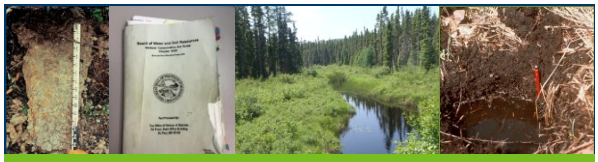
Day Five

Quote of the Day

"My temple is the swamp… When I would recreate myself, I seek the darkest wood, the thickest and most impenetrable to the citizen, most dismal, swamp. I enter the swamp as a sacred place, a sanctum sanctorum… I seemed to have reached a new word, so wild a place…far away from human society. "

- Henry David Thoreau

1



MN Wetland Professional Certification Program Introduction Class- Day 5

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Professional Certification Program

2

Basic Agenda

Monday

- 3 Parameters, Wetland Function & Classification Systems, Hydrology Indicators, Delineation Methods & Critical Definitions, Data Sheet Field Exercise

Tuesday

- Quiz 1, Antecedent Precipitation, Offsite Resources and Hydrology Methods, Soil Concepts, Hydric Soil Indicators, Web Soil Survey, Soil Texture Lab, Soil profile description field exercise

Wednesday

- Quiz 2, Intro to Regulatory Programs, WCA Basic Decision Types, LGU Duties, Technical Evaluation Panel, WCA Application Procedures, Wetland Vegetation, Vegetation Field Plots Exercise

Thursday

- Quiz 3, Small Group delineation Field Exercise, Submitting Delineations, Replacement Plans, Wetland Banks, Monitoring

Friday

- WCA Enforcement, Altered Hydrology and Wetland Restoration, Functional Assessments Methods, Course Summary & Summary Quiz

- MWPCP Professional Exams

3

WCA Enforcement

BOARD OF WATER AND SOIL RESOURCES

4

Learning Objectives

- **WCA Enforcement Procedures**
- Identify the roles and responsibilities of the Minnesota Department of Natural Resources (DNR), Local Government Units (LGUs), Soil and Water Conservation Districts (SWCDs), and the Minnesota Board of Water and Soil Resources (BWSR) in investigating and resolving WCA violations.
- Describe the sequence of enforcement actions used to address unauthorized wetland impacts.
- Differentiate among Resource Protection Notices, Cease and Desist Orders, voluntary restoration, Restoration and Replacement Orders, and Certificates of Satisfactory Restoration.
- Explain the purpose and timelines of the WCA appeals process and the rights of applicants and affected parties.

5

Enforcement Procedure Overview

6

8420.0900 Subp. 3. **Restoration and Replacement orders.**

- B. Promptly upon being informed by the enforcement authority or the local government unit of the need, a soil and water conservation district staff person **must** inspect the site and prepare a plan in consultation with the local government unit and the enforcement authority for restoring the site to its pre-altered condition.

7

SWCD Role in a violation

- Landowner contact for CDO or RPN
- Site visit- gather information/evidence
- Prepare Restoration/Replacement Order
- Monitor restoration/ replacement site.
- Certificate of Satisfactory Completion
- Track the cases.

8

LGU Role in a violation

- Help Determine if site has permit for work or prior work done.
- Assist SWCD on Restoration/Replacement Orders
- Assist with gathering evidence
- Receive application from landowner for exemption, no-loss determinations, and replacement plans
- Track the cases

9

BWSR's Role in a violation

- Rule interpretation
- Bounce ideas back and forth (appropriate seed mixes)
- May contact more specialist BWSR staff to assist in difficult projects
- Assist SWCD/LGU in developing RO's
- Assist in technical findings

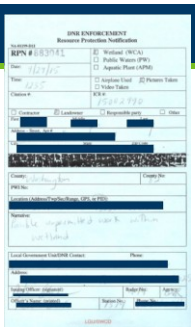
10

DNR Enforcement Role

- Landowner contact if Cease and Desist Orders
- Write Summary of information on violation
- Gather Evidence of the violation including contractors' info
- Issue Restoration and Replacement Order
- Grant Extensions
- Initiate enforcement action
- Follow and track all violation cases
- Issue RPN for after the fact cases. (not in progress)

11

Resource Protection Notices



DNR ENFORCEMENT
Resource Protection Notification

RPN # [redacted]

Wetland (WCA)
Public Waters (PW)
Aquatic Plant (APM)
Airplane Used
Pictures Taken
Video Taken

Contractor
Landowner
Responsible party
Other

County:
County No:
PWI No.:
Location (Address/Twp/Sec/Range, GPS, or PID):
Narrative:
Local Government Unit/DNR Contact:
Phone:
Address:
Issuing Officer (signature):
Badge/Dep:
Agency:
Station No.:
Phone No.:

Used as a notice when activity is complete and no sign it will continue

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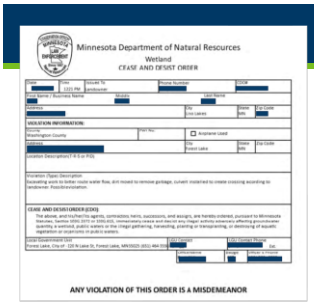
Cease & Desist Orders


Minnesota Department of Natural Resources
Wetland
CEASE AND DESIST ORDER

ANY VIOLATION OF THIS ORDER IS A MISDEMEANOR

Used when equipment is on site, and it appears the activity will continue to impact wetlands.

13

Data Collection

Who – landowner and/or responsible party, contractor

- RO will go to all

What – type of disturbance or activity that occurred

- Useful for determining impact

Why – purpose of action? Were goals achieved? (i.e. some drainage is not effective…)

14

Data Collection

When – estimated time of activity occurrence

- Helpful in determining responsible party if ownership change has occurred
- Aerial photos/PID information
- Did the activity work?

Where – Property location (critical), but also landscape position, slope, etc.

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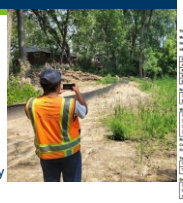
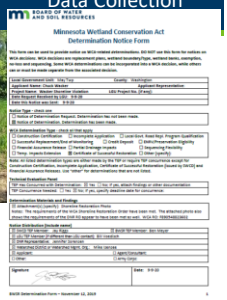
Data Collection

Photos

- Maps
- Illustrations
- TEP Findings and Recommendation
- Discussions with landowner/responsible party
- Survey information
- You may only have one opportunity to be on site





BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Conservation Act
Determination Notice Form

This form can be used to provide notice on WCA-related determinations. DO NOT use this form for notices on WCA decisions. WCA decisions are replacement plans, wetland boundary/type, wetland banks, exemption, no-loss and sequencing. Some WCA determinations can be incorporated into a WCA decision, while others can or must be made separate from the associated decision.

Local Government Unit: Tony Pepi	County: Washington
Applicant Name: Chuck Wacker	Applicant Representative
Date Received by LGU: 8-8-00	LGU Project No. (if any):
Date Deposit Received by LGU: 8-8-00	
Date this Notice was Sent: 8-9-00	

Notice Type - check one:

- ☐ Notice of Determination Request. Determination has not been made.
- ☒ Notice of Determination. Determination has been made.

WCA Determination Type - check all that apply:

- ☐ Construction Certification
- ☐ Incomplete Application
- ☐ Local Grant, Road Rep. Program Qualification
- ☐ Successful Replacement/End of Monitoring
- ☐ Credit Deposit
- ☐ BWSR/Preservation Eligibility
- ☐ Exemption/Exemption Verification
- ☐ Sequencing/Sequencing Feasibility
- ☐ Delay - Impacts Extension
- ☒ Certificate of Successful Restoration
- ☐ Other (specify)

Note: All listed determination types are either made by the TEP or require TEP concurrence except for Construction Certification, Incomplete Application, Certificate of Successful Restoration (issued by SWCD) and Financial Assurance Releases. Use "other" for determinations that are not listed.

Technical Evaluation Panel

TEP was Consulted with Determination: ☒ Yes ☐ No If yes, attach findings or other documentation

TEP Concurrence Needed: ☐ Yes ☒ No If yes, specify deadline date for concurrence:

Determination Materials and Findings:

☒ Attachment(s) (specify): Shoreline Restoration Photo

Notes: The requirements of the WCA Shoreline Restoration Order have been met. The attached photo also shows the requirements of the DNR PO appear to have been met as well. WCA PO: PWR94-0000

Notice Distribution (Include name):

☒ LGU TEP Member: Tony Pepi	☒ BWSR TEP Member: Ben Meyer
☒ LGU TEP Member (if different than LGU contact): Bill Crawford	
☐ DNR Regional/Area: Jim/Pat Schroeder	
☐ Watershed District or Watershed District Rep.: Mike Gaccioli	
☒ Applicant	☐ Agent/Consultant
☐ Other	☐ Army Corps

Signature: Date: 8-9-00

BWSR Determination Form – November 12, 2010

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The RO

Restoration Order Gives the Landowner Options

- Restoration is priority
- Apply for replacement, exemption, no-loss
- Appeal- w/in 30 days + $500 fee
- Court/Deed Restriction if no action is taken by landowner

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Conservation Act
Restoration Order

After-the-fact replacement ratio must be twice the ratio otherwise required but may be reduced by LGU and DNR Enf.

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The RO

- Send RO to the Conservation Officer OR Environmental Enforcement Officer ASAP
- Enforcement will serve the order (must be served in person or certified mail)
  - We recommend to officers to use only certified mail
  - Easy for everyone to track timeline
- MAKE SURE YOU SIGN YOUR COPY BEFORE SENDING IT TO CO OR Environmental Enforcement Officer (EEO).
- Extensions are issued **only** by enforcement and if:
  - The landowner has a good reason for not getting it done
  - Has made some progress
  - Maybe weather related (heavy rains, early freeze)
  - Submitted application
  - Filed an Appeal

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Is a formal Restoration Order Always Required?

- No, voluntary restoration is allowed but should consider
  - Willingness to cooperate
  - Past history
  - Shortened timeframe for completion to allow for formal RO process
  - Some kind of written plan or agreement with deadlines
  - Communication and agreement with DNR Enforcement
  - No formal way to make other responsible parties liable

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Voluntary Restoration

WASHINGTON CONSERVATION DISTRICT

September 7, 2021

[redacted]

Sent via email to: [redacted]

RE: NOTICE OF WETLAND CONSERVATION ACT VIOLATION AT [redacted] FOREST LAKE

Dear [redacted]

Thank you for discussing the unpermitted fill within wetland on the property noted above that is a violation of Wetland Conservation Act (WCA). Based on a historical aerial photo review, topographic data, and site visit, the total estimated Wetland fill estimate is 1,410 square feet (SF). Part of this fill (???? SF) is adjacent to the new blacktop parking area and the majority (?,??? SF) is in the southeast corner of the wetland. See the attached figure.

To expedite the process a voluntary restoration approach will be allowed if the following items are addressed by September 30, 2021. If these items are not addressed satisfactorily by that date a Restoration Order will be served by the DNR Conservation Officer.

Wetland Restoration Requirements:

- Remove the 1,410 SF of non-native fill material from the SW corner of the impacted wetland (the fill depth is estimated to be between 6 and 12 inches). The fill shall be moved to non-wetland.
- The restored wetland shall be seeded with a native wet meadow seed mix.
- The fill adjacent to the parking lot is below the 0ft Minimum threshold of the WCA and may be allowed to remain if you receive confirmation of the exemption from the City of Forest Lake. Send this request to [redacted] who serves as the WCA Local Government Unit (LGU) contact.

Please contact me at [redacted] to meet onsite and discuss the wetland restoration process. Please note there may be additional Watershed District or City requirements in addition to the WCA requirements related to the parking lot construction. The City and Watershed are copied on this communication.

Respectfully,

[redacted]

Washington Conservation District

cc: [redacted]

Supervisors: Bob Rosengquist • John Rheinberger • Jim Lovrich • Diane Hinke • Tim Bobrowski

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Certificate of Successful Restoration

MINNESOTA DEPARTMENT OF NATURAL RESOURCES AND SOIL RESOURCES

Minnesota Wetland Conservation Act
Determination Notice Form

This form can be used to provide notice on WCA-related determinations. All WCA and WD/WMO form notices on WCA decisions. WCA decisions are replacement plans, wetland boundary/type, wetland bank, exemption, sequencing, no loss, or banking plan. Watershed District decisions are incorporated into a WCA decision, while others can or must be made separate from the association decision.

Local Government Unit: City/Twp | County: Washington
Applicant Name, Contact Person: | Applicant Representative:
Project Name: Wetland Restoration Location: Lake Project No. (if any):
Date of Application: 9/7/21
Date this Notice was sent: 9/7/21

Action Type: check one:
☐ Notice of Wetland Impact: determination has not been made
☒ Notice of Wetland Impact: determination has been made

Wetland Conservation Type: check one or more:
☐ Conservation Guidelines ☐ Municipal Application ☐ Lake Minor Area Regs / Program Qualification
☐ Successful Replacement/End of Monitoring ☐ Credit Deposit ☐ Wetland Preservation eligibility
☐ Wetland Bank Establishment/Credit Withdrawal ☐ Exemption ☐ Sequencing
☐ Temp. Impacts Extension ☒ Certificate of Successful Restoration ☐ Water Quality

Note: All WCA determination types are subject to review by the TEP. It requires TEP concurrence except for Exemptions, Sequencing, and Water Quality determinations (issued by SWCD) and Certificate of Successful Restoration. Only Banking requires Agency and Tribal concurrence.

Technical Evaluation Panel:
☒ City, County, SWCD, Other Local Gov't ☒ Agency ☒ Tribal (Timing or other documentation)
TEP Concurrence Needed: ☐ Yes ☒ No (Decisions made by Local Gov't without TEP review are for concurrence)

Administrative Authorities and Contacts:
Local Government Unit Contact Person: Jennifer Sorensen
Notes: The requirements of the WCA Shoreline Restoration Order have been met. The attached photo was taken the requirements of the DNR RO appear to have been met on-site. WCA RO 2020000001[illegible]

Notice Distribution (Include Name):
☒ Local Gov't Unit: Jennifer Sorensen ☒ SWCD/WD/WMO: Mary Kaiser
☒ Agency TEP Member (if different than LGU contact): Bill Cronquist
☒ Tribal Representative: Jennifer Sorensen
☒ Applicant (SWCD or Watershed District, Only – Other Upon Request): [illegible]
☒ Landowner: Agency Consultant
☒ Other: Mary Kaiser

Signature: Date: 9-9-22

DNR Determination Form – November 22, 2010 1

Prepared and issued by the SWCD

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RO Non-Compliance

The landowner does not comply with the RO. Now what?

- Enforcement will work with you!
  - CO Sends a Letter
  - CO Makes a Phone call
  - Deed restriction in some cases
  - Landowner Served a Criminal Citation
  - Court

22

Contractors Responsibility

Prior to working in wetlands:

- Must have obtained signed statement from landowner
- Mailed a copy to the LGU
- They do not need to verify if the landowner has a permit or not. Just have the signed form and mailed it.

Landowner Statement and Contractor Responsibility
For Work in Wetlands or Public Waters

MN Statutes Sections 103B.231 and 103G.241 stipulate that an agent or employee of another may not:
1) drain, excavate, or fill a wetland, wholly or partially; or
2) construct a dam, dike, or structure, or make any changes in any reservoir, dam, or the course, current, or cross-section of any public water.

Unless the agent or employee has obtained a signed statement from the property owner stating that any permit or wetland replacement plan required for the work has been obtained, or that a permit or replacement plan is not required. A WRBA statement is mailed to the appropriate office with jurisdiction over the wetland or public water prior to initiating the work (see next page for information on where to send this notification).

This form is a notification only and is not an application or authorization for any activities described in it.

1. PROJECT INFORMATION

Project will affect (check all that apply):
☐ Lake, Watercourse, or Public Waters Wetland ☐ Non-Public Waters Wetland ☐ Wetland of Unknown Jurisdiction

Address or description of project location (attach map if necessary):
Legal address:

County	Twp (Township)	Range (Township)	Section(s)	Township(s)	Range(s)	Lot, Block, Subd

Description of proposed work (include sketch and/or attach additional pages if needed):

2. LANDOWNER STATEMENT

I certify that, as the owner of the property listed on this form (check one):
☐ I have obtained all permits or approvals required to perform the work described above.
☐ No permits or approvals are required for this work.

Property Owner (Print Name)	Address
Signature	Date / Phone Number and E-m ail Address (Optional)

3. CONTRACTOR VERIFICATION

DNR Form 15-12-24 Page 1 of 2

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Appeals

- Landowner has 30 days to appeal Order
- RO must allow minimum of 30 days to comply with Order
- TEP, in consultation with DNR Enforcement, may allow longer to complete restoration.

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Scenario- lake fringe fill

- What kind of information is relevant to collect?
  - Who, when, why?
  - Extent of fill and depth
  - Wetland boundary and type
  - Impact amount
  - Applicable exemptions?
  - Jurisdiction(s)?
- How should this be handled?

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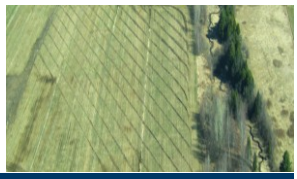

Altered Hydrology

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Professional Certification Program

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Learning Objectives

- **Altered Hydrology**
- Explain how artificial drainage systems alter wetland hydrology and influence wetland delineation and regulatory determinations.
- Define lateral effect and the physical and site-specific factors that influence the extent of lateral effect
- Define effectively drained and explain how artificial drainage can eliminate wetland hydrology while hydric soils persist.
- Interpret county-specific NRCS Drainage Setback Tables to evaluate the potential influence of drainage systems on adjacent wetlands.

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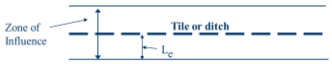
Lateral Effect

- 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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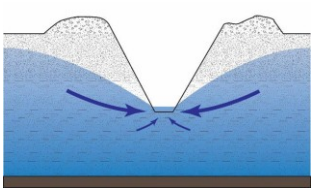
Lateral Effect

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



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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

30

Drainage Setback Tables

- Developed by NRCS using the van Schilfgaarde 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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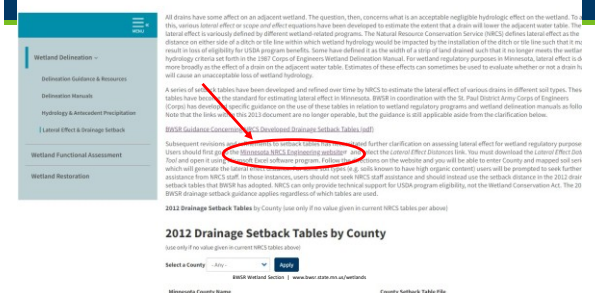
Lateral Effect & Drainage Setback



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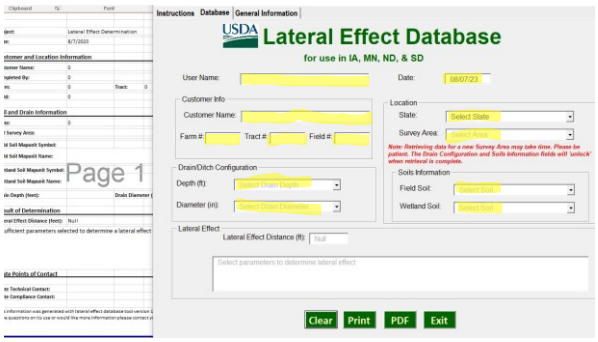

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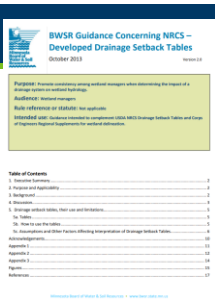
Drainage Setback Tables



BWSR Guidance Concerning NRCS – Developed Drainage Setback Tables

October 2013 Version 1.0

Purpose: Promote consistency among wetland managers when determining the impact of a drainage system on wetland hydrology.

Audience: Wetland managers

Rule reference or statute: Not applicable

Intended use: Guidance intended to complement USDA NRCS Drainage Setback Tables and Corps of Engineers Regional Supplements for wetland delineation.

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Minnesota Board of Water & Soil Resources • www.bwsr.state.mn.us

https://bwsr.state.mn.us/sites/default/files/2018-12/WETLANDS_Delin_Drainage_setback_guidance_BWSR_2013.pdf

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Drainage Setback Tables

- County-specific
- MN NRCS uses setback distance rather than lateral effect.
- **Setback distance** and **lateral effect** are not the same thing!!
- Setback tables not directly applicable for use in determining drainage impact.
- https://bwsr.state.mn.us/lateral-effect-drainage-setback

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How to use tables

1) Determine if hydrology indicators are present
2) Overlay drains on soil map
3) Determine average depth of drain per soil type
4) Determine setback distance for each soil type using NRCS table
5) Delineate setback corridor for drain
6) Identify wetlands within or adjacent to setback corridor
7) Consider all variables to determine potential wetland impact

Map Unit Symbol	Drain Depth, feet			
	2	3	4	5
124	50	60	80	100
142	50	70	90	100
147	60	80	100	120
386	80	110	110	110
386	130	210	260	350
202	130	200	260	320
218	110	150	170	190
243	50	50	70	80
292	50	70	100	120
346	60	70	90	100
428	50	60	80	90
502	60	90	100	120
532	120	180	230	290
533	50	70	80	90
540	50	70	80	90
541	200	250	300	350
543	50	110	210	290
544	50	70	80	90
546	50	70	80	90
549	200	250	300	350
564	140	250	330	400
607	110	170	220	260
615	90	150	200	250
621	50	70	100	120
625	170	230	280	290
627	90	130	210	290
628	70	100	120	140
672	60	90	120	140
685	120	220	300	370

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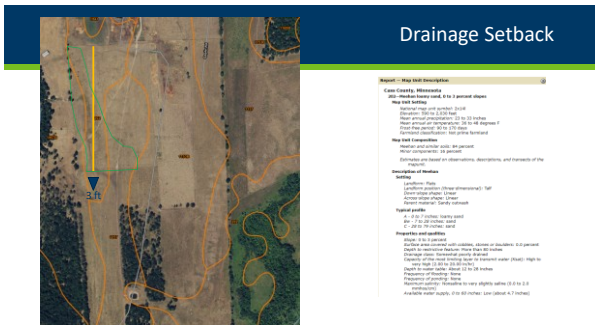

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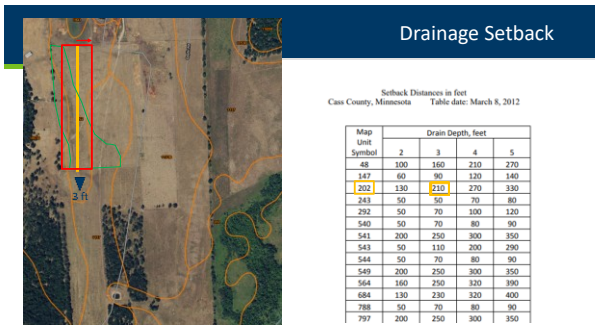

Map Unit Symbol	Drain Depth, feet			
	2	3	4	5
48	100	160	210	270
147	60	90	120	140
202	130	210	270	330
243	50	50	70	80
292	50	70	100	120
540	50	70	80	90
541	200	250	300	350
543	50	110	200	290
544	50	70	80	90
549	200	250	300	350
564	160	250	320	390
684	130	230	320	400
788	50	70	80	90
797	200	250	300	350

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Learning Objectives

Wetland Restoration

- Explain the ecological and regulatory purposes of wetland restoration, including restoring wetland functions and supporting compensatory mitigation, wetland banking, conservation programs, and enforcement actions.
- Apply the Minnesota Wetland Restoration Guide, associated Technical Guidance Sheets, and Native Vegetation Establishment and Enhancement Guidelines to restoration planning, implementation, and monitoring.
- Develop restoration goals that are consistent with site conditions, project objectives, and applicable regulatory requirements.
- Develop monitoring plans to evaluate restoration performance and ecological success.

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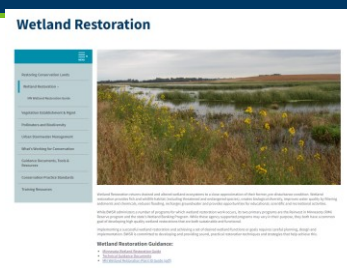
- Wetland Restoration



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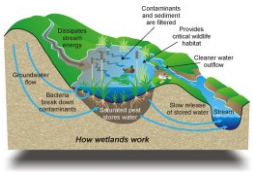
Why restore wetlands?

- 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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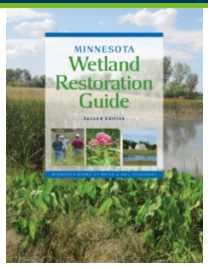
MN Wetland Restoration Guide

MN Wetland Restoration Guide:

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



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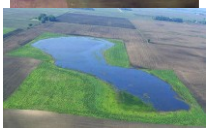
General considerations for wetland restoration

- 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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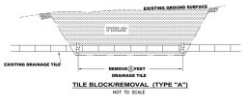
Technical Guidance Sheets

- 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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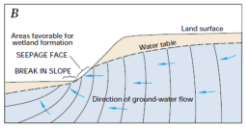
Hydrologic design considerations

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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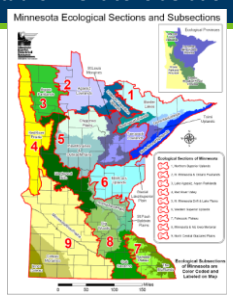
Vegetation establishment considerations

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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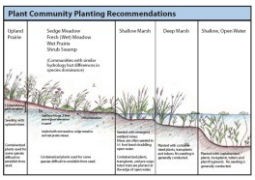
Developing a vegetation plan

- 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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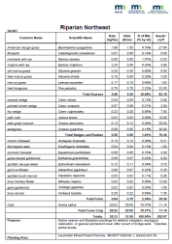
Selecting seed mixes and plants

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



Riparian Northeast

Common Name	Scientific Name	% Mix (Bulk)	Mix (Bulk)	% of Mix (% by Wt)	Seed/ Lb
American virgin's bower	Anemonastrum virginianum	0.50	0.50	0.79%	27,000
Bluejacket	Centaurea cyanus cultivarious	0.67	0.68	0.79%	8,000
Creeping wild rye	Elymus repens	0.50	0.50	0.79%	2,000
Virginia wild rye	Elymus virginicus	0.25	0.25	0.53%	3,000
Wild bergamot	Monarda fistulosa	0.25	0.25	0.53%	100,000
Wild morning glory	Ipomoea pandurata	0.75	0.80	0.29%	3,000
Wild red grass	Leersia oryzoides	0.17	0.18	0.44%	1,000
Wild tuberose	Polianthes tuberosa	0.75	0.75	0.79%	10,000
	Total Grasses	0.50	0.50	0.88%	30,18
Common sedge	Carex stipata	0.25	0.25	0.79%	0,000
Fox sedge	Carex vulpinoidea	0.25	0.25	0.79%	0,000
Lance sedge	Carex lanceolata	0.25	0.25	0.53%	0,000
Soft rush	Juncus effusus	0.25	0.25	0.53%	10,000
Soft green bulrush	Scirpus atrovirens	0.25	0.25	0.53%	10,000
Wool grass	Scirpus cyperinus	0.50	0.50	0.79%	20,000
	Total Sedges and Rushes	0.50	0.50	0.97%	70,00
Jewel orchidweed	Impatiens capensis	0.50	0.50	0.79%	0,000
Narrowleaf vetch	Vicia cracca cultivarious	0.50	0.50	0.79%	0,000
Common boneset	Eupatorium perfoliatum	0.50	0.50	0.79%	0,000
Joe-pye weed, spotted Joe	Eutrochium maculatum	0.50	0.50	0.79%	0,000
Lance-leaved	Verbena hastata	0.75	0.80	0.29%	0,000
Lance-leaved coreopsis	Coreopsis lanceolata	0.50	0.50	0.79%	0,000
Marsh milkweed	Asclepias incarnata	0.50	0.50	0.79%	0,000
Ohio goldenrod	Solidago ohiensis	0.50	0.50	0.79%	0,000
Ohio ironweed	Vernonia fasciculata	0.50	0.50	0.79%	0,000
	Total Forbs	0.50	0.50	0.79%	0,000
Oats	Avena sativa	20.00	20.00	31.77%	1,000
	Total Cover Crop	20.00	20.00	31.77%	1,000
	Totals	63.00	63.00	100.00%	101,18
Purpose:	Native species and floristical advantage for wetland mitigation, ecological restoration and compatibility to cover after control in Hedge rows. *Indicates central shrub.				
Planting Area:	Lowlands/ Wetland/Hedgerows. Wetlands Classes 1, 2 and 3 and 4a				

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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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Learning Objectives

Functional Assessment Methods

- Describe the purpose, strengths, and limitations of wetland functional assessment methods used in Minnesota: Minnesota Rapid Assessment Method (MnRAM) and the Rapid Floristic Quality Assessment (RFQA)
- Interpret functional assessment results to support wetland impact evaluation, avoidance and minimization strategies, replacement planning, and other regulatory decisions.

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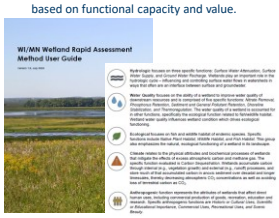
Functional Assessment Methods

- WI/MN Wetland Rapid Assessment Method
  - Rapid method for assessing wetland functions based on functional capacity and value.



- Floristic Quality Assessment
  - Vegetation based ecological condition assessment method

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WI/MN Wetland Rapid Assessment Method

- Developed by Committee of MN, Wisconsin and Federal Agencies
  - Released for public comment in 2024
- Tool assesses 17 wetland functions under five categories: hydrologic, water quality, ecological, climate, anthropogenic

Functional Group	Function
Hydrology	Surface Water Attenuation
	Surface Water Supply
	Groundwater Recharge
Water Quality	Nitrate Removal
	Phosphorus Retention
	Sediment and Pollutant Retention
	Shoreline Stabilization
	Temperature Maintenance
Ecological	Native Plant Habitat
	Wildlife Habitat
	Fish Habitat
Climate	Carbon Sequestration
Anthropogenic	Historic or Cultural Uses
	Scientific or Educational Importance
	Commercial Uses
	Recreational Uses
	Scenic Beauty

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Method

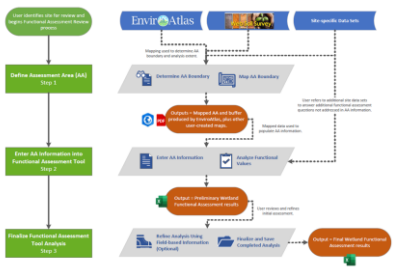
1) Identify area of interest (AOI)

2) Level one delineation of wetlands and HGM type

3) Conduct desktop review using information sources

4) Field visit- verify AOI, conduct Rapid FQA, and answer questions

5) Complete Data input and save



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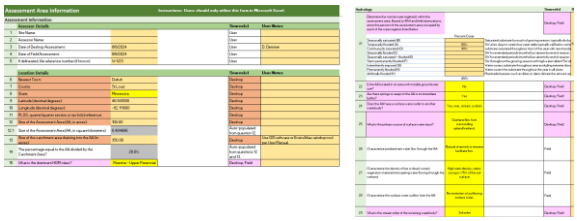
Data Entry in Spreadsheet



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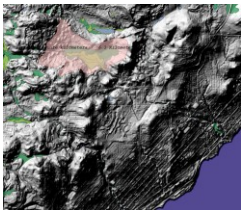
Results Summary

Functions Organized by Ranking

Higher	Moderate	Lower	Not Applicable
Surface Water Supply (SWS)	Nitrate Removal (NR)	Groundwater Recharge (GR)	
Thermoregulation (TR)	Sediment and Pollutant Retention (SPR)	Commercial Uses (CU)	
Native Plant Habitat (NP)	Shoreline Stabilization (SS)		
Historic or Cultural Uses (HCU)	Carbon Sequestration (CS)		
Scientific or Educational Importance (SEI)			
Recreational Uses (RU)			
Scenic Beauty (SB)			



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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

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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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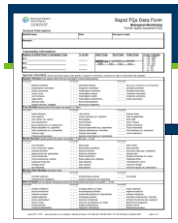
Rapid Floristic Quality Assessment (FQA)



Scientific Name	Fresh Meadow #1 C	CC	Mid	p	pC	Fresh Meadow #2 C	CC	Mid	p	pC
Calamagrostis canadensis	4	5	82.5	0.5556	2.2222	3	15	1.1364	0.5455	
Phalaris arundinacea	0	2	3	0.0267	0.0000	6	85	0.7727	0.0000	
Carex stricta	5	4	37.5	0.3333	1.6667	2	3	0.0273	0.1364	
Carex lacustris	5	2	3	0.0267	0.1333	5	0.5	0.0045	0.0227	
Sorbi petiolatus	5	2	3	0.0267	0.1333	2	3	0.0273	0.1364	
Solidago gigantea	3	1	0.5	0.0044	0.0133	1	0.5	0.0045	0.0136	
Rubus idaeus ssp. strigosus	3	1	0.5	0.0044	0.0133	1	0.5	0.0045	0.0136	
Lycopus uniflorus	5	1	0.5	0.0044	0.0222	1	0.5	0.0045	0.0227	
Mentha arvensis	3	1	0.5	0.0044	0.0133	1	0.5	0.0045	0.0136	
Typha latifolia	2	1	0.5	0.0044	0.0089	1	0.5	0.0045	0.0091	
Impatiens capensis	2	1	0.5	0.0044	0.0089	1	0.5	0.0045	0.0091	
Rumex obiculatus	6	1	0.5	0.0044	0.0267	1	0.5	0.0045	0.0273	

Metric	Fresh Meadow #1	Fresh Meadow #2
Native Spp. Richness	11	11
Introduced Richness	1	1
Mean C	3.6	3.0
FQI	11.9	11.9
wC	4.3	1.0
Total Mid-point % Cover	112.5	130
Introduced Spp. % Cover	3	85
Introduced Proportion	0.05	0.77

Condition Category	wC
Exceptional	> 4.6*
Good	> 4.2
Fair	2.5 – 4.2
Poor	< 2.5

Condition Category	Description
Exceptional	Composition/structure completely intact
Good	Minor composition/structure changes
Fair	Moderate composition/structure changes
Poor	Large-extreme changes in composition/structure
Absent	Devoid of wetland vegetation

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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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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

$$FQI = \bar{C}\sqrt{S}$$

  - 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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MINNESOTA WETLAND PROFESSIONAL CERTIFICATION PROGRAM
CORE CURRICULUM

- **Critical Definitions**
- **Classification Systems & Functions**
- **Wetland Delineation**
  - Vegetation – hydrophyte, Dominance
  - Soil – hydric indicators
  - Hydrology- inputs/outputs, indicators, monitoring
- **Wetland Conservation Act**
  - Purpose & Scope
  - Application Procedures & Noticing Requirements
  - Basic Decisions
    - Boundary/Type
    - No-Loss
    - Exemptions
- Replacement plans
- Wetland Banking
- Enforcement & Appeals

Minnesota Wetland Professional Certification Program

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What is a Wetland?

Definition: Those areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions.

Hydrology + Vegetation + Soil = Wetland

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3-Parameter/ Indicator Approach

1. **Soils** –Historic conditions, may not reflect current condition.
2. **Hydrology** –Current condition, but heavily influenced by recent climate conditions
3. **Vegetation** – Somewhere between

The 87 Manual requires 3 parameters because no one source typically gives the answer in all situations

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Wetland Functions & Values

Wetland Functions: in scientific assessments means natural processes

Wetland Value: wetland goods and services providing monetary or social welfare benefit.

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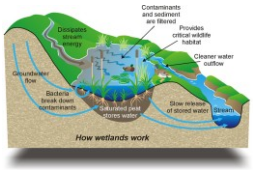
Wetland Functions

- Act as a natural "filter" to maintain water quality
- Facilitates infiltration recharging groundwater
- Stabilize base flow
- Decreases fluid velocity during high flow events which decreases turbidity
- Storm water retention (i.e. storage)
- Provides habitat
- Shoreline protection



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

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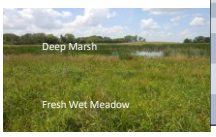
Wetland Classification Systems in MN

- Circular 39
- Eggers & Reed
- Cowardin
- Hydrogeomorphic Method



Circular 39	Eggers & Reed
1	Seasonally Flooded Basins
1	Floodplain Forests
2	Sedge Meadows
2	Fresh (wet) Meadows
2	Wet to Wet-Mesic Prairies
2	Calcareous Fens
3	Shallow Marsh
4	Deep Marsh
5	Shallow, Open Water
6	Shrub-Carr
6	Alder Thicket
7	Hardwood Swamp
7	Coniferous Swamp
8	Open Bog
8	Coniferous Bog

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Land Resource Regions

- **Regions dictate which indicators are used and how they are used**

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Wetland Delineation Types

ROUTINE

- **Level 1** - Onsite Inspection Unnecessary
- **Level 2** - Onsite Inspection Necessary
- **Level 3** - Combination of Levels 1 and 2

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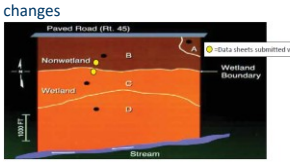
Sampling Location Should Be Representative

- Representative of soil changes (from upland to wetland)
- Representative of vegetation changes
- Representative of hydrology indicator changes
- Representative of landscape changes



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Research Data Sources

- Aerial Photos (current and historic)
- Soil map (Web Soil Survey)
- Topographic\LiDAR
- NWI Map (updated version in MN)
- DNR Protected Waters Map

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Critical Definitions

- Wetlands
- Growing Season
- Atypical Situations
- Problem Areas
- Normal Circumstances

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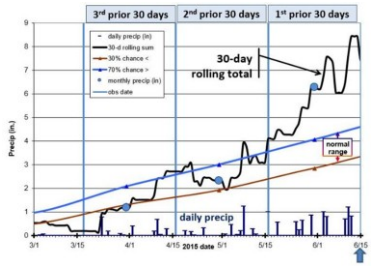
Antecedent Precipitation

To better interpret the data collected or observation made in the proper context.



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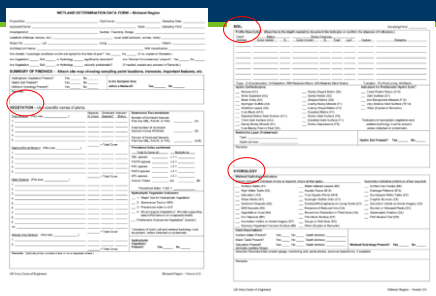
It's all about the documentation!



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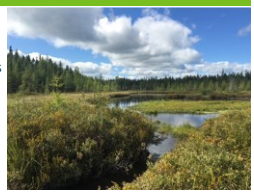
Hydrology

…"inundated or saturated by surface or ground water at a frequency and duration"

- Technical standard of 14 or more consecutive days of flooding or ponding;
- Water table 12 in. or less below soil surface;



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Hydrology Indicators

Evidence that there is continuing hydrology and confirms that an episode of inundation/saturation occurred recently.

Wetland hydrology indicators are divided into two categories:

- Primary – provide stand-alone evidence of a current or recent hydrologic event; and
- Secondary – provide evidence of recent hydrology when supported by one or more other hydrology indicators.

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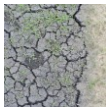
Hydrology Indicator Groups

Group A – direct observation of *water*



Group B – evidence of *flooding/ponding*

Group C – evidence of *current or recent saturation.*

Group D – *Landscape and veg. characteristics* that indicate contemporary wetland conditions.

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Soil

- Basics of Soil
  - Soil formation
  - Landscape position
- Soil Properties
  - Texture
  - Color
- Hydric soil development
- Web Soil Survey
  - Interpreting soil reports
- Hydric soil indicators
  - All
  - Fine
  - Sandy
- Common soil indicators

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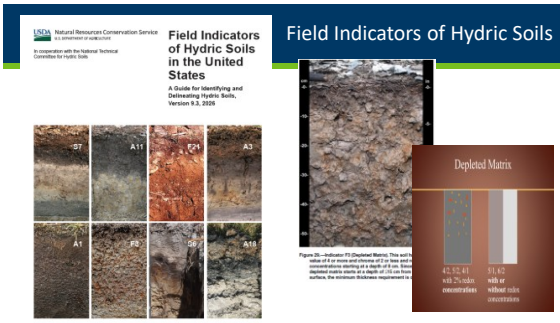
Field Indicators of Hydric Soils



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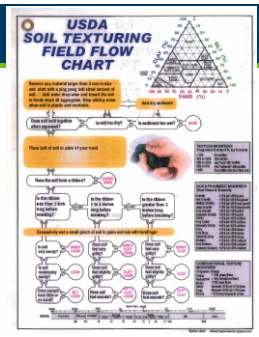
Soils



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Web Soil Survey

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
C63B	Bushville loamy sand, Rainy till phase, 0 to 3 percent slopes	31.8	25.3%
C103B	Brainerd sandy loam, 1 to 4 percent slopes	13.0	10.3%
C164B	Braiterrd-Fisk complex, 4 to 8 percent slopes	13.3	10.6%
C165A	Nokay-Prebish complex, 0 to 2 percent slopes	56.3	44.8%
W	Water	11.3	9.0%
Totals for Area of Interest		**125.7**	**100.0%**

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Determining Hydrophytic Vegetation

The procedure for using hydrophytic vegetation indicators is as follows:

1. Apply Indicator 1 (Rapid Test for Hydrophytic Vegetation).
2. Apply Indicator 2 (Dominance Test).
3. Apply Indicator 3 (Prevalence Index). This and the following step assume that at least one indicator of hydric soil and one primary or two secondary indicators of wetland hydrology are present.
4. Apply Indicator 4 (Morphological Adaptations).

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Overview of Wetland Vegetation

- Hydrophytic Vegetation Definition
  - Define Hydrophyte
  - What makes a plant a hydrophyte
  - Determine why matters
- Hydrophytic Vegetation Indicators
  - Field indicators
  - Indicator status
  - Dominance
- Determining Hydrophytic Plant Community
  - Rapid Test
  - Dominance Test (50/20 Rule)
  - Prevalence Index
  - Morphological Adaptations

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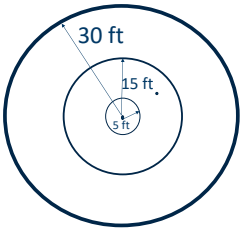
Vegetation Sampling



5 ft Herbaceous; 15 ft Shrub/Sapling; 30 ft Tree

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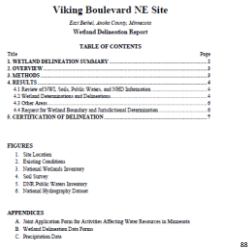
Wetland Delineation Reports

- Field Notes
- Basic Report Components
- Report Contents
- Field Review
- Non-Routine Wetland Delineations



Viking Boulevard NE Site

East Bethel, Anoka County, Minnesota

Wetland Delineation Report

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FIGURES

1. Site Location
2. Existing Conditions
3. National Wetlands Inventory
4. Soil Survey
5. DNR Public Waters Inventory
6. National Hydrography Dataset

APPENDICES

A. Joint Application Form for Activities Affecting Water Resources in Minnesota
B. Wetland Delineation Data Forms
C. Precipitation Data

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MN Wetland Regulatory Programs

- Public Waters Permit Program
- Wetland Conservation Act (WCA)
- Clean Water Act Section 404
- Section 401 of the Clean Water Act (401)
- Swampbuster provisions of the Food Security Act (FSA)

DEPARTMENT OF NATURAL RESOURCES

Communities and Local Government

US Army Corps of Engineers®

BOARD OF WATER AND SOIL RESOURCES

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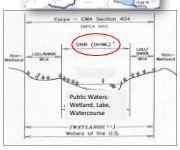
Public Waters Permit Program

- **Regulates:** changes to "course, current or cross-section"
- **Administered by:** DNR – Area Hydrologists
- **Authorities:** M.S. 103G; M.R. Chapter 6115
- **Jurisdictional boundary:** "Ordinary High-Water Level"
- **Review standards:** Public interest; reasonable/practical, Riparian rights, Availability of feasible & prudent alternatives, Compensatory mitigation
- **Appeals:** Contested case hearing
- **Enforcement:** DNR Conservation Officers; cease & desist, restoration orders
- **Application:** on-line via "MPARS"

DNR



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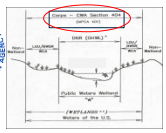
Clean Water Act Section 404

- **Regulates:** Discharges of dredged or fill material, including redeposit
- **Administered by**:U.S. Army Corps of Engineers – St. Paul District
- **Authorities:** 33 U.S.C. §1251; 33 CFR Parts 320-332; 40 CFR Part 230
- **Jurisdictional boundary:** 1987 Corps of Engineers Wetland Delineation Manual
- **Review Standards:** Sequencing, public interest, adequate compensatory mitigation
- **Appeals:** COE administrative appeal
- **Enforcement:** COE and USEPA; administrative orders
- **Application**: Joint Application Form for Activities Affecting Water Resources in Minnesota

US Army Corps of Engineers



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Wetland Conservation Act

- **Regulates:** draining, filling, some excavation
- **Administered by:** Local Government Units, SWCDs, Watershed Districts
- **Oversight by:** MN Board of Water and Soil Resources
- **Authorities:** M.S. 103A, 103B, 103G; M.R. Chapter 8420
- **Jurisdictional boundary:** 1987 Corps of Engineers Wetland Delineation Manual
- **Review standards:** Avoid, minimize, replace (sequencing)
- **Enforcement:** DNR Conservation Officers; cease & desist, restoration orders
- **Application**: Joint Application Form for Activities Affecting Water Resources in Minnesota

Communities and Local Government

MINNESOTA WATERSHEDS

MASWCD

BWSR

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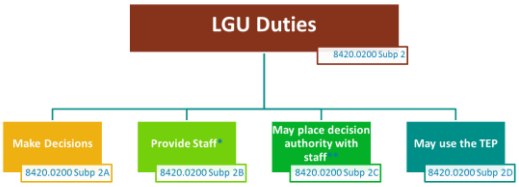
WCA



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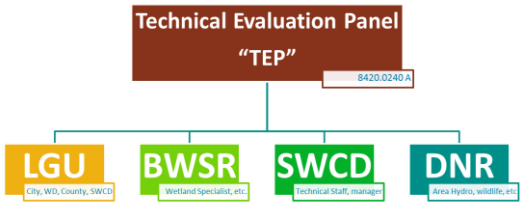
WCA



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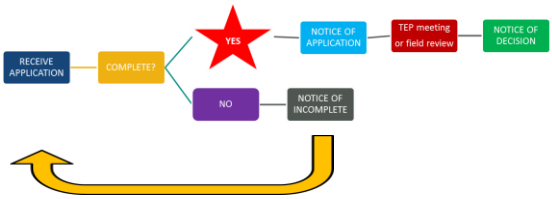
Procedures and Process



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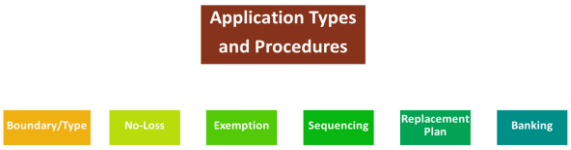
WCA



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WCA

WCA decisions for wetland projects that DO NOT REQUIRE REPLACEMENT

- **No-Loss** 8420.0415
- **Exemption** 8420.0420

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Replacement Plans

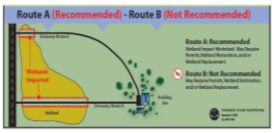
Transaction Form to Withdraw Credits
Minnesota Wetland Bank Program

Sequencing 8420.0520

- Avoid Impact 8420.0520 subp 3
- Minimize Impact 8420.0520 subp 4
- Replace 8420.0522

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.



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Overview of Wetland Banking

- 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

Banking-related topics covered in other sections:

- Restoration Construction Standards
- Monitoring and Corrective Actions

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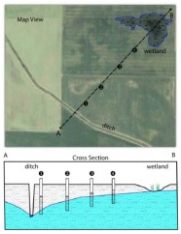
Overview of Wetland Bank Monitoring

- 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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Enforcement Procedure Overview

101

Overview of Wetland Restoration

- 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
- Monitoring
  - Timelines
  - Roles and responsibilities
  - Interpreting hydrology and vegetation monitoring data

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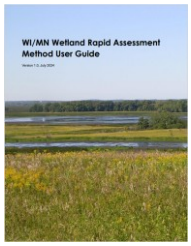
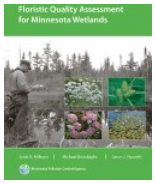
Functional Assessment Methods

- WI/MN Routine Assessment Method



- Floristic Quality Assessment
  - Vegetation based ecological condition assessment method



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Final Thoughts

Questions (last chance!)

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Summary Quiz

Minnesota Wetland Professional Certification Program

1) Sometimes referred to as the "60 day Rule", this Minnesota State Statute determines the agency action deadline for all WCA LGUs to make a decision on a wetland application.

A) MN Statute 8420

B) MN Statute 15.99

C) MN Statute 404

D) MN Statute 103G

105

Quiz

2) Which step in the wetland banking review is required by both the Corps and WCA?

a) draft prospectus

b) prospectus

c) Full application/mitigation plan

d) Easement acquisition

3) During the review of a replacement plan application, LGUs must use this process to determine whether a project avoids, minimizes then replaces wetland impacts:

a) No-loss criteria

b) Sequencing

c) Exemption standards

d) Replacement order

106

Quiz

4) After an initial wetland bank credit release, the remaining credits are eligible for deposit:

a) Whenever the LGU decides they should be released.

b) Based on the credit release schedule.

c) When a complete monitoring report is submitted.

d) Based on the credit release schedule and when performance standards are being met.

5) Bank Service Areas are factored into what aspect of implementing the Wetland Conservation Act?

a) Calculating de minimis

b) Wetland replacement siting

c) Determining the LGU

d) Prioritizing wetland restoration projects

107

Quiz

6) A project to restore a partially drained wetland may qualify as _____ under the wetland banking program:

a) Action eligible for credit
b) Compensation planning framework
c) Local Government road wetland replacement project
d) Full application

7) Who certifies construction of a wetland bank project?

a) BWSR

b) Army Corps

c) LGU

d) SWCD

108

Quiz

8) Which of the following are considerations for wetland restoration projects?

a) Adjacent land uses
b) Location of existing drainage ditches
c) Drainage law implications of restoring ditches
d) All of the above

9) Which of following is a vegetation based ecological condition assessment method for wetlands:

a) MNRAM

b) Cowardin

c) Floristic Quality Assessment

d) Eggers & Reed

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Quiz

10) Which member of TEP is responsible for writing a WCA Restoration Order?

a) LGU
b) BWSR
c) SWCD
d) Army Corps

11) In the WCA, fill is defined as:

a) Any solid material added to or redeposited in a wetland

b) Woody vegetation that originated in the wetland that impairs water flow

c) Posts or pilings for linear projects such as boardwalks

d) Both a and b

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Quiz

12) A delineator conducts a desktop review of air photos, soils map, topographic maps, and local wetland maps to identify and defines a wetland boundary without making a site visit. This is an example of what?

a) A comprehensive level 3 delineation

b) An unacceptable methodology under any circumstances

c) A quantitative delineation approach
d) A routine level 1 delineation

13) A Circular 39 Type 2 wetland, is most similar to what Cowardin Classification?

a) PEMB

b) PUBF

c) PSS1C

d) PFO1B

111

Quiz

14) A seasonally flooded wetland on agricultural land is normally plowed and planted in most years. For delineation purposes, which of the following conclusions is most likely true?

a) This is not a jurisdictional wetland
b) Normal circumstances are not present
c) Normal circumstances exist
d) A level 2 delineation is required

15) A wetland good and services which provides monetary or social welfare benefit is known as:

a) wetland value

b) Floristic Quality Assessment

c) wetland function

d) stormwater retention

112

Quiz

16) What is the definition of depleted matrix? Describe what it looks like.

Value 4 or More
Chroma 2 or Less

17) A project is located within the 50-80% pre-settlement area outside of shoreland. The landowner proposes to excavate in a semi-permanently flooded wetland. What is the maximum de minimis allowed for this activity?

a. 10,890 square feet
b. 4,356 square feet
c. 400 square feet
d. 100 square feet

113

Quiz

- 18) Which of the following hydric soil indicators does this profile description meet?

a) Loamy Mucky Mineral (F1)

b) Histic Epipedon (A2)

c) Thick Dark Surface (A12)

d) Redox Dark Surface (F6)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10yr 2/1	98	7.5yr 4/2	15	C	M	Loamy/Clayey	Distinct redox concentrations
8-18	10yr 3/1	85	7.5yr 3/2	5	C	M	Loamy/Clayey	Silty clay, faint redox

114

Quiz

19) Which of the following is the least important when conducting hydrology monitoring with shallow wells for determining if the wetland hydrology technical standard is met for an area?

a) Growing season.

b) Depth to restrictive soil layer.

c) "A" horizon thickness.

d) Well installation methodology.

Quiz

20) Which of the following tests is used for a wetland hydrology indicator?

a) 50/20 dominance

b) FAC Neutral

c) Prevalence Index

d) Bulk density

21) When should the Prevalence Index be calculated?

a) When dominant vegetation (as determined by the 50/20 rule) is determined to be hydrophytic.

b) When non-dominant vegetation (as determined by the 50/20 rule) is determined to be hydrophytic.

c) When hydric soils and wetland hydrology indicators are absent and the wetland determination is made by vegetation alone.

d) When wetland plant communities fail the dominance test, but have indicators of hydric soils and wetland hydrology

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Quiz

22) Based on the following vegetation sampling, how many dominant species are present?

Herb Strata	Shrub Strata	Tree Strata
Species A – 45%	Species A – 4%	Species A – 10%
Species B – 35%		Species B – 5%
Species C – 30%		
Species D – 30%		

a) 2
b) 6
c) 7
d) 8

23. For projects impacting both WCA wetlands and Public waters, what regulatory programs may have jurisdiction?

a) WCA only

b) Section 404 of Clean Water Act

c) DNR Public Waters and WCA only

d) Section 404, DNR Public Waters, WCA

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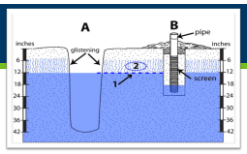
Quiz



24 Using the figure above, the level marked "1" is:

a) The water table.

b) The zone of saturation.

c) The upper limit of saturation.

d) The depth to bedrock.

25. When using the "Guidance for Offsite Hydrology", Area A shows what wetland signature?

a) Altered Pattern (AP)

b) Upland (UP)

c) Normal vegetative cover (NSS)

d) Drowned out (DO)

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MWPCP Exam Instructions

- Show State-issued ID
- Fill out name (as you want it to appear on your certificate) and date
- **Do not open test** until instructed (at start time)
- Circle the **one** best answer
- 2 hours to complete from start time
- No cells phones allowed on desk
- Use calculators provided
- Return test and all materials, pick up ID
- Results in ~4 weeks

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