



New Mexico Environment Department

New Mexico Rapid Assessment Method
Lowland Riverine Wetlands
April 18, 2024

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New Mexico Environment Department
Surface Water Quality Bureau
Wetlands Program

New Mexico Rapid Assessment Method (NMRAM) for Lowland Riverine Wetlands



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Wetlands Program

Natural Heritage New Mexico
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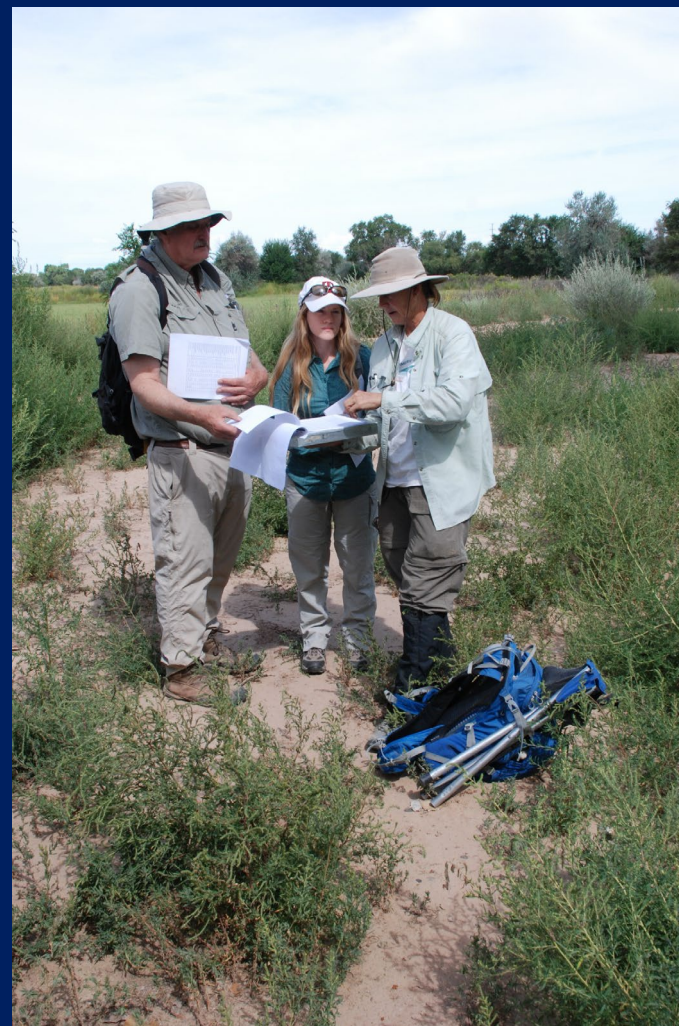


Unconfined Lowland Riverine Wetlands on the Rio Grande (Photo by K. Menetrey)

NMRAM Design Goals

Create a science-based tool that provides a meaningful, rapid, and repeatable assessment of current wetland condition within a subclass.

- **Based on Observation of Current Conditions**
 - Combination of GIS and field data collection
 - Guided by best professional judgement
- **Designed for New Mexico Wetlands**
 - Subclass type and description
- **Rapid**
 - Team of 2-3 experienced trained users can complete in 1 day
- **Repeatable**
 - Trained users will arrive at same score independently



