New Mexico Rapid Assessment Method

Confined Valley Riverine Wetlands

Field Guide

Version 1.3

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NMRAM

New Mexico Environment Department

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and

Natural Heritage New Mexico

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Cover and font page photos: Cover: Confined valley riverine wetlands, Rio Guadalupe at Gilman Tunnels in the Jemez Mountains (Photo: M. McGraw June, 2019). First Page: Bobcat Creek near Red River (Photo: D. Crosley, September 2020).

New Mexico Rapid Assessment Method: Confined Valley Riverine Wetlands Field Guide.

Version 1.3

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Acronyms

AU	Assessment Unit
CT	Community Type
DBH	Diameter at Breast Height
E	Exotic
GIS	Geographic Information System
GPS	Global Positioning System
LUI	Land Use Index
LUZ	Land Use Zone
M	Mixed Native and Exotic
N	Native
NA	Not Applicable
NMED	New Mexico Environment Department
NMRAM	New Mexico Rapid Assessment Method
OBL	Obligate Wetland Species
PDF	Portable Document Format
RCC	Riparian Corridor Connectivity
RSR	Relative Size Ratio
RWSI	Relative Wetland Size Index
SA	Sampling Area
SQUID	Surface Water Quality Information Database
SWQB	Surface Water Quality Bureau
U	Unknown
USDA	United States Department of Agriculture
UPL	Upland Species
UTM	Universal Transverse Mercator
VST	Vertical Structure Type
WOI	Wetland of Interest

I. Introduction

This New Mexico Rapid Assessment Method (NMRAM) Field Guide provides procedures for conducting a rapid ecological assessment of wetlands in the Confined Valley Riverine Wetland subclass of the Riverine Wetland class. Confined Valley Riverine Wetlands are those wetlands found along stream and river channels that are cobble, boulder, and/or bedrock controlled and typically constrained within narrow v-shaped valleys (Brinson 1993; Wilder et al. 2012) (Figure 1). Lateral migration of channels is limited, and stream channel morphologies range from cascading to a step-pool configuration with intermixed drops over boulders and extended pools. This subclass 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%. (See NMRAM Manual Version 2.0 for additional subclass description detail.)

Figure 1. Confined Valley stream reach of Lake Fork of Cabresto Creek structurally controlled with large boulder bottom and riparian wetlands adjacent to the stream.

This NMRAM Field Guide complements the NMRAM Manual Version 2.0 by providing specific protocols and datasheets for evaluating 10 wetland ecological condition metrics using a

combination of Geographic Information System (GIS)-based measurements and field surveys. In addition to details on metric measurements, appendices are provided that include the data collection worksheets, a reference guide for taking some metric data, a plant species list with wetland indicator status, the state noxious weed list, a guide for taking photos, and a glossary of terms.

The assessment is a multi-step process involving a two- or three-person team. It begins with delineating a target Wetland of Interest (WOI) and one or more Sampling Areas (SAs) within the WOI to be assessed. For each SA, 10 metrics grouped into three attribute categories: Landscape Context (4 metrics), Biotic (3), and Abiotic (3) (Table 1). The metrics are measured using maps and aerial imagery or evaluated in the field. Landscape Context metrics are assessed using maps and/or a geographic information system (GIS) and these are termed "Level 1" metrics. Landscape Context metrics are preferably completed before going into the field to help familiarize the team with the site. Level 1 metrics are also confirmed or modified as necessary during the field survey. In contrast, Biotic and Abiotic metrics are evaluated in the field (Level 2 metrics) and include annotated field maps and documentary photographs. In addition, a stressor checklist for evaluating potential drivers of ecological condition at local to watershed scales is completed in the office prior to going in the field and reviewed and updated, if necessary, as part of the field survey. The checklist is not used directly in scoring or ranking the condition of the wetland and accordingly explicitly excludes elements that are already incorporated in NMRAM metrics themselves (e.g., Surrounding Land Use).

A set of worksheets organized by attribute classes has been developed to support efficient data capture (Appendix A). These data collection worksheets are provided as printable forms in Appendix A and as a downloadable fillable PDF file that computes and rates most metrics automatically and rolls up the scores for the user. The worksheet packet contains a cover worksheet for recording basic information, surveyor identification, and narrative descriptions of the SA by attribute. The worksheets together with maps and photographs make up the NMRAM Assessment Package that becomes the supporting record at a project level and the tool for data entry into the Surface Water Quality Bureau Information Database (SQUID) (a comprehensive database currently under construction by New Mexico Environment Department [NMED] Surface Water Quality Bureau to provide access to information about wetland areas, wetland habitats, and ecological condition).

Below are step-by-step protocols for filling out the worksheets and evaluating and rating each metric. Ratings for each metric range from one (poor condition) to four (excellent). To arrive at an overall rating for an SA, individual metric ratings are weighted and rolled up by attribute group into a final overall numeric score. Based on the scores, categorical condition ranks are assigned as follows: A = Excellent (≥3.25-4.0); B = Good (≥2.5-<3.25); C = Fair (≥1.75-<2.5), and D = Poor (1.0 -<1.75). When there are multiple SAs in a WOI, the SA scores can be averaged to arrive at a final rank for the entire wetland.

Table 1. List of NMRAM Confined Valley Riverine metrics. (Numbering refers to NMRAM Manual Version 2.0 descriptions of each metric.)

Metrics
Landscape Context
L1. Buffer Integrity Index
L2. Riparian Corridor Connectivity
L4. Surrounding Land Use
L8. Road Proximity
Biotic
B5. Invasive Exotic Plant Species Cover
B9. Riparian Zone Wetland Plant Abundance
B10. Wetland Vegetation Zone Loss
Abiotic
A5. Soil Surface Condition
A12. Large Woody Debris
A13. Confined Channel Condition

II. Pre-field Protocols

1. Download the worksheets for NMRAM Confined Valley Riverine Wetlands Version 1.3. Worksheets are provided in Appendix A and a digital version is available from NMED SWQB.[1]
2. Delineate the project area, WOI(s), and provisional SA(s) boundaries on maps as described below to assess the Landscape Context suite of metrics and guide the field survey.
3. Verify land ownership, review site background information, fill in stressor checklist based on watershed knowledge, and obtain the necessary permissions for sampling.
4. Assemble field equipment, guides, worksheets, and maps.

Worksheets

Worksheets are provided in Appendix A and digital versions are available from the NMED SWQB. The downloaded worksheets are smart PDFs where data and ratings can be directly entered in the field using a laptop or other digital device that uses Adobe Acrobat Pro DC, or recorded manually on printed forms and entered later into the digital file. The PDF worksheets are designed to compute some metric ratings automatically when the data are entered; other metric ratings must still be evaluated directly. The worksheets also track the field process, global positioning system (GPS) locations, and photo inventory.

[1]NMED SWQB Wetlands Program - Contact Maryann McGraw at maryann.mcgraw@state.nm.us.

Maps

The foundation for the NMRAM is a set of three field maps on which landscape, biotic and abiotic features are mapped to support metric scoring. Each map should have a 100- or 200-m UTM grid overlay or lat-long grid to help field navigation along with a north arrow and scale bar (Figure 2).

1. Landscape Map. A map at approximately 1:4,000-6,000 scale that shows the SA(s) in a landscape context (see Figure 2). Any modifications to the SA location that occur on site along with any features to aid the field validation of Landscape Context metrics around the SA should be sketched on the Landscape Map. Specifically, the map should delineate the maximum extent of the potential buffer used to measure the Buffer Width sub-metric of the Buffer Integrity Index (see Landscape Context metrics below).
2. SA Map. A map that encompasses a single SA at between1:1,000-1,500 scale for mapping vegetation communities, abiotic features, and transect locations (see Biotic and Abiotic metrics below). Two copies of the SA Map are required, one each for the biotic and abiotic measurements, respectively. The vegetation communities in an SA can be provisionally mapped on the SA Biotic Map prior to field reconnaissance and then validated and modified during the survey. Modifications to the SA boundary should be recorded on both the SA Biotic and the SA Abiotic map. The SA Biotic map should include a sketch of the Biotic Index Area (see biotic protocols).
3. Road Map. A third optional map at 1:24,000 or coarser is often useful for locating a site relative to highways and towns.

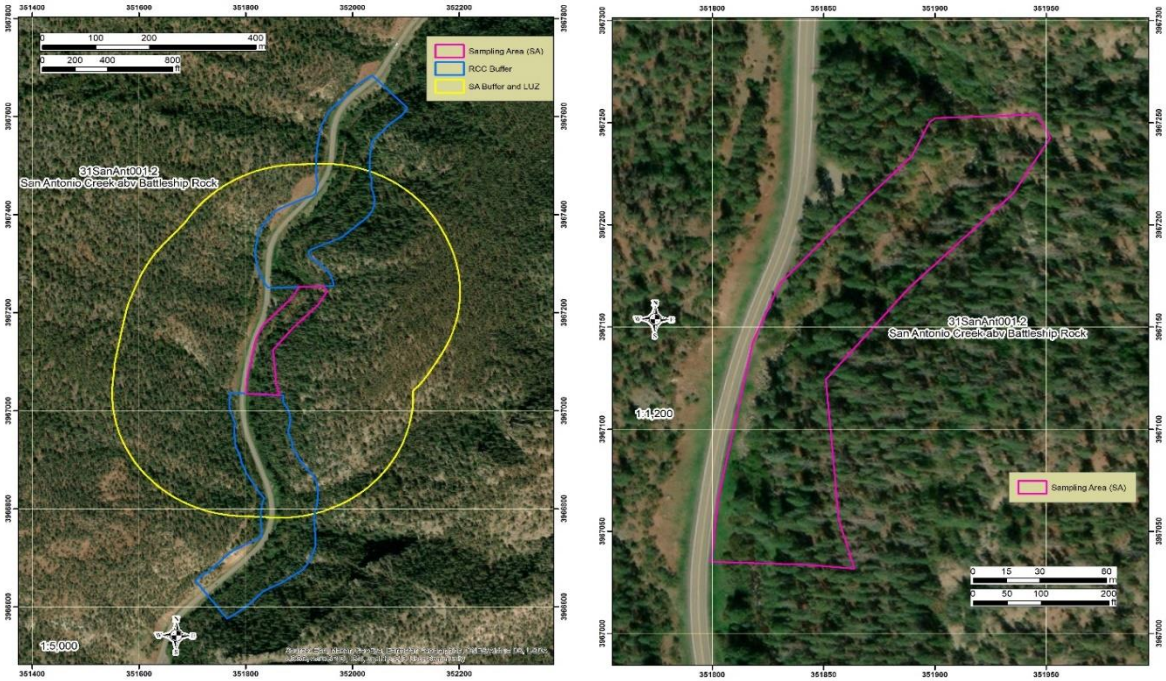

Figure 2. Examples of Landscape and SA field maps. On the left, a landscape-scale map with boundaries for measuring the landscape metrics. On the right, a fine-scale SA map for field vegetation and abiotic features mapping.

Delineating the Wetland of Interest (WOI)

Delineating a Wetland of Interest (WOI) is necessary for determining the number and placement of SAs and for some metric measurements. A WOI is delineated using a GIS or paper maps and may or may not coincide with the project area. When it does not, wetland vegetation maps can help inform the boundaries of a WOI in concert with aerial imagery interpretation (e.g., National Wetland Inventory maps[2]). In addition, boundaries should:

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

An example where the WOI boundary follows these natural-features guidelines is shown in Figure 3. This approach is designed to meet the immediate needs of a rapid assessment when other procedures are not required or desired (e.g., jurisdictional wetland delineation). As necessary, the boundary may be modified based on the field reconnaissance or other requirements at a project level.

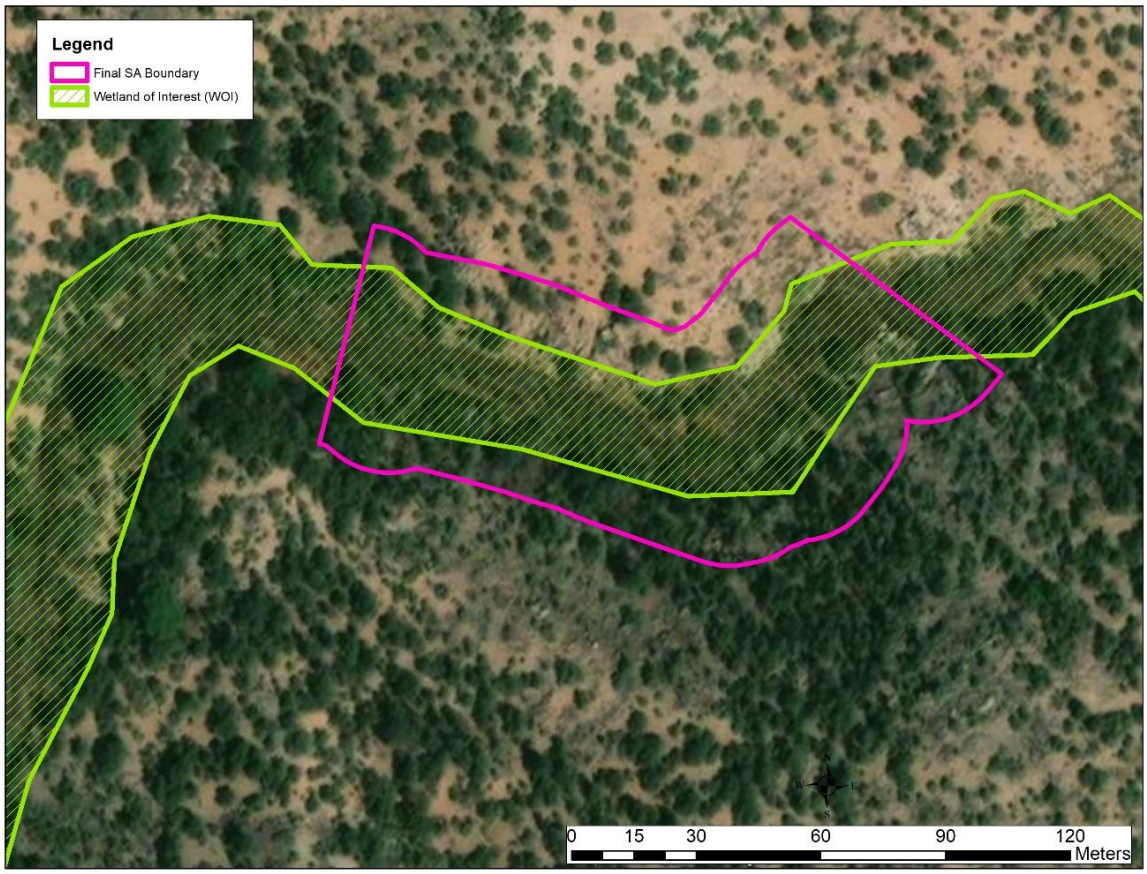

Figure 3. Example of Wetland of Interest (WOI) delineation (green) and the placement of an SA (pink outline) that is representative of the WOI.

[2] https://www.fws.gov/wetlands/

Delineating the Sampling Area and the SA Cover Worksheet

Use the *SA Cover Worksheet* (Worksheet Page 1) to track the basic information about a given SA within a WOI/project area.

- Assign a unique SA Code and SA Name, which are user-defined per project needs. For tracking purposes, an SA Code and SA Name cannot duplicate other SAs.
- Enter the project and/or WOI name this SA references or any other relevant site designation that can help track the assessment.
- For SQUID, enter the AU (Assessment Unit) Code and AU Name if available from the NMED SWQB website.
- Describe the general location and SA boundary rationale.
- Provide driving directions and note required permissions for visiting the site.
- Enter the ownership and note any restrictions on data sharing, if applicable.
- Enter the surveyor names and initials by their roles in the assessment.
- For SWQB purposes, enter whether fish species were present within the wetland (not including the adjacent stream).
- Enter the central location in lat-long and UTM coordinates and include the zone and datum.
- Enter the date and start and end times of the field survey.
- In the SA Description, provide narratives of condition by major attribute category and comments on the condition rank of the SA (preferably before leaving the site).
- Before the team leaves the site, they should give the SA a provisional field Score and Rank and provide the surveyors initials who scored the site for future reference.
- Final Score and Rank are completed in the office after all data have been entered and finalized.

SA Size and Placement

While an SA can be placed randomly, given the limitations of time and personnel resources that often exist in rapid assessment, it should be optimally placed to best represent the predominant vegetation pattern and conditions within the WOI. At a minimum, there is one SA per WOI/project area, but for large WOIs, two or more SAs may be required to capture the range of variation (particularly if randomization is used). In addition, an SA may be constrained by logistical considerations such as ownership and access (keeping in mind this may affect metric scores).

SAs are provisionally mapped prior to the field visit, then modified as needed based on field indicators and constraints using the guidelines given below. The delineation of SAs should be done with care and decision rules documented on the SA Cover Worksheet to provide context for evaluating the assessment outcome. This is particularly important where project goals may affect the delineation (e.g., mitigation assessments). Overall, the goal is to delineate relatively homogeneous SAs with respect to hydrology and wetland type. That is, an SA is a sampling area along a channel that best reflects the hydrological processes of the local reach (e.g., flooding, sediment deposition, scour, and groundwater recharge) and is characterized by wetland

vegetation communities that are representative of the wetland subclass (non-riparian or non-wetland types may occur internally but they should be relatively minor elements with the exception of the allochthonous zone).

For the Confined Valley Riverine Wetlands subclass the SA must include both banks of the river, the riparian wetland zone and a 20-meter section of upland slope termed the allochthonous zone. The SA lateral boundaries include the entire channel, plus the riparian bank zones based on hydrologic and vegetative indicators. At the outer edge of each riparian zone a 20-meter extension upslope is added to the SA area and labeled the allochthonous zone. If a major break in hydrological connectivity due to development, such as a road, building, or irrigation ditch is encountered before reaching the full width of the riparian and allochthonous zones the SA boundary is stopped at that break. If there are no anthropogenic breaks, the SA will include the riparian zone plus the 20-meter allochthonous zone on both sides of the channel. For the biotic metrics the full 20-meter allochthonous zone is included in the Biotic Index Area (BIA) regardless of anthropogenic breaks (See the biotic protocols below). The length of SA up and down the river corridor is 200 m for the Confined Valley Riverine Wetlands subclass. Figure 4 provides an example of the final delineated SA boundaries for a Confined Valley Riverine Wetlands SA.

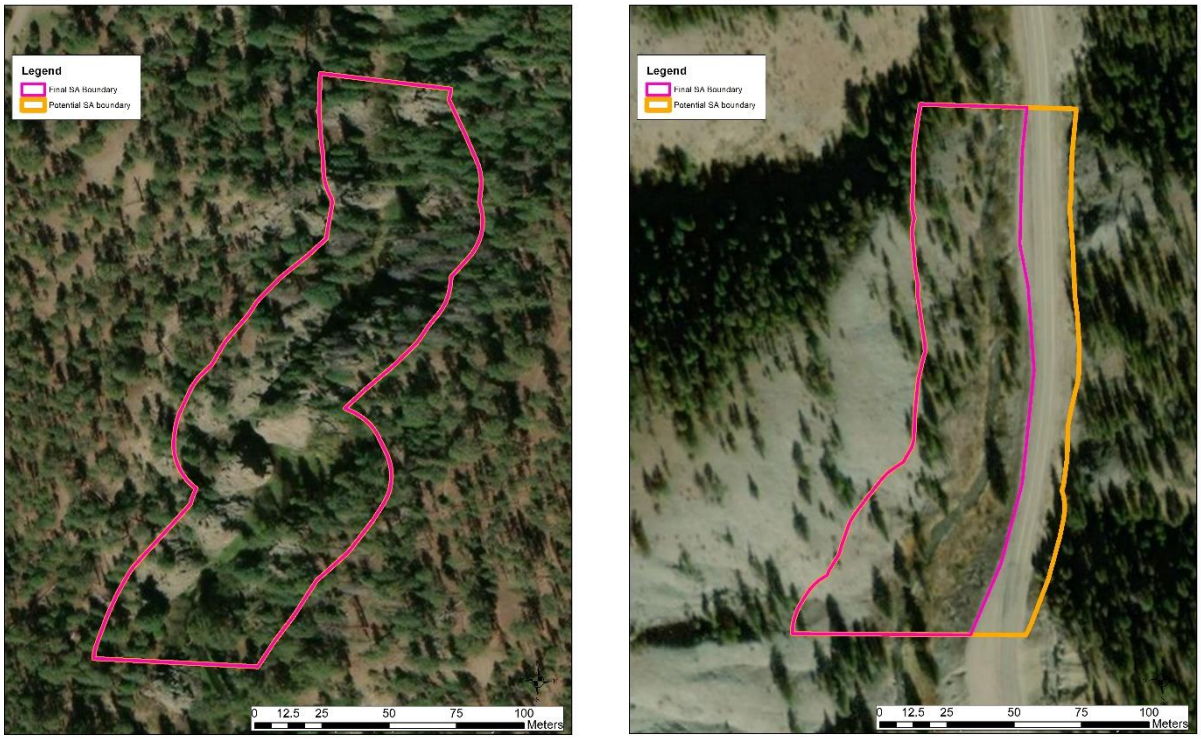

Figure 4. Confined Valley Riverine Wetlands SA delineation examples without a major hydrologic break (left) and with a major hydrologic break due to a paved road (right). Note that the length of the SA for Confined Valley Riverine Wetlands in 200 meters. The SA should encompass at least three step-pool stream sections whenever possible, to accommodate three stream-channel cross-section locations for the Abiotic metrics.

SA homogeneity. SAs should be relatively homogeneous with respect to hydrological factors and other site conditions; there should not be any major hydrological breaks or significantly different

site alterations within an SA. If there are, then two or more SAs should be placed to assess the range of conditions within the WOI.

Examples of features that should be used to delineate SA boundaries include:

- Acequias and other diversion structures and ditches;
- Ends of large-pipe discharges;
- Grade control or water-elevation control structures;
- Weirs, culverts, dams, levees, and other flow-control structures;
- Major changes in riverine confinement, entrenchment, degradation, aggradation, slope, or bed form;
- Major tributary or channel confluences that significantly alter the shape and structure of the floodplain (including ephemeral channel confluences with significant sediment input);
- Major Waterfalls;
- Reaches with beaver ponds versus ones without;
- Adjacent springs or seeps that significantly modify the floodplain and/or local groundwater conditions;
- Transitions between wetland subclasses (e.g., confined to unconfined);
- Railroads and other "non-buffer" elements listed in Worksheet 1a that cross the floodplain and active channel.

Land Ownership and Sampling Permissions

In general, sampling permissions can be obtained for public lands, but each land management agency has its own rules and regulations that must be followed to obtain access. Many land management agencies have a formal application process for obtaining a special use permit or other official written permission. Agencies should be contacted as far in advance as possible to determine the correct process for obtaining permission, with a month generally being the minimum amount of time in which a permit can be processed.

When sampling on private lands, permission for access needs to be sought and granted. Allow sufficient time in the planning stage to contact owners and to schedule your visit once permission has been granted. If the ownership is unknown, records can be checked at county clerk or assessor's office or assessor's records on-line for ownership and contact information. Owners should be contacted directly by phone or visit, and written permission for access obtained. While delineation of the SA should be based on biological and physical attributes, lack of owner permission may require adjusting the SA location and boundaries prior to field reconnaissance.

Field Equipment, Guides, and Worksheets

Suggested equipment includes:

- ☐ Two copies of Landscape maps, one each for the Biotic and Abiotic field teams, and one each of Abiotic and Biotic SA maps (either paper or writable on a tablet or other device). A third optional map at 1:24,000 is often useful for locating a site relative to highways and towns.

- ☐ Worksheet sets (Appendix A) and Reference Guides (Appendix B) for each field team covering the metrics they will measure. Note for those using field tablets, just download Appendix B. For Teams using paper datasheets, a printed copy of Appendix B is needed.
- ☐ Covered clipboards to protect worksheets and maps (if using paper copies).
- ☐ A ruggedized tablet or other protected electronic device uploaded with interactive PDF Data Collection Worksheets and Field Guide (if using the interactive PDFs).
- ☐ Pencils and water-resistant markers for labeling paper maps or other sheets or items which may come in contact with water.
- ☐ GPS unit and directions to site (with GPS coordinates).
- ☐ Camera and photo board.
- ☐ Binoculars for viewing landscape conditions.
- ☐ Compass for accurately orienting field maps and conducting mapping exercises.
- ☐ 50-meter measuring tapes for delineating Large Woody Debris transects.
- ☐ Pin flags to mark or corroborate bankfull indicators and other features in photographs.
- ☐ Plant press for collecting plants requiring identification.
- ☐ Bleach and bucket: it is mandatory that all field technicians sterilize boots with a bleach and water mixture before and after entering waterways to prevent the spread of aquatic nuisance species such as didymo (*Didymosphenia geminata*), a microscopic algae, as well as whirling disease and other potential pathogens.
- ☐ Waders for crossing and working within channels as site conditions require. Waders, wading shoes, or other footwear *without* felted soles are recommended; felted soles are known to transport pathogens.

III. Metric Measurement and SA Condition Ranking Overview

There are two levels of investigation: 1) GIS-based assessment of the Landscape Context metrics (Level 1), and 2) field-based semi-quantitative Biotic and Abiotic metrics (Level 2), each with its own section of Data Collection Worksheets, which are provided in Appendix A. The protocols that follow provide the guidelines for measuring the metrics and completing the worksheets, and assigning assessment ratings to each metric.

Assessing Landscape Context Metrics (Level 1)

For the Landscape Context attribute, metrics are measured in the context of the SA boundary. These are non-field metrics that are evaluated manually or in a GIS framework using maps and aerial photographs and then verified in the field where possible. The basic GIS layers needed are:

- Recent ortho-rectified aerial photography or satellite imagery with a minimum resolution of 1 m (3 feet);
- Roads and trails;
- Ownership; and
- Topographic maps or digital elevation models.

Sources for geospatial data include New Mexico Resource Geographic Information System (https://rgis.unm.edu/browsedata), BING, and Google Earth, among others. See the Protocols section for specific instructions on metric measurements.

Assessing Field Biotic and Abiotic Metrics (Level 2)

There are 3 Biotic and 3 Abiotic metrics that are measured as part of the field survey of the SA (Table 1). The survey requires a field team composed of two to three members: one who evaluates the biotic metrics, while the other individual(s) evaluates the abiotic metrics. The team member responsible for the biotic reconnaissance should have a basic understanding of the local flora (common dominant trees and shrubs in particular), and their wetland status (see Appendix C for a list of common species with their wetland status). In addition, the biotic technician should be familiar with state-listed noxious weeds that may occur in the area (Appendix D). The team member(s) responsible for the abiotic metrics should have basic training in measuring hydrological conditions and recognizing floodplain geomorphological characteristics (Rosgen **Applied Fluvial Geomorphology** training is beneficial). As they work through the SA, both team members should watch for stressors and altered conditions along the SA edges relevant to the landscape context metrics. One team member is designated to be responsible for the field review of landscape context metrics. Upon completion of the field survey, the team works together to verify the landscape context metrics, write the SA narrative summaries and assign a provisional Wetland Condition Rank. The stressor checklists are also reviewed by the teams after observing the influence of the stressors on the ground; stressors are updated, and stressor ranks are verified.

Field Assessment Steps

1. Preliminaries. Together, team members fill in basic survey information (date, time, location, etc.) on the SA Cover Worksheet. *The team then conducts a joint rapid reconnaissance of the site to help set up the survey and make SA boundary changes based on local conditions.* All changes to the SA boundary are recorded on the field maps and noted on the SA Cover Worksheet with rationale for changes.
2. Biotic survey. The biotic team member traverses the SA and maps the major vegetation communities detailing attributes that are important to the metric scoring. This map becomes the basis for filling out Worksheets 4 and 5 and rating the biotic metrics.
3. Abiotic survey. The abiotic team member(s) sets up three cross-section locations (segments) to assess soil surface condition, large woody debris and confined channel condition metrics. These segments should be located in independent riffle runs of the stream channel, that is, straight sections separated by bends, waterfalls or pools. The team should traverse from the channel edge to the floodplain edge at each of these locations, to search for indicators of soil and channel conditions and annotate the map with supporting information. Additionally, the team will count large woody debris 30 m upstream and downstream from each segment. (Note that cross-section locations should be spaced so that the large woody debris counts don't overlap.) For each segment,

indicators are checked off on the metric-specific worksheets that provide the foundation for rating each metric.

4. Landscape Context review. The Landscape Context metrics have been measured prior to the field survey and now can be reviewed based on field evidence during the survey. Each team is likely to survey different areas in the SA and each should note landscape-context condition issues that may affect the ratings, particularly in areas adjacent to the SA boundary. These are reported on the SA Cover Worksheet and should be marked on the landscape field map and can be used to modify metric ranks (with a narrative and mapped justification).
5. Stressor Checklist. Team members collaboratively review the Stressor Checklist to identify potential drivers of ecological condition in the WOI and greater watershed.
6. SA Summary. After completion of the surveys, team members collaboratively complete the narrative summaries on the SA Cover Worksheet; review and complete the in-field ranking of all metrics, add comments on conditions and stressors, and provide a provisional SA Rank and Score and Assessment Summary (signed off with team member initials).

Note: If only two team members are available, they both work on the large woody debris measurements and then split the mapping and metric measurement tasks as appropriate. The intent is that a team should be able to complete the field survey in four to six hours, depending on the complexity and size of the site, and personnel resources.

SA Boundary Adjustments in the Field

While the SA boundary is initially mapped in the office prior to heading out to the field, it is not always possible to identify hydrologic breaks such as irrigation diversion structures, irrigation returns, or landownership changes, all of which may affect the SA configuration. Therefore, it is good practice to first check if the SA size meets the specifications outlined above, as well as any lateral constraints not detected in the imagery. The SA can be shifted or the configuration changed in the field as necessary to accommodate the specifications or constraints (e.g., unforeseen ownership restrictions). All changes to the SA configuration or location are recorded on the Biotic and Abiotic SA Maps and noted on the SA Cover Worksheet.

Documentary Photographs

Documentary photographs are taken at each of the cross-sections for the Confined Channel Condition metric. Four photos are taken at each cross-section; one each upstream and downstream from the middle of the channel if feasible, and one facing each bank (bank left and bank right). These photo-points are recorded on the Photo Point Log in Appendix A (Worksheet 10). Documentary photographs are strongly recommended for major vegetation patches, for unknown plant species, and for significant features within or adjacent to the SA. Features that alter the size of the SA, or significantly impact hydrology are particularly useful to photograph. Guidelines for recording important information using documentary photographs are provided in Appendix E.

Best Management Practices for Pest Control

To prevent the spread of aquatic diseases and nuisance species, it is imperative that field staff follow procedures to clean and sterilize field equipment. Outside the wetland, at the staging area before the wetland is entered and upon leaving the wetland, boots, waders, and field equipment (e.g., stadia rods, etc.) that come in contact with surface waters must be hosed or washed off with a bleach solution. This must occur away from wetlands and surface waters. All porous material (including felt-soled shoes, which are not recommended due to concerns about didymo) must be immersed in a 2% bleach solution for five minutes or until thoroughly soaked, then rinsed or dried thoroughly. Any remaining solution must be poured at least 50 m (165 ft) away from wetlands or surface waters.

IV. Metric Protocols

Landscape Context Metrics

There are four Landscape Context metrics designed to measure the conditions surrounding the SA using a GIS or paper maps:

L1. The Buffer Integrity Index is composed of two sub-metrics, Buffer Percent and Buffer Width, which are measured in a buffer zone that extends out 250 m from the SA lateral perimeter (Figure 5).

L2. Riparian Corridor Connectivity is measured in a riparian corridor zone that extends upstream and downstream 500 m and 100 m across.

L4. Surrounding Land Use evaluates conditions within an area (Land Use Zone (LUZ)) that extends out 250 m from the SA perimeter (overlapping the buffer zone).

L8. Road Proximity is measured on the canyon bottom and slopes adjacent and above the SA.

Once all Landscape Context metrics have been rated, they are rolled up into a single Landscape Context Attribute score on the SA Rank Summary Worksheet.

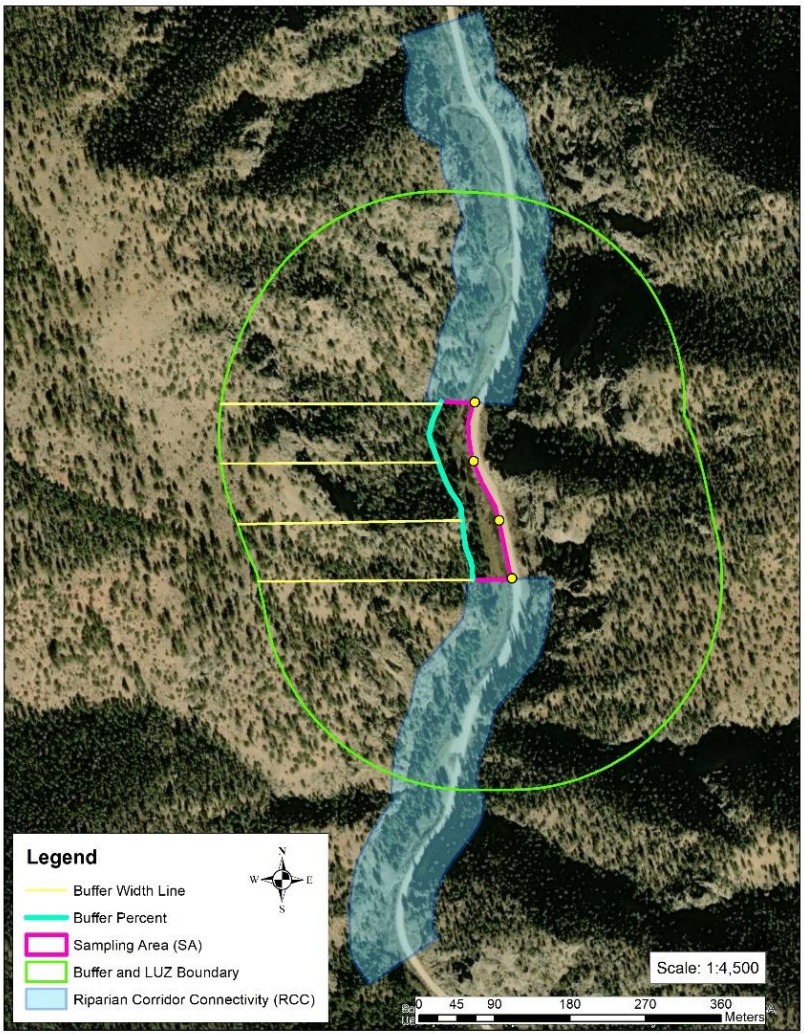

Figure 5. Confined Valley Riverine Wetlands Landscape Context metrics are measured in three zones around an SA: the Buffer and Land Use Zone out to 250 m (green line), and the Riparian Corridor upstream and downstream zones 500 m long each and 100 m wide (blue areas). Buffer % is measured on the lateral sides of the SA (cyan line) and 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).

L1. Buffer Integrity Index

Definition: The Buffer Integrity Index is a measure of the amount of natural and semi-natural vegetated buffer lateral to the SA. Buffer Integrity Index is composed of two sub-metrics:

- *Buffer Percent*: the percentage of the lateral perimeter surrounding a wetland SA that is considered natural or semi-natural buffer;
- *Buffer Width*: the average width of the extant buffer lateral to the SA.

Seasonality: This metric generally is not sensitive to seasonality, but imagery from the growing season will likely enhance interpretations.

Protocol: Buffer Percent and Buffer Width are evaluated using aerial photography imagery in a GIS or on paper maps (Figure 5). It is based on "allowed buffer" land-cover elements that provide protective services such as reducing pollutant contamination within 250 m of the SA boundary versus "excluded non-buffer" land-cover elements that do not (Worksheet 1a).

Buffer Percent

Steps:

1. Using aerial photography in a GIS or on the Landscape map, enter the source of the imagery and the imagery season and year, if available. Check off buffer land-cover elements that occur along the perimeter of the SA on Worksheet 1a. Use only the lateral SA perimeter, ignoring upstream and downstream SA perimeters which cross the channel. Do not include any areas less than 10 m (33 feet) wide as buffer. Any portion of the SA perimeter not bounded by at least 10 m of an "allowed buffer" element is considered unbuffered.
2. Measure or estimate the percentage of the SA perimeter that is flanked by allowed buffer land cover elements and enter the estimated percentage on Worksheet 1b. Use the percentage to rate the sub-metric using Table L1a.

Buffer Width

Buffer Width is measured as the average distance along eight sample lines perpendicular to the lateral perimeter of the SA, extended to the first non-buffer element encountered or to a maximum of 250 m (Figure 5).

Steps:

1. Along the perimeter of the SA, draw a series of eight lines perpendicular to the lateral perimeter of the SA at even intervals extending out to the first non-buffer element as defined in Worksheet 1a or to the buffer boundary at 250 m. Four lines are placed on each lateral side of the SA, with two lines coming off each corner, and two equally spaced between the corners. Lines are recorded as zero length if there is a non-buffer element within 10m of the SA boundary. Label the lines A through H. No lines should extend upstream, downstream, or parallel to the river channel. All buffer lines should be parallel to each other and as perpendicular to the channel as possible.
2. Measure the length of each line in meters and enter the values on Worksheet 1c.
3. Calculate the average buffer width from the measured lines and enter the average on Worksheet 1c.
4. Use the average to rate Buffer Width in Table L1b.

Buffer Integrity Index Calculation and Rating

Steps:

1. Enter the sub-metric ratings (Buffer Percent and Buffer Width) in Worksheet 1d.
2. Calculate the Buffer Integrity Index Score as the average of the two sub-metric ratings.
3. Rate using Table L1c.
4. Enter the Buffer Integrity Index rating on the SA Rank Summary Worksheet.

L2. Riparian Corridor Connectivity (RCC)

Definition: Riparian Corridor Connectivity (RCC) measures the disruption of natural land connectivity upstream and downstream of the SA with an emphasis on detecting intervening obstructions that might inhibit wildlife movement and impact plant populations.

Seasonality: This metric generally is not sensitive to seasonality, but imagery from the growing season will likely enhance interpretations.

Protocols: Riparian Corridor Connectivity rating is based on the total segment lengths of Riparian Corridor non-connectivity land cover segments (Worksheet 1a) in the riverine corridor 500 m upstream and downstream of the SA and 100 m wide.

Steps:

1. Using the most recent imagery available in GIS, delineate the Riparian Corridor Connectivity zone 500 m upstream and 500 m downstream from the SA boundaries along the main channel, and 100 m in width. The Riparian corridor connectivity zone should be centered within the river available floodplain, and must include both banks of the river, but does not need to be centered on the active channel per se. The river available floodplain is the floodplain that is not disconnected by anthropogenic features such as levees.
2. For each bankside (left and right) on the upstream and downstream segments, check off all excluded RCC land cover elements that disrupt riparian corridor connectivity on Worksheet 1a.
3. Using the GIS imagery, for each bankside on the upstream and downstream segments, measure in meters along the **outside edge** of the riparian corridor connectivity zone the total **length** of all excluded land-cover patches (from Worksheet 1a) that interrupt the corridor for at least 10 m (33 feet). A feature is considered to interrupt the corridor if it either crosses the corridor edge or sits completely inside the corridor. A feature that completely crosses the corridor and intersects both the outside edges is measured as an interruption on both sides. There will be a total length each for upstream bank left, upstream bank right, downstream bank left and downstream bank right. Enter the total lengths for each bankside on Worksheet 2 (step A).
4. 4. Assign at least the minimum length for any special class, non-connectivity elements that cross the riparian corridor as provided in Table 2 below (Table L2a in Appendix B).
5. 5Sum the total length of disruptions for each segment (step B) and for both segments upstream and downstream combined on Worksheet 2 (step D).
6. Calculate the percentage disruption for each segment (step C) and total disruption for the SA and enter the value on Worksheet 2 (step E).
7. Rate Riparian Corridor Connectivity using Table L2 and the data from Worksheet 2.
8. Enter the rating score in the SA Rank Summary Worksheet.

Table 2. Minimum assessed length for special class, excluded land cover elements bisecting the riparian corridor.

Special Class Non-Connectivity Land Cover Elements	Minimum Assigned Impairment
Unpaved graded and/or maintained roads	10 m
Single-lane paved road	20 m
Two-lane paved road/highway	50 m
Four-lane paved road/highway	100 m
Railroad	50 m
Concrete diversion or retention dams	25 m
Small non-concrete (wood, earth) diversion dams	10 m

L.4 Surrounding Land Use

Definition: The amount and intensity of human land use in the Land Use Zone (LUZ) surrounding the SA.

Seasonality: This metric can be evaluated during any season. However, the use of growing-season imagery with adequate "green-up" may improve accuracy.

Protocol: Surrounding Land Use is based on calculating a Land Use Index (LUI) that reflects the relative extent of a suite of land-use elements in an area extending 250 m out from the SA boundary (LUZ). Each land-use element is weighted for its potential impact on the SA (from 0.0 indicating high impact to 1.0 indicating no impact (Worksheet 3).

Steps:

1. Using current aerial photography in a GIS platform or from the Landscape map, estimate the percentage of each land-use element in the LUZ and enter the whole number value in Worksheet 3. Total cover must equal 100%.
2. For each element, multiply the percentage area times the weighting coefficient and record that score in the LUI Score column. Sum the scores in the LUI Score column. (This will be done automatically for those using the fillable PDF worksheets.)
3. Rate using the LUI Rating Table L4.
4. Enter rating on the SA Rank Summary Worksheet.

For example, if 30% of the LUZ is composed of old fields (0.5 * 30 = 15), 10% of unpaved roads (0.1 * 10 = 1), and 60% of natural area (1 * 60 = 60), the total LUI score would equal 76 as the sum of 15 + 1 + 60. The rating from Table L4 would be "2."

L8. Road Proximity

Definition: Road Proximity is a measurement of the nearness of roadways to confined riverine wetlands. Roads are typically placed in confined valleys adjacent to the channel and cause severe harm to the confined riverine wetland and the stream channel.

Seasonality: This metric can be evaluated during any season.

Protocol: Road Proximity is based on the presence and proximity of a road to the wetland (Figure 6). Any paved or graded road, railroad, or paved hiking trail are considered a road when

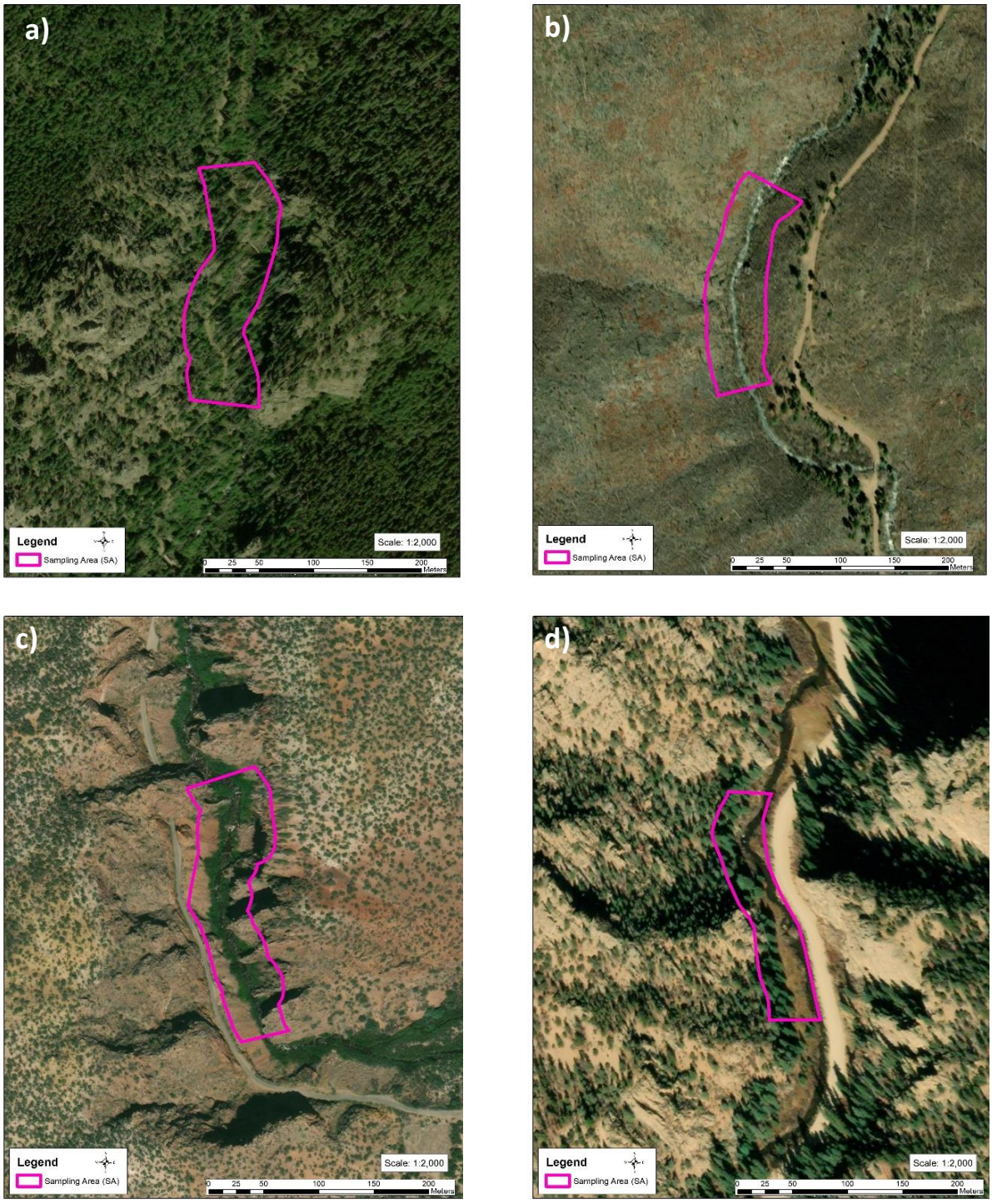

Figure 6. . Road Proximity metric examples of (a) no roads adjacent to the SA or on canyon slopes (rating 4), (b) road present within the upper half of the canyon slope (rating 3), (c) road above the SA with evidence of sediment impacts to the SA (rating 2), and (d) road and road fill on and adjacent to the SA (rating 1).

evaluating this metric. The rating is based on the presence or absence of a road within the canyon slope, and the road's proximity to the wetland.

Steps:

1. Using the SA landscape map look for any roads that lie between the canyon rim and the mapped SA.
2. Evaluate the presence and proximity of any roads based on the descriptions provided in ratings Table L8.

Biotic Metrics

There are three Biotic metrics that are designed to measure key biological attributes within a wetland that reflect ecosystem integrity:

B5. 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.

B9. 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.

B10. Wetland Vegetation Zone Loss is a measure of presence of absence of expected wetland and riparian vegetation zones for the subclass.

Biotic metric measurements are based on the mapping of vegetation community patches (polygons) on the SA Biotic Map with its aerial imagery base (Figure 7). The vegetation patches are directly drawn in the field on the SA Biotic Map as part of the survey walkthrough.

- When mapping, only polygons of individual patches of homogeneous vegetation greater than 0.1 ha [0.25 acre] are delineated (i.e., the minimum mapping unit polygon size). Patches smaller than 0.1 ha are considered inclusions in the surrounding patch polygon.
- Include the channel in the largest patch of riparian or wetland vegetation adjacent to the channel.

Each polygon is labeled with a number that corresponds to a Polygon Number on Worksheets 4 and 5. Worksheet 4 tracks the cover of the five most common species for each polygon which is used to evaluate Riparian Zone Wetland Plant Abundance (B9). Any invasive exotic plant species cover whether it is a dominant or rare is tracked on Worksheet 5 to evaluate Invasive Exotic Plant Species Cover (B5) metric. To help with later interpretations and scoring, documentary photographs representative of each polygon plant community are recommended and logged using the Photo Point Log in Appendix A (Worksheet 11). When the species identification of a stratum dominant is uncertain:

- Collect and press a voucher specimen for later confirmation.
- Label each collection with the date, collector, SA code, the polygon number, and a unique field species code from the polygon species list on Worksheet 4.
- Note: Photographs of the entire plant, as well as close-ups of leaves, flowers and fruits can also aid in identification (Record these photographs in the Photo Point Log (Worksheet 11).

Once all metrics have been rated, they are rolled up into a single Biotic Attribute score on the SA Rank Summary Worksheet. The attribute narratives on the SA Cover Worksheet that describe SA conditions and impacts should also be completed at this time.

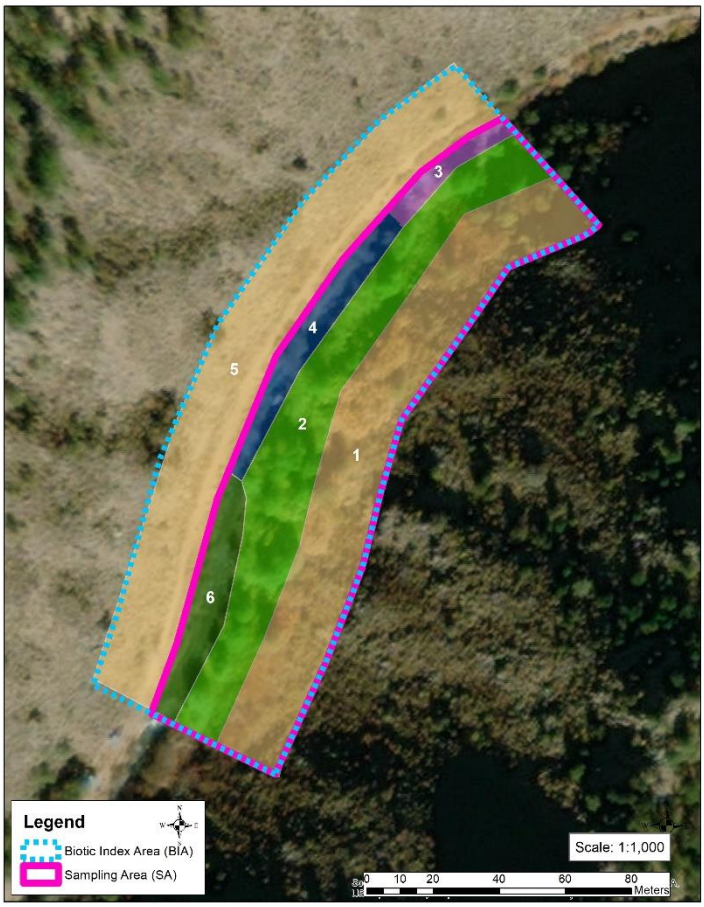

Figure 7. An example of vegetation polygons mapped on the SA Biotic Map that underpins the NMRAM biotic metrics. The polygons are labeled with the polygon numbers from Worksheet 4.

Biotic Mapping Process

Protocols: The Invasive Exotic Plant Species Cover (B3) and Riparian Zone Wetland Plant Abundance (B9) metrics are based on the vegetation polygon patch map (SA Biotic Map) and field reconnaissance data in Worksheets 4 and 5. Each polygon is evaluated with respect to species composition and abundance.

The entire Biotic Index Area (BIA) should be mapped with data recorded for all polygons on Worksheet 4. The total wetland cover for each polygon is weighted relative to the percentage area that polygon represents of the Biotic Index Area (BIA). *The BIA is the total area of the Channel, RZ and the potential Allochthonous Zones (AZ) of 20 m on either site of the RZ summed together.* If there is a road or other development within 20 m of the edge of the RZ, that area is still included within the BIA, even though it is not included in the SA (Figure 8).

At each polygon the five highest cover species are listed on Worksheet 4 (Figure 9). Species listed should exceed 5% total cover for the polygon, unless the entire polygon is sparsely vegetated (less than 50% total plant cover), in which case list the top 5 species that exceed 1% cover. For each species listed total cover should be estimated using the Braun-Blanket cover abundance scaler (Table 3 and Table B9 in Appendix B) and the mid-point value recorded on Worksheet 4. Additionally, the wetland status for the species should be recorded for each listed species (see protocols for Riparian Zone Wetland Plant Abundance (B9) below. The automated pdf worksheets will automatically fill this for species in Appendix C. The total cover of invasive exotic plant species within each polygon should also be recorded by polygon on Worksheet 5 (Figure 10). This should include the cover for any invasive exotic plant species regardless of their percentage cover. Include both invasive exotic species that might have also been listed as stand dominants on Worksheet 4, and those that are rare within the polygon. Record cover to the nearest tenth percent for Invasive Exotic Plant Species Cover on Worksheet 5. Figures 9 and 10 show an example of a completed Worksheets 4 and 5. See individual metric protocols below for additional information.

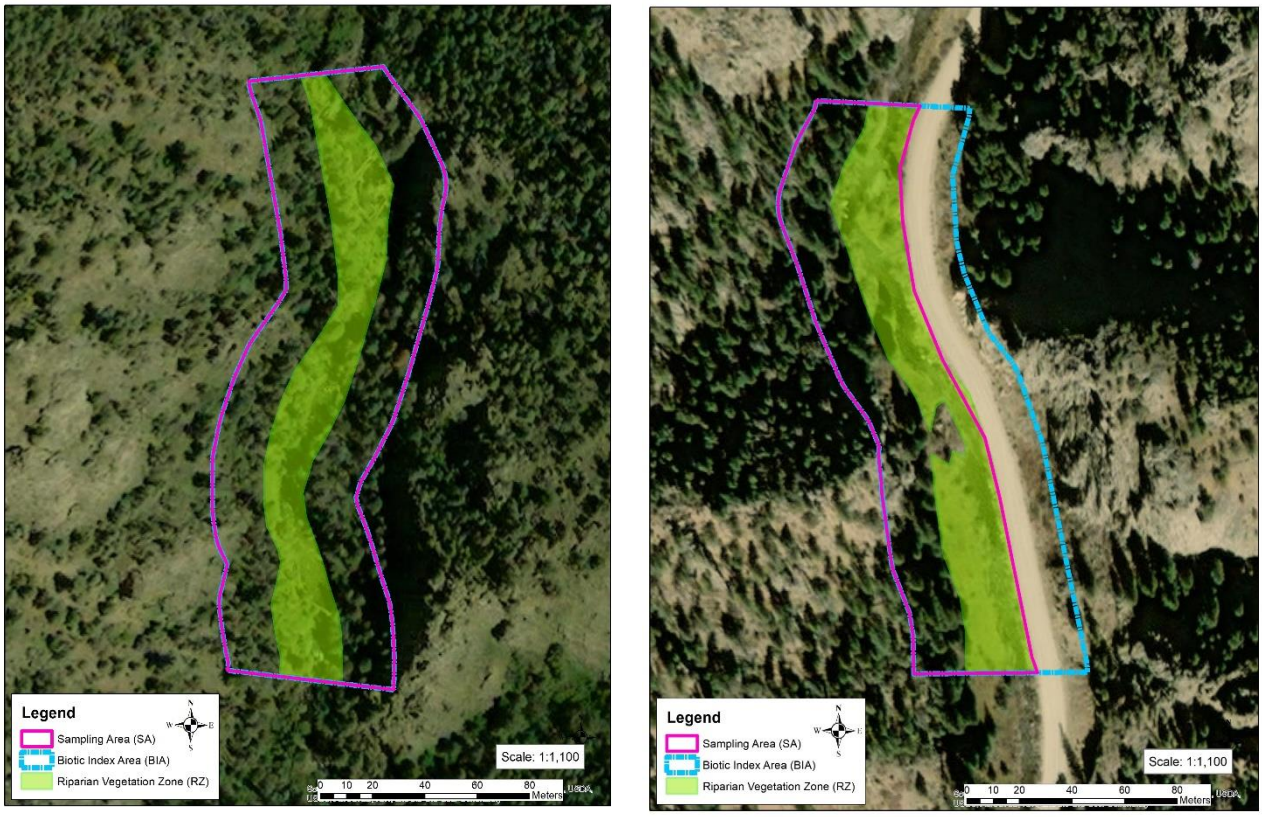

Figure 8. Examples of BIA relative to riparian wetland vegetation zone (RZ) and SA for a confined wetland without (map on left) and with (map on right) a discontinuity due to development. The BIA on the left map is coincident with the SA. On the right map the SA ends at the boundary between the RZ and the road, and the BIA includes 20m past the RZ which includes the road and beyond.

Biotic Metrics

B9 - Riparian Zone Wetland Plant Abundance

Worksheet 4. Riparian Zone Wetland Plant Abundance. For each polygon, select the zone where the polygon is located - either RZ for riparian and active channel, or AZ for allocthonous zone. Enter the decimal percent of Biotic Index Area (BIA) occupied by polygon (Refer to Biotic SA Map). The sum of all polygons must equal 1.0 (100%) of BIA. Record the 5 dominant species, wetland status and mid-point cover estimation for the 5 dominant species within the polygon using Table 4 in Appendix B. Sum the RZ Wetland Species % Cover Total only. (Note that using mid-point cover estimations could result in greater than 100% cover which is acceptable.) For each RZ multiply the RZ Wetland Species % Cover Total by the % BIA to get the RZ Area Weighted % of BIA. Add the RZ Area Weighted % of BIA totals for the RZ polygons only and enter in the box below. Select rating on Table B9 and enter on SA Rank Summary Worksheet.

			Dominant Plant Species Cover																	
Polygon	SA Zone	% BIA (decimal)	Species 1	Wetland Status	% cover	Species 2	Wetland Status	% cover	Species 3	Wetland Status	% cover	Species 4	Wetland Status	% cover	Species 5	Wetland Status	% cover	RZ Wetland Species % Cover Total	RZ Area Weighted % of BIA
1	RZ	0.06	ALINT	Wet	62.5	EQLA	Wet	37.5	FEAR3	Up	17.5	AGGI2	Wet	17.5	CIMA2	Wet	17.5	135	8.1
2	RZ	0.02	PIPU	Up	17.5	PSME	Up	17.5	ALINT	Wet	17.5	FEAR3	Up	17.5	AGST2	Wet	17.5	35	0.7
3	RZ	0.05	SCOUR	Up	100													0	
4	RZ	0.03	AGGI2	Wet	37.5	FEAR3	Up	17.5	BRIN2	Up	2.5	EQAR	Up	2.5	ACRE3	Up	2.5	37.5	1.13
5	RZ	0.05	ALINT	Wet	37.5	AGST2	Wet	37.5	FEAR3	Up	62.5	GLGR	Wet	17.5	AGGI2	Wet	2.5	95	4.75
6	RZ	0.04	ALINT	Wet	62.5	FEAR3	Up	17.5	AGST2	Wet	17.5	PIPO	Up	17.5	AGGI2	Wet	17.5	97.5	3.9
7	AZ	0.36	PIPO	Up	37.5	PIPU	Up	17.5	PSME	Up	17.5								
8	AZ	0.39	PIPO	Up	37.5	PIPU	Up	17.5	PSME	Up	17.5								
9																			
10																			
11																			
12																			
13																			
14																			
15																			
Sum % BIA		1															Area weighted RZ Wetlands Species cover for BIA total		18.58

Figure 9. Example of data entry on Worksheet 4 based on the mapping of vegetation polygons on the SA Biotic Map.

B5 - Invasive Exotic Plant Species Cover

Worksheet 5 - Invasive Exotic Plant Species Cover. For each polygon from Worksheet 4, enter the decimal percent of Biotic Index Area (BIA) occupied by polygon. For the vegetated polygons only, record the 5 dominant invasive exotic (IE) species (from NM Noxious Weed List - Appendix D) and estimate the percent cover for each IE species within the polygon. For vegetated polygons with no IE species, select the NO IE option under Invasive Exotic Species 1 and enter 0 for the IE Species % Cover Total and 0 for the IE Area Weighted % Cover of BIA. For polygons with no vegetation, select the NO VEG option under Invasive Exotic Species 1 and leave the IE Species % Cover Total and the IE Area Weighted % Cover of BIA blank. For each vegetated polygon multiply the IE Species % Cover Total by the Decimal % of BIA Area to get the IE Area Weighted % Cover of BIA. Add the IE Area Weighted % Cover of BIA totals for the vegetated polygons and enter in the box below. Select rating on Table B5 and enter rating on SA Rank Summary Worksheet.

Polygon Number	**Decimal % of BIA Area**	Invasive Exotic Species 1	% cover	Invasive Exotic Species 2	% cover	Invasive Exotic Species 3	% cover	Invasive Exotic Species 4	% cover	Invasive Exotic Species 5	% cover	**IE Species % Cover Total**	**IE Area Weighted % Cover of BIA**
1	0.06												
2	0.02	LEVU	1	CIVU	1							2	0.04
3	0.05												
4	0.03	ACRE3	3	CIVU	1	LEVU	1					5	0.15
5	0.05												
6	0.04												
7	0.36												
8	0.39												
9													
10													
11													
12													
13													
14													
15													
									Total Invasive Exotic Area Wt Cov for BIA				0.19

Figure 10. Example of data entry on Worksheet 5 for Invasive Exotic Plant Species Cover.

B5. Invasive Exotic Plant Species Cover

Definition: The Invasive Exotic Plant Species Cover is a measure of the total percent cover of invasive plant species that are Class A through Class C on the New Mexico list of noxious weeds (NMDA 2020) (Appendix D). Species of specific concern for a given project or those that are not yet on the New Mexico list of noxious weeds can be included on a project-specific basis but are not included in the rating for the metric.

Seasonality: Invasive Exotic Plant Species Cover is best assessed from summer to early fall.

Protocols: Invasive Exotic Plant Species Cover ratings are based on calculated percent cover across the SA. Note that once you have 10% cover or above of invasive exotic species within the SA, the SA will score a 1.

Using the New Mexico Noxious Weed list provided in Appendix D as a guide, during the reconnaissance survey:

1. For each polygon, enter the decimal percent of the BIA occupied by the polygon on Worksheet 5 (from Worksheet 4).
2. Record the invasive exotic species found in the BIA by polygon (up to five most dominant within the polygon) on Worksheet 5.
3. For each invasive exotic species listed for the polygon, estimate the percent cover and record in the % Cover column on Worksheet 5.
4. Enter the sum of Invasive Exotic (IE) species cover for each polygon within the BIA in the IE Species % Cover Total column. (This will be automatically calculated in the activated pdf worksheets).
5. For each polygon, multiply IE Species % Cover Total by Decimal % of the BIA Area to get the IE Area Weighted % of BIA by polygon.
6. Repeat for all polygons and sum the IE Area Weighted % of BIA in the box provided on Worksheet 5.
7. Based on the Total Invasive Exotic Area Weighted Cover of the BIA from Worksheet 5, rate the SA using Table B5.
8. Enter rating on the SA Rank Summary Worksheet.

B9. Riparian Zone Wetland Plant Abundance

Definition: An index of wetland condition based on the presence and abundance of dominant or co-dominant wetland species in the riparian zone within confined riverine wetlands and channels.

Seasonality: Best assessed during the growing season when trees and shrubs are in leaf and herbaceous species are most easily detected and identified.

Protocol: Riparian Zone Wetland Plant Abundance is based on an area weighted measurement of wetland species cover in the BIA using the wetland status of the dominant species in the mapped vegetation patch polygons located within the RZ boundary (Worksheet 4) and not in the Allochthonous Zone (AZ). All species with OBL or FACW status and all species of cottonwoods are considered wetland species for this metric. (See Appendix C for a list of common wetland and riparian species in New Mexico with their NMRAM wetland status.) Cover of all wetland species

regardless of stratum are included in the metric calculation (tall woody, short woody and herbaceous) for any polygons designated as part of the RZ. The total wetland species cover for each polygon is weighted relative to the percentage area that polygon represents of the Biotic Index Area (BIA). This allows for the abundance of wetland plants to be compared between SA's without being biased by losses to development. The RZ area-weighted wetland percent cover of the BIA are then summed to calculate an overall wetland plant abundance for the SA, which is ranked with Table B9.

Steps:

1. For each polygon, select the zone where it is located within the BIA, either RZ for riparian zone or active channel, or AZ for allochthonous zone in the SA Zone column on Worksheet 4.
    a. Include the channel in the largest RZ polygon of riparian or wetland vegetation adjacent to the channel.
2. For each polygon estimate the percentage it represents of the Biotic Index Area (BIA) and enter % BIA as a decimal on Worksheet 4.
    a. When estimating the percentage area of the BIA that the polygon represents, be sure to estimate for the full BIA. Even if there are roads or other disturbances within the BIA always include 20 m extending out from the RZ on both sides (AZ) as part of the BIA area.
    b. Include the channel in the area estimation of the largest polygon of riparian or wetland vegetation adjacent to the channel.
3. For each polygon record the five most common species (provided they represent >5% of total plant cover for the polygon (or >1% for sparsely vegetated polygons)) on Worksheet 4.
    a. However, for the RZ polygon that includes the channel, estimate the wetland plant cover for the polygon as though the channel was not included.
4. For each species listed determine its wetland status and enter in Wetland Status box on Worksheet 4.
    a. Wetland Status will be automatically entered for species from the drop-down list on the activated pdf datasheets (Based on the list in Appendix C).
    b. For those working on paper the list of commonly encountered NM riparian and wetland species with their wetland status is provided in Appendix C
    c. If a species not on the list is encountered, use the USDA Plants Database (https://plants.sc.egov.usda.gov) to find the correct species code and Wetland status for the Arid West zone. Species that are classified as OBL or FACW are considered wetland species (Wet) for the Confined NMRAM. Additionally, all cottonwood species are considered (Wet) for this metric. Species with any other classification are not considered wetland species (Up).

5. For each recorded species estimate cover using the modified Braun-Blanket cover abundance scaler (Table 3) (Table B9a in Appendix B) and record the mid-point value in the % Cover box.
6. Sum the cover of wetland species for each polygon designated as RZ and enter in RZ Wetland Species % Cover Total column.
    a. For AZ polygons, leave the RZ Wetland Species % Cover Total column blank.
    b. For RZ polygons with no wetland status species, enter a 0 in the RZ Wetland Species % Cover Total column.
7. For each RZ polygon, multiply RZ Wetland Species % Cover Total by decimal % of the BIA area to get the RZ Area Weighted % of BIA. Repeat for all RZ polygons.
8. Sum the RZ Area Weighted % of BIA column to obtain the RZ Wetland Plant Abundance % on Worksheet 4.
9. Based on the RZ Wetland Plant Abundance percent, rate using Table B9b.
10. Enter rating on the SA Rank Summary Worksheet.

Table 3. Braun-Blanquet scale for plant cover estimation.

Braun-Blanquet Scaler Mid-Point Values for Plant Cover Estimation	
Mid-point %	**Cover Range**
2.5	> 1 % to 5 %
17.5	> 5 % to 25 %
37.5	> 25 % to 50 %
62.5	> 50 % to 75 %
87.5	> 75 % to <100%
100	100%

B10. Wetland Vegetation Zone Loss

Definition: Wetland Vegetation Zone Loss assesses the presence or absence of expected wetland and riparian vegetation zones as a measure of overall biotic habitat availability.

Seasonality: This metric can be measured year-round.

Protocol: This metric is assessed based on the proximity of development, if present, to the expected wetland vegetation zones within the BIA (see BIA definition in Biotic Mapping Process Protocols (above)), as well as the total extent of development relative to the lateral SA boundaries. When rating this metric, all types of anthropogenic fill and soil disturbance as well as pavement and other structures are considered "development disturbance." Natural features such as cliffs or natural rock-falls should not be considered development disturbance. Anthropogenic fill materials can result from activities other than adjacent road building such as up-slope mining or dumping from development outside the immediate vicinity of the SA. Thus, any fill like material within the

rating zones should be carefully examined to determine if it is anthropogenic or natural in origin. The metric is rated using the descriptions provided in Table B10.

Steps:

1. Carefully assess areas of development disturbance or potential development during walk through of BIA.
2. Map any areas where development is within 40 m of Riparian Zone (RZ) outer edge on the SA biotic field map.
    a. Remember to exclude all natural cliffs and natural slope fill
3. Using the map fill in Worksheet 6 estimating the unaltered landscape distance and length of BIA perimeter where that distance is represented. (For example, in Figure 8 (map on right) 0 meters of unaltered landscape adjacent to the RZ exists on the right and
4. Rate the site using the distance criteria provided in Table B10 as follows.
5. Determine where development is closest to the Riparian Zone (RZ) outer boundary then find the description that fits that level of proximity in Table B10. Assign that rating for the SA unless the conditions below are also present:
    a. If less than 15% of total BIA lateral boundary meets criteria for a rating of "1" the overall rating for the SA can be moved up to "2"
    b. Similarly, when less than 25% for BIA lateral boundary meets rating for a "2" or for a "3", then the overall SA rating can move up one value.
    c. Only one move up in overall rating is allowed per SA.
        - For any given site, if it meets the criteria to move up ratings values from a lower ratings, that can only be performed once. That is, if a site meets the criteria move up from a "1" to a "2", and then meets the criteria to be moved up from a "2"to a "3", you would assign a final SA rating of "2".
6. Enter the final SA rating from Table B10 on the SA score summary sheet.

Abiotic Metrics

There are three Abiotic metrics that reflect the physical status of a wetland:

A5. Soil Surface Condition reflects anthropogenic soil disturbance impacts within the SA.

A12. Large Woody Debris is a measurement of the average amount of large woody debris available to create habitat complexity within confined riverine wetlands and channels.

A13. Confined Channel Condition is the assessment of the degree of channel aggradation or degradation relative to reference equilibrium conditions.

The Channel and Floodplain Survey Overview

A channel and floodplain survey is conducted by one or two team members and uses a combination of direct measurements and checklists with narrative descriptions to arrive at an assessment. The team divides the stream reach into three more-or-less equal segments (upper,

middle, and lower) and scopes out stream cross-section locations for measuring *Large Woody Debris* and evaluating *Confined Channel Condition* metrics. Within each segment, a cross-section site is placed in a riffle zone between two step pools. It is important not to place two cross-sections on the same riffle zone. The *Large Woody Debris* metric is easier to measure if there are two people, so one can record while the other counts. However, all measurements can be accomplished by a single person. The *Confined Channel Condition* metric is also evaluated at the cross-section locations using metric checklists. *Soil Surface Condition* is evaluated as part of the walk-through of each of the three segments of the floodplain using indicator checklists designed to guide surveyors in identifying important parameters and characteristics to apply to the ratings tables' narratives.

A sketch map of major features of the floodplain on the SA Abiotic map is encouraged as an aid in filling out the checklist and for later interpretation. In addition, photographs are taken at each cross section, across the channel to each bank, as well as upstream and downstream, preferably at the mid-point of the channel, if accessible. If it is not feasible to wade to the center of the channel, photos may be taken from the bank edge (see Appendix E for further guidelines). Photo-points are recorded on the Photo Point Log in Appendix A (Worksheet 11). Additional photographs may be taken of significant features within the floodplain and recorded on the Photo Point Log. Features that alter the size of the SA, or significantly impact metric ratings, are particularly useful to photograph.

The attribute narratives on the SA Cover Worksheet that describe SA abiotic conditions and impacts should be completed after all three cross-sections have been assessed.

A5. Soil Surface Condition

Definition: The Soil Surface Condition metric is a measure of anthropogenic disturbance of wetland and riparian soils that results in modification of soil characteristics.

Seasonality: This metric may be conducted in any season when the soil surface is visible or disturbance evident.

Protocols: Soil Surface Condition is based on a visual assessment of anthropogenic soil disturbance indicators and an estimate of the percentage of soil disturbance relative to the total area of the SA. As part of the survey walkthrough, a running checklist of field indicators by SA segment is completed using Worksheet 7. The final rating requires an estimate of total percent area of the SA that has anthropogenic soil disturbance. The following are general guidelines for assessing Soil Surface Condition:

- Assume there are zones of active, naturally occurring erosion and deposition within the active floodplain of the SA. Portions of the SA may be natural sources of and sinks for sediment.
- Differentiate, to the extent possible, anthropogenic soil disturbance that could contribute to degradation of the riverine wetland.
- Assess both sides of the SA.

Steps:

1. Prior to field work, using available aerial imagery in the GIS or the SA abiotic map, identify roads and other soil surface disturbances within the SA and surrounding landscape area. Mark disturbed areas on the SA Abiotic map to take in the field and provisionally check them off on Worksheet 7.
2. Conduct soil-surface assessment as part of the segment traverses to ground-truth work completed in Step 1 and to identify additional evidence of disturbance not seen at the scale of the SA Abiotic map. For each segment, check off all indicators that apply on Worksheet 7. This is especially important since small amounts of disturbance can change the rating for the metric.
3. Estimate the area of soil surface disturbance by segment and average the estimated area to arrive at the Average Percent Soil Disturbance for the SA.
4. Based on the indicators and the percentage disturbance for the segments combined, rate the overall SA using the narratives in Table A5.
5. Enter the rating on the SA Rank Summary Worksheet.

A12. Large Woody Debris

Definition: This metric is a measurement of the average amount of large woody debris (LWD) available to create habitat complexity within confined valley riverine wetlands and channels.

Seasonality: This metric can be evaluated during any season that wetlands are accessible.

Protocol: LWD is rated based on an average count of woody debris per transect within the channel and RZ. The ratings are adjusted based on the surrounding upland community type that contributes large wood to the system.

Steps:

1. At each of the three segment locations, count the total number of large wood pieces located within the channel and the RZ, 30 m upstream and 30 m downstream, for a total 60 m length zone.
    a. LWD includes any logs ≥10 cm (4 in) diameter and ≥ 1.5 m (5 ft) long.
    b. If a segment is not accessible, note on Worksheet 7 that it was not counted.
2. Conduct the count in six consecutive 10 m sections along the transect - three upstream and three downstream, and add the total counts for each segment on Worksheet 7. (Use the box below Worksheet 7 to tally the woody debris counts if needed.)
3. Average the Total Wood per Segment for the SA (If a segment was not accessible and not counted, do not use in the average.)
4. Select surrounding forest type for SA:
    a. Tall Forest - Mature tall conifer woodland or forest (Ponderosa pine, Douglas Fir, Spruce, etc.)

b. Short Forest – short conifer and/or deciduous woodlands (Pinyon/Juniper, oak or other shrubs, or developed landscape.)

5. Rate the SA based on the surrounding forest type and using Table A12.
6. Enter the rating on the SA Rank Summary Worksheet.

A13. Confined Channel Condition

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

Seasonality: The assessment can be conducted anytime when the river is not at flood stage, but is best conducted during periods of low to moderate flow.

Protocol: The assessment consists of checking off field indicators of channel condition by SA segment at each cross-section using Worksheet 9 and indicating by using High (H), Medium (M) or Low (L) based on how much the indicator is affecting the segment. Transient local impacts such as dredging or fill that may affect the scores should be noted in the comments. In addition, site-scale field indicators caused by beaver activity should *not* be considered in assessing channel conditions, when they are indicative of a natural local disturbance rather than overall channel and watershed processes. For example, head-cutting after a natural breach in an active beaver dam can be a natural process by which the stream returns to equilibrium as it degrades through sediments deposited within the beaver impoundment area.

1. At each cross-section location, check all field indicators on Worksheet 9 that apply to the segment and indicate by using High (H), Medium (M) or Low (L) how much the indicator is affecting the segment.
2. Using the indicators on Worksheet 9 as a guide reflecting the channel conditions throughout the SA, rate Confined Channel Condition using Table A13 description of condition and based on a preponderance of evidence. (This metric does not automatically rate using the fillable PDF.)
3. Enter the rating on the SA Summary Rank Worksheet.

V. Stressor Checklists

The Stressor Checklist provides a guide for evaluating potential drivers of ecological condition at local to watershed scales that can inform management. The checklist is not used directly in scoring or ranking the condition of the wetland and accordingly explicitly excludes elements that are already incorporated in NMRAM metrics themselves (e.g., Surrounding Land Use). On the checklist, stressors have been grouped into major categories by their potential role in driving declines in wetland condition: 1) adverse water management, 2) adverse sediment management, 3) artificial water additions, 4) ground water pumping, 5) watershed alteration, and 6) local biodiversity impacts (See the NMRAM Manual for rationales behind these groups). Note that these drivers may be acting at a watershed scale and may require some research or evidence (local inquiry) before collecting field data.

The presence and intensity of stressors are evaluated as follows:

1. On Worksheet 10, evaluate each stressor in terms of intensity and impact on ecological condition of an SA. If a stressor is thought to have a significant impact on ecological processes at the SA then mark it as either Major or Minor intensity using direct evidence where available or your best professional judgement otherwise (e.g., a major dam directly upstream that significantly alters water availability, or a recent large wildfire in the watershed that may be generating excess sediment in the SA, etc.). If the stressor is known to be absent, mark "Absent." If the presence of the stressor is uncertain, mark it as "Unknown."
2. Rank the major stressors by their importance. Pick up to three.
3. Provide comments where possible that further describe the stressor and implications for management of the WOI.
4. Count the stressors per intensity class on Worksheet 10.
5. Enter the results on SA Rank Summary Sheet.

VI. SA Condition Ranking

For each SA, there is an *SA Rank Summary Worksheet* (Worksheet Page 2) where the metric ratings are compiled, weighted, and an overall weighted Condition Rank for the SA assigned. The metric and attribute weighting hierarchy is built into the summary sheet such that individual and attribute category weighted scores can be calculated easily and then rolled up into a final numeric SA Wetland Condition Score. The digital PDF version of the form *automatically* compiles the scores from the various worksheets, computes a ranking score from 1.0 (poor) to 4.0 (excellent), and assigns a letter SA Wetland Condition Rank as follows:

- A, Excellent Condition – wetlands with intact functions and processes, diverse vegetative communities with almost no exotic weeds, and large relative to its historical size, with natural buffers. These wetlands are largely undisturbed and surrounded by undisturbed land (buffer) and would be considered to meet the wetland reference standard for a site.
- B, Good Condition – somewhat degraded in response to environmental stressors. These wetlands have various combinations of relatively minor disturbances or factors negatively affecting condition, e.g., some alteration of the hydrological regimes; evidence of on-site anthropogenic disturbances; a reduction of vegetative community and structural diversity with the presence of some exotic weeds; and moderately reduced size relative to their historical size, the surrounding landscape may still be relatively natural. Often, these wetlands are good candidates for wetland restoration because impacts can be reversed with a high likelihood of recovery. Wetlands in good condition may be the best available.
- C, Fair Condition – moderately degraded in response to environmental stressors. These wetlands have one or more aspects that significantly affect condition, e.g., significantly disrupted hydrological regimes; degraded vegetative condition marked lack of wetland species and/or noxious weeds; usually small size relative to their historical size. Surrounding landscape is typically significantly modified as well. These wetlands may have restoration potential depending on specific wetland conditions and on the stressors that are affecting that condition. However, restoration measures are expected to be more extensive (and maybe more costly) than B-ranked wetlands.

- D, Poor Condition – degraded wetlands with highly disrupted hydrological regimes, poor vegetative composition and diversity that is usually dominated by upland species and/or noxious weeds, usually very small size relative their historic size. These wetlands will typically have a largely disturbed surrounding landscape. These wetlands generally would require extensive rehabilitation to realize their natural potential and restore their natural functions.

While final scoring will generally be a post-field process that integrates the GIS-based landscape-context metrics with the field-derived biotic and abiotic metrics, it is good practice to assign a provisional score and rank in the field to address any questions or gaps in the data set. Accordingly, there are boxes at the bottom of the SA Cover Worksheet for a provisional score and rank, along with narrative summaries for each attribute category and the overall assessment that should be completed in the field and refined as needed in the final ranking assignment in the office.

VII. Reporting and the New Mexico Surface Water Quality Information Database (SQUID)

The worksheets, maps, and photographs together make up the NMRAM Assessment Package. Any of the package components can be used individually in project-level reports, but the package is also designed for entry into the SQUID Database managed by the NMED Surface Water Quality Bureau. This database is intended as a comprehensive, central clearing house for information on New Mexico's waters with a web interface providing various reporting tools to facilitate the analysis of single and comparison of multiple sites from around the state. See https://www.env.nm.gov/surface-water-quality/ for updates.

Appendix A

New Mexico Rapid Assessment Method

Confined Valley Riverine Wetlands

Field Guide Worksheet Packet

(Version 1.3)

For conducting the New Mexico Rapid Assessment Method (NMRAM), a packet of worksheets is provided for evaluation of both Level 1 GIS mapping metrics (Landscape Context) and the Level 2 field metrics (Biotic and Abiotic). These worksheets are to be used in conjunction with the Landscape and Biotic and Abiotic SA maps. The worksheets are designed for either paper use or as digital application using an interactive PDF available from New Mexico Environment Department Surface Water Quality Bureau (http://www.env.nm.gov/surface-water-quality/WETLANDS/). The PDF version computes some of the metric scores automatically, and auto-fills the SA Rank Summary Worksheet and headers. If field team members use paper versions in the field, they can choose to fill in a PDF later to compute the score and make reports, but regardless, all raw data must be collected first.

NMRAM Confined Valley Riverine Wetlands Version 1.3

SA Cover Worksheet				
SA Code	SA Name		Project	
AU Code	AU Name		WOI	
County	HUC 12	Elevation (ft)	(m)	Ecoregion
SA General Location and Boundary (Rationale, comments)				
Driving Directions				

Ownership	Data Sharing Restrictions		Fish Observed in Wetland?	

Surveyor Role	Surveyor Name	Surveyor Initials
Landscape		
Biotic		
Abiotic		
Stressors		

Easting (m)	Northing (m)	Zone	Datum	Latitude (DD ft)	Longitude (DD ft)
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, walls etc.]; flooding characteristics and evidence of overbank flooding; soil disturbance and other site impacts; explain 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 :**

NMRAM - SA Rank Summary Worksheet: Confined Valley Riverine Wetlands 1.3			
Metric Description	Rating	Wt	Final Score
Landscape Context Metrics		Σ	
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		Σ	
B5. Invasive Exotic Plant Species Cover		0.3	
B9. Riparian Zone Wetland Plant Abundance		0.3	
B10. Wetland Vegetation Zone Loss		0.4	
Abiotic Metrics		Σ	
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 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
D	1.0 - <1.75	Poor Condition

Stressor Summary	Major	Minor	Top Three
			1
			2
			3

Stressor Comments (Evaluation of risk)

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

Landscape Context

L1 - Buffer Integrity Index

Worksheet 1a. Buffer and RCC Checklist. Check off land cover elements within the buffer area or RCC corridors that are either allowed, or are excluded and considered non-buffer elements that disrupt ecosystem connectivity. Indicate the imagery type and date (season and year of imagery).

Imagery		Image Date	

Allowed buffer/RCC land cover elements			Excluded non-buffer/RCC land cover elements		
Buffer	RCC		Buffer	RCC	
☐	☐	Natural or semi-natural vegetation patches	☐	☐	Commercial/residential developments, parking lots, dams, bridges, revetments, and other structures
☐	☐	Small irrigation ditches without levees	☐	☐	Lawns, parks, golf courses, sports fields
☐	☐	Old fields, unmaintained	☐	☐	Railroads
☐	☐	Open range land	☐	☐	Maintained levees, sediment piles, construction materials, staging areas
☐	☐	Foot trails, horse trails, unpaved bike trails (low intensity)	☐	☐	Intensive livestock areas, horse paddocks, feedlots
☐	☐	Non-channel open water	☐	☐	Intensive agriculture: maintained pastures, hay fields, row crops, orchards, and vineyards
☐	☐	Non-functioning abandoned vegetated levees, or naturally occurring levees	☐	☐	Paved roads or developed second-order unpaved but graded roads
☐	☐	unpaved two tracks roads	☐	☐	Open water bounded by a levee or other manmade structure
☐	☐	Other	☐	☐	Other

Worksheet 1b. Buffer Percent Sub-metric. Measure or estimate the percentage of the SA perimeter composed of allowed buffer elements and enter into the Buffer Percent Box below. Rate the sub-metric using Table L1a and enter the rating on the Buffer Integrity Summary Worksheet 1d.

Buffer Percent (%)=	

Table L1a. Buffer Percent

Rating	Buffer Percent
○ 4	100%
○ 3	≥80% - <100%
○ 2	≥50% - <80%
○ 1	<50%

Worksheet 1c. Buffer Width Sub-metric. Measure the length of each buffer line in meters in the GIS or on the map. Average the line lengths and rate using Table L1b. Enter the rating on the Buffer Integrity Summary Worksheet 1d.

Line	Buffer Width (m)	Buffer Width (ft)	Line	Buffer Width (m)	Buffer Width (ft)
A			**E**		
B			**F**		
C			**G**		
D			**H**		
Average		**(m)**			**(ft)**

Table L1b. Buffer Width

Rating	Average buffer width
○ 4	≥190m
○ 3	≥130 - <190m
○ 2	≥65 - <130m
○ 1	<65m

Worksheet 1d. Buffer Integrity Summary. Enter the sub-metric Ratings from Tables L1a and L1b above to calculate the Buffer Integrity Index Score using the formula in the box below. Using the Buffer Integrity Index Score, enter rating for Buffer Integrity in Table L1c and on the SA Summary Worksheet.

Buffer % Rating	+	Buffer Width Rating	/2 =	Buffer Integrity Index Score
	+		/2 =	

Table L1c. Summary Rating for Buffer Integrity

Rating	Score
○ 4	>3.5
○ 3	>2.5 - ≤3.5
○ 2	>1.5 - ≤2.5
○ 1	≤1.5

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

L2 - Riparian Corridor Connectivity (RCC)

Worksheet 2. RCC excluded non-buffer elements calculation. Refer to worksheet 1a for excluded non-buffer RCC land cover elements. Following the steps in the Field Guide, enter the summed values in meters for excluded element lengths for each bank within each segment upstream and downstream of the SA. Sum the values for each segment and calculate % Segment Disruption for the upstream side and the downstream side. Add the total disruption for upstream and downstream segments and then calculate the % Total Disruptions for the riparian corridor. Rate Riparian Corridor Connectivity using Table L2 and the data from this worksheet. Enter rating on the SA Summary Worksheet.

Segments	Upstream Segment		Downstream Segment	
Banks	**Left Bank**	**Right Bank**	**Left Bank**	**Right Bank**
A) Total Bank Disruption (m)				
B) Total Disruption by Segment (m)				
C) % Segment Disruption = (B/1000)*100				
D) Total Disruption both segments				
E) % Total Disruptions = (D/2000)*100				

Table L2. RCC Rating

Rating	Description
○ 4	**0%** total disruption on both segments combined.
○ 3	**<15%** total disruption on both segments combined.
○ 2	**≥15%** - **<40%** total disruption on both segments combined.
○ 1	**≥40%** total disruption on both segments combined.

L8- Road Proximity

Table L8. Road Proximity. On the Landscape Map, look for any roads that lie between the canyon rim and the mapped SA. "Roads" include all of the following: paved highways and smaller order roads, graded unpaved roads, abandoned graded roads, railroads or old railroad embankments. Choose the description that best describes the roads closest to the SA.

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.

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

L4 - Surrounding Land Use

Worksheet 3. Surrounding Land Use. Enter the percent area occupied by a given Land Use Element in the Land Use Zone (LUZ) surrounding the SA. Calculate the Land Use Index (LUI) Score by element as the product of the element coefficient times the percent of the LUZ Area occupied. (The %LUZ Area must total 100%.) Sum the LUI scores for each element to create the final LUI Score. Rate using Table L4 and enter the rating in the SA Rank Summary Worksheet.

Land Use Element	Coef	% LUZ Area	LUI Score
Paved roads, parking lots, domestic or commercially developed buildings, mining (gravel pit, quarry, open pit, strip mining), railroads	0		0
Unpaved roads (e.g., driveway, tractor trail, unpaved parking lots), paddock, dirt lot	0.1		
Dredging, borrow pits, abandoned mines, water-filled artificial impoundments (ponds and reservoirs)	0.1		
Filling or dumping of sediment or soils	0.1		
Intense recreation (all-terrain vehicle use, camping, popular fishing spot, etc.)	0.3		
Rip-rapped channel (highly modified channel with severely limited vegetation zone that is altered by human activities but not a completely concrete channel [that goes under paved roads]), junkyards, trash dumps, disturbed ground (not including roads)	0.3		
Ski area	0.4		
Dam sites and flood-disturbed shorelines around water storage reservoirs	0.5		
Abandoned artificial impoundments (ponds and reservoirs) and associated disturbed flood zones	0.5		
Artificial/Constructed wetlands, irrigation ditches	0.7		
Developed/Managed trail system (high use trail)	0.8		
Paddock, dirt lot	0.1		
Agriculture - active tilled crop production	0.2		
Agriculture - permanent crop (vineyards, orchards, nurseries, berry production)	0.3		
Manicured lawns, sport fields, and golf courses; urban manicured parks	0.3		
Old fields and other disturbed fallow lands dominated by ruderal and/or exotic species (e.g., kochia, Russian thistle, mustards, annual vegetation)	0.5		
Mature old fields and other fallow lands with natural composition, introduced hay field and pastures (e.g., perennial vegetation cover)	0.7		
Restoration areas in process to natural conditions (re-conversion in process)	0.8		
Haying of native grassland (e.g., no tillage, haying and baling only)	0.9		
Heavy logging or tree removal with >50% of large trees (e.g., >30 cm diameter at breast height) removed, woodland/shrub vegetation conversion (chaining, cabling, rotochopping)	0.3		
Commercial tree plantation, Christmas tree farms	0.6		
Selective logging or tree removal with <50% of large trees (e.g., >30 cm diameter at breast height) removed	0.8		
Mature restoration areas returned to natural conditions (re-converted)	0.9		
Natural area, land managed for native vegetation - No agriculture, logging, development	1		
LUI Score= Coefficient * % LUZ Area			

Table L4. Surrounding Land Use Rating

Rating	LUI Score
○ 4	≥95 - 100
○ 3	≥80 - <95
○ 2	≥40 - <80
○ 1	<40

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

Biotic Metrics

B9 - Riparian Zone Wetland Plant Abundance

Worksheet 4. Riparian Zone Wetland Plant Abundance. For each polygon, select the zone where the polygon is located - either RZ for riparian and active channel, or AZ for allocthonous zone. Enter the decimal percent of Biotic Index Area (BIA) occupied by polygon (Refer to Biotic SA Map). The sum of all polygons must equal 1.0 (100%) of BIA. Record the 5 dominant species, wetland status and mid-point cover estimation for the 5 dominant species within the polygon using Table B9a in Appendix B. Sum the RZ Wetland Species % Cover Total only. (Note that using mid-point cover estimations could result in greater than 100% cover which is acceptable.) For each RZ multiply the RZ Wetland Species % Cover Total by the % BIA to get the RZ Area Weighted % of BIA. Add the RZ Area Weighted % of BIA totals for the RZ polygons only and enter in the box below. Select rating on Table B9b and enter on SA Rank Summary Worksheet.

			Dominant Plant Species Cover																
Polygon	SA Zone	% BIA (decimal)	Species 1	Wetland Status	% cover	Species 2	Wetland Status	% cover	Species 3	Wetland Status	% cover	Species 4	Wetland Status	% cover	Species 5	Wetland Status	% cover	RZ Wetland Species % Cover Total	RZ Area Weighted % of BIA
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
Sum % BIA																Area weighted RZ Wetlands Species cover for BIA total			

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

B5 - Invasive Exotic Plant Species Cover

Worksheet 5 - Invasive Exotic Plant Species Cover. For each polygon from Worksheet 4, enter the decimal percent of Biotic Index Area (BIA) occupied by polygon. For the vegetated polygons only, record the 5 dominant invasive exotic (IE) species (from NM Noxious Weed List - Appendix D) and estimate the percent cover for each IE species within the polygon. For vegetated polygons with no IE species, select the NO IE option under Invasive Exotic Species 1 and enter 0 for the IE Species % Cover Total and 0 for the IE Area Weighted % Cover of BIA. For polygons with no vegetation, select the NO VEG option under Invasive Exotic Species 1 and leave the IE Species % Cover Total and the IE Area Weighted % Cover of BIA blank. For each vegetated polygon multiply the IE Species % Cover Total by the Decimal % of BIA Area to get the IE Area Weighted % Cover of BIA. Add the IE Area Weighted % Cover of BIA totals for the vegetated polygons and enter in the box below. Select rating on Table B5 and enter rating on SA Rank Summary Worksheet.

Polygon Number	**Decimal % of BIA Area**	Invasive Exotic Species 1	% cover	Invasive Exotic Species 2	% cover	Invasive Exotic Species 3	% cover	Invasive Exotic Species 4	% cover	Invasive Exotic Species 5	% cover	**IE Species % Cover Total**	**IE Area Weighted % Cover of BIA**
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
									Total Invasive Exotic Area Wt Cov for BIA				

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

Table B5. Ratings for Invasive Exotic Plant Species Cover	
Rating	**Invasive Exotic Species Cover %**
○ 4	0%
○ 3	>0% - <1%
○ 2	≥1% - <10%
○ 1	≥10

Table B9b. Ratings for Riparian Zone Wetland Plant Abundance		
Rating	**Area weighted RZ Wetland Species cover for BIA total**	**Description**
○ 4	≥ 20%	Facultative and /or obligate wetland plant species are a significant component of plant cover within the SA.
○ 3	≥15% - <20%	Facultative and /or obligate wetland plant species are a common component of plant cover within the SA.
○ 2	≥10% - <15%	Facultative and /or obligate wetland plant species are a minor component of plant cover within the SA.
○ 1	<10%	Facultative and /or obligate wetland plant species are rare and less than 10% of plant cover within the SA.

Worksheet 6. Wetland Vegetation Zone Loss. Using the location of "development disturbance" mapped on the Biotic SA 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

B10 - Wetland Vegetation Zone Loss

Table B10 - Rating for Wetland Vegetation Zone Loss. Assign a rating for the SA that is prioritized by the percent altered landscape, 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 Rank Summary Worksheet.

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

Biotic Comments

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

Abiotic Metrics

A5 - Soil Surface Condition

Worksheet 7. Soil Surface Condition. Check all that apply in the upper , middle and lower SA segments during the field reconnaissance. The absence of these indicators would signify that disturbances are naturally occurring (e.g., flood deposition or low-density wildlife trails). Estimate the percent soil disturbance by segment area and referring to the Abiotic SA Map. Rate using Table A5 and enter on the SA Rank Summary Worksheet.

