TP.

Use of TP may be used in situations where the USDA applicant is leasing the land (application is not the landowner) and the landowner converts the wetland without the applicant’s knowledge or awareness of USDA benefit implications.

Any wetland that was manipulated prior to 12/23/1985 + has not been used for cropland + wetland criteria have not returned = NW.

Wetlands

Wetlands created by beaver activities, human activities or other natural events + any soil map unit + present for at least five years = W.

Wetlands created by human activities on non-hydric soil or in active (i.e., not abandoned) prior converted cropland, or in other non-wetland situations = AW.

Historical Labels

CC = Commenced Conversion. Historically used for labeling portions of tracts where conversion began before December 23, 1985, and was approved by FSA, and conversion was completed by January 1, 1995. This symbol is no longer used.

CWNA = Converted Wetland for Non-Agricultural Use. Historically used for labeling portions of tracts that were converted after November 28, 1990 for purposes other than for making agricultural production possible. This symbol is no longer used.

NI = Not Inventoried. Historically used for labeling portions of tracts that were not field checked for specific wetland labels. This symbol is no longer used.

OW = Other Waters of the US. Historically used for labeling concentrated flow within agricultural fields that were determined to be other waters of the US and thus subject to Section 404 of the Clean Water Act. In New England, the US Army Corps of Engineers determines Other Waters of the US. This symbol is no longer used.
KEY TO SYMBOLS

AW = Artificial Wetland
CC = Commenced Conversion (historical label)
CW = Converted Wetland
CW+year = Converted Wetland and year of conversion after 1990
CWNA = Converted Wetland for Non-Agricultural Use (historical label)
CWTE = Converted Wetland Technical Error
FW = Farmed Wetland
FWP = Farmed Wetland Pasture or Hayland
NI = Not Inventoried (historical label)
NW = Non-wetland
OW = Other Waters of the US (historical label)
PC = Prior Converted Cropland
TP = Third Party Conversion
W = Wetland
WX = Manipulated wetland after 1985

NOTE: The above wetland determination symbols will not appear on FSA digital maps. FSA uses red, yellow and green symbols to represent different categories of wetland determinations. For more information, refer to the fact sheet in the Appendix.

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ADDENDUM

The following statement should be included in all written wetland determination documentation provided to USDA participants.

THIS CERTIFIED WETLAND DETERMINATION/DELINEATION HAS BEEN CONDUCTED FOR THE PURPOSE OF IMPLEMENTING THE WETLAND CONSERVATION PROVISIONS OF THE FOOD SECURITY ACT OF 1985. THIS DETERMINATION/DELINEATION MAY NOT BE VALID FOR IDENTIFYING THE EXTENT OF THE CORPS OF ENGINEERS’ (COE) CLEAN WATER ACT JURISDICTION FOR THIS SITE. IF YOU INTEND TO CONDUCT ANY ACTIVITY THAT CONSTITUTES A DISCHARGE OF DREDGED OR FILL MATERIAL INTO WETLANDS OR OTHER WATERS, YOU SHOULD REQUEST A JURISDICTIONAL DETERMINATION FROM THE LOCAL OFFICE OF THE COE PRIOR TO STARTING THE WORK.
**GLOSSARY**

**Agricultural Commodity:** Any crop planted and produced by annual tilling of the soil, including tilling by one-trip planters, or sugarcane. (180-V-NFSAM, Fourth Ed., Amend. 4, Jan. 2008, Part 514.2)

**Agricultural Land, Non-Forested:** Land that is intensively used and managed for the production of food and fiber to the extent that the natural vegetation has been removed and cannot be used to determine whether the area meets applicable hydrophytic vegetation criteria in making a wetland determination.

Areas that meet the above definition may include intensively used and managed cropland, hayland, pasture land, orchards, vineyards, and areas which support wetland crops (e.g., cranberries, taro, watercress, rice). For example, lands intensively used and managed for pasture or hayland where the natural vegetation has been removed and replaced with planted grasses or legumes such as ryegrass, bluegrass, or alfalfa are considered agricultural lands, non-forested. Agricultural lands, non-forested do not include range lands, forest lands, wood lots, or tree farms.