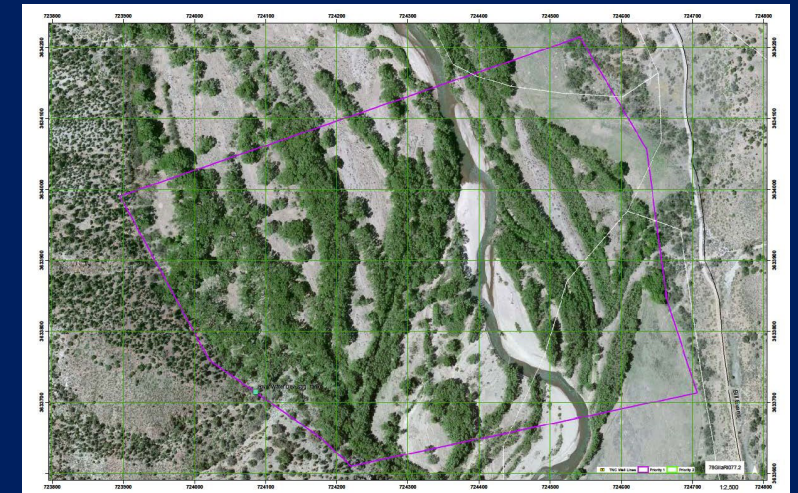
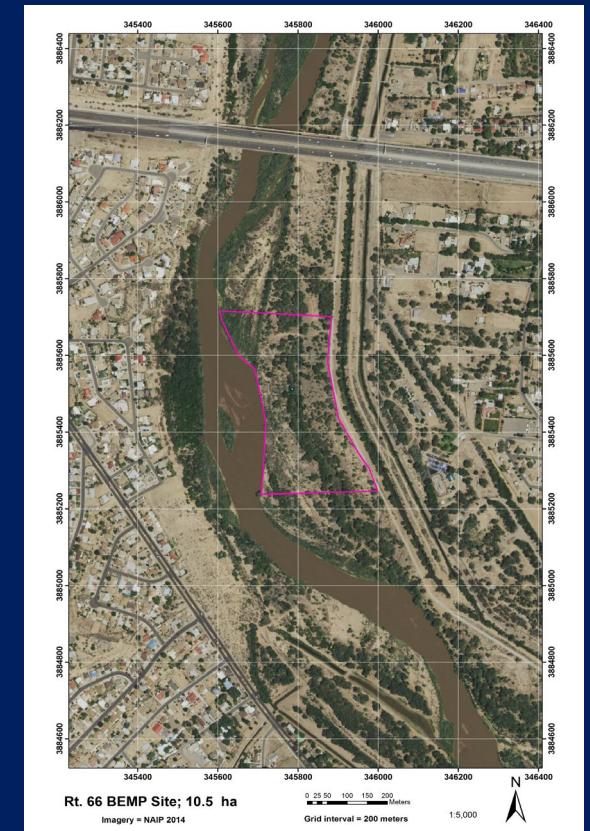
NMRAM Design

- **Uses a set of observable landscape and field metrics to express the condition of a particular wetland site.**
 - Each NMRAM Module is created for wetlands of a similar type (**Subclass**)
 - Developed in context of a disturbance gradient (**Reference Set**)
 - From high quality and functionality with low disturbance to the most degraded with high disturbance
 - NMRAM is tested for use in a given area (**Reference Domain**)
 - As NMRAM is tested in more regions they are added to the reference domain
- **Underlying assumptions that wetland condition:**
 - Will vary from most pristine to highly degraded along the disturbance gradient,
 - Can be evaluated and rated in a meaningful way based on the preponderance evidence provided by the set of metrics.
 - Reflects ecosystem function and integrity.

Some NMRAM metrics were developed and modified after CRAM, EIA, and HGM, and includes new metrics developed specifically for the Lowland Riverine Wetland Subclass.

Lowland Riverine Wetland Subclass

- Wetlands found along river channels that are generally 5th order or greater (>1300 cfs bankfull discharge) and generally occur below 6000 ft elevation.
- Unconfined broad alluvial valleys where the grade falls below 1%.
- Perennial or Intermittent, particularly in desert reaches or during droughts.
- Low degree of confinement and room for lateral movement often leading to a high degree of channel sinuosity or multi-channel systems.



<https://www.env.nm.gov/surface-water-quality/wetlands-rapid-assessment-methods/>

NMRAM – Sampling Location

Wetland Of Interest (WOI)

- follow the natural feature patterns and be relatively homogeneous;
- belong to the target wetland subclass;
- avoid major discontinuities caused by land use (i.e., ag lands, urban development, roads, and other non-wetland elements)

Sampling Area (SA)

- Defined Area for Metric Measurements
- Specific to Wetland Class and Subclass

SA Selection Rules:

