# reerik La Resource La Corridor Improvement July 202 Consultant Mondol

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# Acronyms and Abbreviations

AA Assessment Area AOI Area of Interest CDOT Colorado Department of Transportation CFR Code of Federal Regulations
CDOT Colorado Department of Transportation
CFR Code of Federal Regulations
EA Environmental Assessment
EO Executive Order
EPA U.S. Environmental Protection Agency
FAC facultative
FACU facultative upland
FACW facultative wetland
FCI Functional Capacity Index
FHWA Federal Highway Administration
-25 Interstate 25
-270 Interstate 270
-70 Interstate 70
-76 Interstate 76
NWP Nationwide Permit
NWPR Navigable Waters Protection Rule
OBL obligate wetland
PEM palustrine emergent
PSS palustrine scrub-shrub
UPL upland
USACE United State Army Corps of Engineers
UPL upland USACE United State Army Corps of Engineers

# 1.0 Introduction

This Wetland Technical Report was prepared to support the I-270 Highway Improvement Project (project) Environmental Assessment (EA). The project is proposed by the Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA), in conjunction with local partners Adams County and Commerce City, to make improvements to 6 miles of Interstate 270 (I-270) in Adams County, Commerce City, and the City and County of Denver, Colorado, between Interstate 25 (I-25) and Interstate 70 (I-70) (Figure 1-1).

This report has been written in compliance with Executive Order (EO) 11990, "Protection of Wetlands," and is in accordance with 23 *Code of Federal Regulations* (CFR) 771, 23 CFR 777, and FHWA Technical Advisory T6640.8A. This report is preliminary in nature and is created to help inform the EA alternatives evaluation process; a formal and focused programmatic Wetland Findings will be created, in support of the project Section 404 federal permitting and National Environmental Policy Act process once project design advances to the approximately 90% design phase.

Wetland delineation maps are provided in Appendix A, wetland data sheets are provided in Appendix B, and site photos are provided in Appendix C. FACWet-related maps and data sheets are provided in Appendix D, preliminary wetland impact figures and tables are provided in Appendix E, and a preliminary onsite wetland mitigation concept summary is available in Appendix F.

Sections 1 and 2 of the EA and EA Appendix A contain the project setting and a detailed description of alternatives.

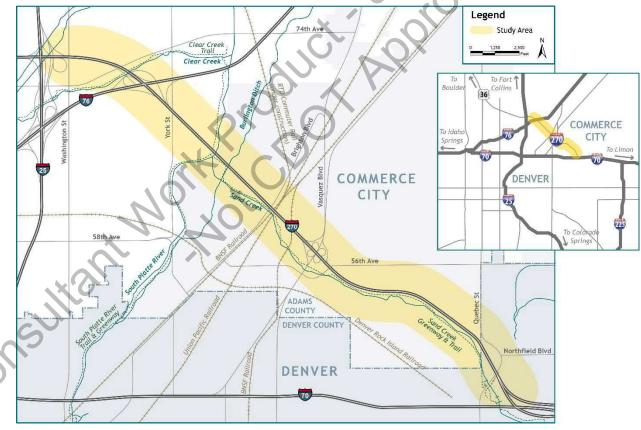


Figure 1-1. Project Location *Source: Jacobs* 

# 2.0 Regulatory Context

Various laws and regulations are in place to protect wetlands and waterways. Aquatic resources discussed in this report are protected by the following federal laws, regulations, and policies.

The federal Clean Water Act was enacted to restore and maintain the chemical, physical, and biological integrity of the U.S.'s waters through the elimination of discharges of pollutants. In support of this goal, the Clean Water Act established permit programs to control discharges into waters of the U.S. and provided the U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) with regulatory authority to issue permits. Section 404 established a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands and streams, and requires the issuance of a permit for any activities resulting in such discharge, unless an exemption applies.

The USACE and EPA are responsible for making all final jurisdictional determinations. Under Section 404 of the Clean Water Act, the USACE and the EPA reserve the right to determine jurisdictional status on a caseby-case basis (41 CFR 219). On June 19, 2020, the District Court for the District of Colorado stayed the effective date of the Navigable Waters Protection Rule only in the state of Colorado. The judicial stay was lifted in Colorado on April 23, 2021. Upon the stay being lifted, the WOTUS [Waters of the United States] Rule, also known as the Navigable Waters Protection Rule (NWPR), is now effective in Colorado, and the federal permitting of the discharge of dredge or fill material into state waters will no longer cover certain state waters protected from unpermitted discharges by state law, including Section 25-8-501.

In accordance with EO 11990 and CDOT's Memorandum of Agreement with FHWA (CDOT 2019), which requires one-to-one replacement of all wetland area or wetland function, CDOT policy requires all wetland impacts to be mitigated, regardless of jurisdictional status.