**Certified Wetland Determination:** A wetland determination made by the Natural Resources Conservation Service that is of sufficient quality to make a determination of ineligibility for program benefits under the Food Security Act of 1985

**Field:** A part of a farm which is separated from the balance of the farm by permanent boundaries such as fences, roads, permanent waterways, woodlands, croplines (in cases where farming practices make it probable that such croplines are not subject to change), or other similar features. (180-V-NFSAM, Third Ed., Amend. 2, Nov. 1996, Part 525.0)

**Non-Agricultural lands:** Lands which are **not** used for the production of food, fiber, or horticultural crops; used for haying or grazing; or, left idle in accordance with USDA program requirements. For the purposes of these off-site methods, forest land and abandoned agricultural lands (except Prior Converted cropland) are non-agricultural lands.

**Qualified Professional:** A NRCS employee who, through training and experience, has demonstrated the knowledge and skill to conduct wetland determinations/delineations and whose name is listed on the roster of qualified employees in the state.

**Wetland Delineation:** Outlining the boundaries of a wetland determination on aerial photography, digital imagery, and other graphic representation of the area; or on the land. (180-V-NFSAM, Fourth Ed., Amend. 4, Jan. 2008, Part 514.2)

**Wetland Determination:** A technical decision regarding whether or not an area is a wetland, including identification of appropriate wetland labels and acres of each label.
Wetland determinations are recorded on NRCS-CPA-026e. (180-V-NFSAM, Fourth Ed., Amend. 4, Jan. 2008, Part 514.2)

Wetland Signature: the indication left in a field, recorded by imagery, of ponding, flooding or saturation for sufficient duration, during the biological growing season, to meet wetland hydrology criteria. Wetland signatures in New England include signs of a water-stressed crop, no crop growing, or standing water. A wet signature on a fallow or recently tilled field is identified by a darker reflection than the surrounding soil color reflection. Textural or color contrast against an otherwise uniform area may indicate wetness. Tire marks, mowing, and plowing patterns which show avoidance of a wet feature on the map are other signs that may be indicative of wetness. Stereoscopic aerial photography can show relief and vegetation strata.
APPENDIX 1
USE OF SOIL SURVEYS AND HYDRIC SOILS LISTS

ACCEPTABLE SOIL SURVEYS:

Soil surveys prepared according to standards of the National Cooperative Soil Survey (NCSS) can be used to identify hydric soil areas. Published soil surveys, cooperator soil maps, and other types of soil surveys that do not meet NCSS standards may also be used but documentation as to how these surveys were made should be provided. If no reliable soil survey is available and if it cannot clearly be determined whether an area meets the hydric soil criteria, an on-site determination will be necessary.

MAP UNIT DESIGN AND MAPPING DETAIL:

Map units are designed to meet the objectives of the soil survey memorandum of understanding. The kinds of map units, intensity of field investigation, documentation, and maximum map unit size for contrasting inclusions (dissimilar soils) are all agreed to items. These items meet the objectives relevant to the various uses and management at the time the soil survey was initiated.

MAP UNITS COMPOSITION AND INCLUSIONS:

The composition and purity of map units are important in the interpretation of soil maps. Most map units include contrasting or dissimilar soils. They could also contain miscellaneous areas. These contrasting soils and miscellaneous areas may not be identified in the map unit name, but may be included in the NRCS database or hydric soil list. Some of these dissimilar inclusions could be mapped out with a larger scale map.

Consociations are soil map units named for a single kind of soil (taxon) or miscellaneous area. Eighty five percent of the area is similar to the taxon for which the unit is named. When named for a hydric soil, the soil map unit is considered a hydric soil map unit for wetland mapping.
Complexes and associations are soil map units named for two or more kinds of soils (taxa) or miscellaneous areas. If all taxa for which a complex or association is named are hydric, the soil map unit may be considered a hydric soil map unit for wetland mapping. If only part of the map unit is made up of hydric soils, only those portions of the map unit that are hydric are considered in wetland mapping.

