



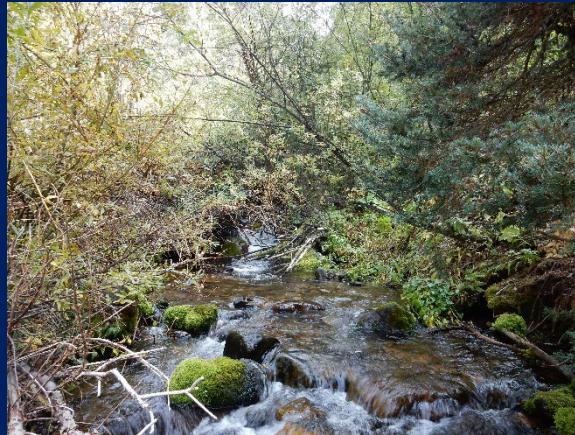
New Mexico Environment Department

New Mexico Rapid Assessment Method
Confined Valley Riverine Wetlands

April 6, 2022

New Mexico Environment Department
Surface Water Quality Bureau
Wetlands Program

New Mexico Rapid Assessment Method (NMRAM) for Confined Valley Riverine Wetlands



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Surface Water Quality Bureau
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Natural Heritage New Mexico
University of New Mexico



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 competent 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 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.

NMRAM metrics developed and modified after CRAM, EIA, and HGM and includes new metrics developed specifically for the Confined Valley Riverine Subclass.

Confined Valley Riverine Wetlands

- Wetlands found along stream and river channels that are cobble, boulder, and/or bedrock controlled
- Constrained within narrow v-shaped valleys
- Lateral migration of channels is limited
- Stream channel morphologies range from cascading to a step-pool configuration
- Typically occurs in mountainous regions but can extend down into ravines that cut through plateaus (e.g., tributaries to the Rio Grande Gorge).
- Elevations range from 4,500 ft to 9,000 ft.
- Stream channel gradients are greater than 1%.



NMRAM – Sampling Location

Wetland Of Interest (WOI)

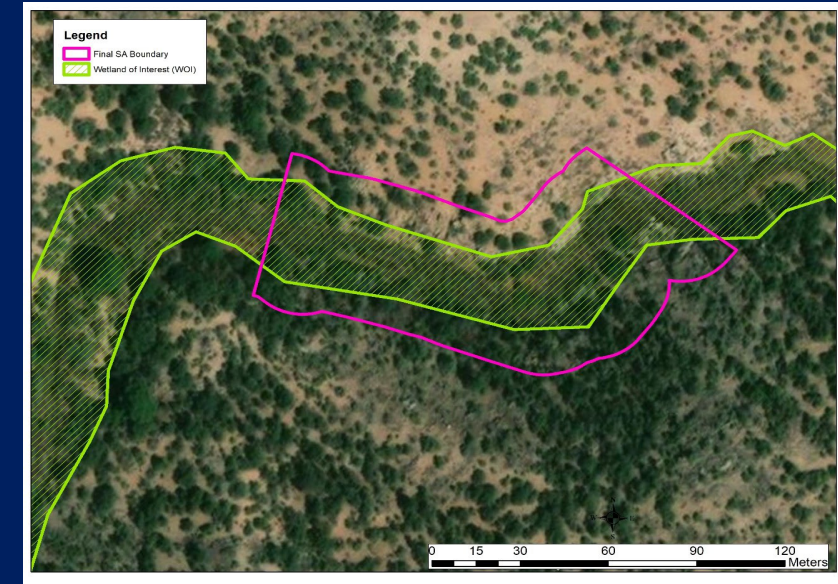
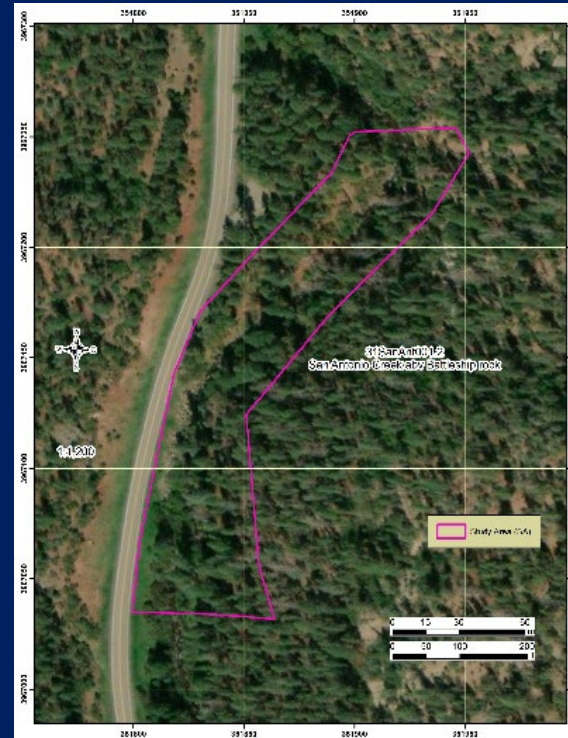
- follow the natural feature patterns and be relatively homogeneous;
- belong to the target wetland subclass;
- avoid major discontinuities caused by land use (i.e., ag lands, urban development, roads, and other non-wetland elements)

Sampling Area (SA)

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

SA Selection Rules:

- **Placement**
 - Represents the WOI
- **Size – 200 m length**
 - Too small – lower score
 - Too large – raise score
- **Consistency**
 - Includes both banks of river and riparian wetlands zone and up to 20 m section of upland slope (allochthonous zone) both sides



Confined NMRAM Metric List

Landscape Context Metrics

- Buffer Integrity Index
- Riparian Corridor Connectivity
- Surrounding Land Use
- Road Proximity (New)

Biotic Metrics

- Invasive Exotic Plant Species Cover
- Riparian Zone Wetland Plant Abundance (New)
- Wetland Vegetation Zone Loss (New)

Abiotic Metrics

- Soil Surface Condition
- Large Woody Debris (New)
- Confined Channel Condition (New)



Landscape Context Metrics

Landscape Context Metrics

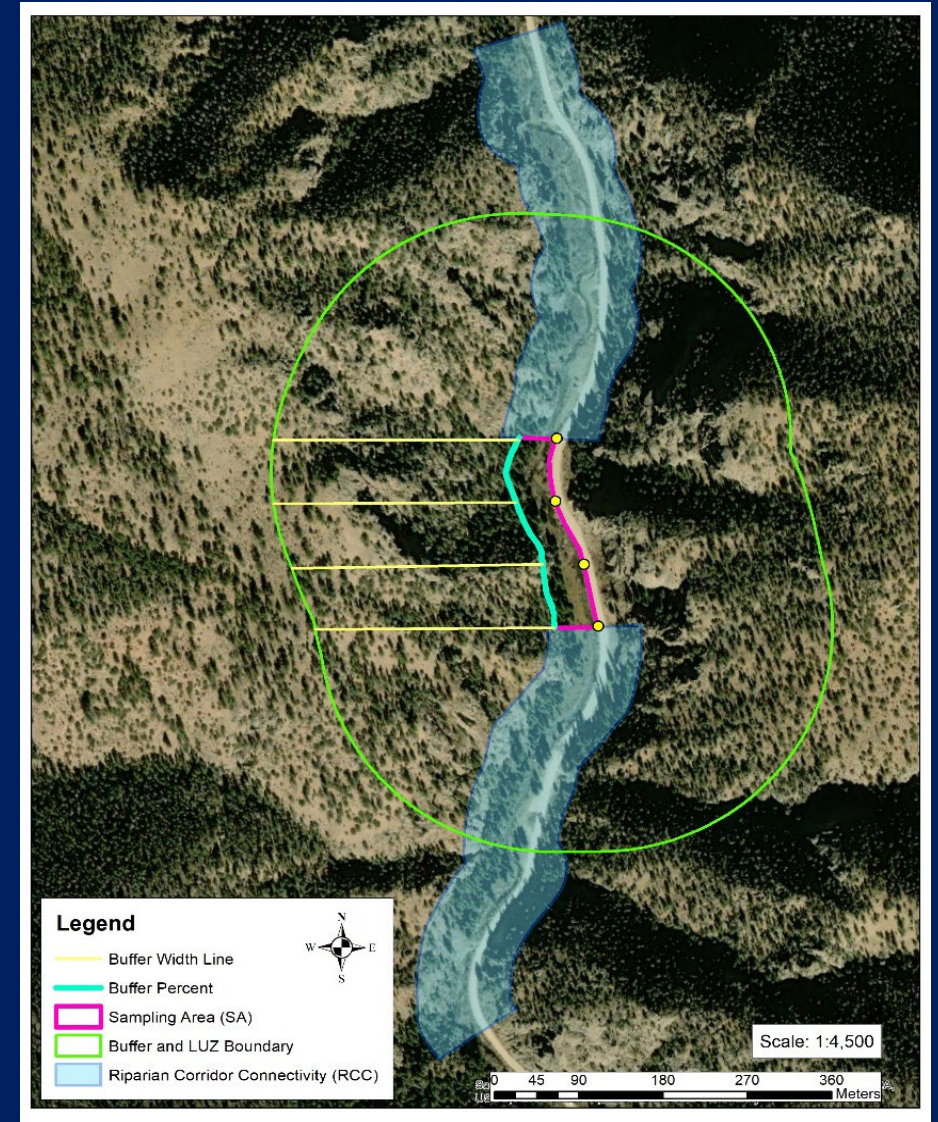
Buffer Integrity Index

Riparian Corridor Connectivity

Surrounding Land Use

Road Proximity (New)

- **Landscape Context metrics measured in three zones around an SA:**
 - Buffer and Land Use Zone out to 250 m (green line)
 - Riparian Corridor upstream and downstream zones 500 m long each and 100 m wide (blue areas)
 - Buffer % is measured on the lateral sides of the SA (cyan line)
 - Buffer Width is measured at eight points extending laterally from the SA boundary (yellow lines and dots)
 - Land Use Index (LUI) is evaluated inside the Land Use Zone (LUZ)



ROAD PROXIMITY

Measurement of the nearness of roadways to confined riverine wetlands.

Level 1: GIS and field verified.

- Roads within the historic wetland and/or adjacent to the current wetland have larger impacts on function than those that are set higher upslope from the wetland.
- Large reductions in historic wetland area indicate alteration to hydrology and ecosystem processes.
- Roads are vectors for non-point source pollution, trash and non-native species.
- Roads negatively impact wildlife access to the wetland.



Table L8. Road Proximity. "Roads" include all of the following: paved highways and smaller order roads, graded unpaved roads, abandoned graded roads, railroads or old railroad embankments.

Rating	Description
4	No roads adjacent to the SA nor any roads on the canyon slopes above the SA. If there is a road on a flat mesa top outside of the canyon slope, then the SA can still receive this rating.
3	Road present within the canyon slope in the upper half of the slope above the canyon bottom and SA. No road fill or sediment input from road to wetland.
2	Road above SA in lower half of the canyon slope, or road in upper half of slope with evidence of sediment, fill, culverts, run-off or other impacts to SA and wetland.
1	Road and/or road fill on or adjacent to SA, either on historic wetland or directly adjacent to current wetland. Obvious impacts to current wetland from fill, sediment, run-off, and/or reduction in wetland size.

Biotic Metrics

Biotic Metrics

Invasive Exotic Plant Species Cover
Riparian Zone Wetland Plant Abundance
(New)
Wetland Vegetation Zone Loss (New)

Biotic metric measurements based on mapping of vegetation community patches (polygons) on an SA Biotic Map with its aerial imagery base.

➤ Measurements are made within a *Biotic Index Area (BIA)* which differs from the SA because it includes adjacent development if present.

- **Invasive Exotic Plant Species Cover** is a measure of the total percent cover of invasive plant species based on the New Mexico list of noxious weeds.
- **Riparian Zone Wetland Plant Abundance** is an index of wetland condition based on the presence and abundance of dominant or co-dominant wetland species in the riparian zone.



Wetland Vegetation Zone Loss

Presence or absence of expected wetland and riparian vegetation zones as a measure of overall biotic habitat availability.

