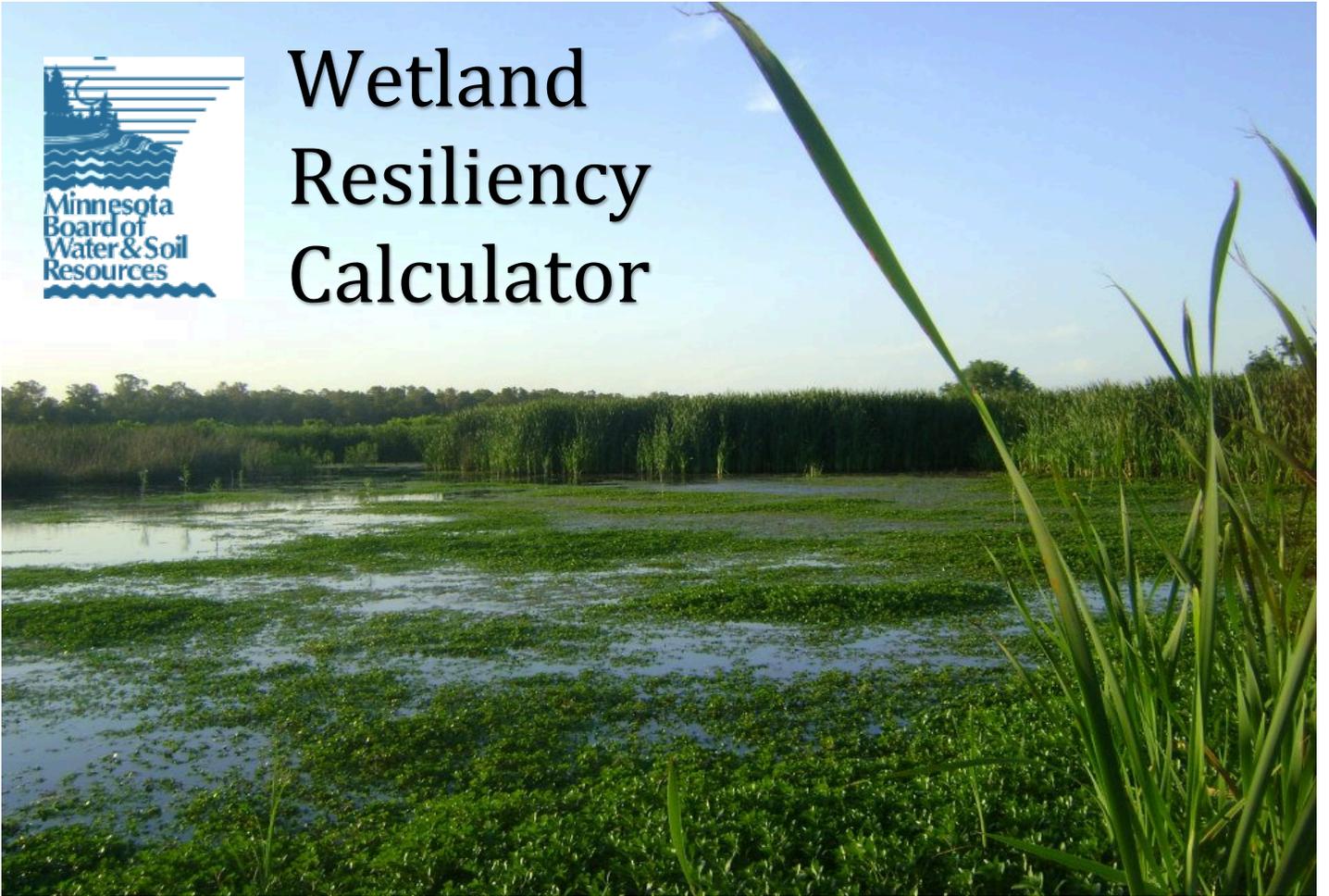




Wetland Resiliency Calculator



MINNESOTA BOARD OF WATER AND SOIL RESOURCES
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Introduction:

In the face of climate change protecting and restoring landscapes that are resilient to growing ecological pressures is becoming increasingly important. The BWSR Wetland Resiliency Calculator is a tool that can quickly assess a plant community's ability to maintain diversity and function through time and be used to measure the effectiveness and success of the wetland restoration projects.

The Minnesota Board of Water and Soil Resources (BWSR) mission is to improve and protect Minnesota's water and soil resources by working in partnership with local organizations and private landowners. BWSR is a leader in wetland protection through perpetual conservation easements, with approximately 16,000 acres of restored wetlands that have replaced losses through wetland banking and on-site mitigation. However, due to a wide range of environmental stressors, including extreme weather events, invasive species, water fluctuations, sedimentation, etc. it is difficult to predict how resilient projects will be after initial establishment and management activities are completed.



The primary goal of BWSR's Wetland Resiliency Calculator is to assess the resiliency of previously restored wetlands, or in newly restored wetlands, or to predict the resiliency of potential projects. The tool can help with project selection, project planning and design and decision making for management. The tool can also be used to compare reference wetlands to restoration sites. Wetland site and buffer conditions, hydrology and plant community integrity, and adaptive or natural disturbances are used in the calculator to assess restored projects.

Instructions:

The Resiliency Calculator has a total of 6 questions covering a variety of resiliency indicators including: wetland types, native plant dominance, buffer conditions, integrity of hydrology, site stressors, and adaptive management or natural disturbances. Each indicator has several check box answers that range in points. After answering all of the indicator questions the points can be tallied to calculate a resiliency score between 1 and 100. The numerical scores then can be placed within a range of predetermined resiliency values (Low, Medium, High, or Exceptional). The Resiliency Calculator was designed to provide a general assessment of wetland plant community resiliency in a short amount of time with relative ease.

The first question focuses on wetland types present in the assessment area. A list of wetland types, based on the Eggers and Reeds Wetland Plant Communities (Egger & Reeds, 1997), are listed with numerical scores listed for each community. All communities present in the site, which must be 10% of the site or 1 acre in size are tallied. The second question focuses on dominance of native plant species within the assessment area. A range of scores depending upon the percent of wetland plant communities in native vegetation are listed with prescribed numerical values. Additional points can be added if the communities are above 50% native species dominant and have been established for more than 5 years. The goal of question three is to rank the buffer condition with consideration of perennial vegetation, quantity of impervious surface or disturbance, and native plant communities. Question four is focused on the predictability of hydrology conditions that are suitable for the restored wetland type. Question five focuses on four main stressors (over-grazing or haying, excessive nutrient conditions, unpredictable water fluctuations, and invasive species pressure) which if found in a wetland increase ecological pressure on the plant communities. The final question in the resiliency calculator focuses on current or future adaptive management intensity, and/or natural disturbances appropriate for wetland plant communities present in the assessment area.

BWSR WETLAND RESILIENCY CALCULATOR

Measuring the ability of wetland plant communities to maintain functional integrity

Site: _____

Date: _____

This calculator has been designed to provide a general assessment of wetland plant community resiliency (with an emphasis on maintaining functional integrity over time) to assess current conditions, or assess potential restored conditions. The calculator can also be used as tool to guide restoration project scoping, project ranking, and to assess reasonable performance standards for projects. To use, check off each applicable option. Add up the points and place the total at the bottom of each category. The grand total will calculate at the end of the sheet to provide the site resiliency.

1 Wetland Types Present

<input type="checkbox"/>	Shallow Open Water	4	pts.
<input type="checkbox"/>	Deep Marsh	4	pts.
<input type="checkbox"/>	Shallow Marsh	4	pts.
<input type="checkbox"/>	Sedge Meadow	4	pts.
<input type="checkbox"/>	Wet Meadow	3	pts.
<input type="checkbox"/>	Wet Prairie	4	pts.
<input type="checkbox"/>	Fens	4	pts.
<input type="checkbox"/>	Open Bog	5	pts.
<input type="checkbox"/>	Coniferous Bog	5	pts.
<input type="checkbox"/>	Shrub-Carr or Alder Thicket	5	pts.
<input type="checkbox"/>	Hardwood Swamp	4	pts.
<input type="checkbox"/>	Coniferous Swamp	4	pts.
<input type="checkbox"/>	Floodplain Forest	5	pts.

0 Total

Note: Communities must be 10% of wetland or at least 1 acre. This questions makes the assumption that some communities are more resilient than others and that having multiple wetland types (as part of a wetland complex adds resiliency. Points should be added for each community present.

2 Native Plant Species Dominance

(for all wetland plant communities combined)

<input type="checkbox"/>	1 - 9%	5	pts.
<input type="checkbox"/>	10 - 24%	10	pts.
<input type="checkbox"/>	25 - 50%	15	pts.
<input type="checkbox"/>	51 - 75%	25	pts.

Note: If the plant communities (having 51-75% dominance) have been established for for 5 - 9 yrs then add 3 pts., If >9 yrs then add 6 pts.

<input type="checkbox"/>	76 - 100%	30	pts.
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Note: If the plant communities (having 76-100% dominance) have been established for >9 yrs then add 8 pts.)

0 Total

Note: Broad-leaf cattail should be included as a "native species" but not narrow-leaf or hybrid cattail

3 Average Buffer Condition

<input type="checkbox"/>	Poor:	-10	pts.
<input type="checkbox"/>	Very Low:	5	pts.
<input type="checkbox"/>	Low:	25	pts.
<input type="checkbox"/>	Medium:	30	pts.
<input type="checkbox"/>	High:	35	pts.
<input type="checkbox"/>	Very High:	40	pts.
<input type="checkbox"/>	Exceptional:	45	pts.

0 Total

Within 150 ft of wetland <30% perennial vegetation and /or high impervious surface (>20%) or human disturbance
 Within 150 ft of wetland 30-49% perennial vegetation and/or moderate impervious surface (10-20%) or human disturbance
 Within 150 ft of wetland 50-70% perennial vegetation and relatively low impervious surface (<10%) or human
 Within 150 ft of wetland >70% perennial vegetation and low impervious surface and human disturbance
 Within 150ft of wetland >70% native plant communities and human disturbance
 150-300 ft of wetland >70% native plant communities and human disturbance
 >300ft of wetland >70% native plant communities and human disturbance

Note: Areas with >20% impervious should rank very poor. Buffers with water flowing away from the wetland should have less influence on the condition ranking. Examples of high human disturbance include practices such as the use of large equipment that can cause soil disturbance or compaction. An example of moderate human disturbance would include mowing and other lawn maintenance

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4 Integrity of Hydrology Conditions

<input type="checkbox"/> Very Low	-5	pts.
<input type="checkbox"/> Low	5	pts.
<input type="checkbox"/> Medium	15	pts.
<input type="checkbox"/> High	25	pts.
<input type="checkbox"/> Very High	30	pts.
	0	Total

Note: This question is focused on predictability of hydrology conditions that are suitable for the restored wetland type, poor integrity of water control structures due to wave action/erosion, muskrat burrows or other damage may lead to a low integrity score, as well as surrounding drain tile or irrigation/pumping, or susceptibility to drought due to sandy soils. Water fluctuations are addressed under "site stressors below."

5 Site Stressors

<input type="checkbox"/> Over-grazing or haying (> 50% of site)	-20	pts.
<input type="checkbox"/> High nutrient conditions	-25	pts.
<input type="checkbox"/> Medium nutrient conditions	-20	pts.
<input type="checkbox"/> High water fluctuations/flooding (Not natural to wetland type)	-25	pts.
<input type="checkbox"/> Medium water fluctuations/flooding (Not natural to wetland type)	-20	pts.
<input type="checkbox"/> High Invasive Species Pressure	-25	pts.
<input type="checkbox"/> Medium Invasive Species Pressure	-20	pts.
	0	Total

Note: Over-grazing refers to average grass heights of 2" or less during growing season but excludes conservation grazing efforts that are following a grazing plan

Note: This would include projects receiving water from large watersheds with intensive agricultural runoff or from urban stormsewers or sites with a large amount of accumulated nutrients

Note: This would include projects receiving water from smaller watersheds with agricultural tiles from a few point sources or from a few urban stormsewers or sites with accumulated nutrients

Note: High water fluctuations refer to >1ft w/10yr. storm event. Bounce may be evident due to high water marks or dominance of non-native cattails.

Note: Medium water fluctuations refer to .5 to 1ft w/10yr. storm event. Bounce may be evident due to high water marks or dominance of non-native cattails.

Note: >20% of wetland or >40% of surrounding areas dominated with invasive vegetation

Note: 10-19 percent of wetland or 30-39% of surrounding area in perennial invasive vegetation Do not include in total if the site has "High Invasive Species Pressure"

6 Current/Future Adaptive Management Intensity, and/or Natural Disturbance Appropriate for Wetland Plant Communities Present

<input type="checkbox"/> None	-5	pts.
<input type="checkbox"/> Low (at least one activity every other year)	5	pts.
<input type="checkbox"/> Medium (1-2 activities per year)	25	pts.
<input type="checkbox"/> High (3+ activities per year)	45	pts.
	0	Total

Note: Actions such as herbicide application, prescribed burning, conservation grazing, or water level management, as well as natural disturbances such as flooding within a floodplain. The disturbances must be of a frequency and intensity that is beneficial to the plant community/s.

GRAND TOTAL:

86-100+ Exceptional Resiliency

85-71 High Resiliency

50-70 Medium Resiliency

0-49 Low Resiliency