The maximum size of contrasting inclusions in a map unit is stated in the memorandum of understanding for the survey area or in the section of the manuscript describing how the survey was made. Order 2 surveys commonly have a maximum size of highly contrasting inclusion (dissimilar soils) of 2.5 to 5 acres. Within a hydric soil map unit there could be areas, less than 2.5 acres in size, that would be non-hydric (highly contrasting inclusion) soils. Contrasting inclusions of less than 2.5 acres may be shown by use of conventional spot symbols.

Criteria for hydric soils. Criteria for hydric soils is found in Hydric Soils of the United States as publishes in the Federal Register. See Appendix 9 for hydric soil criteria, other soil related terms and definitions.

Areas of hydric soils may not coincide with map unit delineations (from the NCRS hydric soil list) in the local soil survey. Interpretations from aerial photography can be made to identify areas of hydric soils within a map unit by a combination of the following: Using landscape position information provided on the NRCS list of hydric soils map units, Appendix 4 (Use of Aerial Photography), Appendix 2 (Use of USGS quad sheets), and Appendix 3 (Use of the National Wetlands Inventory Maps). In some cases an on-site visit will be needed to determine the location of hydric soils within a map unit.
NRCS FIELD OFFICE TECHNICAL GUIDE (FOTG) HYDRIC SOIL LIST:

An official list of hydric soil map units is located in Section II of the NRCS FOTG. The list includes: (1) all soils from the National List of Hydric Soils that are in the geographic area that the NRCS Field Office covers and (2) any soil map units or miscellaneous areas that meet hydric soil criteria.

Elements of the FOTG hydric soil list: (1) the soil map unit symbol and name; (2) the hydric soil component and whether the hydric soil composes all, a part, or a minor inclusion of the soil map unit; (3) probable landscape position of hydric soils within the soil map unit (if only part of the map unit is hydric soil)

Additional items include hydric soil map units that:

1. Contain hydric soils that are hydric only because of saturation. These soils are hydric due to water tables at or near the surface.

2. Support woody vegetation under natural conditions. (These areas will be considered prior converted croplands if an agricultural commodity has been produced prior to December 23, 1985, and these areas are not potholes, playas, or seasonally flooded or ponded.)

3. Contain potholes or playas. (These areas will be considered wetlands regardless of cropping history if they meet wetland criteria.)

4. Are seasonally flooded or ponded. (Climatological data is needed to make this observation, see Appendix 5. These areas will be considered wetlands if they meet wetland criteria.)

5. Can be farmed under natural conditions without removing woody vegetation or other manipulation.
APPENDIX 2

USE OF U.S. GEOLOGICAL SURVEY MAPS (USGS MAPS)

TOPOGRAPHIC MAPS:

A topographic map (quadrangle map or Quad) accurately represents the natural and manmade features of the land. USGS topographic maps are compiled to National Map Accuracy Standards using modern mapping techniques. The shape and elevation of the terrain are portrayed by contour lines and specific features such as roads, towns, water areas, and vegetation are portrayed by map symbols and colors.

MAP SCALES USED IN New Hampshire:

Although a number of different map scales are used by the USGS for the State of New Hampshire, the most commonly used scales are the maps in the 7.5 and 15 minute series. The 7.5 minute series maps generally have a map scale of 1:24000 (1:25000 on selected maps), while the 15 minute series have map scales of 1:62500. The entire State now has 7.5 minutes series coverage and these are the preferred maps for use.

AVAILIABILITY OF MAP PRODUCTS:

Quadrangle map sheets can be purchased at various commercial map dealers. In addition, maps are distributed from the USGS Map Sales, Box 25286, Federal Center, Building 810, Denver, Co 80225.