Senate Bill 40 (33-5-101-107, CRS 1973 as amended) requires any agency of the state to obtain wildlife certification from Colorado Parks and Wildlife (CPW) when the agency plans construction in "...any stream or its bank or tributaries...". Compliance with these requirements is discussed in the Biological Resources Report prepared for the project (CDOT, 2020).

# **Agency Coordination**

At the project onset, CDOT contacted the USACE to inform them of the project and confirm the appropriate agency contact. In August 2020, a resource agency meeting was held with the USACE in attendance. The project team also coordinated with USACE regarding potential jurisdictional status for roadside features.

# 3.0 Methods

To identify aquatic resources in the study area, a desktop evaluation was completed with available mapping and aerial images prior to fieldwork including the National Wetland Inventory Maps (USGS 2020b), U.S. Geological Survey 7.5-minute topographic maps, and Google Earth historic aerial imagery.

Jacobs biologists visited and evaluated the approximately 445-acre study area (see Figures in Appendix A) to delineate aquatic resources. While in the field, boundaries of wetlands and surface waters were recorded on tablets using Collector for ArcGIS. To establish submeter accuracy, Trimble R1 Global Navigation Satellite System receivers were paired with the tablets. Photos of wetland areas were taken while in the field (Appendix C).

To formally delineate wetlands and waters of the U.S. within the study area, biologists conducted field surveys during July 2020, and follow-up surveys in early October 2020 and December 2020 to account for study area adjustments. The wetland delineation was completed in accordance with the *Corps of Engineers Wetland Delineation Manual* (USACE 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)* (USACE 2010). Wetlands were

defined by vegetative, hydrologic, and soil features, and the data were recorded onto field data forms (Appendix B).

Vegetation was identified and documented within the strata-specific sampling radii recommended by the USACE (30 feet for trees, 15 feet for shrubs, 5 feet for herbs, and 15 feet for woody vines) (USACE 2010). Wetland indicator status for plant species was referenced in the "National Wetland Plant List: 2016 wetland ratings" (Lichvar et al. 2016). Species were classified as obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL). Plant species classified as FAC, FACW, or OBL are considered hydrophytic plants and are wetland indicators. Wetlands were also classified using the Cowardin classification system (Cowardin et al. 1979).

Hydrology and soil data were also collected at the sampling points. Hydrology indicators may include topographic position, presence of standing water and saturated soil, profile conditions, drainage patterns, water marks, sediment deposits, and oxidized root channels in the upper 18 inches of the soil profile. Wetland soil indicators may include presence of color streaking (mottling), gleying (grayish coloration), reducing conditions, hydrogen sulfide odor, high organic content, and organic matter streaking in the surface layer of sandy soils. Soil pits were hand excavated in potential wetlands to verify indicators of vegetation, wetland hydrology, and hydric soils.

In addition, the "Functional Assessment of Colorado Wetlands (FACWet) Method" (Johnson et al. 2013) was completed. The Area of Interest (AOI) encompasses the area that could be directly or indirectly impacted by project activities. Within the AOI, areas of target habitat (wetlands) were defined as Assessment Areas (AA). The targeted habitat for this project included any waters, wetlands, or riparian vegetation. The wetlands were grouped into AAs according to hydrogeomorphic class, wetland type, and location within the AOI. Field observations for each AA were incorporated into FACWet data sheets (Appendix D).

The jurisdictional status of the wetlands and other waters were evaluated per the Rapanos Guidance, which was the active jurisdictional evaluation guidance at the time of the delineation but has since been reevaluated considering the recent adoption of the NWRP. In this report, Jacobs biologists have assigned a presumed jurisdictional status to each feature according to the NWPR. However, the USACE must review and formally determine the jurisdictional status of all waters of the U.S. This jurisdictional determination procedure would occur during the project's Section 404 permitting process.

Wetland impact areas were determined through Geographic Information System (GIS) evaluation of design data overlayed on the field delineated wetland data.

Onsite wetland mitigation concepts are based on field observations by CDOT and Jacobs biologists during wetland investigations and subsequent desktop analysis and mapping.

# 4.0 Results

4.1.1

# General Site Conditions

# Vegetation

Three broad wetland categories were delineated and mapped within the study area including herbaceous palustrine emergent (PEM) wetlands associated with natural riparian areas, palustrine scrub-shrub (PSS) wetlands associated with natural riparian areas, and PEM wetlands associated with stormwater hydrology. The typical hydrophytic vegetation characterizing these wetland types as well as the transitional upland communities is described below:

• **Riparian PEM:** PEM wetland areas generally associated with intermittent to perennial hydrologic regime on natural streams within the study area are generally dominated by one or more of the

following species: broadleaf cattail (*Typha latifolia*; OBL), Baltic rush (*Juncus balticus*; FACW), and inland salt grass (*Distichlis spicata*; FACW).