Level 2: Field Based

Riparian zones act as buffers and provide habitat

- Buffer aquatic system from up slope sediment and contaminants
- Provide Habitat for aquatic wildlife, semi-aquatic wildlife, terrestrial wildlife
- Reduction in size could indicate altered hydrology, altered channel morphology
- Anthropogenic disturbance indicates lower quality and quantity wildlife habitat



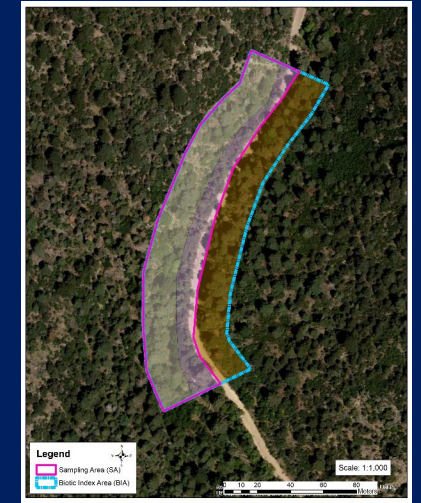
Wetland Vegetation Zone Loss

Presence or absence of expected wetland and riparian vegetation zones as a measure of overall biotic habitat availability.

Level 2: Field Based

Based on the proximity and total extent of “development” relative to the lateral SA boundaries

- All types of anthropogenic fill, soil disturbance, pavement, structures, dumping, etc. are considered.
- Map all areas where development is within 40 m of the outer edge of the riparian zone.



Worksheet 6. Wetland Vegetation Zone Loss. Using the location of "development disturbance" mapped on the SA Biotic map, determine where disturbance is closest (distance in meters) to the RZ outer boundary on both sides of the SA. Estimate percentage of loss to development lateral to Riparian Zone edge for each of the categories below. Percentages should add up to 100%. Rate using Table B10.

Percent	Development Disturbance Distance from RZ Edge
	> 40 m from RZ lateral edge
	> 20 m and ≤40 m from RZ lateral edge
	>10 m and ≤20 from RZ lateral edge
	≤10 m to 0 m from RZ lateral edge

Table B10 - Rating for Wetland Vegetation Zone Loss. Assign a rating for the SA that is prioritized by the altered landscape percent, not the unaltered percent. Work from the development disturbance condition closest to the RZ (eg., a rating of 1). If that criteria is not met, then move to rating of 2 description. If the rating of 2 description is not met then move to rating of 3 description, etc. Only one description can meet the criteria. Enter the rating on the SA Summary Worksheet.

Rating	Meets criteria? (Y/N)	Criteria Description
o 4		Development disturbance >40 m away from of RZ is >75% of RZ edge and not like Ratings 1,2, or 3.
o 3		Development disturbance >20 m and ≤40 m away from of RZ edge for ≥25% of RZ edge, or total ≥25% for ≤40 m away from of RZ edge cumulatively.
o 2		Development disturbance <15% for within 10 m or less, but ≥25% for ≤20 m away from of RZ edge cumulatively.
o 1		Development disturbance within 10m or less for ≥15% of RZ edge.

Abiotic Metrics

Abiotic Metrics

Soil Surface Condition

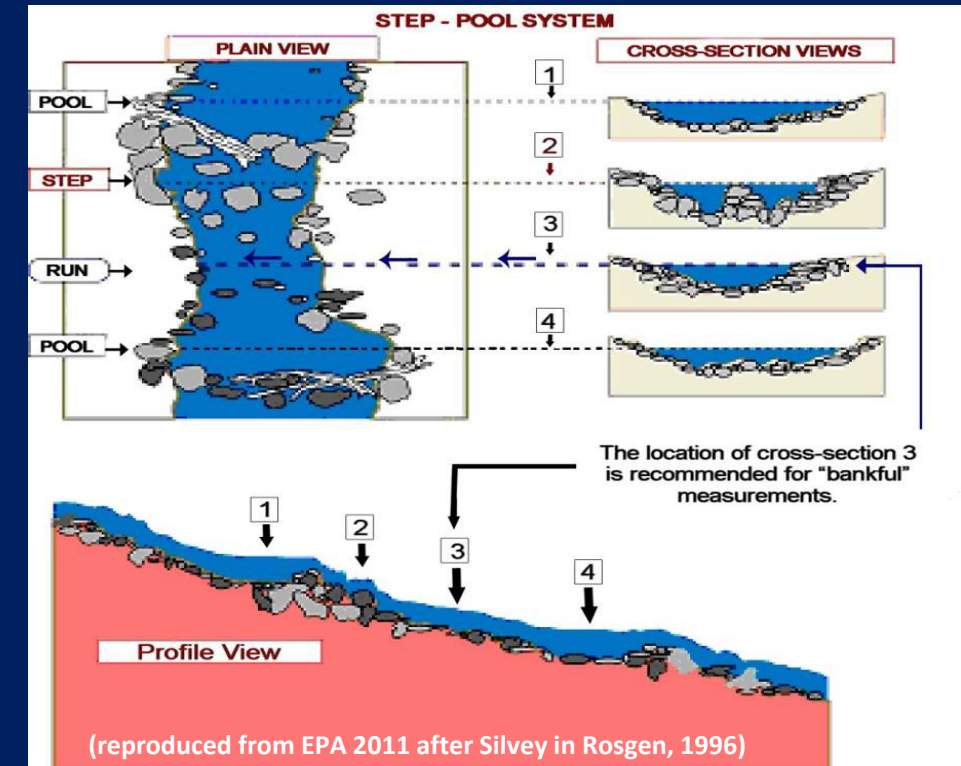
Large Woody Debris (New)