USE OF COLOR:

The use of color helps to distinguish kinds of features on the USGS maps: Black identifies cultural features such as roads and buildings; Blue shows hydrographic features such as lakes and rivers; Brown is indicative of hypsographic features shown by contour lines; Green identifies woodland cover, scrub, orchards, and vineyards; Red shows important roads and public land survey systems; and Purple is indicative of features added (but not field checked) from aerial photographs during map revision. The most helpful colors for finding watered areas are blue and brown.
IMPORTANT MAP SYMBOLS AND INFORMATION FOR DETERMINING WATER FEATURES:

The U.S. Department of Interior, Geological Survey has brochures showing the different topographic map symbols. Some of the more common symbols used in determining water features on the maps are: intermittent blue dot and dash line (intermittent river or stream); solid blue line (perennial river or stream); solid blue color bounded by darker line (water); diagonal lines bounded by dashed line (intermittent or dry lake or pond); blue circle with a tail (springs or seeps); blue grass (sign of marsh or swamp); brown contour line (topographic elevations); brown lines with inward pointing tick marks (depressional areas); and brown stippled areas (wash areas, dry lake or pond, or sand in open water areas).
USE OF NATIONAL WETLAND INVENTORY MAPS

GENERAL:

National Wetlands Inventory (NWI) maps portray natural and manmade wetlands and deep water habitats regardless of ownership. These units are identified and classified according to “Classification of Wetlands and Deep Water Habitats of the United States”, Cowardin, et al., December 1979. NWI maps do not identify wetlands for regulatory purposes.

MAP PREPARATION:

The primary data source for NWI wetland maps is high altitude color infrared photography at a scale of 1:58000. In some cases black and white aerial photography at a scale of 1:80000 was used. The date, scale, and type of aerial photography used are noted in the NWI map legend. NWI maps based on pre-1980’s aerial photography should be used with caution.

MAP PRODUCTS:

The standard NWI wetland products are 1:24000 scale (7.5’) maps based on the USGS topographic maps. Other products include 1:62500 scale (15’) maps, orthophotoquads, or clear overlays to USGS base maps. Maps that have not been through final review are indicated as DRAFT in the legend. Wetlands and deep water habitats are shown as polygon, line, or point feature.

USE OF NWI MAPS:

1) All wetlands visible on the aerial photography (1:58000 scale) are identified and classified on NWI wetland maps.

2) Most tilled agricultural wetlands (farmed wetlands as defined in Cowardin, et al.) are not mapped by the NWI.

3) Tree canopies may obscure small wetlands.
4) Draft 1980’s vintage maps are generally of better quality than “final” 1970’s vintage maps.

5) Both vegetated and unvegetated wetlands are mapped.

6) Mapped linear vegetated wetlands (such as forested or scrub/shrub) are classified according to the canopy cover rather than the underlying stream.

7) NWI maps reflect the instant in time of the aerial photography and, as with any maps, become more reliable when used in combination with collateral data.

**ORDERING NWI WETLAND MAPS:**

NWI maps may be ordered through the USGS by calling 1-888-ASK-USGS or on the web at [www.usgs.gov](http://www.usgs.gov).
USE OF AERIAL PHOTOGRAPHY

Identification of earth features is greatly enhanced by obtaining information without direct physical contact. The remote sensing of data specifically includes the detection, identification, location and measurement of objects at a distance based on energy that is emitted or reflected from the object. The primary tools for remotely sensing data are aerial photography and digital images. The following discussion will deal with the interpretation of aerial photos.

GENERAL:

Aerial photographs provide a better perspective, the ability to study all the interrelationships of the environment at a point in time, and a permanent record of those conditions and interrelationships.

Remote sensing technology allows the acquisition of useful resource data using light wavelengths (infrared) outside the normal spectrum visible to the human eye.

Photo interpretation is visually examining photographic images for the purpose of identifying objects and judging their significance. Interpreters must see indicators and compare small bits of information to form an interpretation.

There are many advantages to using aerial photographs. Repetitive coverage is obtainable over a large surface area. With proper overlap, photographs have three dimensional capabilities. Photos are a permanent record. They provide a vantage viewpoint.

APPENDIX 4 (continued)
PHOTO CHARACTERISTICS:

Inherent factors of photos are scale, contrast, brightness, resolution, and spectral sensitivity. These factors affect the detection and identification quality regardless of the wavelength at which it was recorded. Several characteristics are used to identification of feature within a photograph.

