650.1903 Supplemental data for remote sensing

(a) Applicable situations for use

Remote sensing provides procedures to help document the wetland hydrology associated with mapping conventions. This documentation also helps to determine which years of aerial photograph signatures can be correlated with hydrology of natural wetlands and thus provides independent validation of the wetland hydrology. The procedures are:

Procedure 1 Use of precipitation data to help select the years that signatures indicating wet conditions might be seen on aerial photos.

Procedure 2 Use of precipitation data to document the frequency of signature in humid climates.

Procedure 3 Use of runoff volumes to document wetland hydrology in semiarid areas, such as western Kansas.

(b) Data required

The data required are:

- Daily or monthly precipitation from a long-term, nearby climatic station is needed for procedures 1 and 2.
- Long-term daily or monthly runoff volume is needed for procedure 3.

(c) Limitations

(1) Knowledge and experience required

General knowledge of climate, wetland signatures, and how to interpret rain and runoff data is required. Knowledge of the local agricultural practices improves the quality of photo interpretation.

(2) Climatic regions of applicability

Procedures 1 and 2 are applicable to all climate regions. Procedure 3 is applicable in semiarid regions only.

(3) Factors affecting the accuracy of results

The accuracy of the meteorological data has a significant impact on the results. Saturation and/or inundation has to be observed for a specified duration and frequency during the growing season to establish that the wetland hydrology criterion has been met. An aerial photograph only represents conditions at that point in time. An aerial photograph used alone does not provide sufficient information to establish that the wetland hydrology criterion has been met.

The hydrological conditions need to be established for proper interpretation of wetland signatures on aerial photographs. Precipitation data are widely available for long periods of time and may be used to determine the antecedent moisture conditions.

(d) Sources of information

Precipitation data can be obtained from the NRCS National Water and Climate Center, Portland, Oregon.

Various stream gage data are published. They include mean daily discharge, mean daily stage, peak stage and discharge for flood events, and mean daily lake level. The primary sources for these data are the USGS Water Resources Data publications for each state. Stream and lake gage readings are also available from Corps of Engineers, TVA, USGS, NOAA, BOR, various highway departments, and state or local public works agencies.

Various computer models can also be used to determine the daily runoff volumes. This approach is discussed in the previous section.

(e) Methodology

(1) Rainfall data for procedures 1 and 2

Determine the climate station nearest to the site that has sufficient records to have had statistical information calculated for it. Obtain precipitation data for the site. For procedure 1, annual data are sought. For procedure 2, monthly rainfall totals during the growing season are the desired data. Both procedures require use of the WETS table available on the Internet. The internet address for WETS table and associated documentation is www.wcc.nrcs.usda.gov. The WETS table

is on the National Water and Climate Center's home page of NRCS. This table identifies the boundary where 3 in 10 of the precipitation amounts are wetter than normal value and the boundary where 3 in 10 values are drier than normal. Normal is considered to be values that fall between these two boundaries.

(2) Procedure 1

Precipitation data are used to help select years that signatures might be seen on aerial slides.

Step 1—Determine what aerial photographs are available. Plan to use at least 5 years for the analysis so 5 to 10 years will be examined, depending on how many normal years are anticipated.

Step 2—Compare the annual rainfall total for each year to the annual boundaries for wet and dry as mentioned above in the rainfall data section.

Step 3—Select years where normal precipitation was experienced for the year. These years will be key in determining whether wetland hydrology is present or not on a site. If less than 5 normal years are available, use an equal number of wet and dry years after discarding years where the rainfall was extremely high or low. Review the signatures in all the available years of flights, but concentrate on the normal years. Note slides where further records may need to be checked in case an extreme event occurred that was within normal for the year, but may have been extreme as a single event for a single month.

Step 4—If state mapping conventions are to be developed from the years selected in this process, study data from several sites before determining which years are to be used for the valuation. If a wet signature appears for a site only in wet years, a good probability exists that wetland hydrology is not present under normal circumstances. If a wet signature is seen in both dry and wet years, the site may well meet wetland hydrology criteria. Where the signatures appear in wet and normal years, further study is needed to determine whether wetland hydrology exists on the site.

(3) Procedure 2

Precipitation data are used to document the frequency of wet signatures in humid climates.

Step 1—Complete the general information on figure 19–7 for the year to be evaluated. Determine the date the photograph was taken or estimate it based on information available. Decide which three months will be used to represent the climatic conditions that existed prior to the time the photograph was taken. For example, if a photo was taken July 1, April, May, and June would be the most likely choices for the three prior months. However, if the photo was taken July 22, May, June, and July would be logical choices, provided no extreme events occurred in late July that would alter the wetness condition for that month. Enter the chosen months in the first column in figure 19–7.

Step 2—Enter the monthly rainfall totals in column 5. Enter the wet and dry boundaries and the monthly normal from the WETS table in columns 4, 2, and 3 respectively.

Step 3—Compare the actual rainfall in column 5 to the boundary values in columns 2 and 4 and determine if the actual rainfall was more than the upper boundary (thereby wet), less than the lower boundary (thereby dry), or between the two boundary values (thereby normal). Enter this condition in column 6.

Step 4—Using the small table of condition values in figure 19–7, enter the correct number (1, 2, or 3) in column 7 to correspond to the condition in column 6.

Step 5—Multiply the condition value in column 7 by the monthly weight value in column 8 and place the result in column 9. Sum the three values in column 9 and place the total below the three boxes.

Step 6—Compare this total to the sums in the small table in figure 19–7 to determine whether the evaluation for that year's slide is wet, normal, or dry.

Figure 19–7 Rainfall documentation worksheet

Rainfall Documentation (use with photographs)

Date: _____

Weather station: _____ Landowner: _____ Tract no.: _____

County: _____ State:_____

Soil name: _____ Growing season: _____

Photo date: _____

	Long-term rainfall records							
	Month	3 yrs. in 10 less than	Normal	3 yrs. in 10 more than	Rain fall	Condition dry, wet, normal	Condition value	Month weight value	Product of previous two columns
1st prior month*								3	
2nd prior month*								2	
3rd prior month*								1	
								Sum	

* Compared to photo date

Note: If sum is
- 6 - 9 then prior period has been drier than normal
- 10 - 14 then prior period has been normal
- 15 - 18 then prior period has been wetter than normal

Condition value:
- Dry =1
- Normal =2
- Wet =3

Conclusions: