

Day Four



MN Wetland Professional Certification Program Basic Class- Day 4



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Quiz

1) The Wetland Conservation Act is a:

- a) Federal Law passed in 1972.
- b) State Rule, passed as a bipartisan statute in 1991, implemented by Local Government Units.
- c) State Rule, passed in 1991, which is administered by the MNDNR.
- d) Recommended set of best management practices for activities in wetlands.

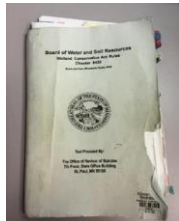
2) The Wetland Conservation Act regulates activities:

- a) In all areas which have wetland characteristics and meet the technical criteria.
- b) In Public Waters and Public Water Wetlands.
- c) In wetlands used in normal farming practices that does not result in the draining of the wetland.
- d) That result in the draining or filling of all wetland types.

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3) Which Agency has administrative oversight and Rulemaking authority for the WCA?

- a) Local Government Units
- b) MN Board of Water and Soil Resources
- c) MN Department of Natural Resources
- d) Local Soil & Water Conservation Districts




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4) While most wetlands are non-navigable, they still may be considered the following and thus regulated under the Federal Clean Water Act:

- a) Incidental wetlands
- b) Perpetual Conservation Easement
- c) Upland
- d) Waters of the United States

5) Which regulatory program defines its jurisdictional boundary by the ordinary high water level?

- a) Section 404 of Clean Water Act
- b) Wetland Conservation Act
- c) Section 401 of Clean Water Act
- d) Public Water Works Permitting Program




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6) Which Federal regulatory program regulates the discharge of dredged or fill material:

- a) Food Security Act
- b) Rules of the Department of the Interior
- c) Section 401 of the Clean Water Act
- d) Section 404 of the Clean Water Act

7) The WCA regulates:

- a) Peat mining
- b) Normal farming practices
- c) Draining, filling of all wetland types
- d) Incidental wetlands



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8) Which of the following is not a LGU's role in administering the WCA:

- a) Make decisions on applications made under the WCA
- b) Completely fill out a joint application for the landowner
- c) Coordinate TEP meetings when needed
- d) Provide knowledgeable and trained staff

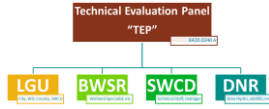
9) The role of the Technical Evaluation Panel does not include:

- a) Operate objectively.
- b) Perform LGU duties such as noticing applications.
- c) Generate findings as requested by the LGU.
- d) Make recommendations to the LGU based their findings.

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10) For a project in a shoreland area, the Technical Evaluation Panel consists of:

- a) The LGU, Army Corps and DNR.
- b) The LGU, SWCD, BWSR and Army Corps.
- c) The LGU, SWCD, BWSR and DNR.
- d) The Army Corps and DNR.



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11) What are the 3 general types of adaptations that plants have made to grow in anaerobic soil conditions:

Morphologic, reproductive, physiologic

12) In the table, place the following plant indicators from most likely to least likely to occur in a wetland.

- OBL
- FACW
- FAC
- FACU
- UPL

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13) A delineator walks into a wetland edge and observes over 75% areal coverage of cattail (OBL) with 2 other species (both FAC) that are less than 5% coverage each. What hydrophytic vegetation indicator test should they use?

- a) Rapid Test of Hydrophytic Vegetation
- b) Dominance Text is >50%
- c) Prevalence Index is ≤ 3.0
- d) Morphological Adaptations

14) How many dominant species are there in the sample point data below?

Species	Strata	% Coverage
Species A	Shrub/Grass	5
Species B	Herbaceous	20
Species C	Herbaceous	20
Species D	Herbaceous	30
Species E	Herbaceous	15
Species F	Herbaceous	30
Species G	Tree	3

- a) 1
- b) 2
- c) 3
- d) 4

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Quiz

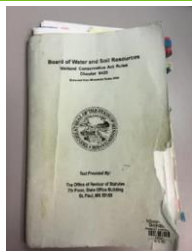
15) What is the recommended sampling size for the sapling/shrub, herbaceous, and tree strata? Use the table below.

Strata	Plot Size (feet)
Tree	30
Shrub/sapling	15
Herbaceous	5
Woody vine	30



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Wetland Conservation Act



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WCA

• [WCA Program Guidance](#)

WCA Program Guidance and Information

"Hit it bro, the lights gray"



WCA Topics of the Week

WCA Exemptions Guidance and Policy

WCA Administrative Procedures and Coordination Guidance and Policy

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Basic WCA Decision Types



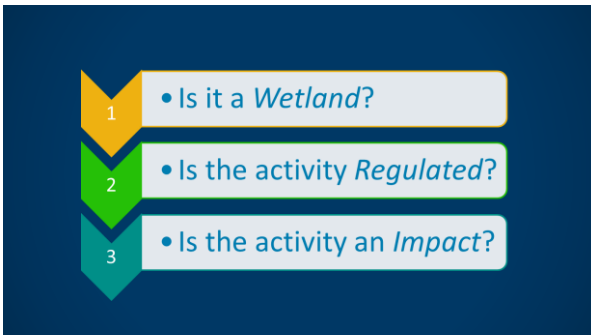
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Basic WCA Decision Types

- Boundary and Type
- No Loss
- Exemption



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What is regulated by WCA?

What is considered Impact?

A loss in quantity, quality, or biological diversity of a wetland *caused* by draining or filling in all types or by excavation in semipermanently and permanently flooded areas.



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What is Drainage?

Any method for removing or diverting waters from a wetland.

- Excavation of a ditch
- Tile Installation
- Filling
- Diking
- Pumping
- Diverted water
- Etc.



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What is Fill?

Any solid material **added or redeposited** in a wetland

- Alters cross-section or hydrological characteristics,
- Obstructs flow patterns,
- Changes Boundary, or
- Converts to non-wetland.



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Wetland Fill

- Does not include posts for walkways, bridges, powerline poles, etc.



- Does not include slash or woody vegetation as long as it originated from vegetation growing in the wetland and does not impair flow or circulation of water.



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Wetland Fill

- Wetland fill *does not* include posts and pilings unless it turns wetland into a nonaquatic use or significantly alters its functions and value.



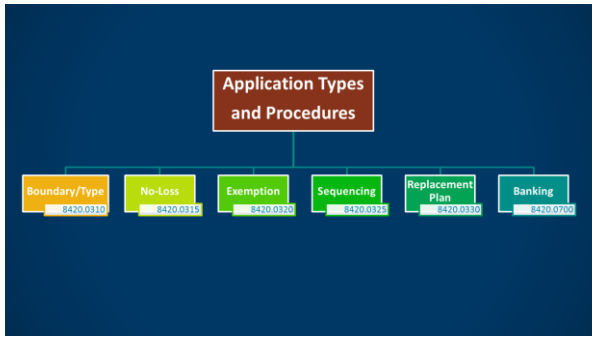
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What is Excavation?

Removal of soil by any method if it results in an impact*.



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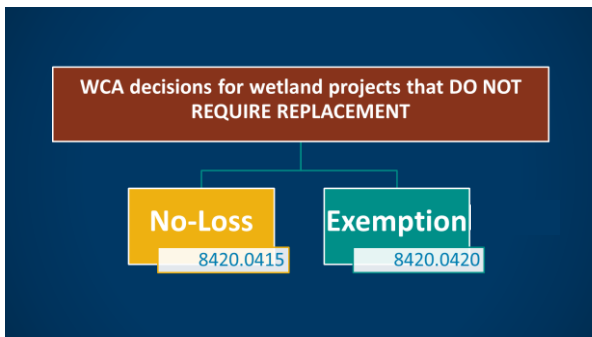
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**Boundary/Type Applications:
Where wetland regulation meets science**

- Boundaries must be delineated using USACE 1987 Manual and Supplements (8420.0405.subp 1)
- Wetland Types must be identified using HGM (WCA) and Eggers and Reed (Corps)
- Requires NOA and NOD.
- Technical Decision- one member of TEP must make a site visit



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No Loss Activity Basics

Defined:

No permanent loss of, or impact to, wetlands from an activity.



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No-Loss Criteria

"No-loss" means no permanent loss of, or impact to, wetlands from an activity according to the criteria in this part.

- **Will not impact a wetland** (8420.0415 Subp A.)
- **Excavation limited to removal of sediment or debris** Trees, logs, beaver dams, trash, blockage of culverts (8420.0415 Subp B.)
- **Water level management** (8420.0415 Subp C.)
- **Excavation limited to removal of sediment** in wetlands utilized as storm water basins. (8420.0415 Subp E.)
- **Operation, Maintenance or Emergency Repair.** (culverts) (8420.0415 Subp F.)
- **Temporary impact** if: Returned to previous conditions. Activity completed within 6 months (8420.0415 Subp H.)



