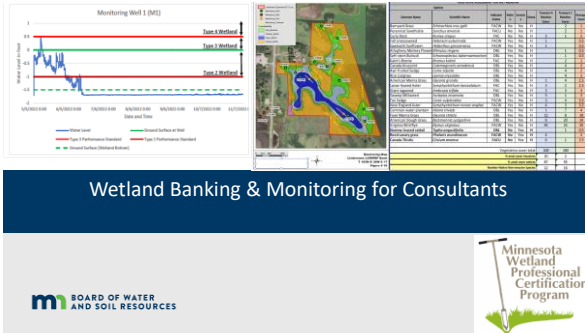




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Wetland Banking & Monitoring for Consultants Course Agenda

Day One

- Overview of Wetland Bank Approval Process
- Performance Standards Exercise
- Lunch
- Setting up a Monitoring Program
- Monitoring Well Installation Exercise
- Hydrology Monitoring

Day Two

- Vegetation Sampling
- Vegetation Sampling Exercise
- Lunch
- Vegetation Data Interpretation
- Monitoring Reports

2

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Session Overview

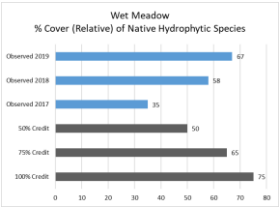
Performance Standards Recap– Purpose & Typical

Veg Monitoring Methods

- Guidance Documents
- Mapping/Imagery
- Plots, Meanders and Point Intercept
- FQA
- Strength/Uses and Weaknesses

Data Summary

- Example Tables and Graphs



4

Veg Performance Standard Purpose

Indicator or Assessment of a Communities response

Observable/Measurable and Repeatable

Demonstrates Restoration Progression & Success



- Generally Similar within same region BUT...
- Vary by Community type
- Unique standards should be supported

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Typical Veg Performance Standards

Relative Areal Cover by Native Non-Invasive Sp. (NNI)

Species Richness & Composition

Relative Areal Cover by Hydrophytes

Unvegetated/Bare Ground Area (absolute)

Open Water Coverage (absolute)

Woody Vegetation Establishment/Live Stem Count

Floristic Quality Assessment (FQA)

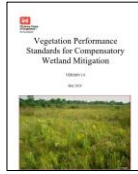


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Vegetation Sampling Guidance



[Link to Vegetation Monitoring on Mitigation Sites](#)



[Link to Veg PS](#)



[Link to FQA Manual](#)

7

Basic Veg Sampling Considerations

- Reflects Existing conditions by Community type
 - Representative locations generally agreed at bank plan
 - If changes are needed, seek advance agreement or support
- Timing IS important
 - Growing Season
 - For data collection and for review
 - Longer time periods generally mean larger differences



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Basic Veg Sampling Considerations

- Separate Community Types
 - During collection if possible but required for data summary/PS
- Replication Important/Reduced Bias
- Select a Sampling method(s) best suited for the goals, conditions and PS
- Adapt to changing conditions if necessary
 - Locations, type/amount,
 - Get preapproval if feasible/substantial

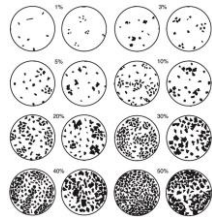


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Basic Veg Sampling Considerations

- Aerial Coverage Metrics estimate veg biomass/dominance
- Should address each strata separately to reduce bias/skew data

Example: Forested Wetlands with Heavy Buckthorn in shrub strata but quality Overstory/Herbaceous layer could meet PS if 'lumped'



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Basic Veg Sampling Considerations

Absolute Cover

Relative Cover

- Both estimate Coverage
- Proportion of total ground surface covered by Sp. when viewed from above/below
- Observed
- % Varies />100% due to overlapping/layering
- Bare Ground/Open Water
- Proportion of individual Species relative to the total vegetation coverage
- Calculated using absolute data
- Must total 100%
- NNI/INN/Hydrophytes
- Describes Community Composition/Dominance

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Basic Veg Sampling Considerations – Abs/Rel

Table 2. Example of % relative cover calculations for two different observers.

Species	Observer 1		Observer 2	
	Absolute % Cover	% Relative Cover	Absolute % Cover	% Relative Cover
A	20	18	30	20
B	30	27	40	27
C	60	55	80	53
Total	110	Sum = 100	150	Sum = 100

$$\frac{\% \text{ Absolute Cover Species A}}{\text{Total Absolute \% Cover All Species}} (100) = \% \text{ Relative Cover Species A}$$

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Vegetation Sampling Methods

Vegetation Monitoring Methods

- a) Mapping, Photography & Drone Imagery
- b) Sample Plots
- c) Timed Meander
- d) Step-Point
- e) FQA



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Mapping

Use of site level photo/drone flights to locate/ID certain conditions

Outline of colonies or groups of similar veg conditions

Examples: Individual Species, community types, canopy cover, management used



Areas or Reed Canary Grass Colonies

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Mapping



Strength/Use

- Rapid Collection(Estimates only)
- Useful on Large Site
- Very Useful for Identifying and displaying invasives species concerns/thresholds
- Overlay with plots/meanders can help identify the “why” of other data collected

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Mapping



Weakness

- Not directly measured/Qualitative
- Lacks the precision of plot and transect methods though *estimates* can be made by coverage area / total project area.
- Pairing of other data collection required for bank monitoring

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Photos/Drone Imagery



Strengths

- Easy collect/includes map of locations
- Provides a basic visual and general flavor of site progress
- Some ID possible

Weakness

- Lacks precision; snapshot

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Sample Plots

- Plot-based sampling involves quantifying vegetation data (cover, richness, composition, stem counts, etc.) within a defined area
- Plot size/dimensions can vary but often use delineation standard (5, 15, & 30 ft)
- Target sampling locations at bank plan
- Sample Effort/Replication Important



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Sample Plots

Mark plots with lath and/or GPS

Data from multiple plots are used to characterize the monitoring unit

Averaging....

- Averaging may be OK for one monitoring unit (ie averaging of data for 3 plots in FWM of Wetland 1)
- Averaging may NOT be OK for jumping of units (ie averaging of data for 6 plots in FWM areas of Wetland 1-3)



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Consideration on Averaging Data

- Sample Size important
 - Too small, larger than needed or just right?
- Adapt to changes if not indicative of the unit
- Variation between sample(s) is important
 - Outliers/High Standard Deviation (spread)
- Support Averaging and/or seek Agency agreement

Example: 3 Sample plots at Bank plan, all of which occurred in areas with limited invasives; not reflective of entire unit. Add additional plots

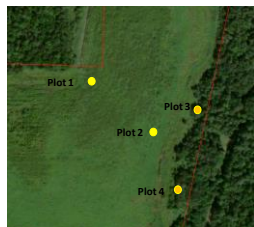


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Sample Plots

Strength/Use

- Reliable estimate of relative cover
- Can be used for all strata and areas
- Systematic, well known & repeatable



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Sample Plots

Weakness

- Time consuming;
- To be representative on large areas will need many plot
- Not effective at locating uncommon species
- Not effective at locating/characterizing the full scope of invasives
- Best if paired with other methods for species richness detection/invasive

Vegetation Layer	Recommended Plot Size
Herbaceous (all herbaceous vegetation and all woody vegetation less than one meter)	5 ft (1.5-m) radius circular plot
Shrub (all woody vegetation one meter or greater in height and less than 3 inches diameter breast height)	15 ft (4.6-m) radius circular plot
Tree (all woody vegetation 3 or more inches in diameter breast height)	30 ft (9.1-m) radius circular plot
Woody vine (woody vines greater than 3.28 ft in height)	30 ft (9.1-m) radius circular plot

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Example Sample Plot Data

2b) Shallow marsh (plots)

Scientific Name	Common Name	Min_Nativity	NNI-NCNE	PS	PS	PS	PS	Ave Relative Cover
<i>Amorcanth</i>	pigweed	I	FACU	0.0	0.0	1.5	1.2	1.7
<i>Azadirachta indica</i> var. <i>indica</i>	neem	N	ORL	0.0	0.0	1.5	0.0	0.4
<i>Bidens biternata</i>	nodding bur marigold	N	ORL	0.0	15.8	1.5	12.3	19.2
<i>Carex flacca</i>	field sedge	N	ORL	1.4	0.0	0.0	0.0	0.1
<i>Carex stipitata</i> var. <i>stipitata</i>	nut-fruited sedge	N	ORL	1.4	0.0	0.0	0.0	0.1
<i>Carex rostrata</i>	fox sedge	N	ORL	16.1	0.0	0.0	0.0	4.0
<i>Civara maculata</i> var. <i>maculata</i>	spotted water hemlock	N	ORL	0.5	0.5	0.0	0.0	0.2
<i>Cyperus aculeatus</i> var. <i>aculeatus</i>	yellow nutcracker	I	FACW	0.0	0.0	1.5	0.0	0.4
<i>Eleocharis acicularis</i>	hald spikerush	N	ORL	3.2	16.6	1.5	0.0	10.8
<i>Eleocharis acicularis</i>	small bedstraw	N	ORL	1.4	0.0	0.0	0.0	0.1
<i>Eleocharis acicularis</i> var. <i>gracilis</i>	half nutcracker	N	ORL	17.6	1.2	0.0	1.4	10.5
<i>Juncus rostratus</i>	nutcracker	N	ORL	4.9	0.0	0.0	0.0	1.7
<i>Lythrum hyssopifolius</i>	rose of Sharon	N	ORL	1.2	1.4	17.6	14.4	10.5
<i>Lythrum hyssopifolius</i>	nodding marshmallow	N	FACW	0.0	0.0	1.5	0.0	0.4
<i>Phytolacca americana</i>	red-leafed hollyhock	I	FACW	0.0	1.4	0.0	1.2	1.1
<i>Rumex crispus</i>	garden dock	N	FACW	0.0	0.0	12.2	0.0	15.5
<i>Spartina patens</i>	soft stem bulrush	N	ORL	0.0	15.8	1.5	0.0	4.3
<i>Spartina patens</i>	dark green bulrush	N	ORL	1.4	0.0	0.0	0.0	0.1
<i>Typha latifolia</i>	large-leafed cattail	I	ORL	0.0	0.0	0.0	1.5	0.1
<i>Typha latifolia</i>	broad-leafed cattail	N	ORL	6.9	0.0	0.0	0.0	3.7
Native Aquatic Cover				100	98.8	95.0	93.1	57

• Plot Data separate AND averaged

• Invasives highlighted

• All data for PS found here (# and % Rel NNI, %Rel INN)

• Totals = 100% for Relative.

Add Row w/Native + Invasive=100%

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Example Sample Plot Data

Shallow Marsh	Native aquatic vegetation > 60% relative cover	Meander	83
	> 4 native aquatic species (cumulative) (2% cover each)	Plots	97
		Meander	8
		Plots	9
	Non-native cattails < 20% relative cover	Meander	0
		Plots	<1
	All other invasive, exotic species < 10% relative cover	Meander	4
		Plots	2
	Open unvegetated water < 60% absolute cover	Meander	<5
		Plots	<5

• Pair/compared with Timed meander

• Include map/figure with locations along proposed community/bank plan

** Note differences in invasives sp. counts.

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Questions?



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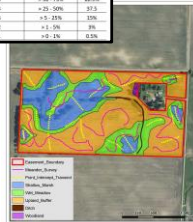
Meander Survey(s)

Meander/Timed Meander Survey

- Uses Visual Aerial Cover Estimation of Veg along a path walked by Observer
- Often Separated by Community type
- Path is GPS recorded and replicated following years
- For Timed Meander - time is tracked and increased under set conditions
- Time is paused for ID as needed

Table 1. Cover classes, percent cover ranges, and midpoints.

Cover Class	Cover Class Range	Midpoint
7	> 95 - 100%	97.5%
6	> 75 - 95%	85%
5	> 55 - 75%	65%
4	> 35 - 55%	45%
3	> 15 - 35%	25%
2	> 5 - 15%	10%
1	> 0 - 5%	2.5%



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Meander Survey(s)

Strengths/Use

- Well Defined methods
 - Bourdaghs FQA Manual 2014/WI DNR 2016
- Quick and efficient/Cover larger areas
- Can be used in variety of communities types
- Good at detecting species for species richness measures & Floristic Quality
- Good at locating invasives/problem areas for management
- More repeatable when timed



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Meander Survey(s)

Weakness

- Lacks Accuracy for determining % relative cover estimates
 - Less repeatability
 - More bias towards larger/obvious veg
- Comparisons between timed meander paths can be limited if conditions differ (ie thick cover, difficult terrain=reduced sampling area)
- Should be paired with plots for more accurate relative cover estimates



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Meander Data

Appendix 4. Shallow marsh vegetation – meanders

Scientific Name	Common Name	Native Status	WRI/SCM	Relative Cover	Min	Max	Avg
<i>Andropogon amurensis</i>	common reedgrass	N	FACU	1.7%	1.0%	2.0%	1.2%
<i>Andropogon scoparius</i> var. <i>incarnatus</i>	cutting reedgrass	N	ORL	0.3%	0.0%	0.5%	0.1%
<i>Andropogon scoparius</i>	cutting reedgrass	N	ORL	0.1%	0.0%	0.2%	0.0%
<i>Bromus horreorum</i>	barb broom	N	ORL	0.6%	0.0%	0.9%	0.2%
<i>Bromus horreorum</i>	barb broom	N	ORL	0.6%	0.0%	0.9%	0.2%
<i>Carex lasiocarpa</i>	lake sedge	N	FACU	2.0%	1.0%	3.0%	1.5%
<i>Carex lasiocarpa</i>	lake sedge	N	ORL	0.6%	0.0%	1.3%	0.4%
<i>Echinochloa crusgalli</i>	leafy spurge	N	FACU	1.7%	0.0%	2.0%	0.7%
<i>Echinochloa crusgalli</i>	leafy spurge	N	ORL	0.3%	0.0%	0.5%	0.1%
<i>Equisetum perfoliatum</i>	common horsetail	N	FACU	0.4%	0.0%	1.0%	0.4%
<i>Equisetum perfoliatum</i>	common horsetail	N	ORL	0.4%	0.0%	1.0%	0.4%
<i>Equisetum perfoliatum</i>	common horsetail	N	FACU	0.4%	0.0%	1.0%	0.4%
<i>Equisetum perfoliatum</i>	common horsetail	N	ORL	0.4%	0.0%	1.0%	0.4%
<i>Glyceria gracilis</i> var. <i>gracilis</i>	leaf narrow grass	N	ORL	0.4%	0.0%	0.9%	0.2%
<i>Glyceria gracilis</i>	leaf narrow grass	N	ORL	0.4%	0.0%	0.9%	0.2%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%
<i>Eleocharis acicularis</i>	nut sedge	N	FACU	0.8%	0.0%	1.0%	0.4%
<i>Eleocharis acicularis</i>	nut sedge	N	ORL	0.7%	0.1%	1.2%	0.5%

Summary Date Table

- 3 meanders/3 locations
- Includes separated and averaged data
- Total is 100% (NNI + INN)
- Used for species richness/count # NNI

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Point Intercept Method

- Path walked by observer, collect data at set intervals, steps or randomize
- Path GPS recorded/replicate following years
- Generally, more precise but more time consuming than timed meander
- Crossing veg communities must be noted/tracked



**Example Site Line with veg data collected
intersecting line at every 2 meters**

30

Point Intercept Method

- Choose along representative locations
- Often in grid pattern
- Percent cover is estimated by dividing the number of "hits" (times the plant species encountered at observation points) by the total number of hits

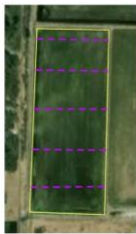
Species	
Red Clover	14
White Clover	1
Yellow Clover	1
Green Clover	1
Red Clover	14
White Clover	1
Yellow Clover	1
Green Clover	1
Red Clover	14
White Clover	1
Yellow Clover	1
Green Clover	1
Red Clover	14
White Clover	1
Yellow Clover	1
Green Clover	1

Red Clover = 14 hits/61 total hits * 100 = 23% Relative Cover

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Point Intercept Method

- Strength/Use**
- Easy to learn/understand
 - Objective and accurate (repeatable)
 - Provides good estimates of aerial cover
 - Works well for large and small areas
 - Fast data collection/More efficient than plots
 - Good for herbaceous strata



5 Transect lines across 20 acre restored area; data collected every 5 paces

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Point Intercept Method

- Weakness**
- Not appropriate for inundated areas(low visibility)
 - Difficult to use for tree/shrub strata (terrain/navigation/cover issues)
 - Can miss low coverage species, (limits species richness or Sp. important for FQA)
- ** Could enhance Sp. Richness by recording observations beyond the transect or toe strike (hit) separately.**



Step Point Variation
Transect with circles representing sample points at the tip of each stride interval or toe strike.

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[illegible]

Point Intercept

- 100% total relative at each transect.
- Includes basic summary of each and average of all in same Wet Meadow
- Include figure of transect w/credit/community for context

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[illegible]

Point Intercept

- Swenson AG Bank
- Additional Summary information at bottom is helpful
- Could augment w/shading (green for PS met or red for not met)

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Questions?



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Floristic Quality Assessment (FQA)

- Assessment of Condition/Integrity
- Based on Coefficient of Conservatism or C value
- Each Sp. assigned a number
 - based on their ability to tolerate or response to stressor.
 - Higher C value = less tolerant/ less adaptable/undisturbed
 - Lower C value = more tolerant/'weedy'



Figure 4. Boneset (*Eupatorium perfoliatum*) has a C value of 4 in Minnesota and 6 in Wisconsin.

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Floristic Quality Assessment (FQA)

Scientific Name	Common Name	MN Native Status	C	I
<i>Eupatorium perfoliatum</i>	Common Boneset	Native	4	1
<i>Luthanasia graminifolia</i>	Flat Top Goldenrope	Native	4	1
<i>Liatris maculata</i>	Spotted Trumpetweed	Native	4	1
<i>Fragaria virginiana</i>	Virginia Strawberry	Native	2	1
<i>Fraxinus nigra</i>	Glossy Leaf Buckthorn	Introduced	0	1
<i>Fraxinus nigra</i>	Black Ash	Native	5	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Native	2	1
<i>Gallium aparine</i>	Sticky-Willy	Native	1	1
<i>Gaultheria hirsuta</i>	Creeper Strawberry	Native	8	1
<i>Gentiana andrewsii</i>	Closed Bottle Gentian	Native	6	1
<i>Geranium maculatum</i>	Spotted Crane's Bill	Native	4	1
<i>Glyceria borealis</i>	Small Floating Marina Grass	Native	8	1
<i>Glyceria canadensis</i>	Buttercup Marina Grass	Native	7	1
<i>Glyceria gracilis</i>	American Marina Grass	Native	6	1
<i>Glyceria striata</i>	Fine Marina Grass	Native	4	1
<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	Native	6	1
<i>Hackelia virginiana</i>	Beggar's Lice	Native	1	1
<i>Helenium autumnale</i>	Fall Sweetreweed	Native	4	1
<i>Helianthus giganteus</i>	Giant Sunflower	Native	4	1
<i>Helianthus grosseserratus</i>	Saw Tooth Sunflower	Native	1	1
<i>Helianthus maximiliani</i>	American Cow-Parson	Native	1	1

Possible Uses include

- Baseline data
- Ambient status and trend
- Sequencing/level of degradation
- Restoration Progress/Success
- Preservation/Enhancement Screening/ENRV

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Floristic Quality Assessment (FQA)

Numerous Math Calculations for Assessment

Table 2. Dependent variables analyzed and their formulas and/or descriptions.

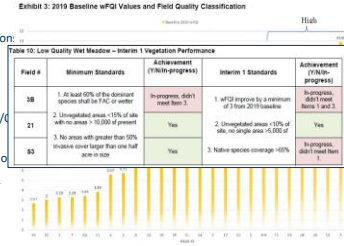
Metric	Formula	Description
Weighted Coefficient of Conservatism (wC)	$wC = \sum_{j=1}^S p_j C_j$	The sum of each species (S) Coefficient of Conservatism (C) multiplied by its relative cover or proportion (p), which was derived from the mid-points of the cover classes used.
Mean Coefficient of Conservatism ($\bar{C}$)	$\bar{C} = (\sum_{j=1}^S C_j) \div S$	The average of all Coefficients of Conservatism (C) divided by the total number of species (S).
Floristic Quality Index (FQI)	$FQI = \bar{C} \sqrt{S}$	Product of the calculated mean coefficient of conservatism ($\bar{C}$) multiplied by the square root of the total number of species (S).
Native Species Richness (S_n)		Sum total of all the native species observed and identified to species level.

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Floristic Quality Assessment (FQA)

Strength/Use

- Effective Indicator of Community condition and Change
- Consistent/Repeatable between skilled observers
- MN has well developed protocol and list of values
- Employs timed meander for data collection
- Good at ID species richness/change over time
- Can be used as PS



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Floristic Quality Assessment (FQA)

Weakness

- Requires higher level of Plant ID
- Requires location of small/less obvious sp.
- Time consuming for data collection and calculations
- Relies on consistency of C value for each sp. across time/habitat/disturbance types



Spotted Joe Pye Weed, *Eutrochium maculatum*, Native OBL, C Value of 4.

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Example FQA Data

Metric	Fresh Meadow #1	Fresh Meadow #2
Native Spp. Richness	11	11
Introduced Richness	1	1
Mean C	3.6	3.6
FQI	11.9	11.9
wFQI	4.3	1.0
Total Midpoint % Cover	112.5	110
Introduced Spp. % Cover	3	85
Introduced Proportion	0.03	0.77

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Example FQA Calculated Data

2019 (Pre-construction)										
Field ID	Community Quality	Plant Community	Mean C	FQI	soil CQ	MFAC%	Species Richness	% Invasive/Non-native Cover	% Native Cover	% Bare Ground
9	High	Wet Meadow	3.7	11.9	18.88	93	14	16	72	-
11	High	Shrub-Carex	4.6	13.4	12.38	93	14	15	63	-

2021										
Field ID	Community Quality	Plant Community	Mean C	FQI	soil CQ	MFAC%	Species Richness	% Invasive/Non-native Cover	% Native Cover	% Bare Ground
9	High	Wet Meadow	3.7	11.0	14.29	100	9	9	105	-
11	High	Shrub-Carex	4.6	15.2	13.08	100	14	0	70	-

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Data Summary Graphics and Results

- 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"	+4" 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%	9%	2%
FQA/MFAC	20.27/6.7	20.07/1.4	14.5/19.7
Tree Coverage (trees per acre)	N/A	26.48	N/A

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Data Summary Graphics and Results

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

Metric	Success Criteria	Measured Criteria	Success Criteria Met?	Comments
Hydrology - Standards used for 2017 - 2024				
Elevation	Water table is 6 inches above and one foot below ground surface	Measured hydrology is between 6 inches above and one foot below ground surface	Yes	Former hydrology monitoring and required for 2017. Results based on direct site observations
Duration	Majority of the growing season	Hydrology was within the accepted range for the majority of the growing season.	Yes	
Vegetation				
Diversity	Minimum of five native species	79 native species have been observed	Yes	Species diversity increased from 2018 to 2017
Composition	Minimum two sedges and two grasses	Eight sedges and eight grasses 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 the species effectively controlled.	Yes	Reed canopy grass is less than 5% coverage
Invasive species concentration	No single area greater than one quarter acre in size	Invasive species remain under control with no single area greater than one quarter acre in size	Yes	Slight increase of along ditches, but turned again in the 2017 to control.

- [Include](#) performance standards
- Interpret data to determine whether the site meets those standards
- If not, document with data what is not meeting standard
- Consult with Agency staff
- Corrective actions recommended?

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Data Summary Graphics and Results

Table 6. Example of summing relative cover estimates by plant community and plant group.

Community	Plant Group	% Relative Cover Estimated from Field Inventory (Percent 0 - 1)						
		A	B	C	D	E	F	Aug.
Moss Prairie	Native	10%	25%	100%	40%	100%	40%	81%
	Non-native	30%	5%	0%	0%	0%	0%	35%
	Total	40%	30%	100%	40%	100%	40%	116%
Wet Meadow	Native	85%	90%	90%	70%	100%	80%	88%
	Non-native	10%	0%	0%	10%	0%	10%	30%
	Total	95%	90%	90%	80%	100%	90%	118%
Shallow marsh	Native	100%	100%	100%	100%	100%	100%	100%
	Non-native	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%

Table 7. Example of comparing data on vegetation metrics to previous years and performance standards.

Community	Metric 1 Performance Standards	2014	2015
		2014	2015
Moss Prairie	Native, non-invasive vegetation >50% relative cover	81%	88%
	C2 native, non-invasive species	10	10
	Non-native and/or invasive species <10% relative cover	35%	30%
	Baro ground cover absolute cover	4%	0%
	Native, non-invasive vegetation >50% relative cover	100%	100%
Wet Meadow	C2 native, non-invasive species >20% relative cover	0	0
	Non-native and/or invasive species <10% relative cover	10%	10%
	Baro ground cover absolute cover	7%	0%
	Native, non-invasive vegetation >50% relative cover	90%	90%
	C2 native, non-invasive species	20	10
Shallow Marsh	Non-native and/or invasive species <10% relative cover	0%	0%
	Unvegetated areas <10% absolute cover	10%	10%

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Field Exercise



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Field Exercise

Front of form: Meander

Community	Plant Group	A	B	C	D	E	F	Aug.
Moss Prairie	Native	10%	25%	100%	40%	100%	40%	81%
	Non-native	30%	5%	0%	0%	0%	0%	35%
	Total	40%	30%	100%	40%	100%	40%	116%
Wet Meadow	Native	85%	90%	90%	70%	100%	80%	88%
	Non-native	10%	0%	0%	10%	0%	10%	30%
	Total	95%	90%	90%	80%	100%	90%	118%
Shallow marsh	Native	100%	100%	100%	100%	100%	100%	100%
	Non-native	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%

Back of form: Plot

Community	Plant Group	A	B	C	D	E	F	Aug.
Moss Prairie	Native	10%	25%	100%	40%	100%	40%	81%
	Non-native	30%	5%	0%	0%	0%	0%	35%
	Total	40%	30%	100%	40%	100%	40%	116%
Wet Meadow	Native	85%	90%	90%	70%	100%	80%	88%
	Non-native	10%	0%	0%	10%	0%	10%	30%
	Total	95%	90%	90%	80%	100%	90%	118%
Shallow marsh	Native	100%	100%	100%	100%	100%	100%	100%
	Non-native	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	100%	100%	100%	100%	100%

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Field Exercise – Data Interpretation

Upland	Cover 90%-100%	Minister	Plants
	< 90% species	Minister	Plants
R. Forest	Cover 90%-100%	Minister	Plants
	Cover of Typha <20%	Minister	Plants
	< 90% species	Minister	Plants
	Hydrophytes <20%	Minister	Plants
R. Meadow	Cover 90%-100%	Minister	Plants
	Cover of Typha <20%	Minister	Plants
	< 90% species	Minister	Plants
	Hydrophytes <20%	Minister	Plants

- Vegetation Performance Standards**
1. Relative areal cover by Native Non-Invasive (NNI) species shall be >80%
 2. Relative areal cover by inv. Species, including narrow-leaf and hybrid cattails (Typha angustifolia & T. x glauca), shall be <20%
 3. Species richness shall consist of >5 NNI species with at least 5% relative cover
 4. Cover by hydrophytes shall be greater than 50%

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Micros

Monitoring Reports and Use of the 2024 Template

2025-03-20 15:02 UTC

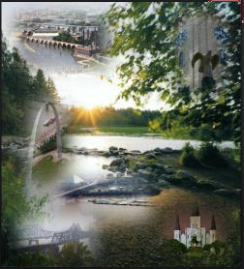
Recorded by
Day, Leslie E CIV
USARMY CEMVP (USA)

Organized by
Day, Leslie E CIV
USARMY CEMVP (USA)

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 **Monitoring Report Narrative and Presentation**

November 13, 2025
Brian Yagle



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Sections A and B

A. Title Page (1 page)

B. Project Overview (1-2 pages): Provide the following:

1. Compensation site name:
2. Corps File Number:
3. County/State/LGU (in Minnesota):
4. RIBITS Bank Number:
5. Name and contact information of sponsor:
6. Name and contact information of agent:
7. Date construction of mitigation bank was completed (including seeding):
8. Year of monitoring (calendar year AND number of full growing seasons since construction):
9. Start and end dates of growing season:
10. Describe how you determined start date and end date of growing season:
11. Short project summary paragraph:
12. Short paragraph describing whether performance standards are being met:
13. Clearly state whether this report includes a credit release request:

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B11. Short Project Summary Paragraph

- ◆ Include dates mitigation bank was approved.
- ◆ Include dates when construction was completed, and seeding was completed.
- ◆ Include previous credit releases.
- ◆ Include any adaptive management activities and the dates they were completed.

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B12. Short paragraph describing whether performance standards are being met:

- ◆ The section must be clear and straightforward.
- ◆ This section is needed even if there is no credit release request.
- ◆ If you state that performance standards are being met, you must have data to support that finding.
 - ◆ For example: "Hydrology performance standards were met in 2024. Data from all wells indicated that hydrology performance standards were met for all wetland communities and basins within the mitigation bank. See the table in Section C Monitoring Results."
- ◆ If you don't have the data to support your assertion that performance standards are met, you should clearly state that in part 12.
 - ◆ For example: "Hydrology data collected from monitoring wells indicates that hydrology performance standards were not met in all wells in 2024. However, we believe a hydrology credit release is warranted based on available well data and drone imagery. See Section C for more details. We would also like to set up a meeting to discuss the monitoring results with you."

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B12. Example 1: Is this hydrology performance standard met?

Community Type and Performance Standard	Well	Observed	Standard Met
Wet Meadow: Water table within 12" of the surface for 28 consecutive days	1	2022: 40 days (4/28-6/7) 2023: 46 days (4/25-6/10)	?

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B12. Example 1: Is this hydrology performance standard met?

Community Type and Performance Standard	Well	Observed	Standard Met
Wet Meadow: Water table within 12" of the surface for 28 consecutive days	1	2022: 40 days (4/28-6/7) 2023: 46 days (4/25-6/10)	?

YES! Example Statement: Data from well 1 indicates hydrology performance standards were met in 2022 and 2023.

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B12. Example 2: Is this hydrology performance standard met?

Community Type and Performance Standard	Well	Observed	Standard Met
Wet Meadow: Water table within 12" of the surface for 28 consecutive days	1	2022: 27 days (4/28-5/25) 2023: 46 days (4/25-6/10)	?

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B12. Example 2: Is this hydrology performance standard met?

Community Type and Performance Standard	Well	Observed	Standard Met
Wet Meadow: Water table within 12" of the surface for 28 consecutive days	1	2022: 27 days (4/28-5/25) 2023: 46 days (4/25-6/10)	?

No! Example Statement: Data from well 1 indicates hydrology performance standard was met in 2023 but missed the hydrology performance standards in 2022 by one day.

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B13. Clearly state whether this report includes a credit release request:

- ◆ This section must be clear and straightforward.
- ◆ If you are requesting a credit release, include which performance standard credit release (ex. hydrology credit release) you are requesting and the amount and types of wetland community credits you are requesting.
- ◆ FOR EXAMPLE:
We are requesting the following credits for meeting vegetation 1 performance standards:
Fresh Wet Meadow: 1.1518 credits
Shallow Marsh: 2.1582 credits
Total: 3.3100 credits

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12. Short paragraph describing whether performance standards are being met:
13. Clearly state whether this report includes a credit release request:

- ◆ These are two separate items and should be answered independently.
- ◆ There is the potential to get a credit release without meeting all performance standards.
- ◆ Just because you think a credit request is warranted, doesn't mean you met the performance standards.
- ◆ You must answer B12 and B13 honestly and explain your request in part C *Monitoring Results*.

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C. Monitoring Results

- ❖ You **MUST** summarize your monitoring results and compare to the performance standards.
- ❖ It is **HIGHLY** recommended that you use a table to summarize your results and compare to performance standards.
- ❖ Simply stating you met the standard is not acceptable, you must provide the data that indicates the PS was met.
- ❖ This is your place to shine!
- ❖ This is the section to provide your alternative facts.

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		Each performance standard met for two growing seasons		Met Performance Standard
Hydrology Performance Standards (30% Release of Credits)	Wet Meadow	Hydrology shall consist of a water table at or within 10 inches of the surface for the required duration (30 consecutive days or two periods of 15 consecutive days) during the growing season. Hydrology shall not occur later than the specified deadline based on the date of the growing season and following the release. A flow log or ground water table recording, or a record of the water table elevation, shall be maintained for the entire duration of the project. Hydrology shall be maintained for the entire duration of the project.		Yes
	Shallow Water/Deep Water	Hydrology shall consist of a water table at the surface, 10 inches to the water table elevation (10 inches) for a minimum of 30 consecutive days (or two periods of 15 days, or four periods of 10 consecutive days), during the growing season.		Yes
Vegetation Inference Standard (30% Release of Credits)	Each performance standard met for a minimum of two growing seasons			
	Wet Meadow	75% or more relative cover by native species composed of at least 5 species	Yes	
		Percent cover native species shall be measured 50% relative cover	Yes	
		75% or more relative cover by herbaceous	Yes	
		Percent cover shall be measured 50% relative cover	Yes	
Shallow Water/Deep Water	75% or more relative cover by native species	Yes		
	Percent cover native species shall be measured 50% relative cover	Yes		
	75% or more relative cover by herbaceous	Yes		
	Percent cover shall be measured 50% relative cover	Yes		
	Shallow Water/Deep Water	75% or more relative cover by native species	Yes	
Wet Meadow (Shallow)	75% or more relative cover by native species	Yes		
	Percent cover native species shall be measured 50% relative cover	Yes		
	75% or more relative cover by herbaceous	Yes		
	Percent cover shall be measured 50% relative cover	Yes		
	Shallow Water/Deep Water	75% or more relative cover by native species	Yes	

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C. Monitoring Results

Wet Meadow Hydrology Standard

- ❖ **Not acceptable:** Yes.
- ❖ **Acceptable:** Yes, 35 consecutive days. (For 1 well in a wet meadow community)
- ❖ **Acceptable (even better):** Well 1 met the hydrology performance standard (>28 days) for 37 days (April 14 – May 21).

Wet Meadow Veg 1 Standard (species richness)

- ❖ **Not acceptable:** Yes, >5 species.
- ❖ **Acceptable:** Yes, we documented 10 native species, meeting the species richness performance standard of >5 species.

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2024			
Prairie	FWM	SM	DM
14	17	7	5
10.71%	66.48%	100%	100%
16.97%	16.09%	7.97%	27.84%
74.86%	71.16%	66.84%	29.92%
25.14%	28.84%	33.16%	70.08%



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**ATTACHMENT 1
HYDROLOGY AND VEGETATION PERFORMANCE SUMMARY**

HYDROLOGY PERFORMANCE SUMMARY

Shallow Marsh: Shallow Marsh: Hydrology shall consist of inundation from 1" - 12 inches in depth for at least 28 consecutive days during the growing season under normal and wetter than normal hydrological conditions per "Savanna and Water 2000". During the growing season, inundation up to 18 inches in depth following the 2-year, 24-hour or greater precipitation event is permitted provided that the duration does not exceed 28 consecutive days. If, water depth drops from 18 inches to 12 inches within 28 days. The water table shall be within 12 inches of the surface or more hydrology. Inundation C2: Dry season water table during the growing season. In the case of a drought year, hydrology results can be compared to the Sed and Water Conservation District reference wetland of the same type and size and not writing to determine if a credit reserve should be granted.

Wetland (Site 1 - Well 1)	2022	2023
Wetland (Site 2 - Well 2)	N	N
Wetland (Site 3 - Well 3)	N	N
Wetland (Site 4 - Well 4)	N	N

Wet Meadow: Hydrology shall consist of a water table 12 inches or less below the soil surface for a minimum of 28 consecutive days or a minimum of 14 or more consecutive days during the growing season per "Savanna and Water 2000". Inundation during the growing season shall not exceed 28 consecutive days. In the case of a drought year, hydrology results can be compared to the Sed and Water Conservation District reference wetland of the same type and size and not writing to determine if a credit reserve should be granted.

Wetland (Site 1 - Well 1)	2022	2023
Wetland (Site 2 - Well 2)	N	N
Wetland (Site 3 - Well 3)	N	N
Wetland (Site 4 - Well 4)	N	N

Wetland (Site 1 - Well 1) **Wetland (Site 2 - Well 2)** **Wetland (Site 3 - Well 3)** **Wetland (Site 4 - Well 4)**

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C. Monitoring Results

Well 12 is located in the planned shallow marsh portion of the basin. This well had water levels from 1 inch to 8 inches for 20 consecutive days. It was within 2-inches for three additional days and then had surface water again for two more days (25 days total) and thus was very close to having surface water for 28 consecutive days. In 2022 it had surface water for 53 consecutive days.

Wetland (Site 1 - Well 1) **Wetland (Site 2 - Well 2)** **Wetland (Site 3 - Well 3)** **Wetland (Site 4 - Well 4)**

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Community **Performance Metric** **2023** **2024**

Community	Performance Metric	2023	2024
Oak Woodland	Shrub & forb % cover	±15% B	±15% B
	Bare soil % cover	±25% B	±25% B
	# NNI species/perennials	±15% Y	±15% Y
	±10% cover	±15% Y	±15% Y
Sedge Meadow	Shrub & forb % cover	±15% B	±15% B
	Bare soil % cover	±25% B	±25% B
	# NNI species/perennials	±15% Y	±15% Y
	±10% cover	±15% Y	±15% Y
Wet Prairie Re-est	Shrub & forb % cover	±15% B	±15% B
	Bare soil % cover	±25% B	±25% B
	# NNI species/perennials	±15% Y	±15% Y
	±10% cover	±15% Y	±15% Y
Wet Prairie Rehab	Shrub & forb % cover	±15% B	±15% B
	Bare soil % cover	±25% B	±25% B
	# NNI species/perennials	±15% Y	±15% Y
	±10% cover	±15% Y	±15% Y

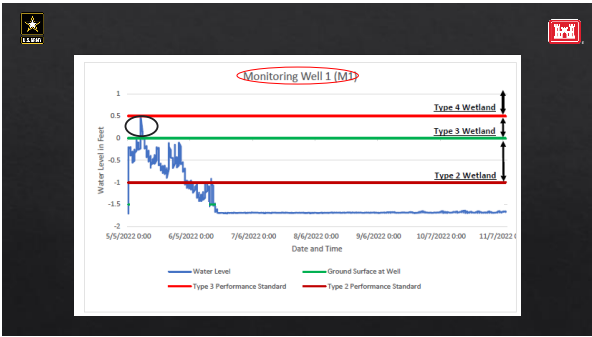
72

Community Type and Performance Standard	Well ID	Consecutive Number of Days Inundation Observed	Standard Met (Y/N)	Consecutive Number of Days Water Table Within 12" Observed	Standard Met (Y/N)
Wet Meadow - Hydrology shall consist of a water table 12 inches or less below the soil surface for a minimum of 28 consecutive days, or two periods of 14 or more consecutive days, during the growing season under normal weather (non-normal hydrological conditions (per Sprecher and Warner 2000). Inundation during the growing season shall not occur except (1) at the start of the growing season (due to snowmelt/precipitation); and (2) following the 10-year, 24-hour - or greater - precipitation events. Depth of inundation during the growing season shall be 6 inches or less with duration of less than 14 consecutive days. An exception can be made for sites with hummocky microtopography - hollows between hummocks can have standing water depths up to 6 inches for extended duration.	Well 1	0	Y	45 days (April 20 - June 9)	Y
	Well 2	0	Y	27 days (April 20 - May 16), 17 days (September 3 - Sept. 18)	Y
	Well 3	0	Y	9 days (April 20-28)	Y

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Table 1. Performance Standards			
HYDROLOGY PERFORMANCE STANDARD (Required years 1 & 2)		MEETING STANDARDS?	NOTES
Wet Meadow - Water table at or within 12 inches of the soil surface for a minimum of 28 consecutive days, or two periods of 14 consecutive days, during the growing season. - Inundation during the growing season shall not occur except: (1) at the start of the growing season; and (2) following the 10-year, 24-hour or greater precipitation events. Depth of inundation during the growing season shall be 6 inches or less with duration of less than 14 consecutive days.	M7 (A5)	Yes	Well installation occurred May 5, 2022, due to wetter than normal April resulting basins being significantly inundated and consequently requiring some well locations to be shifted from planned in order to avoid installation in standing water. The resulting locations were GPS'd and reflected on Figure 3. All wells met target hydrology standards for either a Type 2 Wet Meadow or a Type 3 Shallow Marsh.
	M5 (C3)	Yes	
	M1 (A4)	Yes	
	M2 (A2)	Yes	
	M3 (A3)	Yes	
Shallow Marsh - Inundation up to 6 inches in depth for at least 28 consecutive days during the growing season. - During the growing season inundation up to 18 inches in depth following 10-year, 24-hour or greater precipitation events is permissible provided that the duration does not exceed 28 consecutive days.	M4 (A4)	Yes	
	M6 (A4)	Yes	
	M4 (B1)	Yes	