- **Riparian PSS:** PSS wetlands within the study area generally associated with natural streams are dominated by coyote willow (*Salix exigua*; FACW) and plains cottonwood (*Populus deltoides*; FAC). Understories contain cattails and Emory's sedge (*Carex emoryi*; OBL).
- Stormwater PEM: PEM wetlands associated with stormwater hydrology, including roadside swales and stormwater facilities within the study area, are generally dominated by one or more of the following species: broadleaf cattail (*Typha latifolia*; OBL), inland salt grass (*Distichlis spicata*; FACW), and Fuller's teasel (*Dipsacus fullonum*; FACU).
- **Upland Transition:** The upland transition is typically dominated by a mixture of grasses and forbs, including salt grass, blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), smooth brome (*Bromus inermis*), buffalo grass (*Bouteloua dactyloides*), sand dropseed (*Sporobolus cryptandrus*), side oats grama (*Bouteloua curtipendula*), and downy brome (*Bromus tectorum*).

The dominant vegetation observed throughout the study area primarily consisted of native and nonnative grasses (that is, blue grama, western wheatgrass, smooth brome, and forbs including curly dock [*Rumex crispus*] and sweet clover [*Melilotus officinalis* spp]). Coyote willow, plains cottonwood, and Siberian elm (*Ulmus pumila*) are also present along the study area.

# 4.1.2 Hydrology and Geomorphology

The study area is located within the Middle South Platte–Cherry Creek Watershed (HUC 10190003) (USGS 2020b). Sand Creek flows northwest along the western side of I-270 before joining the South Platte River in the northern portion of the study area. Much of Sand Creek is heavily incised with steep, unstable banks, likely a result of the urbanized nature of the watershed, which leads to intense stormwater flows in a naturally unstable riparian area, characterized by deep unconsolidated sandy alluvium. Notably, a major flood event in September 2013 (approximately 14,000 cubic feet per second), which was approximately 14 times greater than the normal annual peak discharge event (approximately 1,000 cubic feet per second) (USGS 2020a), likely exacerbated and accelerated this channelization. This single event likely scoured the channel, creating floodplain terraces now disconnected from normal high-water events. As such, some former floodplain wetlands now have deficient hydrology to support wetlands, leading to stressed riparian habitat and invasion of weed species, notably teasle and Canada thistle. Dense patches of coyote willow (*Salix exigua*) abut Sand Creek, providing areas of wetland and riparian habitat. However, many of the willow stands are stressed (for example, lacking foliage, and weedy understory) in part because of the channel actively incising.

Clear Creek flows northeast under I-270 near the northern terminus of the study area before intersecting with the South Platte River. Like Sand Creek, Clear Creek is entrenched and is significantly affected by encroachment of urban development and flashy stormwater runoff events. Only a short section of Clear Creek passes through the study area where three large bridge structures span the waterway. The floodplain, which appears to be disconnected from natural seasonal flooding, contains a large riparian wetland complex modified by past borrow pits and dominated by coyote willow and mature plains cottonwood trees (*Populous deltoides* ssp *monilifera*). The wetland complex is somewhat cut off from natural floods by the existence of a berm and recreational trail. However, the complex does drain through culverts connecting the wetlands to Clear Creek.

The South Platte River flows north, under and perpendicular to I-270, near the center of the study area. The South Platte River is a highly manipulated stream, subject to altered flow regime because of water diversions; storage projects; treatment facilities; residential, commercial, and industrial use; and urban runoff. The I-270 bridge over the South Platte is a high bridge just downstream of a major wastewater treatment facility that discharges into the river. Through the study area, the banks of the South Platte

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are very steep, which limits the riparian and wetland zone to a narrow strip at the stream's ordinary high-water mark.

The study area contains many roadside ditches, swales, and stormwater detention basins associated with runoff and drainage from I-270 and adjacent infrastructure. These stormwater wetland features along with agricultural ditches are generally not considered to be jurisdictional waters. Other sources of hydrology include stock ponds, stormwater runoff occurring as sheet flow across the interstate, and stormwater directed into permanent water quality features. These sources of hydrology also contribute to the formation and support of roadside drainage and water quality facility wetlands in portions of the study area.

# 4.1.3 Soils

There are 13 soil types mapped within the study area (NRCS 2018). These soil types are presented in Table 4-1. The soils in the study area's wetlands typically consist of loams, sandy loams, loamy sands, and clay loams. Of the 13 soil types present in the study area, 1 (7.7 percent) is classified as hydric (NRCS 2018).