Upper Segment	Middle Segment	Lower Segment	Field Indicators (Check all existing conditions)
☐	☐	☐	Active erosion features due to anthropogenic disturbance (eg. rills, gullies, plant pedestals).
☐	☐	☐	Multiple livestock and other (fishing,hiking) trails,
☐	☐	☐	Vehicle tracks including off-road and construction, etc.
☐	☐	☐	Impervious compacted surfaces or pavement
☐	☐	☐	Grading or plowing
☐	☐	☐	Fill
☐	☐	☐	Gravel pits
☐	☐	☐	Anthropogenic levees and berms
☐	☐	☐	Irrigation-driven salinity and mineral crusts
☐	☐	☐	Fire pits
☐	☐	☐	Dust layers from adjacent road
☐	☐	☐	Other:
			Estimate % soil disturbance by segment area

Average % Soil Disturbance:

Table A5. Soil Surface Condition Rating

Rating	Description
○ 4	Bare soil areas due to anthropogenic disturbance absent or very limited. No human-caused impervious surfaces or gravel pits are found within the SA. Total disturbance, including erosion, impervious surfaces, fill, or other anthropogenic degradation to the soil surface is <1% of the SA.
○ 3	Some amount of bare soil from human causes is present but the extent is limited. Area of impervious surfaces are minimal in extent. Total disturbance, including erosion, impervious surfaces, fill, gravel pits, vehicle tracks or other anthropogenic degradation to the soil surface is ≥1% - <5% of the sampling area.
○ 2	Bare soils from human causes are common. These may include dense livestock trails, vehicle tracks, trails, construction staging areas, mechanical rutting, or irrigation-driven salinity. Soil disturbance, while apparent, is limited to specific areas and not found across the majority of the SA. Total disturbance, including erosion, impervious surfaces, fill, gravel mining, or other anthropogenic degradation to the soil surface is ≥5% - <10% of the SA.
○ 1	Bare soil areas degrade portions of the site because of altered hydrology or other long-lasting impacts. Deep ruts from off-road vehicles or machinery are present. Livestock disturbance or trails are widespread and several inches deep. Water is channeled into rills or ponded. Additional human-caused impervious surfaces or soil compaction are present. Total disturbance, including erosion, impervious surfaces, fill,gravel mining or other anthropogenic degradation to the soil surface is ≥10% of the SA.

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

A12 - Large Woody Debris

Worksheet 8. Large Woody Debris. At each Segment location, count all wood ≥ 10 cm (4 in) in diameter and ≥ 1.5 m (5 ft) in length on upstream and downstream 30 m (100 ft) transects within the Riparian Zone (RZ) including the active channel. Tally counts by 10 m (30 ft) lengths walking the transect from the beginning of each 10 m Section. Add the total wood counts per Segment and average the Segment wood counts. Indicate in the box if a Segment is counted and only average the counted Segments. Select Forest Type surrounding the SA from the drop down below. Short Forest example: Pinyon-Juniper. Tall Forest example: Spruce-Fir. Rate using Table A12 and enter the rating on the SA Rank Summary Worksheet.

10 m Sections	Upper Segment	Middle Segment	Lower Segment
Segment Counted?			
Upstream			
0-10 m			
10-20 m			
20-30 m			
Downstream			
0-10 m			
10-20 m			
20-30 m			
Total Wood/Segment			
		Average Count for RZ	

Select Forest Type	

Table A12. Rating for Large Woody Debris (LWD)

Rating	Short Forest	Tall Forest	Description
○ 4	>15	>25	LWD is abundant and well distributed throughout the SA
○ 3	>8 - ≤15	>15 - ≤25	LWD is common and may be distributed in patches.
○ 2	>3 - ≤8	>8 - ≤15	LWD is sparse and distributed in patches.
○ 1	≤3	≤8	LWD is rare or absent

Tally Wood Counts and Abiotic Comments

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

A13 - Confined Channel Condition

Worksheet 9. Confined Channel Condition Checklist. Check all field indicators that apply to the Upper, Middle and Lower Segments of the SA observed from the channel edge and indicate by Low (L) Moderate (M) or High (H) based on how much each indicator is affecting the Segment. Rate based on a preponderance of evidence from this checklist using Table A13. Enter the rating on the SA Rank Summary Worksheet.

Condition	Upper Segment	Middle Segment	Lower Segment	Field Indicators (check all existing conditions)
Indicators of Disequilibrium				Active headcuts within recent sediment deposits
				Bank slides or slumps
				Evidence of erosion or freshly exposed soil on one or both banks
				Splays of sediment bury the confined channel (e.g. new gravel bars, gravel and sand sheets, etc.)
				Splays of sediment have buried riparian zone (RZ) vegetation and substrate.
				Road fill and other anthropogenic-sourced materials are encroaching into channel
				Adjacent irrigation ditch in the SA evident and disrupting/modifying channel flow.
				The channel bed is planar overall; original cascade or step-pool channel morphology obscured.
				Channel pools are partially or completely filled with sediment or anthropogenic fill.
				Channel has been altered with rip-rap, culverts, grade control structures or other artificial channel stabilization structures that obscure confined valley profile.

Table A13. Confined Channel Condition Rating

Rating	Description
○ 4	Little or no evidence of recent excess alluvial depostion 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 apprears 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.

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

Worksheet 10. 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	
	☐	☐	☐	☐	Extended low flow dam releases	
	☐	☐	☐	☐	Timing of flow releases not concordant	
	☐	☐	☐	☐	Extended high flow dam releases	
	☐	☐	☐	☐	Agriculture/Urban flow diversion upstream	
					Adverse sediment management	
	☐	☐	☐	☐	Adverse sediment retention by dams	
	☐	☐	☐	☐	Sediment loss by dredging	
	☐	☐	☐	☐	Adverse sediment input (roads/development)	
					Artificial water additions	
	☐	☐	☐	☐	Sewer treatment effluent	
	☐	☐	☐	☐	Point source urban runoff	
	☐	☐	☐	☐	Factory, feedlot outfall	
	☐	☐	☐	☐	Agricultural irrigation ditch returns	
	☐	☐	☐	☐	Mining waste	
					Ground water pumping	
	☐	☐	☐	☐	Urban depletions	
	☐	☐	☐	☐	Fracking	
	☐	☐	☐	☐	Agriculture irrigation wells	
					Watershed alteration	
	☐	☐	☐	☐	Extensive recent fires in watershed	
	☐	☐	☐	☐	Extensive recent timber harvest	
	☐	☐	☐	☐	Extensive open pit mining in watershed	
	☐	☐	☐	☐	Livestock/wildlife overgrazing	
					Local biodiversity impacts	
	☐	☐	☐	☐	Evidence of excessive grazing (local)	
	☐	☐	☐	☐	Excessive noise affecting wildlife	
					Counts by Intensity	

Additional Comments

Version Date: 05/25/2022 Schema: Confined Valley 1.3

SA CODE : **Date :**

SA Name : **Surveyor Initials :**

Photo Point Log

Worksheet 11. Photo Point Log for Metrics B9, B5 and A13. For Biotic Metrics B9 Riparian Zone Wetland Plant Abundance and B5 Invasive Exotic Plant Species Cover, documentary photographs representative of each polygon plant community are recommended and logged. When the species identification of a stratum dominant, wetland plant species, or invasive exotic plant species is uncertain, photographs of the entire plant as well as close-ups of leaves, flowers and fruits are taken that can aid in identification. For Abiotic Metric A13 Confined Channel Condition, four photos are taken at each Segment cross-section - one each upstream and downstream from the middle of the channel if feasible,, and one each facing each bank (bank left and bank right). Significant features which also alter the size of the SA or significantly impact hydrology should be recorded with photographs. **(AZM = Azimuth compass direction of photo; GPS UTM easting and northing location.)**

Enter Camera Details:

Photo File #	AZM	Easting	Northing	Latitude	Longitude	Description	Initial

Appendix B. Reference Sheets for Recording Field Data

The following tables and figures are reference material to be used in conjunction with the Field Guide Worksheet Packet (Appendix A) for the following metrics:

L2. Riparian Corridor Connectivity (Table L2a)

L8. Road Proximity (Figures A5a-A5c)

B9. Riparian Zone Wetland Plant Abundance (Table B9a)

A13. Confined Channel Condition (Figures A13a – A13h)

It is suggested that a copy of these reference sheets be taken into the field as the information contained herein is essential to completing the scoring of the related NMRAM metrics.

L2 – Riparian Corridor Connectivity (RCC).

Table L2a provides a minimum assessed length for special class Non-Connectivity Land Cover Elements bisecting the riparian corridor.

Table L2a	
Special Class Non-Connectivity Land Cover Elements	Minimum Assigned Impairment
Unpaved graded and/or maintained roads	10 m
Single-lane paved road	20 m
Two-lane paved road/highway	50 m
Four-lane paved road/highway	100 m
Railroad	50 m
Concrete diversion or retention dams	25 m
Small non-concrete (wood, earth) diversion dams	10 m

L8 - Road Proximity

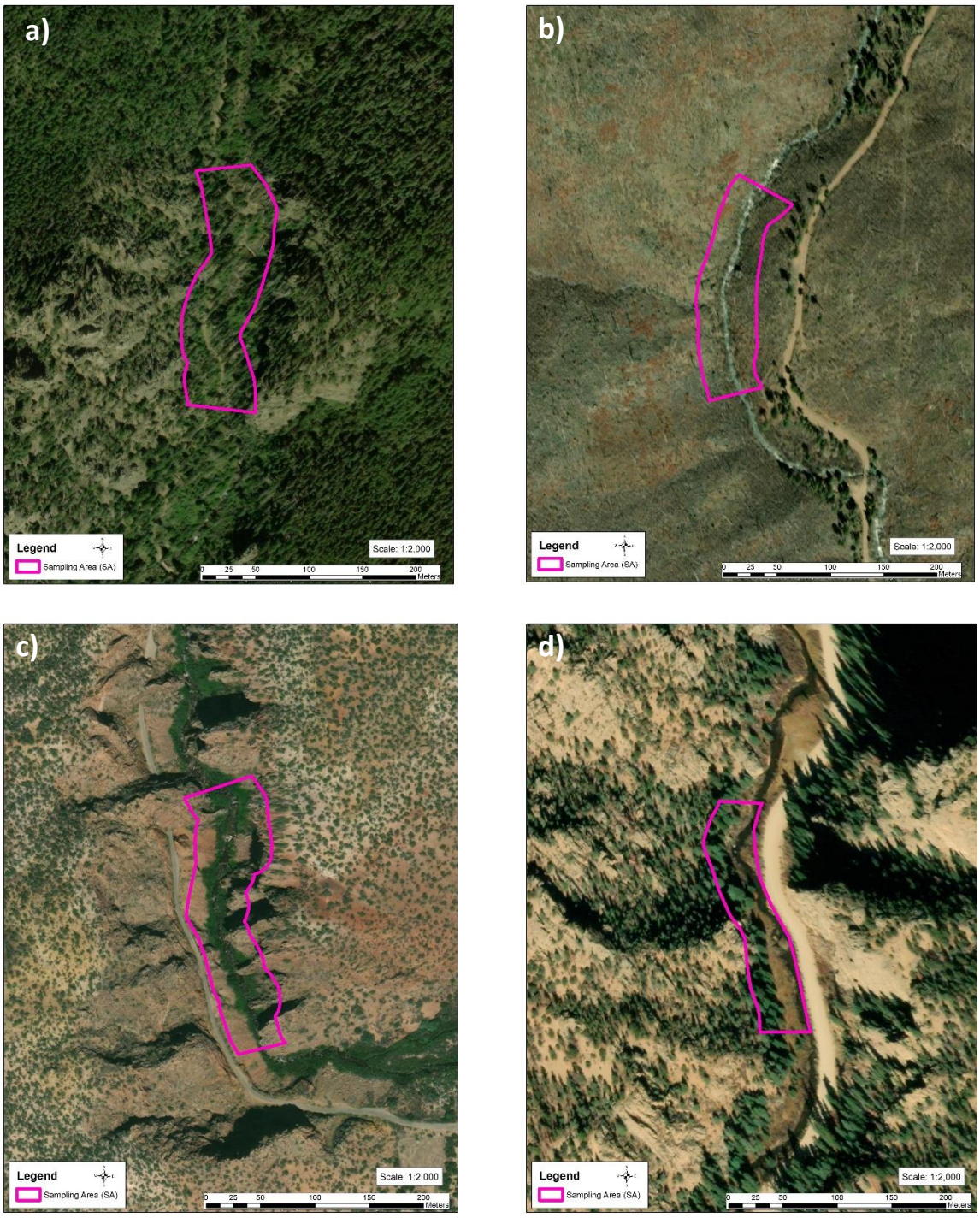

Figure L8b. Road Proximity metric examples of (a) no roads adjacent to the SA or on canyon slopes (rating 4), (b) road present within the upper half of the canyon slope (rating 3), (c) road above the SA with evidence of sediment impacts to the SA (rating 2), and (d) road and road fill on and adjacent to the SA (rating 1).

B9 – Riparian Zone Wetland Plant Abundance

Table B9a provides the Braun-Blanquet mid-point values for estimating wetland species cover on Worksheet 4.

Table B9a	
Braun-Banquet Scaler Mid-Point Values for Wetland Plant Cover Estimation	
Mid-Point %	**Cover Range**
2.5	> 1 % to 5 %
17.5	> 5 % to 25 %
37.5	> 25 % to 50 %
62.5	> 50 % to 75 %
87.5	> 75 %

A13 – Confined Channel Condition

Examples of Channel Condition indicators on site.

Figure A13a. Artificial channel stabilization with rip-rap (left). Rip rap was installed to hold road fill sediment which has been pushed onto historic wetland. Bank erosion on opposite bank (right).

Figure A13b. Artificial stabilization with one-log dam that is capturing sediment and creating a new gravel bar and sediment sheet in the channel.

Figure A13c. Sediment pushed into the river from road construction on the right bank.

Figure A13d. Stable and vegetated banks along confined valley channel in excellent condition.

Figure A13e. Channel bed planar overall and lacking step-pool or cascade channel morphology that is common to high-quality confined valley stream reaches. Interstitial spaces filled with sediment.

Figure A13f. Sediment filled interstitial spaces and clay drapes and films on cobbles and boulders indicate degraded ecological condition.

Figure A13g. Splays of sediment have buried the channel with new cobble/gravel bars and sheets.

Figure A13h. Typical step-pool morphology of a confined valley channel in excellent condition.

Appendix C. Common Dominant Species

The following list identifies common riverine plant species in New Mexico. The lists are organized alphabetically by scientific name within each stratum (life form), with trees listed first, followed by shrubs, graminoids (grasses and grass like plants) and finally forbs. The plant species are grouped by the stratum that they achieve at maturity, however, woody species may be found in other strata. The list also includes the NMRAM wetland status. Species that are classified as OBL or FACW wetland indicator status on the National Wetlands Plant List (Federal Register :: National Wetland Plant List) are considered wetland species (Wet) for the Confined Valley Riverine NMRAM. In addition, some species with FAC wetland indicator status have been classified here as Wet for NMRAM purposes. For example, Rio Grande cottonwood is listed as a wetland species (Wet) for NMRAM purposes. Species with any other classification are not considered wetland species (Up).

This list does not include every plant species in New Mexico, just those commonly encountered during NMRAM assessment. If a species not on the list is a stand dominant within the SA, find the Plants Code and Wetland Status for the species in the USDA Plants Database (https://plants.sc.egov.usda.gov) and use the wetland status for the Arid West zone. The plant code can be entered on Worksheet 4 (Appendix A) using the blank under Species, and the wetland status can be selected using the drop-down list.

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Tree	Tree - unknown species	Tree - unknown species	2TREE	Unk
Tree	*Abies concolor*	white fir	ABCO	Up
Tree	*Acer glabrum*	Rocky Mountain maple	ACGLG2	Up
Tree	*Acer grandidentatum*	bigtooth maple	ACGR3	Up
Tree	*Acer negundo*	boxelder	ACNE2	Wet
Tree	*Ailanthus altissima*	tree of heaven	AIAL	Up
Tree	*Alnus incana ssp. tenuifolia*	thinleaf alder	ALINT	Wet
Tree	*Alnus oblongifolia*	Arizona alder	ALOB2	Wet
Tree	*Betula occidentalis*	water birch	BEOC2	Wet
Tree	*Celtis laevigata var. reticulata*	netleaf hackberry	CELAR	Up
Tree	*Elaeagnus angustifolia*	Russian olive	ELAN	Up
Tree	*Fraxinus velutina*	velvet ash	FRVE2	Up
Tree	*Juglans major*	Arizona walnut	JUMA	Wet
Tree	*Juniperus deppeana*	alligator juniper	JUDE2	Up
Tree	*Juniperus monosperma*	oneseed juniper	JUMO	Up
Tree	*Juniperus scopulorum*	Rocky Mountain juniper	JUSC2	Up
Tree	*Morus alba*	white mulberry	MOAL	Up
Tree	*Picea pungens*	blue spruce	PIPU	Up
Tree	*Pinus ponderosa*	ponderosa pine	PIPO	Up
Tree	*Platanus wrightii*	Arizona sycamore	PLWR2	Wet
Tree	*Populus angustifolia*	narrowleaf cottonwood	POAN3	Wet

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Tree	*Populus deltoides*	cottonwood	PODE3	Wet
Tree	*Populus deltoides ssp. wislizeni*	Rio Grande cottonwood	PODEW	Wet
Tree	*Populus fremontii*	Fremont's cottonwood	POFR2	Wet
Tree	*Populus x acuminata*	lanceleaf cottonwood	POAC5	Wet
Tree	*Populus tremuloides*	quaking aspen	POTR5	Up
Tree	*Prunus armeniaca*	apricot	PRAR3	Up
Tree	*Quercus gambelii*	Gambel's oak	QUGA	Up
Tree	*Robinia pseudoacacia*	black locust	ROPS	Up
Tree	*Salix amygdaloides*	peachleaf willow	SAAM2	Wet
Tree	*Salix gooddingii*	Goodding's willow	SAGO	Wet
Tree	*Ulmus pumila*	Siberian elm	ULPU	Up
Tree	*Tamarix spp.*	Saltcedar	TAMAR2	Up
Shrub	Shrub - species unknown	Shrub - species unknown	2SHRUB	Unk
Shrub	*Alhagi maurorum*	camelthorn	ALMA12	Up
Shrub	*Allenrolfea occidentalis*	iodinebush	ALOC2	Wet
Shrub	*Ambrosia monogyra*	singlewhorl burrobush	AMMO6	Wet
Shrub	*Amelanchier utahensis*	Utah serviceberry	AMUT	Up
Shrub	*Amorpha fruticosa*	desert indigobush	AMFR	Wet
Shrub	*Artemisia filifolia*	sand sagebrush	ARFI2	Up
Shrub	*Artemisia tridentata*	big sagebrush	ARTR2	Up
Shrub	*Atriplex canescens*	fourwing saltbush	ATCA2	Up
Shrub	*Baccharis emoryi*	Emory's falsewillow	BAEM	Wet
Shrub	*Baccharis salicifolia*	seepwillow	BASA4	Wet
Shrub	*Baccharis salicina*	false willow	BASA	Wet
Shrub	*Berberis fendleri*	Colorado barberry	BEFE	Up
Shrub	*Berberis vulgaris*	common barberry	BEVU	Up
Shrub	*Brickelliastrum fendleri*	Fendler's brickellbush	BRFE2	Up
Shrub	*Brickellia californica*	California brickellbush	BRCA3	Up
Shrub	*Brickellia microphylla var. scabra*	rough brickellbush	BRMIS	Up
Shrub	*Cercocarpus montanus*	mountain mahogany	CEMO2	Up
Shrub	*Chilopsis linearis*	desert willow	CHLI2	Up
Shrub	*Clematis ligusticifolia*	western white clematis	CLLI2	Up
Shrub	*Cornus sericea*	redosier dogwood	COSE16	Wet
Shrub	*Dasiphora fruticosa*	shrubby cinquefoil	DAFR6	Wet
Shrub	*Ericameria nauseosa*	rubber rabbitbrush	ERNA10	Up
Shrub	*Fallugia paradoxa*	Apacheplume	FAPA	Up
Shrub	*Forestiera pubescens*	New Mexico olive	FOPU2	Up
Shrub	*Gutierrezia sarothrae*	broom snakeweed	GUSA2	Up
Shrub	*Hymenoclea monogyra*	singlewhorl burrobush	HYMO	Up
Shrub	*Isocoma pluriflora*	southern jimmyweed	ISPL	Up
Shrub	*Lonicera involucrata*	twinberry honeysuckle	LOIN5	Up
Shrub	*Lonicera tatarica*	Tatarian honeysuckle	LOTA	Up
Shrub	*Lycium pallidum*	wolfberry	LYPA	Up

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Shrub	*Parthenocissus vitacea*	thicket creeper	PAVI5	Up
Shrub	*Pluchea sericea*	arrowweed	PLSE	Wet
Shrub	*Poliomintha incana*	hoary rosemarymint	POIN3	Up
Shrub	*Prosopis glandulosa*	honey mesquite	PRGL2	Up
Shrub	*Prosopis pubescens*	screwbean mesquite	PRPU	Up
Shrub	*Prunus americana*	American plum	PRAM	Up
Shrub	*Prunus virginiana*	common chokecherry	PRVI	Up
Shrub	*Rhus trilobata*	skunkbush sumac	RHTR	Up
Shrub	*Ribes aureum*	golden currant	RIAU	Up
Shrub	*Ribes inerme*	whitestem gooseberry	RIIN2	Wet
Shrub	*Ribes leptanthum*	trumpet gooseberry	RILE	Up
Shrub	*Robinia neomexicana*	New Mexico locust	RONE	Up
Shrub	*Rosa woodsii*	Woods' rose	ROWO	Up
Shrub	*Rubus idaeus ssp. strigosus*	grayleaf red raspberry	RUIDS2	Up
Shrub	*Salix bebbiana*	Bebb willow	SABE2	Wet
Shrub	*Salix drummondiana*	Drummond's willow	SADR	Wet
Shrub	*Salix exigua*	coyote willow	SAEX	Wet
Shrub	*Salix irrorata*	bluestem willow	SAIR	Wet
Shrub	*Salix ligulifolia*	strapleaf willow	SALI	Wet
Shrub	*Salix lucida ssp. lasiandra*	Pacific willow	SALUL	Wet
Shrub	*Salix* - species unknown	Willow - unknown species	SALSP	Wet
Shrub	*Shepherdia argentea*	silver buffaloberry	SHAR	Up
Shrub	*Suaeda nigra*	bush seepweed	SUNI	Wet
Shrub	*Symphoricarpos oreophilus*	whortleleaf snowberry	SYOR2	Up
Shrub	*Toxicodendron rydbergii*	western poison ivy	TORY	Up
Shrub	*Vitis arizonica*	canyon grape	VIAR2	Up
Grass	Grass - species unknown	Grass - species unknown	2GRAM	Unk
Grass	*Achnatherum lettermanii*	Letterman's needlegrass	ACLE9	Up
Grass	*Achnatherum robustum*	sleepygrass	ACRO7	Up
Grass	*Aegilops cylindrica*	jointed goatgrass	AECY	Up
Grass	*Agropyron cristatum*	crested wheatgrass	AGCR	Up
Grass	*Agrostis gigantea*	redtop	AGGI2	Wet
Grass	*Agrostis idahoensis*	Idaho bentgrass	AGID	Wet
Grass	*Agrostis stolonifera*	creeping bentgrass	AGST2	Wet
Grass	*Alopecurus aequalis*	shortawn foxtail	ALAE	Wet
Grass	*Aristida purpurea*	purple threeawn	ARPU9	Up
Grass	*Aristida ternipes*	spidergrass	ARTE3	Up
Grass	*Aristida ternipes var. gentilis*	spidergrass	ARTEG	Up
Grass	*Arundo donax*	giant reed	ARDO4	Wet
Grass	*Bolboschoenus maritimus*	saltmarsh bulrush	BOMA7	Wet
Grass	*Buchloe dactyloides*	buffalograss	BUDA	Up
Grass	*Bouteloua aristidoides*	needle grama	BOAR	Up
Grass	*Bouteloua barbata*	sixweeks grama	BOBA2	Up
Grass	*Bouteloua curtipendula*	sideoats grama	BOCU	Up

