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WETLAND FINDING REPORT

US 287 Lamar Reliever Route Environmental Assessment

Prowers County, Colorado

Prepared For:

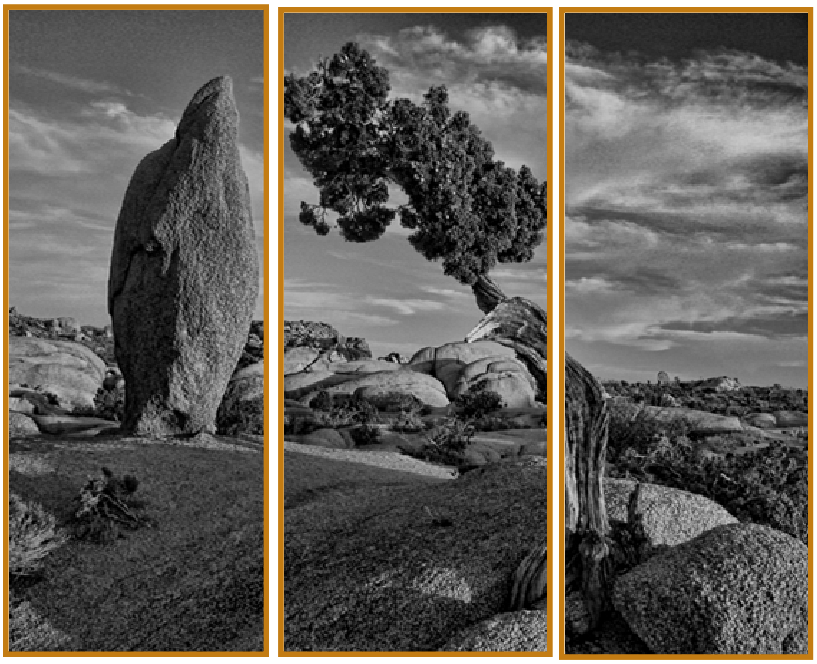
Colorado Department of Transportation Region 2
2402 South Main Street
Lamar, Colorado 81052

Pinyon Project No.:

#1/12-750-05.8000

CDOT Project No.:

C 2871-026 (SA 11637)



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1. Introduction

The following is a wetland finding/wetland finding amendment for U.S. 287 at Lamar Reliever Route, (Colorado Department of Transportation [CDOT] Project Number C2871-026, Subaccount 11637) and has been written in compliance with Executive Order 11990, "Protection of Wetlands," and is in accordance with 23 CFR 771, 23 CFR 777, and Technical Advisory T6640.8A.

1.1 Project Location

The proposed project location is east of the Town of Lamar, located in Prowers County, Colorado (Figure 1), and would result in a reliever route for United States Highway 287 (US 287) and United States Highway 50 (US 50). The proposed reliever route would start near County Road CC at mile post 72.8 (on US 287) head east and then north, crossing US 50 and the Arkansas River before heading west again and reconnecting with the existing US 287/US 50 alignment at mile post 433.2 on US 50/ 80.2 on US 287. The approximate geographical location of the center of the project is decimal degree coordinates (North American Datum 1983 [NAD 83]) latitude 38.08762°, longitude -102.588621°, located on United States Geological Quadrant maps Lamar East (USGS 1979a) and Lamar West (USGS 1979b). The project is located within Sections 19, 20, 28, 29, 30, 32, 33, and 34 of Township 22 South, Range 46 West and Sections 4, 9, 16, 19, 20, 21, 29, 30, 31, 32 of Township 23 South, Range 46 West of the Sixth Principal Meridian. The elevation of the site ranges from approximately 3,605 to 3,788 feet above mean sea level.

1.2 Project Description

The proposed project will construct a reliever route for US 287 and US 50 around the City of Lamar, Colorado ("Reliever Route"). Currently, the highway runs directly through the center of Lamar's business district. The purpose of the reliever route is to improve the safety of U.S. 287/Main Street through Lamar and increase the efficiency of long distance truck traffic traveling through the region. CDOT initiated a Feasibility Study in early 1999. As a result of this evaluation, a preferred corridor was identified on the east side of Lamar.

The Reliever Route would be implemented in phases, as growth occurs and traffic increases in the study area and as funding becomes available. The two-lane interim phase could be in place for a number of years before the ultimate phase is completed. This approach to project implementation addresses those improvements that are needed first and provides the flexibility to implement improvements as needs arise and additional funding becomes available.

During the interim phase, the Reliever Route would be constructed as a two-lane facility. The 72-foot-wide median and second set of travel lanes would not be constructed in the interim phase. The interim two-lane configuration would address local mobility and safety concerns by providing a more appropriate route for through-traffic. At the time of this report, whether the north-bound or south-bound lanes would be built as the interim phase is not known; therefore, both options are included. The ultimate phase would consist of a four-lane divided facility.

In addition to building the Reliever Route, the project would involve building 19 new bridges; 12 bridges would be constructed during either the north- or south-bound interim phase. The bridges are to be built over the open waterways; the largest would be over the Arkansas River. Wetlands in the project area generally occur along the Arkansas River within the riparian zone and along irrigation ditches as fringe wetlands. Construction of the Reliever Route will directly impact these open waters and wetlands since they run perpendicular to this project corridor. However, permanent and temporary impacts have been minimized to the greatest extent practicable.

This Wetland Finding report has been developed in support of an Environmental Assessment (EA) for this project, to provide detail both on the affected environment of the proposed corridor as it relates to wetlands and/or open water and on the potential impacts from the project to those resources.

2. Methods

Pinyon biologists Elly Weber and Tim DeMasters visited the site on October 22 and 23, and Mr. DeMasters revisited the site December 10-12, 2012, to delineate wetlands within the project area. While in the field, wetland and open water boundaries were recorded with a Trimble Geo XH global positioning system (GPS) unit. The GPS data were downloaded and mapped in ArcGIS 10 mapping software. Photos of wetland areas were taken while in the field (Appendix A).

The wetland delineation was completed in accordance with the 1987 U.S. Army Corps of Engineers' (USACE) Wetland Delineation Manual (Wetland Training Institute, 1987), the 2010 Great Plains Regional Supplement (USACE, 2010), and CDOT's Functional Assessment of Colorado Wetlands (FACWet) methodology (Johnson, et al., 2011). Wetlands were defined by vegetative, hydrologic, and soil features, and the data were recorded onto field Wetland Determination Data Forms (Appendix B). Sampling points used to record these three features were placed in representative locations within each wetland area as defined by vegetation type and location along water features.

Vegetation was identified and documented within the strata-specific sampling radii recommended by the USACE (30 feet for trees, 15 feet for shrubs, five feet for herbs, and 15 feet for woody vines). Additional plant species located outside of the sampling point, but within the sampled plant community, were noted on the data forms as needed to better describe the nearby vegetation. Wetland indicator status for plant species was referenced using the "National Wetland Plant List Final Ratings" (USACE, 2012). Species were classified as obligate wetland species (OBL), facultative wetland species (FACW), FAC (facultative species), FACU (facultative upland), or UPL (upland species). A plus (+) or minus (-) sign represented species nearer to wetter or drier ends of the indicator categories, respectively. Plant species classified as FAC, FACW, or OBL, were considered hydrophytic plants, and wetland indicators. Wetlands were also classified using the Cowardin classification system (Cowardin, et al., 1979). Classifications found at this project site are described in Section 3.

Hydrology and soil data were also collected at the sampling points. Hydrology indicators included topographic position, presence of standing water and/or saturated soil, profile condition, drainage pattern, water marks, sediment deposits, and/or oxidized root channels in the upper 18 inches of the soil profile.

Wetland soil indicators included presence of color streaking (mottling), gleying (greyish coloration), reducing conditions, hydrogen sulfide odor, high organic content and organic matter and streaking in the surface layer of sandy soils. Soil pits were hand-excavated within, and adjacent to, potential wetlands to verify indicators of vegetation, wetland hydrology and hydric soils.

Per the FACWet methodology, the Area of Interest (AOI) was defined by adding a perimeter of 25 meters to the extent of direct and indirect impacts. Within the AOI, identified areas of target habitat were defined as Assessment Areas (AA). Targeted habitat for this project included any open water, wetlands, or adjacent riparian vegetation. The FACWet data forms were completed and included in this report as Appendix C.

3. Results

3.1 General Site Conditions

The proposed location for this project is in a rural, agricultural area east of the Town of Lamar (Figure 1). The natural vegetation, soils, and hydrology in most of the project area have been altered by agricultural activities such as growing crops, livestock grazing, and concentrated animal feeding operations.

3.1.1 Upland Vegetation

In general, the upland landscape noted during this survey consisted of plowed fields with agricultural crops as the dominant vegetation present. The upland areas adjacent to County Road C-C 80 in the southern portion of the site consisted primarily of native and introduced grasses and herbaceous plants. The dominant grasses included smooth brome (*Bromus inermis*), Japanese brome (*Bromus japonicus*) and buffalograss (*Bouteloua dactiloydes*). The dominant herbaceous plants included common sunflower (*Helianthus annuus*), Great Plains yucca (*Yucca glauca*), broom snakeweed (*Gutierrez sarothrae*), curlycup gumweed (*Grindelia squarrosa*), and Russian thistle (*Salsola kali*). The upland areas immediately adjacent to the Arkansas River consisted of dense stands of kochia (*Bassia scoparia*) and dead snags of sandbar willow (*Salix exigua*) and tamarisk (*Tamarisk ramosissima*). Based on a visual observation, a broad-spectrum herbicide may have been applied to the areas near the river, and then the vegetation had been burned in an effort to control the tamarisk. The wetland vegetation is described below in Section 3.2.

3.1.2 General Soils

The observed soils were variable across the site. The soils were typically sandy near the Arkansas River, and tended to be loam or clay loam in the other areas (Appendix B). There are nine soil types located within the project area where wetlands occur (USDA, 2012). These were:

- *Colby silt loam, 0-1% slopes*- is classified as well-drained, and all layers are silt loam. These soils are generally found on terrace landforms. Depth to the water table or restrictive feature, which is defined as either bedrock or the water table, is generally more than 80 inches.

- *Kornman clay loam, sand substratum, 0-1 % slopes*- is classified as well-drained, consisting of a clay loam upper, a sandy loam to loamy fine sand middle layer, and a very gravelly loamy sand lower layer. These soils are generally found in flood plains and on terraces. Depth to the water table or restrictive feature is generally more than 80 inches.

- *Las clay loam*- is classified as moderately well-drained, consisting of a clay loam upper and middle layers, and a sand lower layer. These soils are generally found in flood plains and on terraces. Depth to the water table is typically between 24 and 36 inches, and depth to restrictive feature is generally more than 80 inches.

- *Las loam*- is classified as moderately well-drained, consisting of a loam upper layer, a clay loam middle layer, and a sand lower layer. These soils are generally found in flood plains and on terraces. Depth to the water table is typically between 24 and 36 inches, and depth to restrictive feature is generally more than 80 inches.

- *Lincoln sand-* is classified as excessively drained, consisting of a sand upper layer and a stratified loamy fine sand to sandy loam middle layer, and a stratified sand to gravelly sand lower layer. These soils are generally found in flood plains and on terraces. Depth to the water table or restrictive feature is generally more than 80 inches.

- *Nepesta clay loam, 1-3% slopes-* is classified as well drained, consisting of a clay loam upper layer, a silty clay loam middle layer, and a light silty clay loam lower layer. These soils are generally found on terraces and alluvial fans. Depth to the water table or restrictive feature is generally more than 80 inches.

- *Rocky Ford clay loam, 0-1% slopes-* is classified as well drained, consisting of a clay loam upper layer, silty clay loam middle layer, and a silt loam lower layer. These soils are generally found in flood plains and terraces. Depth to the water table or restrictive feature is generally more than 80 inches.

- *Rocky Ford clay loam, 1-3% slopes-* is classified as well drained, consisting of a clay loam upper layer, silty clay loam middle layer, and a silt loam lower layer. These soils are generally found in flood plains or on terraces. Depth to water table or restrictive feature is generally more than 80 inches.

- *Tivoli sand-* is classified as excessively drained, consisting entirely of sand layers. These soils are generally found on hills and alluvial fans. Depth to the water table or restrictive feature is generally more than 80 inches.

3.2 Open Waters and Wetlands

3.2.1 Open Waters

Several hydrologic features were present within the project area, were delineated, and are referred to as open water rather than Waters of the US, since no official determination of the jurisdictional status of these water bodies had been request specifically for this project from USACE at the time of this report. These included the Arkansas River, two smaller natural drainage features, five canals, two unnamed irrigation ditches, three pond areas, and one subirrigated wetland (Figures 2a to 2b). The natural drainage features were Willow Creek and Markham Arroyo. The canals were the Fort Bent Canal, Lamar Canal, Hyde Canal, Amity Canal, and Vista del Rio Ditch. There were also many small, private lateral irrigation ditches throughout the site that provide water for agricultural purposes as well as several small ponds and a subirrigated open meadow. Those with wetlands and/or open water and therefore of concern for this project are noted below.

- Natural drainage features
  - *Arkansas River* (Figure 2d; Appendix A, photos 21 and 22) flows west-east and perpendicular to the proposed Reliever Route. The river is following a natural meander and un-channelized within the project boundaries. During the site visit, it was approximately 60 feet wide (60 to 100 feet) and ranged from four inches deep to three feet in deeper pools.

  - *Willow Creek* (Figures 2e, 2f, and 2g; Appendix A, photos 23 to 27) flows east to west and perpendicular to the proposed Reliever Route, parallel to US 50 just south of their a proposed interchange. Willow Creek is a natural drainage that has been channelized east of Lamar with several foot deep embankments in places, and retains little of its natural characteristics.

  - *Markham Arroyo* (Figures 2b and 2c; Appendix A, photos 10 to 13) flows north-south and perpendicular to the proposed Reliever Route. The arroyo is following its natural course within adjacent agricultural fields.

- Larger canals and ditches, all constructed features that flow at the discretion of the canal/ditch owner(s)
  - *Lamar Canal* (Figures 2f and 2g; Appendix A, photos 28 and 29) is the longest water feature within the project boundaries, located at the proposed interchange and crossed in two areas.
  - *Vista Del Rio Ditch* (Figures 2a, 2b, and 2c; Appendix A, photos 7, 8, and 16) runs south of and parallel to the northern east-west portion of the Reliever Route. The surveyed project boundaries crossed this water feature in two locations.
  - *Amity Canal* (Figure 2b; Appendix A, photos 3 to 6) runs northeast-southwest along northern-most portion of proposed Reliever Route.
  - *Hyde Canal* (Figures 2c and 2d; Appendix A, photo 17) runs east-west and perpendicular to proposed Reliever Route. Hyde Canal is approximately 1,000 feet north of the Arkansas River riparian corridor in the study area.
  - *Fort Bent Canal* (Figure 2g) runs east-west and perpendicular to proposed Reliever Route, and parallel to County Road 8.5. This canal was the southern-most water feature within the surveyed project boundaries.
- Smaller unnamed ditches with wetlands and/or open water present, all constructed features that flow at the discretion of the canal/ditch owner(s)
  - *Unnamed ditch north of Arkansas River* (Figure 2a and 2b; Appendix A, photo 2) runs east-west with a 90 degree turn to run north-south immediately south of State Highway 50 at western-most portion of project boundary. .
  - *Unnamed ditch north of Willow Creek* (Figure 2e) runs east-west, north of Willow Creek, and parallel to County Road HH.5.
- Ponded areas
  - *Pond west of Speculator Ave* (Figure 2a; Appendix A, photo 9) is north of the Arkansas River within an industrial complex, adjacent to a riparian zone. This pond is in a depression area with groundwater the most likely source of water.
  - *Pond north of Arkansas River* (Figure 2d; Appendix A, photos 18 to 20) is within a relatively undisturbed area north of Arkansas riparian zone. This pond is in a depression area that appears to receive water from a buried pipe.

  - *Pond #1 and Pond #2* (Figure 2c; Appendix A, photo 14) is between SH 196 and the Vista Del Rio Ditch. The water source for these ponds was not readily apparent.

- Meadow wetland areas
  - *Open meadow* (Figure 2c; Appendix A, photo 15) is located between Pond #1 and Pond #2 and the Vista Del Rio Ditch. This area appeared to be subirrigated from underground water sources upgradient, possibly Ponds #1 and #2. The area is within a livestock pasture and the vegetation was heavily grazed.

3.2.2 Wetlands

Sixteen wetland areas were identified within the study area which consists of a 300-foot wide swath along the proposed alignment (Figures 2a-2g). The wetland areas were in some cases grouped based on proximity, hydrological source, and similarity of plant communities. Wetlands were delineated at the Arkansas River, Willow Creek, Markham Arroyo, Lamar Canal, Vista Del Rio Ditch, Amity Canal, Hyde Canal, the unnamed ditch north of Arkansas River, the three unnamed ponded areas, and the open meadow north of Vista Del Rio Ditch. No wetlands were observed at Fort Bent Canal, which was dry at the time of the survey, or the unnamed ditch north of Willow Creek. Wetland Determination Data Forms are in Appendix B in numeric order for the Sample Points (SP-1 through SP-28) associated with the 16 wetlands. The following Sections discuss each wetland.

3.2.3 Wetland 1

Wetland 1 (WL-1) was a Palustrine Emergent (PEM) wetland dominanted by the hydrophytic plant scratchgrass (*Muhlenbergia asperifolia*) along the Vista Del Rio Ditch, which is the suspected hydraulic source for this wetland. A PEM wetland is a wetland dominated by herbaceous vegetation. WL-1 emerged near the water's edge along what appeared to be a remnant of Vista Del Rio Ditch at the western portion of the project area (Unnamed ditch north of Arkansas River; Figure 2a; Appendix A, photo 2). The hydric soil indicator was a depleted matrix (95% of Matrix at 0-12" 10YR 4/2, 5% Redox Features 7.5YR 5/5 C/M: Munsell 1994). Hydrology indicators included observation that the water table was present at approximately six inches below ground surface (bgs); and saturated soils were observed at a depth of two inches bgs within the soil pit. Sampling Point-24 was completed in this wetland.

3.2.4 Wetland 2

Wetland 2 (WL-2) was a PEM fringe wetland along a lateral ditch, the suspected hydraulic source for this wetland, that flows off of the remnant of Vista Del Rio Ditch at the western portion of the project area (Unnamed ditch north of Arkansas River; Figure 2a). The dominant hydrophytic plant was scratchgrass. This wetland appeared to be hydraulically connected to WL-1, and shared a similar plant community, hydrology and hydric soils.

3.2.5 Wetland 3

Wetland 3 (WL-3) was a Palustrine Shrub-Scrub (PSS) wetland dominated by sandbar willow with an understory of barnyard grass (*Echinochloa crus-galli*). A PSS wetland is a wetland dominated by shrubs and other woody plants. This wetland was located along Amity Canal, which is the suspected hydraulic source for this wetland, at the northwestern portion of the project area (Figure 2b; Appendix A, photo 3). The hydric soil indicator was sandy redox (40% of Matrix at 0-7" 10YR 6/2 and 45% 10YR 4/1, 10% Redox Features 10YR 6/1 D/M and 5% 10YR 4/6 C/M; 70% of Matrix at 7-16" 10YR 6/2, 30% Redox

Features 7.5YR 5/8: Munsell 1994). Indicators of wetland hydrology were surface-soil cracks, geomorphic position, and the FAC-neutral test. Sampling Point-21 was completed in this wetland.

3.2.6 Wetland 4

Wetland 4 (WL-4) was a PEM wetland along Amity Canal, which is the suspected hydraulic source for this wetland, at the northwestern portion of the project area (Figure 2b; Appendix A, photos 4 to 6). Dominant hydrophytic plants were barnyard grass and veiny dock (*Rumex venosus*). The hydric soil indicator was sandy redox (40% of Matrix at 0-7" 10YR 6/2 and 45% 10YR 4/1, 10% Redox Features 10YR 6/1 D/M and 5% 10YR 4/6 C/M; 70% of Matrix at 7-16" 10YR 6/2, 30% Redox Features 7.5YR 5/8: Munsell 1994). Indicators of wetland hydrology were sediment deposits, sparsely vegetated concave surface, geomorphic position, and the FAC-neutral test. Sampling Point-19 was completed in this wetland.

3.2.7 Wetland 5

Wetland 5 (WL-5) was a PEM wetland along the Vista Del Rio Ditch, which is the suspected hydraulic source for this wetland, where it crosses under US 287, just north of the Town of Lamar (Figure 2b; Appendix A, photo 7 and 8). Dominant hydrophytic plants were common threesquare (*Schoenoplectus pungens*) and narrowleaf cattail (*Typha angustifolia*). The hydric soil indicator was depleted matrix (80% of Matrix at 0-16" 10YR 3/2, 20% Redox Features 7.5YR 5/6 C/M, PL: Munsell 1994). Indicators of wetland hydrology were oxidized rhizospheres on living roots, saturation visible on aerial imagery, geomorphic position, and the FAC-neutral test. Sampling Point-22 was completed in this wetland.

3.2.8 Wetland 6

Wetland 6 (WL-6) was a PEM wetland along an unnamed pond, which is the suspected hydraulic source for this wetland, north of Lamar just to the east of Speculator Avenue (Pond west of Speculator Ave; Figure 2a; Appendix A, photo 9). Dominant hydrophytic plants were hardstem bullrush (*Schoenoplectus acutus*) and narrowleaf cattail. The hydric soil indicator was depleted matrix (90% of Matrix at 0-16" 10YR 5/1, 8% Redox Features 7.5YR 5/6 and 2% 10YR 2/1: Munsell 1994). Indicators of wetland hydrology were saturation, water-stained leaves, dry-season water table, saturation visible on aerial imagery, geomorphic position, and the FAC-neutral test (Munsell, 1994). Indicators of wetland hydrology included observation of saturation present at one inch bgs, and the water table was present at four inches bgs. Sampling Point-27 was completed in this wetland.

3.2.9 Wetland 7

Wetland 7 (WL-7) was a PEM wetland, present as a small shelf within Markham Arroyo, which is the suspected hydraulic source for this wetland, in the northern portion of the study area (Figure 2b; Appendix A, photos 10 to 13). Dominant hydrophytic plants were curly dock (*Rumex crispus*), annual rabbits foot grass (*Polypogon monspeliensis*), and lambsquarters (*Chenopodium album*). The hydric soil indicator was a depleted matrix (90% of Matrix at 0-9" 10YR 5/1, 2% Redox Features 10YR 5/1 D/M and 8% 10YR 5/8 C/M and 90% of Matrix at 9-16" 10YR 6/3, 10% Redox Features 10YR 5/8 C/M: Munsell 1994). Indicators of wetland hydrology included sediment deposits, water-stained leaves, oxidized rhizospheres on living roots, drainage patterns, and geomorphic position (Munsell, 1994). Indicators of wetland hydrology included soil saturation at depths ranging from three inches bgs to saturated at the surface, and the water table was present at six inches bgs. Sampling Points-8 (north) and -10 (south) were completed in this wetland (Figure 2b).

3.2.10 Wetland 8

Wetland 8 (WL-8) was a PEM wetland surrounding a series of small ponds, which is the suspected hydraulic source for this wetland, just north of Vista Del Rio Ditch (Pond #1 and Pond #2; Figure 2c; Appendix A, photo 14). Dominant hydrophytic plants were alkali sacaton (*Sporobolus airoides*), and inland saltgrass (*Distichlis spicata*). The indicators of wetland hydrology were salt crust and sparsely-vegetated concave surface.

3.2.11 Wetland 9

Wetland 9 (WL-9) was a PEM wetland on a slope hydraulically downgradient from the two small ponds associated with WL-8, and upgradient of Vista Del Rio Ditch (Open meadow; Figure 2c; Appendix A, photo 15). This area was a transitional area and appeared to receive groundwater from hydraulically upgradient, source unkown. The dominant hydrophytic plant was inland saltgrass. The hydric soil indicator was depleted matrix (95% of Matrix at 0-16" 10YR 4/2, 5% Redox Features 7.5YR 4/4 C/PL: Munsell 1994). Indicators of wetland hydrology were oxidized rhizospheres on living roots, saturation visible on aerial imagery, and FAC-neutral test. Sampling Point-17 and duplicate SP-17a were completed in this wetland.

3.2.12 Wetland 10

Wetland 10 (WL-10) was a PEM wetland in the channel of Vista Del Rio Ditch, which appeared to be a relic ditch and the suspected hydraulic source for this wetland (Figure 2c; Appendix A, photo 16). The ditch appeared to be a swale feature and was approximately 18-feet wide. Dominant hydrophytic plants were common threesquare (*Schoenoplectus pungens*), alkali sacaton, and inland saltgrass. The hydric soil indicator for the sampling point was depleted matrix (90% of Matrix at 0-7" 10YR 4/1, 10% Redox Features 7.5YR 4/6 C/M PL and 30% of Matrix at 7-16" 10YR 4/1, 70% Redox Features 7.5YR 4/6 C/M: Munsell 1994). Indicators of wetland hydrology were salt crust, oxidized rhizospheres on living roots, sparsely vegetated concave surface, saturation visible on aerial imagery, geomorphic position, and FAC-neutral test. Sampling Point-16 was completed in this wetland.

3.2.13 Wetland 11

Wetland 11 (WL-11) was a PEM wetland, occupying a two-foot-wide fringe on a narrow bank along Hyde Canal, which is the suspected hydraulic source for this wetland (Figures 2c and 2d; Appendix A, photo 17). Dominant hydrophytic plants were common threesquare, alkali sacaton and annual rabbits foot grass. The hydric soil indicator was depleted matrix (70% of Matrix at 0-12" 10YR 5/6, 20% Redox Features 10YR 5/6 C/M and 10% gley2 3/10BG C/M: Munsell 1994). Indicators of wetland hydrology were drainage patterns, geomorphic position, and FAC-neutral test. The soil was saturated at the surface at both sampling points, and the water table was between six and seven inches bgs. Sampling Points-12 (east) and -14 (west) were completed in this wetland.

3.2.14 Wetland 12

Wetland 12 (WL-12) was a Palustrine Unconsolidated Bottom (PUB) wetland. A PUB is a plaustrine wetland where Unconsolidated Bottom includes all wetland and deepwater habitats with at least 25% cover of particles smaller than stones, and a vegetative cover less than 30%. The PUB was surrounding the pond north of the Arkansas River, which is the suspected hydraulic source for this wetland (Figure 2d; Appendix A, photos 18 to 20). The dominant hydrophytic plants were common reed (*Phragmites australis*), and narrowleaf cattail. Sandbar willows were also present at 20% coverage. The hydric soil indicator was sandy redox (98% of Matrix at 0-4" 10YR 4/2, 2% Redox Features 10YR 5/8 C/PL and 90% of Matrix at 4-10" 10YR 5/2, 10% Redox Features 10YR 5/8 C/PL M and 80% of Matrix at 10-12" 10YR 4/1, 20% Redox Features 5YR 4/6 C/M: Munsell 1994). Indicators of wetland hydrology were the presence of the water table at approximately 20 inches bgs, and the soil was saturated at the surface. Sampling Point-4 was completed in this wetland.

3.2.15 Wetland 13

The wetlands identified along the Arkansas River are collectively referred to as Wetland 13 (WL-13; Figure 2d; Appendix A, photos 21 and 22). These wetlands were primarily located within the banks of the river, which is the hydraulic source for these wetlands, and on small fringes and vegetated sandbars, and are classified as Riverine Upper Perennial Unconsolidated Bottom (R3UB). In general, Riverine Upper Perennial is a river system where some water flows throughout the year and the substrate consists of rock, cobbles, or gravel with occasional patches of sand.

Dominant herbaceous species included witchgrass (*Panicum capillare*), foxtail barley (*Hordeum jubatum*), common reed, yellow nutsedge (*Cyperus esculentus*), arctic rush (*Juncus arcticus*), and marsh meadow foxtail (*Alopecurus ventricosus*). Tamarisk and plains cottonwood (*Populus deltoides*) saplings were present in the shrub layer at coverage of 40 percent and one percent, respectively. A thin layer of muck (one centimeter) was present at the top of the soil profile. A hydrogen sulfide odor was also present. Both of these features are indicators of hydric soils (100% of Matrix at 0-0.5" 5Y 4/3, and 100% of Matrix at 0.5-7.5" 10YR 5/4, and 100% of Matrix at 7.5-9.5" gley1 2.5Y/N, and 100% of Matrix at 9.5-18" 10YR 5/4: Munsell 1994). Indicators of wetland hydrology were the presence of the water table at approximately 4 inches bgs, the soil was saturated at the surface, hydrogen sulfide odor, thin muck surface, and geomorphic position. Sampling Point-3 was completed in this wetland.

3.2.16 Wetland 14

The wetland identified within Willow Creek, which is the suspected hydraulic source for this wetland, Wetland 14 (WL-14), was a fringe PSS wetland that range in width from one foot to 20 feet (Figure 2e; Appendix A, photo 23). The PSS portion of the wetland along Willow Creek was dominated by sandbar willow with an understory of scratchgrass and curly dock. Hydric soil indicators included a depleted matrix (80% of Matrix at 0-16" 10YR 4/1, 20% Redox Features 10YR 5/8 C/M: Munsell 1994). Indicators of wetland hydrology were drift deposits, saturation visible on aerial imagery, saturation at approximately 6 inches bgs, geomorphic position, and FAC-neutral test. Sampling Point-28 was completed in this wetland.

3.2.17 Wetland 15

Wetland 15 (WL-15) was a fringe PEM wetland along Willow Creek, which is the suspected hydraulic source for this wetland, and range in width from one foot to 20 feet. Dominant vegetation included barnyard grass, and narrowleaf cattail (Willow Creek; Figures 2e and 2f; Appendix A, photos 25 to 27). The dominant vegetation was barnyard grass or cattails, with some areas dominated by one and other areas dominated by the other, depending on degree and persistence of saturation. Watercress (*Nasturtium officinale*) was also present. Hydric soil indicators included a depleted matrix, and indicators of wetland hydrology included drift deposits, algal mat or curst, and geomorphic position (70% of Matrix at 0-16" 10YR 4/1, 30% Redox Features 10YR 5/8 C/M: Munsell 1994). Indicators of wetland hydrology included the water table present at approximately 8 inches, and soil saturation at the surface. Sampling Point-6 was completed in this wetland.

3.2.18 Wetland 16

The wetlands associated with Lamar Canal, Wetland 16 (WL-16), were fringe PEM wetlands that occurred intermittently along the north bank of the canal (Figure 2f and 2g; Appendix A, photos 28 and 29). The width of the fringe ranged from 10 feet to 20 feet, and composed entirely by narrowleaf cattails. Lamar Canal is the suspected hydraulic source for these wetlands. The hydric soil indicator was sandy redox (90% of Matrix at 0-3" 10YR 5/2, 10% Redox Features 7.5YR 3/4 C/PL and 45% of Matrix at 3-18" 10YR 4/2 and 45% 10YR 4/3, 10% Redox Features 7.5YR 3/4 C/M: Munsell 1994). Indicators of wetland hydrology included inundation visible on aerial imagery, water-stained leaves, salt crust, aquatic invertebrates, surface soil cracks, and geomorphic position. Sampling Point-1 was completed in this wetland.

3.3 FACWet

The AOI included a large area to the east of Lamar, Colorado, where the planned US 287 Reliever Route will be constructed (Figure 1). Sixteen wetland areas (WL-1 to WL-16) were defined within the AOI as detailed in Section 3.2. For the purpose of analyzing the functional capacity of the wetlands per CDOT's FACWet methodology, the wetland areas are grouped into Assessment Areas (AAs). AAs are typically based on hydrogeomorphic class, wetland type, and location within the AOI. In addition, canals and ditches were considered anthropogenic features; therefore, the geomorphology was considered not natural and the score was therefore downgraded on these water bodies.

In this project, the AAs analysis resulted in the same number, size and locations as the wetlands. Therefore, AA-1 to AA-16 locations are synonymous with WL-1 to WL-16 locations in Figure 2. Table 1 provides a summary of the AAs. FACWet Data Forms for AA-1 to AA-16 are included in Appendix C in numerical order. FACWet scores were determined and recorded as Functional Capacity Indices (FCI). FCI score values are interpreted as follows:

FCI Score	**Functional Category**	**Interpretation**
1.0 - 0.9	Reference Standard	AA is functioning at or near its Reference Standard capacity.
<0.9 - 0.8	Highly Functioning	AA retains all of its natural functions. While the capacity of some or all have been altered somewhat, the function of the wetland is still fundamentally sound.
<0.8 - 0.7	Functioning	The capacity of some or all of the AAs functions has been markedly altered, but the wetland still provides the types of functions associated with its habitat type.
<0.7 - 0.6	Functioning Impaired	The functioning of the wetland has been severely altered. Certain functions may be nearly extinguished or they may be grossly altered to be more representative of a different class of wetland (e.g., a fen converted to a depressional system). Despite the profound changes, the AA still supports wetland habitat.

<0.6	Non-functioning	AA no longer possesses the basic criteria necessary to support wetland conditions.

Table 1. List of Wetland Assessment Areas at US 287 Lamar Reliever Route

Assessment Area	Associated Wetland	Overall FCI	Associated Water Feature	Wetland Type*
AA-1	WL-1	0.70	Vista Del Rio Ditch	PEM
AA-2	WL-2	0.68	Vista Del Rio Ditch	PEM
AA-3	WL-3	0.66	Amity Canal	PSS
AA-4	WL-4	0.68	Amity Canal	PEM
AA-5	WL-5	0.66	Vista Del Rio Ditch	PEM
AA-6	WL-6	0.69	isolated pond	PEM
AA-7	WL-7	0.69	Markham Arroyo	PEM
AA-8	WL-8	0.74	Vista Del Rio Ditch	PEM
AA-9	WL-9	0.74	Vista Del Rio Ditch	PEM
AA-10	WL-10	0.73	Vista Del Rio Ditch	PEM
AA-11	WL-11	0.73	Hyde Canal	PEM
AA-12	WL-12	0.70	isolated pond	PUB
AA-13	WL-13	0.85	Arkansas River	R3UB
AA-14	WL-14	0.66	Willow Creek	PSS
AA-15	WL-15	0.66	Willow Creek	PEM
AA-16	WL-16	0.66	Lamar Canal	PEM

* Cowardin, et. al., 1979.

3.3.1 Assessment Area 1

Assessment Area 1 (AA-1) was comprised of WL-1, the wetland along a remnant of Vista Del Rio Ditch. The overall FACWet Functional Capacity Index (FCI) for the AA was 0.70, classifying it as "Functioning." The main causes (i.e. stressors) of the low score were agricultural development in the area, including concentrated animal feeding operations (CAFOs), and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity and buffer capacity. The primary function of this AA is support of characteristic fish/aquatic habitat, flood attenuation, nutrient/toxicant removal, production export/food chain support and sediment retention.

3.3.2 Assessment Area 2

Assessment Area 2 (AA-2) was comprised of WL-2, which was the wetland along a lateral offshoot of the remnant of Vista Del Rio Ditch. The overall FCI for the AA was 0.68, classifying it as "Functioning Impaired." The main stressors causing this lower score were agricultural development in the area, including CAFOs, and the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, chemical environment, and vegetation structure and complexity. The primary function of this AA is short- and long-term water storage, support of characteristic fish/aquatic habitat, flood attenuation, and nutrient/toxicant removal.

3.3.3 Assessment Area 3

Assessment Area 3 (AA-3) was comprised of WL-3, which was the PSS wetland alongside Amity Canal. The overall FCI for the AA was 0.66, classifying it as "Functioning Impaired." The main stressors causing the low score were agricultural development in the area, including CAFOs, and the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water distribution, and water outflow. The primary function of this AA is support of characteristic fish/aquatic habitat, support of wildlife habitat, and production export/food chain support.

3.3.4 Assessment Area 4

Assessment Area 4 (AA-4) was comprised of WL-4, which was the PEM wetland alongside Amity Canal. The overall FCI for the AA was 0.68, classifying it as "Functioning Impaired." The main stressors causing the low score were agricultural development in the area, including CAFOs, and the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, and water outflow. The primary function of this AA is support of wildlife habitat, production export/food chain support and sediment retention.

3.3.5 Assessment Area 5

Assessment Area 5 (AA-5) was comprised of WL-5, which was the wetland associated with the remnant Vista Del Rio Ditch. The overall FCI for the AA was 0.66, classifying it as "Functioning Impaired." The main stressors were agricultural development in the area, including CAFOs, and the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, and water outflow. The primary function of this AA is support of wildlife habitat, production export/food chain support and sediment retention.

3.3.6 Assessment Area 6

Assessment Area 6 (AA-6) was comprised of WL-6, which was the wetland associated with a small pond north of the Town of Lamar. The overall FCI for the AA was 0.69, classifying it as "Functioning Impaired." The main stressors were agricultural development in the area, including CAFOs, and the Town of Lamar. These stressors affected variables such as buffer capacity, water outflow, and geomorphology. The primary function of this AA is support of characteristic fish/aquatic habitat, nutrient/toxicant removal, and support of wildlife habitat.

3.3.7 Assessment Area 7

Assessment Area 7 (AA-7) was comprised of WL-7, which was the wetlands associated with Markham Arroyo, one of the natural drainage features in the project area. The overall FCI for the AA was 0.69, classifying it as "Functioning Impaired." The main stressors were the presence of road grades downstream disrupting the water outflow, livestock grazing, and agricultural development area-wide impacting the water source and water distribution, as well as the chemical environment. The primary function of this AA is nutrient/toxicant removal, support of wildlife habitat, and sediment retention.

3.3.8 Assessment Area 8

Assessment Area 8 (AA-8) was comprised of WL-8, which was the wetland associated with the series of ponds upgradient from the remnant Vista Del Rio Ditch. The overall FCI for the AA was 0.74, classifying it as "Functioning." The stressors affecting the wetland included agricultural development in the area and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, and water outflow. The primary function of this AA is support of wildlife habitat, production export/food chain support and sediment retention.

3.3.9 Assessment Area 9

Assessment Area 9 (AA-9) was comprised of WL-9, which was the slope wetland upgradient from the remnant Vista Del Rio Ditch. The overall FCI for the AA was 0.74, meaning that it was classified as "Functioning." Stressors included agricultural development in the area and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, and water outflow. The primary function of this AA is nutrient/toxicant removal, support of wildlife habitat, and sediment retention.

3.3.10 Assessment Area 10

Assessment Area 10 (AA-10) was comprised of WL-10, which was the wetland associated with the remnant Vista Del Rio Ditch itself. The overall FCI for the AA was 0.73, i.e., "Functioning." The stressors for this wetland included agricultural development in the area and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, and water outflow. The primary function of this AA is support of wildlife habitat, production export/food chain support and sediment retention.

3.3.11 Assessment Area 11

Assessment Area 11 (AA-11) was comprised of WL-11, which was the wetland associated with Hyde Canal. The overall FCI for the AA was 0.73, classifying it as "Functioning." The stressors affecting the wetland included agricultural development in the area and the presence of the Town of Lamar. These stressors affected variables such as water source, water distribution, water outflow, geomorphology, and the chemical environment. The primary function of this AA is support of wildlife habitat, production export/food chain support and sediment retention.

3.3.12 Assessment Area 12

Assessment Area 12 (AA-12) was comprised of WL-12, which was the wetland associated with a small pond that appeared to be fed by a pipe, to the north of the Arkansas River. The overall FCI for the AA was 0.70, classifying it as "Functioning." The stressors affecting the wetland included agricultural development in the area and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity, water source, water distribution, and water outflow. Vegetation structure and complexity was affected by the presence of common reed, which is on the Colorado Noxious Weeds Watch List (CDOA, 2012). The primary function of this AA is support of characteristic fish/aquatic habitat, nutrient/toxicant removal, and support of wildlife habitat.

3.3.13 Assessment Area 13

Assessment Area 13 (AA-13) was comprised of WL-13, which was the wetlands associated with the Arkansas River, the largest natural feature in the study area. The overall FCI for the AA was 0.85, classifying it as "Highly Functioning." The main stressor affecting the FCI score was the presence of tamarisk, which is listed as a noxious weed on the Colorado Noxious Weeds Watch List (CDOA, 2012). The primary function of this AA is short- and long-term water storage, support of characteristic fish/aquatic habitat, and nutrient/toxicant removal.

3.3.14 Assessment Area 14

Assessment Area 14 (AA-14) was comprised of WL-14, which was the PSS wetland associated with Willow Creek. The overall FCI for the AA was 0.66, classifying it as "Functioning Impaired." The main stressors causing the lower score were the channelization of Willow Creek, agricultural development in the area, CAFOs, and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, water outflow, and geomorphology. The primary function of this AA is wildlife habitat, production export/food chain support and sediment retention.

3.3.15 Assessment Area 15

Assessment Area 15 (AA-15) was comprised of WL-15, which was the PEM wetland associated with Willow Creek. The overall FCI for the AA was 0.66, classifying it as "Functioning Impaired." The main stressors were the channelization of the natural drainage, agricultural development in the area, CAFOs, and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, water outflow, and geomorphology. The primary function of this AA is wildlife habitat, production export/food chain support and sediment retention.

3.3.16 Assessment Area 16

Assessment Area 16 (AA-16) was comprised of WL-16, which was the wetland associated with Lamar Canal. The overall FCI for the AA was 0.66, classifying it as "Functioning Impaired." The main stressors were agricultural development in the area, including CAFOs, and the presence of the Town of Lamar. These stressors affected variables such as habitat connectivity, buffer capacity, water source, water distribution, water outflow, and geomorphology. The primary function of this AA is wildlife habitat, production export/food chain support and sediment retention.

4. Impacts

4.1 Direct Impacts

Direct impacts to open water and wetlands could result from constructing the roadway and roadway infrastructure including bridges, box culverts, shoulders, and retaining walls. Shading from bridges was considered to permanently impact wetlands, but not open water. Open water and wetland direct permanent impact sources used for determination are identified in Table 2.

Table 2. Permanent Impact Source for Open Water and Wetlands at US 287 Lamar Reliever Route

Open Water Body	Wetland ID	Impact Source
Vista Del Rio Dtich	WL-1 & WL-2	No impact – project will not disturb this area
Amity Canal	WL-3 & WL-4	No impact – Existing bridge would remain in place
Markham Arroyo	WL-7	Roadway crossing over arroyo with culvert (30' from edge of traveled way)
Pond #1	WL-8	Roadway and shoulder (proposed ROW minus 10 feet)
Pond #2	WL-8	Roadway and shoulder (proposed ROW minus 10 feet)
Open Meadow	WL-9	Roadway and shoulder (proposed ROW minus 10 feet)
Vista Del Rio Ditch (Culvert)	WL-10	Roadway crossing over ditch with culvert (Box culvert dimensions)
Hyde Canal (Culvert)	WL-11	Roadway crossing over canal with culvert (Box culvert dimensions)
Arkansas River	WL-13	Roadway crossing over river with bridge (proposed ROW minus 10 feet)
Willow Creek	WL-14	Roadway crossing over creek with bridge which will not disturb creek (proposed ultimate structure and box culvert dimensions)
Willow Creek	WL-15	Roadway crossing over creek with bridge which will not disturb creek (proposed ultimate structure and box culvert dimensions)
Lamar Canal	WL-16	Roadway crossing over canal with bridge which will not disturb creek (proposed ultimate structure and box culvert dimensions)
Lamar Canal (Culvert)	no wetland	Roadway crossing over canal with box culvert (proposed ultimate structure and box culvert dimensions)
Fort Bent Canal (Culvert)	no wetland	Roadway crossing over canal with box culvert (box culvert dimensions)
Unnamed Ditch N. of Willow Creek	no wetland	Roadway crossing over ditch with culvert (estimated from other box culverts)

Permanent impacts are presented for the Interim phase to build to two lanes and for the Ultimate phase to build to four lanes (Table 3, Figures 3 to 5). The Interim phase is calculated for both the north-bound lanes and the south-bound lanes, since which lanes will be built during the Interim phase has not been determined at the time of this report. The impacts have been reduced to less than 0.5 acre for each of the phases through use of retaining walls, most notably at the open meadow and Pond #1 and #2.

Construction of the Interim phase for the north-bound lanes would result in permanent impacts to a total of 0.433 acre of wetlands and 0.193 acre of open waters (Table 3; Figure 3). The south-bound Interim phase option would result in permanent impacts to a total of 0.466 acre of wetlands and 0.170 acre of open waters (Table 3; Figure 4). The Interim phase impacts take into account the area needed for two travel lanes, two 10-foot shoulders, and the adjacent ROW for cut and fill limits for the roadway. The ROW limits for both the northbound and southbound Interim alignments extend beyond the center line of the ultimate phase alignment. Therefore, there is some overlap in impacts between the northbound and southbound alignments, where their ROW limits overlap in the center of the Ultimate phase alignment. For this reason the northbound and southbound impact quantities do not add up to the Ultimate phase impact quantities. The Ultimate phase would result in permanent impacts to a total of 0.912 acre of wetlands and 0.379 acre of open waters (Table 3; Figure 5).

Table 3. Permanent Impact Amounts (acres) for Open Water and Wetlands at US 287 Lamar Reliever Route

Open Water Body	**Wetland ID**	**Northbound Route Impact (acres)**		**Southbound Route Impact (acres)**		**Ultimate Phase Impact (acres)**	
		Wetland	**Open Water**	**Wetland**	**Open Water**	**Wetland**	**Open Water**
Amity Canal*	WL-3 & WL-4	0	0	0	0	0	0
Markham Arroyo	WL-7	0.018	0.029	0.025	0.029	0.038	0.039
Pond #1	WL-8	0.035	0	0.116	0.025	0.116	0.025
Pond #2	WL-8	0.096	0.048	0	0	0.096	0.048
Open Meadow	WL-9	0.110	0	0.123	0	0.328	0
Vista Del Rio Ditch (Culvert)	WL-10	0.062	0.023	0.066	0.023	0.125	0.053
Hyde Canal (Culvert)	WL-11	0.004	0.023	0.003	0.023	0.007	0.053
Arkansas River	WL-13	0.016	0	0.014	0	0.030	0
Willow Creek (bridge)	WL-14	0.052	0	0.101	0	0.123	0
Willow Creek (bridge)	WL-15	0.036	0	0.014	0	0.041	0
Lamar Canal (bridge)	WL-16	0.004	0	0.004	0	0.008	0
Lamar Canal (Culvert)	no wetland	0	0.024	0	0.024	0	0.055
Fort Bent Canal (Culvert)	no wetland	0	0.023	0	0.023	0	0.053
Unnamed Ditch North of Willow Creek	no wetland	0	0.023	0	0.023	0	0.053
Total		0.433	0.193	0.466	0.170	0.912	0.379

* existing bridge would remain in place

Temporary wetland impacts will result from construction activities (Table 4). Temporary wetland impacts will occur as a result of ground disturbance needed to prepare the road base, installation of culverts, bridge piers, and general construction access.

Table 4. Temporary Impact Source for Open Water and Wetlands at US 287 Lamar Reliever Route

Open Water Body	Wetland ID	Impact Source
Vista Del Rio Dtich	WL-1 & WL-2	No impact – project will not disturb this area
Amity Canal	WL-3 & WL-4	No impact – Existing bridge would remain in place
Markham Arroyo	WL-7	Installation of culvert - estimated from culvert (30' from edge of traveled way)
Pond #1	WL-8	Installation of roadway - area between limit of proposed ROW and 10 feet buffer used in determining perm impacts
Pond #2	WL-8	Installation of roadway - area between limit of proposed ROW and 10 feet buffer used in determining perm impacts
Open Meadow	WL-9	Installation of roadway - area between limit of proposed ROW and 10 feet buffer used in determining perm impacts
Vista Del Rio Ditch (Culvert)	WL-10	Temporary occupation for construction purposes
Hyde Canal (Culvert)	WL-11	Temporary occupation for construction purposes
Arkansas River	WL-13	Bridge footprint
Willow Creek	WL-14	Temporary occupation for construction purposes
Willow Creek	WL-15	Temporary occupation for construction purposes
Lamar Canal	WL-16	Temporary occupation for construction purposes
Lamar Canal (Culvert)	no wetland	Temporary occupation for construction purposes
Fort Bent Canal (Culvert)	no wetland	Temporary occupation for construction purposes
Unnamed Ditch N. of Willow Creek	no wetland	Estimated from other box culverts

Construction of the Interim phase for the north-bound lanes would result in temporary impacts to a total of 0.227 acre of wetlands and 0.106 acre of open waters (Table 5). The south-bound Interim phase option would result in temporary impacts to a total of 0.210 acre of wetlands and 0.081 acre of open waters. The Ultimate phase would result in temporary impacts to a total of 0.261 acre of wetlands and 0.121 acre of open waters.

Table 5. Temporary Impact Amounts (acres) for Open Water and Wetlands at US 287 Lamar Reliever Route

Open Water Body	Wetland ID	Northbound Route Impact (acres)		Southbound Route Impact (acres)		Ultimate Impact (acres)	
		Wetland	Open Water	Wetland	Open Water	Wetland	Open Water
Amity Canal	WL-3 & WL-4	0	0	0	0	0	0
Markham Arroyo	WL-7	0.008	0.011	0.007	0.011	0.001	0.011
Pond #1	WL-8	0.010	0	0	0	0*	0
Pond #2	WL-8	0.012	0.014	0	0	0.014	0.014
Open Meadow	WL-9	0.081	0	0.083	0	0.059	0
Vista Del Rio Ditch (Culvert)	WL-10	0.026	0.011	0.025	0.011	0.004	0.011
Hyde Canal (Culvert)	WL-11	0.004	0.011	0.003	0.011	0.004	0.011
Arkansas River	WL-13	0.010	0.026	0.005	0.015	0.015	0.041
Willow Creek	WL-14	0.040	0	0.065	0	0.119	0
Willow Creek	WL-15	0.033	0	0.012	0	0.036	0
Lamar Canal	WL-16	0.003	0	0.010	0	0.009	0
Lamar Canal (Culvert)	no wetland	0	0.011	0	0.011	0	0.011
Fort Bent Canal (Culvert)	no wetland	0	0.011	0	0.011	0	0.011
Unnamed Ditch North of Willow Creek	no wetland	0	0.011	0	0.011	0	0.011
Total		0.227	0.106	0.210	0.081	0.261	0.121

* Pond #1 is entirely within the Northbound Route and would be permanently impacted by construction of the Northbound Route first with no additional impact during the Ultimate Phase construction. If the Southbound Phase is constructed first, then the Ultimate Phase construction would impact the entire pond.