Table 4-1. So	il Types within the Study Area	5
Soil Key <sup>a</sup>	Soil Name <sup>a</sup>	Hydric Rating <sup>a</sup>
AsB	Ascalon sandy loam, sandy substratum, 0 to 3 percent slopes	No
BoD	Blakeland loamy sand, 3 to 9 percent slopes	No
Lv	Loveland soils	No
Lw	Loamy alluvial land, moderately wet	No
MISLD	Gravel pits	No
NuA	Nunn clay loam, 0 to 1 percent slopes	No
NuB	Nunn clay loam, 1 to 3 percent slopes	No
Sm	Sandy alluvial land	Yes <sup>b</sup>
Тс	Terrace escarpments	No
TuB	Truckton loamy sand, 1 to 3 percent slopes	No
TuD	Truckton sandy loam, 3 to 9 percent slopes	No
VoA	Vona sandy loam, 1 to 3 percent slopes	No
VoB	Vona sandy loam, 1 to 3 percent slopes	No

<sup>a</sup> Source: NRCS 2018

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<sup>b</sup> Generic soil unit was not described; it was assumed to be hydric based onsite observations and physiological landscape position.

# Wetlands

Numerous wetland areas were identified within the study area. The study area boundaries are shown on Figure 1-1. Wetlands are generally associated with watercourses that flow through the study area and permanent stormwater facilities or highway drainage features such as roadside swales. Wetlands were grouped together for the purposes of simplifying the discussion. The wetland groupings were based on hydrogeomorphic class, wetland type, and location within the AOI. The following sections discuss each wetland grouping. Table 4-2 lists delineated wetlands within the study area; Table 4-3 lists other waters (non-vegetated channels and open water features) delineated within the study area.

# 4.2.1 Wetlands Associated with Clear Creek

These wetlands were located along the banks and historic floodplain of Clear Creek, which is the primary source of hydrology for these wetlands. The wetlands are a combination of PEM, dominated by herbaceous vegetation, and PSS, which support at least 30 percent shrub canopy (Cowardin et al. 1979). The wetland plants present at these wetlands included graminoids such as Emory's sedge (OBL), broadleaf cattail (OBL), Fuller's teasel (FACU), wild mint (*Mentha arvensis;* FACW), poison hemlock (*Conium maculatum;* FACW), and leafy spurge (*Euphorbia escula;* UPL); the shrub community is characterized by narrowleaf willow (FACW); and the tree canopy, where present, is dominated by plains cottonwood (FAC) and Siberian elm (UPL). Hydric soil indicators in these wetlands included sandy redox and 2.5 centimeters of mucky peat (USACE 2010). Wetland hydrology indicators included surface water, high-water table, saturation, drainage patterns, and geomorphic position (USACE 2010). Because Clear Creek is a jurisdictional waterway, wetlands adjacent to the stream or connected via culvert to Clear Creek are assumed to be jurisdictional.

# 4.2.2 Wetlands Associated with Sand Creek

These wetlands were located along portions of Sand Creek, which is the primary source of hydrology for these wetlands. The wetlands are a combination of PEM and PSS wetlands. The wetland plants present at these wetlands included graminoids such as inland salt grass (FACW), foxtail barley (Hordeum jubatum; FAC), common three-square (Schoenoplectus pungens; OBL), meadow foxtail (Alopecurus pratensis; FACW), pepperweed (Lepidium perfoliatum; FAC), red fescue (Festuca rubra; OBL), Fuller's teasel (FACU), Emory's sedge (OBL), Baltic rush (FACW), reed canary grass (Phalaris arundinacea; FACW), and broadleaf cattail (OBL); herbaceous plants such as Canada thistle (Cirsium arvense; FAC), Indian hemp (Apocynum cannabinum; FAC), and sweet clover (UPL); a shrub community dominated by coyote willow (FACW), snowberry (Symphoricarpos occidentalis; FACU), and Woods' rose (Rosa woodsii; FACU); and the tree canopy, where present, is dominated by plains cottonwood (FAC). Hydric soil indicators in these wetlands included hydrogen sulfide, thick dark surface, sandy redox, and redox dark surface (USACE 2010). The wetland hydrology indicators included high-water table, saturation, surface water, geomorphic position, hydrogen sulfide smell, oxidized rhizospheres on living roots, drift deposits, and drainage patterns (USACE 2010). Because Sand Creek is a jurisdictional waterway, wetlands adjacent to this creek including stream bank wetlands and floodplain wetlands with clear surface connectivity are assumed to be jurisdictional.

