MN CREP Wetland Restoration Overview

BOARD OF WATER AND SOIL RESOURCES

Presentation Topics

- **Overview of Wetland Types and Relationship to Eligibility and Scoring**
- **Overview of Commonly Used Wetland Restoration Strategies**

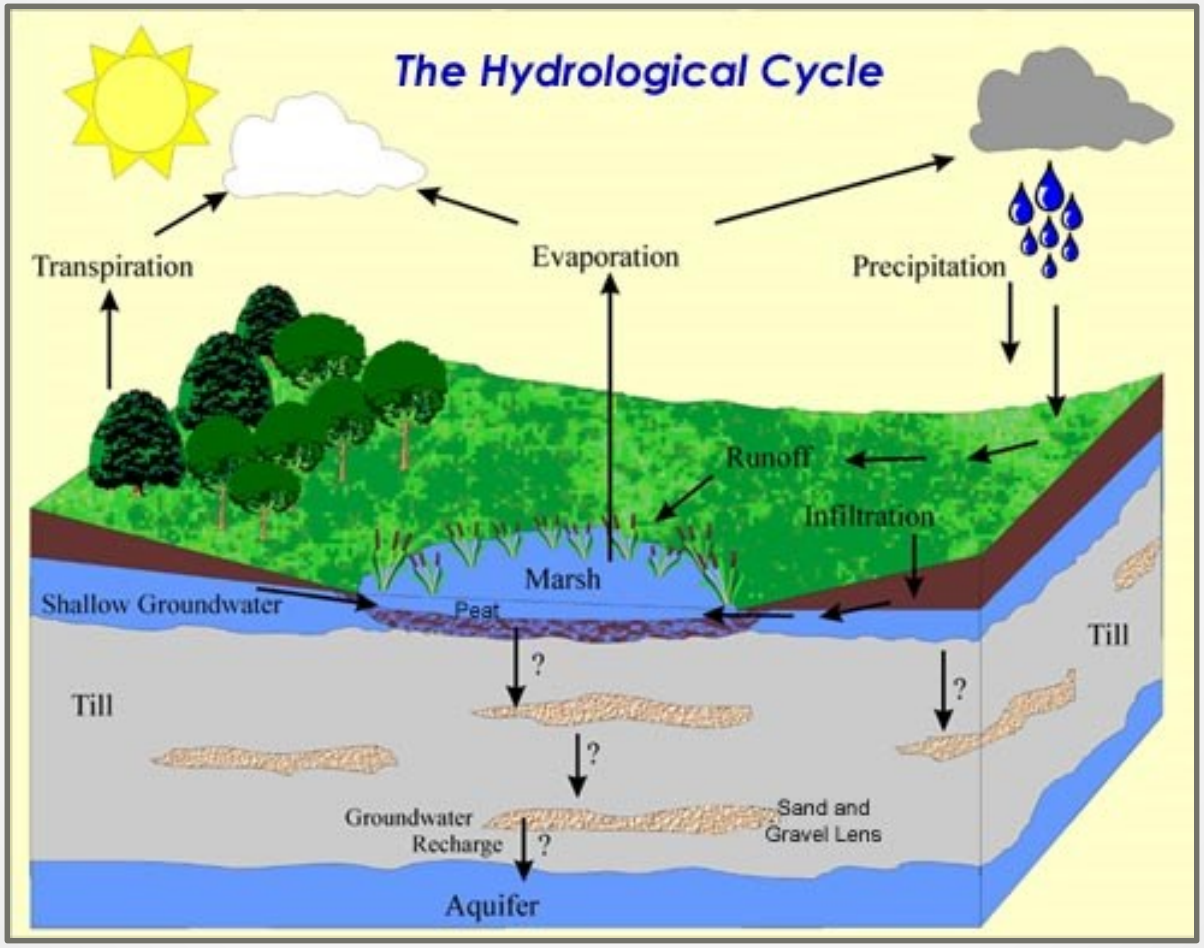
Goal

The program goal is to restore drained and altered wetland communities (hydrology and vegetation) to their original pre-manipulation condition, wherever feasible and practicable.

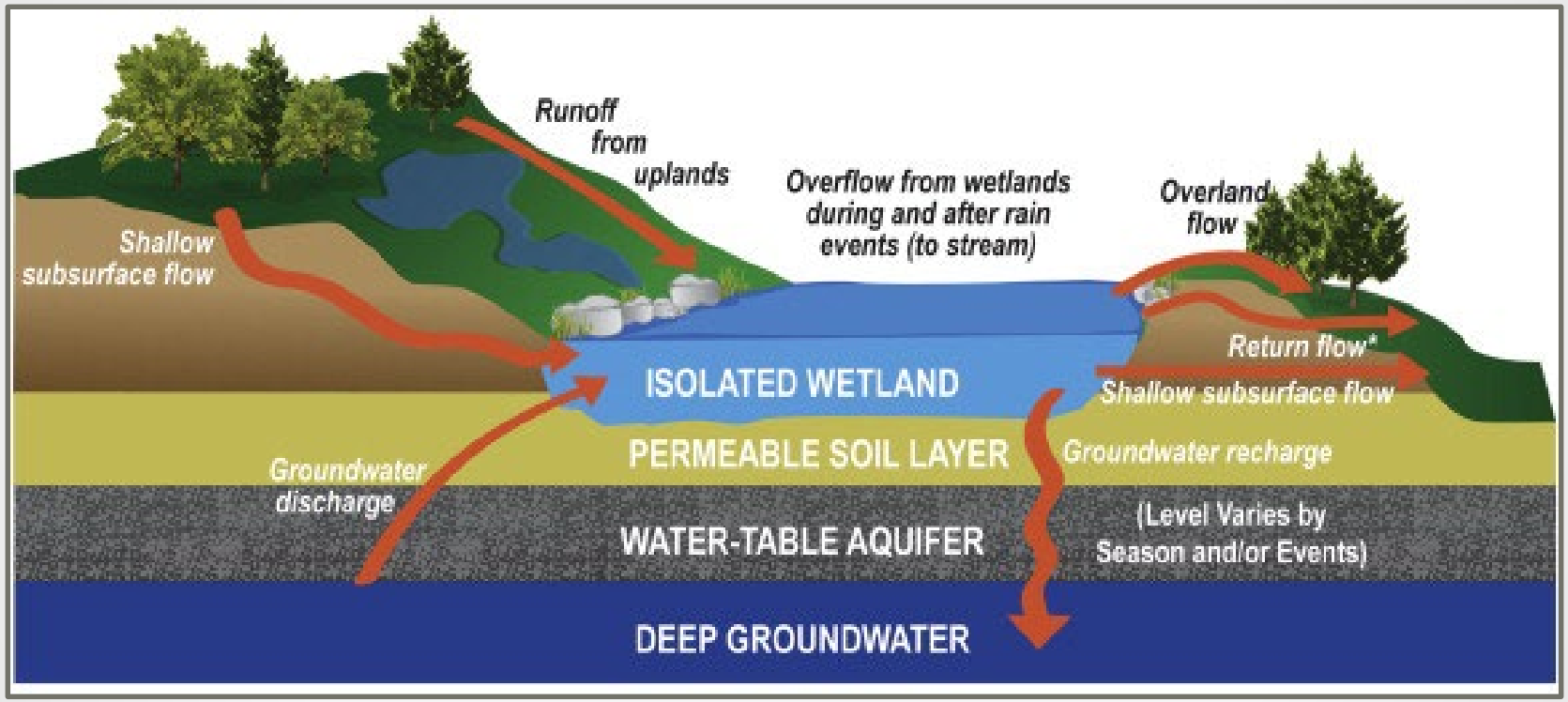
BOARD OF WATER AND SOIL RESOURCES

Overview of Wetland Types within the MNCREP Area

Hydrologic Cycle Within Typical MN Pothole Wetland

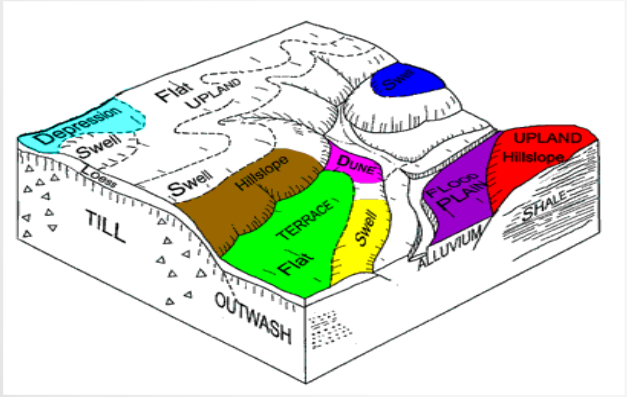


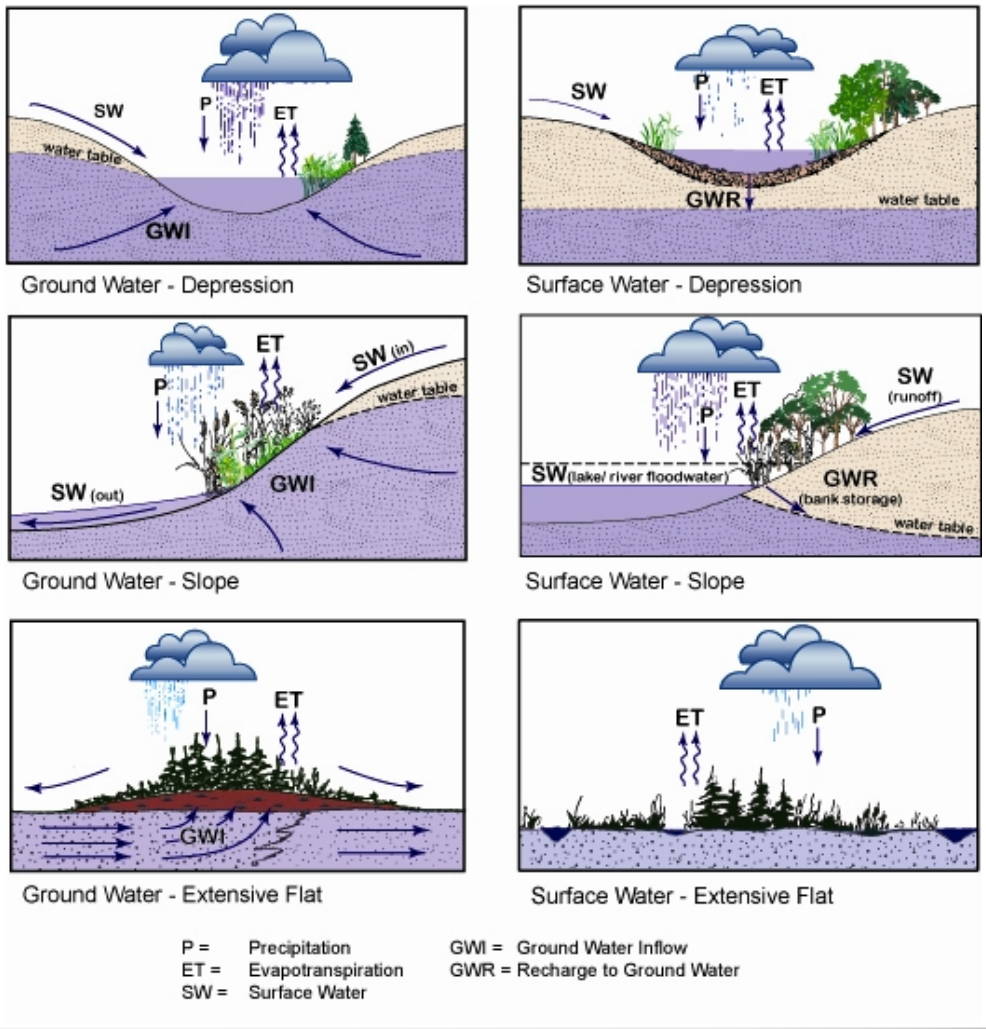
Subsurface (Groundwater) Hydrologic Relationships



Wetland Types from an Ecological Sciences Perspective

Varying Geomorphic Landscape Settings "Wetland Types" Within CREP Area





Depressional Wetlands

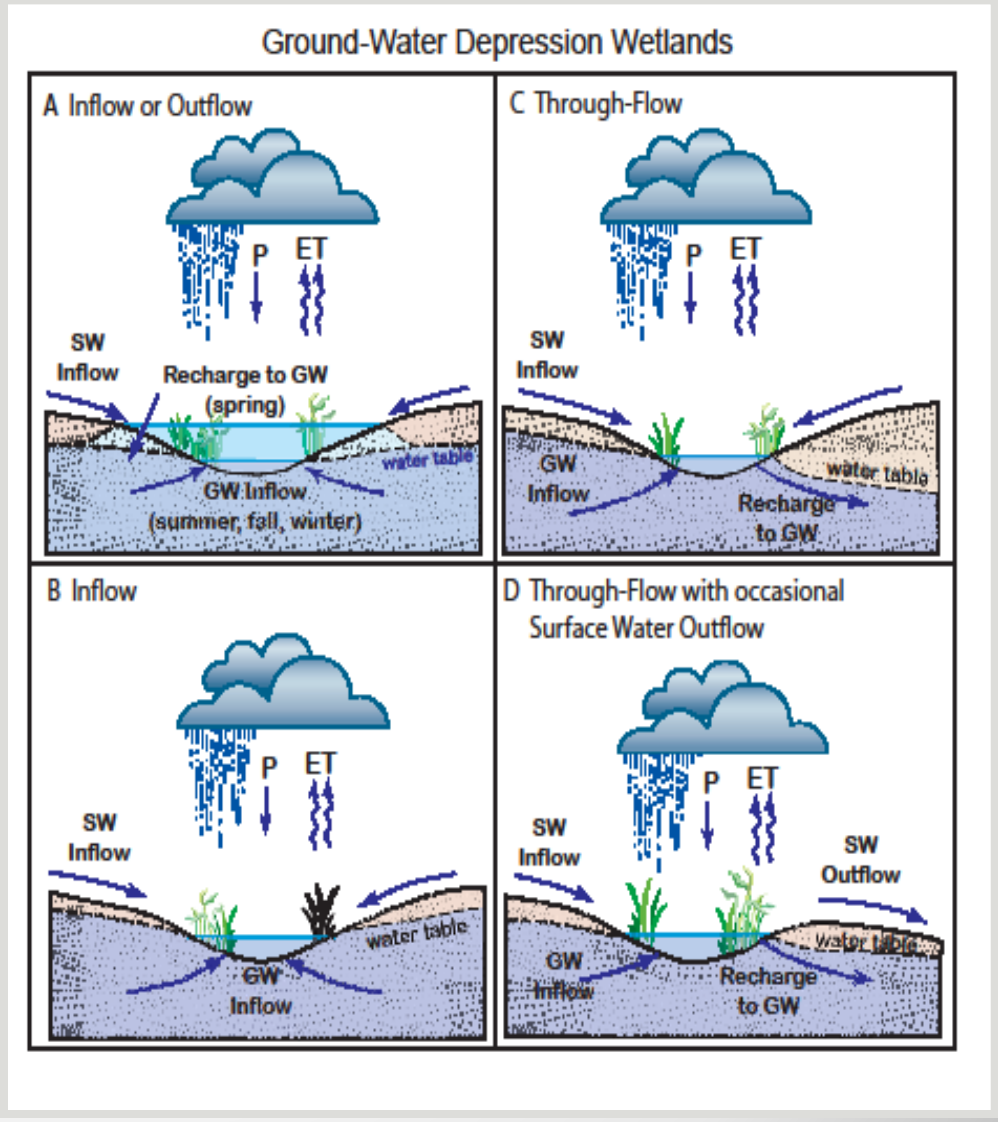
- ***Seasonal Wetlands***
- ***Sedge Meadows***
- ***Shallow/Deep Marshes***
- ***Fens***

Wetland Hydrology
Geomorphic Setting

Depressional Wetlands

Ground Water Supported

- ***Marshes***
- ***Sedge meadows***
- ***Fens***



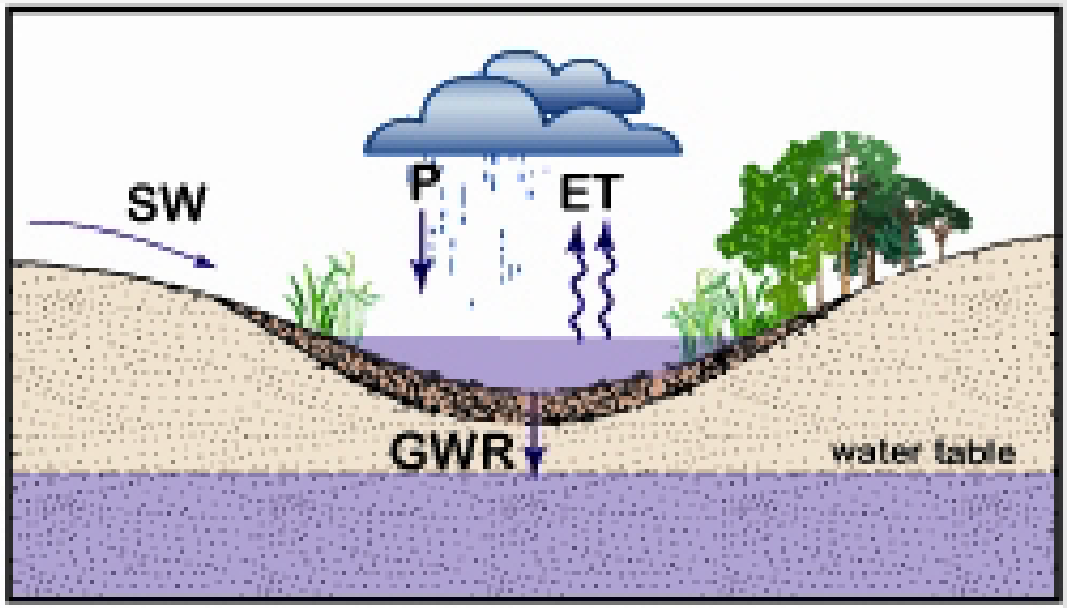
Wetland Hydrology

Geomorphic Setting

Depressional Wetlands

Surface Water Supported

- ***Seasonal Wetlands***
- ***Sedge meadows***
- ***Marshes***



Surface Water - Depression

Sloped Wetlands

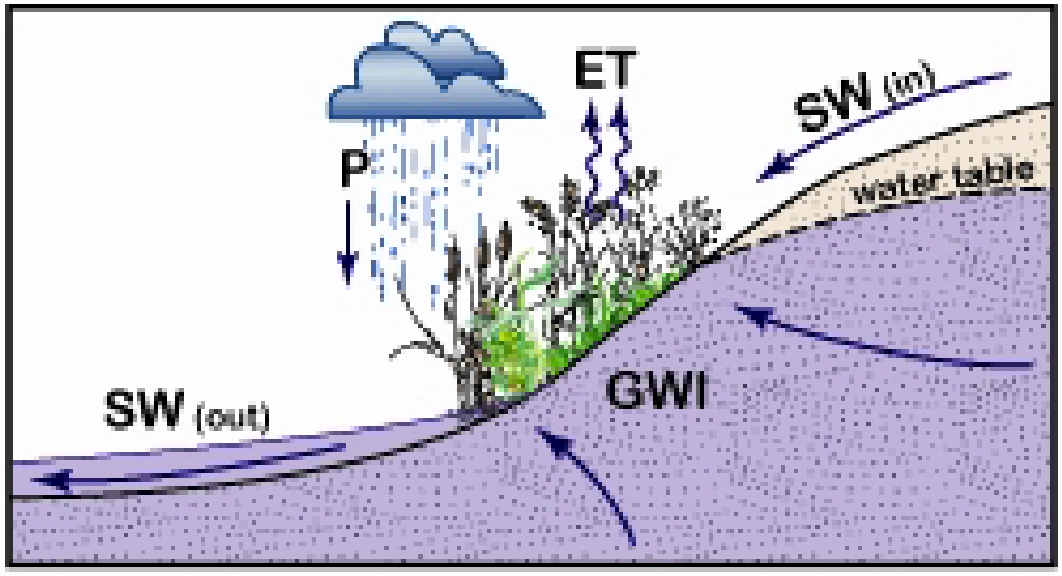
- *Shallow Marshes*
- *Shrub Swamps*
- *Riverine Wetlands*
- *Floodplain Forests*
- *Fens*

Wetland Hydrology
Geomorphic Setting

Sloped Wetlands

Ground Water Supported

- ***Marshes***
- ***Fens***



Ground Water - Slope

Wetland Hydrology
Geomorphic Setting

Sloped Wetlands

Surface Water Supported

- ***Marshes***
- ***Shrub Swamps***
- ***Riverine Wetlands***
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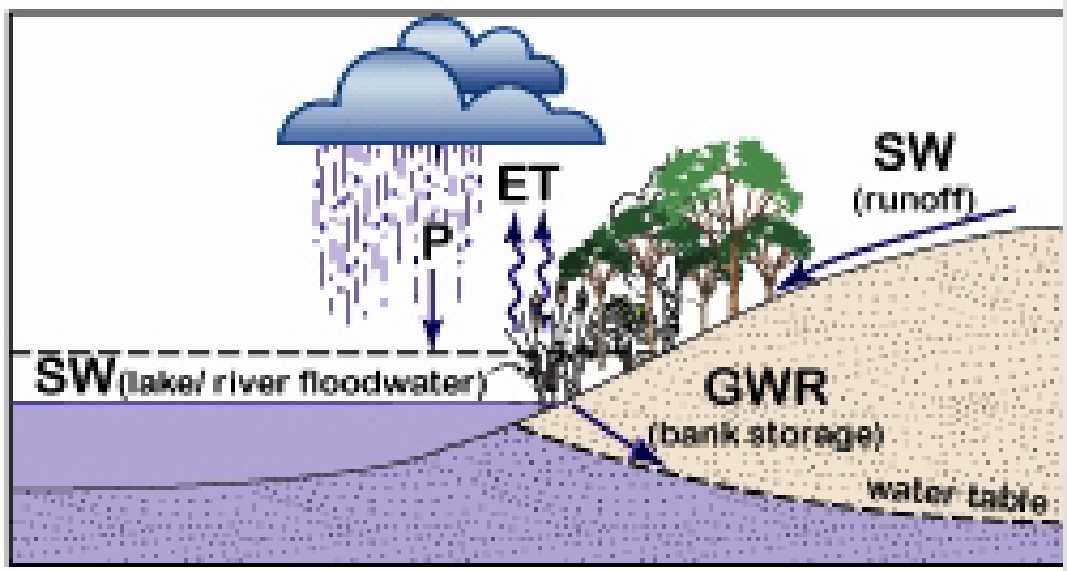
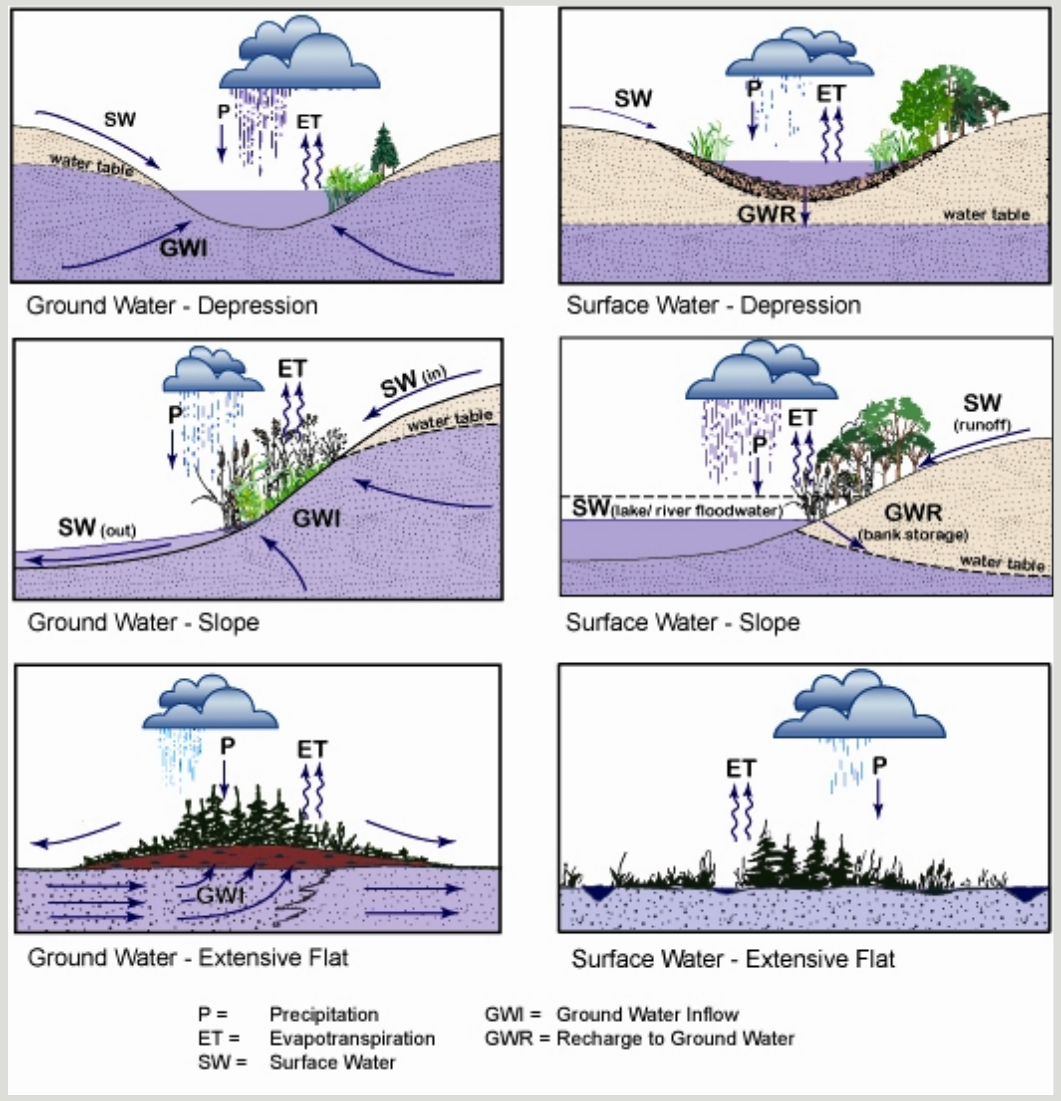


Surface Water - Slope

Wetland Hydrology

Geomorphic Setting

Why is it Important to Understand This?



Wetland Hydrology

Geomorphic Setting

Because it influences how and to what extent wetlands are (were) drained

Wetland Hydrology
Geomorphic Setting

And it influences strategies used to effectively restore them

Wetland Hydrology

Geomorphic Setting

Example - restoration of a *Surface water supported (discharge) wetland* may require sealing off breaches through the wetland's substrate. If not sealed, the wetland's ability to retain hydrology may be limited

MN CREP Eligible Wetland Types

- **Wetlands Farmed Under Natural Conditions**

Wetlands Farmed Under Natural Conditions:

- **Includes former wetlands who's hydrology has not been manipulated by drainage or filling but rather hydrophytic vegetation has been removed by annual cropping**
- **Often (not always) mapped by NRCS as a "W"**

Wetlands Farmed Under Natural Conditions:

- **Restoration is often referred at “Crop Cessation”**
- **Restoration is achieved by re-establishing hydrophytic vegetation suitable for the site or through natural colonization if best professional judgement determines an adequate seedbank is already present**

MN CREP Eligible Wetland Types

- **Prior Converted - Drained and Altered Wetlands**

Prior Converted - Drained and Altered Wetlands:

- Includes former wetlands who's hydrology has been manipulated by drainage, fill, or other means
- Often (not always) mapped by NRCS as a "FW's and PC's"
- Restoration should address both hydrology and vegetation

Prior Converted - Drained and Altered Wetlands:

Restoration is achieved by:

- **Re-establishing hydrophytic vegetation suitable for the site or through natural colonization if best professional judgement determines an adequate seedbank is already present**

Prior Converted - Drained and Altered Wetlands:

AND

- **Restoration of site hydrology to the extent feasible and practicable**

Prior Converted - Drained and Altered Wetlands:

- **Practice feasibility, economic costs, site limitations, along with other considerations may limit the extent of restoration that can be accomplished**

Prior Converted - Drained and Altered Wetlands:

What if restoration of hydrology is determined to be infeasible, unlawful or not practicable to consider?

As per USDA's CP23/23A Documentation of Suitability and Feasibility Worksheets dated June 2018

- ***Consider as being minimally restored once vegetated***
- ***In other words – include as part of eligible restorable wetland area but do not score them as being restorable***

BOARD OF WATER AND SOIL RESOURCES

Overview of Restoration/Construction Strategies

Presentation Topics

- Ditch Blocks and Fills
- Shallow Earthen Embankments
- Tile Blocks
- Outletting Incoming Drainage Tile
- Rerouting Tile and Ditch Systems
- Removing, Relocating, and Installing Drainage Lift Stations
- Sediment/Vegetation Removal
- Constructing Wetland Outlets

Overview of Restoration/ Construction Strategies

Ditch Blocks/Fills

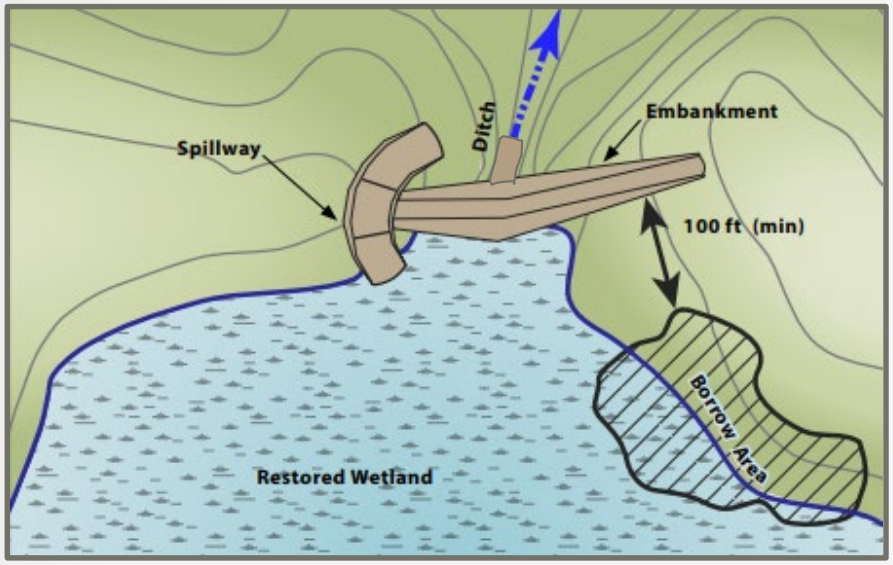
Overview of Restoration/ Construction Strategies

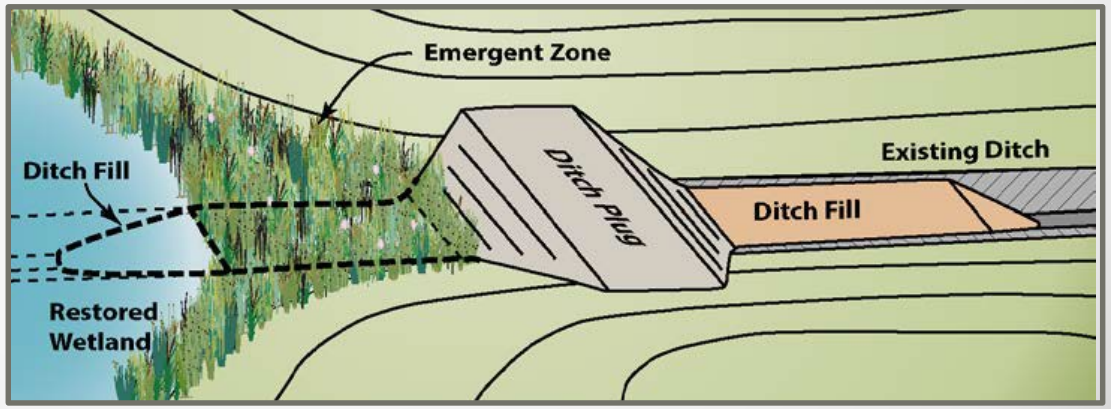
Ditch Blocks/Fills

Overview of Restoration/ Construction Strategies

Shallow Earthen Embankments

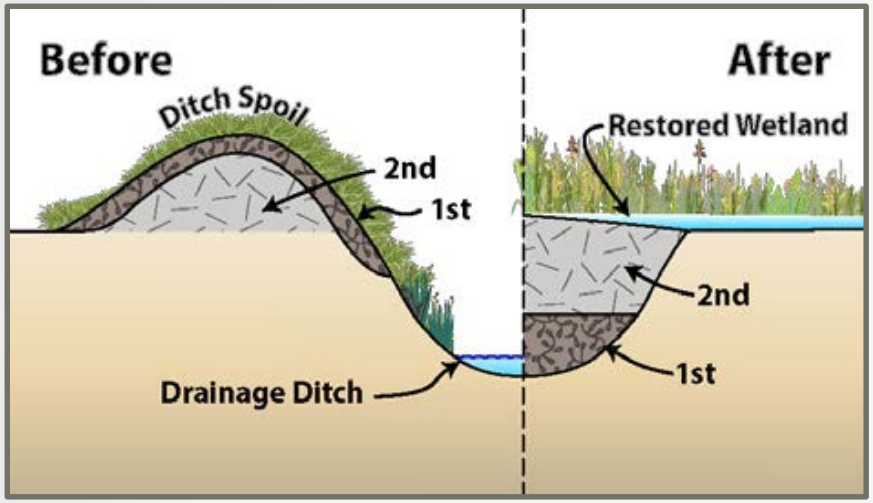
Design Considerations for all Plugs and Embankments





Design Considerations for all Plugs and Embankments

Design Considerations for all Plugs and Embankments



Overview of Restoration/ Construction Strategies

Design Considerations for all Plugs and Embankments

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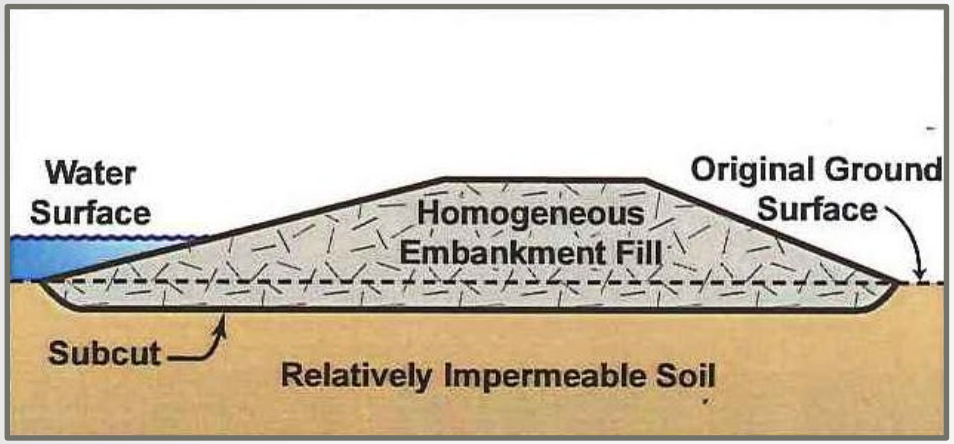
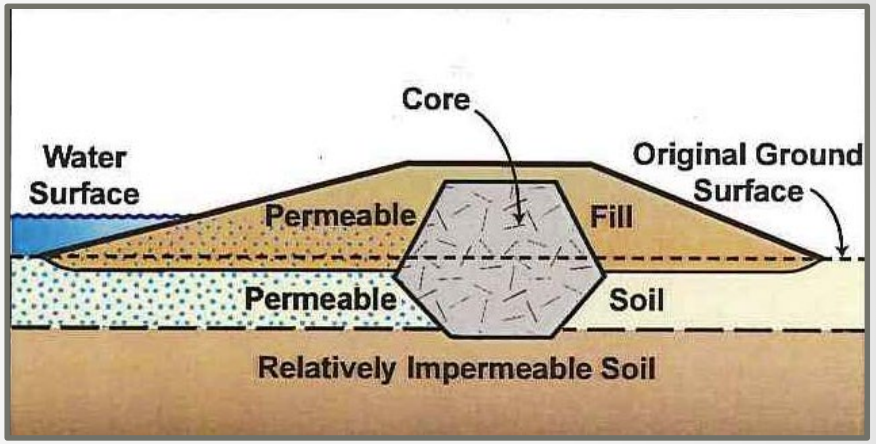
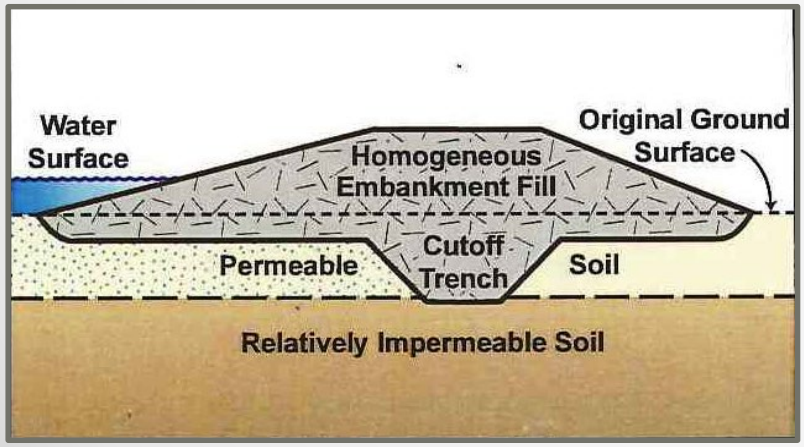
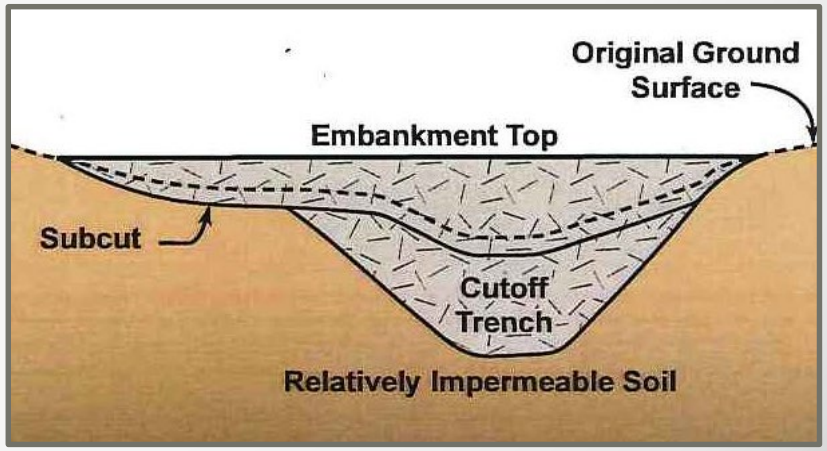
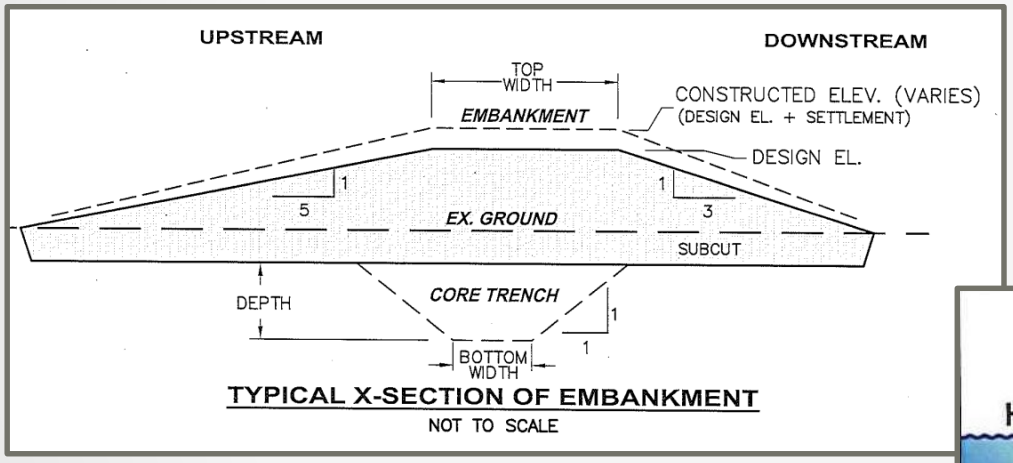


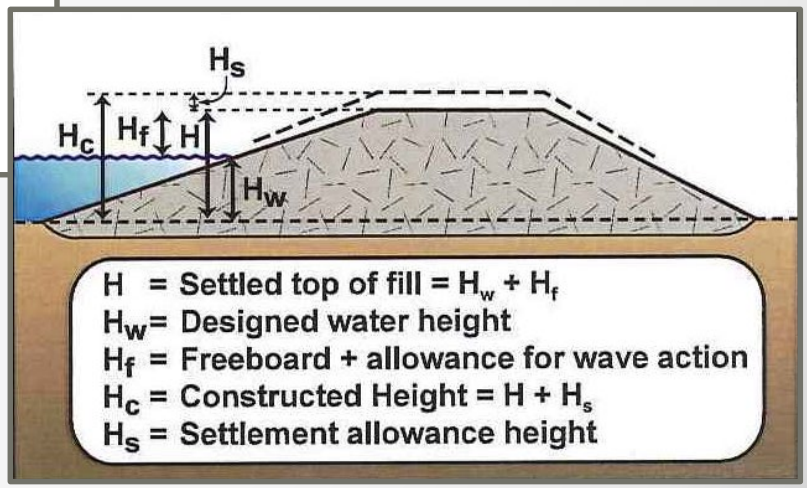






Design Considerations for all Plugs and Embankments





Design Considerations for all Plugs and Embankments

-Dozer
-Loaded Scraper
-Sheepsfoot

10-20 psi (lb/in^{2})
100 psi (lb/in^{2})
200 psi (lb/in^{2})

Overview of Restoration/ Construction Strategies

Design Considerations for all Plugs and Embankments

Overview of Restoration/ Construction Strategies

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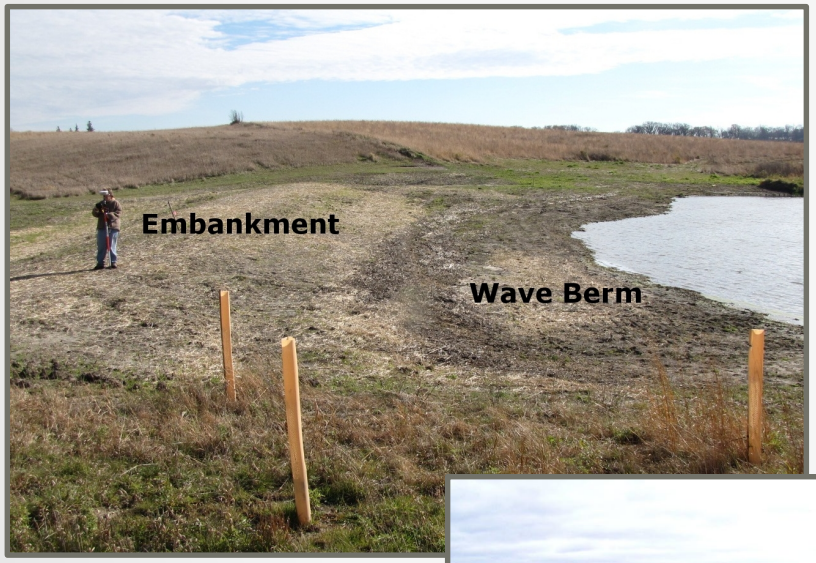
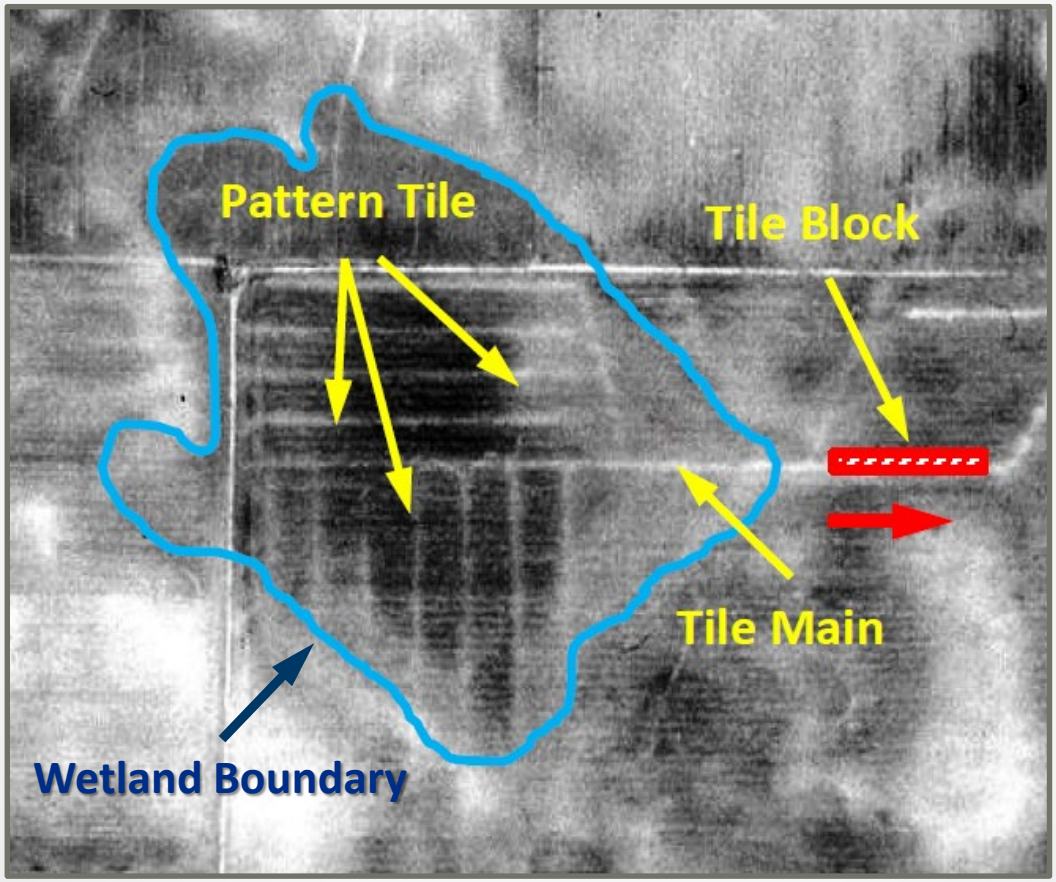


Overview of Restoration/ Construction Strategies

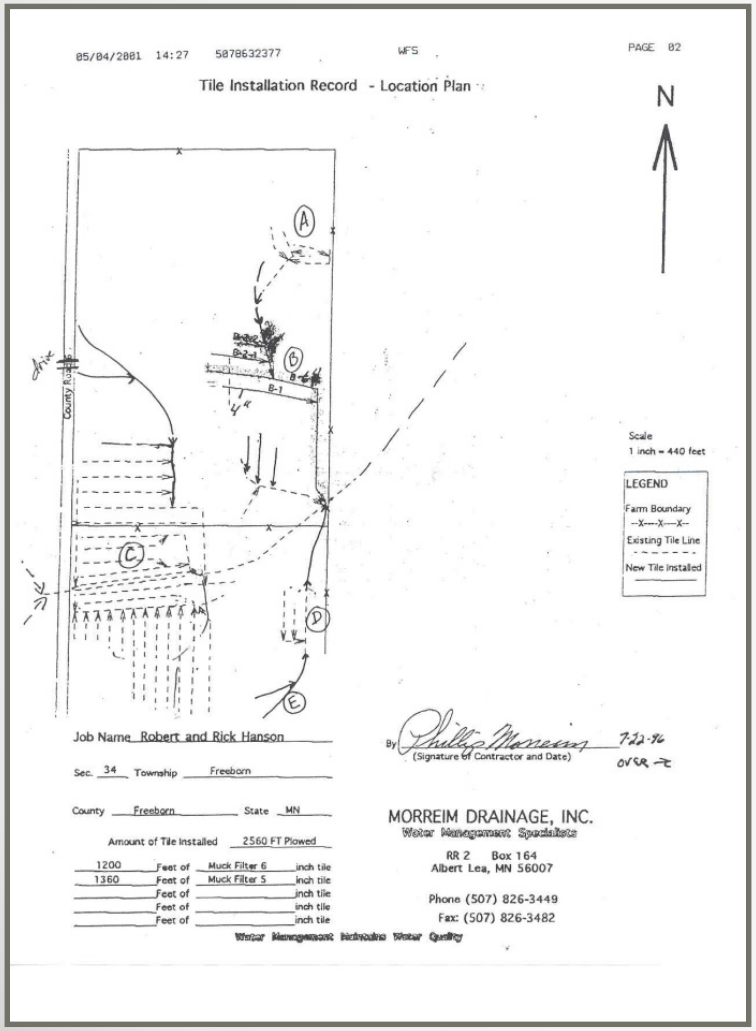
Design Considerations for all Plugs and Embankments

Blocking Drain Tile



Overview of Restoration/ Construction Strategies

Blocking Drain Tile



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Tile Installation Record - Location Plan

N

Scale
1 inch = 440 feet

LEGEND
Farm Boundary
Existing Tile Line
New Tile Installed

Job Name Robert and Rick Hanson

By (Signature of Contractor and Date) 7-22-96

Sec. 34 Township Freeborn

County Freeborn State MN

Amount of Tile Installed 2560 FT Plowed

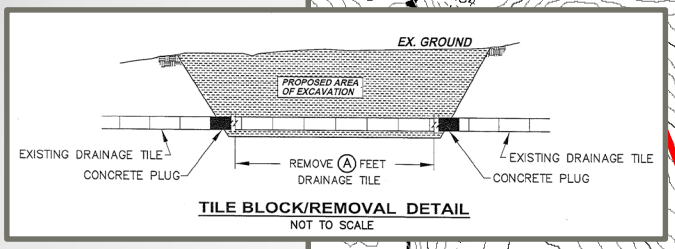
1200	Feet of	Muck Filter 6	inch tile
1360	Feet of	Muck Filter 5	inch tile
	Feet of		inch tile
	Feet of		inch tile
	Feet of		inch tile

MORREIM DRAINAGE, INC.
Water Management Specialists
RR 2 Box 164
Albert Lea, MN 56007
Phone (507) 826-3449
Fax: (507) 826-3482

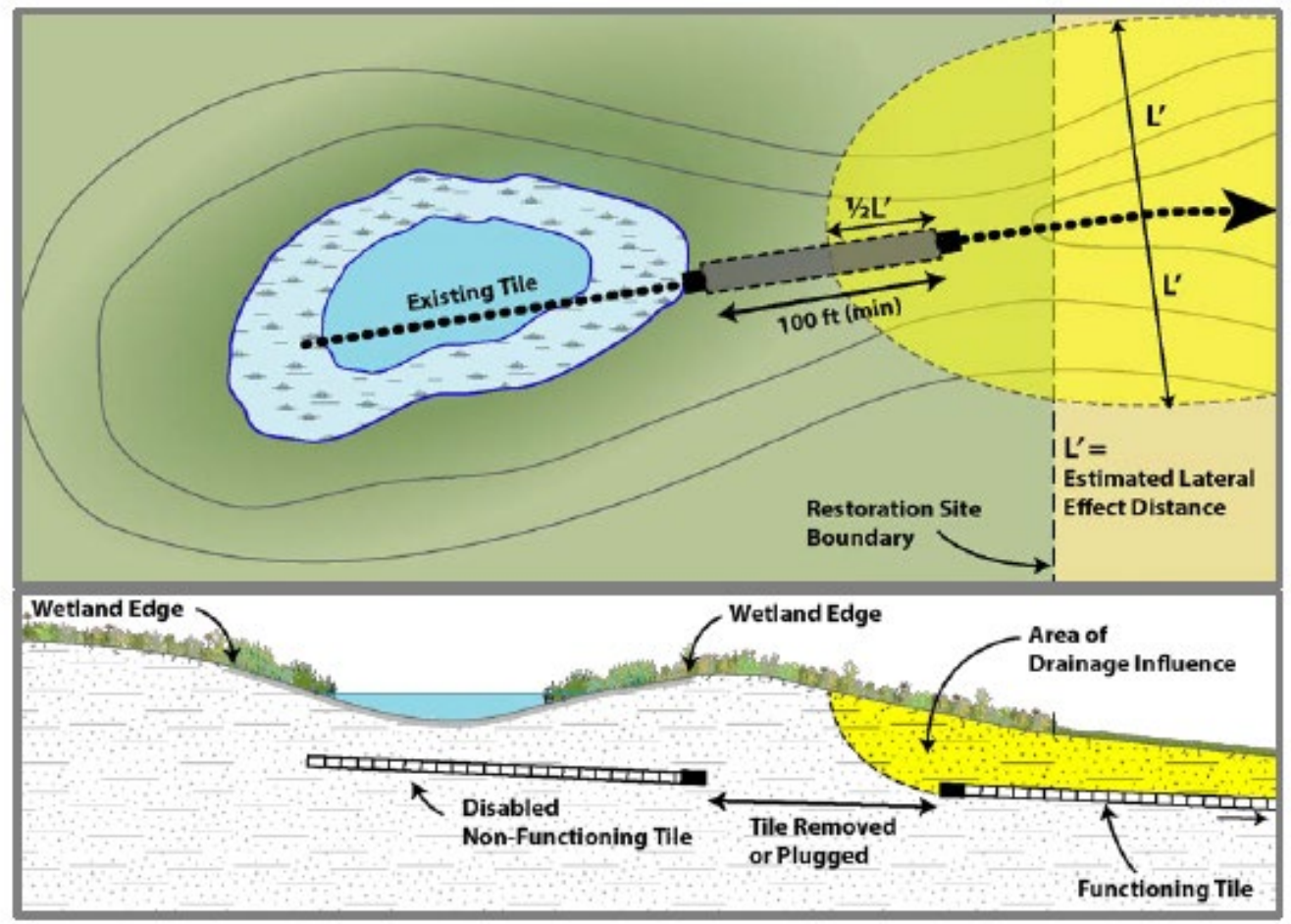
Water Management Increasing Water Quality

Design Considerations for Blocking Tile

Overview of Restoration/ Construction Strategies



Design Considerations for Blocking Tile



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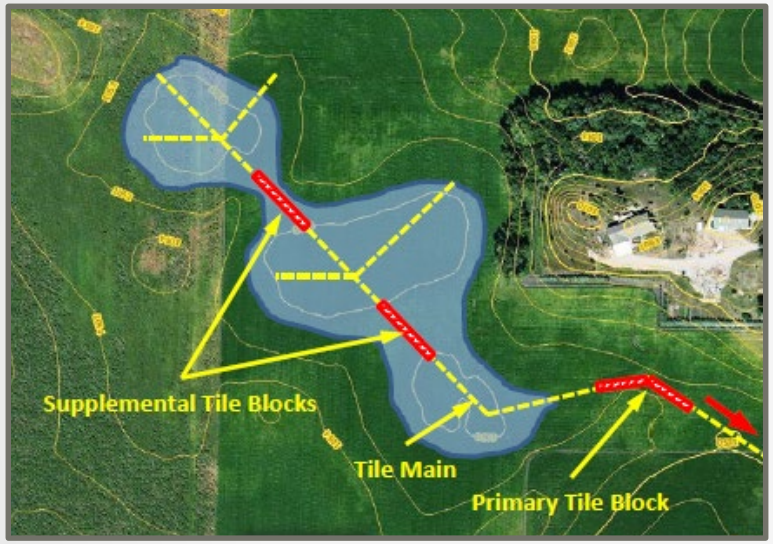
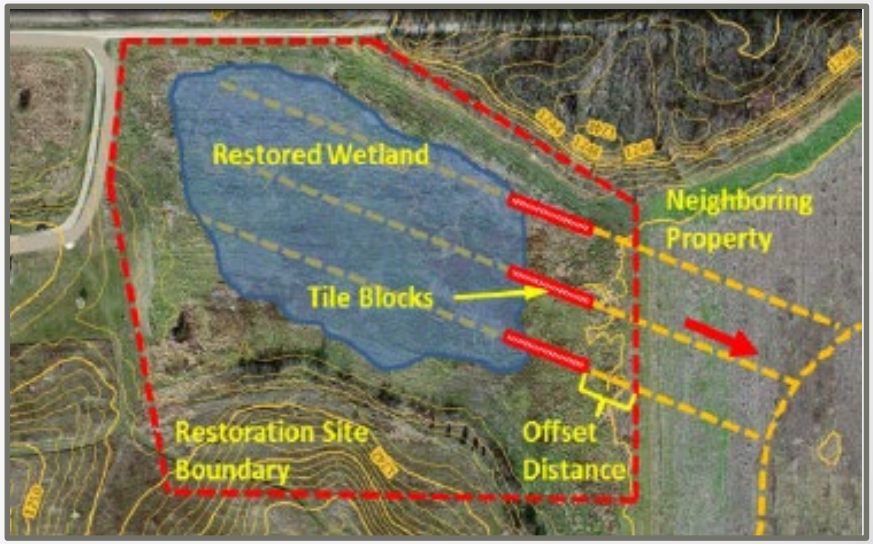
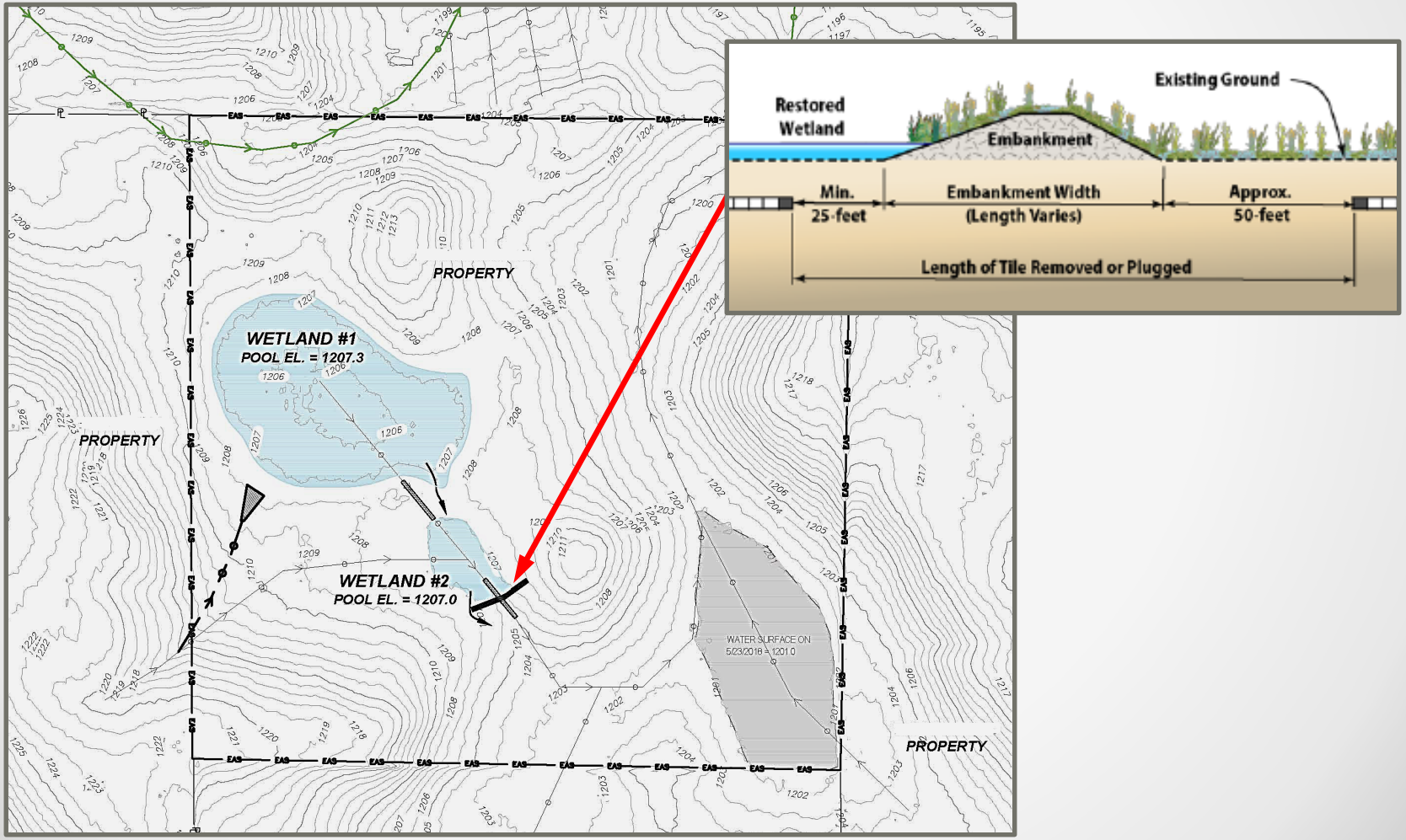




Design Considerations for Blocking Tile



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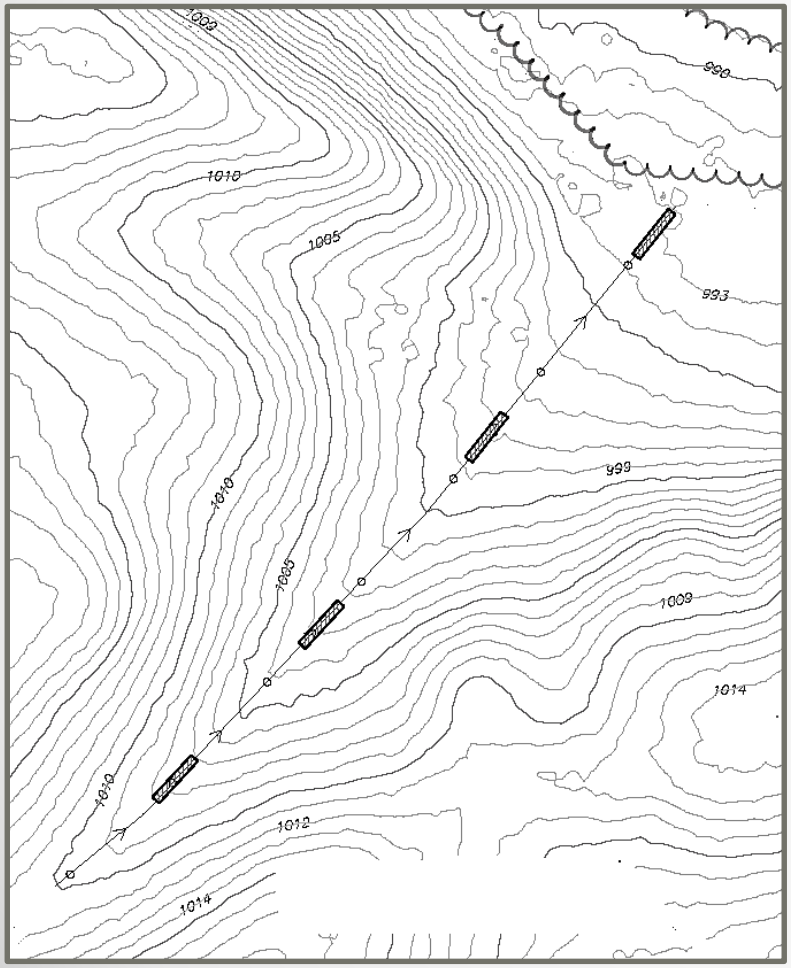
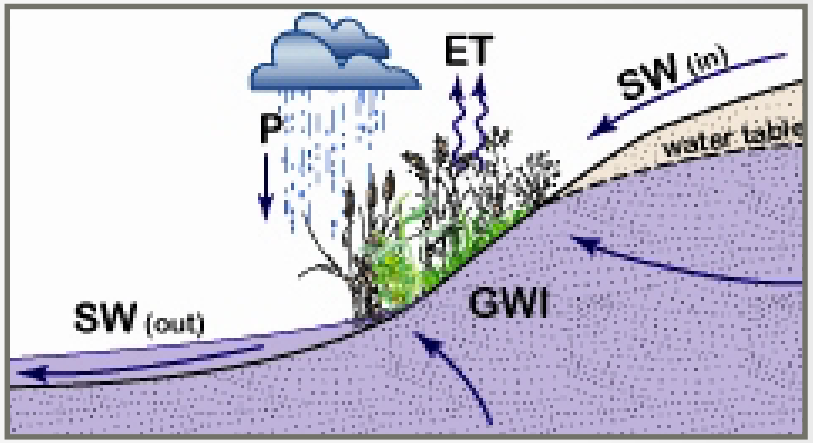
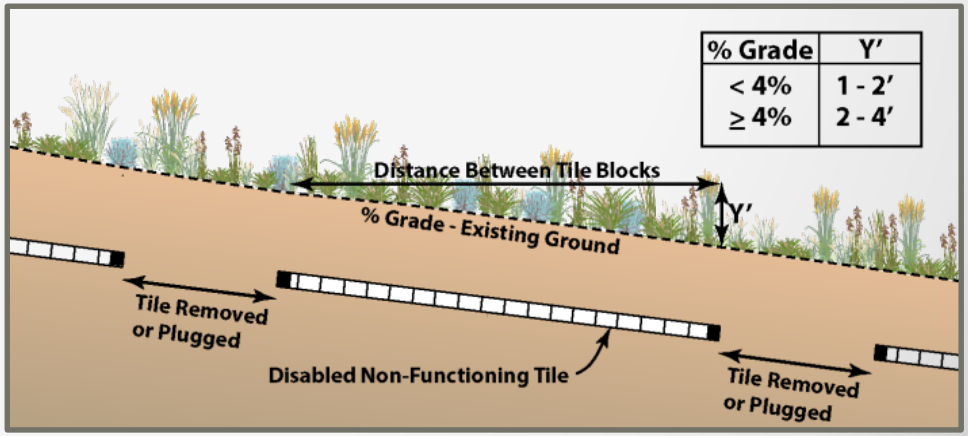
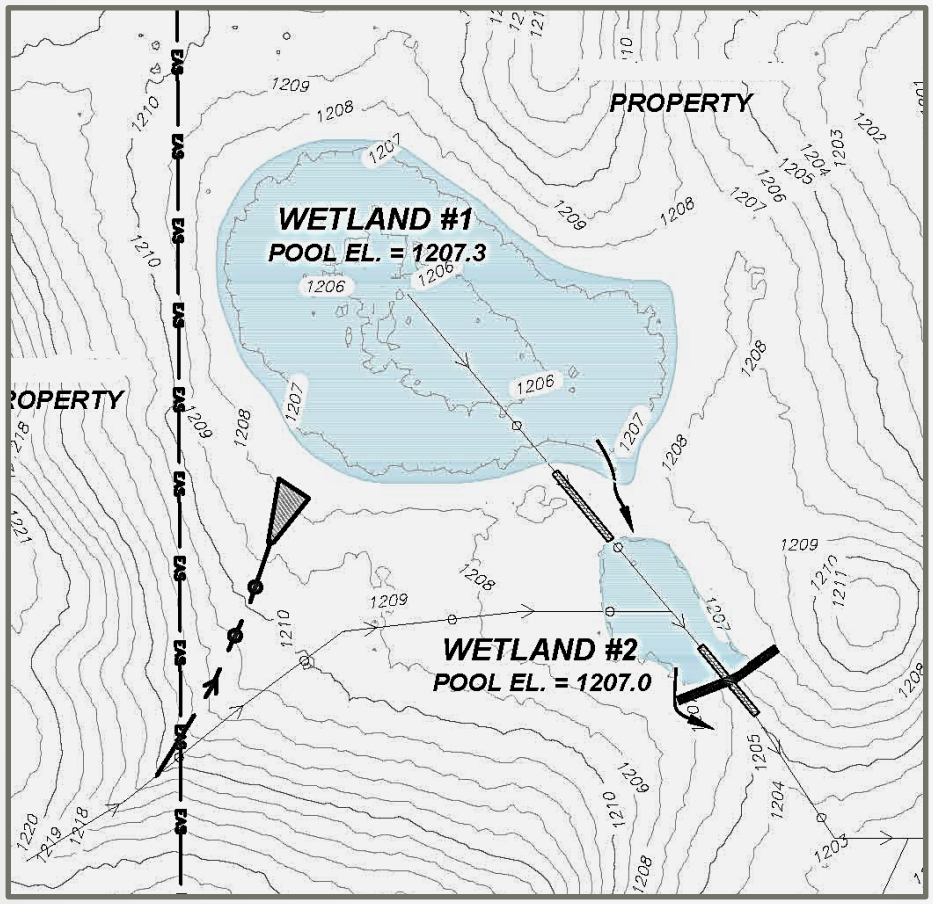




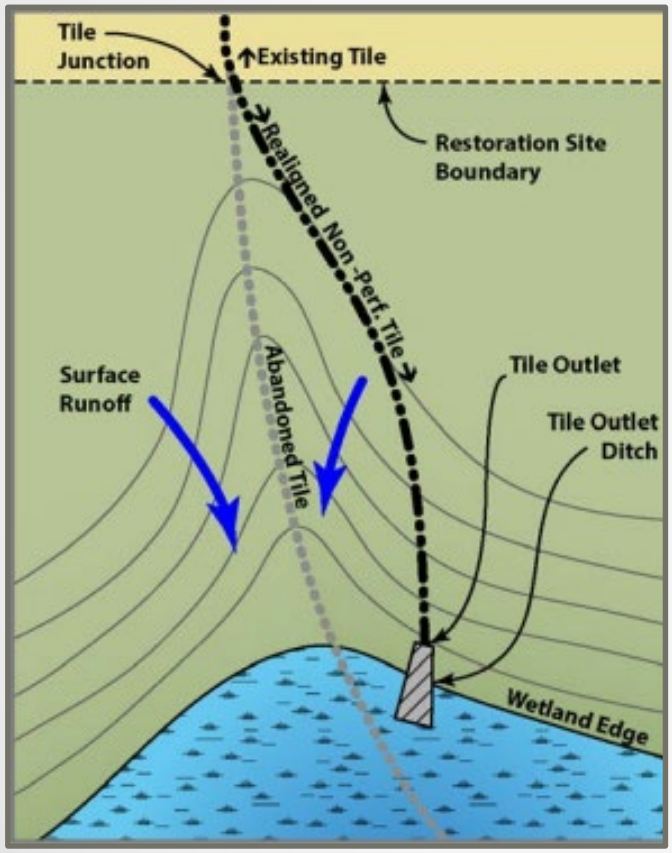


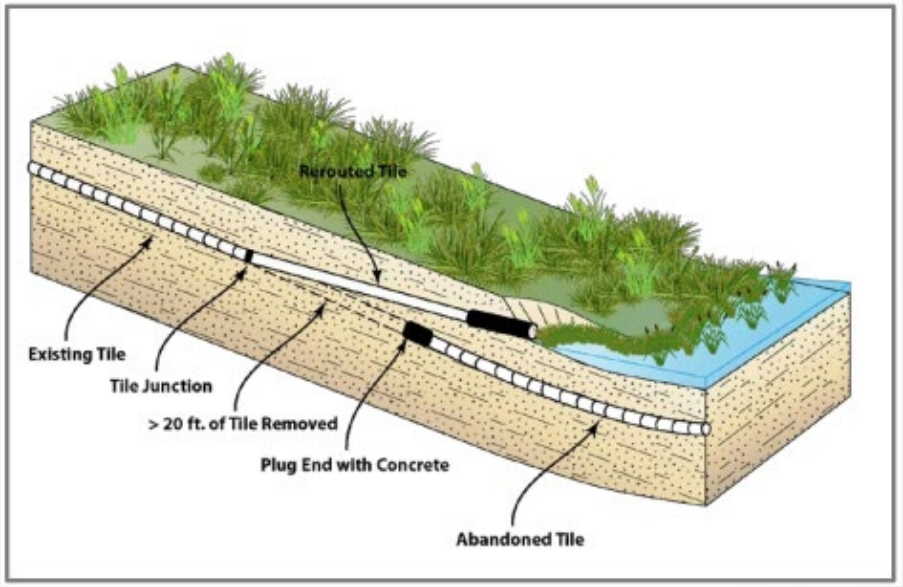
Outletting Drain Tile



Overview of Restoration/ Construction Strategies

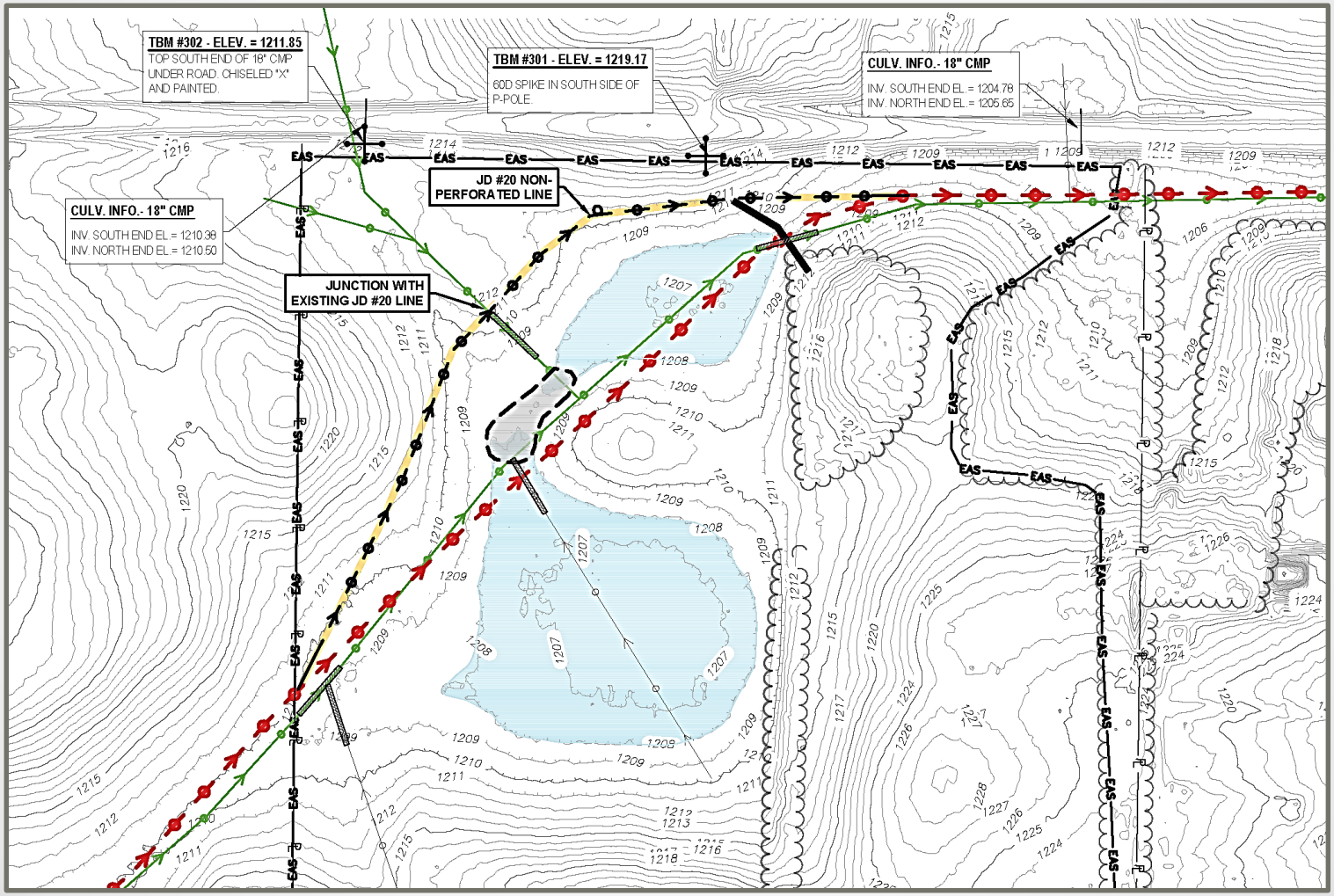
Outletting Drain Tile





Rerouting Drain Tile and Ditch Systems

Overview of Restoration/ Construction Strategies



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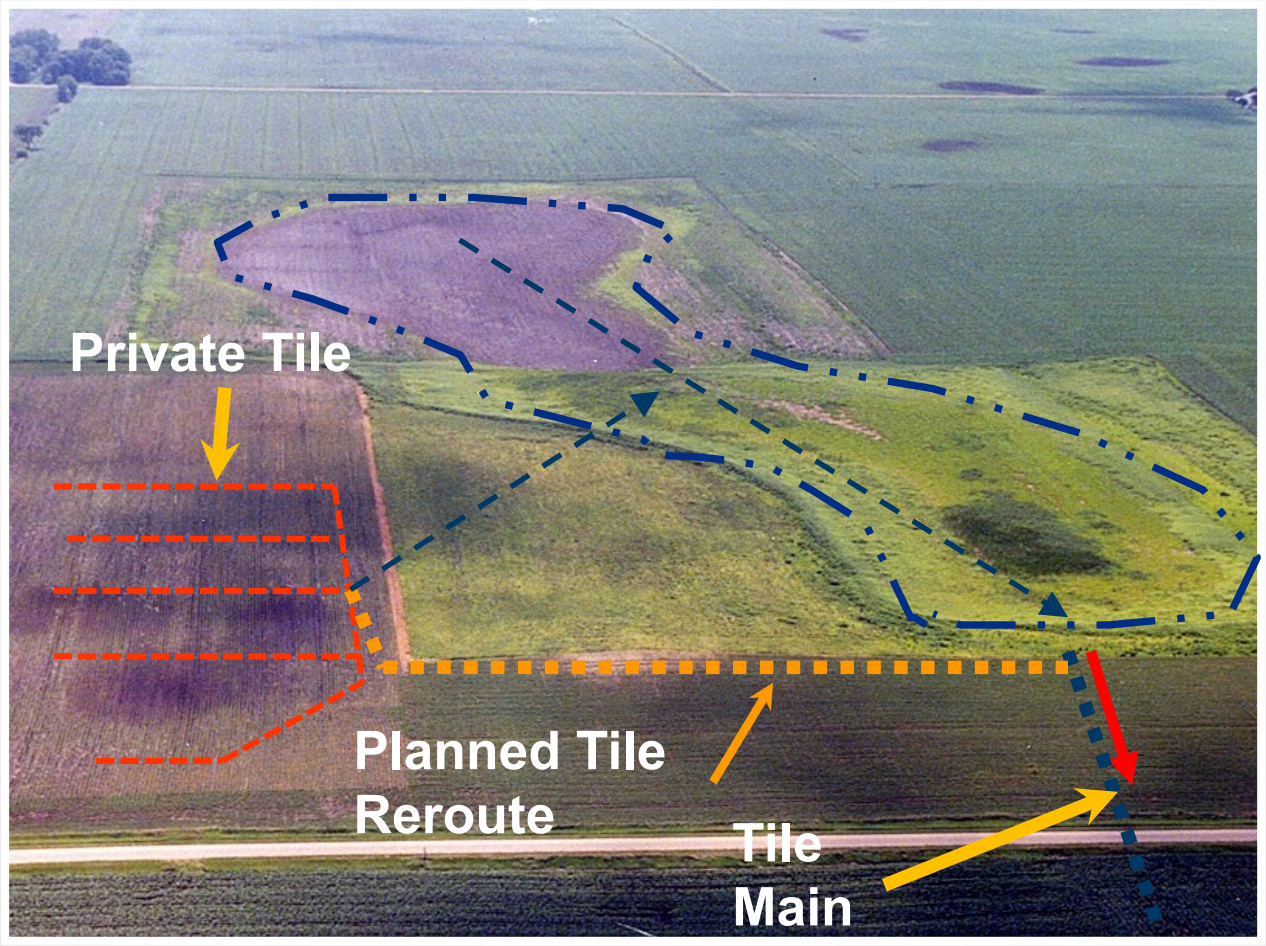

Rerouting Drain Tile and Ditch Systems

Overview of Restoration/ Construction Strategies

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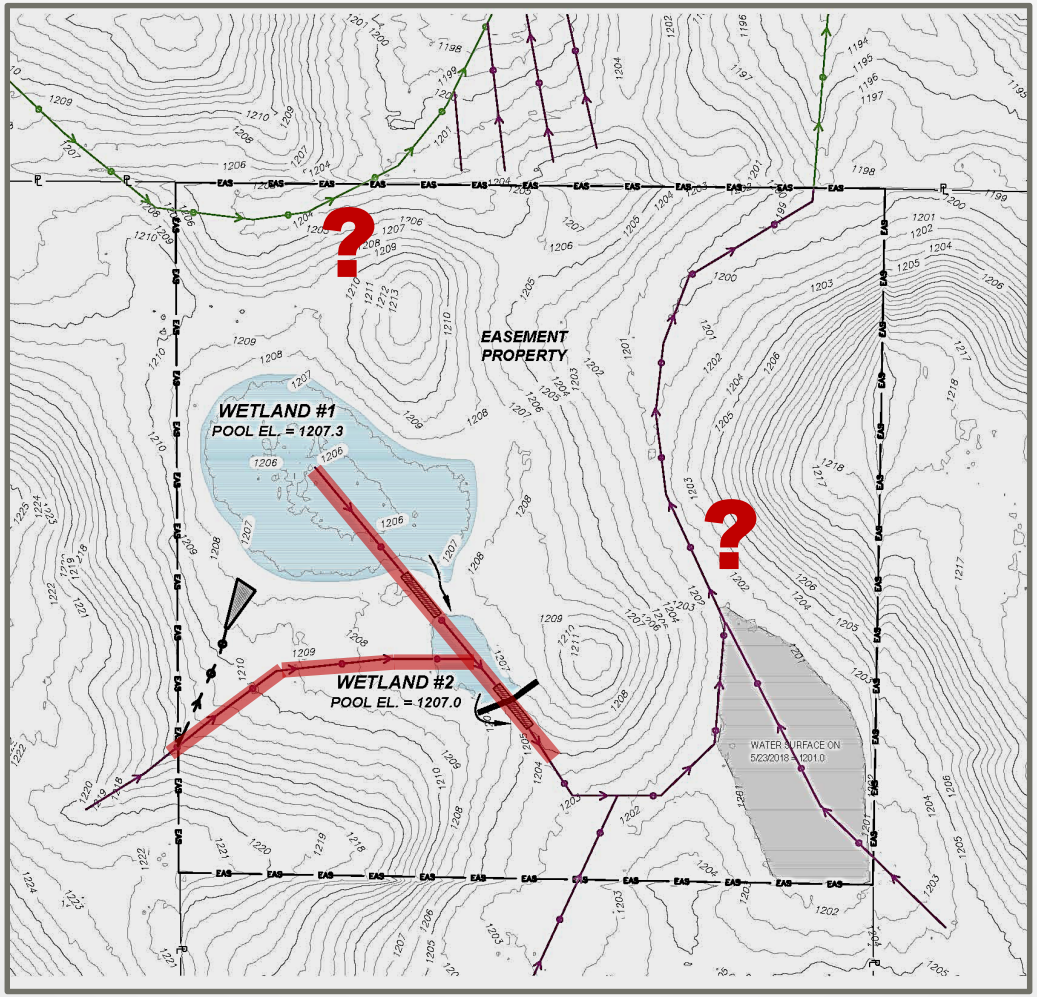


Agency Policy

What Landowner's Need to Know

- **Existing drainage systems will be manipulated when a wetland restoration or water quality benefit will be achieved AND when feasible and practical to do so**
- **When those conditions are not met, these existing drainage systems will likely be left "as is"**

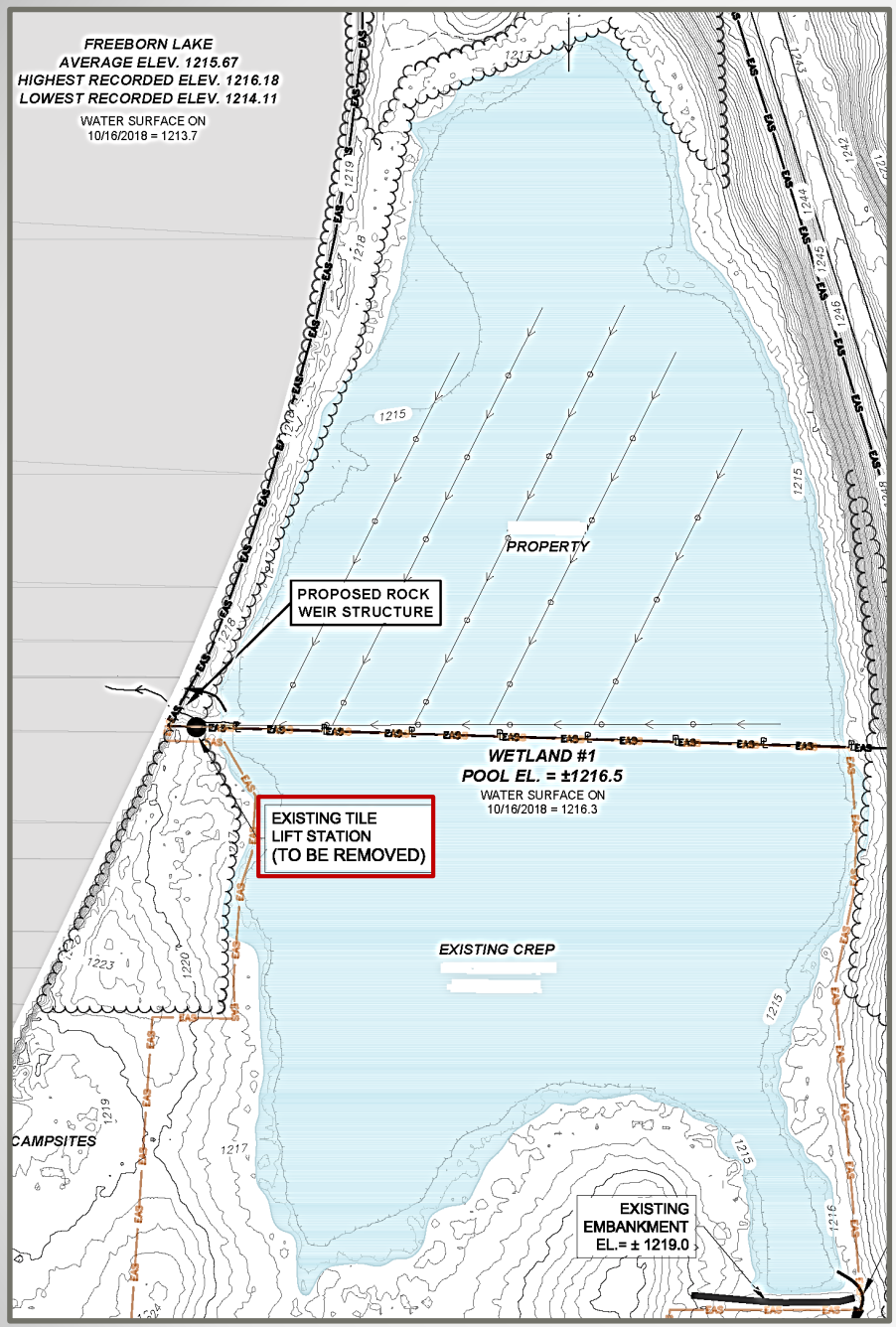
Agency Policy

What Landowner's Need to Know

- **BWSR's conservation easement allows for lawful maintenance or repair of existing drainage systems being left "as is"**
- **BWSR will not be responsible for any costs relating to maintenance or repair of existing drainage systems when left "as is" within a conservation easement**
- **As a result, the state will not provide practice money to install non-perforated conduit thru an easement area just to avoid future maintenance issues**

Overview of Restoration/ Construction Strategies

Removing, Relocating, and Installing Drainage Lift Stations



Overview of Restoration/ Construction Strategies

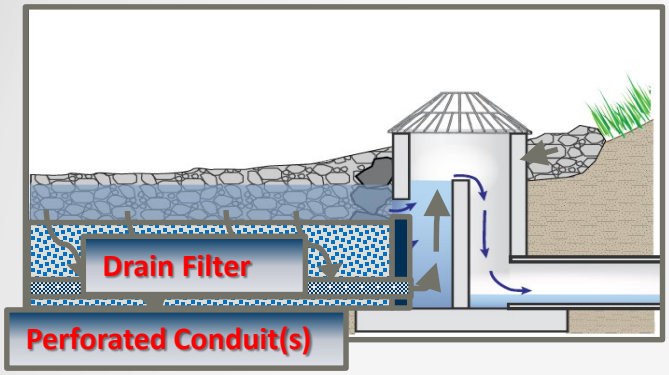
Removing, Relocating, and Installing Drainage Lift Stations

Overview of Restoration/ Construction Strategies

Sediment/Vegetation Removal

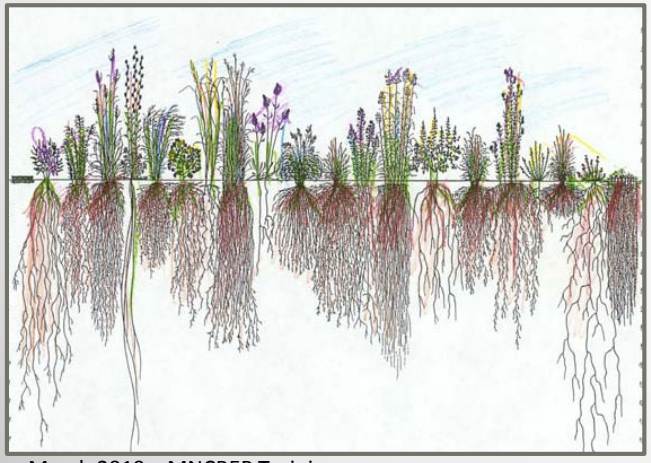
Constructing Wetland Outlets

Overview of Restoration/ Construction Strategies



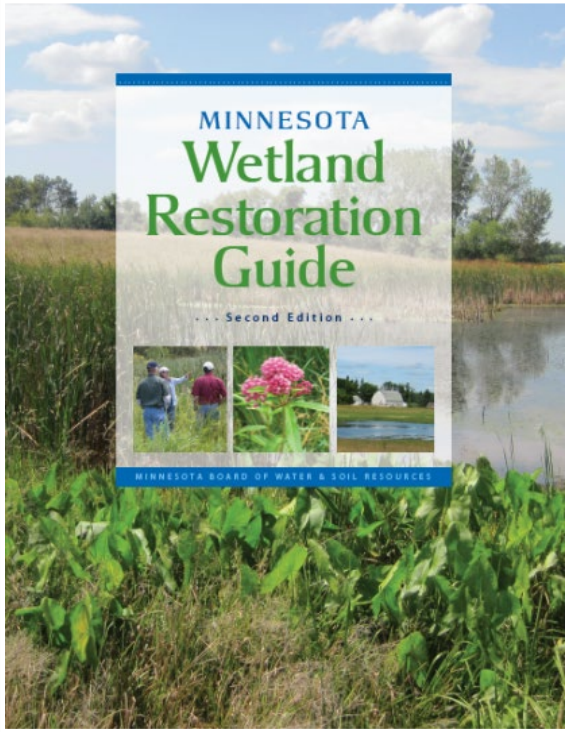
Vegetation Establishment

Overview of Restoration/ Construction Strategies



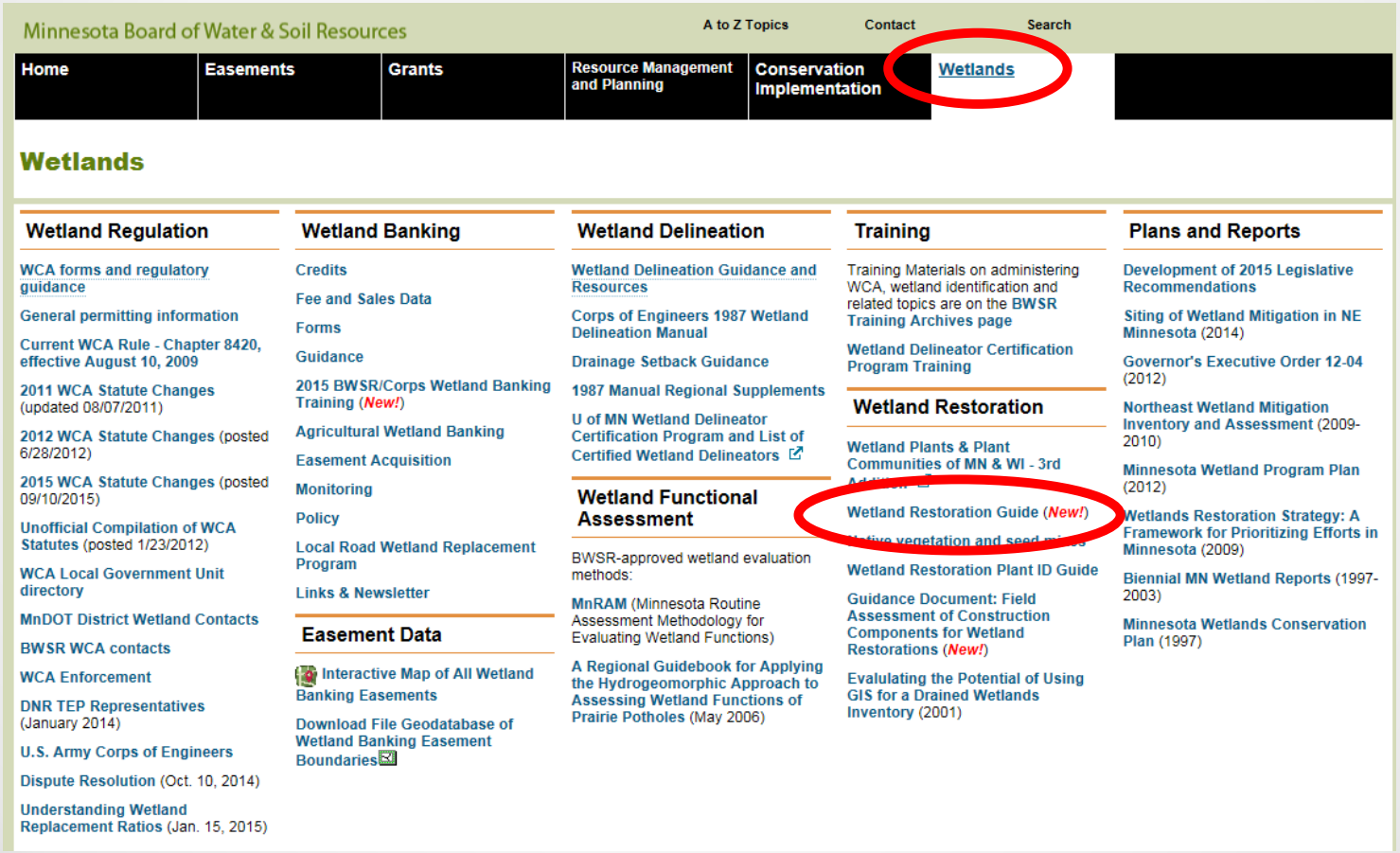
MN Board of Water and Soil Resources

Wetland Restoration Programs/Guide



Restoration Guide Website:

Located at: **bwsr.state.mn.us/restoration/index.html**



Overview of Restoration/ Construction Strategies

OUTLETTING DRAINAGE SYSTEMS

TECHNICAL GUIDANCE DOCUMENT

Document No.: WRG 4A-3
Publication Date: 10/14/2015

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INTRODUCTION

In Minnesota, wetlands planned for restoration are commonly drained by surface drainage ditches and subsurface drainage tile. These drainage systems often extend upstream from planned restoration sites and provide drainage to neighboring lands not part of a restoration project.

The restoration of wetlands in these types of drainage scenarios provides a number of design and construction challenges and may not always be possible. However, strategies to address incoming drainage systems as part of restoration do exist and should be considered, when feasible. These strategies include rerouting incoming drainage systems away from or around planned wetland restorations or when possible, outletting them directly into planned wetlands or other suitable areas within the restoration site.

Figure 1. Upstream Drainage Tile Outletting into Restored Wetland

APPLICATION

This Technical Guidance Document focuses on strategies to design effective and functional outlets within restoration sites for neighboring upstream drainage systems. The design of drainage system outlets will primarily be dependent on the type, location, elevation and grade of the drainage system as it approaches and enters the restoration site. If the approaching drainage system is steep enough in grade, then it may be possible to modify it and construct an effective and functional outlet directly onto the restoration site. The design will also be influenced by the general landscape of the planned outlet's location and, if part of a wetland restoration, the type of wetland being restored.

The strategies presented are most applicable to modifying subsurface tile drainage systems that

BLOCKING AND FILLING SURFACE DRAINAGE DITCHES

TECHNICAL GUIDANCE DOCUMENT

Document No.: WRG 4A-1
Publication Date: 10/14/2015

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INTRODUCTION

Surface ditches are common in Minnesota and have drained and altered countless wetlands. When attempting to restore wetlands drained by surface ditches, it is usually necessary to place earth fills at strategic locations within the drainage ditch to block the flow of water. This wetland restoration strategy is commonly referred to as constructing a "ditch plug". While these earthen fills are often thought of as being only small, simple structures, ditch plugs are essentially small dams and must be designed and constructed accordingly.

Figure 1. Construction of an Earthen Plug Across Drainage Ditch

In addition to constructing appropriately located and designed ditch plugs, there is often a need or desire to also completely fill the entire reach of ditch within the planned restoration area. In certain landscape settings, this additional action will be necessary for the successful restoration of wetland hydrology.

APPLICATION

Drainage ditches remove excess water that collects on the land surface as well as in the soil profile. They provide a means to manage or lower water tables and can rapidly convey runoff from wetlands to areas downstream. Ditches can be just a few inches to many feet in depth, depending on topography and landscape setting.

Drainage ditches can be located in depressional wetlands, sloped wetlands, and wetland flats. As discussed in Section 3-4 and in Appendix 3-A of the Guide, each of these wetland types interact with surface and ground water to varying degrees depending on hydrogeologic factors such as soil characteristics, geologic setting, and water table position. It is important that the dynamic nature of a drained wetland's hydrogeology be understood to accurately determine effective design strategies for restoration. More specifically, it will be important to determine if a ditch plug alone will be

Questions?