4.2 Indirect Impacts

This project is not expected to result in above normal indirect impacts as compared to comparable roadways. In general, indirect impacts to wetlands caused by roadways can include increase in stormwater runoff with a resultant increase in water level fluctuation and may result in greater inputs of sediment, nutrients, chlorides, and other pollutants and may increase erosion. An increase in noxious weeds could occur due to habitat disturbance during construction and as a result of weed seeds being carried by vehicles using the new highway. Water quality practices as planned for this roadway would greatly reduce these factors. The following water quality mitigation commitments will be implemented:

- CDOT will design bridge features to provide maximum water quality protection, including size and location of piers and abutments, and will design bridge features to minimize scour. These mitigation features will be designed to minimize impact on aquatic habitat.

- CDOT will treat stormwater runoff from bridge decks using Best Management Practices (BMPs) prior to discharging to adjacent water bodies.

- The contractor will follow CDOT's *Specification for Road and Bridge Construction* to implement temporary and permanent water quality BMPs.

- During final design, CDOT will develop permanent water quality BMPs such as detention ponds or swales to treat runoff before entering surface waters or wetlands, consistent with the guidelines set by the CDOT New Development and Redevelopment Program. These features will be constructed concurrent with the Proposed Action.

5. Mitigation

Unavoidable impacts to wetlands and open waters will be compensated in-kind with on-site mitigation for temporary impacts and for permanent impacts to the extent practicable. CDOT policy requires that all wetlands, both jurisdictional and non-jurisdictional, be mitigated for disturbance at a ratio of 1:1. All temporarily impacted wetlands will be restored in-place.

Both USACE and CDOT typically require mitigation for permanent impacts at a ratio of 1:1. Mitigation for wetland impacts greater than 0.10 acre is required by USACE; CDOT mitigates all permanent and temporary wetland impacts; therefore, all impacts to wetlands will require mitigation for this project. Mitigation may take place onsite or through the use of wetland mitigation bank credits through the CDOT Limon Wetland Mitigation Bank (wetland bank) in Lincoln County. Currently, the wetland bank has approximately six acres left of credit. However, a recent field visit has led to concerns that the wetland bank may not be viable. Therefore, this wetland bank may or may not be available for use when this project goes to construction.

The Arkansas River, Markham Arroyo, and hydraulically connected canals and ditches are most likely under the jurisdiction of USACE. However, some of the minor irrigation ditches and canals and the isolated ponds may not be regulated by USACE. This determination can only be officially made by the USACE. The wetlands associated with non-jurisdictional Waters of the US, would also not be jurisdictional.

It is anticipated that multiple Nationwide Permits can be used for this project rather than an Individual Permit for Section 404 of the Clean Water Act, as long as impacts at each wetland/US waters location is less than 0.5 acre. In both the interim and ultimate phases, retaining walls will be constructed at or near the edge of the proposed shoulder of the project in the Open Meadow area (WL-9) to reduce the project's impact to this specific wetland. During final design, CDOT will consider additional construction measures, such as steepening side slopes or constructing additional retaining walls, to potentially further reduce impacts to other existing wetlands and open waters. CDOT will coordinate with USACE as project specific plans are available. However, CDOT requires mitigation for disturbance of all wetlands therefore jurisdictional status will not affect wetland mitigation as presented in this report.

During final design this Wetland Finding report will be updated with actual wetland impacts and a site-specific mitigation plan will be developed and implemented during construction. If actual wetland impacts exceed the stated amounts, then the contractor would be responsible for any subsequent modification of USACE permitting requirements

All temporary open water and temporary wetland impacts will be mitigated in place. Indirect impacts will be minimized by the implementation of a Stormwater Management Plan (SWMP) and construction BMPs. A Noxious Weed Management Plan will be developed to minimize indirect impacts to wetlands due to weeds by re-seeding with native species where ground disturbance occurs.

5.1 Wetland Mitigation Options

Wetland mitigation for permanent impacts will occur onsite where possible, although teaming with another agency or private entity for offsite mitigation may also be considered. For example, CDOT and Colorado Parks and Wildlife have had preliminary discussion about partnering to reclaim the gravel ponds located just east of US 287 as it crosses the Arkansas River. When onsite or offsite mitigation is not feasible, the wetland bank could be used. Potential mitigation locations for each wetland are presented below.

5.1.1 Undisturbed Wetlands = WL-1, WL- 2, WL-3, WL-4

No disturbance of wetlands in WL-1, WL- 2, WL-3, or WL-4 is planned; therefore, mitigation is not required.

5.1.2 Canal and Ditch Wetlands = WL-7, WL-10, WL-11, WL-14, WL-15, WL-16

The canal and ditch wetlands are fringe PEM wetlands that occur intermittently along the waterways. WL-15 also has some PSS wetland. Where feasible hydraulically, permanent impacts will be mitigated through development of new wetlands in areas along these ditches and canals where wetlands currently do not occur. These may be developed concurrent with and using similar methods to temporary impact wetland replacement. These could be located within the ROW of the Reliever Route where no future development will occur. Most likely not enough acreage will be available to mitigate for all permanent impacts. Use of the wetland bank may be considered as well as offsite mitigation. Onsite mitigation may not be possible along the Fort Bent and Hyde Canals as these resources have been identified as potentially eligible for listing on the National Register of Historic Properties.

5.1.3 Pond Wetlands = WL-8

WL-8 could be mitigated at the gravel ponds located east of current US 287 as it crosses the Arkansas River if CDOT and Colorado Parks and Wildlife can work collaboratively to reclaim these ponds. The wetland bank could also be used.

5.1.4 Open Meadow Wetland = WL-9

The open meadow wetland is a PEM wetland that could be mitigated through use of the wetland bank.

5.1.5 Riverine Wetland = WL-13

Wetlands along the river are intermittent and, as with the canals and ditches, where feasible hydraulically, permanent impacts could be mitigated through development of new wetlands in areas along the river where wetlands currently do not occur. Mostly likely not enough acreage will be available to mitigate for all permanent impacts and some wetland bank purchase with the wetland bank will be required.

5.2 Wetland Mitigation Monitoring

Monitoring and documenting the success of mitigation efforts is an integral part of the mitigation process. As mitigation sites are finalized, mitigation plans and formal monitoring program will be developed.

5.3 Best Management Practices

Avoidance and minimization of impacts were addressed during the site plan development via the advanced identification of wetlands and open waters in all areas in which impacts are proposed. An initial natural resources inventory and evaluation of all wetlands areas were completed to provide a basis for planning to avoid impacts to wetlands. During the refinement of design plans this identification provided the opportunity for avoidance and minimization of wetlands and open waters and ensured compliance with the Section 404(b)(1) "best management practices" guidance of the Clean Water Act, which provides for the structural and non-structural methods, measures or practices implemented to prevent, reduce or mitigate adverse water quality impacts resulting from construction and operation of a project.

CDOT will implement the following BMPs, as appropriate, in order to limit temporary project impacts to wetlands and other aquatic systems:

- Construction staging, including construction and waste material, fill material, equipment, fuel, etc. areas shall be located outside of the area adjacent to streams, including wetlands and riparian areas. At a minimum, such staging areas and materials shall not be located within 15 meters (50 horizontal feet) of the ordinary high water mark of any watercourse.

- Equipment refueling and servicing shall occur only within approved designated areas.

- All construction equipment shall be maintained in good working order to avoid unnecessary discharge of harmful materials used in the operation of that equipment, including petroleum products, radiator fluid, hydraulic fluid, etc.

- All practicable efforts shall be expended to avoid and minimize in-stream work. Where practical, equipment shall be operated from banks or shoulders above riparian and wetland areas. In those instances where in-stream work is required, such work shall be performed during low flows, and the use of heavy equipment in streambeds, especially in live or flowing water, shall be minimized. The equipment used shall be of such a type that will produce minimal environmental damage, including damage to the stream bottom.

- All reasonable measures shall be taken to avoid excess application and introduction of chemicals into aquatic ecosystems and adjacent riparian areas, including wetlands. The use of chemicals such as soil stabilizers, dust palliatives, herbicides, sterilants, growth inhibitors, fertilizers, deicing salts, etc., during construction and maintenance operations shall be in accordance with the manufacturer' s recommended application rates, frequency, and instructions. These chemicals shall not be used, stored, or stockpiled within 15 meters (50 horizontal feet) of the ordinary high water mark of any state waters, including wetlands, except when otherwise specified in the project contract.

- Geotextile fabric shall be placed over temporarily impacted wetland areas located within work areas. The fabric shall be covered with straw and topsoil for the duration of the work and then removed.

- Temporary fencing (orange) shall be installed in areas outside the projects limit of disturbance but which require additional protection from encroachment of personnel and equipment, such as wetlands, streams, etc.

- Silt fence, erosion logs, or similar erosion control products shall be installed wherever the toe of fill meets the water's edge, riparian areas, and wetlands in the work area. Temporary and permanent erosion and sediment control measures shall be installed at the earliest practicable time consistent with good construction practices. Such measures shall be properly monitored and maintained throughout the operation of the project.

- Washing of trucks or equipment, or concrete saw water will be allowed in aquatic ecosystems and riparian areas, including wetlands. Concrete washout areas shall occur only within approved designated areas.

- The stream channel bottom shall be returned to the elevation and configuration existing prior to construction. Work in live water systems shall be conducted in accordance with all applicable permits and contract conditions.

- Riprap above the ordinary high water line shall be covered with topsoil and revegetated as specified by the CDOT landscape architect. Areas under bridges do not need topsoil treatment. Where appropriate, streamside areas at the ordinary high water line should be revegetated with brush layer cuttings of native riparian shrub species.

- All practicable measures shall be taken to avoid disturbance to existing vegetation. The length of time that disturbed areas are left exposed shall be as short as practicable and the extent of such disturbed areas shall be as small as practicable. Particular attention shall be paid to protecting aquatic ecosystems, riparian areas, wetlands, and habitats for threatened and endangered species from such impacts and unnecessary disturbance. Once earthwork has begun on a section, it shall be pursued until complete. Within seven days, completed areas should be stabilized, that is, seeded and mulched according to the plans. In some situations, temporary stabilization may be appropriate.

- All disturbed areas above the ordinary high water mark shall be revegetated with appropriate native plant species to provide bank stabilization, erosion control, and habitat replacement. These activities shall be conducted according to specifications approved by the CDOT landscape architect. Temporary seeding shall be done where necessary. Only certified weed-free hay and straw shall be used.

- All practicable effort shall be expended to avoid destruction of trees and shrubs in the vicinity of streams and in riparian areas. Existing trees within the project area that are not scheduled for removal shall be cordoned off from construction activity with temporary construction fencing (orange).

- Highway runoff shall be diverted away from the stream channel to avoid siltation and other pollution problems. Where it is necessary to divert runoff directly into the stream channel, intervening water holding or siltation-filtration basins of adequate size shall be constructed.

- Temporary fills, such as cofferdams and temporary road crossings, using imported material shall utilize clean, chemically-free fill to avoid increasing suspended solids or pollution. Fill material shall not be obtained from the live water area in the stream unless approved by Colorado Parks and Wildlife (CPW).

- Discharge of water directly into the stream from cofferdams or new channel construction is prohibited. Such water shall be treated prior to discharge according to the project's Clean Water Act Section 401 or 404 permit.

- Under current CDOT policies, in-stream work is limited to specific periods in order to avoid disruption of fish migration and spawning seasons. Under certain circumstances, instream work during such periods may be allowed. Special techniques are required during such situations and shall be pursued in consultation with staff of the CPW. The timing of such activities will be determined in consultation with CPW.

6. Closing Statement

Based on the above considerations, it is determined that there is no practicable alternative to the proposed new construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

7. References

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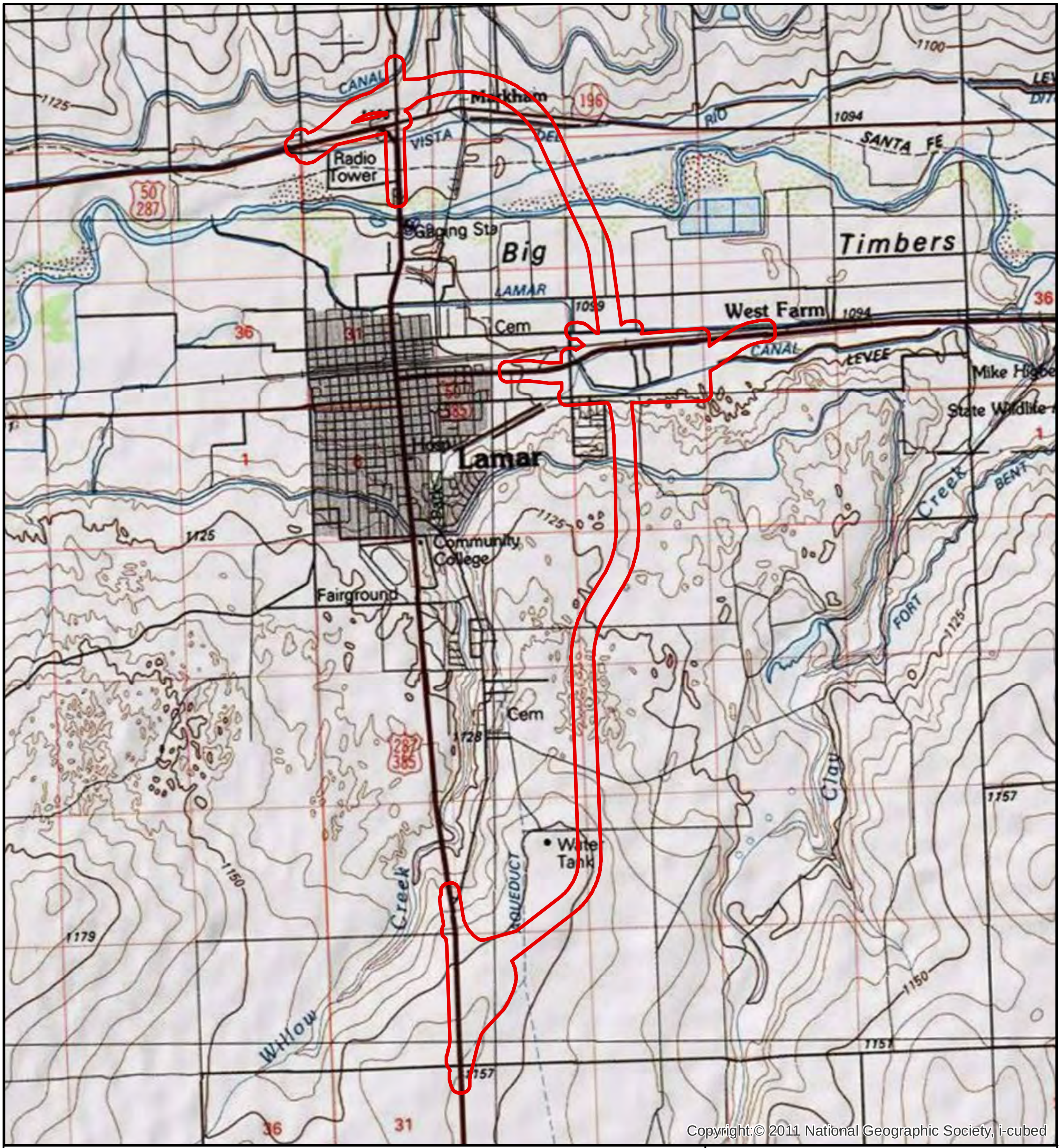
FIGURES



N

Legend

USGS 7.5' Topographic Map
Lamar East, CO 1953 (Revised 1979)

○ Site

0 1 2
Miles

Pinyon
Environmental, Inc

SITE LOCATION

US 287 Reliever Route

Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

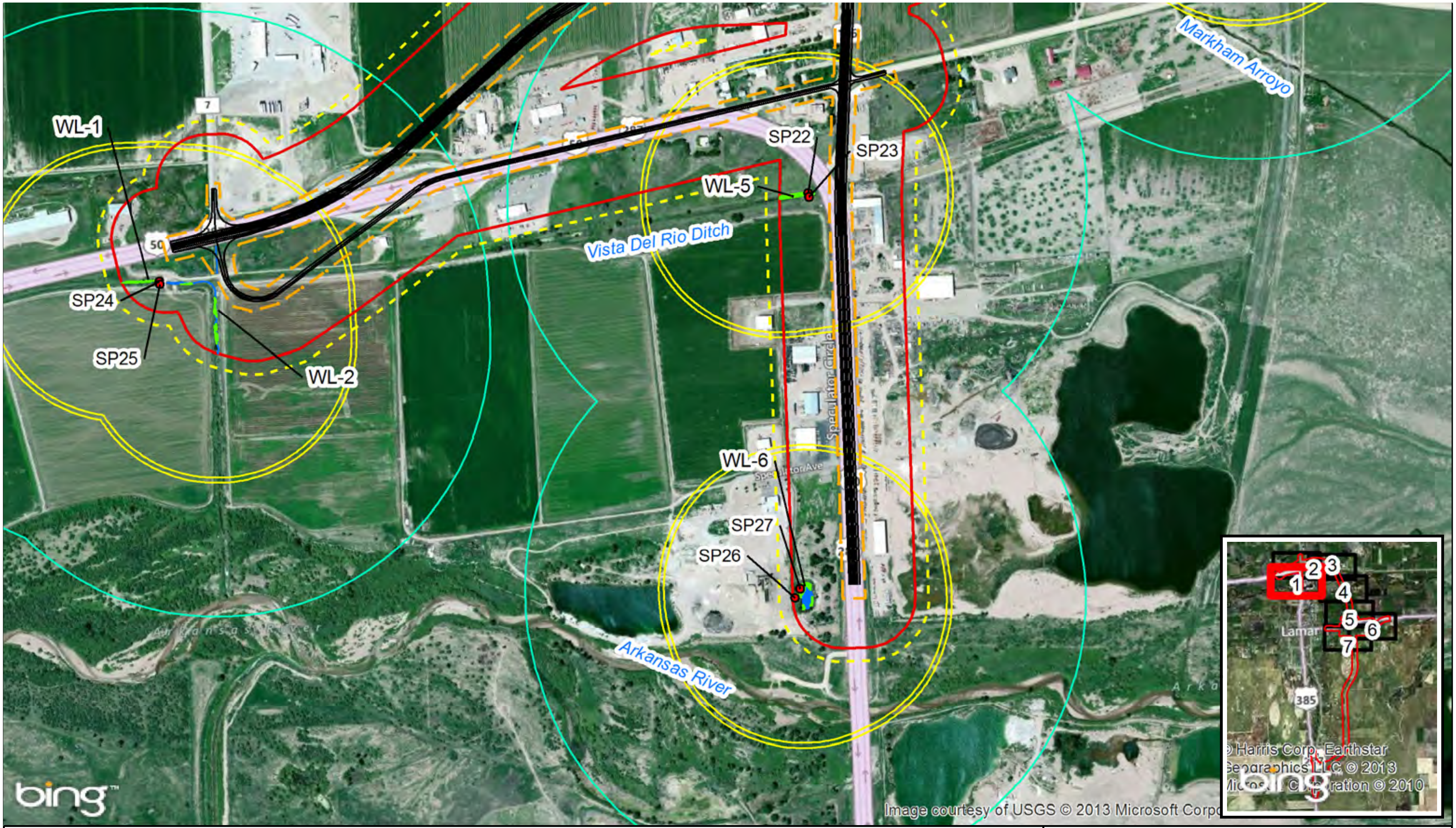
Figure 1

Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 1.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 12/18/2012



N

Legend

- ● Sampling Points (SP)
- — Proposed Edge of Roadway
- 🟩 Wetland (WL) / Assessment Areas (AA)
- 🟦 Waters
- 🟥 300 Foot Right of Way Buffer
- ▭ Reliever Route Right of Way Limits
- ▭ Area of Interest (AOI)
- ▭ 250 Meter Buffer Area (BA)
- ▭ 500 Meter Habitat Connectivity Envelope (HCE)

0 1,000 2,000 Feet

Pinyon *Environmental Engineering Resources, Inc.*

Wetland and FACWet Areas

US 287 Lamar Reliever Route
Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

Figure 2 a

Path: Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 2_FACWet.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 2/15/2013

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Feet
0 1,000 2,000

Pinyon *Environmental Engineering Resources, Inc.*

Wetland and FACWet Areas

US 287 Lamar Reliever Route
Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

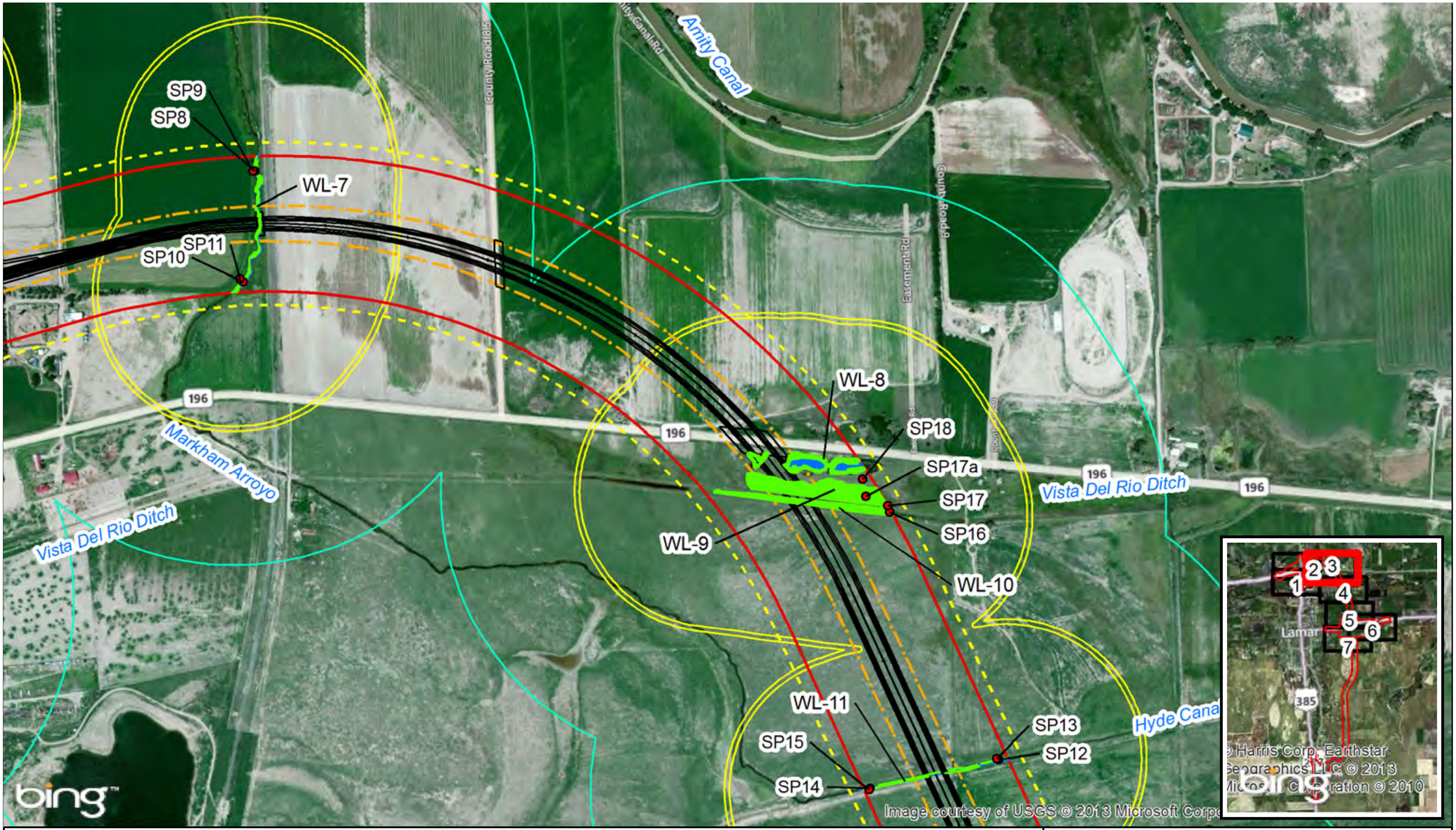
Figure 2 b

Path: Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 2_FACWet.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 2/15/2013



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0 1,000 2,000 Feet

Pinyon *Environmental Engineering Resources, Inc.*

Wetland and FACWet Areas

US 287 Lamar Reliever Route
Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

Figure 2 c

Path: Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 2_FACWet.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 2/15/2013

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0 1,000 2,000 Feet

Pinyon *Environmental Engineering Resources, Inc.*

Wetland and FACWet Areas

US 287 Lamar Reliever Route
Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

Figure 2 d

Path: Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 2_FACWet.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 2/15/2013

N

Legend

● Sampling Points (SP)

— Proposed Edge of Roadway

🟩 Wetland (WL) / Assessment Areas (AA)

🟦 Waters

🟥 300 Foot Right of Way Buffer

Reliever Route Right of Way Limits

Area of Interest (AOI)

250 Meter Buffer Area (BA)

500 Meter Habitat Connectivity Envelope (HCE)

0 1,000 2,000 Feet

Pinyon Environmental Engineering Resources, Inc.