# 4.2.3 Wetlands Associated with the South Platte River

These wetlands were located along portions of the South Platte River, which is the primary source of hydrology for these wetlands. The wetlands are a combination of PEM and PSS wetlands (Cowardin et al. 1979). The wetland plants present at these wetlands included graminoids such as inland salt grass (FACW), foxtail barley (FAC), common three-square (OBL), meadow foxtail (FACW), pepperweed (FAC), red fescue (OBL), Fuller's teasel (FACU), Emory's sedge (OBL), Baltic rush (FACW), reed canary grass (FACW), and broadleaf cattail (OBL); herbaceous plants such as Canada thistle (FAC), Indian hemp (FAC), and sweet clover (UPL); a shrub community dominated by coyote willow (FACW), snowberry (FACU), and Woods' rose (FACU); and the tree canopy, where present, is dominated by plains cottonwood (FAC). Hydric soil indicators in these wetlands included hydrogen sulfide, thick dark surface, sandy redox, and redox dark surface (USACE 2010). The wetland hydrology indicators included high-water table, saturation, surface water, geomorphic position, hydrogen sulfide smell, oxidized rhizospheres on living roots, drift deposits, and drainage patterns (USACE 2010). Because the South Platte River is a jurisdictional waterway, wetlands adjacent to, or with clear surface connectivity to these surface waters, are assumed to be jurisdictional as well.

## 4.2.4 Wetlands Associated with Stormwater Drainage Infrastructure

The wetlands associated with highway drainage are located in roadside ditches and low spots along I-270 and the various roads that run parallel to and on and off I-270. Stormwater runoff from paved surfaces is the primary source of hydrology for these wetlands. The wetlands were primarily PEM (Cowardin et al. 1979). Some of these wetlands were a combination of PEM and PSS (Cowardin et al. 1979), but the shrub component is minimal. The wetland plants present at these wetlands included graminoids such as broadleaf cattail (OBL), inland salt grass (FACW), Baltic rush (FACW), Emory's sedge (OBL), common spike rush (*Eleocharis palustris*; OBL), reed canary grass (FACW), foxtail barley (FAC), and common three-square (OBL); the herbaceous plants Fuller's teasel (FACU), Indian hemp (FAC), and Canada thistle (FAC); and the shrub canopy, where present, is dominated by coyote willow (FACW). The most common hydric soil indicator in these wetlands was redox dark surface (USACE 2010). Other hydric soil indicators included depleted matrix, 2.5-centimeter mucky peat, sandy redox, thick dark surface, and hydrogen sulfide odor (USACE 2010). The most common wetland hydrology indicators included saturation, drift deposits, salt crust, and geomorphic position (USACE 2010). Other wetland hydrology indicators included high-water table, surface soil cracks, inundation visible on aerial imagery, and drainage patterns (USACE 2010).

	<b>C</b>	Durana		Are	Area	
Wetland Name	Cowardin Class	Presumed Jurisdiction <sup>a</sup>	Comment/Significant Nexus	Square Feet	Acres	
W001	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	8,658	0.199	
W002	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	25,841	0.593	
W003	PEM	Non- jurisdictional	Roadside stormwater swale—overland nexus to Sand Creek	10,027	0.230	
W010	PSS	Jurisdictional	Artificially created wetland potentially for mitigation—direct nexus to Sand Creek via culverts	55,175	1.267	
W020	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	13,106	0.301	
W023	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	277	0.006	
W025	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	3,441	0.079	
W027	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	16,591	0.381	
W028	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	47,123	1.082	
W030	PSS	Jurisdictional	In-channel wetland direct nexus—abutting tributary to Sand Creek within Sand Creek floodplain	245	0.006	
W031	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	3,694	0.085	
W032	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	98	0.002	
W050	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	12,447	0.286	
W051	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	7,137	0.164	
W052	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	1,993	0.046	
W053	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	351	0.008	
W070	PEM	Non- jurisdictional	Isolated—roadside swale	11,874	0.273	
W100	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	2,474	0.057	

# Table 4-2. Summary of Delineated Wetlands

Wetland	Cowardin	cowardin Presumed			Area		
Name	Class	Jurisdiction <sup>a</sup>	Comment/Significant Nexus	Square Feet	Acres		
W195	PSS	Jurisdictional	Wetland fringed of constructed depressional feature—nexus to Sand Creek via overland flow and culverts	583	0.013		
W200	PEM	Non- jurisdictional	Isolated—stormwater swale	7,848	0.180		
W205	PSS	Jurisdictional	Constructed depressional feature in Sand Creek floodplain— overland nexus to Clear Creek	26,314	0.604		
W210	PSS	Jurisdictional	Constructed depressional feature in Sand Creek floodplain- nexus via overland and culvert to Clear Creek	61,952	1.422		
W215	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Clear Creek	1,103	0.025		
W216	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Clear Creek	9,512	0.219		
W220	PSS	Jurisdictional	Depressional feature in Sand Creek floodplain—overland nexus to Clear Creek	1,086	0.025		
W230	PSS	Jurisdictional	In-channel wetland direct nexus-abutting South Platte River	245	0.006		
W231	PSS	Jurisdictional	In-channel wetland direct nexus-abutting South Platte River	2,767	0.064		
W232	PSS	Jurisdictional	In-channel wetland direct nexus—abutting South Platte River	732	0.01		
W233	PSS	Jurisdictional	In-channel wetland direct nexus—abutting South Platte River	1,029	0.024		
W300	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	56,694	1.302		
W320	PEM	Jurisdictional	In-channel wetland direct nexus—within Clear Creek floodplain	15,883	0.365		
W330	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	3,071	0.070		
W340	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	1,320	0.030		
W401	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	2,902	0.067		
W410	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	2,728	0.063		
W420	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	19,732	0.453		
W430	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	4,259	0.098		
W440	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	333	0.008		
W450	PEM	Non- jurisdictional	Roadside swale—associated with highway construction and runoff	3,179	0.073		
			Subtotal Jurisdictional	319,857	7.346		
			Subtotal Non-jurisdictional	123,967	2.847		
			Total	443,824	10.19		