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Grass	*Bouteloua gracilis*	blue grama	BOGR2	Up
Grass	*Bromus catharticus*	rescuegrass	BRCA6	Up
Grass	*Bromus ciliatus*	fringed brome	BRCI2	Up
Grass	*Bromus ciliatus var. richardsonii*	fringed brome	BRCIR	Up
Grass	*Bromus inermis*	smooth brome	BRIN2	Up
Grass	*Bromus japonicus*	Japanese brome	BRJA	Up
Grass	*Bromus polyanthus*	Great Basin brome	BRPO	Up
Grass	*Bromus tectorum*	cheatgrass	BRTE	Up
Grass	*Calamagrostis canadensis*	Canada reedgrass	CACA4	Wet
Grass	*Carex atherodes*	wheat sedge	CAAT2	Wet
Grass	*Carex emoryi*	Emory's sedge	CAEM2	Wet
Grass	*Carex nebrascensis*	Nebraska sedge	CANE2	Wet
Grass	*Carex occidentalis*	western sedge	CAOC2	Up
Grass	*Carex pellita*	woolly sedge	CAPE42	Wet
Grass	*Carex praegracilis*	clustered field sedge	CAPR5	Wet
Grass	*Carex rossii*	Ross' sedge	CARO5	Up
Grass	*Carex simulata*	analogue sedge	CASI2	Wet
Grass	*Carex utriculata*	Northwest Territory sedge	CAUT	Wet
Grass	*Carex* - species unknown wetland	Carex species unknown wetland	CARSP	Wet
Grass	*Chloris virgata*	feather fingergrass	CHVI4	Up
Grass	*Cynodon dactylon*	bermudagrass	CYDA	Up
Grass	*Cyperus niger*	black flatsedge	CYNI2	Wet
Grass	*Dactylis glomerata*	orchardgrass	DAGL	Up
Grass	*Distichlis spicata*	inland saltgrass	DISP	Wet
Grass	*Echinochloa crus-galli*	barnyardgrass	ECCR	Wet
Grass	*Eleocharis palustris*	common spikerush	ELPA3	Wet
Grass	*Eleocharis parishii*	Parish's spikerush	ELPA4	Wet
Grass	*Eleocharis rostellata*	beaked spikerush	ELRO2	Wet
Grass	*Elymus canadensis*	Canada wildrye	ELCA4	Up
Grass	*Elymus glaucus*	blue wildrye	ELGL	Up
Grass	*Elymus repens*	quackgrass	ELRE4	Up
Grass	*Elymus trachycaulus*	slender wheatgrass	ELTR7	Up
Grass	*Elymus x pseudorepens*	false quackgrass	ELPS	Up
Grass	*Eragrostis cilianensis*	stinkgrass	ERCI	Up
Grass	*Eragrostis intermedia*	plains lovegrass	ERIN	Up
Grass	*Eragrostis mexicana*	mexican lovegrass	ERME	Up
Grass	*Eriochloa acuminata var. acuminata*	tapertip cupgrass	ERACA	Wet
Grass	*Festuca arundinacea*	tall fescue	FEAR3	Up
Grass	*Festuca pratensis*	meadow fescue	FEPR	Up
Grass	*Glyceria grandis*	American mannagrass	GLGR	Wet
Grass	*Hordeum jubatum*	foxtail barley	HOJU	Wet
Grass	*Hordeum murinum ssp. glaucum*	smooth barley	HOMUG	Up
Grass	*Juncus arcticus var. balticus*	Baltic rush	JUARB5	Wet
Grass	*Juncus dudleyi*	slender rush	JUDU2	Wet

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Grass	*Juncus ensifolius var. montanus*	Rocky Mountain rush	JUENM2	Wet
Grass	*Juncus torreyi*	Torrey's rush	JUTO	Wet
Grass	*Juncus* - species unknown	Juncus - species unknown	JUNSP	Wet
Grass	*Leersia oryzoides*	rice cutgrass	LEOR	Wet
Grass	*Leptochloa fusca ssp. fascicularis*	bearded sprangletop	LEDU	Wet
Grass	*Lycurus setosus*	bristly wolfstail	LYSE3	Up
Grass	*Muhlenbergia asperifolia*	alkali muhly	MUAS	Wet
Grass	*Muhlenbergia depauperata*	sixweeks muhly	MUDE	Up
Grass	*Muhlenbergia repens*	creeping muhly	MURE	Up
Grass	*Muhlenbergia richardsonis*	Mat muhly	MURI	Up
Grass	*Muhlenbergia wrightii*	spike muhly	MUWR	Up
Grass	*Panicum capillare*	witchgrass	PACA6	Up
Grass	*Panicum obtusum*	vine mesquite	PAOB	Wet
Grass	*Pascopyrum smithii*	western wheatgrass	PASM	Up
Grass	*Paspalum distichum*	knotgrass	PADI6	Wet
Grass	*Phalaris arundinacea*	reed canarygrass	PHAR3	Wet
Grass	*Phleum pratense*	timothy	PHPR3	Up
Grass	*Phragmites australis*	common reed	PHAU7	Wet
Grass	*Poa palustris*	fowl bluegrass	POPA2	Wet
Grass	*Poa pratensis*	Kentucky bluegrass	POPR	Up
Grass	*Polypogon monspeliensis*	annual rabbitsfoot grass	POMO5	Wet
Grass	*Psathyrostachys juncea*	Russian wildrye	PSJU3	Up
Grass	*Saccharum ravennae*	ravennagrass	SARA3	Wet
Grass	*Schedonorus phoenix*	tall fescue	SCPH	Up
Grass	*Schoenoplectus pungens*	common threesquare	SCPU10	Wet
Grass	*Schoenoplectus tabernaemontani*	softstem bulrush	SCTA2	Wet
Grass	*Scirpus microcarpus*	panicled bulrush	SCMI2	Wet
Grass	*Setaria grisebachii*	Grisebach's bristlegrass	SEGR6	Up
Grass	*Sorghum halepense*	johnsongrass	SOHA	Up
Grass	*Sorghastrum nutans*	Indiangrass	SONU2	Wet
Grass	*Sporobolus airoides*	alkali sacaton	SPAI	Up
Grass	*Sporobolus compositus var. compositus*	tall dropseed	SPCOC2	Up
Grass	*Sporobolus contractus*	spike dropseed	SPCO4	Up
Grass	*Sporobolus cryptandrus*	sand dropseed	SPCR	Up
Grass	*Sporobolus giganteus*	giant dropseed	SPGI	Up
Grass	*Sporobolus wrightii*	big sacaton	SPWR2	Up
Grass	*Thinopyrum intermedium*	intermediate wheatgrass	THIN6	Up
Forb	Forb - species unknown	Forb - species unknown	2FORM	Unk
Forb	*Achillea millefolium*	common yarrow	ACMI2	Up
Forb	*Aconitum columbianum*	Columbian monkshood	ACCO4	Wet
Forb	*Acroptilon repens*	Russian knapweed	ACRE3	Up
Forb	*Agrimonia striata*	roadside agrimony	AGST	Up
Forb	*Amaranthus hybridus*	slim amaranth	AMHY	Up
Forb	*Ambrosia acanthicarpa*	flatspine burr ragweed	AMAC2	Up

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Forb	*Ambrosia confertiflora*	weakleaf bur ragweed	AMCO3	Up
Forb	*Ambrosia psilostachya*	Cuman ragweed	AMPS	Up
Forb	*Ambrosia trifida*	great ragweed	AMTR	Up
Forb	*Ambrosia tomentosa*	skeletonleaf burr ragweed	AMTO3	Up
Forb	*Anemone canadensis*	Canada anemone	ANCA8	Wet
Forb	*Anemopsis californica*	yerba mansa	ANCA10	Wet
Forb	*Apocynum androsaemifolium*	spreading dogbane	APAN2	Up
Forb	*Apocynum cannabinum*	Indianhemp	APCA	Up
Forb	*Arctium minus*	lesser burdock	ARMI2	Up
Forb	*Argentina anserina*	silverweed cinquefoil	ARAN7	Wet
Forb	*Artemisia campestris*	field sagewort	ARCA12	Up
Forb	*Artemisia carruthii*	Carruth's sagewort	ARCA14	Up
Forb	*Artemisia dracunculus*	tarragon	ARDR4	Up
Forb	*Artemisia ludoviciana*	white sagebrush	ARLU	Up
Forb	*Atriplex micrantha*	Russian atriplex	ATMI2	Wet
Forb	*Berula erecta*	cutleaf waterparsnip	BEER	Wet
Forb	*Bidens bigelovii*	Bigelow's beggarticks	BIBI	Wet
Forb	*Bidens leptocephala*	fewflower beggartick	BILE	Wet
Forb	*Boerhavia coccinea*	scarlet spiderling	BOCO	Up
Forb	*Cardamine cordifolia*	heartleaf bittercress	CACO6	Wet
Forb	*Cardaria draba*	hoary cress	CADR	Up
Forb	*Carduus nutans*	nodding plumeless thistle	CANU4	Up
Forb	*Centaurea calcitrapa*	purple starthistle	CECA2	Up
Forb	*Centaurea diffusa*	diffuse knapweed	CEDI3	Up
Forb	*Centaurea melitensis*	Malta starthistle	CEME2	Up
Forb	*Centaurea solstitialis*	yellow starthistle	CESO3	Up
Forb	*Centaurea stoebe ssp. micranthos*	spotted knapweed	CESTM	Up
Forb	*Chamaesyce setiloba*	Yuma sandmat	CHSE8	Up
Forb	*Chamaesyce vermiculata*	wormseed sandmat	CHVE5	Up
Forb	*Chenopodium berlandieri*	pitseed goosefoot	CHBE4	Up
Forb	*Chenopodium fremontii*	Fremont's goosefoot	CHFR3	Up
Forb	*Chenopodium graveolens*	fetid goosefoot	CHGR2	Up
Forb	*Chenopodium pratericola*	desert goosefoot	CHPR5	Up
Forb	*Cichorium intybus*	chicory	CIIN	Up
Forb	*Cicuta maculata*	spotted water hemlock	CIMA2	Wet
Forb	*Cirsium arvense*	Canada thistle	CIAR4	Up
Forb	*Cirsium parryi*	Parry's thistle	CIPA	Wet
Forb	*Cirsium vulgare*	bull thistle	CIVU	Up
Forb	*Cleome serrulata*	Rocky Mountain beeplant	CLSE	Up
Forb	*Conium maculatum*	poison hemlock	COMA2	Wet
Forb	*Convolvulus arvensis*	field bindweed	COAR4	Up
Forb	*Conyza canadensis*	Canadian horseweed	COCA5	Up
Forb	*Croton texensis*	Texas croton	CRTE4	Up
Forb	*Cosmos parviflorus*	southwestern cosmos	COPA12	Up

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Forb	*Cucurbita foetidissima*	buffalo gourd	CUFO	Up
Forb	*Cyclachaena xanthifolia*	giant sumpweed	CYXA	Up
Forb	*Cynoglossum officinale*	hound's tongue	CYOF	Up
Forb	*Datura wrightii*	sacred thornapple	DAWR2	Up
Forb	*Descurainia pinnata*	western tanseymustard	DEPI	Up
Forb	*Descurainia sophia*	herb sophia	DESO2	Up
Forb	*Dieteria canescens*	hoary aster	MACA2	Up
Forb	*Dipsacus fullonum*	Fuller's teasel	DIFU2	Up
Forb	*Drymaria arenarioides*	alfombrilla	DRAR7	Up
Forb	*Egeria densa*	Brazilian waterweed	EGDE	Wet
Forb	*Epilobium ciliatum*	hairy willowherb	EPCI	Wet
Forb	*Equisetum arvense*	field horsetail	EQAR	Up
Forb	*Equisetum laevigatum*	smooth horsetail	EQLA	Wet
Forb	*Erigeron flagellaris*	trailing fleabane	ERFL	Up
Forb	*Eriogonum polycladon*	sorrel buckwheat	ERPO4	Up
Forb	*Eritrichium nanum*	arctic alpine forget-me-not	ERNA	Up
Forb	*Euphorbia davidii*	David's spurge	EUDA5	Up
Forb	*Euphorbia esula*	leafy spurge	EUES	Up
Forb	*Eustoma exaltatum*	catchfly prairie gentian	EUEX5	Wet
Forb	*Euthamia occidentalis*	western goldenrod	EUOC4	Wet
Forb	*Fragaria virginiana ssp. glauca*	Virginia strawberry	FRVIG2	Up
Forb	*Funastrum cynanchoides*	fringed twinevine	FUCY	Up
Forb	*Galium aparine*	stickywilly	GAAP2	Up
Forb	*Gaura coccinea*	scarlet beeblossom	GACO5	Up
Forb	*Gaura mollis*	velvetweed	GAMO5	Up
Forb	*Geranium caespitosum*	pineywoods geranium	GECA3	Up
Forb	*Geranium richardsonii*	Richardson's geranium	GERI	Up
Forb	*Geum aleppicum*	yellow avens	GEAL3	Wet
Forb	*Geum macrophyllum*	largeleaf avens	GEMA4	Wet
Forb	*Glycyrrhiza lepidota*	American licorice	GLLE3	Up
Forb	*Gnaphalium exilifolium*	slender cudweed	GNEX	Wet
Forb	*Grindelia squarrosa*	curlycup gumweed	GRSQ	Up
Forb	*Halogeton glomeratus*	halogeton	HAGL	Up
Forb	*Helianthus annuus*	common sunflower	HEAN3	Up
Forb	*Helianthus nuttallii*	Nuttall's sunflower	HENU	Wet
Forb	*Heliomeris multiflora*	showy goldeneye	HEMU3	Up
Forb	*Heracleum maximum*	cow parsnip	HEMA80	Wet
Forb	*Heterotheca subaxillaris*	camphorweed	HESU3	Up
Forb	*Heterotheca villosa*	hairy goldenaster	HEVI4	Up
Forb	*Hydrilla verticillata*	hydrilla	HYVE3	Wet
Forb	*Hymenopappus filifolius*	fineleaf hymenopappus	HYFI	Up
Forb	*Hyoscyamus niger*	black henbane	HYNI	Up
Forb	*Ipomopsis longiflora*	flaxflowered ipomopsis	IPLO2	Up
Forb	*Iris missouriensis*	Rocky Mountain iris	IRMI	Wet

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Forb	*Isatis tinctoria*	Dyer's woad	ISTI	Up
Forb	*Iva axillaris*	povertyweed	IVAX	Wet
Forb	*Kochia scoparia*	common kochia	BASC5	Up
Forb	*Lactuca serriola*	prickly lettuce	LASE	Up
Forb	*Lepidium latifolium*	perennial pepperweed	LELA2	Up
Forb	*Lepidium montanum*	mountain pepperweed	LEMO2	Up
Forb	*Lesquerella fendleri*	Fendler's bladderpod	LEFE	Up
Forb	*Leucanthemum vulgare*	oxeye daisy	LEVU	Up
Forb	*Linaria dalmatica*	Dalmation toadflax	LIDA	Up
Forb	*Linaria vulgaris*	butter and eggs	LIVU2	Up
Forb	*Lycopus americanus*	American bugleweed	LYAM	Wet
Forb	*Lycopus asper*	rough bugleweed	LYAS	Wet
Forb	*Lythrum salicaria*	purple loosestrife	LYSA2	Wet
Forb	*Machaeranthera tanacetifolia*	tanseyleaf aster	MATA2	Up
Forb	*Maianthemum racemosum*	feathery false lily of the vally	MARA7	Up
Forb	*Maianthemum stellatum*	starry false Solomon's seal	MAST4	Up
Forb	*Matricaria perforata*	Scentless camomile	TRPE21	Up
Forb	*Medicago lupulina*	black medick	MELU	Up
Forb	*Medicago sativa*	alfalfa	MESA	Up
Forb	*Melilotus officinalis*	yellow sweetclover	MEOF	Up
Forb	*Mentha arvensis*	wild mint	MEAR4	Wet
Forb	*Mentha spicata*	spearmint	MESP3	Wet
Forb	*Mentzelia albicaulis*	whitestem blazingstar	MEAL6	Up
Forb	*Mentzelia multiflora*	manyflowered mentzelia	MEMU3	Up
Forb	*Mentha arvensis*	wild mint	MEAR4	Wet
Forb	*Mentha spicata*	spearmint	MESP3	Wet
Forb	*Mimulus glabratus*	roundleaf monkeyflower	MIGL	Wet
Forb	*Mirabilis longiflora*	sweet four o'clock	MILO2	Up
Forb	*Mirabilis oxybaphoides*	smooth spreading four o'clock	MIOX	Up
Forb	*Myriophyllum aquaticum*	parrot feather watermilfoil	MYAQ2	Wet
Forb	*Myriophyllum spicatum*	Eurasian watermilfoil	MYSP2	Wet
Forb	*Nasturtium officinale*	watercress	NAOF	Wet
Forb	*Oxalis dillenii*	Dillen's oxalis	OXDI2	Up
Forb	*Oxypolis fendleri*	Fendler's cowbane	OXFE	Wet
Forb	*Oenothera elata ssp. hirsutissima*	Hooker's eveningprimrose	OEELH	Wet
Forb	*Oenothera pallida*	pale eveningprimrose	OEPA	Up
Forb	*Onopordum acanthium*	Scotch thistle	ONAC	Up
Forb	*Peganum harmala*	African rue	PEHA	Up
Forb	*Persicaria lapathifolia*	curlytop knotweed	PELA22	Wet
Forb	*Phacelia integrifolia*	gypsum scorpionweed	PHIN	Up
Forb	*Physalis longifolia*	longleaf groundcherry	PHLO4	Up
Forb	*Physalis virginiana*	Virginia groundcherry	PHVI5	Up
Forb	*Phyla nodiflora*	Frog fruit	PHNO2	Wet

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Forb	*Plantago major*	common plantain	PLMA2	Up
Forb	*Polygonum aviculare*	prostrate knotweed	POAV	Wet
Forb	*Polygonum lapathifolium*	curlytop knotweed	POLA4	Wet
Forb	*Portulaca oleracea*	common purslane	POOL	Up
Forb	*Potamogeton crispus*	curly pondweed	POCR3	Wet
Forb	*Potentilla hippiana*	woolly cinquefoil	POHI6	Up
Forb	*Potentilla pulcherrima*	beautiful cinquefoil	POPU9	Up
Forb	*Pseudognaphalium stramineum*	cottonbatting cudweed	PSST7	Up
Forb	*Ranunculus aquatilis*	white water crowfoot	RAAQ	Wet
Forb	*Ranunculus cardiophyllus*	heartleaf buttercup	RACA4	Wet
Forb	*alkali buttercup*	Ranunculus cymbalaria	RACY	Wet
Forb	*Ranunculus flammula var. ovalis*	greater creeping spearwort	RAFLO	Wet
Forb	*Ratibida columnifera*	upright prairie coneflower	RACO3	Up
Forb	*Ratibida tagetes*	green prairie coneflower	RATA	Up
Forb	*Rorippa sinuata*	spreading yellowcress	ROSI2	Wet
Forb	*Rudbeckia laciniata*	cutleaf coneflower	RULA3	Up
Forb	*Rumex acetosella*	common sheep sorrel	RUAC3	Up
Forb	*Rumex altissimus*	pale dock	RUAL4	Wet
Forb	*Rumex crispus*	curly dock	RUCR	Up
Forb	*Rumex salicifolius*	willow dock	RUSA	Wet
Forb	*Sagittaria cuneata*	arumleaf arrowhead	SACU	Wet
Forb	*Salsola tragus*	prickly Russian thistle	SATR12	Up
Forb	*Salvinia molesta*	giant salvinia	SAMO5	Wet
Forb	*Securigera varia*	crownvetch	SEVA4	Up
Forb	*Senecio eremophilus*	desert groundsel	SEER2	Up
Forb	*Senecio flaccidus*	threadleaf ragwort	SEFL3	Up
Forb	*Senecio riddellii*	Riddell's ragwort	SERI2	Up
Forb	*Senecio triangularis*	arrowleaf groundsel	SETR	Wet
Forb	*Sicyos ampelophyllus*	streamside bur cucumber	SIAM	Up
Forb	*Sidalcea candida*	white checkermallow	SICA3	Wet
Forb	*Sisymbrium altissumum*	tall tumblemustard	SIAL2	Up
Forb	*Sisymbrium irio*	London rocket	SIIR	Up
Forb	*Sisyrinchium demissum*	dwarf blue-eyed grass	SIDE4	Wet
Forb	*Sisyrinchium montanum*	mountain blue-eyed grass	SIMO2	Wet
Forb	*Solanum elaeagnifolium*	silverleaf nightshade	SOEL	Up
Forb	*Solanum nigrum*	black nightshade	SONI	Up
Forb	*Solanum rostratum*	buffalobur nightshade	SORO	Up
Forb	*Solidago canadensis*	Canada goldenrod	SOCA6	Up
Forb	*Sonchus arvensis*	field sowthistle	SOAR2	Up
Forb	*Sonchus asper*	spiny sowthistle	SOAS	Up
Forb	*Sphaeralcea coccinea*	scarlet globemallow	SPCO	Up
Forb	*Sphaerophysa salsula*	alkali swainsonpea	SPSA3	Up
Forb	*Stuckenia pectinata*	sago pondweed	STPE15	Wet

Lifeform	Species Name	Common Name	Plants Code	NMRAM Wetland Status
Forb	*Suaeda calceoliformis*	Pursh seepweed	SUCA2	Wet
Forb	*Symphyotrichum ericoides var. ericoides*	heath aster	SYERE	Up
Forb	*Symphyotrichum lanceolatum*	white panicle aster	SYLA6	Wet
Forb	*Taraxacum officinale*	common dandelion	TAOF	Up
Forb	*Thalictrum fendleri*	Fendler's meadowrue	THFE	Up
Forb	*Thalictrum revolutum*	waxyleaf meadow-rue	THRE	Wet
Forb	*Thalictrum venulosum*	veiny meadow-rue	THVE	Up
Forb	*Thelesperma megapotamicum*	Hopi tea greenthread	THME	Up
Forb	*Thermopsis montana*	mountain goldenbanner	THMO6	Up
Forb	*Townsendia annua*	annual townsend daisy	TOAN	Up
Forb	*Tribulus terrestris*	puncturevine	TRTE	Up
Forb	*Trifolium pratense*	red clover	TRPR2	Up
Forb	*Trifolium repens*	white clover	TRRE3	Up
Forb	*Trifolium wormskioldii*	cows clover	TRWO	Wet
Forb	*Typha angustifolia*	narrowleaf cattail	TYAN	Wet
Forb	*Typha domingensis*	southern cattail	TYDO	Wet
Forb	*Typha latifolia*	broadleaf cattail	TYLA	Wet
Forb	*Urtica dioica*	stinging nettle	URDI	Up
Forb	*Valeriana edulis*	edible valerian	VAED	Up
Forb	*Verbascum thapsus*	common mullein	VETH	Up
Forb	*Verbesina encelioides*	golden crownbeard	VEEN	Up
Forb	*Veronica americana*	American speedwell	VEAM2	Wet
Forb	*Veronica anagallis-aquatica*	water speedwell	VEAN2	Wet
Forb	*Viguiera cordifolia*	heartleaf goldeneye	VICO	Up
Forb	*Viguiera dentata*	toothleaf goldeneye	VIDE3	Up
Forb	*Xanthisma gracile*	slender goldenweed	MAGR10	Up
Forb	*Xanthisma spinulosum*	lacy tansyaster	MAPI	Up
Forb	*Xanthium spinosum*	spiny cockleburr	XASP2	Up
Forb	*Xanthium strumarium*	rough cocklebur	XAST	Up

Species Name	Common Name	PLANTS code	Weed Class	Wetland Status	N/E
Tall Woody Species					
Abies concolor	white fir	ABCO		UPL	N
Acer glabrum	Rocky Mountain maple	ACGLG2		FAC	N
Acer grandidentatum	bigtooth maple	ACGR3		FAC	N
Acer negundo	boxelder	ACNE2		FACW	N
Ailanthus altissima	tree of heaven	AIAL	C	FACU	E
Alnus incana ssp. tenuifolia	thinleaf alder	ALINT		FACW	N
Alnus oblongifolia	Arizona alder	ALOB2		FACW	N
Betula occidentalis	water birch	BEOC2		FACW	N
Celtis laevigata var. reticulata	netleaf hackberry	CELAR		FAC	N
Elaeagnus angustifolia	Russian olive	ELAN	C	FAC	E

