

# Assessing Proper Functioning Condition (PFC) of Lentic Areas



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## RIPARIAN AREA MANAGEMENT

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*A User Guide to Assessing Proper  
Functioning Condition and  
the Supporting Science for Lentic Areas*



Checklist  
Summary

Uses of  
PFC



U.S. Department of the Interior  
Bureau of Land Management



U.S. Department of Agriculture  
Forest Service



U.S. Department of Agriculture  
National Riparian Conservation Information System

# What is PFC?

- How well physical processes are functioning.

A state:

- of resiliency
- that allows lentic wetland areas to remain stable in the face of disturbances (e.g. wind/wave actions, overland flow events)
- that allows an area to produce desired values (e.g. waterfowl habitat)

# *Riparian Proper Functioning Condition (PFC)*

Term “PFC” is used in two ways:

- Condition Description: An on-the-ground condition of riparian-wetland areas determined by completing the “PFC” assessment process. This results in describing the “functionality” of a system (PFC, FAR, or NF).
- Qualitative Method for assessing the physical function of riparian-wetland areas (which may include using *quantitative* data to validate checklist items).



*As a condition description, PFC  
describes:*

- How well the physical processes are working
- How well the riparian-wetland area will hold together during wind & wave actions or overland flow
- The system's ability to maintain and produce both physical and biological values



# As an assessment - PFC

- Is a *qualitative* procedure based on *quantitative* science
- Provides a *consistent* approach for considering hydrology, vegetation, and soil attributes and processes in a synthesized manner to determine the health of the site.



# *The PFC assessment is:*

- Intended to be performed by a trained and experienced ID team



# Using PFC Assessments

- PFC is an appropriate starting point for determining and prioritizing the type and location of necessary quantitative inventory or monitoring.
- PFC condition correlates to “resiliency” with respect to desired values.

# Attributes & Processes

- Vary by wetland type
- Vary site to site
- Vegetation
- Soils
- Hydrology



# Attributes and Processes

## ➤ Erosion/Deposition

- Shoreline stability
- Depositional features

## ➤ Soils

- Soil type
- Distribution of  
Aerobic/Anearobic soils
- Annual pattern of soil/water  
states
- Ponding frequency and  
duration
- Restrictive materials

## ➤ Water Quality

- Temperature
- pH
- Dissolved solids
- Dissolved oxygen
- Toxic material

## ➤ Biotic Community

- Aquatic Plants
- Recruitment/  
Reproduction
- Nutrient enrichment

# Attributes and Processes

## ➤ Hydrogeomorphic

- Ground-water
  - Discharge
  - Recharge
- Flood modification
- Inundation
  - Depth
  - Duration
  - Frequency
- Semi-permanently flooded
- Shoreline Shape

## ➤ Vegetation

- Community types
- Community type distribution
- Density
- Cover
- Community dynamics and succession
- Recruitment/  
Reproduction
- Root characteristic
- Survival

# What PFC does

- Condition Description
- *Communication*
- Provide a *general/broad scale assessment* of the condition of riparian/wetland areas
- “*Coarse filter*” used to prioritize management, restoration & monitoring efforts



# *DEFINITION: Proper Functioning Condition (PFC)*

Adequate vegetation, landform or woody debris present to:

- -Dissipate Energy (wind, wave, and overland flow)
- -Filters Sediment -Improve Flood-water Retention
- -Develop Root Masses
- -Restrict Water Percolation
- -Develop Diverse Ponding Characteristics
- -Support Greater Biodiversity

# PFC CONDITION YIELDS

- Reduced erosion
- Improved water quality
- Floodplain development
- Ground-water recharge
- Stabilized islands and shoreline features
- Fish & wildlife habitat

# DEFINITIONS: Functional - At Risk (FAR)

Riparian-wetland areas that are in functional condition but have an existing soil, water, or vegetation attribute that makes them susceptible to degradation.