# Table 4-2. Summary of Delineated Wetlands

				Area
Wetland	Cowardin	Presumed	Comment/Significant Nexus	Square Acres
Name	Class	Jurisdiction <sup>a</sup>		Feet

## Source: Jacobs

<sup>a</sup> Jurisdictional status will be determined by USACE during Section 404 permitting, this table assumes use of the NWPR as a basis for determining jurisdictional status.

Table 4-3. Sumr	nary of Delir	neated Other Wa	aters		$\cdot \cdot \cdot \cdot$	
Feature Name	Feature Type (Cowardin Class) ª	Presumed Jurisdiction <sup>a</sup>	Approx. OHWM Width (feet)	Comment/Presumed Connectivity	Are Square Feet	a Acres
OW001 (Sand Creek)	R3AB	Jurisdictional	80	Sand Creek	65,855	1.512
OW025 (Sand Creek)	R3AB	Jurisdictional	60	Sand Creek	25,683	0.590
OW027 (Sand Creek)	R3AB	Jurisdictional	55	Sand Creek	2,243	0.051
OW030	R3RB	Jurisdictional	5	Unnamed intermittent stream, natural bottom, tributary and direct nexus with Sand Creek	516	0.012
OW050 (Sand Creek)	R3AB	Jurisdictional	100	Sand Creek	54,500	1.251
OW150 (O'Brien Ditch)	R3RB	Non- jurisdictional	50	O'Brien Ditch	21,247	0.488
OW195	L2AB	Jurisdictional	40	Gravel pit—associated with infrastructure construction	4,345	0.100
OW215 (Clear Creek)	R3AB	Jurisdictional	80	Clear Creek	60,202	1.382
OW230 (South Platte River)	R3AB	Jurisdictional	110	South Platte River	46,607	1.070
OW310	R6	Non- jurisdictional	3	Constructed stormwater swale—natural bottom	131	0.003
N.X.O.				Subtotal Jurisdictional	259,951	5.968
				Subtotal Non-jurisdictional	21,378	0.491
S				Total	281,329	6.459

#### Source: Jacobs

<sup>a</sup> Jurisdictional status will be determined by USACE during Section 404 permitting, this table assumes use of the NWPR as a basis for determining jurisdictional status.

# 4.3 FACWet

The wetland areas are grouped into AAs in order to analyze the functional capacity of the wetlands per CDOT's FACWet methodology. AAs are typically based on hydrogeomorphic class, wetland type, and location within the AOI. The AOI typically includes the study area and a 25-meter buffer; however, for this project the AOI is limited to the project designated study area because the study area serves the

same purpose as the AOI; maps of each AA are provided with the data forms in Appendix D. FACWet scores were recorded as Functional Capacity Indexes (FCIs). FCI score values are interpreted as noted in Table 4-4.

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.

Source: Johnson et al. 2013

Wetlands have been grouped into 10 AAs, according to hydrogeomorphic class, associated water body, and proximity. The FACWet data sheets are presented in Appendix D. The stressors and scores are summarized in Table 4-5.