Confined Channel Condition (New)



Stream reach is divided into three equal segments (upper, middle, and lower) and stream cross-section locations.

- *Soil Surface Condition* is evaluated as part of the walk-through of each of the three segments of the floodplain using indicator checklists.
- *Large Woody Debris* metric is a record of LWD counts along transects in each segment.
- *Confined Channel Condition* is evaluated at the cross-section locations using metric checklists.



Confined Channel Condition

Degree of excessive sediment accumulation in confined channels and riparian zones resulting from streamside to watershed disturbances.

Level 2: Field Based

- Under normal hydrological conditions bedload transport rates exceed sediment supply leading to naturally scoured channels and little floodplain development from sediment aggradation.
- Degradation in the short term may apply when there has been significant alteration of the channel by development or fill.
- Focuses on specific and recent indicators of aggradation
 - that occur most often during monsoon-driven high-flow events
 - that may follow major watershed-scale disturbance events that accelerated erosion (e.g., catastrophic fires, roads, timber harvest, mining, grazing, and drought. (Wohl 1998)
- Checklist of observable field features



Table A13. Confined Channel Condition Rating

Rating	Description
4	Little or no evidence of recent excess alluvial deposition in the channel or RZ except in microsites typical of montane confined valley stream reaches. Stream reaches are typified by scoured cascade and step-pool channels and exposed bedrock, boulders and cobbles and wetland vegetation development is not affected. No evidence of headcuts or channel alteration.
3	Some recent sediment deposition has occurred in channel. Limited deposition in the RZ (flood zone), but vegetation development is not affected. Raw banks are not evident. No anthropogenic channel alteration.
2	Moderate recent sediment deposition is evident in channel and adjacent RZ, but the adverse sediment package has begun to mobilize through channel incision and scour. Pools evident with little sediment fill. Or some raw banks present due to anthropogenic channel and/or bank alteration.
1	Extensive and on-going sediment deposition is evident in channel and adjacent RZ. Sediment package appears to be increasing with little evidence of mobilization. The stream lacks well-define channel pools or pools are sediment-filled. Original cascade or step-pool channel morphology is obscured. Or riparian and wetland vegetation buried by sediment creating barren areas throughout the reach. Or numerous raw banks due to anthropogenic sources. Or one or more banks covered by rip-rap or composed of anthropogenic fill.

Stressor Checklist

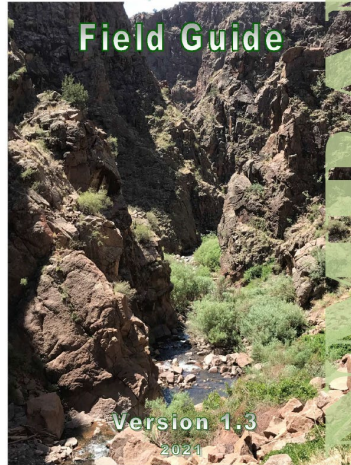
Guide for evaluating potential drivers of ecological condition at local to watershed scales that can inform management

- 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	Counts by Intensity	
Additional Comments						