Fraxinus velutina	velvet ash	FRVE2		FAC	N
Juglans major	Arizona walnut	JUMA		FACW	N
Juniperus deppeana	alligator juniper	JUDE2		FACU	N
Juniperus monosperma	oneseed juniper	JUMO		UPL	N
Juniperus scopulorum	Rocky Mountain juniper	JUSC2		FACU	N
Morus alba	white mulberry	MOAL		UPL	E
Picea pungens	blue spruce	PIPU		FAC	N
Pinus ponderosa	ponderosa pine	PIPO		FACU	N
Platanus wrightii	Arizona sycamore	PLWR2		FACW	N
Populus angustifolia	narrowleaf cottonwood	POAN3		FACW	N
Populus deltoides	cottonwood	PODE3		FAC	N
Populus deltoides ssp. wislizeni	Rio Grande cottonwood	PODEW		FAC	N
Populus fremontii	Fremont's cottonwood	POFR2		FAC	N
Populus x acuminata	lanceleaf cottonwood	POAC5		FAC	N
Populus tremuloides	quaking aspen	POTR5		FAC	N
Prunus armeniaca	apricot	PRAR3		FACU	E
Quercus gambelii	Gambel's oak	QUGA		UPL	N
Robinia pseudoacacia	black locust	ROPS		FAC	E
Salix amygdaloides	peachleaf willow	SAAM2		FACW	N
Salix gooddingii	Goodding's willow	SAGO		FACW	N
Ulmus pumila	Siberian elm	ULPU	C	UPL	E
Tamarix spp.	Saltcedar	TAMAR2	C	FAC	E
Short Woody Species					
Alhagi maurorum	camelthorn	ALMA12	A	FAC	E
Allenrolfea occidentalis	iodinebush	ALOC2		FACW	N
Ambrosia monogyra	singlewhorl burrobush	AMMO6		FACW	N
Amelanchier utahensis	Utah serviceberry	AMUT		FAC	N
Amorpha fruticosa	desert indigobush	AMFR		FACW	N
Artemisia filifolia	sand sagebrush	ARFI2			N
Artemisia tridentata	big sagebrush	ARTR2			N
Atriplex canescens	fourwing saltbush	ATCA2			N
Baccharis emoryi	Emory's falsewillow	BAEM		FACW	N
Baccharis salicifolia	seepwillow	BASA4		FACW	N
Baccharis salicina	false willow	BASA		FAC	N
Berberis fendleri	Colorado barberry	BEFE		FACU	N
Berberis vulgaris	common barberry	BEVU		FACU	E
Brickelliastrum fendleri	Fendler's brickellbush	BRFE2			N
Brickellia californica	California brickellbush	BRCA3		FAC	N
Brickellia microphylla var. scabra	rough brickellbush	BRMIS			N
Cercocarpus montanus	mountain mahogany	CEMO2		UPL	N
Chilopsis linearis	desert willow	CHLI2		FAC	N
Clematis ligusticifolia	western white clematis	CLLI2		FAC	N
Cornus sericea	redosier dogwood	COSE16		FACW	N
Dasiphora fruticosa	shrubby cinquefoil	DAFR6		FACW	N
Ericameria nauseosa	rubber rabbitbrush	ERNA10		FACU	N
Fallugia paradoxa	Apacheplume	FAPA		FACU	N
Forestiera pubescens	New Mexico olive	FOPU2		FACU	N

Gutierrezia sarothrae	broom snakeweed	GUSA2		UPL	N
Hymenoclea monogyra	singlewhorl burrobush	HYMO			N
Isocoma pluriflora	southern jimmyweed	ISPL			N
Lonicera involucrata	twinberry honeysuckle	LOIN5		FAC	N
Lonicera tatarica	Tatarian honeysuckle	LOTA		FACU	E
Lycium pallidum	wolfberry	LYPA			N
Parthenocissus vitacea	thicket creeper	PAVI5		FAC	N
Pluchea sericea	arrowweed	PLSE		FACW	N
Poliomintha incana	hoary rosemarymint	POIN3			N
Prosopis glandulosa	honey mesquite	PRGL2		FAC	N
Prosopis pubescens	screwbean mesquite	PRPU		FAC	N
Prunus americana	American plum	PRAM		FACU	E
Prunus virginiana	common chokecherry	PRVI		FAC	N
Rhus trilobata	skunkbush sumac	RHTR		FACU	N
Ribes aureum	golden currant	RIAU		FAC	N
Ribes inerme	whitestem gooseberry	RIIN2		FACW	N
Ribes leptanthum	trumpet gooseberry	RILE		FAC	N
Robinia neomexicana	New Mexico locust	RONE		FACU	N
Rosa woodsii	Woods' rose	ROWO		FACU	N
Rubus idaeus ssp. strigosus	grayleaf red raspberry	RUIDS2		FACU	N
Salix bebbiana	Bebb willow	SABE2		FACW	N
Salix drummondiana	Drummond's willow	SADR		FACW	N
Salix exigua	coyote willow	SAEX		FACW	N
Salix irrorata	bluestem willow	SAIR		FACW	N
Salix ligulifolia	strapleaf willow	SALI		FACW	N
Salix lucida ssp. lasiandra	Pacific willow	SALUL		FACW	N
Shepherdia argentea	silver buffaloberry	SHAR		FACU	N
Suaeda nigra	bush seepweed	SUNI		FACW	N
Symphoricarpos oreophilus	whortleleaf snowberry	SYOR2		FAC	N
Toxicodendron rydbergii	western poison ivy	TORY		FACU	N
Vitis arizonica	canyon grape	VIAR2		FACU	N
Herbaceous (graminoids)					
Achnatherum lettermanii	Letterman's needlegrass	ACLE9		UPL	N
Achnatherum robustum	sleepygrass	ACRO7		UPL	N
Aegilops cylindrica	jointed goatgrass	AECY	C		E
Agropyron cristatum	crested wheatgrass	AGCR			E
Agrostis gigantea	redtop	AGGI2		FACW	E
Agrostis idahoensis	Idaho bentgrass	AGID		FACW	N
Agrostis stolonifera	creeping bentgrass	AGST2		FACW	E
Alopecurus aequalis	shortawn foxtail	ALAE		OBL	N
Aristida purpurea	purple threeawn	ARPU9			N
Aristida ternipes	spidergrass	ARTE3		UPL	N
Aristida ternipes var. gentilis	spidergrass	ARTEG		UPL	N
Arundo donax	giant reed	ARDO4	C	FACW	E
Bolboschoenus maritimus	saltmarsh bulrush	BOMA7		OBL	N
Buchloe dactyloides	buffalograss	BUDA		FACU	N
Bouteloua aristidoides	needle grama	BOAR		UPL	N

Bouteloua barbata	sixweeks grama	BOBA2		UPL	N
Bouteloua curtipendula	sideoats grama	BOCU		UPL	N
Bouteloua gracilis	blue grama	BOGR2		UPL	N
Bromus catharticus	rescuegrass	BRCA6		UPL	E
Bromus ciliatus	fringed brome	BRCI2		FAC	N
Bromus ciliatus var. richardsonii	fringed brome	BRCIR		FAC	N
Bromus inermis	smooth brome	BRIN2		FAC	E
Bromus japonicus	Japanese brome	BRJA		FACU	E
Bromus polyanthus	Great Basin brome	BRPO		UPL	N
Bromus tectorum	cheatgrass	BRTE	C	UPL	E
Calamagrostis canadensis	Canada reedgrass	CACA4		FACW	N
Carex atherodes	wheat sedge	CAAT2		OBL	N
Carex emoryi	Emory's sedge	CAEM2		OBL	N
Carex nebrascensis	Nebraska sedge	CANE2		OBL	N
Carex occidentalis	western sedge	CAOC2		UPL	N
Carex pellita	woolly sedge	CAPE42		OBL	N
Carex praegracilis	clustered field sedge	CAPR5		FACW	N
Carex rossii	Ross' sedge	CARO5		UPL	N
Carex simulata	analogue sedge	CASI2		OBL	N
Carex utriculata	Northwest Territory sedge	CAUT		OBL	N
Chloris virgata	feather fingergrass	CHVI4		FACU	N
Cynodon dactylon	bermudagrass	CYDA		FACU	E
Cyperus niger	black flatsedge	CYNI2		FACW	N
Dactylis glomerata	orchardgrass	DAGL		FACU	E
Distichlis spicata	inland saltgrass	DISP		FACW	N
Echinochloa crus-galli	barnyardgrass	ECCR		FACW	E
Eleocharis palustris	common spikerush	ELPA3		OBL	N
Eleocharis parishii	Parish's spikerush	ELPA4		FACW	N
Eleocharis rostellata	beaked spikerush	ELRO2		OBL	N
Elymus canadensis	Canada wildrye	ELCA4		FAC	N
Elymus glaucus	blue wildrye	ELGL		FACU	N
Elymus repens	quackgrass	ELRE4	B	FAC	E
Elymus trachycaulus	slender wheatgrass	ELTR7		FAC	N
Elymus x pseudorepens	false quackgrass	ELPS		FACU	N
Eragrostis cilianensis	stinkgrass	ERCI		FACU	E
Eragrostis intermedia	plains lovegrass	ERIN		UPL	N
Eragrostis mexicana	mexican lovegrass	ERME		FAC	N
Eriochloa acuminata var. acuminata	tapertip cupgrass	ERACA		FACW	N
Festuca arundinacea	tall fescue	FEAR3		FAC	E
Festuca pratensis	meadow fescue	FEPR		FACU	E
Glyceria grandis	American mannagrass	GLGR		OBL	N
Hordeum jubatum	foxtail barley	HOJU		FACW	N
Hordeum murinum ssp. glaucum	smooth barley	HOMUG			E
Juncus arcticus var. balticus	Baltic rush	JUARB5		FACW	N
Juncus dudleyi	slender rush	JUDU2		FACW	N
Juncus ensifolius var. montanus	Rocky Mountain rush	JUENM2		FACW	N
Juncus torreyi	Torrey's rush	JUTO		FACW	N

Leersia oryzoides	rice cutgrass	LEOR		OBL	N
Leptochloa fusca ssp. fascicularis	bearded sprangletop	LEDU		FACW	N
Lycurus setosus	bristly wolfstail	LYSE3		UPL	N
Muhlenbergia asperifolia	alkali muhly	MUAS		FACW	N
Muhlenbergia depauperata	sixweeks muhly	MUDE		UPL	N
Muhlenbergia repens	creeping muhly	MURE		FACU	N
Muhlenbergia richardsonis	Mat muhly	MURI		FAC	N
Muhlenbergia wrightii	spike muhly	MUWR		FACU	N
Panicum capillare	witchgrass	PACA6		FAC	N
Panicum obtusum	vine mesquite	PAOB		FACW	N
Pascopyrum smithii	western wheatgrass	PASM		FAC	N
Paspalum distichum	knotgrass	PADI6		FACW	N
Phalaris arundinacea	reed canarygrass	PHAR3		FACW	N
Phleum pratense	timothy	PHPR3		FAC	E
Phragmites australis	common reed	PHAU7		FACW	N
Poa palustris	fowl bluegrass	POPA2		FACW	N
Poa pratensis	Kentucky bluegrass	POPR		FAC	E
Polypogon monspeliensis	annual rabbitsfoot grass	POMO5		FACW	E
Psathyrostachys juncea	Russian wildrye	PSJU3		FAC	E
Saccharum ravennae	ravennagrass	SARA3	A	FACW	E
Schedonorus phoenix	tall fescue	SCPH		FAC	E
Schoenoplectus pungens	common threesquare	SCPU10		OBL	N
Schoenoplectus tabernaemontani	softstem bulrush	SCTA2		OBL	N
Scirpus microcarpus	panicled bulrush	SCMI2		OBL	N
Setaria grisebachii	Grisebach's bristlegrass	SEGR6		FACU	N
Sorghum halepense	johnsongrass	SOHA		FAC	E
Sorghastrum nutans	Indiangrass	SONU2		FACW	N
Sporobolus airoides	alkali sacaton	SPAI		FAC	N
Sporobolus compositus var. compositus	tall dropseed	SPCOC2		UPL	N
Sporobolus contractus	spike dropseed	SPCO4		FACU	N
Sporobolus cryptandrus	sand dropseed	SPCR		FACU	N
Sporobolus giganteus	giant dropseed	SPGI		FAC	N
Sporobolus wrightii	big sacaton	SPWR2		FAC	N
Thinopyrum intermedium	intermediate wheatgrass	THIN6		FACU	E
Herbaceous (forbs)					
Achillea millefolium	common yarrow	ACMI2		FACU	N
Aconitum columbianum	Columbian monkshood	ACCO4		FACW	N
Acroptilon repens	Russian knapweed	ACRE3	B		E
Agrimonia striata	roadside agrimony	AGST		FACU	N
Amaranthus hybridus	slim amaranth	AMHY		FACU	N
Ambrosia acanthicarpa	flatspine burr ragweed	AMAC2		FACU	N
Ambrosia confertiflora	weakleaf bur ragweed	AMCO3		UPL	N
Ambrosia psilostachya	Cuman ragweed	AMPS		FACU	N
Ambrosia trifida	great ragweed	AMTR		FAC	N
Ambrosia tomentosa	skeletonleaf burr ragweed	AMTO3		FACU	N
Anemone canadensis	Canada anemone	ANCA8		FACW	N
Anemopsis californica	yerba mansa	ANCA10		FACW	N

Apocynum androsaemifolium	spreading dogbane	APAN2		FACU	N
Apocynum cannabinum	Indianhemp	APCA		FAC	N
Arctium minus	lesser burdock	ARMI2		FACU	E
Argentina anserina	silverweed cinquefoil	ARAN7		OBL	N
Artemisia campestris	field sagewort	ARCA12		FACU	N
Artemisia carruthii	Carruth's sagewort	ARCA14		UPL	N
Artemisia dracunculus	tarragon	ARDR4		FACU	N
Artemisia ludoviciana	white sagebrush	ARLU		FACU	N
Atriplex micrantha	Russian atriplex	ATMI2		FACW	E
Berula erecta	cutleaf waterparsnip	BEER		OBL	N
Bidens bigelovii	Bigelow's beggarticks	BIBI		FACW	N
Bidens leptocephala	fewflower beggartick	BILE		FACW	N
Boerhavia coccinea	scarlet spiderling	BOCO		FACU	N
Cardamine cordifolia	heartleaf bittercress	CACO6		OBL	N
Cardaria draba	hoary cress	CADR	A	FACU	E
Carduus nutans	nodding plumeless thistle	CANU4	B	FACU	E
Centaurea calcitrapa	purple starthistle	CECA2	A		E
Centaurea diffusa	diffuse knapweed	CEDI3	A		E
Centaurea melitensis	Malta starthistle	CEME2	B		E
Centaurea solstitialis	yellow starthistle	CESO3	A		E
Centaurea stoebe ssp. micranthos	spotted knapweed	CESTM	A		E
Chamaesyce setiloba	Yuma sandmat	CHSE8		FACU	N
Chamaesyce vermiculata	wormseed sandmat	CHVE5		FACU	N
Chenopodium berlandieri	pitseed goosefoot	CHBE4		FACU	N
Chenopodium fremontii	Fremont's goosefoot	CHFR3		FACU	N
Chenopodium graveolens	fetid goosefoot	CHGR2		FACU	N
Chenopodium pratericola	desert goosefoot	CHPR5		FACU	N
Cichorium intybus	chicory	CIIN	B	FACU	E
Cicuta maculata	spotted water hemlock	CIMA2		OBL	N
Cirsium arvense	Canada thistle	CIAR4	A	FAC	E
Cirsium parryi	Parry's thistle	CIPA		FACW	N
Cirsium vulgare	bull thistle	CIVU	B	FAC	E
Cleome serrulata	Rocky Mountain beeplant	CLSE		FACU	N
Conium maculatum	poison hemlock	COMA2	B	FACW	E
Convolvulus arvensis	field bindweed	COAR4		FACU	E
Conyza canadensis	Canadian horseweed	COCA5		FACU	N
Croton texensis	Texas croton	CRTE4			N
Cosmos parviflorus	southwestern cosmos	COPA12		FAC	N
Cucurbita foetidissima	buffalo gourd	CUFO		FACU	N
Cyclachaena xanthifolia	giant sumpweed	CYXA		FAC	N
Cynoglossum officinale	hound's tongue	CYOF		FACU	E
Datura wrightii	sacred thornapple	DAWR2			N
Descurainia pinnata	western tanseymustard	DEPI			N
Descurainia sophia	herb sophia	DESO2			E
Dieteria canescens	hoary aster	MACA2		FAC	N
Dipsacus fullonum	Fuller's teasel	DIFU2	B	FAC	E
Drymaria arenarioides	alfombrilla	DRAR7	A		E

Egeria densa	Brazilian waterweed	EGDE	A	OBL	E
Epilobium ciliatum	hairy willowherb	EPCI		FACW	N
Equisetum arvense	field horsetail	EQAR		FAC	N
Equisetum laevigatum	smooth horsetail	EQLA		FACW	N
Erigeron flagellaris	trailing fleabane	ERFL		FAC	N
Eriogonum polycladon	sorrel buckwheat	ERPO4		UPL	N
Eritrichium nanum	arctic alpine forget-me-not	ERNA		UPL	N
Euphorbia davidii	David's spurge	EUDA5		FACU	E
Euphorbia esula	leafy spurge	EUES	A		E
Eustoma exaltatum	catchfly prairie gentian	EUEX5		OBL	N
Euthamia occidentalis	western goldenrod	EUOC4		OBL	N
Fragaria virginiana ssp. glauca	Virginia strawberry	FRVIG2		FACU	N
Funastrum cynanchoides	fringed twinevine	FUCY		FAC	N
Galium aparine	stickywilly	GAAP2		FACU	N
Gaura coccinea	scarlet beeblossom	GACO5			N
Gaura mollis	velvetweed	GAMO5		FACU	N
Geranium caespitosum	pineywoods geranium	GECA3		FAC	N
Geranium richardsonii	Richardson's geranium	GERI		FAC	N
Geum aleppicum	yellow avens	GEAL3		FACW	N
Geum macrophyllum	largeleaf avens	GEMA4		FACW	N
Glycyrrhiza lepidota	American licorice	GLLE3		FAC	N
Gnaphalium exilifolium	slender cudweed	GNEX		FACW	N
Grindelia squarrosa	curlycup gumweed	GRSQ		FACU	N
Halogeton glomeratus	halogeton	HAGL	B		E
Helianthus annuus	common sunflower	HEAN3		FACU	N
Helianthus nuttallii	Nuttall's sunflower	HENU		FACW	N
Heliomeris multiflora	showy goldeneye	HEMU3		UPL	N
Heracleum maximum	cow parsnip	HEMA80		FACW	N
Heterotheca subaxillaris	camphorweed	HESU3			N
Heterotheca villosa	hairy goldenaster	HEVI4		UPL	N
Hydrilla verticillata	hydrilla	HYVE3	C	OBL	E
Hymenopappus filifolius	fineleaf hymenopappus	HYFI			N
Hyoscyamus niger	black henbane	HYNI	A		E
Ipomopsis longiflora	flaxflowered ipomopsis	IPLO2		FAC	N
Iris missouriensis	Rocky Mountain iris	IRMI		FACW	N
Isatis tinctoria	Dyer's woad	ISTI	A		E
Iva axillaris	povertyweed	IVAX		FACW	N
Kochia scoparia	common kochia	BASC5		FAC	E
Lactuca serriola	prickly lettuce	LASE		FAC	E
Lepidium latifolium	perennial pepperweed	LELA2	B	FAC	E
Lepidium montanum	mountain pepperweed	LEMO2			N
Lesquerella fendleri	Fendler's bladderpod	LEFE			N
Leucanthemum vulgare	oxeye daisy	LEVU	A	FACU	E
Linaria dalmatica	Dalmation toadflax	LIDA	A		E
Linaria vulgaris	butter and eggs	LIVU2	A	FACU	E
Lycopus americanus	American bugleweed	LYAM		OBL	N
Lycopus asper	rough bugleweed	LYAS		OBL	N

Lythrum salicaria	purple loosestrife	LYSA2	A	OBL	E
Machaeranthera tanacetifolia	tanseyleaf aster	MATA2		FACU	N
Maianthemum racemosum	feathery false lily of the vally	MARA7		FAC	N
Maianthemum stellatum	starry false Solomon's seal	MAST4		FAC	N
Matricaria perforata	Scentless camomile	TRPE21	A		E
Medicago lupulina	black medick	MELU		FAC	E
Medicago sativa	alfalfa	MESA		UPL	E
Melilotus officinalis	yellow sweetclover	MEOF		FACU	E
Mentha arvensis	wild mint	MEAR4		FACW	N
Mentha spicata	spearmint	MESP3		OBL	E
Mentzelia albicaulis	whitestem blazingstar	MEAL6			N
Mentzelia multiflora	manyflowered mentzelia	MEMU3			N
Mentha arvensis	wild mint	MEAR4		FACW	N
Mentha spicata	spearmint	MESP3		FACW	I
Mimulus glabratus	roundleaf monkeyflower	MIGL		OBL	N
Mirabilis longiflora	sweet four o'clock	MILO2		FACU	N
Mirabilis oxybaphoides	smooth spreading four o'clock	MIOX			N
Myriophyllum aquaticum	parrot feather watermilfoil	MYAQ2	C	OBL	E
Myriophyllum spicatum	Eurasian watermilfoil	MYSP2	C	OBL	E
Nasturtium officinale	watercress	NAOF		OBL	E
Oxalis dillenii	Dillen's oxalis	OXDI2		FACU	N
Oxypolis fendleri	Fendler's cowbane	OXFE		FACW	N
Oenothera elata ssp. hirsutissima	Hooker's eveningprimrose	OEELH		FACW	N
Oenothera pallida	pale eveningprimrose	OEPA			N
Onopordum acanthium	Scotch thistle	ONAC	A		E
Peganum harmala	African rue	PEHA	B		E
Persicaria lapathifolia	curlytop knotweed	PELA22		OBL	N
Phacelia integrifolia	gypsum scorpionweed	PHIN			N
Physalis longifolia	longleaf groundcherry	PHLO4		FACU	N
Physalis virginiana	Virginia groundcherry	PHVI5			N
Phyla nodiflora	Frog fruit	PHNO2		OBL	N
Plantago major	common plantain	PLMA2		FAC	E
Polygonum aviculare	prostrate knotweed	POAV		FACW	E
Polygonum lapathifolium	curlytop knotweed	POLA4		OBL	N
Portulaca oleracea	common purslane	POOL		FAC	N
Potamogeton crispus	curly pondweed	POCR3	C	OBL	E
Potentilla hippiana	woolly cinquefoil	POHI6		FAC	N
Potentilla pulcherrima	beautiful cinquefoil	POPU9		FAC	N
Pseudognaphalium stramineum	cottonbatting cudweed	PSST7		FAC	N
Ranunculus aquatilis	white water crowfoot	RAAQ		OBL	N
Ranunculus cardiophyllus	heartleaf buttercup	RACA4		FACW	N
alkali buttercup	Ranunculus cymbalaria	RACY		OBL	N
Ranunculus flammula var. ovalis	greater creeping spearwort	RAFLO		OBL	N
Ratibida columnifera	upright prairie coneflower	RACO3		FACU	N
Ratibida tagetes	green prairie coneflower	RATA		FACU	N
Rorippa sinuata	spreading yellowcress	ROSI2		FACW	N

Rudbeckia laciniata	cutleaf coneflower	RULA3		FAC	N
Rumex acetosella	common sheep sorrel	RUAC3		FAC	E
Rumex altissimus	pale dock	RUAL4		FACW	N
Rumex crispus	curly dock	RUCR		FAC	E
Rumex salicifolius	willow dock	RUSA		FACW	N
Sagittaria cuneata	arumleaf arrowhead	SACU		OBL	N
Salsola tragus	prickly Russian thistle	SATR12		FACU	E
Salvinia molesta	giant salvinia	SAMO5	A	OBL	E
Securigera varia	crownvetch	SEVA4		FACU	E
Senecio eremophilus	desert groundsel	SEER2		FAC	N
Senecio flaccidus	threadleaf ragwort	SEFL3			N
Senecio riddellii	Riddell's ragwort	SERI2			N
Senecio triangularis	arrowleaf groundsel	SETR		FACW	N
Sicyos ampelophyllus	streamside bur cucumber	SIAM			N
Sidalcea candida	white checkermallow	SICA3		FACW	N
Sisymbrium altissumum	tall tumblemustard	SIAL2		FACU	E
Sisymbrium irio	London rocket	SIIR		FAC	E
Sisyrinchium demissum	dwarf blue-eyed grass	SIDE4		OBL	N
Sisyrinchium montanum	mountain blue-eyed grass	SIMO2		FACW	N
Solanum elaeagnifolium	silverleaf nightshade	SOEL			N
Solanum nigrum	black nightshade	SONI		FACU	E
Solanum rostratum	buffalobur nightshade	SORO			N
Solidago canadensis	Canada goldenrod	SOCA6		FACU	N
Sonchus arvensis	field sowthistle	SOAR2		FAC	E
Sonchus asper	spiny sowthistle	SOAS		FAC	E
Sphaeralcea coccinea	scarlet globemallow	SPCO			N
Sphaerophysa salsula	alkali swainsonpea	SPSA3		FAC	E
Stuckenia pectinata	sago pondweed	STPE15		OBL	N
Suaeda calceoliformis	Pursh seepweed	SUCA2		FACW	N
Symphyotrichum ericoides var. ericoides	heath aster	SYERE		FAC	N
Symphyotrichum lanceolatum	white panicle aster	SYLA6		OBL	N
Taraxacum officinale	common dandelion	TAOF		FACU	E
Thalictrum fendleri	Fendler's meadowrue	THFE		FAC	N
Thalictrum revolutum	waxyleaf meadow-rue	THRE		FACW	N
Thalictrum venulosum	veiny meadow-rue	THVE		FAC	N
Thelesperma megapotamicum	Hopi tea greenthread	THME			N
Thermopsis montana	mountain goldenbanner	THMO6		FAC	N
Townsendia annua	annual townsend daisy	TOAN			N
Tribulus terrestris	puncturevine	TRTE			E
Trifolium pratense	red clover	TRPR2		FACU	E
Trifolium repens	white clover	TRRE3		FAC	E
Trifolium wormskioldii	cows clover	TRWO		FACW	N
Typha angustifolia	narrowleaf cattail	TYAN		OBL	E
Typha domingensis	southern cattail	TYDO		OBL	N
Typha latifolia	broadleaf cattail	TYLA		OBL	N
Urtica dioica	stinging nettle	URDI		FAC	N
Valeriana edulis	edible valerian	VAED		FAC	N

Verbascum thapsus	common mullein	VETH		FACU	E
Verbesina encelioides	golden crownbeard	VEEN		FAC	N
Veronica americana	American speedwell	VEAM2		OBL	N
Veronica anagallis-aquatica	water speedwell	VEAN2		OBL	N
Viguiera cordifolia	heartleaf goldeneye	VICO			N
Viguiera dentata	toothleaf goldeneye	VIDE3		UPL	N
Xanthisma gracile	slender goldenweed	MAGR10		UPL	N
Xanthisma spinulosum	lacy tansyaster	MAPI			N
Xanthium spinosum	spiny cockleburr	XASP2	B	FAC	E
Xanthium strumarium	rough cocklebur	XAST		FAC	N

Appendix D. New Mexico Noxious Weed List

The following is the New Mexico Noxious Weed List from the New Mexico Department of Agriculture as of July 2, 2020. The NMRAM metric B5 Invasive Exotic Plant Species Cover uses Class A through C species, so those are the only species contained on this list. Species are ordered alphabetically by scientific name within lifeform group (tree, shrub, grass or forb). Class A species are currently not present in New Mexico, or have limited distribution. Preventing new infestation of these species and eradicating existing infestations is the highest priority. Class B species are limited to portions of the state. In areas with severe infestations, management should be designed to contain the infestation and stop any further spread. Class C species are wide-spread in the state. Management decisions for these species should be determined at the local level, based on feasibility of control and level of infestation.

NM Weed Class	Common Name	Scientific Name	Plant Symbol
Trees			
C	tree of heaven	Ailanthus altissima	AIAL
C	Russian olive	Elaeagnus angustifolia	ELAN
C	tamarisk	Tamarix spp. (any species)	TAMAR2
C	Siberian elm	Ulmus pumila	ULPU
Shrubs			
A	camelthorn	Alhagi maurorum	ALMA12
Grasses			
C	jointed goatgrass	Aegilops cylindrica	AECY
C	giant reed	Arundo donax	ARDO4
C	cheatgrass	Bromus tectorum	BRTE
B	quackgrass	Elymus repens	ELRE4
A	ravennagrass	Saccharum ravennae	SARA3
Forbs			
C	Russian knapweed	Acroptilon repens	ACRE3
A	hoary cress	Cardaria draba	CADR
C	musk thistle	Carduus nutans	CANU4
A	purple starthistle	Centaurea calcitrapa	CECA2
A	diffuse knapweed	Centaurea diffusa	CEDI3
B	Malta starthistle	Centaurea melitensis	CEME2
A	yellow starthistle	Centaurea solstitialis	CESO3
A	spotted knapweed	Centaurea stoebe ssp. micranthos	CESTM
B	chicory	Cichorium intybus	CIIN
A	Canada thistle	Cirsium arvense	CIAR4
B	bull thistle	Cirsium vulgare	CIVU

NM Weed Class	Common Name	Scientific Name	Plant Symbol
B	poison hemlock	Conium maculatum	COMA2
B	teasel	Dipsacus fullonum	DIFU2
A	leafy spurge	Euphorbia esula	EUES
B	halogeton	Halogeton glomeratus	HAGL
C	hydrilla	Hydrilla verticillata	HYVE3
A	black henbane	Hyoscyamus niger	HYNI
A	Dyer's woad	Isatis tinctoria	ISTI
B	perennial pepperweed	Lepidium latifolium	LELA2
A	oxeye daisy	Leucanthemum vulgare	LEVU
A	Dalmation toadflax	Linaria dalmatica	LIDA
A	Yellow toadflax	Linaria vulgaris	LIVU2
A	purple loosestrife	Lythrum salicaria	LYSA2
A	Scentless camomile	Matricaria perforata	TRPE21
C	parrot feather watermilfoil	Myriophyllum aquaticum	MYAQ2
C	Eurasian watermilfoil	Myriophyllum spicatum	MYSP2
A	Scotch thistle	Onopordum acanthium	ONAC
B	African rue	Peganum harmala	PEHA
C	curly pondweed	Potamogeton crispus	POCR3
A	giant salvinia	Salvinia molesta	SAMO5
B	spiny cockleburr	Xanthium spinosum	XASP2

Appendix E. Photo Point Guidelines

Photo points are highly recommended to document 1) general condition of the SA, 2) dominant plant communities and unknown plants, and 3) stream condition. Photo-point documentation provides a visual record of the condition of the wetland that may be useful for future reference. Photographs are logged in Worksheet 11. The photograph number, direction (azimuth compass direction of the photo (AZM)), photo point coordinates (GPS UTM easting and northing location), and latitude and longitude should be recorded along with the segment on which the photo was taken, a general description, and the initials of the photographer. See metric descriptions for when and what photo documentation is recommended.

SA Condition

The general condition of the SA and the surrounding buffer area should be documented to support the assessment, e.g., evidence of recent flooding, soil disturbance and human impacts (Figure E1). In addition, photos that provide an overview of the SA and surrounding landscape,

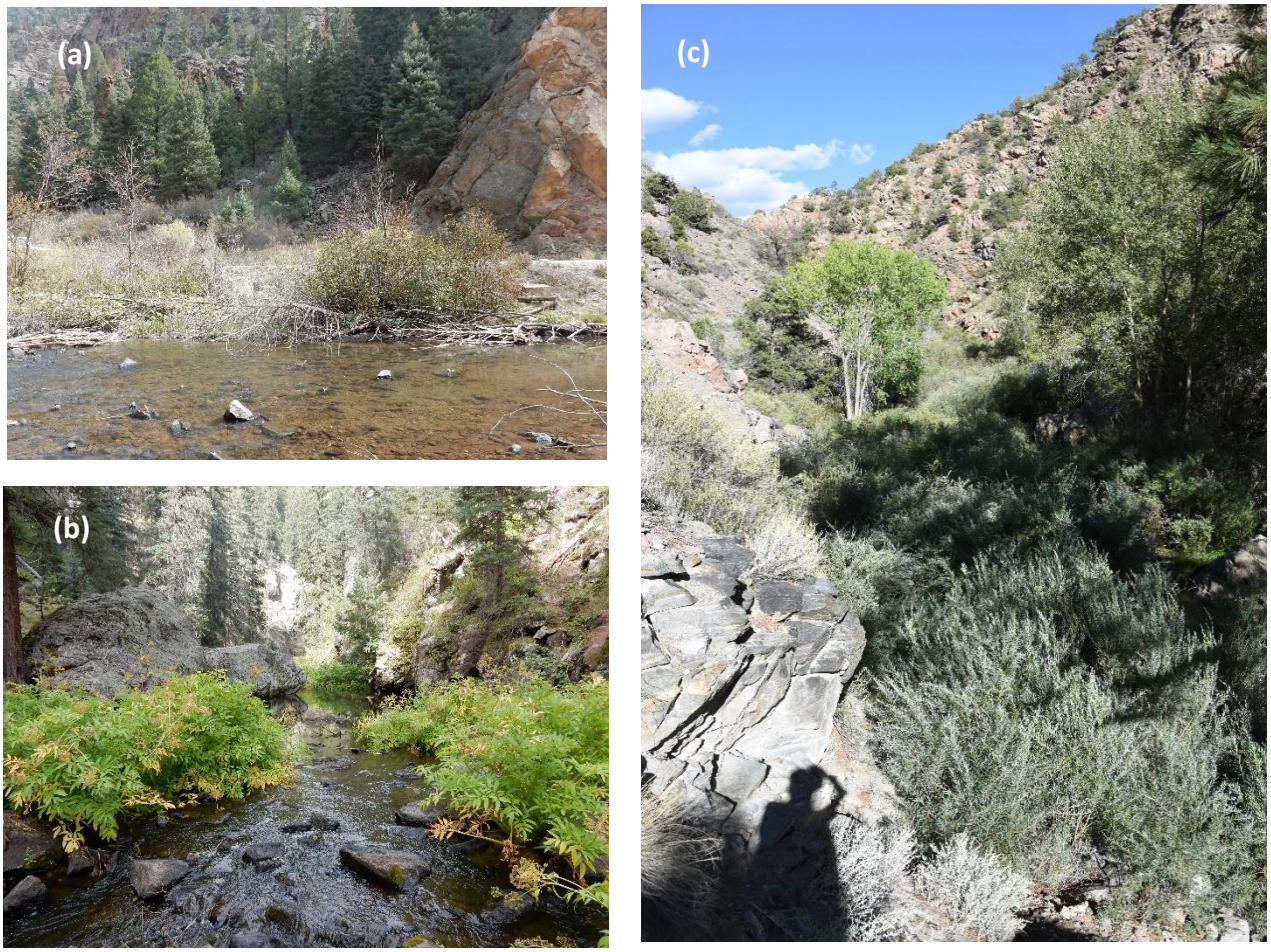

Figure E1. Example photos of conditions (a) across a channel showing SA setting next to road, (b) showing overall SA setting from mid-channel, and (c) overview of confined floodplain from upslope. These photos support Abiotic metrics and understanding of SA landscape context.

including panoramas, can be helpful in describing the site.

Vegetation Communities and unknown plants

Documenting the dominant vegetation communities (CTs) during the mapping process is highly recommended. Photographs should be taken to capture the central character of the vegetation stand composition and structure types. A photo-board indicating the SA Name, polygon number and CT is important for cross-referencing photographs (Figure E2).

Figure E2 Example photos of vegetation communities (CTs) to support the mapping and biotic metric ratings. The photograph number, photo-point direction and coordinates are recorded on the photo point log (Worksheet 11). The CT and polygon number along with a brief description and the initials of the photographer are also recorded.

When the species identification of a polygon dominant is uncertain, photographs of the entire plant, as well as close-ups of leaves, flowers and fruits can aid in identification (Figure E3). Record these photographs in the Photo Point Log Worksheet 11.

Figure E3. Plant identification photos should include at least one photo that shows all of the plant, as well as close up photos of any flowers, fruits and leaves.

Stream channel documentation

At the channel in each floodplain segment, a series of photographs are taken to document the condition of the river segment. Photographs are taken facing upstream, downstream, and of both banks to capture the bank conditions on each side of the river at that location and are used as corroborating evidence for metrics such as large woody debris. For Abiotic Metric A13 Confined Channel Condition, four photos are taken at each Segment cross-section - one each upstream and downstream from the middle of the channel if feasible, and one each facing each bank (bank left and bank right). (Figure E4). Additional photos of floodplain characteristics and indicators are recommended.

Figure E4. Examples of stream channel photo points.

Appendix F. Glossary

The following list defines terms used throughout the NMRAM field guide and datasheets. The terms are listed alphabetically.

Abandoned Floodplain: A portion of the floodplain that no longer receives overbank flooding events because of avulsion of the channel away from this floodplain area, permanently altered river flow, or entrenchment of the active channel. Often deep-rooted riparian vegetation communities are still supported with a dryer herbaceous understory, some upland trees and shrubs such as Ponderosa pine and Junipers species maybe present.

Abandoned Side Channel: Side channels that never, or only very rarely during extreme events, carry river flows as evidenced by their vegetated surfaces and lack of flood deposited sediment or wrack.

Abandoned Terrace: A relatively flat topographical feature formed through alluvial processes that is elevated above the current flood-prone height and is considered far enough removed from the current active floodplain that it no longer receives overbank flood flow. Often these may support deep rooted riparian vegetation communities with a dryer herbaceous understory and may also feature non-wetland trees and shrubs such as Ponderosa pine and Juniper species.

Active Channel: The portion of a channel that carries the fluvial system sediment.

Active Floodplain: Area of the floodplain that carries surface flow, ponding, or is surrounded by surface flow during flood events.

Active Side Channel: A secondary channel in a multi-channel system that is hydrologically connected to the main channel upstream and carries water flows regularly at or below bankfull depths. It may flow year-round or intermittently, but carries water at least periodically, and frequently. It is smaller than the main channel and carries less water. An avulsion channel may be considered an active side channel if it functions as described above. A side channel is considered a high flow channel if it only carries flow during flood stages.

Allochthonous Zone (AZ): The allochthonous zone is a standardized area of the upland slope surrounding a confined valley riverine wetland Sample Area. The AZ is defined as the 20 m extending upslope from the outer edge of the Riparian Zone (RZ) (see RZ definition below).

Animal Mounds/Burrows: Holes and mounds in the floodplain surface created by the activity of burrowing animals.

Assessment Area (AA): Term used in early versions of the NMRAM for the Sample Area (SA).

Assessment Unit (AU): Descriptive name of a specific waterbody (limited to 60 characters). Assessment units are designed to represent surface waters with assumed homogenous water quality (WERF 2007), and are generally defined by various factors such as hydrologic or watershed boundaries, water quality standards (WQS) found in 20.6.4 New Mexico Administrative Code (NMAC), geology, topography, incoming tributaries, surrounding land use/land management, etc.

Attribute: A broad class of wetland properties such as landscape context, hydrology, biology, etc., under which specific measurements of condition (metrics) might fall.

Avulsion Channel: Channels that have functioned as the primary channel in the past until an event or obstruction caused the channel to shift to another location. They may also become active side channels, or abandoned side channels, depending on how frequently they carry stream and flood flow. Oxbow lakes are often found along avulsion channels.

Backwaters: Backwaters are still eddies that provide aquatic and fisheries habitat outside the main current of the stream. These features may be disconnected at low water and open access during high water.

Bank Right: Looking downstream the bank on the right side of the observer.

Bank Left: Looking downstream the bank on the left of the observer.

Bankfull: The incipient elevation on the bank where flooding begins, associated with moderate frequent flow events.

Bankfull Flow: The discharge at which channel maintenance is most effective resulting in the average morphological characteristics of channels, and which has a recurrence interval of 1-2 years.

Biotic Index Area (BIA): The total area of the Channel, Riparian Zone (RZ) and Allochthonous Zones (AZ) of a confined valley riverine wetland that should be used for measurement of the Biotic Metrics when using the Confined Valley Riverine NMRAM. The BIA includes developed areas that are within 20m of the edge of the RZ that are otherwise excluded from the SA.

Berm: Mounded soil due to human earthwork that was intended to impact the flow paths of water across a floodplain.

Beaver Pond: Shallow palustrine wetlands created by beaver dams occupying all or some of the main or side channels and associated floodplain.

Bars: Depositional features that are "built" from repeated depositional events instead of being "cut from" pre-existing features through erosive processes. This includes channel bars that form longitudinally within the channel and point bars that form at the inside of meander bends. They are considered vegetated if woody, perennial vegetation has become established and is more than five years old.

Boulder: A rock separated from the bedrock that exceeds 10.1 inches in diameter measured along the b-axis.

Buffer Zone: The area adjacent to the Sample Area that, in natural condition protects the wetland from impacts, encroachment and invasion.

Community Type (CT): A repeating, classified and recognizable assemblage or grouping of plant species.

Complex Bank Edge: A riverbank that has complex morphology of crenulations, rather than a straight or uniform edge.

Cobble: Individual rock pieces that are between 2.5-10.1 inches in diameter measured along the b-axis.

Cut Bank: A steep eroding channel bank at the outside of a meander bend. For purposes of the NMRAM, only cut banks along channels that have perennial flow or that flow often are considered.

Deep Pools: Areas in the active channel that retain water during low flow and are generally too deep to support emergent vegetation. Can be considered a separate indicator if riffle-pool complexes are not present.

Debris Jams: Accumulation of woody debris in an active channel that can partially re-direct or completely obstruct water flow and have the ability to retain sediment and alter channel morphology.

Depressional Features on Floodplains: Shallow, seasonally inundated depressions composed of very fine depositional sediments.

Downed Logs: Logs, over three feet in length and six inches in diameter that are not part of a living tree and are lying on the ground.

Eddy: An area of counter-current water movement, usually along a bank edge, that can create a small whirlpool, and provides a refuge from the main current.

Fallow field: An area formerly plowed for agriculture that has been allowed to return to non-production vegetation. This term does not include active agricultural fields that are rested between seasons, prior to planting, or recently plowed active fields that are currently without vegetative cover.

Fill: An area where soil has been deposited by human activity, as opposed to natural or fluvial processes.

Fire Pits: A burn scar from a campfire.

Flood Prone Width: The area on the floodplain adjacent to the active channel whose outside edge corresponds to the elevation of double the maximum bankfull depth measured at the thalweg of a channel cross-section.

Floodplain: The area lateral to the stream that is generally flat-lying and formed through alluvial processes which dissipate energies of higher flows under current climatic and hydrologic conditions.

Grading or Plowing: Alteration of the soil surface by road grader or plow.

Gravel Pit: Pit or hole created by removal of soil for use in another location.

Gully: A steep-sided erosional channel from 1 m to about 10 m across, larger than a rill.

High Flow Side Channel: Secondary channels parallel to the existing channel which carry water at flows that are higher than bankfull stages of the river.

Hydrophyte: A plant species found growing in areas where soils in the rooting zone are saturated much or all of the growing season.

Impervious Compacted Surfaces: Soil surfaces that are so compacted that water runs across these surfaces rather than infiltrating.

Inset Floodplain: The accretion of floodplain materials within the meander belt width and the abandonment of the former wider floodplain bench indicating a reduction in overall stream discharge.

Irrigation Channel: A manipulated open channel used for transporting water to support agriculture.

Irrigation-Driven Saline Mineral Crusts: The build-up of salts and mineral crusts on the soil surface due to irrigation. Often identified by white crust on the soil surface, usually in a patch with sparse vegetation.

Land Use Index (LUI): An index of the intensity of human activity in the landscape surrounding the wetland SA based on the relative impact to wetland function.

Land Use Zone (LUZ): Boundary created for measuring the condition of surrounding land use conversions. For the confined valley riverine subclass the LUZ extends out 250m from the SA boundary.

Large Woody Debris (LWD): Accumulation of large wood and wood debris on the floodplain due to flood flow or other processes. For the confined valley riverine NMRAM Large Woody Debris metric, LWD is defined as wood ≥ 10 cm (4 in) in diameter and ≥ 1.5 m (5 ft) in length.

Levee: A constructed or manipulated linear berm-like feature intended to act as a barrier to stream flow across the floodplain surface.

(Constructed-Abandoned) the feature no longer functions as intended and is no longer maintained.

(Constructed-Maintained) the feature is a barrier to surface flow and is maintained.

(Natural) a feature that has formed through natural overbank depositional processes that acts like a barrier to small flooding events except through crevasse splays.

Metric: A distinct measurable component of an attribute class, such as Exotic Annual Plant Abundance within the Biotic attribute class. Metric measurements are the basis of the NMRAM condition score.

Minimum Map Unit: The minimum size that a vegetation patch must meet in order to be mapped for the NMRAM. This is size differs depending on wetland subclass and is provided in the Field Guides.

Fresh Sediment, New Depositional Features: Sediment that has been recently deposited as evidenced by sedimentary structures indicating flow and accretion.

Phreatophyte: A deep-rooted plant that obtains a significant portion of the water that it needs from the phreatic (zone of saturation) or the capillary fringe above the phreatic zone. They can usually be found along streams where there is a steady flow of surface or groundwater in areas where the water table is near the surface.

Plant Pedestal: An erosional feature between plant bases which causes the plant to appear elevated, as if on a pedestal.

Oxbow Lakes: Permanently ponded areas formed in cut-off meanders or in abandoned channels.

Rapid: A section of a river where the river bed has a relatively steep gradient, causing an increase in water velocity and turbulence.

Riffle: A riffle is a short, relatively shallow and coarse-bedded length of stream over which the stream flows at higher velocity and turbulence during low flow, than in comparison to a pool.

Rills: Small parallel rivulets formed by soil erosion.

Riparian Zone (RZ): The stream bank zone along the edge of a confined valley riverine wetland channel. RZ delineation is based on hydrologic and vegetative indicators and should include all wetland and riparian plant communities adjacent to the channel.

River Available Floodplain: The floodplain that is potentially available to flooding and flow from the river, and not disconnected by anthropogenic features such as levees and other constructed impediments. Ancient terraces are not considered river available floodplain.

Sample Area (SA): A delineated area within a Wetland of Interest in which NMRAM data collection is focused, and for which the final condition rating applies. The size and

placement of a Sample Area is determined by the wetland subclass and described in the Field Guides.

Seeps/Springs: Water flowing from an aquifer to the surface.

Shoal: A submerged ridge, bank, or bar that rises near the surface of the river and is exposed at low flows.

Standing Snags: Dead trees taller than six feet that remain rooted and upright.

Swale: Linear depressions on the floodplain lacking defined channels but supporting vegetation communities that differ from the surrounding uplands, either in composition or productivity, due to increased water availability.

Terraces (Lateral and Island): relatively flat topographical features formed through alluvial processes that are above the active floodplain.

Undercut Bank: An area along a streambank that is concave and creates an overhang.

Vegetation Map Polygon: A created map feature of relatively homogenous vegetation which is used in evaluating a number of the NMRAM Biotic Metrics.

Wrack Lines: Accumulation of debris at the high-water line that occurs along the ground or in standing vegetation.