Wetland and FACWet Areas

US 287 Lamar Reliever Route
Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

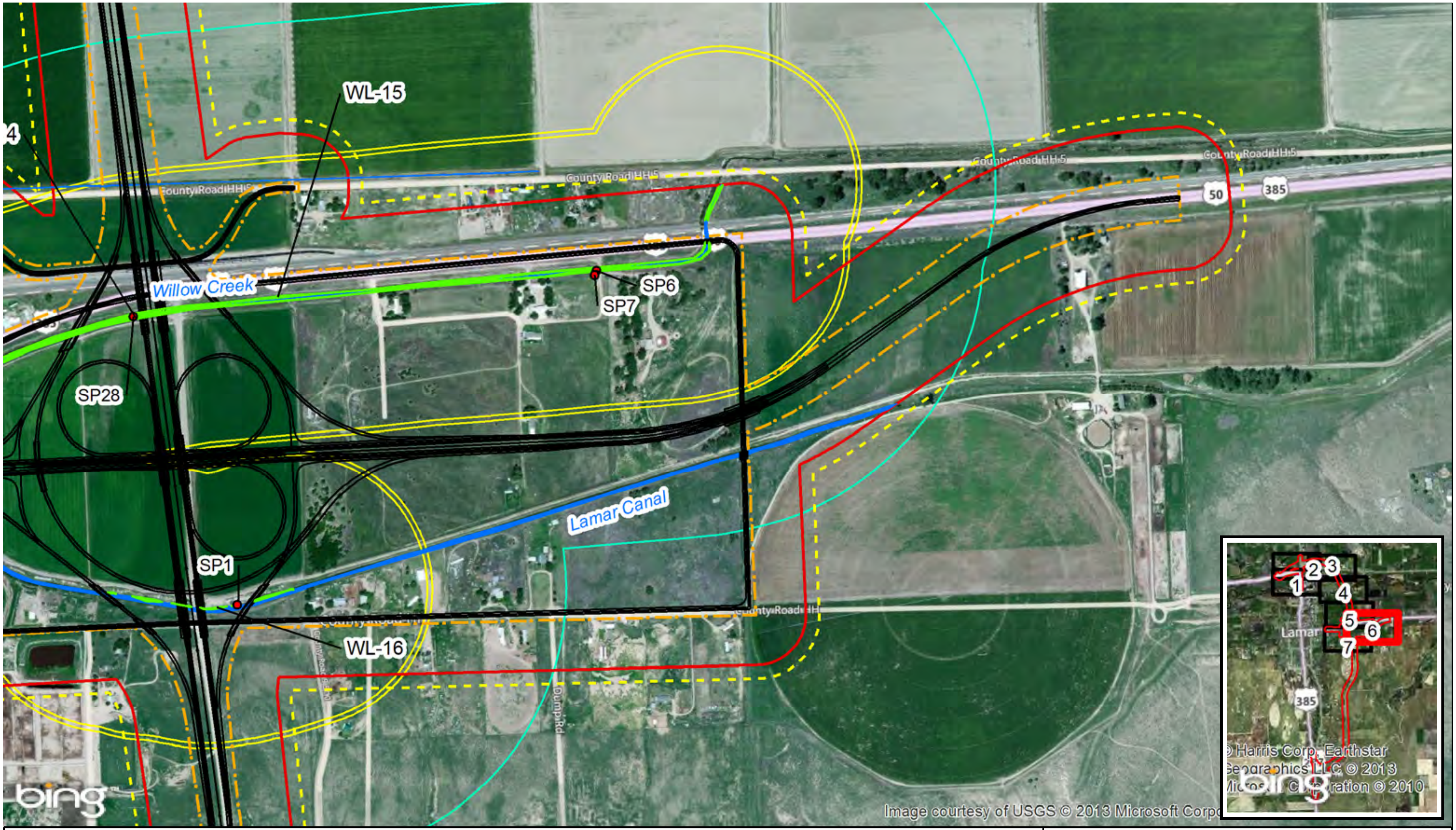
Figure 2 e

Path: Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 2_FACWet.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 2/15/2013



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0 1,000 2,000 Feet

Pinyon Environmental Engineering Resources, Inc.

Wetland and FACWet Areas

US 287 Lamar Reliever Route
Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

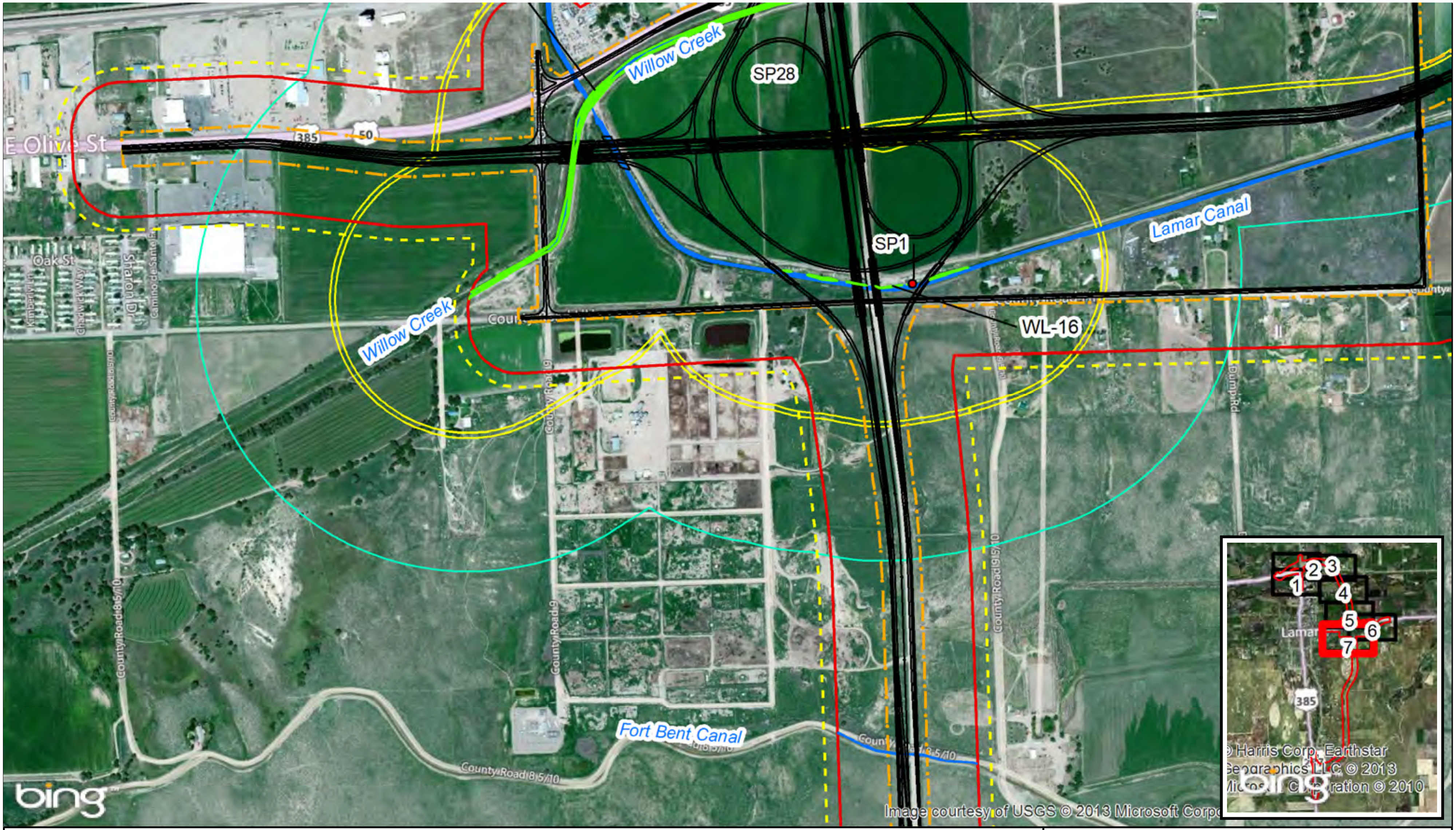
Figure 2 f

Path: Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 2_FACWet.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 2/15/2013



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0 1,000 2,000 Feet

Pinyon *Environmental Engineering Resources, Inc.*

Wetland and FACWet Areas

US 287 Lamar Reliever Route
Lamar, Colorado

Site Location: Townships 22 and 23 S, Range 46W, 6th Principal Meridian

Drawn By: TJD

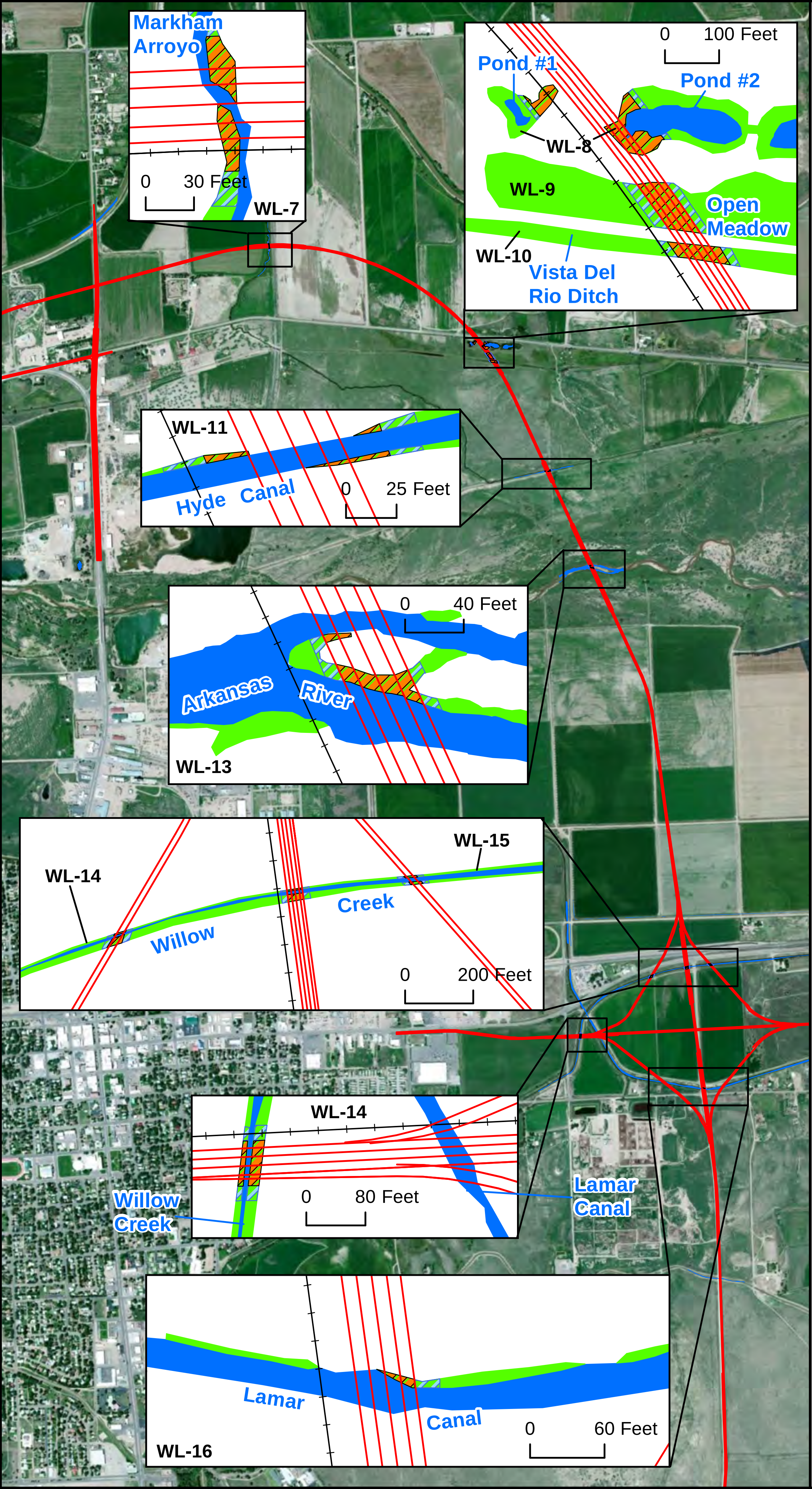
Figure 2 g

Path: Z:\PROJECTS\2012\11275005 US 287 Lamar Bypass w CH2M Hill\Figures\ArcMap\MXDs\Figure 2_FACWet.mxd

Job No: 1/12-750-05

Reviewed By: IEB

Revision: 2/15/2013

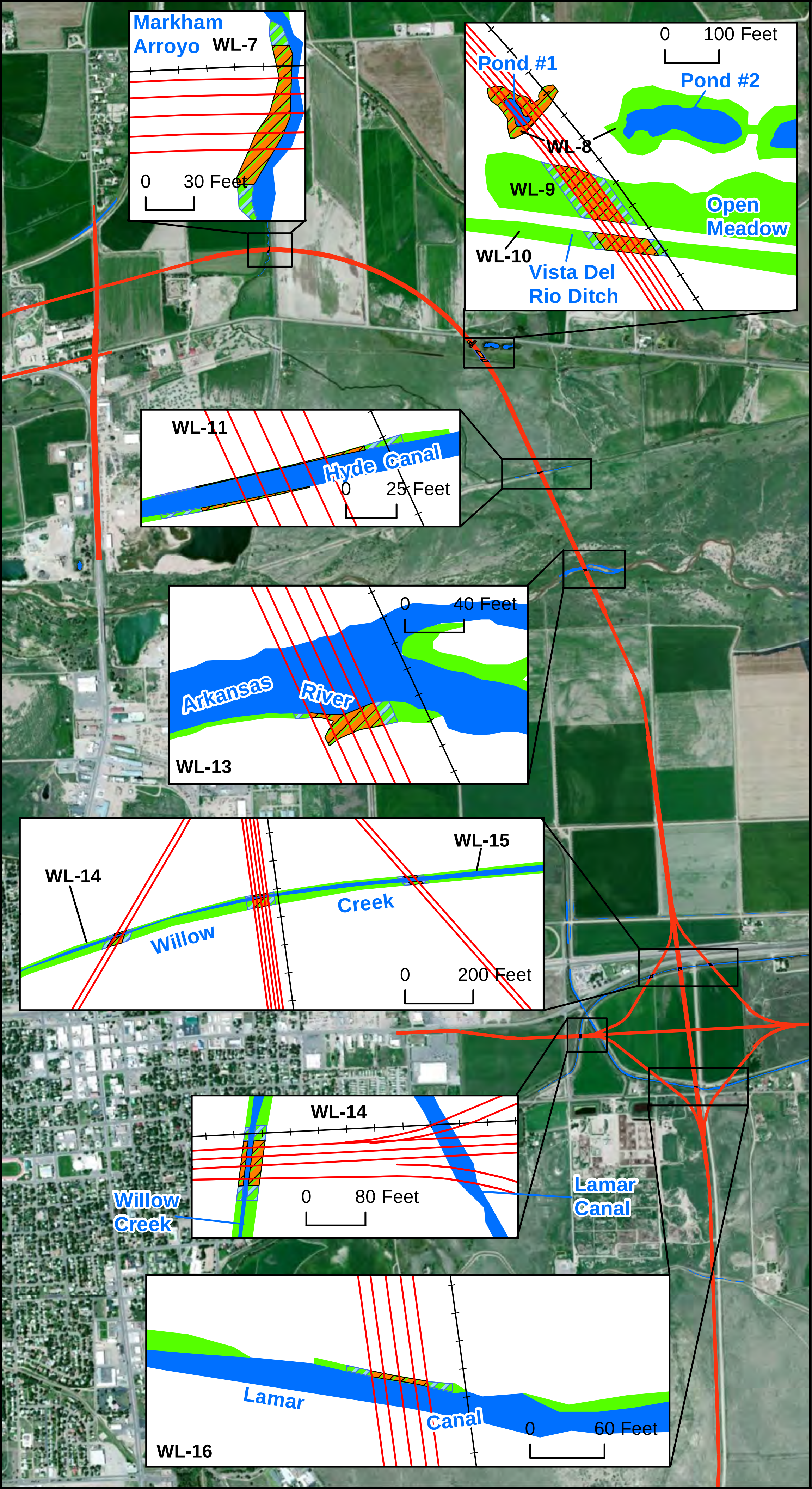


Map ID	Perm Impact to Wetlands
WL-16	0.004 acre
WL-15	0.036 acre
WL-14	0.052 acre
WL-13	0.016 acre
WL-11	0.004 acre
WL-10	0.062 acre
WL-9	0.110 acre
WL-8	0.035 acre
WL-8	0.096 acre
WL-7	0.018 acre
Total	**0.433 acre**

Map ID	Temp Impact to Wetlands
WL-16	0.003 acre
WL-15	0.033 acre
WL-14	0.040 acre
WL-13	0.010 acre
WL-11	0.004 acre
WL-10	0.026 acre
WL-9	0.081 acre
WL-8	0.010 acre
WL-8	0.012 acre
WL-7	0.008 acre
Total	**0.227 acre**

Figure 3

Interim Phase Northbound Wetlands Impact Areas

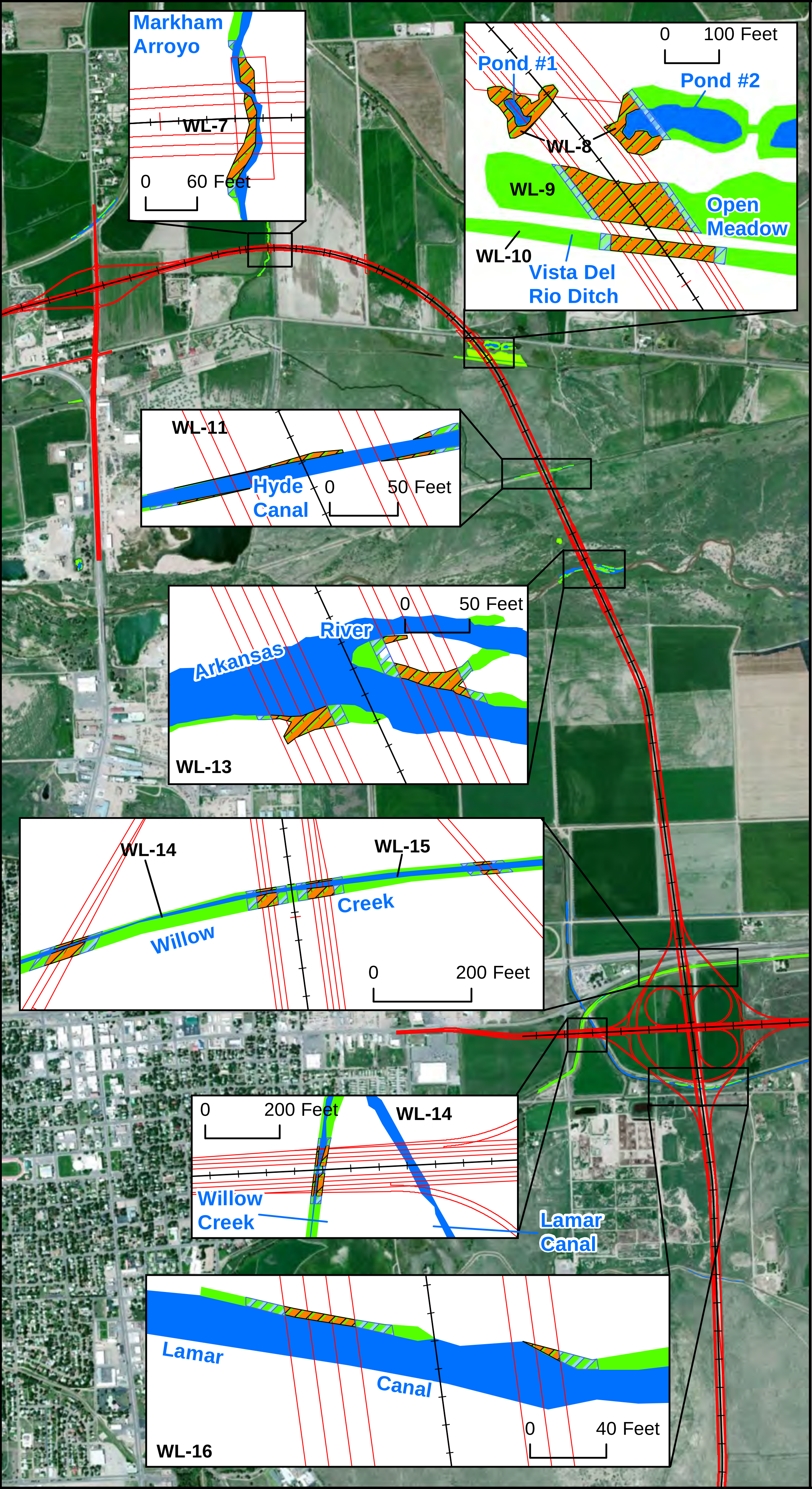


Map ID	Perm Impact to Wetlands
WL-16	0.004 acre
WL-15	0.014 acre
WL-14	0.101 acre
WL-13	0.014 acre
WL-11	0.003 acre
WL-10	0.066 acre
WL-9	0.123 acre
WL-8	0.116 acre
WL-8	0.000 acre
WL-7	0.025 acre
Total	**0.466 acre**

Map ID	Temp Impact to Wetlands
WL-16	0.010 acre
WL-15	0.012 acre
WL-14	0.065 acre
WL-13	0.005 acre
WL-11	0.003 acre
WL-10	0.025 acre
WL-9	0.083 acre
WL-8	0.000 acre
WL-8	0.000 acre
WL-7	.007 acre
Total	**.210 acre**

Figure 4

Interim Phase Southbound Wetlands Impact Areas



Map ID	Perm Impact to Wetlands
WL-16	0.008 acre
WL-15	0.041 acre
WL-14	0.123 acre
WL-13	0.030 acre
WL-11	0.007 acre
WL-10	0.125 acre
WL-9	0.328 acre
WL-8	0.116 acre
WL-8	0.096 acre
WL-7	0.038 acre
Total	**0.912 acre**

Map ID	Temp Impact to Wetlands
WL-16	0.009 acre
WL-15	0.036 acre
WL-14	0.119 acre
WL-13	0.015 acre
WL-11	0.004 acre
WL-10	0.004 acre
WL-9	0.059 acre
WL-8	0.000 acre
WL-8	0.014 acre
WL-7	0.001 acre
Total	**0.261 acre**

Figure 5

Ultimate Phase Wetlands Impact Areas

APPENDIX A
Photographic Log

1. Facing North, View of Unnamed Ditch with No Wetlands, Along US 287/50, at the Western Portion of the Project Area

2. Facing West, View of Wetland 1, at Western Portion of Vista Del Rio Ditch

3. View of Surface Soil Cracks in Palustrine Shrub Scrub Wetland, Wetland 3, at Amity Canal

4. Facing East, View of Palustrine Emergent Wetland, Wetland 4, at Amity Canal

5. Facing West, View of Sampling Point 19 at Amity Canal, Wetland 4

6. View of Sampling Point 19 Soils at Amity Canal, Wetland 4

7. View of Sampling Point 22 Soils at Vista Del Rio Ditch, Wetland 5

8. Facing West, View of Sampling Point 22 and Wetland 5 on Vista Del Rio Ditch

9. Facing Southeast, View of Wetland 6, a Fringe Wetland Around a Small Pond

10. Facing North, View of Sampling Point 8 at Markham Arroyo, Wetland 7

11. Facing North, View of Upland Sampling Point 9 at Markham Arroyo

12. Facing North, View of Sampling Point 10 at Markham Arroyo, Wetland 7

13. Facing North, View of Sampling Point 11 at Markham Arroyo, Wetland 7

14. Facing East, Depressional Ponds Adjacent South of 196, Wetland 8

15. Facing West, View of Sampling Point 18 North of Vista Del Rio Ditch, Wetland 9

16. Facing West, View of Sampling Point 16, Wetland 10, at Vista Del Rio Ditch

17. Facing Northeast, View of Wetland 11 on Hyde Canal

18. Facing Northeast, View of Wetland 12, Small Pond North of the Arkansas River

19. Facing Northeast, View of Sampling Point 4 at Wetland 12

20. Facing Northwest, View of Sampling Point 5, Upland Adjacent to Wetland 12

21. Facing Northeast, View of Sampling Point 3 and Wetland 13 on the Arkansas River

22. Facing East, View of Arkansas River and Sand Bars

23. Facing South, View of Sampling Point 28 Palustrine Scrub Shrub Wetland at Willow Creek, Wetland 14

24. Facing West, View of Sampling Point 7, Upland Sampling Point Adjacent to Willow Creek

25. Facing West, View of Willow Creek, Wetland 15

26. Facing North, View of Sampling Point 6, Wetland 15

27. Facing Southwest, View of Willow Creek

28. Facing Northeast, View of Wetland 16 Along Lamar Canal

29. Facing East, View of Small Clam Shells on Bottom of Lamar Canal

APPENDIX B
Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 10-22-12
Applicant/Owner: CDOT State: CO Sampling Point: SP-1
Investigator(s): E. Weber, T. DeMasters Section, Township, Range: Section 33, Township 22 S, Range 46 W
Landform (hillslope, terrace, etc.): toe of slope Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): G- Western Great Plains Lat: 38.085775 Long: -102.588053 Datum: NAD83
Soil Map Unit Name: Korman clay loam, sand substratum, 0-1% slopes NWI classification: R4SBK
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes x No ____
Wetland Hydrology Present? Yes x No ____

Is the Sampled Area within a Wetland? Yes x **No** ____

Remarks:
*Extreme drought conditions (droughtmonitor.unl.edu)
Lamar Canal, 20 foot wide, 10 foot deep

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Typha angustifolia	90	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	90	x 1 = 90
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	90 (A)	90 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
x 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x **No** ____

Remarks: D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-3	10YR 5/2	90	7.5YR 3/4	10	C	PL	sandy clay loam	Redox feature- root channels
3-18	10YR 4/2	45	7.5YR 3/4	10	C	M	sand/sandy loam	Redox feature- matrix
	10YR 4/3	45						(not a redox feature; 2 soil colors)

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** X **No** ______

Remarks:

Very clear hydric soil indicator for Sandy Redox.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
X Inundation Visible on Aerial Imagery (B7)
X Water-Stained Leaves (B9)

X Salt Crust (B11)
X Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

X Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ____________
Water Table Present? Yes ______ No X Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ____________

Wetland Hydrology Present? **Yes** x **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland fringe on north bank of Lamar Canal, discontinuous. Wetlands slightly sporadic.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 10-23-12
Applicant/Owner: CDOT State: CO Sampling Point: SP-2
Investigator(s): E. Weber, T. DeMasters, G. Cosyleon Section, Township, Range: Section 28, Township 22 S, Range 46 W
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): G- Western Great Plains Lat: 38.1067815674 Long: -102.591397326 Datum: NAD 83
Soil Map Unit Name: Lincoln sand NWI classification: (PFOJ)
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes x ______ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No	**Is the Sampled Area within a Wetland?** Yes ______ No x ______
Hydric Soil Present?	Yes	No x	
Wetland Hydrology Present?	Yes	No x	

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Soil pit completed approximately 6-8 feet above the river. Remnant hydric soil, dead willow canes and tamarisk, likely due to attempted control of tamarisk.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1. Salix exigua	1	Y	FACW
2. Tamarix ramosissima	1	Y	FACW
3.			
4.			
5.			
	2 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Carex nebrascensis	1	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	1 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	1	x 1 = 1
FACW species	2	x 2 = 4
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	3 (A)	5 (B)

Prevalence Index = B/A = 1.67

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
x 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x ______ No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

57% coverage of dead willow canes and tamarisk. Meets criteria for hydrophytic vegetation because the scant vegetation present is all obligate or facultative-wet.