Confined Valley Riverine Wetlands Assessment Package



NMRAM Confined Valley Riverine Wetlands Version 1.3						
SA Cover Worksheet						
SA Code	SA Name			Project		
AU Code	AU Name			MOI		
County	HUC 12		Elevation (ft)	(in)	Scoregion	
SA General Location and Boundary (Rationale, comments)						
DNRC						
C						
Driving Directions						
to SA location						
Ownership:				Data Sharing	Restrictions	Fish Observed in Wetland?
Surveyor Role	Surveyor Name				Surveyor Initials	
Landscape						
Biotic						
Abiotic						
Stressors						
Easting	Northing	Zone	Datum	Latitude	Longitude	
Survey Date		Start Time		End Time		
SA Description						
SA Landscape Context (summarize the wetland and surrounding landscape; include condition and impacts)						
SA Biotic Condition (vegetation patterns, composition and structure, exotics and invasives, disturbance evidence, fire and herbivory)						
SA Abiotic Condition (hydrological alterations (e.g., dams, weirs etc.); flooding characteristics and evidence of overbank flooding; soil disturbance and other site impacts; define the hydrologic breaks or other factors that define the SA limits)						
Assessment Summary Overall site condition summary and comments after the field data is collected:						
Provisional Field Score	Rank	Surveyor(s)	Final Score	Rank	Initials	Date

SA CODE:	Date:		
SA Name:	Surveyor Initials:		
NIMRAM - SA Rank Summary Worksheet: Confined Valley Riverine Wetlands 1.3			
Metric Description	Rating	Wt	Final Score
Landscape Context Metrics		E	
L1. Buffer Integrity Index		0.3	
L2. Riparian Corridor Connectivity		0.3	
L4. Surrounding Land Use		0.1	
L8. Road Proximity		0.3	
Biotic Metrics		E	
B5. Invasive Exotic Plant Species Cover	2	0.3	0.6
B9. Wetland Plant Abundance	4	0.3	1.2
B10. Wetland Vegetation Zone Loss		0.4	
Abiotic Metrics		E	
A5. Soil Surface Condition		0.4	
A12. Large Woody Debris		0.3	
A13. Confined Channel Condition		0.3	

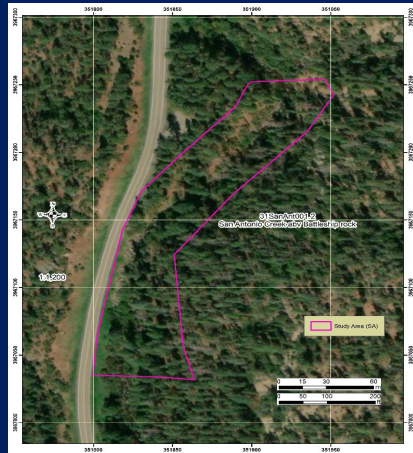
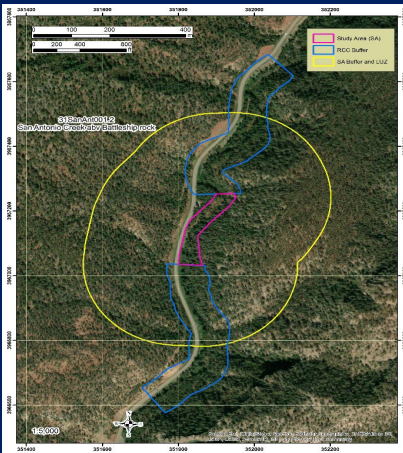
SA Condition Scoring Summary			
Major Attribute	Score	Wt.	Wt. Score
Landscape Context		0.3	
Biotic		0.35	
Abiotic		0.35	
SA WETLAND CONDITION SCORE: I			
SA WETLAND RANK: -			

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
D	1.0 - <1.75	Poor Condition

Stressor or Summary	Major	Minor	Top Three
			1
			2
			3

Stressor Comments (Evaluation of risk)

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Wetland Assessment Objectives

- Establish a baseline of condition, function, quantity, distribution, and overall status of New Mexico's wetlands
- Identify stressors and threats to wetlands
- Monitoring to support development of Narrative Water Quality Standards for subclasses of wetlands
- Conservation planning and mitigation
- Monitoring to support adaptive management.
- Coordinate and communicate wetland activities using a common framework

“All Hands” Field Campaign Summer and Fall 2022 - 2023

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 Session
- Certification upon Completion

Contact: maryann.mcgraw@state.nm.us for more information





New Mexico Environment Department Surface Water Quality Bureau Wetlands Program



Thank you!



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