MN Wetland Professional Certification Program
Rapid Floristic Quality Assessment Training

BOARD OF WATER AND SOIL RESOURCES
MINNESOTA POLLUTION CONTROL AGENCY

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2023 MWPCP Schedule

- WCA Regulatory Training- St Cloud MNDOT Training Facility- April 20
- Regional Training: Rochester - May 16-17
- Wetland Delineation and Regulation Basic Class: Arden Hills- June 12-16
- Floristic Quality Assessment (FQA)- MNDOT Shoreview Training Center – June 20
- Basic Wetland Plant ID- Farmington (July 18) or Brainerd (July 20)
- Wetland Delineation Refresher- Prairie Woods ELC- Spicer- August 8
- Regional Training: Fergus Falls – August 15-16
- Wetland Delineation and Regulation Basic Class: Brainerd - September 11-15

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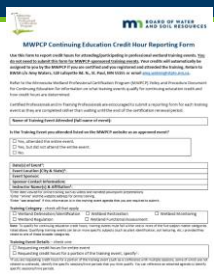
End of the current renewal period

- Current certification renewal period ends on December 31, 2023 for all who transferred to the MWPCP from the U of MN Wetland Delineation Certification Program.
- Credit reporting deadline for this renewal period is January 1, 2024.
- Submit the Credit Hour Reporting Form with proof of attendance no later than January 1, 2024.
- Not required to submit a credit hour reporting form for MWPCP courses.
- COVID-related temporary continuing education policies will lapse at the end of 2023.


MWPCP Continuing Education Credit Hour Reporting Form

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Next renewal period

- The next credit renewal period begins January 1, 2024 and ends on December 31, 2026.
- MWPCP Continuing Education policy, requires 18 credit hours of MWPCP-approved training.
- Six of those may be online training.


Continuing Education for MWPCP – Policies and Procedures

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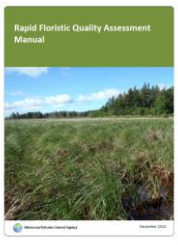
Rapid Floristic Quality Assessment Training Agenda

Agenda

- Intro to FQA Concepts and Methods
- Group demonstration field exercise (Rice Creek Regional Park)
- Lunch (1hr) (then meet at Blaine Wetland Sanctuary- see map below)
- Small Group Field Exercise (Blaine Wetland Sanctuary)
  - Introduction to site
  - Field exercise
- Travel back to training center
- Data input, interpretation, and wrap up

Class Portal: https://bwsr.state.mn.us/node/4681



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Rapid Floristic Quality Assessment

MN Wetland Professional Certification Program

MINNESOTA POLLUTION CONTROL AGENCY

Michael Bourdaghs | Environmental Research Scientist
June 20, 2023

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Introduction

State & Federal Wetland Policy

- No-net-loss of wetland quantity ***and quality***
  - MN Wetland Conservation Act
    - "…no net loss in the quantity, quality, and biological diversity of Minnesota's wetlands…"
    - "…public values…must be based upon the functions of wetlands…"

Functional vs. Condition Assessment

- Functions & Values
  - Goods and services the wetland is providing
- Condition
  - Deviation from a 'natural' or least impacted state

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Introduction

Stressors/impacts

- Hydrologic alterations
- Excess nutrient/sediment
- Chemical pollution
- Physical alterations
- Non-native invasive species



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Introduction

Rapid Assessment Methods (RAMs)

- Simple field observations
- Qualitative/categorical
- Coarse info quickly obtained in exchange for accuracy (EPA Level 2)
- 'Rapid' = ½ day field + ½ day office

Floristic Quality Assessment (FQA)

- Vegetation based approach
- Condition measure
- Detailed veg survey (EPA Level 3)

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What is FQA?

The Coefficient of Conservatism (*C*)

– Reflects the fidelity of a species to natural undisturbed habitats (0-10)

Acer negundo
(Box elder)
C = 1


Carex lacustris
(Lake sedge)
C = 5


Cypripedium candidum
(Small White Lady's Slipper)
C = 10

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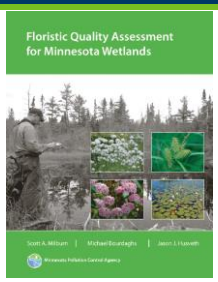
MN Coefficients of Conservatism

Floristic Quality Assessment for Minnesota Wetlands

- Released 2007
- MN wetlist 1.4
- *C* -values
- Distribution maps
- Synonymy
- Available online

www.pca.state.mn.us
-search for 'Floristic Quality Assessment'



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Why the Rapid FQA?

Common FQA Criticisms

- High level of botanical expertise & sampling effort required
- What do the results mean?

Objectives

- Develop standard 'rapid' wetland vegetation sampling protocols that focus on common, easily ID'd species
- Develop data driven assessment criteria

Goal

- Create a 'rapid' wetland condition assessment method that will allow natural resource professionals with moderate botanical expertise to make scientifically defensible wetland condition assessments

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Rapid FQA Applications

Anywhere you want to do wetland condition monitoring & assessment

- Ambient/status & trend monitoring
- Mitigation sequencing
- Restoration success/mitigation performance standards
- Local/regional inventory & planning
- Preservation screening
- Problem investigation

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Follow along in the Rapid FQA manual!

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Key Concepts & Components

The site or Assessment Area (AA)

- The site or AA is the wetland area that is being represented by the Rapid FQA sampling
- Flexibility is the key
- AA's can vary in size & shape according to the needs of the observer
- Discrete or arbitrary boundaries
- Can be quite large (250 ac)

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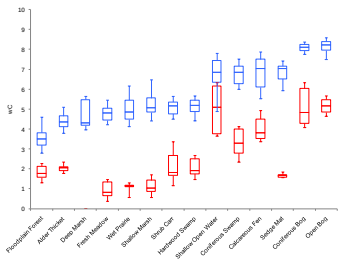
Key Concepts & Components

Plant Communities

- Plant community types should be the basic sampling & assessment unit for any FQA use
- Follows Eggers & Reed (2014) with some modifications
  - Fresh (Wet) Meadow & Sedge Meadow combined into 1 class: Fresh Meadow
  - Seasonally Flooded Basin excluded
  - Sedge Mat = DNR Rich Fen



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Key Concepts & Components

The Rapid Species List

- Detailed vegetation surveys require:
  - High level of expertise
  - Lots of time to ID tough species
- More common, dominant, & easier to ID species selected
- 290 species that cover virtually all community types
- Only the Rapid Spp are used!

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Some plants are easier to ID than others

Impatiens capensis
Orange Jewelweed

Galium trifidum ssp. trifidum
Three-cleft bedstraw

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Some plants are easier to ID than others

Alnus incana ssp. rugosa
Speckled alder

Salix planifolia
Tea leaved willow

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Some plants are easier to ID than others

Phalaris arundinacea
Reed canarygrass

Carex canescens
Gray bog sedge

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Some plants are easier to ID than others

The ID Difficulty Score

- 3 'dimensions' of ID difficulty
- Each given a numerical rating
- Sum of factors = ID Difficulty Score

Commonness	Distinctness	Dominance
1 - Very common	1 - Unique appearance	0 - Not dominant
2 - Occasional	2 - Several similar spp.	-1 - Dominant
3 - Rare	3 - Many similar spp.	

•Common
•Unique
•Dominant

1 Range 6

•Rare
•Not unique
•Not dominant

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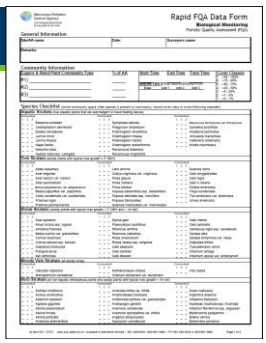
Key Concepts & Components

The Data Form

- Single sheet/front & back
- Bulk of the form is the Rapid Species List
- General information
- Up to 3 communities/form
- Species listed by stratum & alphabetically by scientific name
- Record spp. presence by circling the corresponding community space



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Key Concepts & Components

Seasonal Sampling Period

- June-September

Timed meander sampling

- Walk around the site making species observations
- Only care about rapid species list
- Single meander should cover all communities present in AA
- Total time (base + additional time periods) based on the complexity of the site & the rate that new species are encountered
- Cover class estimations made for each species in each community

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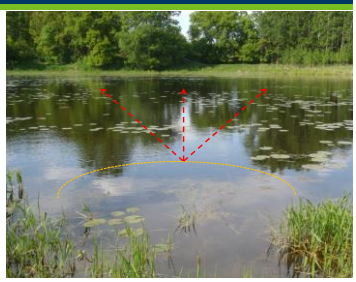
Key Concepts & Components

Shoreline Sampling

- Shallow Open Water community
- 3 representative shoreline sampling stations



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Key Concepts & Components



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Key Concepts & Components

Metrics

- Weighted Coefficient of Conservatism (*wC*)
- $wC = \sum pC$

			Fresh Meadow #1			
Scientific Name	C		CC	Mid	p	pC
Calamagrostis canadensis	4		5	62.5	0.5556	2.2222
Phalaris arundinacea	0		2	3	0.0267	0.0000
Carex stricta	5		4	37.5	0.3333	1.6667
Carex lacustris	5		2	3	0.0267	0.1333
Salix petiolaris	5		2	3	0.0267	0.1333
Solidago gigantea	3		1	0.5	0.0044	0.0133
Rubus idaeus ssp. strigosus	3		1	0.5	0.0044	0.0133
Lycopus uniflorus	5		1	0.5	0.0044	0.0222
Mentha arvensis	3		1	0.5	0.0044	0.0133
Typha latifolia	2		1	0.5	0.0044	0.0089
Impatiens capensis	2		1	0.5	0.0044	0.0089
Rumex orbiculatus	6		1	0.5	0.0044	0.0267

Metric	Fresh Meadow #1
Native Spp. Richness	11
Introduced Richness	1
Mean C	3.6
FQI	11.9
wC	4.3
Total Midpoint % Cover	112.5
Introduced Spp. % Cover	3
Introduced Proportion	0.03

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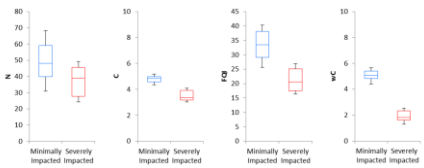
FQA Metric Performance

Hardwood Swamp data (n = 60/10)

- N = native sp. richness
- C = mean coefficient of conservatism
- FQI = Floristic Quality Index = √N * C
- wC = abundance weighted C



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FQA Metric Performance

			Fresh Meadow #1					Fresh Meadow #2			
Scientific Name	C		CC	Mid	p	pC		CC	Mid	p	pC
Calamagrostis canadensis	4		5	62.5	0.5556	2.2222		3	15	0.1364	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		1	0.5	0.0045	0.0227
Salix petiolaris	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 orbiculatus	6		1	0.5	0.0044	0.0267		1	0.5	0.0045	0.0273

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FQA Metric Performance

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
wC	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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Wetland Veg Bio Condition Gradient (condition categories)

Wetland vegetation condition categories

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


Native shallow marsh community (Polk Co.)


Shallow marsh dominated by narrow-leaved cattail (Marshall Co.)


Treated narrow-leaved cattail (Marshall Co.)

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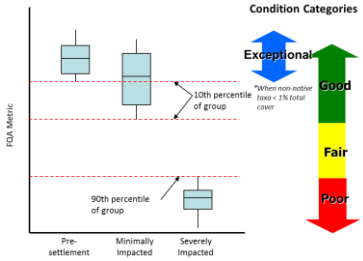
FQA Assessment Criteria

- Assessment criteria derived for 4 condition categories
- Classify data as:
  - Pre-settlement
  - Minimally impacted
  - Severely impacted
- Apply the "lowest/highest scoring reference site" concept
- *wC* calibrated for each community
- Data driven (n = 725)
  - DNR MN Biological Survey Releve db
  - PCA targeted data



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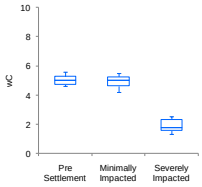
FQA Assessment Criteria

Hardwood Swamp Assessment Criteria

- Pre-Settlement n = 30
- Minimally Impacted n = 30
- Severely Impacted n = 10



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

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Worked Example

Community Type	wC	Condition Category	# Cat.	Prop of AA	Prop x # Cat.
Shrub-Carr	3.3	Fair	3	0.50	1.5
Fresh Meadow	2.3	Fair	3	0.35	1.05
Shallow Marsh	1.4	Poor	4	0.15	0.6
			Weighted Average # Cat.		**3**
			Overall Condition Category		**Fair**

Community							
Condition Category	Shallow Open Water	Deep Marsh	Shallow Marsh	Fresh Meadow	Wet Prairie	Calcareous Fen	Sedge Mat
Exceptional			> 4.9*	> 4.2*	> 4.4*	> 4.8*	> 4.2*
Good	> 5.0	> 4.0	> 4.2	> 4.1	> 3.9	> 5.2	> 5.5
Fair	< 5.0	< 4.0	1.6 - 4.2	1.3 - 4.1	1.5 - 3.9	4.7 - 5.2	1.8 - 5.5
Poor			< 1.6	< 1.3	< 1.5	< 4.7	< 1.8

Community							
Condition Category	Open Bog	Coniferous Bog	Shrub-Carr	Alder Thicket	Hardwood Swamp	Coniferous Swamp	Floodplain Forest
Exceptional	> 7.3*	> 7.3*	> 4.5*	> 3.9*	> 4.6*	> 5.6*	> 3.3*
Good	> 7.1	> 7.2	> 4.3	> 3.5	> 4.2	> 5.5	> 2.7
Fair	5.4 - 7.1	5.8 - 7.2	3.2 - 4.3	2.2 - 3.5	2.5 - 4.2	5.5 - 3.6	2.1 - 2.7
Poor	< 5.4	< 5.8	< 3.2	< 2.2	< 2.5	< 3.6	< 2.1

* Total introduced species cover < 1 percent

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Group demonstration

- Maps
- Clipboard
- Datasheets
- Field gear

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Rest of the day

- Lunch (on your own)
- Small group exercise @ Blaine Wetland Sanctuary
- Data exercise

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Rapid FQA Calculator

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Rapid FQA Limitations

- Moderate level of botanical expertise required
- Dominant/co-dominant spp. at a site is not on the list
- Not all communities are covered
- Community interpretation inconsistencies can cause large errors
- Communities can be interpreted as former types under certain conditions
- Assessment criteria for some types are preliminary

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Rapid FQA Adaptations

Adapting alternative sampling approaches or applying existing data to assessment criteria must meet the following conditions

- Sampling is done by community types
- Sampling intensity is adequate to produce a 'representative' sample
- Cover estimates are made
- Species are ID'd at least to the level of the Rapid Species List

What if I'm collecting high quality/all species data?

- Are you sure?
- Are the above first 3 conditions met?
- You can use the FQA "all species" assessment criteria (Appendix B Table B-8 of the 2019 PCA status & trends report)
- You will have to make the calculations on your own!

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Corps Wetland Determination

Delineation Manual (1987) & Regional Supplements (ca. 2010)

- Vegetation Sampling
  - By community type
  - Representative
  - Species composition (recommended) & aerial cover
- With minor modifications, users should be able to derive Rapid FQA from delineation veg data
- Guidance provided in Appendix 5

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MnRAM Vegetation Component

MN Routine Assessment Method

- Practical functions & values assessment tool for MN Wetland Conservation Act
- Qualitative/Best Professional Judgment
- 12 functions (e.g., veg integrity, downstream water quality)
- Management Classification

Rapid FQA	MnRAM	Management Class
Exceptional	Exceptional	Preserve
Good	High	Manage 1
Fair	Medium	Manage 2
Poor	Low	Manage 3

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FQA Products

www.pca.state.mn.us

- Search for 'Floristic Quality Assessment'
- Rapid FQA Manual
- Datasheets
- Excel calculator
- Rapid FQA Development Report
- Base FQA Report
- C-values & synonymy in Excel format

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