# DEFINITION: Non-functioning (NF)

Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or woody debris to dissipate energy associated with flow events, and thus are not reducing erosion, improving water quality, etc.

# ***HYDROLOGY***



1. Riparian-wetland area is saturated at or near the surface or inundated in “relatively frequent” events

➤ Purpose: Document that inundation or saturation is:

– Long enough

– Frequent enough...

...To maintain wetland characteristics



**Frequent saturation? “Yes,” watermark coincides with vegetation**

## 2. Fluctuation of water levels is not excessive

- Purpose: To determine if water level changes are within limits that will sustain the riparian-wetland vegetation



Fluctuation not excessive? “Yes,” vegetation is keeping up with seasonal fluctuation – “yes”

Fluctuation not excessive? “Yes,” although vegetation is not obvious, natural fluctuation is high and site is at potential



### 3. Riparian-wetland area is enlarging or has reached potential extent

- Purpose: To determine if riparian area is:
  - Degrading (filling with sediment or lowering of water table – water marks are below potential extent)
  - Recovering
  - Recovered



Wetland plants  
replacing upland  
species as water table  
rises - beaver

Wetland enlarging or  
achieved potential extent?  
“No,” rabbitbrush and  
sagebrush encroaching  
(use soil indicators to  
evaluate potential extent)



## 4. Upland watershed is not contributing to riparian-wetland degradation

- Purpose: To determine if there has been a change in water or sediment being delivered to the riparian-wetland area
  - Is the change causing degradation?
  - Indirect (watershed) impacts include altered hydrology, increased pollutants and sediment loadings, and buffer encroachment



**Upland watershed  
not contributing?  
“Yes,” no  
sediment plume  
in delta**

**Upland watershed  
not contributing?  
“No”**



## 5. Water quality is sufficient to support riparian-wetland plants

- Purpose: To determine if water quality is being maintained
  - Allowing the sites to produce the kind of vegetation necessary to function properly
  - For example – lack of hydric macrophytes and dominance of algae indicating nutrient enrichment

# Water quality is sufficient to support riparian-wetland plants (is not modified by pollutants)



✓ Point or non—point source



- ✓ Foul odors
- ✓ Lack Plant Diversity



✓ Algal blooms

**6. Natural surface and subsurface flow patterns are not altered by disturbance (i.e., hoof action, dams, dikes, trails, roads, rills, gullies, drilling activities)**

- Purpose: To determine if surface or subsurface flow patterns are being maintained

Flow patterns are not altered by disturbance  
“Yes”



Flow patterns are not altered by disturbance? “No,” ruts cross pothole or hummocks



7. Structure accommodates safe passage of flows (e.g., no headcut affecting the dam or spillway)

- Purpose: To determine if the outlet structure provides safe passage for water



If the structure is  
stable and  
accommodating flows?  
“Yes”

No headcut affecting  
the dam or spillway ?  
“No”



