U. S. LENTIC PROPER FUNCTIONING CONDITION (PFC) CHECKLIST USER MANUAL (Current as of 5/20/2010)

This user manual is intended to accompany the Lentic Proper Functioning Condition (PFC) Standard Checklist Form for assessing proper functioning condition of riparian wetlands associated with systems lacking flowing water and a defined channel. This document serves to assist data collectors in answering each item on the form and as an aid to the database user in the interpretation of data presented. Another form entitled the Lotic Proper Functioning Condition (PFC) Standard Checklist Form, with a different set of user guidelines, is to be used for lotic (flowing water) wetlands.

BACKGROUND INFORMATION

Flowing Water (Lotic) Wetlands vs. Still Water (Lentic) Wetlands
Cowardin and others (1979) point out that no single, correct definition for wetlands exists, primarily due to the nearly unlimited variation in hydrology, soil, and vegetative types. Wetlands are lands transitional between aquatic (water) and terrestrial (upland) ecosystems. Windell and others (1986) state that "wetlands are part of a continuous landscape that grades from wet to dry. In many cases, it is not easy to determine precisely where they begin and where they end."

In the semi-arid and arid portions of western North America, a useful distinction has been made between wetland types based on association with different aquatic ecosystems. Several authors have used ***lotic*** and ***lentic*** to separate wetlands associated with flowing water from those associated with still water. The following definitions represent a synthesis and refinement of terminology from Shaw and Fredine (1956), Stewart and Kantrud (1972), Boldt and others (1978), Cowardin and others (1979), American Fisheries Society (1980), Johnson and Carothers (1980), Cooperrider and others (1986), Windell and others (1986), Environmental Laboratory (1987), Kovalchik (1987), Federal Interagency Committee for Wetland Delineation (1989), Mitsch and Gosselink (1993), and Kent (1994).

Lotic wetlands are associated with rivers, streams, and drainageways. Such wetlands contain a defined channel and floodplain. The channel is an open conduit, which periodically or continuously carries flowing water, dissolved and suspended material. Beaver ponds, seeps, springs, and wet meadows on the floodplain of, or associated with, a river or stream are part of the lotic wetland.

Lentic wetlands are associated with still water systems. These wetlands occur in basins and lack a defined channel and floodplain. Included are permanent (i.e., perennial) or intermittent bodies of water such as lakes, reservoirs, potholes, marshes, ponds, and stockponds. Other examples include fens, bogs, wet meadows, and seeps not associated with a defined channel.

Functional vs. Jurisdictional Wetland Criteria
Defining wetlands has become more difficult as greater economic stakes have increased the involvement of more politics and less science. A universally accepted wetland definition satisfactory to all users has not yet been developed because the definition depends on the objectives and the field of interest. However, scientists generally agree that wetlands are characterized by one or more of the following features: 1) ***wetland hydrology,*** the driving force creating all wetlands, 2) ***hydric soils,*** an indicator of the absence of oxygen, and 3) ***hydrophytic vegetation,*** an indicator of wetland site conditions. The problem is how to define and obtain consensus on thresholds for these three criteria and various combinations of them.

Wetlands are not easily identified and delineated for jurisdictional purposes. Functional definitions have generally been difficult to apply to the regulation of wetland dredging or filling. Although the intent of legislation is to protect wetland functions, delineation of jurisdictional wetlands has relied largely on structural features or attributes. The hydrogeomorphic (HGM) approach being developed by the US Corps of Engineers is intended to focus more specifically on wetland functions.

The prevailing view among many wetland scientists is that ***functional wetlands need*** to meet only one of the three criteria as outlined by Cowardin and others (1979) (e.g., hydric soils, hydrophytic plants, and wetland hydrology). On the other hand, ***jurisdictional wetlands need to*** meet all three criteria, except in limited situations. Even though functional wetlands may not meet jurisdictional wetland requirements, they certainly perform wetland functions resulting from the greater amount of water that accumulates on or near the soil surface relative to the adjacent uplands. Examples include some woody draws occupied by the *Fraxinus pennsylvanica*/*Prunus virginiana* (green ash/common chokecherry) habitat type and some

floodplain sites occupied by the *Artemisia cana*/*Agropyron smithii* (silver sagebrush/western wheatgrass) habitat type or the *Pinus ponderosa*/*Cornus stolonifera* (ponderosa pine/red-osier dogwood) habitat type. Currently, many of these sites fail to meet jurisdictional wetland criteria. Nevertheless, these sites do provide important wetland functions and may warrant special managerial consideration. The current interpretation, at least in the western United States, is that not all functional wetlands are jurisdictional wetlands, but all jurisdictional wetlands are functional wetlands.