1) **Size** – Size is one of the most useful items in identifying features. We depend on relative size and absolute size of features within the photo. Relative size depends on the other items in the photo. Absolute size of an object would be identified dependent of the scale of the photo.

2) **Shape** – A vertical view often makes the identity of an object difficult to judge. Most of us are not familiar with this direction of views. Manmade items tend to have straight linear shapes, and natural features are more irregularly shaped.

3) **Shadow** – Most aerial photos are shot within 2 hours of solar noon. However, any shadows cast by objects will aid in its identification. Often size and shape of an object can be gauged by the shadow it casts.

4) **Pattern** – This is one of the most intriguing characteristics of natural and manmade features when viewed from the air. The pattern of “patterned ground” is significantly different than that of braided streams.

5) **Tone and color** – Photographic tone refers to the shades of gray exhibited by black-and-white photos. Human eyes are limited to the number of gray-scale values it can separate. However, color separations, based on hue, value, and chroma, allow many more determinations than with black-and-white. Accuracies of plant identification are greater with color photos than with black-and-white.

6) **Texture** – Photographic texture is the function of the size of objects photographed and the scale of the photo. Texture refers to the degree of roughness exhibited on the photo. Terms used are coarse, medium, smooth, fine, and mottled. For example, on a large scale photo individual tree crowns may be recognized and on a smaller scale the tree crowns are so small only a texture appears. Pastures present a smoother texture than rangeland.
Site association – Natural and manmade features usually occur in certain locations or near other objects. For example, cottonwood and willow trees are natural occurrences along flood plains or river sandbars as are Douglas fir on steep mountain slopes.

**TYPES OF AERIAL PHOTOS:**

Black-and-white and color are the two basic types of aerial photography.

Black-and-white films react with the same wavelengths as the human eye. “What you see is what you get.”

Color films vary in types and processes. Basically, color and color infrared are the two types of color film that are used extensively to produce photos for interpretation. Color film produces photos that are termed “true” color. They are sensitive to the visible region.

Color infrared (CIR) film is sensitive to the visible and near infrared region. CIR film is dyed a different color by the light that caused the exposure. Since actively growing healthy vegetation reflects a large amount of near infrared energy, it creates a red image. Water absorbs most of the infrared energy, so it appears dark in a CIR photograph.

**Table 1:** Illustrates CIR and normal colors for selected objects.

<table>
<thead>
<tr>
<th>CIR Colors</th>
<th>Normal Colors</th>
<th>Objects could be:</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue</td>
<td>green, cyan</td>
<td>water, soils, autos</td>
</tr>
<tr>
<td>green</td>
<td>red, magenta</td>
<td>soils, stressed vegetation</td>
</tr>
<tr>
<td>red</td>
<td>blue, cyan</td>
<td>water, vegetation</td>
</tr>
<tr>
<td>yellow</td>
<td>red, magenta</td>
<td>autos, clay soils, tile</td>
</tr>
<tr>
<td></td>
<td></td>
<td>roofs, stressed vegetation</td>
</tr>
<tr>
<td>cyan</td>
<td>yellow, white</td>
<td>soils</td>
</tr>
<tr>
<td>magenta</td>
<td>green, cyan</td>
<td>healthy vegetation</td>
</tr>
<tr>
<td>white</td>
<td>yellow, white</td>
<td>tulips</td>
</tr>
<tr>
<td>black</td>
<td>black, blue</td>
<td>soils, water</td>
</tr>
</tbody>
</table>

**FEATURE IDENTIFICATION:**

Identification of features on aerial photographs is basic to providing consistent and accurate interpretations. It is important to distinguish difference between natural and cultural features, landforms, drainage patterns and texture, and cultural features.

Landforms are features of the earth’s surface that are formed by natural processes. Landforms commonly contain definite geomorphological features and occur repetitively.
They have typical and recurrent pedological, hydrological, and biological properties, and characteristic topography, drainage, soil, and ecology. To understand landforms and accurately identify landforms, the processes involved in their formation must be clearly understood. Simply stated, weathering, transportation and deposition are the primary agents involved in the formation of landforms. Depending on how they are formed, landforms are either erosional or depositional and occasionally a combination of both. The activities of water, wind, and ice bring about change on the earth’s surface.

To accurately interpret photos an array of data must be assembled and studied prior to making an accurate analysis. The understanding of the processes that are involved in the evolution of landform development is paramount for accurate photo interpretation. Knowledge of the subject areas climate, vegetation, and cultural activities provide for accurate predictions when combined with ground truthing.
WETLAND IDENTIFICATION:

Earth cover is the feature present on the surface. An infinite number of covers exist. Many different types of groupings or classifications have been developed. The identification of wetlands can be approached by deductive reasoning. The use of photographs and ancillary materials can be used to support a decision made remotely.

Wetlands may be the most difficult land cover to identify because of climatic variables, and complex landforms and landscapes.

Interpretative suitability of aerial photography is determined by several factors. For the identification of wetlands these factors should be considered and used to enhance the accuracy of prediction and interpretation as well as be an indicator to determine when wetlands cannot be accurately identified remotely.

1) **Photo accuracy:** The accuracy of photo interpretation to determine wetlands varies greatly depending upon types, scales, and quality of photographs as well as the ability of the individual.

2) **Repetitive results:** One of the best features of remote sensing is that it is repeatable over time and by different people.

3) **Seasonal differences:** Leaf-off and leaf-on photography offers different advantages for different uses. Photography taken at critical periods when wetlands will be more easily identified are advantageous.

4) **Large areas:** Remote sensing is extremely useful over large areas. It reduces time and costs of collecting information and can enhance and even be more accurate than field wetland inventories.

5) **Recognizes multiple uses:** Interrelationships of land uses over large areas can be pieced together. Cause and effect relationships can be developed.

6) **Interpretation over time:** Photographs can record a wetland at reasonable time intervals and comparisons can be made.
7) **Identification in field and by photo interpretation:** When using remote sensing, wetlands can be identified and separated both remotely and in the field.

Aerial photographs contain raw data. Experience and perception of photo interpreters influence the identity of raw data. Using the basic characteristics, which are shape, size, pattern, shadow, tone or color (or both), texture, and site association in a systematic manner results in accurate wetland interpretation and identification.

**PRACTICAL WETLAND IDENTIFICATION SUGGESTIONS:**

1) **Aerial Photographs:** Develop a source of obtaining an index of all photos that are available for a subject area. Inventory available type of photos and note their potential use and limitations.

   Old photos are invaluable from a historic perspective. Wetlands, drainage patterns, etc. can be identified over a long period of time. Wetlands can be observed and changes tracked by cultural and climatic influences.

2) **Collect ancillary material and data:** (i.e. USGS topos, soil surveys, NWI maps, geology maps, climatological data).

3) **Field Visit, reconnaissance of wetlands.** Become familiar with the area landforms, vegetation, climate, and land uses. If available, stereoscopically view the areas while doing the field visit. Develop “on-the-ground” relationships with aerial photographs. Put them in writing.

4) **Compare signatures:** (shape, size, pattern, shadow, tone or color, texture and site association) of different types of wetlands as well as uplands. Record examples on photographs for future reference.

5) While in the field, determine the width of transition from specific types of wetlands to non-wetlands. This will assist in determining accuracy in using photographs and developing confidence levels.
USE OF CLIMATOLOGICAL DATA

GENERAL:

Climate is the composite weather condition of a region including temperature, barometric pressure, humidity, precipitation, sunshine, cloudiness, and winds. Of particular concern for offsite wetland determination(s) is precipitation as related to surface ponding or soil saturation.

Water movement within soils is complex. Hillside seeps or springs result from lateral water movement or aquifers, and will not correlate well with monthly precipitation changes. The hydrology from perched water table areas (hard pan soils) also moves laterally. Perched water table areas may not correlate well with monthly precipitation.

PROCEDURES:

1) Obtain the precipitation records for the date of each flight. This data can be obtained from the Climatological Data Access Facility (CDAF) or National Climatological Data Center. Check with the CDAF liaison in the state office when obtaining the precipitation data.