• Placement

- Represents the WOI

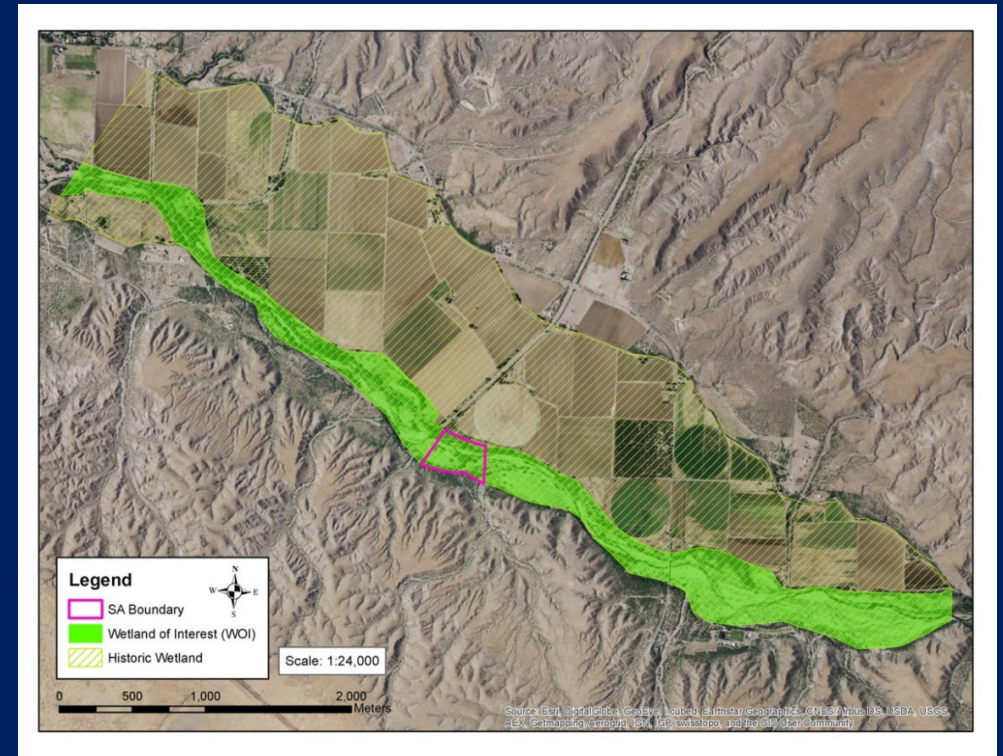
• Size

- Too small – lower score
- Too large – raise score

• Consistency

- May require separate Sampling Areas on each side of river.