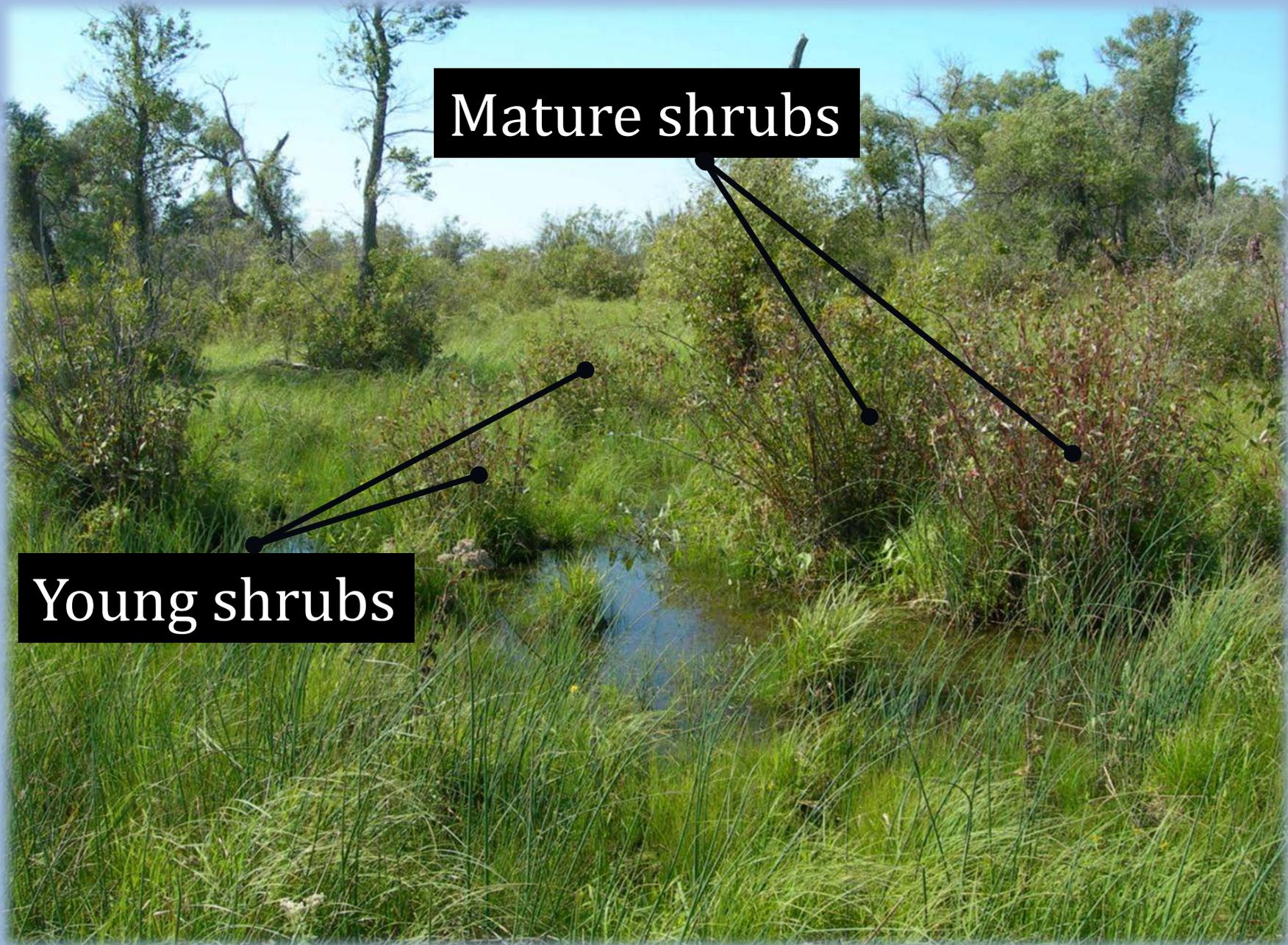
8. There is a diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)

➤ Purpose:

- Determine if sufficient age classes are present to indicate recruitment is occurring
- Does not mean all age-classes are present
- Usually two age classes are sufficient

**Mature shrubs**

**Young shrubs**





Is there a diverse age class of riparian-wetland vegetation?