2) Of primary importance are:
   a) monthly precipitation records
   b) daily records for 7-day and 15-days prior to and after the date of the flight

3) Other suggested data are:
   a) average annual precipitation
   b) yearly distribution of precipitation
   c) unusually high/low events
   d) location on the landscape, e.g. floodplain, high elevation, slope, depression
   e) snow fall and snow pack data related to high, average, low runoff later in the year

4) With appropriate correlation of aerial photo to periods of “normal” precipitation and events, evidence of ponding or soil saturation should be seen for wetlands. For example, May or June aerial photos would be appropriate for areas where the distribution of precipitation is primarily December through May. Whereas clear evidence of ponding or soil saturation may not be evident using July or August flights.
5) Woody canopies may obscure ponding or soil saturation signatures.

6) Records should be obtained from the most representative weather station closest to the wetland site. In some cases, because of ecoregion breaks, the closest station may not be the best choice.
Overview

As part of the U.S. Department of Agriculture’s (USDA) continuous effort to use digital mapping technology to increase efficiency, the Farm Service Agency (FSA) and the Natural Resources Conservation Service (NRCS) have recently revised the symbols used to identify wetland determination locations on FSA maps. The NRCS makes wetland determinations based on landowners’ requests. FSA marks these sites with symbols on the maps for producers’ ease of use.

Revised Symbols

In the past, FSA maps contained labels and delineations of NRCS wetland determinations. When FSA started using digital geographic data for maps, blue dots were used to represent wetland determinations. Since May 2007, FSA and NRCS have updated map symbology to give producers a more detailed representation of the wetland determinations present on their land.

Now, USDA’s wetland point symbols, called wetland determination identifiers, indicate on digital maps the approximate location of NRCS wetland determinations.

Red, yellow and green symbols (no longer blue dots) represent different categories of wetland determinations and a legend provides an explanation of the various levels of use that are allowed on these wetlands:

- Red octagons represent ‘Restricted Use’ determinations; upside-down yellow triangles represent ‘Limited Restrictions’ determinations; and green circles represent ‘Exempt from Conservation Compliance Provisions’ determinations.
- Restricted Use = W (Wetland); CW, CW+YR (Converted Wetland + Year); AW/W (Artificial Wetland/Wetland); GFW, GFW+YR (Good Faith Wetland + Year); RSW, RSW+YR (Restored Wetland + Year); RPW (Replacement Wetland)
- Limited Restrictions = FW (Farmed Wetland); FWP (Farmed Wetland Pasture); CWNA (Converted Wetland, Non-ag Use); AW/FW (Artificial Wetland/Farmed Wetland); CWTE (Converted Wetland Technical Error); TP (Third Party Conversion); WX (Manipulated Wetland) MW; CMW (Minimal Effect Wetlands); MIW, MWM (Mitigation Wetlands); NI (Not Inventoried); OW (Other Waters); Easement

As noted on the producer maps, the change to the current wetland determination identifiers does not change the wetland determinations made by NRCS, nor does it change FSA or NRCS wetland policy or regulations. The wetland determination identifiers do not represent the size, shape, exact location or exact category of wetland determination. The maps are used primarily for producer information when producers make crop acreage reports, change field boundaries or request a map of their land from FSA. The maps are not used for wetland conservation compliance. USDA participants remain responsible for self-certifying compliance with USDA wetland conservation provisions.

Examples of FSA Producer Maps with Varying Wetland Symbols

Exempt from Conservation Compliance Provisions = PC (Prior Converted); NW (Non Wetland); PC/NW (Prior Converted/Non Wetland); CC (Commenced Conversion); NW/NAD (Non Wetland, National Appeal Decision); AW (Artificial Wetland)
The maps with the new identifiers are not the official USDA wetland determination maps. Producers who have questions about the size, shape, exact location or exact category of the determination should refer to the determination information previously provided to them by NRCS on a form (CPA-026), or contact their local NRCS office. Both FSA and NRCS have the USDA wetland determination maps available for landowners and operators. Copies of these original maps have previously been provided to all producers. Producers may request a replacement copy through their local FSA or NRCS office if they no longer have the original.

For More Information

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