Table 4-5.	Stressors and FCI Scores			
AA ID	Associated Surface Water	Wetland Identification	Stressor Discussion	FCI Score
AA-CC-1	Artificial wetlands adjacent to Clear Creek	W195, W200, W205, W210	Urban/commercial/industrial setting, situated under I-270 overpass, adjacent to I-270/Interstate 76 (I-76) interchange and Clear Creek bike path and park. Listed impacts confine and contribute to stress of AA.	0.69
AA-CC-2	Clear Creek	W215, W216, W220, W320	Urban/commercial/industrial setting, situated under I-270 overpass, adjacent to I-270/I-76 interchange and Clear Creek bike path and park. Listed impacts confine and contribute to stress of AA.	0.75
AA-I-1	Runoff from highway and associated infrastructure	W401	Urban/commercial/industrial setting, adjacent to, created by, and confined by I-270.	0.65
AA-1-2	Runoff from highway and associated infrastructure	W300, W330, W340, W410, W420, W430, W440, W450	Urban/commercial/industrial setting, adjacent to, created by, and confined between major transportation corridors.	0.66
AA-1-3	Runoff from highway and associated infrastructure	W070	Urban/commercial/industrial setting, adjacent to, created by, and confined by I-270.	0.65
AA-SP-1	South Platte River	W230, W231, W232, W233	Urban/commercial/industrial setting, situated under I-270 overpass, adjacent to Colorado Front Range bike path and park. Downstream of water treatment facility. Listed impacts confine and contribute to stress of AA.	0.75
AA-SC-1	Sand Creek	W100	Urban/commercial/industrial setting, adjacent to, created by, and confined by I-270.	0.75
AA-SC-2	Sand Creek	W050, W051, W052, W053	Urban/commercial/industrial setting, situated under HWY-85 overpass, adjacent to I-270 and Colorado Front Range bike path and park land. Listed impacts confine and contribute to stress of AA.	0.75
AA-SC-3	Sand Creek	W001, W002, W003, W020, W023, W025, W027, W028, W030, W031, W032	Urban/commercial/industrial setting, adjacent to I-270 and Colorado Front Range bike path and park land. Listed impacts confine and contribute to stress of AA.	0.75
AA-SC-4	Artificial wetlands adjacent to Sand Creek	W010	Wetland created by enhancements in stormwater basin. Adjacent to and stressed by highway and shopping center.	0.69
ource: Jaco	bs of sull			

# 5.0 Aquatic Resource Impacts

This project will result in permanent and temporary impacts to wetlands and other waters (such as unvegetated stream channels and ponds). This report discusses all impacts to wetlands and other waters, regardless of USACE jurisdictional status, because CDOT policy requires that all wetland impacts be replaced at a one-to-one ratio.

Impacts to aquatic resources were quantified with ArcGIS software by overlaying the conceptual project design onto the boundaries of delineated aquatic resources and calculating the intersecting wetland areas with the proposed construction activities. This involved using the proposed cut and fill lines as construction well as access and staging areas to establish the limits of disturbed area for impacts. Impacts to aquatic resources delineated within the study area are summarized in Appendix E.

# 5.1 No Action Alternative

The transportation projects that would occur under the No Action Alternative likely would have minor impacts to aquatic resources, but these impacts are undeterminable.

# 5.2 Proposed Action

The following project design and construction elements of the proposed action may result in permanent or temporary impacts to wetlands and other waters:

- Roadway widening and associated roadway embankment to accommodate the following:
  - Two additional highway travel lanes
  - An auxiliary lane between York Street and Vasquez Boulevard
  - Roadway shoulder widening
- Replacement of Vasquez Boulevard Bridge over Sand Creek
- New bridge piers on I-270 bridge over South Platte River
- Drainage and water quality ponds in vicinity of I-76 interchange
- Drainage outlet scour protection on Sand Creek
- Construction access and staging

Based on preliminary design concepts, permanent wetland impacts resulting from this project are anticipated to be approximately 122,000 square feet (2.803 acres). Temporary wetland impacts are anticipated to be approximately 22,700 square feet (0.525 acre) (Table 5-1). Permanent impacts to other waters are anticipated to be approximately 2,000 square feet (0.048 acre). Temporary impacts to other waters are anticipated to be approximately 55,000 square feet (1.264 acres) (Table 5-2).

Permanent impacts to presumed jurisdictional waters of the U.S. are anticipated to be 0.301 acre of wetland and 0.048 acre of other waters, for a total of 0.349 acre (12% of the project's total wetland and other waters permanent impacts), while temporary impacts to presumed jurisdictional waters of the U.S. are anticipated to be 0.517 acre of wetlands and 1.264 acres of other waters, for a total of 1.781 acres (99% of the project's total wetland and other waters temporary impacts). These impacts, which will be refined as project design progresses, are the result of likely grading needed to accommodate the widened highway, as well as related infrastructure such as bridges, culverts, and utilities (Appendix C).

Associated Surface Water	Cowardin Classification	Temporary Impacts (acres)	Permanent Impacts (acres)	Assumed Jurisdictional Status <sup>a</sup>
Clear Creek	PEM and PSS	0.00	0.250	Jurisdictional
Clear Creek	PEM	0.00	0.180	Non-jurisdictional
Sand Creek	PEM and PSS	0.504	0.007	Jurisdictional
South Platte River	PSS	0.013	0.044	Jurisdictional
Stormwater Wetlands <sup>b</sup>	PEM	0.008	2.322	Non-jurisdictional
Total	NA	0.525	2.803	NA

## Table 5-1. Summary of Wetland Impacts

Source: Jacobs

<sup>a</sup> Jurisdictional status is assumed according to conditions in the field and review of maps and aerial imagery. Only USACE has the authority to determine what is jurisdictional. The jurisdictional status is based on NWPR.

<sup>b</sup> Stormwater Wetlands includes stormwater-related wetland features such as roadside ditches and water quality facilities.