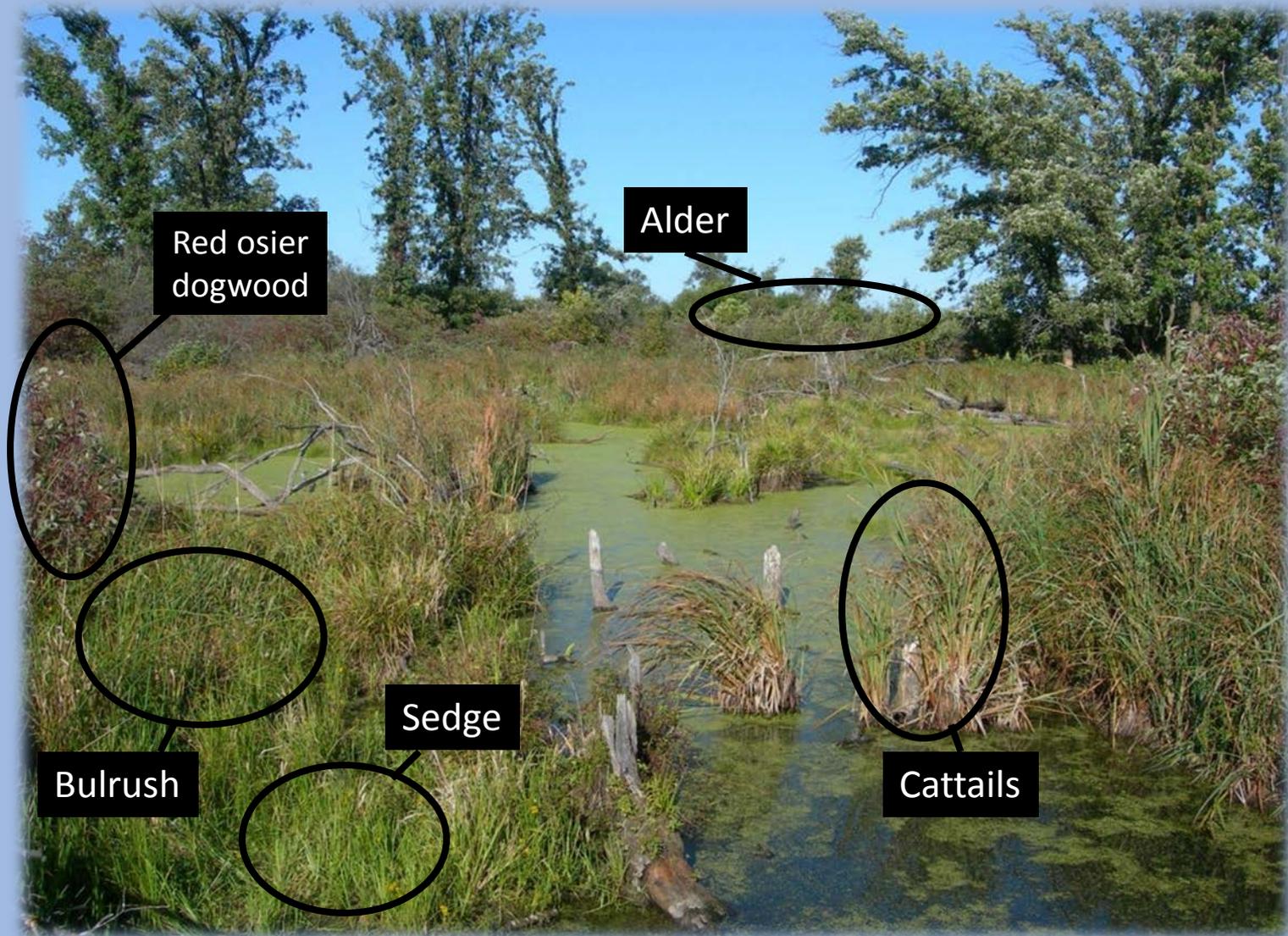
“NO”

## 9. There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)

### ➤ Purpose:

- Determine if sufficient plant species are present for maintenance or recovery
- Documents the existence of the appropriate plants
- Does not indicate whether there is enough of the plants
- Usually 2 or more species are sufficient

## 9. There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)



# 10. Species present indicate maintenance of riparian-wetland soil moisture characteristics

## ➤ Purpose:

- Indicate the presence of a shallow water table
- It does not ask if there is enough plants
- Only that the plants that are there indicate the maintenance of riparian-wetland moisture conditions



“Yes”

Do species present indicate  
maintenance of riparian-wetland  
soil moisture characteristics?

“No”



11: Vegetation is composed of those plants or plant communities that have root masses capable of withstanding wind events, wave flow events, overland flows (e.g., storm events, snowmelt)

➤ Purpose:

- Shorelines (e.g., open water areas) and soil surface (e.g., springs, seeps, wet meadows) have the right plants or plant communities in place.
  - Only asks if the right species are present, NOT if they are in sufficient amounts (but more than scattered plants).