SOIL

Sampling Point: SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 5/3	100					loamy sand	
3-7.5	2.5Y 5/3	98	7.5 YR 4/4	2	C	PL	loamy sand	Redox features distinct
7.5-10.5	10YR 6/4	100					sand	
10.5-12	10YR 5/4	95	10YR 5/6	5	C	M	loamy sand	Redox features

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** x

Remarks:

Layer in upper 6 inches with redox features too thin to qualify for Sandy Redox. 3 in thick, and needs to be 4 in thick.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___
Water Table Present? Yes ___ No x Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

6 to 8 feet above River.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 10-23-12

Applicant/Owner: CDOT State: CO Sampling Point: SP-3

Investigator(s): E. Weber, T. DeMasters, G. Cosyleon Section, Township, Range: Section 28, Township 22 S, Range 46 W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): G- Western Great Plains Lat: 38.1064745619 Long: -102.594743306 Datum: NAD 83

Soil Map Unit Name: n/a (mapped as water) NWI classification: R2OWZ

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______
Hydric Soil Present? Yes x No ______
Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? **Yes** x **No** ______

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Small terrace approximately 1 inch above OHWM, sandy, vegetated sand and gravel bars in Arkansas River.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1. Tamarisk ramosissma	40	Y	FACW
2. Populus deltoides	1	N	FAC
3.			
4.			
5.			
= Total Cover	41		
Herb Stratum (Plot size: 5 Ft radius)			
1. Panicum capillare	50	Y	FAC
2. Hordeum jubatum	30	Y	FACW
3. Phragmites australis	10	N	FACW
4. Cyperus esculentes	5	N	FACW
5. Alopecurus geniculatus	3	N	OBL
6. Juncus arcticus	2	N	FACW
7.			
8.			
9.			
10.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	87	x 2 =	174
FAC species	51	x 3 =	153
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	141 (A)		330 (B)

Prevalence Index = B/A = 2.34

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-0.5	5Y 4/3	100					muck	top layer shows some redox
0.5-7.5	10YR 5/4	100					sand	coarse
7.5-9.5	Gley1 2.5Y/N	100					silt	
9.5-18	10YR 5/4	100					sand	coarse

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- X 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** x **No** ______

Remarks:

Soil has very distinct layers; typical of a depositional environment.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- X Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes X No ______ Depth (inches): 4

Saturation Present? (includes capillary fringe) Yes X No ______ Depth (inches): at surface

Wetland Hydrology Present? **Yes** x **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 10-23-12
Applicant/Owner: CDOT State: CO Sampling Point: SP-4
Investigator(s): T. DeMasters, E. Weber, G. Cosyleon Section, Township, Range: Section 28, Township 22 S, Range 46 W
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 4
Subregion (LRR): G- Western Great Plains Lat: 38.1081414599 Long: -102.59484067 Datum: NAD 83
Soil Map Unit Name: Lincoln sand NWI classification: PFOJ
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______
Hydric Soil Present? Yes x No ______
Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? **Yes** x **No** ______

Remarks:
*Extreme drought conditions (droughtmonitor.unl.edu)
Depressional wetland, north of Arkansas River, water source appears to be a pipe

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1. Salix exigua	20	Y	FACW
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Phragmites australis	70	Y	FACW
2. Typha angustifolia	25	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	25	x 1 = 25
FACW species	90	x 2 = 180
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	115 (A)	205 (B)

Prevalence Index = B/A = 1.78

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
x 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:
D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	98	10YR 5/8	2	C	PL	sandy clay	
4-10	10YR 5/2	90	10YR 5/8	10	C	PL/M	loamy sand	
10-12	10YR 4/1	80	5YR 4/6	20	C	M	loamy sand	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** x **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes X No ______ Depth (inches): 20
Saturation Present? (includes capillary fringe) Yes X No ______ Depth (inches): surface

Wetland Hydrology Present? **Yes** x **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 10-23-12
Applicant/Owner: CDOT State: CO Sampling Point: SP-5
Investigator(s): T. Demasters, E. Weber Section, Township, Range: Section 28, Township 22 S, Range 46 W
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 1
Subregion (LRR): G- Western Great Plains Lat: 38.108190155 Long: 38.108190155 Datum: NAD 83
Soil Map Unit Name: Lincoln sand NWI classification: PFOJ
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x

Is the Sampled Area within a Wetland? **Yes** ____ **No** x

Remarks:
*Extreme drought conditions (droughtmonitor.unl.edu)
Upland pit near small pond; soil representative of area north and south of Arkansas River. Same soil unit for both.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Bassia scoparia	55	Y	UPL
2. Sporobolus cryptandrus	45	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species	100	x 5 =	500
Column Totals:	100	(A)	500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5Y 5/3	100					loamy sand	No redox features

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** x

Remarks:

Soil dry and dusty.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrologic indicators.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 10-24-12

Applicant/Owner: CDOT State: CO Sampling Point: SP-6

Investigator(s): T. Demasters, E. Weber Section, Township, Range: Section 33, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR): G- Western Great Plains Lat: 38.0911480066 Long: -102.579711165 Datum: NAD 83

Soil Map Unit Name: Tivoli sand NWI classification: RS4BK

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes x ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x ____ No ____

Hydric Soil Present? Yes x ____ No ____

Wetland Hydrology Present? Yes x ____ No ____

Is the Sampled Area within a Wetland? Yes x ____ **No** ____

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Sampling Point completed on a small terrace within Willow Creek approximately 6 inches above the water level.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1. Ulmus pumila	trace	Y	UPL
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Echinochloa crus-galli	97	Y	FAC
2. Rumex crispus	2	N	FAC
3. Juncus arcticus	1	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species		x 2 =	
FAC species	99	x 3 =	297
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		298 (B)

Prevalence Index = B/A = 2.98

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

All dominants are FACW and/or OBL.

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x ____ **No** ____

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

Fringe ranges from 3 to 25 feet wide.

SOIL

Sampling Point: SP-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-16	10YR 4/1	70	10YR 5/8	30	C	M	loamy sand	Redox features present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes _x_ **No** ___

Remarks:

Very homogenous throughout the soil profile. Sand becomes coarser after 8 inches below ground surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
_X_ Drift Deposits (B3)
_X_ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
_X_ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ______
Water Table Present? Yes _X_ No ___ Depth (inches): 8
Saturation Present? (includes capillary fringe) Yes _X_ No ___ Depth (inches): at surface

Wetland Hydrology Present? Yes _x_ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 10-23-12
Applicant/Owner: CDOT State: CO Sampling Point: SP-7
Investigator(s): T. Demasters, E. Weber Section, Township, Range: Section 33, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): G- Western Great Plains Lat: 38.0910795855 Long: -102.579748233 Datum: NAD 83
Soil Map Unit Name: Tivoli sand NWI classification: n/a
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x

Is the Sampled Area within a Wetland? **Yes** ____ **No** x

Remarks:
*Extreme drought conditions (droughtmonitor.unl.edu)
Upland pit adjacent to Willow Creek. On top of hill by channelized creek.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: 5 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Bromus ciliates	40	Y	FAC
2. Lepidium densiflorum	60	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	40	x 3 =	120
FACU species		x 4 =	
UPL species	60	x 5 =	300
Column Totals:	100 (A)		420 (B)

Prevalence Index = B/A = 4.20

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.
Mowed, dormant vegetation.

SOIL

Sampling Point: SP-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/3	100						No redox features
7-12	10 YR 3/4	100						No redox features

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No x

Remarks:

Probable fill, next to channelized creek.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ______

Wetland Hydrology Present? Yes ______ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/10/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-8

Investigator(s): T. Demasters, Section, Township, Range: Section 20, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Depositional/Erosional Shelf Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): G- Western Great Plains Lat: 38.121287 Long: -102.609223 Datum: NAD 83

Soil Map Unit Name: Rocky Ford Clay Loam, 0-1 % Slopes NWI classification: PEMC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______

Hydric Soil Present? Yes x No ______

Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? **Yes** x **No** ______

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Sampling Point completed on a small shelf within Markham Arroyo approximately 6 inches above the water level. North side of 300' wetland shelf, common in the straight sections, as well as inside curves throughout reach.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: 5 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Chenopodium album	35	Y	FACU
2. Rumex crispus	40	Y	FAC
3. Juncus arcticus	10	N	FACW
4. Schoenoplectus pungens	15	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
	______ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	10	x 2 =	20
FAC species	40	x 3 =	120
FACU species	35	x 4 =	140
UPL species		x 5 =	
Column Totals:	100 (A)		295 (B)

Prevalence Index = B/A = 2.95

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 5/2	90	10YR 5/1	2	D	M	silty clay	
			10YR 5/8	8	C	M	sand	
9-16	10YR 6/3	90	10YR 5/8	10	C	M	sand	with small gravels

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** _x_ **No** ___

Remarks:

Redox in sand layer at junction between two horizons mostly.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1)
_X_ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
_X_ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
_X_ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
_X_ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ______
Water Table Present? Yes _X_ No ___ Depth (inches): 6"
Saturation Present? Yes _X_ No ___ Depth (inches): 3"
(includes capillary fringe)

Wetland Hydrology Present? **Yes** _x_ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

consistent slope away from water; hydrology falls out around 8' width towards bank.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/10/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-9

Investigator(s): T. Demasters, Section, Township, Range: Section 20, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Bank Local relief (concave, convex, none): Flat Slope (%): 20

Subregion (LRR): G- Western Great Plains Lat: 38.121291 Long: -102.609256 Datum: NAD 83

Soil Map Unit Name: Rocky Ford Clay Loam, 0-1 % Slopes NWI classification: PEMC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No x

Hydric Soil Present? Yes ____ No x

Wetland Hydrology Present? Yes ____ No x

Is the Sampled Area within a Wetland? **Yes** ____ **No** x

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Sampling Point in Markham Arroyo.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1. Crataegus spp.	15		UPL
2.			
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Kochia scoparia	20	Y	UPL
2. Asclepias speciosa	5	Y	FAC
3. Sorghum halepense	7	Y	FACU
4. Helianthus pumilus	3	N	UPL
5.			
6.			
7.			
8.			
9.			
10.			
	35 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species	5	x 3 = 15
FACU species	7	x 4 = 28
UPL species	23	x 5 = 115
Column Totals:	35 (A)	158 (B)

Prevalence Index = B/A = 4.71

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
  All dominants are FACW and/or OBL.
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-10	10YR 5/3	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** x

Remarks:

No redox features

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/10/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-10

Investigator(s): T. Demasters, Section, Township, Range: Section 20, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): Flat Slope (%): 1

Subregion (LRR): G- Western Great Plains Lat: 38.119473 Long: -102.609539 Datum: NAD 83

Soil Map Unit Name: Rocky Ford Clay Loam, 0-1 % Slopes NWI classification: PEMC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ______	**Is the Sampled Area within a Wetland?** **Yes** x **No** ______
Hydric Soil Present?	Yes x	No ______	
Wetland Hydrology Present?	Yes x	No ______	

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Sampling Point completed on a small shelf within Markham Arroyo on southwest bank.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Chenopodium album	15	N	FACU
2. Rumex crispus	40	Y	FAC
3. Schoenoplectus pungens	2	N	OBL
4. Polypogon monspeliensis	35	Y	FACW
5. Juncus balticus	3	N	OBL
6.			
7.			
8.			
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		
% Bare Ground in Herb Stratum 5			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−):	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	35	x 2 =	70
FAC species	40	x 3 =	120
FACU species	15	x 4 =	60
UPL species		x 5 =	
Column Totals:	95	(A)	255 (B)

Prevalence Index = B/A = 2.68

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
  All dominants are FACW and/or OBL.
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 5/2	90	10YR 5/1	2	D	M	silty clay	
			10YR 5/8	8	C	M	sand	
9-16	10YR 6/3	90	10YR 5/8	10	C	M	sand	with small gravels

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** x **No** ______

Remarks:

Redox in sand layer at junction between two horizons mostly.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes X No ______ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes X No ______ Depth (inches): 0"

Wetland Hydrology Present? **Yes** x **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/10/12
Applicant/Owner: CDOT State: CO Sampling Point: SP-11
Investigator(s): T. Demasters Section, Township, Range: Section 20, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): Bank Local relief (concave, convex, none): Flat Slope (%): 10
Subregion (LRR): G- Western Great Plains Lat: 38.119519 Long: -102.609599 Datum: NAD 83
Soil Map Unit Name: Rocky Ford Clay Loam, 0-1 % Slopes NWI classification: PEMC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x

Is the Sampled Area within a Wetland? **Yes** ____ **No** x

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Sampling Point completed on bank slope above Markham Arroyo. Upland pair point with SP-10

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 5 Ft radius)			
1. Pascopyrum smithii	40	Y	FACU
2. Oenothera spp.	15	Y	FACU
3. Kochia scoparia	15	Y	UPL
4. Helianthus pumilus	10	N	UPL
5. Asclepias speciosa	7	N	FAC
6.			
7.			
8.			
9.			
10.			
= Total Cover	87		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 13

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species	7	x 3 = 21
FACU species	55	x 4 = 220
UPL species	25	x 5 = 125
Column Totals:	87 (A)	366 (B)

Prevalence Index = B/A = 4.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

13% bare, dirt banks

SOIL

Sampling Point: SP-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 5/4	60					silty loam	
	10YR 4/3	40						

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No x

Remarks:

Mixed horizons, difficult to determine breaks. Not hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ______

Wetland Hydrology Present? Yes ______ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12
Applicant/Owner: CDOT State: CO Sampling Point: SP-12
Investigator(s): T. Demasters, Section, Township, Range: Section 28, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): bank Local relief (concave, convex, none): concave Slope (%): 3
Subregion (LRR): G- Western Great Plains Lat: 38.111199 Long: -102.594057 Datum: NAD 83
Soil Map Unit Name: Las clay loam, clay substratum NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______
Hydric Soil Present? Yes x No ______
Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? **Yes** x **No** ______

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Hyde Canal, north of Arkansas River - eastern portion. Narrow bank along canal. Water present in canal. Fringe about 2' before becoming too steep. Not continuous, mostly on north bank.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 5 Ft radius)			
1. Sporobolus airoides	85	Y	FAC
2. Schoenoplectus pungens	10	N	OBL
3. Chenopodium album	5	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	10	x 1 = 10
FACW species		x 2 =
FAC species	90	x 3 = 270
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	280 (B)

Prevalence Index = B/A = 2.80

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
  All dominants are FACW and/or OBL.
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-12	10YR 4/1	70	10YR 5/6	20	C	M	silty loam	staining
			gley2 3/10BG	10	C	M		dark gley component

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5) (**LRR F**)
☐ 1 cm Muck (A9) (**LRR F, G, H**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

☐ 1 cm Muck (A9) (**LRR I, J**)
☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
☐ Dark Surface (S7) (**LRR G**)
☐ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
☐ Reduced Vertic (F18)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes x No

Remarks:

couldn't dig further than 12", water in pit prevented getting complete soil sample profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Water-Stained Leaves (B9)
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Dry-Season Water Table (C2)
☐ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
☐ Presence of Reduced Iron (C4)
☐ Thin Muck Surface (C7)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Drainage Patterns (B10)
☐ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☒ Geomorphic Position (D2)
☒ FAC-Neutral Test (D5)
☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches):

Water Table Present? Yes X No ___ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes x No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-13

Investigator(s): T. Demasters, Section, Township, Range: Section 28, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): Flat Slope (%): 1

Subregion (LRR): G- Western Great Plains Lat: 38.111214 Long: -102.5941 Datum: NAD 83

Soil Map Unit Name: Las clay loam, clay substratum NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No x	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** x
Hydric Soil Present?	Yes ______	No x	
Wetland Hydrology Present?	Yes ______	No x	

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Hyde Canal, north of Arkansas River. On top of bank, upland sampling point for SP-12.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Grindelia acutifolia	25	Y	UPL
2. Distichlis spicata	15	N	FACW
3. Pascopyrum smithii	30	Y	UPL
4. Kochia scoparia	20	Y	FACU
5. Helianthus annuus	5	N	FACU
6. Descurainia pinnata	5	N	UPL
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	15	x 2 =	30
FAC species		x 3 =	
FACU species	25	x 4 =	100
UPL species	60	x 5 =	300
Column Totals:	100 (A)		430 (B)

Prevalence Index = B/A = 4.30

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
  All dominants are FACW and/or OBL.
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No x

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-16	10YR 6/4	70					silty loam	mixed horizons
	10YR 4/2	30						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** x

Remarks:

Some layering, but mostly well mixed, ditch maintenance work most likely.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12
Applicant/Owner: CDOT State: CO Sampling Point: SP-14
Investigator(s): T. Demasters, Section, Township, Range: Section 29, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): G- Western Great Plains Lat: 38.110785 Long: -102.596772 Datum: NAD 83
Soil Map Unit Name: Las clay loam, clay substratum NWI classification: R4SBKC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______
Hydric Soil Present? Yes x No ______
Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? Yes x **No** ______

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Hyde Canal, north of Arkansas River - western portion.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 5 Ft radius)			
1. Sporobolus airoides	40	Y	FAC
2. Polypogon monspeliensis	45	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover	85		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	45	x 1 = 45
FACW species		x 2 =
FAC species	40	x 3 = 120
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	85 (A)	165 (B)

Prevalence Index = B/A = 1.9

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x **No** ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-12	10YR 4/1	75	10YR 5/6	15	C	M	silty loam	staining
			gley2 3/10BG	10	C	M		dark gley component

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** _x_ **No** ___

Remarks:

Very similar to SP12

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
_X_ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
_X_ Geomorphic Position (D2)
_X_ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ______
Water Table Present? Yes _X_ No ___ Depth (inches): 7"
Saturation Present? (includes capillary fringe) Yes _X_ No ___ Depth (inches): 0"

Wetland Hydrology Present? **Yes** _x_ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-15

Investigator(s): T. Demasters, Section, Township, Range: Section 29, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Bank Local relief (concave, convex, none): Flat Slope (%): 1

Subregion (LRR): G- Western Great Plains Lat: 38.110762 Long: -102.596786 Datum: NAD 83

Soil Map Unit Name: Las clay loam, clay substratum NWI classification: R4SBKC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No x

Hydric Soil Present? Yes ______ No x

Wetland Hydrology Present? Yes ______ No x

Is the Sampled Area within a Wetland? Yes ______ No x

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Hyde Canal, north of Arkansas River. On top of bank, upland sampling point for SP-14.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Bromis inermis	40	Y	FACU
2. Distichlis spicata	35	Y	FACW
3. Xanthium spinosum	5	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	35	x 2 =	70
FAC species		x 3 =	
FACU species	45	x 4 =	180
UPL species		x 5 =	
Column Totals:	80 (A)		250 (B)

Prevalence Index = B/A = 3.125

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No x

Remarks: D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-14	10YR 6/4	60					silty loam	
	10YR 6/3	40						

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** x

Remarks:

No hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrologic indicators

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-16

Investigator(s): T. Demasters, Section, Township, Range: Section 20, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): G- Western Great Plains Lat: 38.11534 Long: -102.596179 Datum: NAD 83

Soil Map Unit Name: Las loam NWI classification: ___

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No x (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ___

Hydric Soil Present? Yes x No ___

Wetland Hydrology Present? Yes x No ___

Is the Sampled Area within a Wetland? **Yes** x **No** ___

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)

Vista Del Rio Ditch - relic ditch. Quite wide = 18'. Swale feature now. Dry year, would be easier to find hydrology in normal year.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Schoenoplectus pungens	40	Y	OBL
2. Distichlis spicata	20	Y	FACW
3. Sporobolus airoides	20	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: 40)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum 20			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:
OBL species	40	x 1 = 40
FACW species	20	x 2 = 40
FAC species	20	x 3 = 60
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	80 (A)	140 (B)

Prevalence Index = B/A = 1.75

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

All dominants are FACW and/or OBL.

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ___

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

Bare ground due to ponding and cow prints.

SOIL

Sampling Point: SP-16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-7	10YR 4/1	90	7.5YR 4/6	10	C	M/PL	clay	
7-16	10YR 4/1	30	7.5YR 4/6	70	C	M	clay	staining, very prevalent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
X Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
X Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
X Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
X Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

hydrology indicators presumed weaker than in an average precipitation year.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12
Applicant/Owner: CDOT State: CO Sampling Point: SP-17
Investigator(s): T. Demasters, Section, Township, Range: Section 20, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2
Subregion (LRR): G- Western Great Plains Lat: 38.115443 Long: -102.596212 Datum: NAD 83
Soil Map Unit Name: Las loam NWI classification: ______
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes x No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______
Hydric Soil Present? Yes x No ______
Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? **Yes** x **No** ______

Remarks:
*Extreme drought conditions (droughtmonitor.unl.edu); Vista Del Rio Ditch - up gradient from ditch. Transitional area, appears to receive groundwater from up gradient of sampling point. SP-17a taken as a verification/duplicate soil pit on a transect long:-102.596661), identical to SP-17 in vegetation, hydric soils, and hydrology. SP-18 is the paired upland for SP17.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: 5 Ft radius)			
1. Distichlis spicata	95	Y	FACW
2. Thinopyrum intermedium	5	N	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover	100		
Woody Vine Stratum (Plot size: 40)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	95	x 2 = 190
FAC species		x 3 =
FACU species		x 4 =
UPL species	5	x 5 = 25
Column Totals:	100 (A)	215 (B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
x 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ______

Remarks:
D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	95	7.5YR 4/4	5	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X **No** ___

Remarks:

Hydric soils present throughout this feature both upgradient to boundary, and to western boundary. SP17a is a duplicate pit, dug as a transect to verify soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
X Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
X Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
X Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

In an average precipitation year expected to have saturation present also.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12
Applicant/Owner: CDOT State: CO Sampling Point: SP-18
Investigator(s): T. Demasters, Section, Township, Range: Section 20, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): slightly convex Slope (%): 5
Subregion (LRR): G- Western Great Plains Lat: 38.115892 Long: -102.596723 Datum: NAD 83
Soil Map Unit Name: Nepesta clay loam, 1 to 3 percent slopes NWI classification: PFLW
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x

Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
*Extreme drought conditions (droughtmonitor.unl.edu);
Vista Del Rio Ditch - up gradient from ditch. SP-18 paired upland for SP17.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Thinopyrum intermedium	60	Y	UPL
2. Distichlis spicata	25	Y	FACW
3. Agrostis stolonifera	10	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 40)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	25	x 2 =	50
FAC species	10	x 3 =	30
FACU species		x 4 =	
UPL species	60	x 5 =	300
Column Totals:	95	(A)	380 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
  All dominants are FACW and/or OBL.
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/3	100					silty loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ______ **No** x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? Yes ______ No x Depth (inches): ______
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology present.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-19

Investigator(s): T. Demasters, Section, Township, Range: Section 19, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): G- Western Great Plains Lat: 38.12255 Long: -102.617009 Datum: NAD 83

Soil Map Unit Name: Rocky Ford Clay Loam, 0-1 % Slopes NWI classification: R40WKF

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______

Hydric Soil Present? Yes x No ______

Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? **Yes** x **No** ______

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Amity Canal north portion.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Echinochloa crus-galli	40	Y	FAC
2. Rumex venosus	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: 40)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	60	x 3 =	180
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	60 (A)		180 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

All dominants are FACW and/or OBL.

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** x **No** ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

Sandy bare soil, vegetation patchy.

SOIL

Sampling Point: SP-19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-7	10YR 6/2	40	10YR 6/1	10	D	M	sand	
	10YR 4/1	45	10YR 4/6	5	C	M	sandy loam	
7-16	10YR 6/2	70	7.5YR 5/8	30			sandy loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
X Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
X Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? **Yes** X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12
Applicant/Owner: CDOT State: CO Sampling Point: SP-20
Investigator(s): T. Demasters, Section, Township, Range: Section 19, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): flat Slope (%): 0
Subregion (LRR): G- Western Great Plains Lat: 38.121974 Long: -102.617463 Datum: NAD 83
Soil Map Unit Name: Rocky Ford Clay Loam, 0-1 % Slopes NWI classification: R40WKF
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No x (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No x
Hydric Soil Present? Yes ___ No x
Wetland Hydrology Present? Yes ___ No x

Is the Sampled Area within a Wetland? **Yes** ___ **No** x

Remarks:
*Extreme drought conditions (droughtmonitor.unl.edu)
Amity Canal central portion. Upland paired with SP19 and SP21. On bank.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Kochia scoparia	15	Y	UPL
2. Helianthus pumilus	5	Y	UPL
3. Distichlis spicata	20	Y	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40 = Total Cover		
Woody Vine Stratum (Plot size: 60)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 60

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	20	x 2 = 40
FAC species		x 3 =
FACU species		x 4 =
UPL species	20	x 5 = 100
Column Totals:	40 (A)	140 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** x

Remarks:
D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 5/4	100					silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ____________
Depth (inches): ____________

Hydric Soil Present? **Yes** ______ **No** x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ____________
Water Table Present? Yes ______ No x Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ____________

Wetland Hydrology Present? **Yes** ______ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/11/12
Applicant/Owner: CDOT State: CO Sampling Point: SP-21
Investigator(s): T. Demasters, Section, Township, Range: Section 19, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): concave Slope (%): 2
Subregion (LRR): G- Western Great Plains Lat: 38.121113 Long: -102.619227 Datum: NAD 83
Soil Map Unit Name: Rocky Ford clay loam, 1 to 3 percent slopes NWI classification: R40WKF
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ______	Is the Sampled Area within a Wetland? Yes x No ______
Hydric Soil Present?	Yes x	No ______	
Wetland Hydrology Present?	Yes x	No ______	

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Amity Canal - southwestern portion.
Palustrine scrub-shrub wetland (PSS)

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1. Salix exigua	40	Y	FACW
2.			
3.			
4.			
5.			
	40 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Echinochloa crus-galli	25	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	25 = Total Cover		
Woody Vine Stratum (Plot size: 40)			
1.			
2.			
	85 = Total Cover		
% Bare Ground in Herb Stratum 15			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	40	x 2 = 80
FAC species	25	x 3 = 75
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	65 (A)	155 (B)

Prevalence Index = B/A = 2.38

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 6/2	40	10YR 6/1	10	D	M	sand	
	10YR 4/1	45	10YR 4/6	5	C	M	sandy loam	
7-16	10YR 6/2	70	7.5YR 5/8	30			sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

X Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes X **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/12/12

Applicant/Owner: CDOT State: CO Sampling Point: SP-22

Investigator(s): T. Demasters, Section, Township, Range: Section 19, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): swale/relic ditch Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G- Western Great Plains Lat: 38.114455 Long: -102.619103 Datum: NAD 83

Soil Map Unit Name: Las loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ______

Hydric Soil Present? Yes x No ______

Wetland Hydrology Present? Yes x No ______

Is the Sampled Area within a Wetland? Yes x **No** ______

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Vista Del Rio Ditch north of Town of Lamar. Relic ditch turned wetland swale.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Schoenoplectus pungens	70	Y	OBL
2. Typha angustifolia	30	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 60)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	100	x 1 = 100
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP-22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	80	7.5 YR 5/6	20	C	M,PL	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X No ______

Remarks:

fairly uniform soil, 0-16"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
X Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
X Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes X No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/12/12

Applicant/Owner: CDOT State: CO Sampling Point: SP- 23

Investigator(s): T. Demasters, Section, Township, Range: Section 19, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): Shelf Local relief (concave, convex, none): Flat Slope (%): 1

Subregion (LRR): G- Western Great Plains Lat: 38.114395 Long: -102.619089 Datum: NAD 83

Soil Map Unit Name: Las loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No x

Hydric Soil Present? Yes ______ No x

Wetland Hydrology Present? Yes ______ No x

Is the Sampled Area within a Wetland? **Yes** ______ **No** x

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Vista Del Rio Ditch north of Town of Lamar. Upland paired with SP-22.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Sporobolus cryptandrus	90	Y	FACU
2. Kochia scoparia	5	N	FACU
3. Descurainia pinnata	3	N	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	98 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species	95	x 4 = 380
UPL species	3	x 5 = 15
Column Totals:	98 (A)	395 (B)

Prevalence Index = B/A = 4.03

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

All dominants are FACW and/or OBL.

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No x

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP- 23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features					
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 5/3	60					silty loam	
	10YR 4/3	40						mixed matrices

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** x

Remarks:

No hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ______
Water Table Present? Yes ______ No x Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No x Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrologic indicators

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/12/12

Applicant/Owner: CDOT State: CO Sampling Point: SP- 24

Investigator(s): T. Demasters, Section, Township, Range: Section 25, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR): G- Western Great Plains Lat: 38.113331 Long: -102.632717 Datum: NAD 83

Soil Map Unit Name: Las clay loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ______	**Is the Sampled Area within a Wetland?** **Yes** x **No** ______
Hydric Soil Present?	Yes x	No ______	
Wetland Hydrology Present?	Yes x	No ______	

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Vista Del Rio Ditch northwest of Town of Lamar.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Muhlenbergia asperifolia	80	Y	FACW
2. Echinochloa crus-galli	10	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		
% Bare Ground in Herb Stratum 10			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	80	x 2 = 160
FAC species	10	x 3 = 30
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	90 (A)	190 (B)

Prevalence Index = B/A = 2.11

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
x 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP- 24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 4/2	95	7.5 YR 5/5	5	C	M	Silty Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** x **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
X Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes X No ______ Depth (inches): 6
Saturation Present? Yes X No ______ Depth (inches): 2
(includes capillary fringe)

Wetland Hydrology Present? **Yes** x **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/12/12
Applicant/Owner: CDOT State: CO Sampling Point: SP- 25
Investigator(s): T. Demasters, Section, Township, Range: Section 25, Township 22 South, Range 46 West
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Flat Slope (%): 1
Subregion (LRR): G- Western Great Plains Lat: 38.113282 Long: -102.632705 Datum: NAD 83
Soil Map Unit Name: Las clay loam NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No x	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** x
Hydric Soil Present?	Yes ____	No x	
Wetland Hydrology Present?	Yes ____	No x	

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Vista Del Rio Ditch northwest of Town of Lamar. Upland paired with SP-24.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Distichlis spicata	40	Y	FACW
2. kochia scoparia	40	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	40	x 2 = 80
FAC species		x 3 =
FACU species	40	x 4 = 160
UPL species		x 5 =
Column Totals:	80 (A)	240 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
__ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

hydric soil and wetland vegetation are not present.

SOIL

Sampling Point: SP- 25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-12	10 YR 5/3	100						

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No x Depth (inches): ____________

Water Table Present? Yes ______ No x Depth (inches): ____________

Saturation Present? Yes ______ No x Depth (inches): ____________
(includes capillary fringe)

Wetland Hydrology Present? Yes ______ No x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/12/12

Applicant/Owner: CDOT State: CO Sampling Point: SP- 26

Investigator(s): T. Demasters, Section, Township, Range: Section 30, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): flat Slope (%): 2

Subregion (LRR): G- Western Great Plains Lat: 38.107776 Long: -102.619639 Datum: NAD 83

Soil Map Unit Name: Lincoln sand NWI classification: PFOW

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No x
Hydric Soil Present?	Yes ____	No x
Wetland Hydrology Present?	Yes ____	No x

Is the Sampled Area within a Wetland? **Yes** ____ **No** x

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Pond to east of Speculator Ave. and west of US 50. Upland pair for SP-27

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: 5 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Kochia scoparia	25	Y	FACU
2. Descurainia pinnata	15	N	UPL
3. Bromus tectorum	20	Y	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	60 = Total Cover		

Woody Vine Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−):	0	(A)
Total Number of Dominant Species Across All Strata:	0	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species	25	x 4 =	100
UPL species	35	x 5 =	175
Column Totals:	60 (A)		275 (B)

Prevalence Index = B/A = 4.58

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
  All dominants are FACW and/or OBL.
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP- 26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 5/4	100					Silt Loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** x

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/12/12

Applicant/Owner: CDOT State: CO Sampling Point: SP- 27

Investigator(s): T. Demasters, Section, Township, Range: Section 30, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): G- Western Great Plains Lat: 38.107916 Long: -102.619527 Datum: NAD 83

Soil Map Unit Name: Lincoln sand NWI classification: PFOW

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes x No ____
Wetland Hydrology Present? Yes x No ____

Is the Sampled Area within a Wetland? **Yes** x **No** ____

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
Pond north of Town of Lamar. Pond to east of Speculator Ave. and west of US 50. PEM wetland fringe on pond.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Schoenoplectus acutus	60	Y	OBL
2. Typha angustifolia	40	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
x 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP- 27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10 YR 5/1	90	7.5 YR 5/6	8			silt loam	
			10 YR 2/1	2				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)

___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** x **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
X Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
X Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
X Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes X No ______ Depth (inches): 4
Saturation Present? Yes X No ______ Depth (inches): 1
(includes capillary fringe)

Wetland Hydrology Present? **Yes** x **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Pond has water, but not up to bank full.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: US 287 Lamar Bypass City/County: Prowers County Sampling Date: 12/12/12

Applicant/Owner: CDOT State: CO Sampling Point: SP- 28

Investigator(s): T. Demasters, Section, Township, Range: Section 33, Township 22 South, Range 46 West

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 8

Subregion (LRR): G- Western Great Plains Lat: 38.090627 Long: -102.589413 Datum: NAD 83

Soil Map Unit Name: Las clay loam; Las clay loam, saline;Rocky Ford, clay substratum, 0 to 1 percent slopes NWI classification: R4SBKC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ______ No x (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes x No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x No ______	Is the Sampled Area within a Wetland?	Yes x No ______
Hydric Soil Present?	Yes x No ______		
Wetland Hydrology Present?	Yes x No ______		

Remarks:

*Extreme drought conditions (droughtmonitor.unl.edu)
PSS fringe on Willow Creek.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1. Salix exigua	45	Y	FACW
2.			
3.			
4.			
5.			
	45 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Muhlenbergia asperifolia	15	Y	FACW
2. Rumex Crispus	10	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	25 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		
% Bare Ground in Herb Stratum 30			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	70	x 2 = 140
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	70 (A)	140 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation
All dominants are FACW and/or OBL.
x 2 - Dominance Test is >50%
x 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes x No ______

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

PSS wetland.

SOIL

Sampling Point: SP- 28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	80	10YR 5/8	20	C	M	sandy loam	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
x Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16)
(**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16)
(**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** x **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
X Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3)
(**where tilled**)
___ Crayfish Burrows (C8)
X Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 6

Wetland Hydrology Present? **Yes** x **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C
FACWet Data Forms

ADMINISTRATIVE CHARACTERIZATION

General Information

Site Name or ID:	Wetland 1 (Vista Del Rio Ditch)	Date of Evaluation:	12/14/2012
		Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.113331°, -102.632717°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other* (Describe)

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used) ac. ☒ Measured 0.016 ☐ Estimated

Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)						
ac.	☐ Measured	0.016	ac.	ac.	ac.
	☐ Estimated	ac.	ac.	ac.	ac.

Characteristics or Method used for AA boundary determination: This AA is WL-1 and WL-5, wich are a series of fringe wetlands along Vista Del Rio Ditch.

Notes: AA is a man-made ditch.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	Over-bank 0 [✓ 1] 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe wetlands along Willow Creek.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	
	Previous HGM Class	Riverine Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): This is a man-made canal, therefore the wetlands have been created from a historically upland setting.

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	UB	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes: AA is a man-made ditch. Little historical wetlands in the area.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✓	**Stressors**	**Comments/description**
		Major Highway	
	x	Secondary Highway	US 50, 287, 196
	x	Tertiary Roadway	Several county roads
	x	Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.63

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes	x	Industrial/commercial	Some commercial lots nearby.
		Urban	
		Residential	
	x	Rural	Some residential lots nearby.
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.65

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	Several bridges over canal
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	Flow to canal controlled.

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.7

Variable 5: Water Distribution

*This variable is concerned with hydrologic connectivity **within** the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally **result** from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
x	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
x	Hardened/Engineered Channel	Engineered channel
	Enlarged Channel	
x	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	Many in study area

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.7

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓	Stressors		Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc.	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
X		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.65

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	X	CAFOs in area	0.70
	Agricultural Runoff	X		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff	X		
	Livestock	X	CAFOs in area	
	Agricultural Runoff	X		
	Storm Water Runoff	X	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	X		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	X		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.75	+	0.70	+	0.70	+	0.73	=	3.58

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not require In cases where a stratum has been thinned or removed, enter the expected coverage of that laye**not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).
5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".
8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquati**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenizatio			X		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	#####	+		=	100	
	x		x		x		x			
Veg. Layer Sub-variable Score	0.6		0.6		0.78				÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=			
Weighted Sub-variable Score	0.00	+	0.00	+	78.00	+		=	78	

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, howe if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.63
	Variable 3:	**Buffer Capacity**	0.65
Hydrology	**Variable 4:**	**Water Source**	0.70
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.70
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.65
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)						**Total Functional Points**				**Functional Capacity Index**
0.63	+	0.63	+	0.65	+	1.56	+	▨	+	▨	=	3.47	÷	5	=	0.69

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$								
2.10	+	1.40	+	1.40	+	0.75	+	0.65	+	▨	=	6.30	÷	9	=	0.70

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$						
0.65	+	1.40	+	1.40	+	1.40	+	0.65	+	0.78	=	6.28	÷	9	=	0.70

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$)		$V7_{geom}$										
0.70	+	1.40	+	1.40	+	0.65	+	▨	+	▨	=	4.15	÷	6	=	0.69

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$												
1.40	+	0.75	+	0.65	+	▨	+	▨	+	▨	=	2.80	÷	4	=	0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)												
0.65	+	1.30	+	1.56	+	▨	+	▨	+	▨	=	3.51	÷	5	=	0.70

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)								
0.63	+	1.40	+	0.75	+	0.65	+	1.56	+	▨	=	4.99	÷	7	=	0.71

Sum of Individual FCI Scores	**4.90**
Divide by the Number of Functions Scored	**÷ 7**
Composite FCI Score	**0.70**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/17/2012
Site Name or ID:	Wetland 2	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.112661°, -102.631584°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other* (Describe)

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured 0.027					
		☐ Estimated					
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. 0.027	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is a series of fringe shrub-scrub wetlands along the banks of an unnamed ditch flowing south from Vista Del Rio Ditch.					

Notes:	Wetland is grazed and mowed. Heavy agricilural influence.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow]	Groundwater	Precipitation	Unknown		
	Hydrodynamics	[✓ Unidirectional]	Vertical	Bi-directional			
	Wetland Gradient	[✓ 0 - 2%]	2-4%	4-10%	>10%		
	# Surface Inlets	Over-bank	0	[✓ 1]	2	3	>3
	# Surface Outlets		0	[✓ 1]	2	3	>3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe shrub-scrub wetlands along the banks of an unnamed ditch.					
	HGM class	[✓ Riverine]	Slope	Depressional	Lacustrine		

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow]	Groundwater	Precipitation	Unknown
	Hydrodynamics	[✓ Unidirectional]	Vertical		
	Geomorphic Setting (Narrative Description)	Historically upland			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): This is a man-made canal, therefore the wetlands have been created from a historically upland setting.

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	SS	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes:

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✓	**Stressors**	**Comments/description**
		Major Highway	
	x	Secondary Highway	US 50/287
	x	Tertiary Roadway	Several roads
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.65

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	Residential and commercial nearby
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.65

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
×	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	Several bridges over canal
×	Point Source (urban, ind., ag.)	CAFO
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	Flow to canal controlled.

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.7

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.7

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓	**Stressors**		**Comments**
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc.	
×		Grading	
		Compaction	
		Plowing/Disking	
×		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
×		Channelization	
		Reconfigured Stream Channels	
×		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
×		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.67

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	X	CAFO	0.60
	Agricultural Runoff	X		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.60
	Nearby Industrial Sites			
	Road Drainage/Runoff	X		
	Livestock	X	CAFO	
	Agricultural Runoff	X		
	Storm Water Runoff	X	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	X		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	X		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.60	+	0.75	+	0.60	+	0.70	+	0.73	=	3.38

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.67

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not requirec In cases where a stratum has been thinned or removed, enter the expected coverage of that laye**not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).
5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1
	x		x		x		x		
Veg. Layer Sub-variable Score	0.6		0.78		0.67			÷	
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.00	+	0.67	+		=	0.67

See sub-variable scoring guidelines on following page

Variable 9 Score 0.67

Sub-variable 9 Scoring Guidelines

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, howe if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.65
	Variable 3:	**Buffer Capacity**	0.65
Hydrology	**Variable 4:**	**Water Source**	0.70
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.70
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.67
	Variable 8:	**Chemical Environment**	0.67
	Variable 9:	**Vegetation Structure and Complexity**	0.67

Functional Capacity Indices

						Total Functional Points		**Functional Capacity Index**
Function 1 -- Support of Characteristic Wildlife Habitat								
$V1_{wetloss}$ +	$V2_{barriers}$ +	$V3_{buffer}$ +	(2 x $V9_{veg}$)					
0.63 +	0.65 +	0.65 +	1.34 +	+	=	3.27	÷ 5 =	0.65
Function 2 -- Support of Characteristic Fish/aquatic Habitat								
(3 x $V4_{source}$) +	(2 x $V5_{dist}$) +	2 x $V6_{outflow}$ +	$V8_{chem}$ +	$V7_{geom}$				
2.10 +	1.40 +	1.40 +	0.67 +	0.67 +	=	6.24	÷ 9 =	0.69
Function 3 -- Flood Attenuation								
$V3_{buffer}$ +	2 x $V4_{source}$ +	(2 x $V5_{dist}$) +	2 x $V6_{outflow}$ +	$V7_{geom}$ +	$V9_{veg}$			
0.65 +	1.40 +	1.40 +	1.40 +	0.67 +	0.67 =	6.19	÷ 9 =	0.69
Function 4 -- Short- and Long-term Water Storage								
$V4_{source}$ +	(2 x $V5_{dist}$) +	2 x $V6_{outflow}$)	$V7_{geom}$					
0.70 +	1.40 +	1.40 +	0.67 +	+	=	4.17	÷ 6 =	0.70
Function 5 -- Nutrient/Toxicant Removal								
(2 x $V5_{dist}$) +	$V8_{chem}$ +	$V7_{geom}$						
1.40 +	0.67 +	0.67 +	+	+	=	2.74	÷ 4 =	0.69
Function 6 -- Sediment Retention/Shoreline Stabilization								
$V3_{buffer}$ +	(2 x $V7_{geo}$) +	(2 x $V9_{veg}$)						
0.65 +	1.34 +	1.34 +	+	+	=	3.33	÷ 5 =	0.67
Function 7 -- Production Export/Food Chain Support								
$V1_{wetloss}$ +	2 x $V6_{outflow}$ +	$V8_{chem}$ +	$V7_{geo}$ +	(2 x $V9_{veg}$)				
0.63 +	1.40 +	0.67 +	0.67 +	1.34 +	=	4.71	÷ 7 =	0.67

Sum of Individual FCI Scores **4.75**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.68**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/14/2012
Site Name or ID:	Wetland 3 (Amity Canal)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.121974°, -102.617463°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other* *(Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured 0.008					
		☐ Estimated					
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. 0.008	ac.	ac.	ac.	
		☐ Estimated	ac.	ac.	ac.	ac.	
Characteristics or Method used for AA boundary determination:	This AA is a small set of fringe wetlands along the banks of Amity Canal.						

Notes:	These wetlands are sporadic and inconsistent.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow]	Groundwater	Precipitation	Unknown		
	Hydrodynamics	[✓ Unidirectional]	Vertical	Bi-directional			
	Wetland Gradient	[✓ 0 - 2%]	2-4%	4-10%	>10%		
	# Surface Inlets	Over-bank	0	[✓ 1]	2	3	>3
	# Surface Outlets	0	[✓ 1]	2	3	>3	
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe wetlands along Willow Creek.					
	HGM class	[✓ Riverine]	Slope	Depressional	Lacustrine		

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow]	Groundwater	Precipitation	Unknown
	Hydrodynamics	[✓ Unidirectional]	Vertical		
	Geomorphic Setting (Narrative Description)				
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): This is a man-made canal, therefore the wetlands have been created from a historically upland setting.

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	SS	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes: Historical upland setting.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✔	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
	x	Secondary Highway	US 196
	x	Tertiary Roadway	Several county roads
	x	Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.65

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	Several residential lots nearby
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.65

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
x	Culverts or Constrictions	Several bridges over canal
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
x	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
x	Actively Managed Hydrology	Flow to canal controlled.

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.73

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Enlarged Channel	
×	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.63

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	Many in study area

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.63

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✔		Stressors	Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc.	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
X		Excessive Bank Erosion	
X		Channelization	
		Reconfigured Stream Channels	
X		Artificial Banks/Shoreline	Road grade
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	X	CAFOs in area	0.70
	Agricultural Runoff	X		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff	X		
	Livestock	X	CAFOs in area	
	Agricultural Runoff	X		
	Storm Water Runoff	X	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	X		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	X		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.75	+	0.70	+	0.70	+	0.73	=	3.58

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).
5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization		x	x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.40	+	1.00	+		=	1.4
	x		x		x		x		
Veg. Layer Sub-variable Score	0.6		0.6		0.78				÷
	II		II		II		II		
Weighted Sub-variable Score	0.00	+	0.24	+	0.78	+		=	1.02

See sub-variable scoring guidelines on following page

Variable 9 Score 0.73

Sub-variable 9 Scoring Guidelines

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, howe if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.65
	Variable 3:	**Buffer Capacity**	0.65
Hydrology	**Variable 4:**	**Water Source**	0.73
	Variable 5:	**Water Distribution**	0.63
	Variable 6:	**Water Outflow**	0.63
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.73

Functional Capacity Indices

Total Functional Points **Functional Capacity Index**

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$ + $V2_{barriers}$ + $V3_{buffer}$ + (2 x $V9_{veg}$)

0.63 + 0.65 + 0.65 + 1.46 + ▨ + ▨ = 3.39 ÷ 5 = 0.68

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$) + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geom}$

2.19 + 1.26 + 1.26 + 0.75 + 0.60 + ▨ = 6.06 ÷ 9 = 0.67

Function 3 -- Flood Attenuation

$V3_{buffer}$ + 2 x $V4_{source}$ + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$ + $V7_{geom}$ + $V9_{veg}$

0.65 + 1.46 + 1.26 + 1.26 + 0.60 + 0.73 = 5.96 ÷ 9 = 0.66

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$ + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$) $V7_{geom}$

0.73 + 1.26 + 1.26 + 0.60 + ▨ + ▨ = 3.85 ÷ 6 = 0.64

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$) + $V8_{chem}$ + $V7_{geom}$

1.26 + 0.75 + 0.60 + ▨ + ▨ + ▨ = 2.61 ÷ 4 = 0.65

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$ + (2 x $V7_{geo}$) + (2 x $V9_{veg}$)

0.65 + 1.20 + 1.46 + ▨ + ▨ + ▨ = 3.31 ÷ 5 = 0.66

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$ + 2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geo}$ + (2 x $V9_{veg}$)

0.63 + 1.26 + 0.75 + 0.60 + 1.46 + ▨ = 4.70 ÷ 7 = 0.67

Sum of Individual FCI Scores **4.64**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.66**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/14/2012
Site Name or ID:	Wetland 4 (Amity Canal)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.121974°, -102.617463°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- ☒ *Project Wetland*
- ☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
- ☒ *Potentially Impacted Wetlands*
- ☒ *Mitigation; Pre-construction*
- ☐ *Mitigation; Post-construction*
- ☐ *Monitoring*
- ☐ *Other* (Describe)

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured 0.0627 ☐ Estimated					
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. 0.0627	ac.	ac.	ac.	
		☐ Estimated	ac.	ac.	ac.	ac.	
Characteristics or Method used for AA boundary determination:	This AA is a series of fringe wetlands along the banks of Amity Canal.						

Notes:	Wetlands are sporadic and small.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	Over-bank 0 [✓ 1] 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe wetlands along Willow Creek.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	
	Previous HGM Class	Riverine Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): This is a man-made canal, therefore the wetlands have been created from a historically upland setting.

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	UB	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes: Low amount of historic wetlands.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
	x	Secondary Highway	US 50, 287
	x	Tertiary Roadway	Several county roads
	x	Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.65

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	Several residential lots nearby
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.65

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	Several bridges over canal
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	Flow to canal controlled.

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.67

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Enlarged Channel	
×	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.67

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	Many in study area

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.67

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✔	Stressors		Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc.	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
x		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	X	CAFOs in area	0.70
	Agricultural Runoff	X		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff	X		
	Livestock	X	CAFOs in area	
	Agricultural Runoff	X		
	Storm Water Runoff	X	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	X		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	X		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.75	+	0.70	+	0.70	+	0.73	=	3.58

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not requirec In cases where a stratum has been thinned or removed, enter the expected coverage of that laye**not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).
5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1
	x		x		x		x		↑ ÷
Veg. Layer Sub-variable Score	0.6		0.6		0.78				**See sub-variable scoring guidelines on following page**
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g, 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, howe if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.65
	Variable 3:	**Buffer Capacity**	0.65
Hydrology	**Variable 4:**	**Water Source**	0.67
	Variable 5:	**Water Distribution**	0.67
	Variable 6:	**Water Outflow**	0.67
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)						**Total Functional Points**				**Functional Capacity Index**
0.63	+	0.65	+	0.65	+	1.56	+		+		**=**	3.49	÷	**5**	=	0.70

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$								
2.01	+	1.34	+	1.34	+	0.75	+	0.60	+		**=**	6.04	÷	**9**	=	0.67

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$						
0.65	+	1.34	+	1.34	+	1.34	+	0.60	+	0.78	**=**	6.05	÷	**9**	=	0.67

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$)		$V7_{geom}$										
0.67	+	1.34	+	1.34	+	0.60	+		+		**=**	3.95	÷	**6**	=	0.66

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$												
1.34	+	0.75	+	0.60	+		+		+		**=**	2.69	÷	**4**	=	0.67

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)												
0.65	+	1.20	+	1.56	+		+		+		**=**	3.41	÷	**5**	=	0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)								
0.63	+	1.34	+	0.75	+	0.60	+	1.56	+		**=**	4.88	÷	**7**	=	0.70

Sum of Individual FCI Scores	**4.75**
Divide by the Number of Functions Scored	**÷ 7**
Composite FCI Score	**0.68**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/14/2012
Site Name or ID:	Wetland 5 (Vista Del Rio Ditch)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.113331°, -102.632717°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- ☒ *Project Wetland*
- ☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
- ☒ *Potentially Impacted Wetlands*
- ☒ *Mitigation; Pre-construction*
- ☐ *Mitigation; Post-construction*
- ☐ *Monitoring*
- ☐ *Other* (Describe)

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒	Measured 0.016				
		☐	Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☐	Measured	0.016	ac.	ac.	ac.
		☐	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is WL-5, which is a PEM wetlands spanning the width of the Vista Del Ri Ditch.						
Notes:							

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	Over-bank 0 [✓ 1] 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe wetlands along Willow Creek.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	
	Previous HGM Class	Riverine Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): This is a man-made canal, therefore the wetlands have been created from a historically upland setting.

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	UB	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes: There are very little neighboring wetlands within the HCE.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers

✓	Stressors	Comments/description
	Major Highway	
x	Secondary Highway	US 50, 287, 196
x	Tertiary Roadway	Several county roads
x	Railroad	
	Bike Path	
	Urban Development	
x	Agricultural Development	Cropland and pastureland
	Artificial Water Body	
x	Fence	
x	Ditch or Aqueduct	
	Aquatic Organism Barriers	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.63

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

Stressors = Land Use Changes	✓	**Stressors**	**Comments/description**
	x	Industrial/commercial	Some commercial lots nearby.
		Urban	
		Residential	
	x	Rural	Some residential lots nearby.
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.65

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA’s water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
x	Culverts or Constrictions	Several bridges over canal
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
x	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
x	Actively Managed Hydrology	Flow to canal controlled.

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.63

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✔	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Enlarged Channel	
×	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	**Condition Class**	**Non-riverine**	**Riverine**
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.63

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	Many in study area

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.63

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		Stressors	Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc.	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
X		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	X	CAFOs in area	0.70
	Agricultural Runoff	X		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff	X		
	Livestock	X	CAFOs in area	
	Agricultural Runoff	X		
	Storm Water Runoff	X	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	X		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	X		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.75	+	0.70	+	0.70	+	0.73	=	3.58

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.

3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not requirec In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.

4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1	
	x		x		x		x			
Veg. Layer Sub-variable Score	0.6		0.6		0.78				÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=			
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78	

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, howe if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.63
	Variable 3:	**Buffer Capacity**	0.65
Hydrology	**Variable 4:**	**Water Source**	0.63
	Variable 5:	**Water Distribution**	0.63
	Variable 6:	**Water Outflow**	0.63
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$ + $V2_{barriers}$ + $V3_{buffer}$ + $(2 \times V9_{veg})$

												Total Functional Points				**Functional Capacity Index**
0.63	+	0.63	+	0.65	+	1.56	+		+		=	3.47	÷	5	=	0.69

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V4_{source})$ + $(2 \times V5_{dist})$ + $2 \times V6_{outflow}$ + $V8_{chem}$ + $V7_{geom}$

1.89	+	1.26	+	1.26	+	0.75	+	0.60	+		=	5.76	÷	9	=	0.64

Function 3 -- Flood Attenuation

$V3_{buffer}$ + $2 \times V4_{source}$ + $(2 \times V5_{dist})$ + $2 \times V6_{outflow}$ + $V7_{geom}$ + $V9_{veg}$

0.65	+	1.26	+	1.26	+	1.26	+	0.60	+	0.78	=	5.81	÷	9	=	0.65

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$ + $(2 \times V5_{dist})$ + $2 \times V6_{outflow})$ $V7_{geom}$

0.63	+	1.26	+	1.26	+	0.60	+		+		=	3.75	÷	6	=	0.63

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V5_{dist})$ + $V8_{chem}$ + $V7_{geom}$

1.26	+	0.75	+	0.60	+		+		+		=	2.61	÷	4	=	0.65

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$ + $(2 \times V7_{geo})$ + $(2 \times V9_{veg})$

0.65	+	1.20	+	1.56	+		+		+		=	3.41	÷	5	=	0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$ + $2 \times V6_{outflow}$ + $V8_{chem}$ + $V7_{geo}$ + $(2 \times V9_{veg})$

0.63	+	1.26	+	0.75	+	0.60	+	1.56	+		=	4.80	÷	7	=	0.69

Sum of Individual FCI Scores **4.62**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.66**

FACWet Version 2.1
December 2011

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/18/2012
Site Name or ID:	Wetland 6	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.107916°, -102.619527°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	cement company

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- ☒ *Project Wetland*
- ☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
- ☒ *Potentially Impacted Wetlands*
- ☒ *Mitigation; Pre-construction*
- ☐ *Mitigation; Post-construction*
- ☐ *Monitoring*
- ☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used) ac.
- ☒ Measured 0.083
- ☐ Estimated

Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment) ac.

☒ Measured	ac. 0.083	ac.	ac.	ac.
☐ Estimated	ac.	ac.	ac.	ac.

Characteristics or Method used for AA boundary determination: This AA is WL-6, a fringe wetland surrounding a pond adjacent to a gravel pit.

Notes: Wetland is isolated. Probably not USACE jurisdictional.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	Over-bank 0 [✓ 1] 2 3 >3
	# Surface Outlets	[✓ 0] 1 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a fringe around a pond.
	HGM class	Riverine Slope Depressional [✓ Lacustrine]

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	Area was likely historical wetlands associated with the Arkansas River.
	Previous HGM Class	Riverine Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): AA was previously most likely an upland setting.

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Lacustrine	Littoral	EM	Rooted vascular	F		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.7

Notes: There are historic wetlands nearby on the Arkansas river, within the HCE.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✓	**Stressors**	**Comments/description**
		Major Highway	
	x	Secondary Highway	US 50, 287
		Tertiary Roadway	
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	
	x	Gravel pit	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.7

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes	x	Industrial/commercial	Some commercial lots nearby.
		Urban	
		Residential	
		Rural	
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
	x	Physical Resource Extraction	Gravel pit
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.65

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Gravel pit, tire yard upstream
	Impermeable Surface Runoff	
×	Irrigation Return Flows	
×	Mining/Natural Gas Extraction	Gravel pit
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.73

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	**Condition Class**	**Non-riverine**	**Riverine**
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.73

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
x	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.63

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		**Stressors**	**Comments**
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
x		Aggregate or Mineral Mining	Next to gravel pit.
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x	CAFOs in area	0.65
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.	x	Evidence on latest aerial	
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x	CAFOs in area	
	Agricultural Runoff	x		
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.65	+	0.75	+	0.70	+	0.70	+	0.73	=	3.53

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		Composite Score
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.74

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*	☐	☐	☐	☐	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1
	x		x		x		x		
Veg. Layer Sub-variable Score	0.64		0.6		0.78			÷	
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78

See sub-variable scoring guidelines on following page

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.70
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.70
	Variable 3:	**Buffer Capacity**	0.65
Hydrology	**Variable 4:**	**Water Source**	0.73
	Variable 5:	**Water Distribution**	0.73
	Variable 6:	**Water Outflow**	0.63
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.74
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)						**Total Functional Points**			**Functional Capacity Index**
0.70	+	0.70	+	0.65	+	1.56	+		+		=	3.61	÷ 5	=	0.72

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$							
2.19	+	1.46	+	1.26	+	0.74	+	0.60	+		=	6.25	÷ 9	=	0.69

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$					
0.65	+	1.46	+	1.46	+	1.26	+	0.60	+	0.78	=	6.21	÷ 9	=	0.69

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$)		$V7_{geom}$									
0.73	+	1.46	+	1.26	+	0.60	+		+		=	4.05	÷ 6	=	0.68

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$											
1.46	+	0.74	+	0.60	+		+		+		=	2.80	÷ 4	=	0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)											
0.65	+	1.20	+	1.56	+		+		+		=	3.41	÷ 5	=	0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)							
0.70	+	1.26	+	0.74	+	0.60	+	1.56	+		=	4.86	÷ 7	=	0.69

Sum of Individual FCI Scores	**4.86**
Divide by the Number of Functions Scored	**÷ 7**
Composite FCI Score	**0.69**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/18/2012
Site Name or ID:	Wetland 7 (Markham Arroyo)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.119473°, -102.609539°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured 0.208 ☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. 0.208	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is alongside Markham Arroyo.					

Notes:	High amount of stressors up and downstream, functioning impaired wetland.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	[✓ Over-bank] 0 1 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is associated with Markham Arroyo.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	Retains historical typology.
	Previous HGM Class	Riverine Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	EM	Rooted vascular	Y		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.7

Notes: Wetlands have been grazed downstream. Channelization and controlled flows have most likely decreased amount of historical wetlands in HCE.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
	x	Secondary Highway	US 196
	x	Tertiary Roadway	County Rd 8.5
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
		Fence	
	x	Ditch or Aqueduct	Hyde Canal
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.78

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
	x	Residential	Farm House adjacent to site
	x	Rural	Residental lot at edge of buffer zone.
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
	x	Transportation Corridor	SH 196
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.65

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
×	Ditches or Drains (tile, etc.)	
	Dams	
×	Diversions	
×	Groundwater pumping	
×	Draw-downs	
	Culverts or Constrictions	
×	Point Source (urban, ind., ag.)	
×	Non-point Source	
×	Increased Drainage Area	
	Storm Drain/Urban Runoff	
	Impermeable Surface Runoff	
×	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.62

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.

2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
×	Ditches	
	Ponding/Impoundment	
	Culverts	
×	Road Grades	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
×	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
×	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
×	Ditches	
	Dikes/Levees	
×	Road Grades	
×	Culverts	Culvert under Highway 196.
	Diversions	
	Constrictions	
×	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
×	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.68

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓	**Stressors**		**Comments**
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
×		Compaction	
×		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
×		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
×		Excessive Bank Erosion	
×		Channelization	
		Reconfigured Stream Channels	
×		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
×		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score 0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x		0.62
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.65
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.64
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x		
	Agricultural Runoff	x		
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.76
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.75
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.62	+	0.65	+	0.64	+	0.76	+	0.75	=	3.42

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.78

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing			x		
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization					
Dewatering			x		
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	80.00	+		=	80	
	x		x		x		x		↑	
Veg. Layer Sub-variable Score					0.78				÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=			
Weighted Sub-variable Score		+		+	62.40	+		=	62.4	

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.70
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.78
	Variable 3:	**Buffer Capacity**	0.65
Hydrology	**Variable 4:**	**Water Source**	0.62
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.68
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.78
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Total Functional Points **Functional Capacity Index**

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$ + $V2_{barriers}$ + $V3_{buffer}$ + (2 x $V9_{veg}$)

0.70 + 0.78 + 0.65 + 1.56 + + = 3.69 ÷ **5** = 0.74

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$) + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geom}$

1.86 + 1.40 + 1.36 + 0.78 + 0.60 + = 6.00 ÷ **9** = 0.67

Function 3 -- Flood Attenuation

$V3_{buffer}$ + 2 x $V4_{source}$ + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$ + $V7_{geom}$ + $V9_{veg}$

0.65 + 1.24 + 1.40 + 1.36 + 0.60 + 0.78 = 6.03 ÷ **9** = 0.67

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$ + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$) $V7_{geom}$

0.62 + 1.40 + 1.36 + 0.60 + + = 3.98 ÷ **6** = 0.66

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$) + $V8_{chem}$ + $V7_{geom}$

1.40 + 0.78 + 0.60 + + + = 2.78 ÷ **4** = 0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$ + (2 x $V7_{geo}$) + (2 x $V9_{veg}$)

0.65 + 1.20 + 1.56 + + + = 3.41 ÷ **5** = 0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$ + 2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geo}$ + (2 x $V9_{veg}$)

0.70 + 1.36 + 0.78 + 0.60 + 1.56 + = 5.00 ÷ **7** = 0.71

Sum of Individual FCI Scores **4.83**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.69**

ADMINISTRATIVE CHARACTERIZATION

General Information

Site Name or ID:	Wetland 8 (Ponds near Vista Del Rio Ditch)	Date of Evaluation:	12/18/2012
		Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.116146°, -102.597429°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- ☒ *Project Wetland*
- ☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
- ☒ *Potentially Impacted Wetlands*
- ☒ *Mitigation; Pre-construction*
- ☐ *Mitigation; Post-construction*
- ☐ *Monitoring*
- ☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured .661 ☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. .661	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is comprised of the fringe wetlands surrounding three ponds to the north of Vista Del Rio Ditch, and south of Rd 196.					
Notes:	PEM fringe wetlands, fringes of three ponds.					

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☒ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	Surface flow [✓ Groundwater] Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	[✓ Over-bank] 0 1 2 3 >3
	# Surface Outlets	[✓ 0] 1 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands fringe wetlands surrounding a series of ponds north of Vista Del Rio Ditch.
	HGM class	Riverine Slope Depressional [✓ Lacustrine]

Historical Conditions

Previous wetland typology	**Water source**	Surface flow [✓ Groundwater] Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	Likely retains historical typology.
	Previous HGM Class	Riverine Slope Depressional [✓ Lacustrine]

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Lacustrine	Littoral	EM	Rooted vascular	Y		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.75

Notes: There are a number of wetlands within the HCE, both up gradient (across 196) and down gradient towards Vista Del Rio Ditch.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
	x	Secondary Highway	US 196
	x	Tertiary Roadway	A handful of county roads
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
		Fence	
	x	Ditch or Aqueduct	Hyde Canal
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.73

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	Residental lot at edge of buffer zone.
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.75

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
x	Impermeable Surface Runoff	US 196
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.7

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
×	Road Grades	US 196
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	**Condition Class**	**Non-riverine**	**Riverine**
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.7

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		Stressors	Comments
	General	Dredging/Excavation/Mining	
x		Fill, including dikes, road grades, etc	US 196
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score 0.78

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x		0.75
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.78
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.75
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x		
	Agricultural Runoff	x		
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.78
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.78
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.75	+	0.78	+	0.75	+	0.78	+	0.78	=	3.84

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.78

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1	
	x		x		x		x		↑	
Veg. Layer Sub-variable Score	0.6		0.6		0.78				÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=		↑	
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78	

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.75
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.73
	Variable 3:	**Buffer Capacity**	0.75
Hydrology	**Variable 4:**	**Water Source**	0.70
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.70
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.78
	Variable 8:	**Chemical Environment**	0.78
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Total Functional Points

Functional Capacity Index

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$ + $V2_{barriers}$ + $V3_{buffer}$ + (2 x $V9_{veg}$)

0.75 + 0.73 + 0.75 + 1.56 + ▨ + ▨ = 3.79 ÷ 5 = 0.76

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$) + (2 x $V5_{dist}$) + (2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geom}$

2.10 + 1.40 + 1.40 + 0.78 + 0.78 + ▨ = 6.46 ÷ 9 = 0.72

Function 3 -- Flood Attenuation

$V3_{buffer}$ + (2 x $V4_{source}$ + (2 x $V5_{dist}$) + (2 x $V6_{outflow}$ + $V7_{geom}$ + $V9_{veg}$

0.75 + 1.40 + 1.40 + 1.40 + 0.78 + 0.78 = 6.51 ÷ 9 = 0.72

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$ + (2 x $V5_{dist}$) + (2 x $V6_{outflow}$) $V7_{geom}$

0.70 + 1.40 + 1.40 + 0.78 + ▨ + ▨ = 4.28 ÷ 6 = 0.71

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$) + $V8_{chem}$ + $V7_{geom}$

1.40 + 0.78 + 0.78 + ▨ + ▨ + ▨ = 2.96 ÷ 4 = 0.74

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$ + (2 x $V7_{geo}$) + (2 x $V9_{veg}$)

0.75 + 1.56 + 1.56 + ▨ + ▨ + ▨ = 3.87 ÷ 5 = 0.77

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$ + (2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geo}$ + (2 x $V9_{veg}$)

0.75 + 1.40 + 0.78 + 0.78 + 1.56 + ▨ = 5.27 ÷ 7 = 0.75

Sum of Individual FCI Scores **5.18**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.74**

ADMINISTRATIVE CHARACTERIZATION

General Information

Site Name or ID:	Wetland 9 (Slope wetland near Vista Del Rio Ditch)	Date of Evaluation:	12/19/2012
		Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.115604°, -102.596661°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured 1.803 ☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. 1.803	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is a slope wetland, between three ponds and Vista Del Rio Ditch.					

Notes:	Slope wetland, mostly salt grass. Hydrology directly dependent on upgradient ponds.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☒ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	Surface flow [✓ Groundwater] Precipitation Unknown
	Hydrodynamics	Unidirectional [✓ Vertical] Bi-directional
	Wetland Gradient	0 - 2% [✓ 2-4%] 4-10% >10%
	# Surface Inlets	Over-bank [✓ 0] 1 2 3 >3
	# Surface Outlets	[✓ 0] 1 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands slope wetland, between a series of ponds upslope and Vista Del Rio Ditch downslope.
	HGM class	Riverine [✓ Slope] Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	Surface flow [✓ Groundwater] Precipitation Unknown
	Hydrodynamics	Unidirectional [✓ Vertical]
	Geomorphic Setting (Narrative Description)	Likely retains historical typology.
	Previous HGM Class	Riverine [✓ Slope] Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Palustrine	Palustrine	EM	Rooted vascular	Y		100
Lacustrine Palustrine Riverine	Littoral; Limnoral Palustrine Lower perennial; Upper perennial; Intermittent	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.75

Notes: There are neighboring wetlands with in the HCE, but many are most likely man made, not historical.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
	x	Secondary Highway	US 196
	x	Tertiary Roadway	A handful of county roads
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
		Fence	
	x	Ditch or Aqueduct	Hyde Canal
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.73

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	Residental lot at edge of buffer zone.
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.75

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
x	Impermeable Surface Runoff	US 196
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.7

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
×	Road Grades	US 196
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	**Condition Class**	**Non-riverine**	**Riverine**
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	Stressors	Comments/description
x	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.7

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓	**Stressors**		**Comments**
	General	Dredging/Excavation/Mining	
x		Fill, including dikes, road grades, etc	US 196
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.78

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x		0.75
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.78
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.75
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x		
	Agricultural Runoff	x		
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.78
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.78
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.75	+	0.78	+	0.75	+	0.78	+	0.78	=	3.84

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.78

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1
	x		x		x		x		
Veg. Layer Sub-variable Score	0.6		0.6		0.78			÷	
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78

See sub-variable scoring guidelines on following page

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.75
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.73
	Variable 3:	**Buffer Capacity**	0.75
Hydrology	**Variable 4:**	**Water Source**	0.70
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.70
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.78
	Variable 8:	**Chemical Environment**	0.78
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+ $V2_{barriers}$	+ $V3_{buffer}$	+ (2 x $V9_{veg}$)			**Total Functional Points**		**Functional Capacity Index**
0.75	+ 0.73	+ 0.75	+ 1.56	+	+	= 3.79	÷ **5**	= 0.76

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+ (2 x $V5_{dist}$)	+ 2 x $V6_{outflow}$	+ $V8_{chem}$	+ $V7_{geom}$				
2.10	+ 1.40	+ 1.40	+ 0.78	+ 0.78	+	= 6.46	÷ **9**	= 0.72

Function 3 -- Flood Attenuation

$V3_{buffer}$	+ 2 x $V4_{source}$	+ (2 x $V5_{dist}$)	+ 2 x $V6_{outflow}$	+ $V7_{geom}$	+ $V9_{veg}$			
0.75	+ 1.40	+ 1.40	+ 1.40	+ 0.78	+ 0.78	= 6.51	÷ **9**	= 0.72

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+ (2 x $V5_{dist}$)	+ 2 x $V6_{outflow}$)	$V7_{geom}$					
0.70	+ 1.40	+ 1.40	+ 0.78	+	+	= 4.28	÷ **6**	= 0.71

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+ $V8_{chem}$	+ $V7_{geom}$						
1.40	+ 0.78	+ 0.78	+	+	+	= 2.96	÷ **4**	= 0.74

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+ (2 x $V7_{geo}$)	+ (2 x $V9_{veg}$)						
0.75	+ 1.56	+ 1.56	+	+	+	= 3.87	÷ **5**	= 0.77

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+ 2 x $V6_{outflow}$	+ $V8_{chem}$	+ $V7_{geo}$	+ (2 x $V9_{veg}$)				
0.75	+ 1.40	+ 0.78	+ 0.78	+ 1.56	+	= 5.27	÷ **7**	= 0.75

Sum of Individual FCI Scores **5.18**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.74**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/19/2012
Site Name or ID:	Wetland 10 (Vista Del Rio Ditch)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.11534°, -102.596179°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*

☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):

☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured .747 ☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. .747	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is a PEM wetland spanning the width of Vista Del Rio Ditch at this location.					

Notes:	AA is "functioning."

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☒ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	[✓ Over-bank] 0 1 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetland is a small fringe wetland along Vista Del Rio Ditch.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	Unidirectional [✓ Vertical]
	Geomorphic Setting (Narrative Description)	Wetland in a historical floodplain area; historical typology may have been depressional or riverine.
	Previous HGM Class	Riverine Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	EM	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	**Condition Category**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.75

Notes: There are neighboring wetlands within the HCE.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✓	**Stressors**	**Comments/description**
		Major Highway	
	x	Secondary Highway	US 196
	x	Tertiary Roadway	A handful of county roads
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
		Fence	
	x	Ditch or Aqueduct	Hyde Canal
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.73

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

Stressors = Land Use Changes	✓	**Stressors**	**Comments/description**
		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	Residental lot at edge of buffer zone.
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.75

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
×	Impermeable Surface Runoff	US 196
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	man-made canal with controlled flows

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.7

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✔	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
×	Road Grades	US 196
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.7

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		Stressors	Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
x		Channelization	
		Reconfigured Stream Channels	
x		Artificial Banks/Shoreline	Man-made canal
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.7

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x		0.75
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.78
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.75
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x		
	Agricultural Runoff	x		
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.78
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.78
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.75	+	0.78	+	0.75	+	0.78	+	0.78	=	3.84

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.78

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*	☐	☐	☐	☐	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1	
	x		x		x		x			
Veg. Layer Sub-variable Score	0.6		0.6		0.78				÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=			
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78	

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.75
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.73
	Variable 3:	**Buffer Capacity**	0.75
Hydrology	**Variable 4:**	**Water Source**	0.70
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.70
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.70
	Variable 8:	**Chemical Environment**	0.78
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

												Total Functional Points				**Functional Capacity Index**
$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)										
0.75	+	0.73	+	0.75	+	1.56	+		+		=	3.79	÷	5	=	0.76

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$								
2.10	+	1.40	+	1.40	+	0.78	+	0.70	+		=	6.38	÷	9	=	0.71

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	(2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$						
0.75	+	1.40	+	1.40	+	1.40	+	0.70	+	0.78	=	6.43	÷	9	=	0.71

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$)		$V7_{geom}$										
0.70	+	1.40	+	1.40	+	0.70	+		+		=	4.20	÷	6	=	0.70

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$												
1.40	+	0.78	+	0.70	+		+		+		=	2.88	÷	4	=	0.72

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)												
0.75	+	1.40	+	1.56	+		+		+		=	3.71	÷	5	=	0.74

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)								
0.75	+	1.40	+	0.78	+	0.70	+	1.56	+		=	5.19	÷	7	=	0.74

Sum of Individual FCI Scores	**5.08**
Divide by the Number of Functions Scored	**÷ 7**
Composite FCI Score	**0.73**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	12/19/2012
Site Name or ID:	Wetland 11 (Hyde Canal)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.110785°, -102.596772°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*

☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):

☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured .071				
		☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. .071	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.

Characteristics or Method used for AA boundary determination:	This AA is a series of small fringe wetlands along both banks of Hyde Canal.
Notes:	

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☒ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	[✓ Over-bank] 0 1 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetland is a small fringe wetland along Vista Del Rio Ditch.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	Wetland in a historical floodplain area; historical typology may have been depressional or riverine.
	Previous HGM Class	Riverine Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	EM	Rooted vascular	E		100
Lacustrine Palustrine Riverine	Littoral; Limnoral Palustrine Lower perennial; Upper perennial; Intermittent	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	**Condition Category**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.68

Notes: Wetland is in a historically upland setting. Few neighboring wetlands within the HCE.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
		Secondary Highway	
		Tertiary Roadway	
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
		Fence	
		Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.83

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	Residental lot at edge of buffer zone.
		Dryland Farming	
	x	Intensive Agriculture	Plowed fields
		Orchards or Nurseries	
		Livestock Grazing	
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.83

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
×	Point Source (urban, ind., ag.)	CAFOs in area
	Non-point Source	
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	Man-made canal with controlled flows

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.7

Variable 5: Water Distribution

*This variable is concerned with hydrologic connectivity **within** the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally **result** from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	Stressors	Comments/description
x	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
x	Culverts	Under US 196
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.7

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓	**Stressors**		**Comments**
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
x		Channelization	
		Reconfigured Stream Channels	
x		Artificial Banks/Shoreline	Man-made canal
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.7

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x		0.70
	Agricultural Runoff	x	CAFO in area	
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.78
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x		
	Agricultural Runoff	x	CAFO in area	
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.78
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.78
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.78	+	0.70	+	0.78	+	0.78	=	3.74

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.73

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.