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



NMRAM Lowland Riverine Wetlands Metric List

Landscape Context Metrics

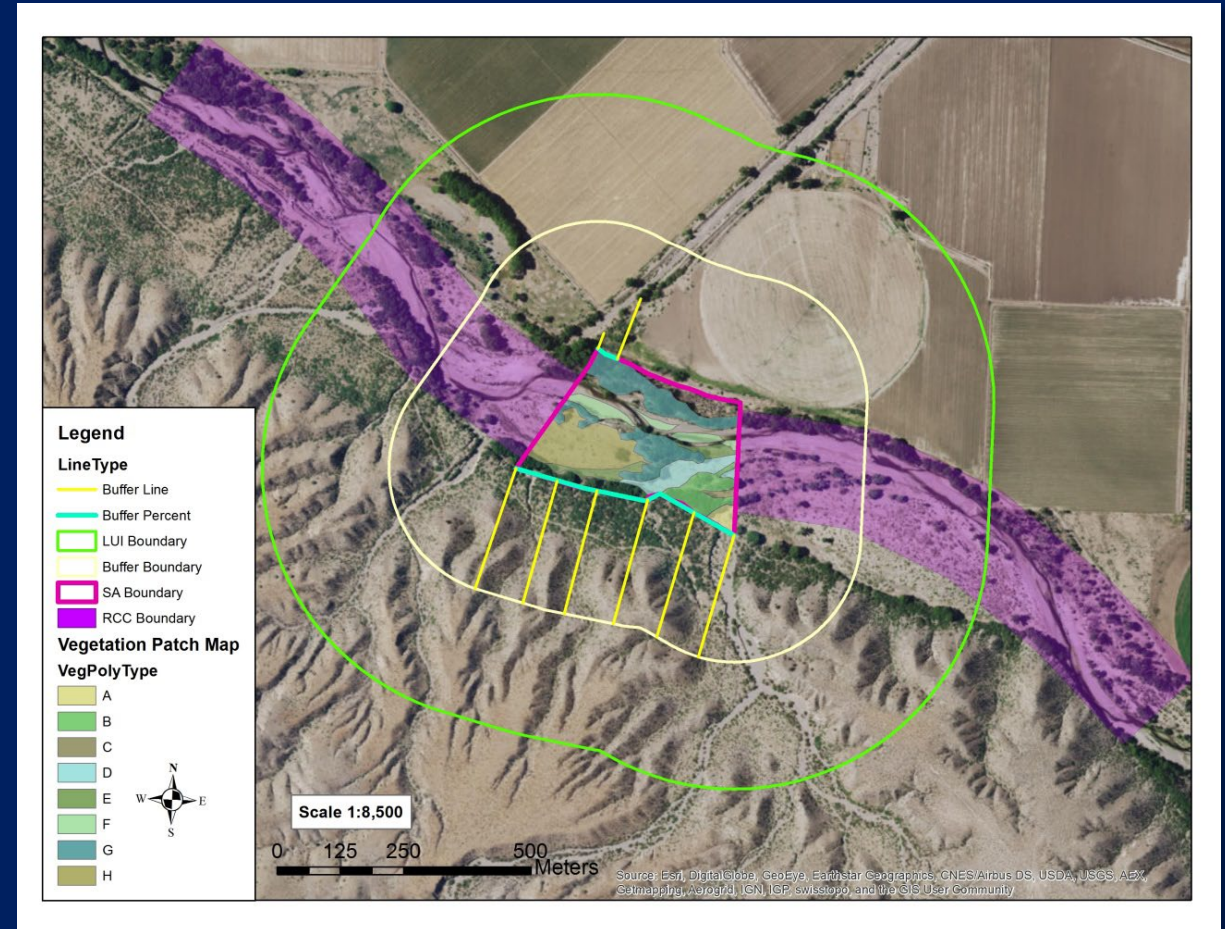
Buffer Integrity Index
Riparian Corridor Connectivity
Relative Wetland Size
Surrounding Land Use

Biotic Metrics

Relative Native Plant Community Composition
Vegetation Horizontal Patch Structure
Vegetation Vertical Structure
Native Riparian Tree Regeneration
Invasive Exotic Plant Species Cover

Abiotic Metrics

Floodplain Hydrologic Connectivity
Physical Patch Complexity
Soil Surface Condition
Channel Mobility
Groundwater Index



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- Buffer Integrity Index
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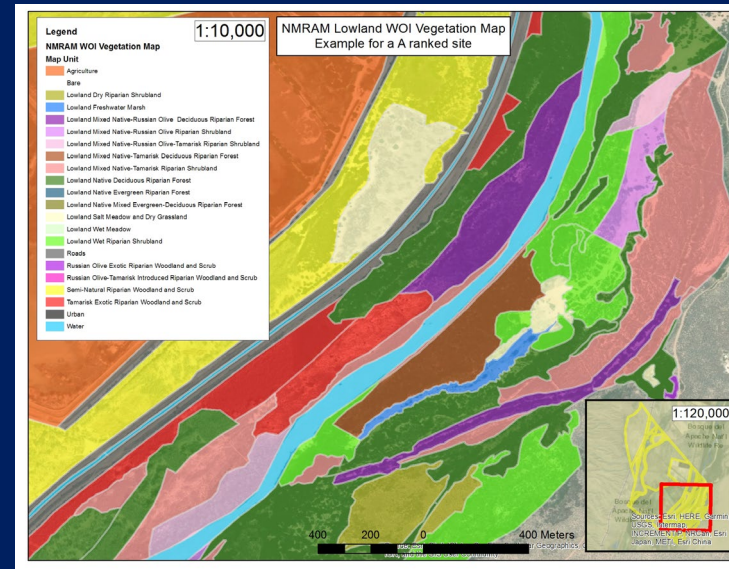
Biotic Metrics

- Relative Native Plant Community Composition
- Vegetation Horizontal Patch Structure
- Vegetation Vertical Structure
- Native Riparian Tree Regeneration
- Invasive Exotic Plant Species Cover