Polygon Delineation

The lentic wetland inventory process incorporates data on a wide range of biological and physical categories. The basic unit of delineation within which this data is collected is referred to as a ***polygon.*** A polygon is the area upon which one set of data is collected. One inventory form is completed (i.e., one set of data is collected) for each polygon. One or more (usually several) polygons constitute a project. A lentic (still water) wetland polygon is a wetland, or portion of a wetland, which is not associated with a waterway (stream or river) and which has no defined channel. Polygons are delineated on topographic maps before observers go to the field. It is important to clearly mark and number the polygons on the map.

If aerial photos are available, polygon delineations can be based on vegetation differences, geologic features, or other observable characteristics. On larger systems with wide wetland areas, aerial photos may allow delineation of multiple vegetation-based polygons away from the water source. In these cases, where polygons can be drawn as enclosed units a minimum mapping unit of possibly 5 to 10 acres (2 to 4 ha) should be followed. The size of the minimum mapping unit should be based on factors such as management capabilities, available funds, and capabilities of data collection.

If pre-delineated polygons are drawn on the maps, and pre-assigned numbers are given, be sure the inventoried polygons correspond exactly to those drawn. Observers are allowed to move polygon boundaries, create new polygons, or consolidate polygons if the vegetation, geography, location of fences, or width of the wetland zone warrant. If polygon boundaries are changed, the changes must be clearly marked on the field copies of the maps. Observers should draw the complete polygon boundary onto their field maps if possible at the 1:20,000 or 1:50,000 scale.

In most cases involving small bodies of water or small lentic wetlands, the inventoried polygon will be a single unit of area. Around larger lakes, extensive marshes, or other large lentic wetlands, it may be necessary to divide the wetland into separate polygons (Figure 1). Polygons should be divided at distinct locations such as fences, stream entrances or exits, or other features easily recognized in the field. When selecting "representative sites," consideration should be given to the differences presented by landform position (i.e., point vs. bay, or windward vs. leeward side of the water body). ***Polygons should not cross fences between areas with different management.***

The outer boundaries of polygons are usually at the wetland ecosystem outer edges. These boundaries are sometimes easily determined by abrupt changes in the landform and/or vegetation, but proper determination often depends on experienced interpretation of more subtle features. Do not include deep water habitat within the polygon area. The inner polygon boundary is the landward edge of the deep-water habitat, or where persistent emergent vegetation gives way to open water. In concept, deep-water habitat is the area covered by surface water deeper than 6.6 ft [2 m], or where sunlight cannot penetrate to support persistent, erect, rooted, plant life. Persistent emergent vegetation consists of species that normally remain standing at least until the beginning of the next growing season, e.g., *Typha* spp. (cattails) or *Scirpus* spp. (bulrushes). In practice, include all emergent vegetation (i.e., go out to open water) regardless of depth. If emergent vegetation has been removed by human activity, include out to where it would be expected in the absence of that impact. If there is no emergent vegetation, and there is no apparent potential for it, then stop the polygon where persistent vegetation ends and the open water begins.

In cases where observer access and visibility on part of the site to be assessed is impeded by deep water that may have extensive areas of emergent vegetation, the observer may choose, with documented reason, to either:

- Break the area into separate polygons in cases where large areas are utilized differently, such as where the landward area (onshore) is heavily impacted by human use and the wetted area (marsh) is unimpacted;
- Draw an arbitrary outer edge of the polygon that does not include all of the area with emergent vegetation, in which case the observer must carefully document the delineation and the rationale employed; or
- Include the entire dry and wet area together in a single polygon with careful commentary noting any areas that may be impacted differently due to having such greatly different conditions.

When using the inventory on artificial or artificially enlarged water bodies (e.g. dugout, manmade pond, reservoirs), use the same criteria, but remember that there will be questions that are difficult to apply appropriately. Focus on consistently applying the methods, including site boundaries, as well as recording all decisions made in applying the methodology. The goal of this exercise is to assess the ability of the site to perform riparian functions to its potential.

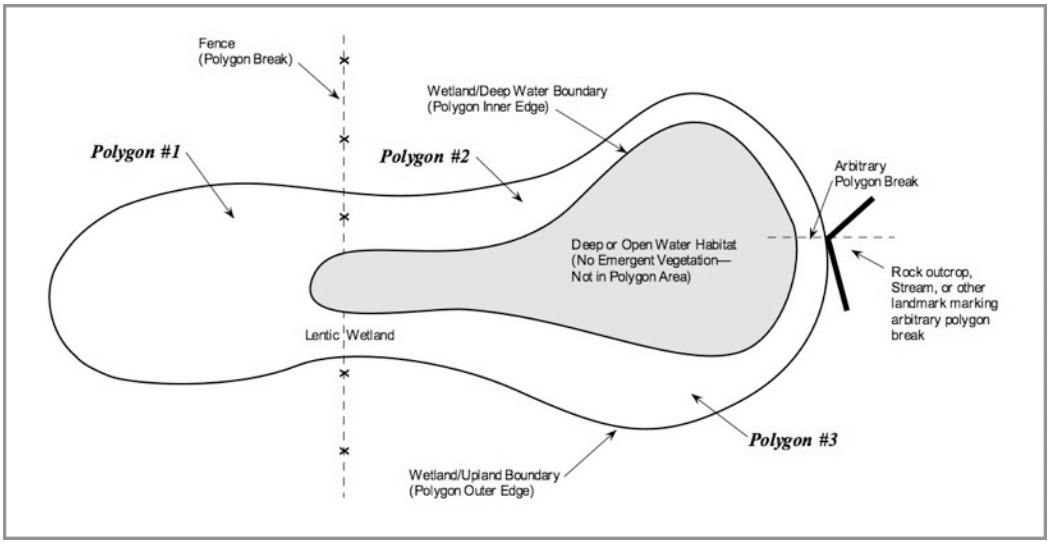


Figure 1. Schematic drawing of a lentic (still water) wetland showing: 1) delineation of polygons on larger systems, i.e. those too big to inventory as a single polygon (more than about one half mile [1.6 km] in length) or those with managerial breaks crossing them; 2) a typical relationship between "deep water habitat" (lacking emergent vegetation) and surrounding lentic wetland, which includes all areas of persistent emergent vegetation in standing water.

PFC FORM ITEM CODES AND INSTRUCTIONS

Polygon Data

The following are the codes and instructions for the individual data items on the form. All data items are to be recorded in the field unless otherwise noted. Numbering corresponds to that of items on the form. Do not use "—" and do not leave items blank ***NA*** means the item is not applicable to a particular polygon. ***NC*** means data was not collected for that item in a particular polygon. Observers must write legibly and should limit use of abbreviations throughout to prevent confusion.

Record ID No. This is the unique identifier allocated to each polygon. This number will be assigned in the office when the form is entered into the database.

Administrative Data

A1. Agency or organization collecting the data.

A2. Funding Agency/Organization.

A3a. BLM (Bureau of Land Management) State Office.

A3b. BLM Field Office/Field Station.

A3c. BLM Office Code (recorded in the office).

A3d. Is the polygon in an active BLM grazing allotment (recorded in the office)?

A3e, f. For BLM polygons, the BLM Office Code, whether the polygon is in an active BLM grazing allotment, and the Allotment Number is supplied by the BLM. These items are entered into the computer in the office; the computer then references a master list of Allotment ID's to complete the remaining Allotment information. Because some polygons incorporate more than one Allotment, space is provided to enter two sets of Allotment information. The master Allotment list is periodically updated by the BLM National Applied Resource Sciences Center to make needed corrections.

A4. USDI Fish and Wildlife Service Refuge name.

A5. Indian Reservation name.

A6. USDI National Park Service Park/National Historical Site name.

A7. USFS (Forest Service) National Forest name.

A8. Other location.

A9. Year the field work was done.

A10. Date of field work by day, month, and year.

A11. Names of all field data observers.

Note: Information for items **A12a-h** is found in the office; field evaluators need not complete these items.

A12. The several parts of these items identify various ways in which a data record may represent a resampling of a polygon that may have been inventoried again at some other time. The data in this record may have been collected on an area that coincides precisely with an area inventoried at another time and recorded as another record in the database. It may also represent the resampling of only a part of an area previously sampled. This would include the case where this polygon overlaps, but does not precisely and entirely coincide with one inventoried at another time. One other case is where more than one polygon inventoried one year coincides with a single polygon inventoried another year. All of these cases are represented in the database, and all have some value for monitoring purposes, in that they give some information on how the status on a site changes over time. ***This is done in the office with access to the database; field evaluators need not complete these items.***

A12a. Has any part of the area within this polygon been inventoried previously, or subsequently, as represented by any other data record in the database? Such other records would logically carry different dates.

A12b. Does the areal extent of this polygon exactly coincide with that of any other inventory represented in the database? In many cases, subsequent inventories only partially overlap spatially. The purpose of this question is to identify those records that can be compared as representing exactly the same ground area.

A12c. Does this record represent the latest data recorded for this site (polygon)?

A12d. If A12b is answered "Yes," then enter the record ID number(s) of any other previous or subsequent re-inventories (resampling) of this exact polygon for purposes of cross-reference.

A12e. Enter the years of any records recorded in item A12d as representing other inventories of this exact polygon.

A12f. Even though this polygon is not a re-inventory of the exact same area as any other polygon, does it share at least some common area with one or more polygons inventoried at another time?

A12g. Enter the years of any other inventories of polygons sharing common ground area with this one.

A12h. If A12f is answered "Yes," then enter the record ID number(s) of any other polygon(s) sharing common ground area with this one.

A13a. Has a management change been implemented on this polygon?

A13b. If A13a is answered "Yes," in what year was the management change implemented?

A13c. If A13a is answered "Yes," describe the management change implemented.

Location Data

B1. State in which the field work was done (recorded in the office).

B2. County or municipal district in which the field work was done (recorded in the office).

B3. This field for allotment or range unit is intended for entities other than the BLM to use for grouping polygons by management unit. The BLM management units are grouped using the grazing allotment information in A3 above.

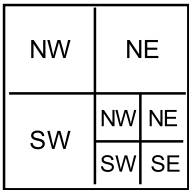
B4a. For lentic polygons the area is usually listed as a lake name, or other local designation that identifies the area where the inventory is conducted. If possible, use a name that is shown on the 7.5 minute topographic map.

B4b. Record the stream (if there is one) with which the inventoried lentic wetland is associated. Such association may be by inlet or outlet surface flow, or by general ground water (sub surface) connection.

B4c, d. Polygons are grouped together for management purposes. For example, all polygons around Henry's Lake in the Idaho Falls Field Office could be identified as Group Name: Idaho Falls Field Office; Group Number: 1 (recorded in the office).

B5. Polygon number is a sequential identifier of the portion of the area assessed. This is referenced to the map delineations. Sequences normally progress clockwise.

B6. The Township, Range, Section, 1/4 section, and 1/4–1/4 section is the location of the midpoint of the polygon area. When reading this information as a legal description, the order is presented from smallest to largest unit. Below is a schematic showing the quarter sections, with the SE quarter divided into quarter-quarters.



B7. Elevation (feet or meters) of the polygon midpoint. Elevation is interpolated from the topographic map(s).

B8a-e. The US Geological Survey has divided the nation into successively smaller hydrologic units based on drainage basins. These units in the United States are subdivided into fourth levels, uniquely identified by a two-digit number for each level. This results in a eight-digit identifier for a drainage at the fourth level. Some regions have units defined to the fifth and sixth level (finer scales). (Data is entered in the office.)

B9a. Record the latitude and longitude of the polygon, along with the GPS projection and accuracy. Record the degrees, minutes, and seconds. ***Note: All of North America is latitude = North, and longitude = West.***

B9b. Record any comments pertaining to the location of the polygon.

B10. Record the name(s) of the 7.5 minute quadrangle map(s) locating the polygon using precisely the name listed on the map sheet. Provision is made for listing two maps in case the polygon crosses between two maps.

Selected Summary Data

C1. Wetland/waterbody type is a categorical description of predominant polygon character. Select from the following list of categories that may occur within a lentic system the one that best characterizes the majority of the polygon. Observers will ***select only one category*** as representative of the entire polygon. If significant amounts of other categories are present, indicate this in Vegetation Comments (item D17) or consider dividing the original polygon into two or more polygons.

Category Description

Wet Meadow. A grassland with waterlogged soil near the surface, but without standing water for most of the year. This type of wetland may occur in either riparian (lotic) or in still water (lentic) systems. A lotic wet meadow has a defined channel or flowing surface water nearby, but is typically much wider than the riparian zone associated with the classes described above. This is often the result of the influence of lateral groundwater not associated with the stream flow. Lotic and lentic wet meadows may occur in proximity (e.g., when enough groundwater emerges to begin to flow from a mountain meadow, the system goes from lentic to lotic). Such communities are typically dominated by herbaceous hydrophytic vegetation that requires saturated soils near the surface, but tolerates

no standing water for most of the year. This type of wetland typically occurs as the filled-in basin of old beaver ponds, lakes, and potholes.

Marsh. A frequently or continually inundated wetland characterized by emergent herbaceous vegetation adapted to saturated soil conditions. A marsh generally has a mineral soil substrate does not accumulate peat.

Fen. A peat-accumulating wetland that receives some drainage from surrounding mineral soil and usually supports marsh-like vegetation.

Bog. A peat-accumulating wetland that has no significant inflows or outflows and supports acidophilic mosses, particularly sphagnum.

Spring/Seep. Groundwater discharge areas. In general, springs have more flow than seeps. This wetland type may occur in a riparian (lotic) or still water (lentic) system.

Reservoir. An artificial (dammed) water body with at least 8 ha (20 acres) covered by surface water.

Stock pond. An artificial (dammed) body of water of less than 8 ha (20 acres) covered by surface water.

Lake. A natural topographic depression collecting a body of water covering at least 8 ha (20 acres) with surface water.

Pothole, Slough, or Small Mountain Lake. A natural topographic depression collecting a body of water covering less than 8 ha (20 acres) with surface water.

Other. Describe any other wetland type encountered, which is not associated with a surface water channel.

Upland. This designation is for those areas which are included in the inventoried polygon, but which do not support functional wetland vegetation communities. Such areas may be undisturbed inclusions of naturally occurring high ground or such disturbed high ground as roadways and other elevated sites of human activity.

C2. The size (acres/hectares) of polygons large enough to be drawn as enclosed units on topographic maps is determined in the office using a planimeter, dot grid, or GIS. For polygons too small to be accurately drawn as enclosed units on the maps, polygon size is calculated using polygon length (item C5) and average polygon width (item C7a).

C3a-d. Evaluators may be asked to survey some areas that have not been determined to be wetlands for the purpose of making such a determination. Other polygons include areas supporting non-wetland vegetation types. A "Yes" answer here indicates that no part of the polygon keys to a riparian habitat type or community type (HT/CT). Areas classified in item C8 as any vegetation type described in a riparian and/or wetland classification document for the region in which you are working are counted as functional wetlands. Areas listed as UNCLASSIFIED WETLAND TYPE are also counted as functional wetlands. Other areas are counted as non-wetlands, or uplands. The functional wetland fraction of the polygon area is listed in item C3c in acres and as a percentage of the entire polygon area in item C3d.

C4. Lentic wetlands associated with open water, like lakes and ponds, usually have a shore. The shore is defined here as a variable width area that contains the locus of all points reached over time by the water's edge along the waterbody between its high stage and current water level (the time frame is generally taken to mean the recent period of hydrologic record, or the extent indicated by physical evidence present). Some lentic polygons may not contain a shore between wetland and open water. In some cases these polygons are in ephemeral depressions which may be infrequently inundated, but do support wetland plant communities. In other cases, these polygons may be part of large marsh systems that may or may not be associated with lakes, but where polygons may be delineated in areas not adjacent to open water.

C5. Polygon length is measured in the field or by scaling from the map. This data is considered accurate to the nearest 0.1 mile (0.16 km). Polygon length may be the same as shoreline length, but may not be in cases of much curved shoreline, or for polygons that have no shoreline (i.e., wet meadows or marshes). The shoreline is defined here as a linear feature extending at the time of observation along the water's edge one meter (three feet) wide back from the water onto the land.

C6. In some cases, the polygon data is used to characterize, or represent, a much larger, or longer, area. The length represented by the polygon is given here. For example, a 0.5-mile (0.8 km) polygon may be used to represent 2 miles (3.2 km) of total shoreline length. In this case, 0.5 (0.8 km) is the shoreline length in the polygon (item C5), and 2 miles (3.2 km) is the overall shoreline length entered in this question.

C7a, b. Record average width of the polygon, which in smaller wetlands corresponds to the width of the entire wetland area. Record the range of width (ft/m), narrowest to widest, of the wetland area in the polygon.

LOTIC PFC STANDARD CHECKLIST

For assistance and clarification in filling out and interpreting the checklist, refer to USDI BLM Technical Reference 1737-11 (Prichard and others 1994) and USDI BLM Technical Reference 1737-16 (Prichard and others 1999).

LITERATURE CITED

American Fisheries Society, Western Division. 1980. Position paper on management and protection of western riparian stream ecosystems. American Fisheries Society, Bethesda, Maryland, USA. 24 p.

Boldt, Charles D., Daniel W. Uresk, and Keith E. Severson. 1978. Riparian woodlands in jeopardy on Northern High Plains. In: Strategies for protection and management of floodplain wetlands and other riparian ecosystems (R. R. Johnson and J. F. McCormick, Technical Coordinators). USDA Forest Service General Technical Report WO-12. Washington, DC, USA. pp. 184-189.