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No-Loss

- **Temporarily crossing or entering a wetland to perform silvicultural activities**, including timber harvest as part of a forest management activity, so long as the activity limits the impact on the hydrologic and biologic characteristics of the wetland; the activity does not result in the construction of dikes, drainage ditches, tile lines, or buildings; and the timber harvesting and other silvicultural practices do not result in the drainage of the wetland or public waters (8420.0415 Subp G)
- **Activity conducted as part of an approved replacement or banking plan, conducted or authorized by public agencies for the purpose of wetland restoration or fish and wildlife habitat restoration** (8420.0415 Subp D)



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No-loss and Exemption conditions

- Every activity in wetland, regardless of whether an application is submitted must:
 - Implement erosion control measures to prevent sedimentation of wetlands
 - Not block fish activity
 - Comply with all other applicable local, State, Federal requirements, including best management practices



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General Exemption Requirements for ALL

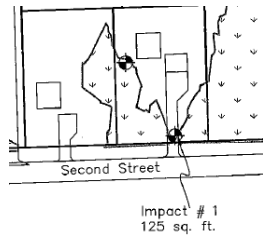
- Only has to fit one; not disqualified if not exempt by another
- If impacts exceed max allowed = nothing is exempt
- Max may not apply to all situations or wetlands-**very specific**
- May not be combined on a project
- Must stabilized to prevent sedimentation/erosion.

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Exemptions 8420.0420

- Impacts to wetlands that **DO NOT** require replacement.
 - The activity is still regulated.
 - WCA does not REQUIRE an application; some LGU's may.
 - May not be combined on a project.
- Exemptions do not apply to: calcareous fens, wetland bank sites, project-specific replacement sites (8420.0420 Subp 1B)



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Exemptions – Agricultural Activities

"Agricultural land" means land devoted to the following uses and includes any contiguous land associated with the uses:

- (1) pasture or hayland for domestic livestock or dairy animals;
- (2) producing agricultural crops;
- (3) growing nursery stocks; or
- (4) animal feedlots.



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Exemptions – Agricultural Activities

Replacement plan for wetlands is not required for:

- impacts to wetlands on agricultural land labeled prior-converted (PC) cropland and
- impacts to wetlands resulting from drainage maintenance activities authorized by the Natural Resources Conservation Service, on areas labeled farmed wetland, farmed-wetland pasture, and wetland.

The prior-converted cropland, farmed wetland, farmed-wetland pasture, or wetland must be labeled on a valid final certified wetland determination issued by the Natural Resources Conservation Service.

Landowner is responsible to provide a copy of the final certified wetland determination (1026) to, and allow the Natural Resources Conservation Service to share related information with, the local government unit and the board for purposes of verification;

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Exemptions – Ag Activities

Exempt

- Prior Converted Cropland (PC)

Exempt if drainage maintenance

- Wetland (W)
- Farmed Wetland (FW)
- Farmed Wetland Pasture/Hayland (FWP)



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Exemptions – Agricultural Activities

Subp. 2. C.

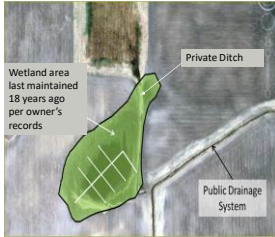
Impacts resulting from soil and water conservation projects that are certified by the SWCD staff after review by TEP

- The projects must minimize impacts to the hydrologic and biologic characteristics of the wetland.

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Exemptions – Drainage Exemption

A replacement plan is not required for draining or filling of wetlands, except for draining wetlands that have been in existence for more than 25 years, resulting from maintenance and repair of existing drainage systems other than, including public drainage systems.



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Drainage/Ditch Maintenance

Replacement not required for maintenance or repair of existing drainage systems

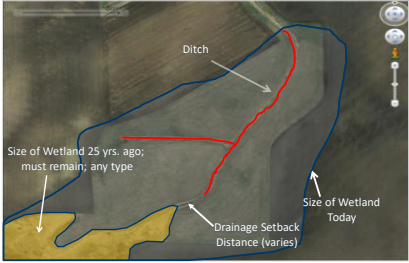
WHEN:

The work does not drain Wetland that have existed more than 25 years.



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Drainage/Ditch Maintenance Illustration



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Ditch Maintenance

CONDITIONS:

- Spoil must be placed and stabilized to minimize impacts.
 - remove
 - place on existing spoil
 - incorporate
 - side cast
- Ditch must be stable and not degrade water quality downstream.

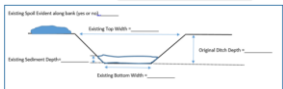


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Drainage/Ditch Maintenance

What items may be needed to demonstrate this exemption is met?

- Past records of maintenance (receipt to contractors)
- Aerial Photo review
- Amount of Sediment Proposed to be removed (can be critical)
- Depth of ditch/soil types
- Culvert elevation and location
- Site visit
- Lateral Effect Calculations or estimates



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Exemptions

- Federal Approvals** 8420.0420 Subp 4
 - Impacts authorized by Corps of Engineers that meet standards agreed to by BWSR, Dept. of Ag., DNR, and MPCA.
 - Pipelines, electrical, broadband, etc.

- Utilities** MS 103G.2241

A replacement plan for wetlands is not required for wetland impacts resulting from:

- new placement or maintenance, repair, enhancement, realignment, or replacement of existing utility or utility-type service, including pipelines, if, when wetland impacts are authorized under and conducted in accordance with a permit issued by the United States Army Corps of Engineers under section 404 of the federal Clean Water Act
- Repair and updating existing septic systems to comply with local, state and federal regulations



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Exemptions – de minimis

- The de minimis exemption covers small impacts to wetlands typically used for driveways, culverts, small projects by landowners, etc.
- Very specific requirements depending on location in state, local area, shoreland, etc.

Table 1: Maximum de minimis exemption amounts for per MS 103G.2241 (Aug. 1, 2024)

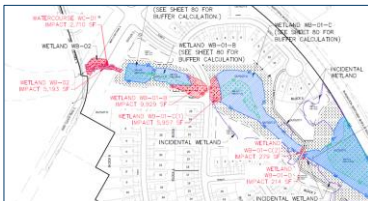
Impacts to wetlands, excluding permanent and semipermanently flooded areas of wetland.	Prisesettlement area of state	Impact area up to (acres):	Impact area up to: (square feet):
Outside of Shoreland Wetland Protection Zone	Greater than 80 percent area	One-quarter (1/4)	10,890
	50 to 80 percent area	One-tenth (1/10)	4,356
	Less than 50 percent area	One-twentieth (1/20)	2,178
Within Shoreland Protection Zone, but beyond structure setback	Statewide	N/A	320
Within Shoreland Protection Zone and structure setback	Statewide	N/A	20 *(100)
Impacts to permanent and semipermanently flooded areas of wetlands	Statewide	N/A	400

*Increased amount shown in parenthesis may be allowed if wetland is isolated from the public water, or if permanent water runoff retention or infiltration measures are established in proximity to the impact and approved by the shoreland management authority.

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De Minimis Exemption

- Can't be combined
- If total area of impacts exceed de minimis, a replacement plan is required for the entire amount.
- May not divide property simply to get more



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Exemptions

- Subp. 7. **Forestry.** The exemption under this subpart is for roads and crossings solely constructed, and primarily used, for the purpose of providing access for the conduct of silvicultural activities. A replacement plan is not required for impacts resulting from construction of forest roads and crossings so long as the activity limits the impact on the hydrologic and biologic characteristics of the wetland; the construction activities do not include, or result in, the access becoming a dike, drainage ditch, or tile line; impacts are avoided wherever possible; and there is no drainage of the wetland or public waters.



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Exemptions

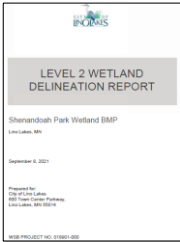
- **Wildlife Habitat 8420.0420 Subp 9**
- Excavation or the associated deposition of spoil within a wetland for the primary purpose of wildlife habitat, if:
 - Deposition is less than 5% or ½ acre
 - No adverse effect on Threatened & Endangered Species
 - Certified by SWCD or TEP
 - All spoil must be stabilized with native, noninvasive vegetation.



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Summary of Basic WCA Decisions

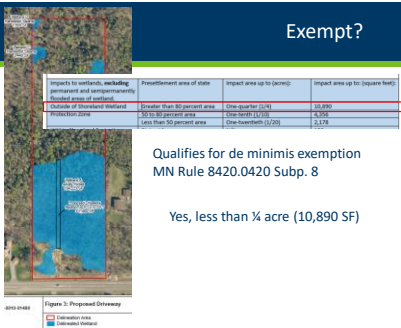
- Boundary/Type: approving wetland delineation that used Corps manual: Level 1, 2, 3 or comprehensive.
- No-loss: activity that does not result in wetland impacts
- Exemptions: wetland impacts that are exempt from replacement



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Exempt?

- Located in >80% area
- Not in shoreland
- Wetland =154,223 SF
- Proposed impact=7,490 SF



Qualifies for de minimis exemption
MN Rule 8420.0420 Subp. 8

Yes, less than ¼ acre (10,890 SF)

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De minimis - Examples

Table 1: Maximum de minimis exemption amounts for per MS 103G.2241 (Aug. 1, 2024)

Impacts to wetlands, excluding permanent and semipermanently flooded areas of wetland	Presettlement area of state	Impact area up to (acres):	Impact area up to: (square feet):
Outside of Shoreland Wetland Protection Zone	Greater than 80 percent area	One-quarter (1/4)	10,890
	50 to 80 percent area	One-tenth (1/10)	4,356
	Less than 50 percent area	One-twentieth (1/20)	2,178
Within Shoreland Protection Zone, but beyond structure setback	Statewide	N/A	100
Within Shoreland Protection Zone and structure setback	Statewide	N/A	20 *(100)
Impacts to permanent and semipermanently flooded areas of wetlands	Statewide	N/A	400

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Scenario 1

A project is located outside of shoreland in a 50-80% area of the State and proposes to fill and impact 4,975 ft² of saturated mineral flat wetland for a driveway access.



Does Not Qualify:
De minimis is up to 1/10 acre (4,356 sf)

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Scenario 2

A project is located within the building setback zone in a >80% area of the State and proposes to fill and impact 320 ft² of a lacustrine fringe wetland.



Does not Qualify:
De minimis statewide for all wetland types within building setback is up to 20 sf.

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Scenario 3

A project is located outside of shoreland in a greater 80% area of the State and proposes to fill and impact 5,800 ft² of a mineral flat wetland.



Qualifies:
De minimis is up to 10,890 sf (1/4 acre)

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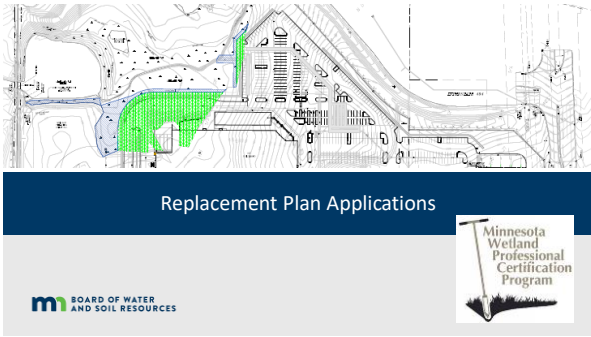
Scenario 4

A project is located in the less than 50% area of the State and proposes to excavate 175 ft² of a permanently flooded area of wetland.



Not enough info to determine:
What is the shoreland status?

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Replacement Plans

8420.0330 REPLACEMENT PLAN APPLICATIONS.
 Subpart 1. **Requirement.** A landowner proposing a wetland impact that requires replacement under this chapter must apply to the local government unit and receive approval of a replacement plan before impacting the wetland.

Sequencing §8420.0520

Avoid Impact §8420.0521

Minimize Impact §8420.0522

Replace §8420.0522

§8420 Wetland Section | www.bwsr.state.mn.us/wetlands

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Preapplication Meeting

- Prior to preparation of an application;
- Meet with the LGU/TEP, provide basic information of the project
- LGU/TEP inform the applicant of sequencing requirements and criteria to evaluate the replacement plan

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Application Contents

• Information necessary to be considered a complete application (a lot of this info can be pulled from the delineation report)

• For the impacted Wetland:

1. The amount of wetland impact (in sq ft or acres) by type
2. Minor/Major watershed, County, and Bank Service Area (BSA)
3. Soil survey of site, identify hydric soils
4. Hydrologic inlets and outlets, adjacent Public Waters (shoreland), floodplain



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Application Contents Continued...

5. Information pertaining to special considerations (8420.0515) (Threatened & Endangered species, rare communities, cultural resources, etc.)
6. List of known local, state, and federal permits required for the activity
7. Identify project purpose and need and alternatives considered



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Application Contents Continued...

- C. for the replacement wetland when the replacement consists of wetland bank credits:
 - (1) the wetland bank account number;
 - (2) the minor watershed, major watershed, county, and bank service area; (3) the amount of credits to be withdrawn in square feet; and
 - (4) a completed application for withdrawal of wetland credits from the wetland bank in a form provided by the board or a purchase agreement signed by the applicant and bank account holder; and
- D. a description of the required replacement as determined according to the proposed replacement actions and the replacement standards in part 8420.0522.

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Special Considerations (8420.0515)

These factors must be considered by the applicant before submitting a replacement and by the LGU during the review

- 1. Endangered and threatened species (DNR natural heritage/nongame)
- 2. Rare natural communities (DNR natural heritage)<https://mce.dnr.state.mn.us/>
- 3. Special fish and wildlife resources (fish spawning, water birds, waterfowl, deer wintering/wildlife corridor)
- 4. Archaeological, historic, or cultural resource sites (National Register of Historic Places, State Historical Preservation Office) <https://mn.gov/admin/shpo/>
- 5. Groundwater sensitivity (Decorah edge, Geologic Sensitivity)



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Special Considerations Continued...

- 6. Sensitive surface waters (trout stream)
- 7. Education or research use (Cedar Creek, Anoka Co)
- 8. Waste disposal site (former dump, superfund, TCAAP/AHATS)
- 9. Consistency with other plans (watershed management, land use, planning and zoning)



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Sequencing: 8420.0520

- **LGU MUST NOT** approve a wetland replacement plan unless the LGU finds the project complies with sequencing.

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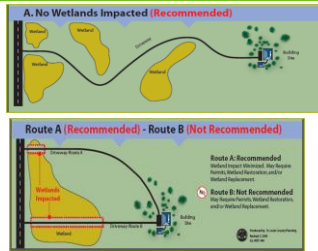
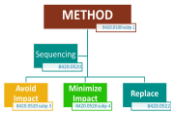
Key Concepts

- Sequencing is a MUST for all replacement plans
- TWO avoidance alternatives
- Evaluate projects...can wetlands be avoided?
- Are impacts minimized?
- Long term effects
- 8420.0520 Subp C – Page 45 of 2009 Rule book

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Sequencing

- Avoid
- Minimize
- Replace



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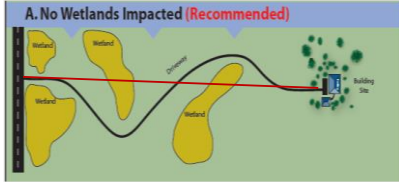
How does applicant demonstrate sequencing?

- Clearly define the **purpose** of the project.
- Identify the physical, economic, and/or demographic **requirements** of the project.
- **Justify** why this project should or must go on this site.
- Show (concept plans, discarded grading plans, etc.) and describe other **reasonable alternatives** that were considered or could be considered.

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Impact Avoidance

- If LGU finds that a Feasible and Prudent Alternative exists that avoids impacts, the application must be denied.



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Alternatives Analysis

What is *feasible and prudent*?

WCA rule tells us (8420.0520 subp 3C(2)):

- Can be done from an engineering perspective
- Is in accordance with accepted engineering standards and practices
- Is consistent with public health, safety, and welfare requirements
- Is environmentally preferable based on social, economic, and environmental impacts
- Would not create any truly unusual problems

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Evaluating Alternatives (continued)

• LGU must consider (8420.0520 subp 3C(3)):

- Could the size, configuration, or density of the project be modified to avoid wetlands?
- Has the applicant made efforts to remove constraints (zoning restrictions, ordinance requirements, etc.) that are causing wetland impacts (i.e. request for variances, PUD, conditional use permit, etc.)?

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What if an avoidance alternative DOES exist?

- If the LGU determines that a feasible and prudent alternative exist that avoids wetland impacts, it **MUST DENY** the replacement plan.

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Avoidance



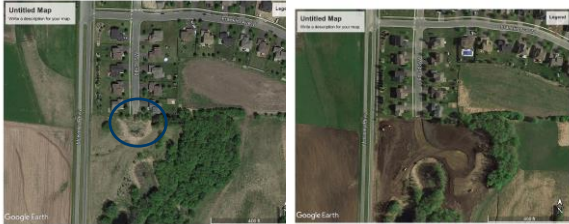
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Alternatives Analysis Continued...

Future considerations when reviewing a site and potential off-site impacts



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Alternatives Analysis Continued...

• Direct and secondary impacts:

A wetland may not be directly impacted (filled/drained/excavated) but can be impacted through loss of hydrology (storm pond, curb/gutter, pipes, etc.)



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What if an avoidance alternative does NOT exist?

• LGU evaluates:

- Minimization
- Rectification
- Reduction/Elimination of impacts over time
- Replacement

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Impact Rectification

- Temporary impacts must be rectified by repairing, rehabilitating, or restoring the affected wetland to pre-project conditions



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Reduction or Elimination of Impacts Over Time

- Once complete, further impacts must be reduced or eliminated and preserve or maintain wetland functions
- Best Management Practices (BMP)
- Silt fence
- Storm-ponds
- Buffers
- Rip-Rap



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Sequencing Flexibility

- Allowed at the discretion of the LGU if:
 1. Impacted wetland degraded;
 2. Avoidance results in severe degradation;
 3. Upland site of the project or replacement has greater function and value;
 4. Human health and safety is a factor.

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Sequencing – Replacement

Final Review Step

LGU must evaluate if unavoidable impacts will be adequately replaced AND if correctly sited.

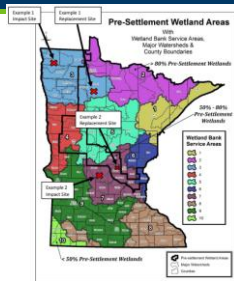
Adequate Replacement

- Must replace the functions and values at an equal or greater level than that which was lost.
- Uses wetland area as the unit of measurement (acreage or sq. ft.)

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Replacement Siting

- Must follow a priority order:
 - Minor watershed
 - Major watershed
 - Same BSA
 - Another BSA



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Replacement Ratios

Minimum Replacement Ratios: Banking		
Location of Impact	Replacement	Minimum replacement ratio
>80% area or agricultural land	Outside bank service area	1.5:1
	Within bank service area	1:1
<50% area, 50-80% area, and nonagricultural land	Outside bank service area	2.5:1
	Within bank service area	2:1

- Must follow a priority order:
- Minor Watershed
 - Major Watershed
 - Same BSA
 - Another BSA



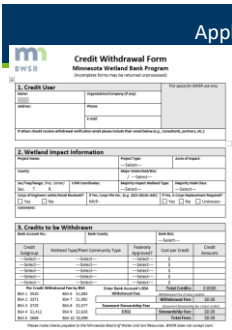
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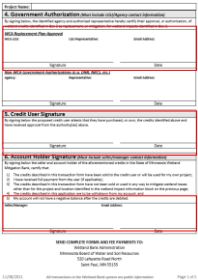
Result?

A formal NOD document that summarizes the decision, is supported by technical findings and is valid for 5 years.

79



- Be sure to complete all sections!
- Form auto calculates fees
- Signatures



80



Wetland Banking



81



Overview

- Purpose of Wetland Banking
- Types of Wetland Banks
- Actions Eligible for Credit
- Establishing a Wetland Bank
- Certification and deposit of credits
- Withdrawals and transfers
- Replacement for Public Road Projects



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Banking

- [Wetland Bank Guidance and Information](#)

Wetland Bank Guidance and Information

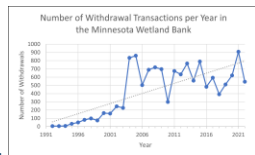
Wetland Bank Credits and Fees	Wetland Bank Credits and Fees
Wetland Bank Transactions	Wetland Bank Transactions
Wetland Bank Credits	Wetland Bank Credits
Wetland Bank Withdrawals	Wetland Bank Withdrawals
Wetland Bank Transfers	Wetland Bank Transfers
Wetland Bank Deposits	Wetland Bank Deposits
Wetland Bank Audits	Wetland Bank Audits
Wetland Bank Reporting	Wetland Bank Reporting

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Purpose

What is Wetland Banking?

- WCA rule: "The purpose of the state **wetland banking** system is to provide a market-based structure that allows for replacement of unavoidable impacts with pre-established replacement wetlands."
- Federal Mitigation Rule definition (33 CFR 332.2): "A **mitigation bank** sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor."



84

Bank types

- Private
 - Standard- Landowners establish bank on private land to mitigate impacts on non-ag or transportation projects
 - Agriculture- Credits can only be used for Ag projects
- In-lieu Fee (proposed)
 - Mitigation NOT completed in advance
 - Open to only government and NGOs, mitigation completed in advance, requires compensation planning framework
- Local Government Road Wetland Replacement Program
 - Replaces impacts resulting from local transportation projects



85

Quick facts on ILF (as proposed)

Minnesota In-Lieu Fee Program

A program in which wetland replacement requirements are satisfied through payment of money to the board or a board-approved sponsor to develop replacement credits according to section 103G.2242, subdivision 12. (Minn Stat.)

In-lieu fee versus banking, major differences

- Mitigation is completed in advance with banking, after sale of credits with ILF
- Banking is for profit, ILF is open only to government and NGOs
- Corps is involved in finances with ILF, no involvement in banking
- ILF requires development of a compensation planning framework for program approval, banking does not

86

Quick facts on Ag bank

Eligibility to USE the Ag Bank:

- ✓The wetland must be proposed to be impacted for agricultural use.
- ✓The land must remain in agricultural use.
- ✓The wetland must be a farmed wetland (FW) or otherwise degraded wetland on existing agricultural land.

Differences with Standard Bank:

- Credits can only be used for Ag projects
- Flexibility on Vegetation Standards
- Expired CRP sites could be eligible "as-is"

87

Local Government Road Wetland Replacement Program

- WCA exempts certain local road projects from State wetland replacement requirements
- BWSR is required to replace the associated wetland impacts so the local governments don't have to
- These wetland credits also satisfy Corps of Engineers' Section 404 permit requirements



88

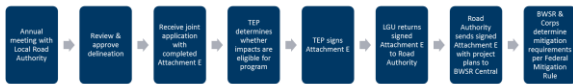
What projects Qualify?

- **Repair, rehabilitation, reconstruction or replacement of currently serviceable** existing State, City, County or Town public road.
 - Provided that:
 - Project minimizes impacts
 - Plans are provided to the LGU
- What doesn't qualify?
 - New roads
 - Roads expanded solely for additional capacity lanes



89

Reviewing Local Road Projects



90

Joint Application Form



For Local Road Projects:

- Parts 1-5; Attachments C and E
- May need Attachment D if there will be impacts that do not meet the Local Road Program eligibility requirements



91

91

Application Requirements

Local Road Unit should provide TEP the following:

- Project plans depicting wetland boundaries
- Description of wetland impacts by type
- Information demonstrating wetland impact minimization
- Only one alternative is required



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Good Example

MnDOT's Road Design Manual (2000) also recommends turn and/or bypass lanes for rural undivided roadways with traffic volumes over 1,500 ADT and speed limits above 45 mph. Current road condition compared with required and proposed are laid out in the table below.

	Existing	Required	Proposed
Lane Width (ft)	12	11-12	12
Shoulder Width (ft)	0-6	8	8
In-Slope	1:4	1:4	1:4

This project is proposed to improve CSAH 18 to meet today's State Aid Standards and improve safety along the corridor.

93

93

Establishing a Wetland Bank

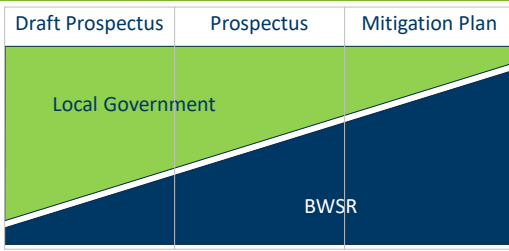
State and Federal Review Process in Minnesota

- Draft Prospectus
 - State: Optional
 - Federal: Optional
- Prospectus
 - State: Optional
 - Federal: Required
- Mitigation Plan/Draft MBI
 - State and Federal: Required
- Final Mitigation Plan and MBI
 - Federal only and required



97

Roles in Establishing a Wetland Bank



98

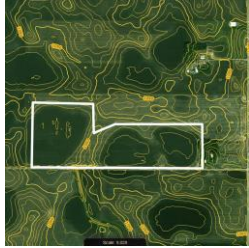
Draft Prospectus

- Optional
- No decision required
- Help sponsors
- Complex or difficult projects
- Minimal investment

99

Draft Prospectus

- Basic project information
- Easement questionnaire
- Basic Features
- Why is it a good bank project
- Constraints
- Existing wetlands



100

Draft Prospectus

- BWSR provides "Discussion Items"
- WS uses discussion items at TEP meeting
- TEP writes Findings based on discussion
- Sponsor receives TEP findings and decides what to do

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Prospectus

 A screenshot of a "Wetland Mitigation Proposal Prospectus" form. The form includes sections for "Project Information", "Project Description", "Mitigation Plan", and "Findings". It features various checkboxes and text input fields.

- Required by Corps
- No decision required
- Baseline Information
- Justify Credit Actions
- Justify Credit Allocation
- General Concept Plans

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Prospectus

- Crediting
- Topographic Information
- Wetland Determination
- Title Opinion
- Site Hydrology Information

WCA Wetland Bank Credit Allocation Table

Map ID	Credit Action 1	Acres ±	Credit Allocation			
			Minimum Credit %	Maximum Credit %	Minimum Credit Amount	Maximum Credit Amount
1	Julia 4.0, Submittals	11.0	75	100	14,000	14,000
2	Julia 4.0, Submittals	1.9	75	100	1,400	1,400
3	Julia 4.0, Submittals	1.9	75	100	1,400	1,400
4	Julia 4.0, Submittals	1.2	75	100	840	840
5	Julia 4.0, Submittals	1.2	75	100	840	840
6	Julia 4.0, Submittals	1.2	75	100	840	840
7	Julia 2, Upland Buffer	8.0	10	20	3,200	9,600
8	Julia 2, Upland Buffer	17.0	10	20	6,800	14,000
9A	Julia 2, Upland Buffer	2.5	10	20	1,000	2,000
9B	Julia 2, Upland Buffer	2.7	10	20	1,080	2,160
9	Further Enhancement	0.0	0	0	0	0
	TOTAL EASEMENT SIZE	67.0	TOTAL:	32.00%	TOTAL:	44,520

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Roles for reviewing prospectus

TEP/LGU Roles:

- Verify previous comments addressed
- Verify sponsor adequately described the site
- Review wetland delineation or determination
- Review crop history (if necessary)
- Provide LOCAL perspective on project and eligibility

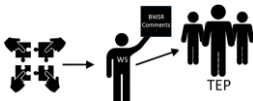
BWSR Role:

- Evaluate easement issues
- Vegetation, Engineering, and Bank Coordinator comments included
- Statewide consistency
- Technical answers and interpretations
- Coordination with Corps

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Review

- Comments become more direct
- Baseline information must justify credit actions and allocations
- Some credit actions require more information
- Project takes shape but detailed plans not required
- Balance information needs versus sponsor's cost



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Mitigation Plan

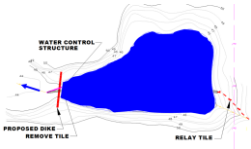
- Document of record
- Required for both programs
- LGU Decision Required
- Section 15.99 time limits!
- Attached to Corps' MBI

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Mitigation Plan

Required:

- Detailed vegetation plans
- Detailed construction plans
- Detailed monitoring plans
- Performance standards
- Credit release schedule



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TEP Review

- Verify Corps has completed Prospectus phase
- Verify Prospectus information carried forward and comments addressed
- Verify Baseline Information is complete and adequate
- Wetland delineation approval
- Review detailed plans to your comfort level

108

LGU role in Easement Acquisition

- Help the sponsor find the [“Conservation Easement Acquisition Overview for Private Wetland Banks”](#)
- BWSR easement staff will take it from there



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Easement Acquisition

The significant steps in the easement acquisition process include:

1. Sponsor submits initial \$1,000 Easement Acquisition Fee to BWSR along with application
2. BWSR performs a preliminary review of ownership information to identify potential issues
3. Sponsor provides DRAFT Certificate of Survey in required format for BWSR review & comment
4. BWSR provides sponsor with instructions to obtain Title Commitment
5. Sponsor (landowner) provides Title Commitment to BWSR for State Attorney General (AG) review & comment
6. BWSR prepares Conservation Easement document to be signed by landowner
7. Landowner signs Easement and returns to BWSR with \$2,400 Easement Acquisition Fee balance
8. BWSR sends instructions to record the Easement and issue a Title Insurance Policy
9. BWSR notifies sponsor that easement acquisition process is complete

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Construction Certification

• LGU must certify the initial construction

- Documentation:
 - as-built drawing
 - surveyed map
 - seed tags
 - construction photos



- Site Visit with TEP
 - Recommend TEP Findings of Fact

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Credit Deposits

- Up to 15% of the credits are eligible for deposit after the certification of construction
- Remaining credits are eligible for deposit based on the credit release schedule and performance standards in the approved bank plan
- Subject to review by the LGU & TEP
- After certifying the credit for deposit, the LGU must forward to BWSR banking administrator

Transaction Form to Deposit Credits
Minnesota Wetland Bank Program

1. Wetland Bank Information

2. Applicant Information

3. Credits to be Deposited

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Credit Withdrawal and Transfer

- Submitted as part of Replacement Plan to LGU with jurisdiction of impact site
- Reviewed and approved by the LGU with TEP input
- Processed and entered into official ledger by BWSR
- BWSR coordinates approved transactions with Corps
 - Need Corps approval letter



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Credit Transactions

Help us improve transaction processing efficiency:

- Make sure all requested information is provided
- Make sure account information is provided and each column is fill out
- Don't worry about fees – BWSR will calculate and communicate to applicant

Transaction Form to Withdraw Credits
Minnesota Wetland Bank Program

Credits

1. Wetland Bank Information

2. Applicant Information

3. Credits to be Withdrawn

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Credit Transactions

When processing transactions we need LGU name and contact. Typed or printed information makes it easier to figure out.

Transaction forms cannot be processed without required signatures.

Applicant and LGU will get verification letter once BWSR processes.

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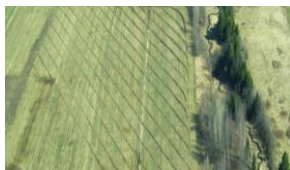
Review

Types of Wetland Banks

- Standard
 - Private and Agriculture
- In Lieu of Fee (proposed)
- Local Road Program
- Replacement for Public Road Projects
 - Repair, rehabilitate, reconstruction of currently serviceable roads
- Actions Eligible for Credit
 - Restoration of drained wetlands, vegetation restoration, protection, ENRV, Preservation, upland buffer

- Establishing a Wetland Bank
 - Draft Prospectus
 - Prospectus
 - Mitigation Plan
- LGU and TEP procedures for banking
 - Construction Certification, deposit of credits, withdrawal of credits

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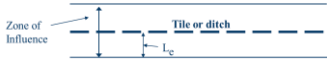


Altered Hydrology

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Lateral Effect

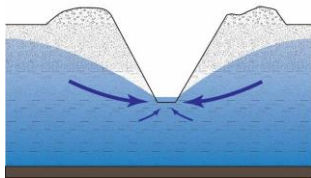
- Lateral Effect (L_e)
- The distance on each side of a tile or ditch in its longitudinal direction where the ditch or tile has an influence on the hydrology
- Measured perpendicular from midpoint of tile line or toe of ditch bank



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Lateral Effect

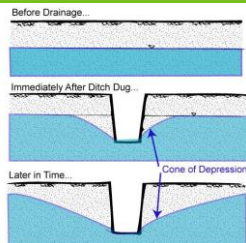
- Factors influencing Lateral Effect
- Depth
- Soil Properties
 - Hydraulic conductivity
 - Drainable porosity
- Grade
- Impermeable Layer



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Why Is Lateral Effect Important?

- Wetland impacts from a drain
- Distance needed to avoid a wetland impact



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2 Primary types of drainage

- Surface drainage via ditches
- Subsurface via
 - Clay tile
 - Concrete tile
 - Corrugated plastic



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Drained Wetland

2012



2016



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Effectively Drained

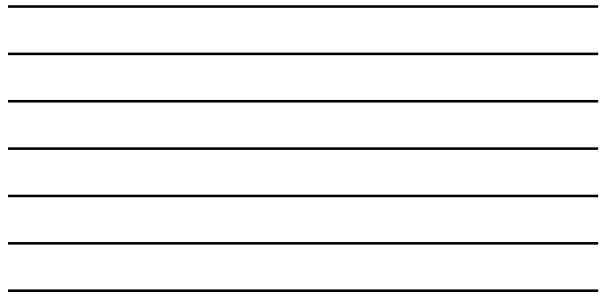
- A condition where ground or surface water has been removed by artificial means to the point that an area no longer meets the wetland hydrology criterion
- "Artificial means" is usually a ditch, tile or diversion
- The area will not support a dominance of hydrophytes but hydric soil will persist

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Drainage Setback Tables

- Developed by NRCS using the van Schilfgarde equation from the ND-Drain program
- **Setback distance** is the minimum distance from the wetland boundary to the tile line or ditch necessary to minimize adverse hydrologic impacts to adjacent wetlands
- Developed by NRCS to advise farmers

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Lateral Effect & Drainage Setback

All drains have some effect on an adjacent wetland. The question, then, concerns what is an acceptable negligible hydrologic effect on the wetland. To this, various lateral effect or seepage effect equations have been developed to estimate the extent that a drain will lower the adjacent water table. The lateral effect is variously defined by different wetland-related programs. The Natural Resource Conservation Service (NRCS) defines Lateral Effect as the distance an entire table of effect or tile line without which wetland hydrology would be impacted by the installation of the ditch or tile line such that it result in loss of eligibility for USDA program benefits. Some have defined it as the width of a strip of land drained such that it no longer meets the wetland hydrology criteria set forth in the USF Corps of Engineers Wetland Determination Manual. For wetland regulatory purposes in Minnesota, lateral effect is a more broadly as the effect of a drain on the adjacent water table. Estimates of these effects can sometimes be used to evaluate whether or not a drain will cause an unacceptable loss of wetland hydrology.

A series of **2012 Drainage Setback Tables** have been developed and refined over time by NRCS to estimate the lateral effect of various drains in different soil types. These tables have been developed to provide guidance for estimating lateral effect in Minnesota. NRCS in coordination with the St. Paul District Army Corps of Engineers (ACEC) has developed specific guidance on the use of these tables in relation to wetland regulatory programs and wetland delineation manuals in July 2012 that the links will be provided in the 2012 document are no longer operative, but the guidance is still applicable aside from the clarification below.

NRCS Guidance Concerning the 2012 Drainage Setback Tables (pdf)

Subsequent revisions and clarifications to the 2012 Drainage Setback Tables. Further clarification on assessing lateral effect for wetland regulatory purposes users should find guidance in the **2012 Drainage Setback Tables by County** document on the website and you will be able to enter County and request soil type which will generate the Lateral Effect Distance (LED) for each soil type. (e.g. soils known to have high organic content) users will be prompted to seek further assistance from NRCS staff. In these instances, users should not seek NRCS staff assistance and should instead use the setback distance in the 2012 Drainage Setback Tables that NRCS has adopted. NRCS can only provide technical support for USDA program eligibility, not the Wetland Conservation Act. The 2012 Drainage Setback Tables by County apply regardless of which tables are used.

2012 Drainage Setback Tables by County use only if no value given in current NRCS tables per above)

2012 Drainage Setback Tables by County

(see only if the value given in current NRCS tables above)

Select a County:

Minnesota Power Watch County Tables File

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Checklist

Wetland Definition

Delineation Criteria & Resources

Delineation Methods

Hydrology & Associated Precipitation

Lateral Effect & Drainage Setback

Wetland Functional Assessment

Wetland Restoration

Lateral Effect Database

for use in IA, MN, ND, & SD

User Name: Date:

Customer Info: Location:

Customer Name: State:

Farm # Tract # Field # Survey Area:

Drain/Ditch Configuration

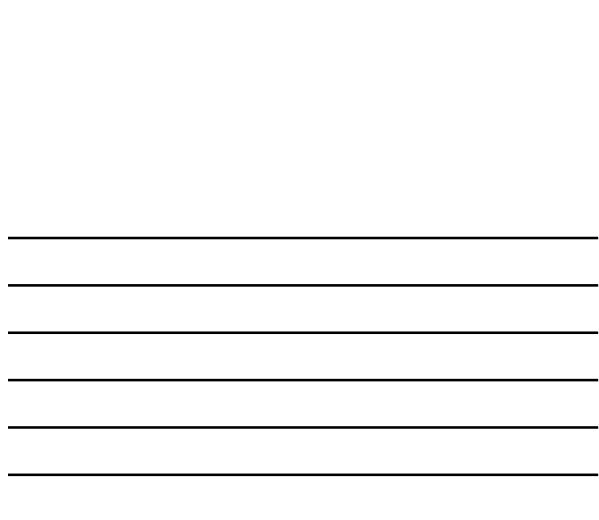
Depth (ft): Field Soil:

Diameter (in): Wetland Soil:

Lateral Effect

Lateral Effect Distance (ft):

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Overview

- General considerations for successful restoration
 - MN Restoration Guide
- Restoring natural hydrology
 - Hydrogeomorphology
 - Landscape position
 - Hydrology
 - hydraulics
- Restoration techniques
 - Filling ditches
 - Removing drain tile
 - Rerouting & pump removal
- Establishing vegetation

BWS Wetland Section | www.bws.state.mn.us/wetlands

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Wetland Restoration

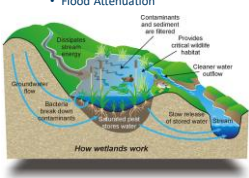
- [Wetland Restoration](#)

The image shows a screenshot of a web page titled "Wetland Restoration". On the left is a table of contents with links to various sections: Home, About Wetlands, Wetland Types, Wetland Values, Wetland Assessment, Wetland Restoration, Wetland Bank, Wetland Restoration Guidelines, and Wetland Restoration Case Studies. To the right is a photograph of a wetland landscape with tall grasses and yellow flowers. Below the photo is a small text block titled "Wetland Restoration Guidelines" with a list of links.

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Why restore wetlands?

- Restore lost functions:
 - Wildlife habitat
 - Water Quality
 - Flood Attenuation
- Wetland Banking
- CRP/RIM
- Enforcement



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Setting function-based restoration goals and performance standards.

Establishing Goals & Measurable Outcomes:

- Restore natural hydrology
- Reestablish native plant community to site
- Performance Standards (banking)- measurable attributes to determine if restoration goals are met

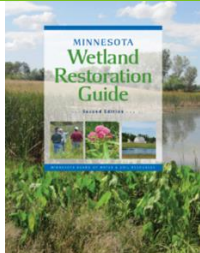


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MN Wetland Restoration Guide

[MN Wetland Restoration Guide:](#)

- Planning
- Site Assessment
- Design and Construction
- Vegetation establishment
- Site Management & Monitoring



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Technical Guidance Sheets

- Supplements to the MN Wetland Restoration Guide
- <https://bwsr.state.mn.us/guidance-documents-tools-and-other-resources>
 - Vegetation Establishment
 - Restoration Design and Construction
 - Managing Restoration Sites



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General considerations for wetland restoration

- Identifying and selecting projects
 - Restoration over creation
- Consider potential complications from degraded sites
- Adjacent land uses (present and future?)
 - Changes to adjacent landowners?
- Location of area ditches
 - Public or private?
 - Drainage Law?
- Understand soil conditions of site (permeability, chemistry)
- Water quality

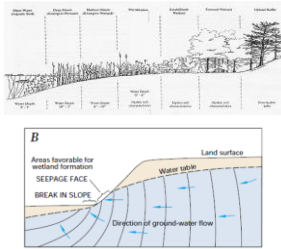


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Hydrologic design considerations

Restoring natural hydrology:

- Hydrology
 - Precipitation, evapotranspiration, surface and groundwater inflow & outflow
- Hydraulics- how water flows
 - Unidirectional, bi-directional
- Landscape position
 - Surface shape
- Outlet structures
 - Location and size



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Drainage Modifications

Drainage Manipulation Strategies:

- Ditches
- Tile
- Rerouting
- Restoration "reverses" modifications
- Don't over-engineer structures
 - Restore natural hydrology



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Ditches and Drain Tile

Ditch design considerations:

- Cross section area
- Depth
- Grade
- Outlet



Tile Design considerations:

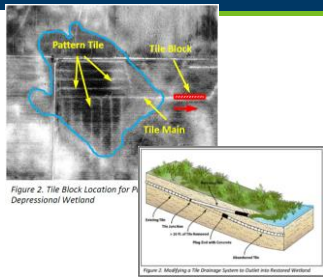
- Tile size
- Depth
- Spacing grade
- Material
- Outlet



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Drainage Restoration Methods

- Filling ditches
- Removing tile
- Re-routing



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Blocking and Filling Surface Ditches

Design Considerations:

- Ditch fill
 - Length
 - recontouring
- Ditch plugs for depressional, non-depressional, sloped wetlands
- Project boundaries/property lines



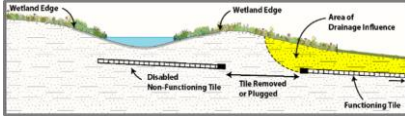
[Blocking and Filling Surface Drainage Ditches Technical Guidance Document](#)

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Blocking and Removing Subsurface Tile



- Design Considerations:
 - Tile block construction
 - Strategies to protect upstream land
 - Length, location, number of blocks (depressional vs sloped wetlands)



[Blocking Subsurface Drainage Tile Technical](#)

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Rerouting Drainage Systems

- [Rerouting Drainage Systems](#)
 - Outletting incoming drainage directly into planned wetlands
 - Rerouting drainage to avoid planned wetlands
 - Removing/Relocating Pumps
- Design Considerations:
 - Wetland type, location, elevations, topography, adjacent land uses

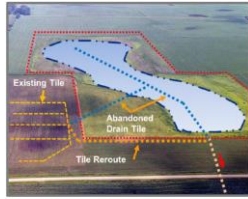


Figure 3. Drainage Tile Rerouted Around a Restored Wetland

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Outlets

Design Considerations:

- Location
- Elevation
- Size



[Outletting Drainage Systems](#)

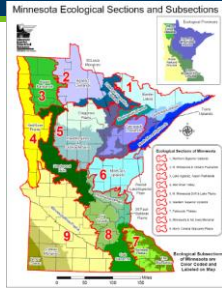
- Types of outlet structures
 - Surface drainage
 - Rock riprap outfalls
 - Weir
 - Subsurface tile outlets
 - Several plastic pipe options
 - Consider perforated or non-perforated

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Vegetation establishment considerations

General strategies:

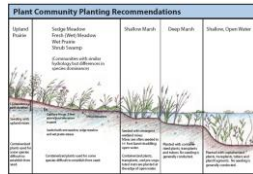
- Strategic site preparation
 - Planting elevation, water depth, soil type
 - Flooding frequency, duration
- Make landscape connections
- Match plant communities to site
- Restore and maintain plant diversity
 - Work with ecological variability
- Selecting seed mixes and plants
 - Species tolerance
- Manage Invasive species throughout entire site



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Developing a vegetation plan

- Consider topography and elevations to promote natural hydroperiods for plant species and communities
- [Native Vegetation Establishment and Enhancement Guidelines](#)
 - Comprehensive Guidebook



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Selecting seed mixes and plants

- [State Seed Mixes lists](#)
- Grassland mixes (NW, SW, SE)
- Woodland mixes (S&W, Central, NE, NW)
- Wetland mixes (NE, South & West)

State of Minnesota
Department of Natural Resources

Region	Seed Mix Name	Species	Percent	Notes
Northern	Grassland Mix	Big Bluestem	30%	
	Grassland Mix	Common Bluegrass	20%	
	Grassland Mix	Smooth Bromegrass	15%	
	Grassland Mix	Hard Fescue	10%	
	Grassland Mix	Parlor Grass	10%	
	Grassland Mix	Redtop	10%	
	Grassland Mix	Timothy	5%	
	Grassland Mix	Wild Rye	5%	
	Grassland Mix	White Clover	5%	
	Grassland Mix	Yellow Clover	5%	
Central	Grassland Mix	Big Bluestem	25%	
	Grassland Mix	Common Bluegrass	20%	
	Grassland Mix	Smooth Bromegrass	15%	
	Grassland Mix	Hard Fescue	10%	
	Grassland Mix	Parlor Grass	10%	
	Grassland Mix	Redtop	10%	
	Grassland Mix	Timothy	5%	
	Grassland Mix	Wild Rye	5%	
	Grassland Mix	White Clover	5%	
	Grassland Mix	Yellow Clover	5%	

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Managing Restoration Sites

- **Technical Guidance Documents:**
 - Herbicide application
 - Prescribed burning
 - Mowing, grazing & haying
 - Water level management (flooding & drawdown)
 - Plant Care
 - Inspecting and maintaining outlet structures
 - Animal Control



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Wetland Bank Monitoring

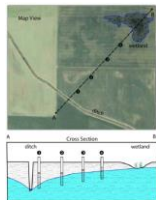
m BOARD OF WATER AND SOIL RESOURCES

BWSR Wetland Section | www.bwsr.state.mn.us/wetlands

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Overview of Wetland Bank Monitoring

- **Monitoring process**
 - Construction Certification
 - Duration of monitoring
 - Deposit of Credits
- **Maintenance responsibilities**
 - Monitoring reports
 - Timeline
 - Reports
- **Corrective Actions**
- **Hydrology Monitoring**
 - Performance standards
- **Vegetation Monitoring**
 - Performance standards



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General Monitoring roles once wetland bank is approved

LGU/Corps roles:

- certify construction
- certify credits for deposit
- review monitoring reports
- may require corrective actions as needed

Sponsor/landowner roles:

- Sponsor responsible for maintenance
- Submitting as-built documentation
- Submitting wetland credit deposit transaction form(s)
- Submitting monitoring reports
- Paying administrative fees

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Monitoring Schedule

- Monitoring must begin no later than first full growing season after construction certification
- Must continue for at least 5 full growing seasons
- If unsuccessful, the LGU may extend the monitoring period (<5 additional years)
- Actual monitoring schedule may vary for different bank types (restoration vs preservation)

Stage of Construction	Bank Category	Type of Structure	Construction Period (months)	Release Period (months)	Release Volume (cubic feet)	Release Volume (cubic feet)	Release Volume (cubic feet)	Release Volume (cubic feet)
Restoration/Preservation of Existing Wetlands	A-1	Bank-use	20%	100%	0.750	1.000	1.000	1.000
Restoration/Preservation of Existing Wetlands	A-2	Non-bank-use	20%	100%	0.500	0.500	0.500	0.500
Restoration/Preservation of Existing Wetlands	B-1	Bank-use	30%	100%	0.750	0.500	0.500	0.500
Bank-use	B-2	Non-bank-use	20%	100%	0.500	0.250	0.250	0.250
Bank-use	B-3	Non-bank-use	20%	100%	0.500	0.250	0.250	0.250
Total	A-1				0.750	1.000	1.000	1.000

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Performance Standards

- Performance standard: observable or measurable physical (including hydrological), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives.

Examples:

- **Vegetation**
 - "85% of the site is vegetated by planted species and/or regenerated species as per approved plan by end of 5th complete growing season."
- **Hydrology**
 - "Hydrology must meet wetland definition of 1987 Corps of Engineers Manual with saturation to the surface of the soil for at least 31 days of the growing season."

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- Submitted following the first full growing season no later than 12/31
- Then submitted as per approved bank plan
- May include Transaction Form to Deposit Credits

Monitoring Report

Contents of the report:

- Project location map
- Description of performance standards
- Activities completed and planned
- Hydrology measurements
- Plant communities map
- Color photographs
- Other information specified from approved plan

A screenshot of a 'Transaction Form to Deposit Credits' with various fields for project information, site details, and monitoring data.

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Reviewing Monitoring Reports

A. Success Criteria Summary
Summary of Success Criteria Standards and Current Metrics for 2017

Metric	Success Criteria	Measured Criteria	Success Criteria Met?	Comments
Restoration	Restoration used for 2017			
Soil Saturation	Water saturation 6 inches above and one foot below ground surface	Measured hydrology is between 6 inches above and one foot below ground surface	Yes	Final hydrology monitoring not required for 2017. Saturation based on direct site observations
Duration	Moisture of the growing season	Hydrology was within the desired range for the majority of the growing season	Yes	
Diversity	Minimum of five native species	75 native species have been observed	Yes	Species diversity increased from 2016 to 2017
Competition	Maximum tall grasses and tree density	Eight tall grasses and eight trees have been identified	Yes	Species composition stable
Invasive Species Coverage	No more than 10% total cover	Total cover of invasive species is less than 10% and has been effectively controlled	Yes	Recent survey great in low tree % coverage
Bankline Species	No more than one greater than one percent cover	Invasive species coverage control with no single area greater than one-quarter acre in size	Yes	Single instance of strong 10% tree, but spread again in Apr 2017 no control

- Know performance standards
- Interpret data to determine whether the site meets those standards
- If not, document with data what is not meeting standard
- Consult with TEP & Corps
- Then corrective actions should be recommended

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Corrective Actions

- If, during the monitoring period, the LGU/Corps or TEP determine that a bank site does not meet the approved plan's specifications, the LGU must require corrective actions
- BWSR can freeze accounts by restricting deposits, withdrawals, transfers until the LGU determines the site is in compliance
- Noncompliance of bank sites is subject to enforcement procedures



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Functional Assessment Methods

- MN Routine Assessment Method (MNRAM)
 - Numeric model for assessing wetland functions and some values
- Floristic Quality Assessment
 - Vegetation based ecological condition assessment method

Comprehensive General Guidance

for
Minnesota Routine Assessment Method (MNRAM)
Evaluating Wetland Function, Version 3.4 (draft)

9/15/2010



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MnRAM (MN Routine Assessment Method)

- Developed by interagency work group shortly after WCA passed.
 - Refined in 2010
- Assessment tool that uses numeric model to rank both Functions and values
- BWSR no longer supports Access database version
- Excel version 3.2 and text version using the Comprehensive Guidance Document for explanations, definitions and ranking formulas for each function

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Method

Determine vegetative diversity and integrity:

- List plant communities of each wetland
 - Dominant vegetation
 - Cover class

MNRAM 3.2 Digital/Manual Worksheet, Side 1					If the cell contains text that the "Required Function" box (provided) may not adequately address function, use key			
Date	Wetland name / ID	Wetland name / ID	Wetland name / ID	Wetland name / ID				
4/1	Community Number (code with community name) maximum of four 10% of the wetland	3A, 3B, 4A, 4B, 7A, 7B, 8A, 8B, 12A, 12B, 12C, 14A, 14B, 15A, 15B, 15C, 15D	3A, 3B, 4A, 4B, 7A, 7B, 8A, 8B, 12A, 12B, 12C, 14A, 14B, 15A, 15B, 15C, 15D	3A, 3B, 4A, 4B, 7A, 7B, 8A, 8B, 12A, 12B, 12C, 14A, 14B, 15A, 15B, 15C, 15D	3A, 3B, 4A, 4B, 7A, 7B, 8A, 8B, 12A, 12B, 12C, 14A, 14B, 15A, 15B, 15C, 15D			
VC 8.1.d	Describe each community type individually below:		Describe each community type individually below:					
	Community Type and number (range)							
	Community Proportion (% of total)							
	Dominant Vegetation / Cover Class							
	Indicative Vegetation / Cover Class							
Comments								

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Hydrology

Considerations in planning hydrologic monitoring project:

- What is the question?
- What is the performance criteria?
 - Precision?
- Site characteristics
 - Landscape position, hydrology setting, soil, vegetation, drainage features
- Pre-existing data
- Timeline and available resources

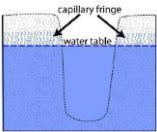
• [BWSR Hydrology Guidance documents](#)



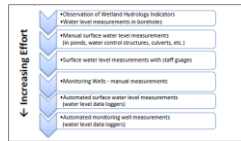
169

Methods to monitor hydrology

- Observation of indicators
- Staff gauges
- Open boreholes

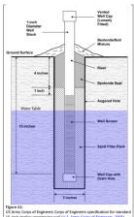


- Monitoring wells
 - Manual measurements
 - Automated measurements



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Design and location of monitoring wells



Monitoring wells

- Screen, Riser, Sand Pack, Bentonite seal

Well location

- Depends on the question:
 - Single well will tell if hydrology is present
 - Complex sites require transects based on landscape position, etc.
 - Professional judgement

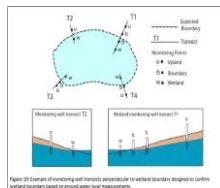
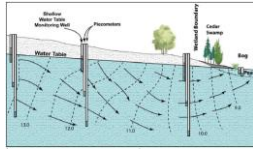


Figure 10. Examples of monitoring well transects perpendicular to wetland boundary designed to confirm wetland boundary based on ground water level measurements.

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Piezometers

- Used to measure depth-specific head measurements
 - Measure vertical component
 - Hydrostatic pressure or "head"
 - May provide automated measurements
- Not typically used for standard wetland investigations



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Monitoring Well Data

Hydrograph:

- Growing season
- Normal "envelope"
- 30 day rolling total
- Daily Precipitation

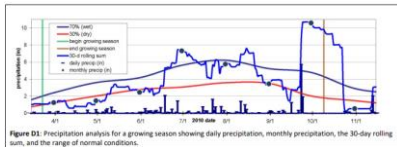
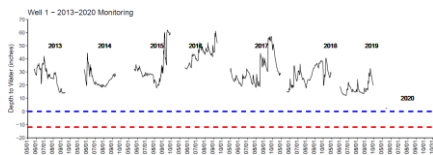


Figure 01: Precipitation analysis for a growing season showing daily precipitation, monthly precipitation, the 30-day rolling sum, and the range of normal conditions.

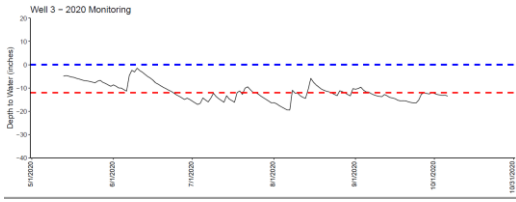
173

Permanent inundation



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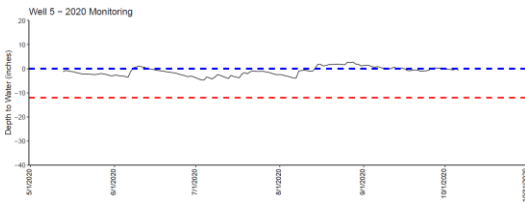
Seasonally Saturated



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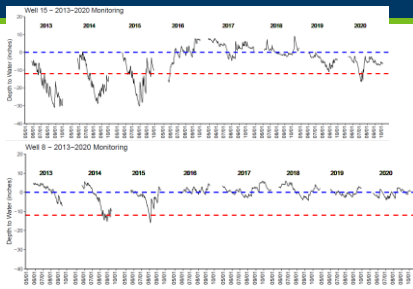
Shallow Inundation



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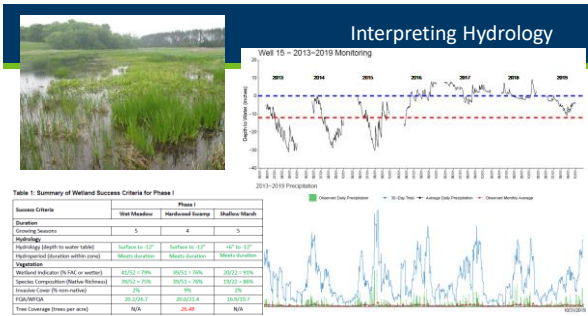


Shows restoration of mid 2015



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Vegetation Monitoring for Wetland Bank Sites

- [Vegetation Monitoring for Compensatory Wetland Mitigation Sites](#)
- Developing a vegetation monitoring plan
- Sampling methods
- Where and when to monitor
- Monitoring plan considerations
- Reporting monitoring results

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Vegetation

- Methods to monitor vegetation:
 - Floristic Quality Assessment
 - Mapping plant communities
 - Estimating invasive species

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Vegetation

- Interpreting vegetation data
 - Indicator status (% FAC or wetter)
 - Composition (% native species richness)
 - Invasive cover (%)
 - Floristic Quality Assessment (index rating)

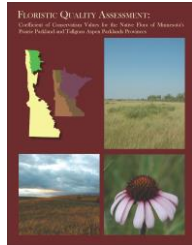
Table 1: Summary of Wetland Success Criteria for Phase I

Success Criteria	Phase I		
	Wet Meadow	Hardwood Swamp	Shallow Marsh
Duration			
Growing Seasons	5	4	5
Hydrology			
Hydrology (depth to water table)	Surface to -12"	Surface to -12"	+6" to -12"
Hydroperiod (duration within zone)	Meets duration	Meets duration	Meets duration
Vegetation			
Wetland Indicator (% FAC or wetter)	41/52 = 79%	39/51 = 76%	20/22 = 91%
Species Composition (Native Richness)	39/52 = 75%	39/51 = 76%	19/22 = 86%
Invasive Cover (% non-native)	2%	0%	2%
FQA/WFQA	20.2/26.7	20.0/21.4	16.9/19.7
Tree Coverage (trees per acre)	N/A	26.48	N/A

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Floristic Quality Assessment

- Vegetation condition assessment to measure the quality of a native plant community
- Developed by the MN Pollution Control Agency
 - 2007, Statewide C-values
 - Efforts to regionalize C-values underway
- Intended to compliment functional assessments such as MNRAM



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FQA Key Concepts

- Key concepts:
 - Species conservatism- tolerance to degradation
 - Coefficients of Conservatism (C-value)
 - Floristic Quality Index
 - Species richness and mean C-values
- Sampling methods
 - Rapid FQA
 - Full Method



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FQA Key Concepts

- Coefficients of Conservatism
 - Numeric rating of an individual species fidelity in relationship to disturbance
 - C-values range from 0-10
 - 0= most tolerant, found in wide variety of plant communities
 - 10= least tolerant, found in narrow range of plant communities
 - Non-native species = 0
 - Reed Canary Grass (introduced) C=0
 - Ostrich Fern (FAC, NCNE) C=5
 - Pink lady slipper C=9



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Sampling Methods Overview

- FQA Sampling Protocol:
 - Map Assessment Area
 - Determine Plant community types
 - Conduct timed meander (rapid) or plot-based sampling
 - Conduct shoreland sampling (if necessary)
 - Make Areal cover estimations
 - Calculations
- Full FQA -Plot-based sampling
- Rapid FQA- Timed meander rules
 - Areal cover in cover classes for each species



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Sampling Methods

- Determining the Assessment Area
- Define plant communities
 - Eggers & Reed
 - MN DNR Native Plant Communities Classification Guide
 - Laurentian Mixed Forest, Eastern Broadleaf Forest, Prairie Parkland and Tallgrass Aspen Parklands



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Metrics

Variables:

- Number of species = Species Richness
- Mean C-value
- Mean C-value (weighted) (wC)
 - $wC = \sum pC$

Floristic Quality Index

- Integral measurement of FQA
- $$FQI = C\sqrt{S}$$
- mean C value
 - S= number of species (i.e. species richness)
 - Both stand alone indices

Greater the FQI, the closer the condition is to a natural state

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Small Group Delineation Exercise

Plan:

- Work in small groups
- Field pack, shovel, auger, field maps
- Complete at least one upland and one wetland data sheet
- Determine wetland boundary



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