3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.

4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1	
	x		x		x		x			
Veg. Layer Sub-variable Score	0.6		0.6		0.78				÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=			
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78	

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.68
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.83
	Variable 3:	**Buffer Capacity**	0.83
Hydrology	**Variable 4:**	**Water Source**	0.70
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.70
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.70
	Variable 8:	**Chemical Environment**	0.73
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)							**Total Functional Points**				**Functional Capacity Index**
0.68	+	0.83	+	0.83	+	1.56	+	▨	+	▨	=		3.90	÷	5	=	0.78

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$							
2.10	+	1.40	+	1.40	+	0.73	+	0.70	+	▨	=	6.33	÷ 9	=	0.70

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$					
0.83	+	1.40	+	1.40	+	1.40	+	0.70	+	0.78	=	6.51	÷ 9	=	0.72

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$)		$V7_{geom}$									
0.70	+	1.40	+	1.40	+	0.70	+	▨	+	▨	=	4.20	÷ 6	=	0.70

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$											
1.40	+	0.73	+	0.70	+	▨	+	▨	+	▨	=	2.83	÷ 4	=	0.71

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)											
0.83	+	1.40	+	1.56	+	▨	+	▨	+	▨	=	3.79	÷ 5	=	0.76

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)							
0.68	+	1.40	+	0.73	+	0.70	+	1.56	+	▨	=	5.07	÷ 7	=	0.72

Sum of Individual FCI Scores	**5.10**
Divide by the Number of Functions Scored	**÷ 7**
Composite FCI Score	**0.73**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	11/29/2012
Site Name or ID:	Wetland 12	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.1081414599°, -102.59484067°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- ☒ *Project Wetland*
- ☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
- ☒ *Potentially Impacted Wetlands*
- ☒ *Mitigation; Pre-construction*
- ☐ *Mitigation; Post-construction*
- ☐ *Monitoring*
- ☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☒ Measured 0.098 ☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☒ Measured	ac. 0.098	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is a small depressional wetland surrounding a pond that recieves water from a pipe. The water source for the pipe is unkown; possibly irrigation return flow.					
Notes:						

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☒ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow]	Groundwater	Precipitation	Unknown		
	Hydrodynamics	[✓ Unidirectional]	Vertical	Bi-directional			
	Wetland Gradient	[✓ 0 - 2%]	2-4%	4-10%	>10%		
	# Surface Inlets	Over-bank	0	[✓ 1]	2	3	>3
	# Surface Outlets	[✓ 0]	1	2	3	>3	
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is within the floodplain for the Arkansas River, but the source is a pipe of an unknown source, possibly irrigation return flow, that drains into a depression with no outlet.					
	HGM class	Riverine	Slope	[✓ Depressional]	Lacustrine		

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow]	Groundwater	Precipitation	Unknown
	Hydrodynamics	[✓ Unidirectional]	Vertical		
	Geomorphic Setting (Narrative Description)	Within the Arkansas River floodplain. Wetlands likely in this location, historically.			
	Previous HGM Class	[✓ Riverine]	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Palustrine	Palustrine	UB	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.76

Notes: Herbicide application along the river to control salt cedar has killed the stands of willows. Evidence of remnant hydric soils. Could be due to lack of live vegetation or severe drought in the area.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
		Secondary Highway	
		Tertiary Roadway	
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	Barbed-wire
	x	Ditch or Aqueduct	Earthen ditch
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.8

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

Stressors = Land Use Changes	✓	**Stressors**	**Comments/description**
		Industrial/commercial	
		Urban	
		Residential	
		Rural	
		Dryland Farming	
		Intensive Agriculture	
		Orchards or Nurseries	
	x	Livestock Grazing	Minor, on north side of Arkansas River only
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	
	x	Herbicide application	Vegetation along river banks dead due to herbicide application

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.8

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA’s water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
x	Point Source (urban, ind., ag.)	Water source from a pipe, ultimate source unknown
	Non-point Source	
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.7

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	**Stressors**	**Comments/description**
x	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	**Condition Class**	**Non-riverine**	**Riverine**
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.7

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
×	Road Grades	Small farm road
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	
×	No outlet	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.67

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		Stressors	Comments
☐	**General**	Dredging/Excavation/Mining	
☐		Fill, including dikes, road grades, etc	
☐		Grading	
☐		Compaction	
☐		Plowing/Disking	
☐		Excessive Sedimentation	
☐		Dumping	
☐		Hoof Shear/Pugging	
☐		Aggregate or Mineral Mining	
☐		Sand Accumulation	
☐	**Channels Only**	Channel Instability/Over Widening	
☐		Excessive Bank Erosion	
☐		Channelization	
☐		Reconfigured Stream Channels	
☐		Artificial Banks/Shoreline	
☐		Beaver Dam Removal	
☐		Substrate Embeddedness	
☐		Lack or Excess of Woody Debris	
☐			

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.7

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x	CAFOs in area	0.73
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List	x	Fecal coliforms	
Sedimentation/ Turbidity	Excessive Erosion			0.80
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff			
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.77
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x	CAFOs in area	
	Agricultural Runoff			
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.73	+	0.80	+	0.77	+	0.70	+	0.80	=	3.80

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.			x		Common reed on CO nox weed watch list
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1
	x		x		x		x		
Veg. Layer Sub-variable Score	0.6		0.6		0.6				÷
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.00	+	0.60	+		=	0.6

See sub-variable scoring guidelines on following page

Variable 9 Score 0.60

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.76
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.80
	Variable 3:	**Buffer Capacity**	0.80
Hydrology	**Variable 4:**	**Water Source**	0.70
	Variable 5:	**Water Distribution**	0.70
	Variable 6:	**Water Outflow**	0.67
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.70
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.60

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)						**Total Functional Points**				**Functional Capacity Index**
0.76	+	0.80	+	0.80	+	1.20	+		+		=	3.56	÷	**5**	=	0.71

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$								
2.10	+	1.40	+	1.34	+	0.75	+	0.70	+		=	6.29	÷	**9**	=	0.70

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$						
0.80	+	1.40	+	1.40	+	1.34	+	0.70	+	0.60	=	6.24	÷	**9**	=	0.69

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	2 x $V6_{outflow}$)		$V7_{geom}$										
0.70	+	1.40	+	1.34	+	0.70	+		+		=	4.14	÷	**6**	=	0.69

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$												
1.40	+	0.75	+	0.70	+		+		+		=	2.85	÷	**4**	=	0.71

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)												
0.80	+	1.40	+	1.20	+		+		+		=	3.40	÷	**5**	=	0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)								
0.76	+	1.34	+	0.75	+	0.70	+	1.20	+		=	4.75	÷	**7**	=	0.68

Sum of Individual FCI Scores **4.87**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.70**

ADMINISTRATIVE CHARACTERIZATION

General Information

Site Name or ID:	Wetland 13 (Arkansas River	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Date of Evaluation: 11/29/2012

Location Information:

Site Location (Lat./Long. or UTM):	38.1064745619°, -102.594743306°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	1:24,000 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*

☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):

☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used) ac. ☒ Measured 0.31 ☐ Estimated

Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment) ac.

☒ Measured	ac. 0.31	ac.	ac.	ac.
☐ Estimated	ac.	ac.	ac.	ac.

Characteristics or Method used for AA boundary determination: This AA was defined by all the wetlands within the channel of the Arkansas River, as they are hydrologically connected, and the plant communities are similar.

Notes:

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☒ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	[✓ Over-bank] 0 1 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	The Arkansas River retains most of its natural characteristics. The channel is still a natural braided channel, and is only somewhat affected by small towns and agriculture.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	The wetlands retain their historical wetland typology.
	Previous HGM Class	[✓ Riverine] Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Upper perennial	UB	Rooted vascular	E		100
Lacustrine Palustrine Riverine	Littoral; Limnoral Palustrine Lower perennial; Upper perennial; Intermittent	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.76

Notes: Herbicide application along the river to control salt cedar has killed the stands of willows. Evidence of remnant hydric soils. Could be due to lack of live vegetation or severe drought in the area.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✓	**Stressors**	**Comments/description**
		Major Highway	
		Secondary Highway	
		Tertiary Roadway	
		Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	Barbed-wire
	x	Ditch or Aqueduct	Earthen ditch
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.88

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
		Rural	
		Dryland Farming	
		Intensive Agriculture	
		Orchards or Nurseries	
	x	Livestock Grazing	Minor, on north side of Arkansas River only
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	
	x	Herbicide application	Vegetation along river banks dead due to herbicide application

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.88

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	**Stressors**	**Comments/description**
×	Ditches or Drains (tile, etc.)	Many ditches in vicinity- including Lamar Canal
×	Dams	At Lamar Canal
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
×	Irrigation Return Flows	
×	Mining/Natural Gas Extraction	Gravel pit
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	**Condition Class**	**Depletion**	**Augmentation**
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.9

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
x	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.9

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.88

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		**Stressors**	**Comments**
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.9

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x	CAFOs in area	0.78
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List	x	Fecal coliforms	
Sedimentation/ Turbidity	Excessive Erosion			0.90
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff			
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.80
	Nearby Industrial Sites			
	Road Drainage/Runoff			
	Livestock	x	CAFOs in area	
	Agricultural Runoff			
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.85
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.78	+	0.90	+	0.80	+	0.85	+	0.80	=	4.13

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.83

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.

3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.

4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*	☐	☐	☐	☐	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds		x			Salt Cedar- noxious weed
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide		x			
Loss of Zonation/Homogenization	x	x	x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.10	+	0.40	+	1.00	+		=	1.5	
	x		x		x		x		↑	
Veg. Layer Sub-variable Score	0.6		0.6		0.73				÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=			
Weighted Sub-variable Score	0.06	+	0.24	+	0.73	+		=	1.03	

Variable 9 Score 0.69

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.76
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.88
	Variable 3:	**Buffer Capacity**	0.88
Hydrology	**Variable 4:**	**Water Source**	0.90
	Variable 5:	**Water Distribution**	0.90
	Variable 6:	**Water Outflow**	0.88
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.90
	Variable 8:	**Chemical Environment**	0.83
	Variable 9:	**Vegetation Structure and Complexity**	0.69

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)						**Total Functional Points**				**Functional Capacity Index**
0.76	+	0.88	+	0.88	+	1.37	+	▨	+	▨	**=**	3.89	÷	**5**	=	0.78

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$								
2.70	+	1.80	+	1.76	+	0.83	+	0.90	+	▨	**=**	7.99	÷	**9**	=	0.89

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	(2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$						
0.88	+	1.80	+	1.80	+	1.76	+	0.90	+	0.69	**=**	7.83	÷	**9**	=	0.87

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$)		$V7_{geom}$										
0.90	+	1.80	+	1.76	+	0.90	+	▨	+	▨	**=**	5.36	÷	**6**	=	0.89

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$												
1.80	+	0.83	+	0.90	+	▨	+	▨	+	▨	**=**	3.53	÷	**4**	=	0.88

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)												
0.88	+	1.80	+	1.37	+	▨	+	▨	+	▨	**=**	4.05	÷	**5**	=	0.81

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)								
0.76	+	1.76	+	0.83	+	0.90	+	1.37	+	▨	**=**	5.62	÷	**7**	=	0.80

Sum of Individual FCI Scores **5.93**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.85**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	11/30/2012
Site Name or ID:	Wetland 14 (Willow Creek)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.0911480066°, -102.579711165°	Geographic Datum Used (NAD 83 preferred):	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☐ Measured .19 ☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☐ Measured	ac. .19	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is a series of fringe shrub-scrub wetlands along Willow Creek.					

Notes: Wetlands created from historically upland setting.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☒ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	Over-bank 0 [✓ 1] 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe wetlands along Willow Creek.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	
	Previous HGM Class	[✓ Riverine] Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	SS	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes: Neighboring wetlands are very few/small within the HCE (other than other wetlands along Willow Creek).

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = artificial barriers		Major Highway	
	x	Secondary Highway	US 50
	x	Tertiary Roadway	Several county roads
	x	Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.65

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	
		Dryland Farming	
	x	Intensive Agriculture	Feed lots nearby, plowed fields
		Orchards or Nurseries	
	x	Livestock Grazing	Minor, on north side of Arkansas River only
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.63

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	**Stressors**	**Comments/description**
	Ditches or Drains (tile, etc.)	
×	Dams	
×	Diversions	Creek appears to have been diverted to flow east rather than north into Rive
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	Creek has been channelized in town and to the east of town.
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	**Condition Class**	**Depletion**	**Augmentation**
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.63

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Enlarged Channel	
×	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.63

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	Many in study area

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.63

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		**Stressors**	**Comments**
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
x		Reconfigured Stream Channels	
x		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x	CAFOs in area	0.70
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.	x		
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List	x	Fecal coliforms	
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff	x		
	Livestock	x	CAFOs in area	
	Agricultural Runoff	x		
	Storm Water Runoff	x	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	x		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.75	+	0.70	+	0.70	+	0.73	=	3.58

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.

3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.

4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization		x	x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.40	+	1.00	+		=	1.4
	x		x		x		x		
Veg. Layer Sub-variable Score	0.6		0.78		0.78			÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.31	+	0.78	+		=	1.092

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.65
	Variable 3:	**Buffer Capacity**	0.63
Hydrology	**Variable 4:**	**Water Source**	0.63
	Variable 5:	**Water Distribution**	0.63
	Variable 6:	**Water Outflow**	0.63
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Total Functional Points

Functional Capacity Index

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$ + $V2_{barriers}$ + $V3_{buffer}$ + (2 x $V9_{veg}$)

0.63 + 0.65 + 0.63 + 1.56 + ▨ + ▨ = 3.47 ÷ 5 = 0.69

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$) + (2 x $V5_{dist}$) + (2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geom}$

1.89 + 1.26 + 1.26 + 0.75 + 0.60 + ▨ = 5.76 ÷ 9 = 0.64

Function 3 -- Flood Attenuation

$V3_{buffer}$ + (2 x $V4_{source}$ + (2 x $V5_{dist}$) + (2 x $V6_{outflow}$ + $V7_{geom}$ + $V9_{veg}$

0.63 + 1.26 + 1.26 + 1.26 + 0.60 + 0.78 = 5.79 ÷ 9 = 0.64

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$ + (2 x $V5_{dist}$) + (2 x $V6_{outflow}$) $V7_{geom}$

0.63 + 1.26 + 1.26 + 0.60 + ▨ + ▨ = 3.75 ÷ 6 = 0.63

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$) + $V8_{chem}$ + $V7_{geom}$

1.26 + 0.75 + 0.60 + ▨ + ▨ + ▨ = 2.61 ÷ 4 = 0.65

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$ + (2 x $V7_{geo}$) + (2 x $V9_{veg}$)

0.63 + 1.20 + 1.56 + ▨ + ▨ + ▨ = 3.39 ÷ 5 = 0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$ + (2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geo}$ + (2 x $V9_{veg}$)

0.63 + 1.26 + 0.75 + 0.60 + 1.56 + ▨ = 4.80 ÷ 7 = 0.69

Sum of Individual FCI Scores **4.62**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.66**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	11/30/2012
Site Name or ID:	Wetland 15 (Willow Creek)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.0911480066°, -102.579711165°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
☒ *Project Wetland*
☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
☒ *Potentially Impacted Wetlands*
☒ *Mitigation; Pre-construction*
☐ *Mitigation; Post-construction*
☐ *Monitoring*
☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☐	Measured 2.47				
		☐	Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☐	Measured	ac. 2.47	ac.	ac.	ac.
		☐	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	This AA is a series of fringe wetlands along Willow Creek.						

Notes: These PEM wetlands are created from a historically upland setting.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☒ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☐ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	Over-bank 0 [✓ 1] 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe wetlands along Willow Creek.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine

Historical Conditions

Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	
	Previous HGM Class	[✓ Riverine] Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	UB	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes: Low amount of neighboring wetlands within the HCE (other than other Willow Creek wetlands).

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✓	**Stressors**	**Comments/description**
		Major Highway	
	x	Secondary Highway	US 50
	x	Tertiary Roadway	Several county roads
	x	Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.65

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	
		Dryland Farming	
	x	Intensive Agriculture	Feed lots nearby, plowed fields
		Orchards or Nurseries	
	x	Livestock Grazing	Minor, on north side of Arkansas River only
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.63

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
×	Dams	
×	Diversions	Creek appears to have been diverted to flow east rather than north into Rive
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	Creek has been channelized in town and to the east of town.
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.63

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.

2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
×	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Enlarged Channel	
×	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.63

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	Many in study area

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.63

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		Stressors	Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
X		Reconfigured Stream Channels	
X		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score

0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
 -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x	CAFOs in area	0.70
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.	x		
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List	x	Fecal coliforms	
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff	x		
	Livestock	x	CAFOs in area	
	Agricultural Runoff	x		
	Storm Water Runoff	x	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	x		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.75	+	0.70	+	0.70	+	0.73	=	3.58

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.

3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.

4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	#####	+		=	100
	x		x		x		x		
Veg. Layer Sub-variable Score	0.6		0.6		0.78			↑ ÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.00	+	78.00	+		=	78

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.65
	Variable 3:	**Buffer Capacity**	0.63
Hydrology	**Variable 4:**	**Water Source**	0.63
	Variable 5:	**Water Distribution**	0.63
	Variable 6:	**Water Outflow**	0.63
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)						**Total Functional Points**				**Functional Capacity Index**
0.63	+	0.65	+	0.63	+	1.56	+	▨	+	▨	=	3.47	÷	**5**	=	0.69

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$								
1.89	+	1.26	+	1.26	+	0.75	+	0.60	+	▨	=	5.76	÷	**9**	=	0.64

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	(2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$						
0.63	+	1.26	+	1.26	+	1.26	+	0.60	+	0.78	=	5.79	÷	**9**	=	0.64

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$)		$V7_{geom}$										
0.63	+	1.26	+	1.26	+	0.60	+	▨	+	▨	=	3.75	÷	**6**	=	0.63

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$												
1.26	+	0.75	+	0.60	+	▨	+	▨	+	▨	=	2.61	÷	**4**	=	0.65

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)												
0.63	+	1.20	+	1.56	+	▨	+	▨	+	▨	=	3.39	÷	**5**	=	0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)								
0.63	+	1.26	+	0.75	+	0.60	+	1.56	+	▨	=	4.80	÷	**7**	=	0.69

Sum of Individual FCI Scores **4.62**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.66**

ADMINISTRATIVE CHARACTERIZATION

General Information

		Date of Evaluation:	11/30/2012
Site Name or ID:	Wetland 16 (Lamar Canal)	Project Name:	US 287 Lamar Bypass
404 or Other Permit Application #:		Applicant Name:	CDOT
Evaluator Name(s):	Elly Weber	Evaluator's professional position and organization:	Biologist, Pinyon Environmental

Location Information:

Site Location (Lat./Long. or UTM):	38.0911480066°, -102.579711165°	Geographic Datum Used (NAD 83	NAD 83
USGS Quadrangle Map:	Lamar East	Map Scale: (Circle one)	[✓ 1:24,000] 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020009	Wetland Ownership:	Private

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- ☒ *Project Wetland*
- ☐ *Mitigation Site*

Purpose of Evaluation (check all applicable):
- ☒ *Potentially Impacted Wetlands*
- ☒ *Mitigation; Pre-construction*
- ☐ *Mitigation; Post-construction*
- ☐ *Monitoring*
- ☐ *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restortation ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	☐ Measured 0.143 ☐ Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	☐ Measured	ac. 0.143	ac.	ac.	ac.
		☐ Estimated	ac.	ac.	ac.	ac.

Characteristics or Method used for AA boundary determination:	This AA is a series of fringe wetlands along the north bank of Lamar Canal.
Notes:	Mostly cattail fringe wetlands. Intermittent and dependent on canal flows.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).

☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.

☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.

☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?

☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

☐ Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?

☒ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?

☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics

☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
If the above is checked, please describe the original wetland type if discernable using the table below.

☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical Bi-directional
	Wetland Gradient	[✓ 0 - 2%] 2-4% 4-10% >10%
	# Surface Inlets	Over-bank 0 [✓ 1] 2 3 >3
	# Surface Outlets	0 [✓ 1] 2 3 >3
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	This wetland is a series of fringe wetlands along Willow Creek.
	HGM class	[✓ Riverine] Slope Depressional Lacustrine
Historical Conditions		
Previous wetland typology	**Water source**	[✓ Surface flow] Groundwater Precipitation Unknown
	Hydrodynamics	[✓ Unidirectional] Vertical
	Geomorphic Setting (Narrative Description)	
	Previous HGM Class	[✓ Riverine] Slope Depressional Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Palustrine	UB	Rooted vascular	E		100
Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

See Figure 2

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI and hydric soils maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.63

Notes: There are very few neighboring wetlands.

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✓	**Stressors**	**Comments/description**
		Major Highway	
	x	Secondary Highway	US 50
	x	Tertiary Roadway	Several county roads
	x	Railroad	
		Bike Path	
		Urban Development	
	x	Agricultural Development	Cropland and pastureland
		Artificial Water Body	
	x	Fence	
	x	Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.65

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.
2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.
3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

	✓	**Stressors**	**Comments/description**
Stressors = Land Use Changes		Industrial/commercial	
		Urban	
		Residential	
	x	Rural	
		Dryland Farming	
	x	Intensive Agriculture	Feed lots nearby, plowed fields
		Orchards or Nurseries	
	x	Livestock Grazing	Minor, on north side of Arkansas River only
		Transportation Corridor	
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.63

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 8.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✓	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
×	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	Several constricted bridge openings
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	Town of Lamar
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	Flow to canal controlled

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.63

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	**Stressors**	**Comments/description**
✕	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
✕	Hardened/Engineered Channel	Engineered channel
	Enlarged Channel	
✕	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	**Condition Class**	**Non-riverine**	**Riverine**
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.63

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✓	**Stressors**	**Comments/description**
×	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Engineered channel
	Artificial Stream Banks	
	Weirs	
×	Confined Bridge Openings	Many in study area

Variable Score	**Condition Class**	**Scoring Guidelines**
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.63

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓	Stressors		Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc	
		Grading	
		Compaction	
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
X		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score 0.6

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
   -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✓	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	x	CAFOs in area	0.70
	Agricultural Runoff	x		
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	x		
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites			
	Road Drainage/Runoff	x		
	Livestock	x	CAFOs in area	
	Agricultural Runoff	x		
	Storm Water Runoff	x	Town of Lamar	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x		
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.73
	Mechanical Soil Disturbance			
	Dumping/introduced Soil	x		
	CDPHE Impairment/TMDL List			

Variable 8: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.75	+	0.70	+	0.70	+	0.73	=	3.58

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.75

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.
3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not required. In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.
4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*	☐	☐	☐	☐	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization			x		
Dewatering					
Over Saturation					

Percent Cover of Layer	0.00	+	0.00	+	1.00	+		=	1
	x		x		x		x		
Veg. Layer Sub-variable Score	0.6		0.6		0.78			↑ ÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=		
Weighted Sub-variable Score	0.00	+	0.00	+	0.78	+		=	0.78

Variable 9 Score 0.78

Sub-variable 9 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.63
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.65
	Variable 3:	**Buffer Capacity**	0.63
Hydrology	**Variable 4:**	**Water Source**	0.63
	Variable 5:	**Water Distribution**	0.63
	Variable 6:	**Water Outflow**	0.63
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.60
	Variable 8:	**Chemical Environment**	0.75
	Variable 9:	**Vegetation Structure and Complexity**	0.78

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{wetloss}$	+	$V2_{barriers}$	+	$V3_{buffer}$	+	(2 x $V9_{veg}$)	+		+			Total Functional Points				Functional Capacity Index
0.63	+	0.65	+	0.63	+	1.56	+		+		=	3.47	÷	5	=	0.69

Function 2 -- Support of Characteristic Fish/aquatic Habitat

(3 x $V4_{source}$)	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geom}$	+							
1.89	+	1.26	+	1.26	+	0.75	+	0.60	+		=	5.76	÷	9	=	0.64

Function 3 -- Flood Attenuation

$V3_{buffer}$	+	(2 x $V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$	+	$V7_{geom}$	+	$V9_{veg}$						
0.63	+	1.26	+	1.26	+	1.26	+	0.60	+	0.78	=	5.79	÷	9	=	0.64

Function 4 -- Short- and Long-term Water Storage

$V4_{source}$	+	(2 x $V5_{dist}$)	+	(2 x $V6_{outflow}$)		$V7_{geom}$										
0.63	+	1.26	+	1.26	+	0.60	+		+		=	3.75	÷	6	=	0.63

Function 5 -- Nutrient/Toxicant Removal

(2 x $V5_{dist}$)	+	$V8_{chem}$	+	$V7_{geom}$												
1.26	+	0.75	+	0.60	+		+		+		=	2.61	÷	4	=	0.65

Function 6 -- Sediment Retention/Shoreline Stabilization

$V3_{buffer}$	+	(2 x $V7_{geo}$)	+	(2 x $V9_{veg}$)												
0.63	+	1.20	+	1.56	+		+		+		=	3.39	÷	5	=	0.68

Function 7 -- Production Export/Food Chain Support

$V1_{wetloss}$	+	(2 x $V6_{outflow}$	+	$V8_{chem}$	+	$V7_{geo}$	+	(2 x $V9_{veg}$)								
0.63	+	1.26	+	0.75	+	0.60	+	1.56	+		=	4.80	÷	7	=	0.69

Sum of Individual FCI Scores **4.62**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.66**