Cooperrider, Allen Y., Raymond J. Boyd, and Hanson R. Stuart. 1986. Inventory and monitoring of wildlife habitat. USDI Bureau of Land Management, Denver Service Center, Denver Colorado, USA. 858 p.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deep water habitats of the United States. USDI Fish and Wildlife Service, Office of Biological Services, Washington, DC, USA. Publication Number FWS/OBS-79/31. 107 p.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, USA. 100 p.

Federal Interagency Committee for Wetland Delineation. 1989. Federal manual for identifying and delineating jurisdictional wetlands. US Army Corps of Engineers, US Environmental Protection Agency, USDI Fish and Wildlife Service, and USDA Soil Conservation Service Cooperative Technical Publication, Washington, DC, USA. 76 p.

Hansen, Paul L. and James B. Hall. 2002. Classification and management of USDI Bureau of Land Management's riparian and wetland sites in eastern and southern Idaho. Bitterroot Restoration, Inc., Corvallis, Montana, USA. 304 p.

Hansen, Paul L., Robert D. Pfister, Keith Boggs, Bradley J. Cook, John Joy, and Dan K, Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous Publication No 54. Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula, Montana, USA. 646 p.

Hansen, Paul L., William H. Thompson, J. Gant Massey, and Max Thompson. 2008. Classification and management of upland, riparian, and wetland sites of USDI Bureau of Land Management's Miles City Field Office, eastern Montana USA. Prepared for the USDI Bureau of Land Management Miles City Field Office, Miles City, Montana, USA. 640 p. plus 91 p. of Appendix B (Indicator Species).

Johnson, R. R., and S. W. Carothers. 1980. Riparian habitats and recreation: interrelationships and impacts in the Rocky Mountain region. Produced under agreement 53-82 FT-0-125 of the Eisenhower Consortium for Western Environmental Forestry Research, Fort Collins, Colorado, USA. 109 p.

Kent, Donald M. 1994. Applied wetlands science and technology. Donald M. Kent, editor. CRC Press, Inc., Lewis Publishers, Boca Raton, Florida, USA. 436 p.

Kovalchik, Bernard L. 1987. Riparian zone associations: Deschutes, Ochoco, Fremont, and Winema National Forests. USDA Forest Service Region 6 Ecology Technical Paper 279-87. Pacific Northwest Region, Portland, Oregon, USA. 171 p.

Mitsch, William J., and James G. Gosselink. 1993. Wetlands. Second Edition. Van Nostrand Reinhold, Publishers, New York, New York, USA. 722 p.

Prichard, Don, Clay Bridges, Russ Krapf, Steve Leonard, and Warren Hagenbuck. 1994. Riparian area management: Process for assessing proper functioning condition for lentic riparian-wetland areas. Technical Reference 1737-11. USDI Bureau of Land Management Service Center. Denver, Colorado. USA. 38 p.

Prichard, Don, Forrest Berg, Warren Hagenbuck, Russ Krapf, Robert Leinard, Steve Leonard, Mary Manning, Chris Noble, and Janice Staats. 1999. Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lentic areas. Technical Reference 1737-16. USDI Bureau of Land Management Service Center. Denver, Colorado. USA. 109 p.

Reed, Porter B., Jr. 1988. National list of plant species that occur in wetlands: Northwest (Region 9). US Fish and Wildlife Service Biological Report 88 (26.9). USDI Fish and Wildlife Service, Research and Development, Washington, DC, USA. 89 p.

Shaw, S. P., and C. G. Fredine. 1956. Wetlands of the United States: Their extent and their value for waterfowl and other wildlife. USDI Fish and Wildlife Service, Circular 39. Washington, DC, USA. 67 p.

Stewart, R. E., and H. A. Kantrud. 1972. Classification of natural ponds and lakes in the glaciated prairie region. USDI Fish and Wildlife Service, Research Publication 92. 57 p.

Windell, John T., Beatrice E. Willard, David J. Cooper, Susan Q. Foster, Christopher F. Knud-Hansen, Lauranne P. Rink, and George N. Kiladis. 1986. An ecological characterization of Rocky Mountain montane and subalpine wetlands. USDI Fish and Wildlife Service Biological Report 86(11). National Ecology Center, Division of Wildlife and Contaminant Research, Fish and Wildlife Service, US Department of the Interior, Washington, DC, USA. 298 p.