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Community Type and Performance Standard	Well ID	Consecutive Number of Days Inundation Observed	Standard Met (Y/N)	Consecutive Number of Days Water Table Within 12" Observed	Standard Met (Y/N)
Wet Meadow - Hydrology shall consist of a water table 12 inches or less below the soil surface for a minimum of 28 consecutive days, or two periods of 14 or more consecutive days, during the growing season under normal average flow-normal hydrological conditions (per Sprecher and Warner 2000). Inundation during the growing season shall not occur except (1) at the start of the growing season (due to snowmelt/precipitation), and (2) following the 24-hour - or greater - precipitation events. Depth of inundation during the growing season shall be 6 inches or less with duration of less than 14 consecutive days. An exception can be made for sites with hummocky microtopography - hollows between hummocks can have standing water depths up to 6 inches for extended duration.	Well 1	0	Y	45 days (April 20 - June 9)	Y
	Well 2	0	Y	27 days (April 20 - May 16), 17 days (September 3 - Sept. 18)	Y
	Well 3	0	Y	9 days (April 20-28)	Y

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D. Performance Standards from MBI (1-2 Pages)



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E. Credit Release Table from MBI (1 page)

Table 2: WCA/CWA Wetland Credit Release Schedule								
Performance Standard	%	Wetland Release			Upland Release			Total Credits
		Fresh (wet) Meadow	Shallow Marsh	Deep Marsh	Fresh (wet) Meadow	Shallow Marsh	Deep Marsh	
Initial Release	15%	2.9100	0.6600	4.8600	0.7376	0.1686	1.2013	10.5375
Hydrology	40%	7.7600	1.7600	12.9600	1.9670	0.4496	3.2034	28.1000
Veg Interim 1	10%	1.9400	0.4400	3.2400	0.4918	0.1124	0.8009	7.0251
Veg Interim 2	15%	2.9100	0.6600	4.8600	0.7376	0.1686	1.2013	10.5375
Final Veg	20%	3.8800	0.8800	6.4800	0.9835	0.2248	1.6017	14.0500
Total:	100%	19.4000	4.4000	32.4000	4.9175	1.1240	8.0085	70.2500

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F. Management Activities (1 page)

◆ **Management Activities (1 page):** Describe all past management activities and planned future management. Include in a table details of management activities completed since the previous monitoring report. Include maps identifying the locations of management activities. For sites or areas onsite where performance standards are not being met or require additional maintenance or adaptive management beyond that projected in the MBI, sponsors should summarize their proposed maintenance and adaptive management activities here.



Image: Pixabay

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F. Management Activities

Table 3.1: 2024 Vegetation Management

Date	Management Activity
March 2024	Controlled burn in upland buffer and wetland fringe.
May/June 2024	Herbicide treatment, manual removal of cattail/thistle.
June-August 2024	Herbicide treatment for cattail and reed canary grass in wetland and Canada thistle in upland buffer. Mechanical/hand removal of sweet clover in upland buffer.
October/November 2024 (Proposed)	Herbicide treatment of reed canary grass in wetland. Removal of sweet clover.

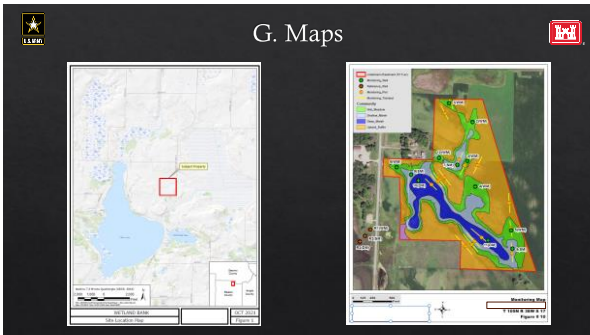
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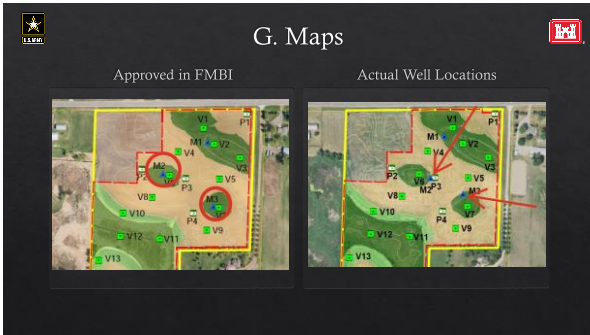
G. Maps (2-3 pages)

◆ **Maps (2-3 pages):** Provide (minimally) one map to show the location of the compensatory mitigation site with enough detail for IRT members to locate the site for a site visit (e.g., site location map in the approved MBI). Include map(s) from the approved MBI that show planned community types and sampling locations. Then, to compare planned conditions and monitoring to actual conditions and monitoring, provide map(s) that include actual wetland and upland community types, transect locations, sampling data points, photograph locations with orientation, and any other features required for monitoring and documenting site conditions. If practical, provide a map that overlays actual conditions and monitoring locations with planned conditions and monitoring locations.

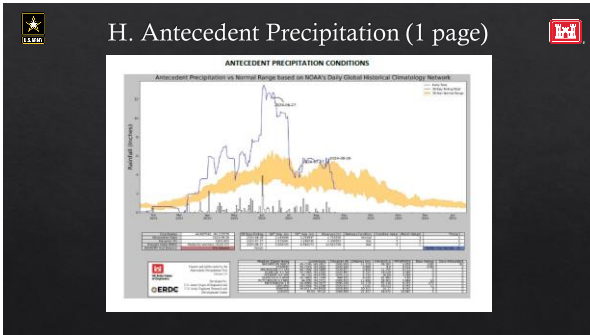
81



82



83

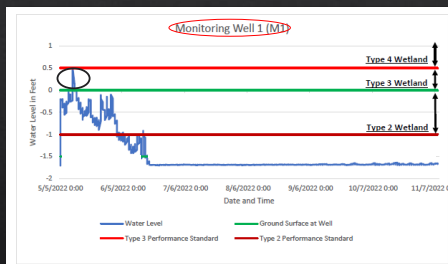


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I. Hydrographs – Common Issues