6 15 '00

# 12: Riparian-wetland plants exhibit high vigor

## ➤ Purpose:

- Determine if riparian-wetland plants are healthy and robust with appropriate reproduction
- Or stressed and weakened with little or no reproduction



## 12: Riparian-wetland plants exhibit high vigor

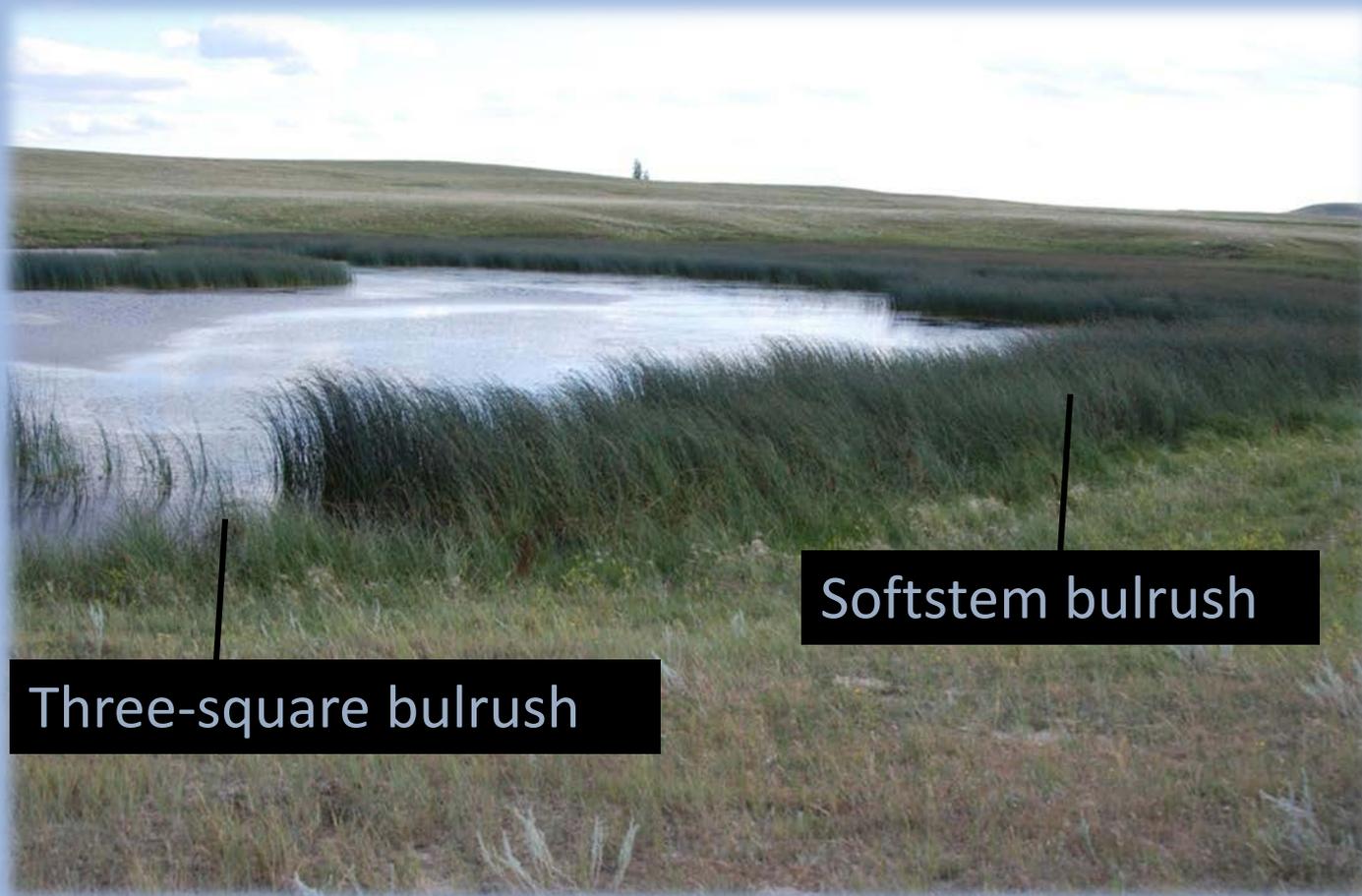
Low vigor can be illustrated by:

- Color (chlorosis)
- Necrosis (tissue degeneration)
- Wilting
- Relative size, production or reproduction

# **13: Adequate riparian-wetland vegetative cover is present to protect shoreline/soil surface and dissipate energy during high wind and wave events or overland flows.**

- Purpose:
  - To determine if there is a sufficient amount of riparian wetland vegetation to dissipate energy from high wind/wave events or high overland flow

# 13: Adequate riparian-wetland vegetative cover



Three-square bulrush

Softstem bulrush

# 13: Adequate riparian-wetland vegetative cover



# **14: Frost or abnormal hydrologic heaving is not present**

## **➤ Purpose**

- Determine whether frost or hydrologic heaving is at a normal or aggravated rate**



“No” – excess hummocking – note vertical sides to hummocks.

“No” for area on left and “yes” for the area on right.



**15: Favorable microsite condition (i.e., woody material, water temperature, etc.) is maintained by adjacent type characteristics**

➤ **Purpose**

- Determine if microsite conditions are necessary for proper functioning, and if so, whether adjacent site characteristics are maintaining those conditions



“No” due to removal of adjacent trees by fire.

# Erosion/Deposition



# **16: Accumulation of chemicals affecting plant productivity/composition is not apparent**

## ➤ Purpose:

- Determine if the vegetation is being affected by chemicals in the system
  - Accumulation of some chemicals can adversely affect vegetation



Iron precipitate in  
the meadow as a  
result of early  
thaw.



# **17: Saturation of soils (i.e., ponding, flooding frequency, and duration is sufficient to compose and maintain hydric soils**

## ➤ Purpose:

- Determine if there is sufficient water available to create or maintain hydric soil characteristics
  - Flooding frequency and duration
  - Ponding
  - Ground water saturation

# Wetland Characteristics (Soils)

## ➤ Soils

- Anaerobic soils
  - No oxygen
- Reducing Soils
  - Oxidation of metals

# Soils indicating seasonal saturation

Gley soils exhibit a greenish-blue-grey soil color due to anoxic wetland conditions.



# 18: Underlying geologic structure/soil material/permafrost is capable of restricting water percolation

➤ Purpose:

- Determine whether the underlying material is being maintained
  - Restrict water flow



**19: Riparian-wetland is in balance with water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)**

- Determine if water and sediment are being supplied to the area at a natural rate or are too much or too little



## 20: Islands and shoreline characteristics (i.e., rocks, coarse and/or large woody material) are adequate to dissipate wind and wave event energies

- Purpose:
  - To address those systems that *do not* require vegetation



# Summary Determination

## Functional Rating

Proper Functioning Condition \_\_\_\_\_  
Functional --At Risk \_\_\_\_\_  
Nonfunctional \_\_\_\_\_  
Unknown \_\_\_\_\_

Strong  
  
Weak

Remarks:

## Trend for Functional--At Risk

Upward \_\_\_\_\_  
Downward \_\_\_\_\_  
Not Apparent \_\_\_\_\_

Remarks:

# Standard Checklist

**Are factors contributing to unacceptable conditions outside the manager's control?**

Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, what are those factors?

\_\_\_\_\_ Dewatering  
\_\_\_\_\_ Dredging Activities  
\_\_\_\_\_ Road encroachment

\_\_\_\_\_ Other (specify) \_\_\_\_\_

\_\_\_\_\_ Mining Activities  
\_\_\_\_\_ Watershed conditions

Remarks: