NMRAM Framework

- **Attributes: basic broad classes of wetland condition:**
  - Absolute Size
  - Landscape context
  - Biotic
  - Abiotic

- **Metrics: measurable components of an attribute class:**
  - Selected for relevance
  - When combined provide a preponderance of evidence for the wetland condition assessment

- **NMRAM Ecological Condition Rank**

4 = A	**Excellent Condition**
3 = B	**Good Condition**
2 = C	**Fair Condition**
1 = D	**Poor Condition**

- **NMRAM Condition Scores: Big Boxes**
  - More robust
  - Aids in rapidity
  - Less sensitive

- **Trained technicians can perform consistently and efficiently**

Metrics measurement intensity is tiered

Level 1 – GIS-based metrics of conditions in the area surrounding a wetland

Level 2 – Rapid field assessment - semi-quantitative field indicators to evaluate condition and stressors

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Level 3 - Intensive site assessment – higher precision for priority issues and validation of Level 2

NMRAM uses a map-based rapid assessment strategy that combines levels 1 & 2

NMRAM – Sampling Location

Sampling Area (SA)

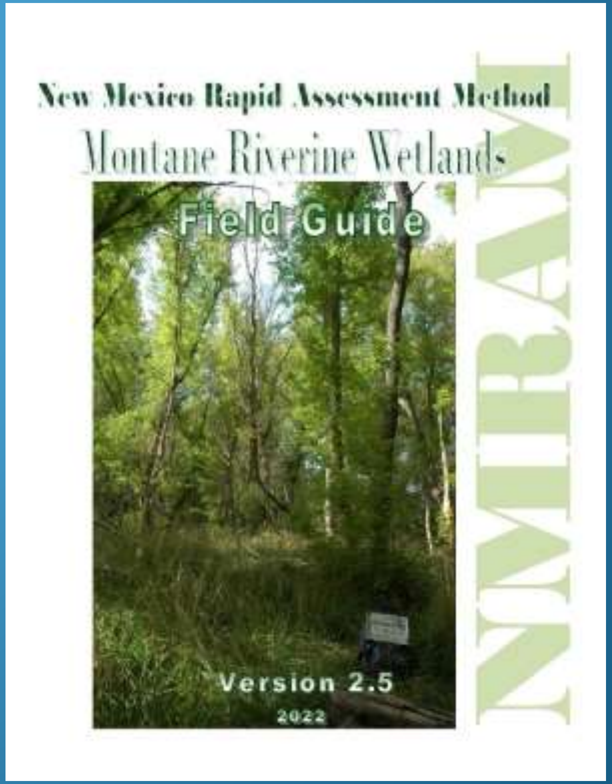
- Defined Area in which Metric Measurements are Taken
- Specific to Wetland Class and Subclass (Module)

SA Selection Rules:

- Placement
  - Avoid confusion in metric scores
- Size
  - Too small – lower score
  - Too large – raise score
- Consistency

Montane Riverine Wetland NMRAM – 14 Metrics

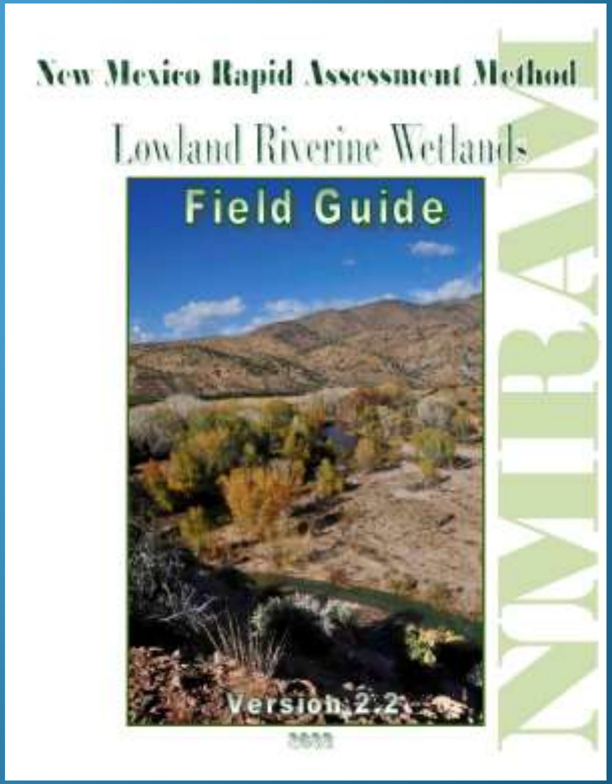
- Landscape Context Metrics (GIS-based)
  1. Buffer Integrity Index
  2. Riparian Corridor Connectivity
  3. Relative Wetland Size
  4. Surrounding Land Use
- Biotic Metrics (field-based)
  1. Relative Native Plant Community Composition
  2. Vegetation Horizontal Patch Structure
  3. Vegetation Vertical Structure
  4. Native Riparian Tree Regeneration
  5. Invasive Exotic Plant Species Cover
- Abiotic Metrics (field-based)
  1. Floodplain Hydrologic Connectivity
  2. Physical Patch Complexity
  3. Channel Equilibrium
  4. Stream Bank Stability and Cover
  5. Soil Surface Condition



Lowland Riverine Wetland NMRAM – 14 Metrics

- Landscape Context Metrics (GIS-based)
  1. Buffer Integrity Index
  2. Riparian Corridor Connectivity
  3. Relative Wetland Size
  4. Surrounding Land Use

- Biotic Metrics (field-based)
  1. Relative Native Plant Community Composition
  2. Vegetation Horizontal Patch Structure
  3. Vegetation Vertical Structure
  4. Native Riparian Tree Regeneration
  5. Invasive Exotic Plant Species Cover



- Abiotic Metrics (field-based)
  1. Floodplain Hydrologic Connectivity
  2. Physical Patch Complexity
  3. Soil Surface Condition
  4. Channel Mobility
  5. Groundwater Index

NMRAM - Example Metric:

Invasive Exotic Plant Species Cover

- **Definition:** The Invasive Exotic Plant Species Cover is a measure of the total percent cover of a set of exotic plant species that are considered invasive based on the New Mexico list of noxious weeds (NRCS 1999).

- **Procedure:**
  - List all invasive exotic plant species encountered by polygon
  - Estimate cover for all listed species
  - After reconnaissance calculate total Invasive Exotic Plant Species cover within the SA
  - Rate with Table B5

Table B5. Ratings for Invasive Exotic Plant Species Cover

Rating	Invasive Species Cover %
4	0%
3	>0% - <1%
2	≥1% - <10%
1	≥10

NMRAM Condition Score

- Wetland condition score
  - A = 4
  - B = 3
  - C = 2
  - D = 1
- Four big boxes
  - More robust
  - Less sensitive
  - Aids in rapidity

SA Wetland Rank		
Rank	Score	Description
A	≥3.25 - 4.0	Excellent Condition
B	≥2.5 - <3.25	Good Condition
C	≥1.75 - <2.5	Fair Condition
D	1.0 - <1.75	Poor Condition

Final SA Condition Score and Rank

Weighted scoring by attribute class and final rank assignment

Available as a part of the activated PDF data worksheets

SA CODE: **Date:**

SA Name: **Surveyor Initials:**

NMRAM - SA Rank Summary Worksheet: Montane Riverine Wetlands 2.5			
Metric Description	Rating	Wt	Final Score
Landscape Context		Σ	
L1. Buffer Integrity Index		0.25	
L2. Riparian Corridor Connectivity		0.25	
L3. Relative Wetland Size		0.25	
L4. Surrounding Land Use		0.25	
Biotic		Σ	
B1. Relative Native Plant Community Composition		0.2	
B2. Vegetation Horizontal Patch Structure		0.2	
B3. Vegetation Vertical Structure		0.2	
B4. Native Riparian Tree Regeneration		0.2	
B5. Invasive Exotic Plant Species Cover		0.2	
Abiotic		Σ	
A1. Floodplain Hydrologic Connectivity		0.3	
A2. Physical Patch Diversity		0.2	
A3. Channel Equilibrium		0.2	
A4. Stream Bank Stability and Cover		0.2	
A5. Soil Surface Condition		0.1	

SA Condition Scoring Summary			
Major Attribute	Score	Wt.	Wt. Score
Landscape Context		0.3	
Biotic		0.35	
Abiotic		0.35	
SA WETLAND CONDITION SCORE Σ			
SA WETLAND RANK =			

SA Wetland Rank		
Rank	Score	Description
A	≥3.25 - 4.0	Excellent Condition
B	≥2.5 - <3.25	Good Condition
C	≥1.75 - <2.5	Fair Condition
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Stressor Summary	Major	Minor	Top Three	
	0	0	1	
			2	
			3	

Stressor Comments (Evaluation of risk)

Page 2 of 17

NMRAM - Procedure

NMRAM process involves a series of pre-field, field, and post-field tasks:

1. Identifying the target Wetland of Interest (WOI)
2. Delineating assessment boundaries (SA, etc) within the WOI
3. GIS/Mapping analysis of landscape context metrics
4. Measuring a suite of biotic and abiotic metrics within and around the SA as part of a field reconnaissance survey
5. Scoring, summarizing and reporting the findings

Identifying the target Wetland of Interest (WOI)

- There are no specific NMRAM rules for defining a WOI
  - Can be project dependent or based on legal requirements

- Alternative: “natural rule” that is expert driven
  - Contiguous area of natural wetland vegetation defined by breaks in continuity
  - i.e., significant gaps between natural vegetation and semi-natural vegetation, cultural vegetation, development, roads, etc.
  - Change in subclass
- From existing maps or custom mapping as part of the assessment

Defining the Sampling Area (SA)

- Limits to lateral and linear extent
- Size limits based on floodplain size

Table 2. SA lengths based on historic floodplain size.

Size Class	Historic WOI Width	Riparian Corridor Length
Small	<500 m	250 m
Medium	500-1000 m	500 m
Large	>1000 m	750 m

Small

Medium

Large

- SA definition rules
- Linear extent
  - use Table 2 lengths
  - include 2 meander bends (3 riffle sections)(Montane)
  - should not cross hydrologic boundaries
    - acequias and other diversion structures and ditches
    - end of large pipe discharges
    - weirs, culverts, dams, levees, and other flow control structures
    - major changes in riverine confinement, entrenchment, degradation, aggradation, slope, or bed form
    - tributary or channel confluences
    - transitions between wetland types, such as beaver ponds, spring or seep-fed adjacent wetlands or change in subclass

Table 2. SA lengths based on historic floodplain size.

Size Class	Historic WOI Width	Riparian Corridor Length
Small	<500 m	250 m
Medium	500-1000 m	500 m
Large	>1000 m	750 m

Large wetlands may require more than one SA

- SA definition rules
  - Lateral extent across the floodplain
    - area that influences the stream channel through allochthonous input
    - influenced by active hydrological processes
      - no break in hydrological connectivity (development, etc)
    - wetland vegetation communities—not upland
    - flood-prone width
      - Sample both sides of channel if practical, one side is allowed
      - Extend to edge of active floodplain on at least one side
    - Representative sample of the WOI

Maps for Field Team

- Landscape Map
  - Shows the SA within landscape context with needed boundaries
  - Approx. 1:4,000-6,000 scale
- Sample Area (SA) Map
  - For mapping vegetation communities and abiotic features
  - Approx. 1:1,000-2,500 scale
- Road Map
  - As needed for navigation to the SA

Montane Riverine Wetlands

Landscape

SA

Lowland Riverine Wetlands

Landscape

SA