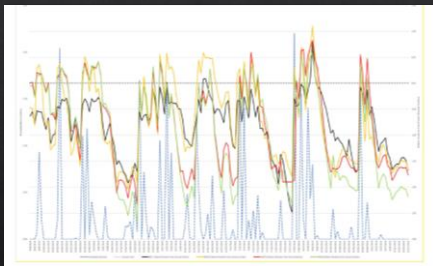
Title: Performance standards		MEASUREMENTS	
HIGHER LEVEL PERFORMANCE STANDARDS		MEASUREMENTS	
Performance Standard 1.8.1		NOTES	
Water table at and within 2 inches of the soil surface for 28 consecutive days during the growing season.	[AS]	[AS]	Not collected according to § 1014, so data were not available. In some cases, rainfall events have been significant enough to cause the water table to rise above the plastic mulch in some areas.
Soil temperature at and within 2 inches of the soil surface for 28 consecutive days during the growing season. Depth of insulation during the growing season was not less than 4 inches of straw or less than 12 consecutive days.	[AS]	[AS]	Soil temperature was not collected according to § 1014, so data were not available. In some cases, rainfall events have been significant enough to cause the water table to rise above the plastic mulch in some areas.
Insulation up to 6 inches depth for at least 28 consecutive days during the growing season.	[AS]	[AS]	Insulation was not collected according to § 1014, so data were not available. In some cases, rainfall events have been significant enough to cause the water table to rise above the plastic mulch in some areas.
During the growing season, insulation up to 18 inches in depth for 14 consecutive days. At least one precipitation event is permissible provided that the duration does not exceed 20 consecutive days.	[AS]	[AS]	Insulation was not collected according to § 1014, so data were not available. In some cases, rainfall events have been significant enough to cause the water table to rise above the plastic mulch in some areas.

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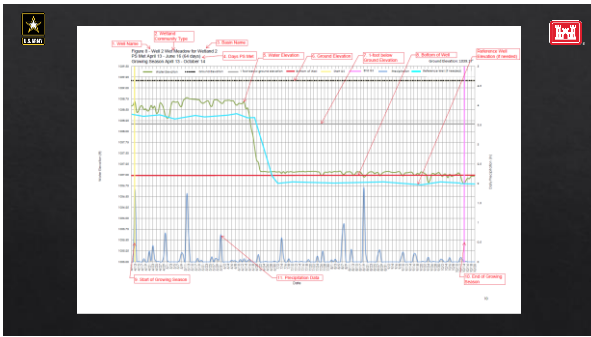


86

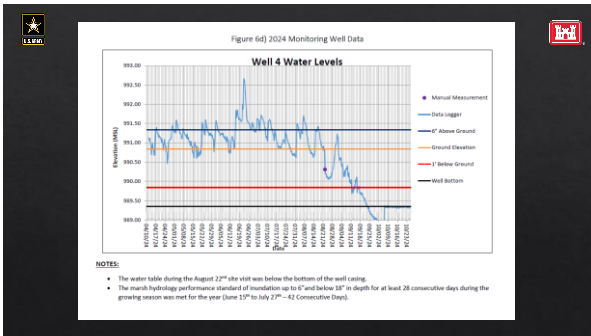
I. Hydrographs – Common Issues



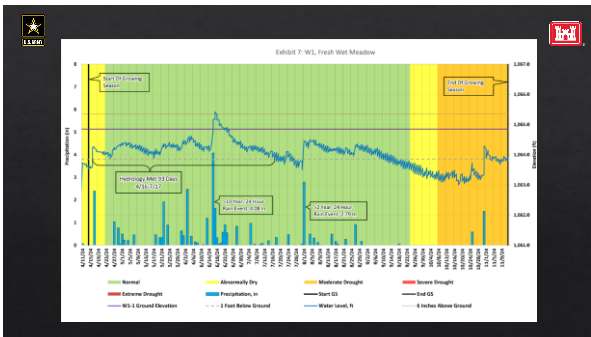
87



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92



93



94

[illegible]



K. Vegetation Summary Data



Provide summary data to substantiate the success and/or potential challenges associated with the compensatory mitigation project.

Before submitting:
 Check the data to make sure it is accurate.
 Check the data to make sure it matches the information you provided in Section C Monitoring Results.
 Relative cover should equal 100.
 Relative cover should not include bare ground or open water.



Variable	Demographic characteristics		Mean		SD		P-value
	Age (years)	Gender	Age (years)	Gender	Age (years)	Gender	
Age (years)	18-24	25-34	25.5	28.5	4.0	4.0	0.001
Gender	Male	Female	50	50	50	50	0.001
Education level	High school	University	50	50	50	50	0.001
Marital status	Single	Married	50	50	50	50	0.001
Occupation	Student	Professional	50	50	50	50	0.001
Religion	Islam	Christianity	50	50	50	50	0.001
Family size	1-2	3-4	50	50	50	50	0.001
Income level	Low	High	50	50	50	50	0.001
Health status	Healthy	Unhealthy	50	50	50	50	0.001
Smoking status	Non-smoker	Smoker	50	50	50	50	0.001
Alcohol consumption	Non-drinker	Drinker	50	50	50	50	0.001
Exercise frequency	Regular	Irregular	50	50	50	50	0.001
Stress level	Low	High	50	50	50	50	0.001
Sleep quality	Good	Poor	50	50	50	50	0.001
Dietary habits	Healthy	Unhealthy	50	50	50	50	0.001
Work-life balance	Good	Poor	50	50	50	50	0.001
Overall well-being	High	Low	50	50	50	50	0.001

[illegible]

VEGETATION ASSESSMENT FOR HAWKWOOD SWAMP - TRANSECTS							
Site Name	Indicator	Native	Invasive	Shrub ¹	Transient & Relative Cover	Transient & Relative Cover Vegetation Only ²	Transient & Disturbed ³
am lanceolatum	FAC	Yes	No	H	4	4	No
FACW	Yes	No	H	1	1	1	No
ajacem	FACW	No	Yes	H	1	1	No
ge	FAC	No	Yes	H	1	1	No
ge	FACW	No	Yes	H	1	1	No
goss	FACW	No	Yes	H	1	1	No
hirsut	FACW	No	Yes	H	1	1	No
holc	OBL	No	Yes	H			No
Bare Ground							
Total					100	100	
% annual cover (Shrubless)						4	
% annual cover (Native)						95	
% annual cover (Hydrophilous OBL, FACW, and FAC excluding cover water)						95	
Number Native/Non-Invasive Species						20	
Number Disturbed/ Native/Non-Invasive Species						5	

[illegible]

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Outside the Guidance

- ◆ As sponsor or consultant, it's your responsibility to monitor the mitigation bank site, collect and provide the data that demonstrates performance standards are met, and identify issues with the site. This responsibility is not transferable.
- ◆ The Year 1 monitoring report issue.
- ◆ Collect the data necessary to show performance standards are met. For example: If you have multiple wetland types (ex. Shallow marsh and wet meadow), you must monitor and collect hydrology data for all communities.
- ◆ Lack of data prevents more credit releases than any other means.
- ◆ Communication is often the key to preventing credit release delays and denials.
- ◆ Ask for a meeting if there are issues.

100




Site Visits

- ◆ We make at least approximately 4-5 site visits per bank site for as-built inspection, hydrology release, at least one vegetation release, and final release.
- ◆ Plan ahead!
- ◆ Predict credit release requests.
- ◆ Plan for appropriate time of year – spring for hydrology.
- ◆ As sponsor or consultant, it's your responsibility to schedule a site visit. This responsibility is not transferable.
- ◆ Tell your best story!



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Make it easy for us to say “yes” to a credit release request!

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QUESTIONS?

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