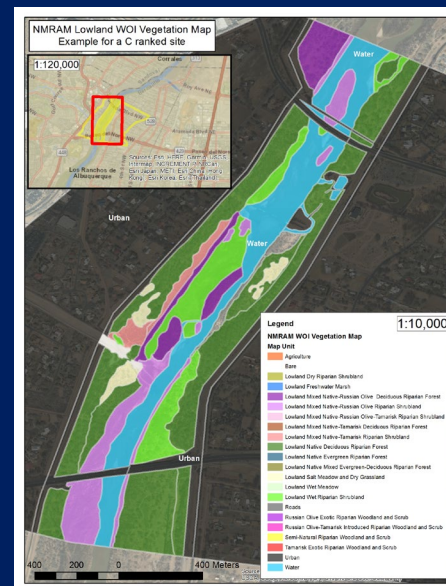
Abiotic Metrics

- Floodplain Hydrologic Connectivity
- Physical Patch Complexity
- Soil Surface Condition
- Channel Mobility
- Groundwater Index

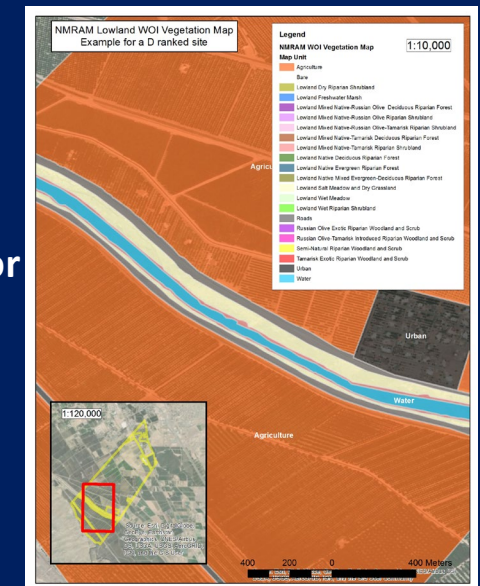
Vegetation Map for C-ranked site, Albuquerque, NM



Vegetation Map Detail for an A-ranked site, Bosque del Apache National Wildlife refuge.



Vegetation Map for D-Ranked Site, Las Cruces, NM



NMRAM Lowland Riverine Wetlands Metric List

Landscape Context Metrics

Buffer Integrity Index
Riparian Corridor Connectivity
Relative Wetland Size
Surrounding Land Use

Biotic Metrics

Relative Native Plant Community Composition
Vegetation Horizontal Patch Structure
Vegetation Vertical Structure
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Abiotic Metrics

Floodplain Hydrologic Connectivity
Physical Patch Complexity
Soil Surface Condition
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Floodplain Hydrologic Connectivity Sub-metrics

- Sampling Area Inundation – degree and location
- Flood-deposited Large Woody Debris
- Side Channel Wetting
- Surface Litter

Floodplain Hydrologic Connectivity Return Interval for Stream Peak Discharge

- >25-year recent peak discharge return interval
- 10-25-year recent peak discharge return interval
- 2-10-year recent peak discharge return interval
- 1-2-year recent peak discharge return interval



Walking transects for Floodplain Hydrologic Connectivity metric on the Rio Grande

NMRAM Lowland Riverine Wetlands Rank and Summary Worksheet

- The Sample Area Summary allows for reviewing the values for each metric.
- The metric values are weighted based on understanding of the ecological processes and ability to measure them.
- The major attribute groups are further weighted relative to one another.
- The weighted category scores are then rolled up into a Final numeric Wetland Condition Score between 1.0 and 4.0

The Site is assigned a final Wetland Condition Rank that allows comparisons among sites for planning, mitigation, restoration prioritization and other management activities.

NMRAM - SA Rank Summary Worksheet: Lowland Riverine Wetlands 2.2			
Metric Description	Rating	Wt	Final Score
Landscape Context		Σ	1.75
L1. Buffer Integrity Index	3	0.25	0.75
L2. Riparian Corridor Connectivity	1	0.25	0.25
L3. Relative Wetland Size	2	0.25	0.5
L4. Surrounding Land Use	1	0.25	0.25
Biotic		Σ	2
B1. Relative Native Plant Community Composition	1	0.2	0.2
B2. Vegetation Horizontal Patch Structure	4	0.2	0.8
B3. Vegetation Vertical Structure	3	0.2	0.6
B4. Native Riparian Tree Regeneration	1	0.2	0.2
B5. Invasive Exotic Plant Species Cover	1	0.2	0.2
Abiotic		Σ	3.7
A1. Floodplain Hydrologic Connectivity	2	0.3	0.6
A2. Physical Patch Complexity	2	0.2	0.4
A5. Soil Surface Condition	1	0.1	0.1
A6. Channel Mobility	3	0.2	0.6
A11. Groundwater Index	2	0.2	0.4

SA Condition Scoring Summary			
Major Attribute	Score	Wt.	Wt. Score
Landscape Context	1.75	0.3	0.525
Biotic	2	0.35	0.7
Abiotic	3.7	0.35	1.295
SA WETLAND CONDITION SCORE Σ			2.52
SA WETLAND RANK =			B

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

Stressor Summary	Major	Minor	Top Three
	3	3	1 Extended low flow dam releases 2 Timing of flow releases not concordant 3 Agriculture/Urban flow diversion upstream

Stressor Comments (Evaluation of risk)

Stressor Checklist

Guide for evaluating potential drivers of ecological condition at local to watershed scales that can inform management

- Not used directly in scoring or ranking condition and explicitly excludes elements that are already incorporated in NMRAM metrics.
- Stressors grouped into major categories by their potential role in driving declines in wetland condition



SA CODE : _____ Date : 2022-03-23

SA Name : _____ Surveyor Initials : _____

Worksheet 15. Stressor Checklist. Check off stressors by intensity category that may be affecting wetland ecological condition of the SA and WOI. Assign categories using direct evidence where available or your best professional judgement otherwise. If the presence of the stressor is uncertain, mark as "Unknown". Rank Major Stressors in Dominant Stressor column(Pick up to 3)

Rank	Affect				Stressor Group/Stressor	Comments
	Major	Minor	Absent	Unknown		
					Adverse water management	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extended low flow dam releases	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Timing of flow releases not concordant	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extended high flow dam releases	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Agriculture/Urban flow diversion upstream	
					Adverse sediment management	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Adverse sediment retention by dams	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sediment loss by dredging	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Adverse sediment input (roads/development)	
					Artificial water additions	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sewer treatment effluent	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Point source urban runoff	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Factory, feedlot outfall	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Agricultural irrigation ditch returns	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mining waste	
					Ground water pumping	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Urban depletions	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fracking	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Agriculture irrigation wells	
					Watershed alteration	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extensive recent fires in watershed	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extensive recent timber harvest	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Extensive open pit mining in watershed	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Livestock/wildlife overgrazing	
					Local biodiversity impacts	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Evidence of excessive grazing (local)	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excessive noise affecting wildlife	
	0	0	0	0	Counts by Intensity	

Additional Comments _____

NMRAM Wetland Assessment Applications

- Prioritizing of riverine wetlands for restoration and protection
- Identifying suites or reaches of wetlands that are particularly impacted
- Providing profile data to facilitate restoration design
- Identifying areas of opportunity to improve and restore riverine wetlands
- Identifying drivers (stressors) of wetland resources declines
- Recognizing significant anthropogenic modification of a landscape and degraded condition around the wetland can influence conditions within the wetland itself
- Supporting the development of restoration and mitigation performance standards
- Monitoring to support adaptive management
- Coordinating and communicating wetland activities using a common framework



The NMRAM Field Guides and Manual can be accessed at <https://www.env.nm.gov/surface-water-quality/wetlands-rapid-assessment-methods/>

Team Requirements

- Team Leader and two other Team Members
- Vegetation and Hydrology Knowledge
- Target Sites or willing to collect data at Reference Sites

NMRAM Training Sessions and Certification for Teams

- On-Line tutorials for NMRAM Procedures
- Botany Booster Training
- Field Training Sessions
- Certification upon Completion

Contact: maryann.mcgraw@env.nm.gov for more information





***Thank you from the
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For More Information contact:
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