NA = not applicable

### Table 5-2. Summary of Other Waters Impacts

Associated Surface Water	Temporary Impacts (acres)	Permanent Impacts (acres)	Assumed Jurisdictional Status <sup>a</sup>
Sand Creek	1.251	0.010	Jurisdictional
South Platte River	0.013	0.038	Jurisdictional
Total	1.264	0.048	NA

Source: Jacobs

6.0

<sup>a</sup> Jurisdictional status is assumed according to conditions in the field and review of maps and aerial imagery. Only USACE has the authority to determine what is jurisdictional. The jurisdictional status is based on NWPR.

NA = not applicable

# 5.3 Indirect Effects

Indirect effects are caused by the project but are separated from direct effects by time or distance. Indirect wetland effects could include increased potential for noxious weeds to become established after construction activities occur. Indirect wetland impacts also could include increased stormwater runoff from the widened road leading to sedimentation and changed hydrology to both onsite and offsite wetlands and other waters. A project-specific stormwater management plan will be developed to include best management practices that will minimize or avoid potential indirect wetland effects.

# Wetland Avoidance, Minimization, and Mitigation

# 6.1 Avoidance and Minimization Measures

This project will be designed to avoid and minimize impacts. As project design is refined, project biologists and designers will work together to avoid and minimize impacts to wetlands and surface waters by reducing and refining the project footprint where possible. Proposed staging areas will also be situated to avoid impacting wetlands and surface waters. A project-specific stormwater management plan will be developed to address the potential for construction-related soil erosion and sedimentation. Construction fencing or other visual barriers will be installed to protect against the possibility of incidental construction-related impacts.

# 6.2 Mitigation of Permanent Wetland Impacts

Per Section 404 of the Clean Water Act, impacts to wetlands must be avoided, minimized to the extent practicable, and mitigated when impacts are unavoidable. CDOT policy requires all wetland impacts to be mitigated, regardless of jurisdiction at a 1:1 ratio. All mitigation plans for the impacted existing wetlands within the study area will be developed in coordination with CDOT biologists and in accordance with CDOT and FHWA mitigation policy. Mitigation for impacts to jurisdictional wetlands will be subject to compliance with Section 404 permit conditions and standards. Mitigation for non-jurisdictional wetlands will be held to similar standards and monitoring protocol but may support roadside water quality as a primary function and purpose.

Jacobs and CDOT biologists evaluated the study area for the potential for onsite mitigation for permanent impacts to wetlands. Several preliminary wetland mitigation concepts have been developed to mitigate unavoidable wetland loss. Wetland mitigation may involve a combination of one or more of the onsite wetland mitigation concepts but may also involve the purchase of wetland bank credits. The preliminary onsite mitigation concepts are summarized in Appendix F.

# 6.3 Mitigation of Indirect and Temporary Wetland Impacts

The project will mitigate for temporary impacts by restoring areas to pre-existing conditions, including the revegetation of wetlands, which will be detailed in a landscape or mitigation specific plan set. As appropriate, the revegetation plans for restoration of temporary impacts will include considerations for soil conditions, hydrology, and surface elevations to ensure full restoration of the affected resource. Revegetation will include reseeding temporarily impacted wetlands with a native wetland seed mix, planting willow stakes or other native plant material, or otherwise use a combination of revegetation methods based on site conditions as appropriate for the specific location. The project may further minimize temporary impacts, and restoration effort, by preserving and covering wetlands that need to be crossed but are not otherwise filled or excavated. This may be accomplished by trimming shrubs to the ground (rather than grubbing, excavating, or removing the root mass), then covering soil and trimmed vegetation in the access areas with wetland tracking pads made from layers of weed-free straw and geotextile. Where excavation in wetlands must occur, wetland topsoil will be salvaged and stockpiled for restoration wherever possible (Table 6-1).

The spread of noxious weeds will be minimized by reseeding with native species those upland and wetland areas that are disturbed by construction, in accordance with Sections 207, 212, and 217 of the CDOT Standard Specifications. Noxious weed spread will also be minimized by implementing the project's noxious weed management plan.

Activity Triggering Mitigation	Location of Activity	Impact	Mitigation Commitment	Responsible Branch	Timing/Phase That Mitigation Will Be Implemented
Construction/ excavation activities	Throughout the study area	Ground disturbance impacting wetlands and surface waters	During final design, avoid and minimize impacts to wetlands and surface waters by reducing and refining the project footprint where possible.	CDOT Engineering and Environmental	Preconstruction

# Table 6-1. Mitigation Commitments

Activity Triggering Mitigation	Location of Activity	Impact	Mitigation Commitment	Responsible Branch	Timing/Phase That Mitigation Will Be Implemented
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Mitigate for temporary impacts by restoring areas to pre-existing conditions. Depending on approval by the USACE, permanent impacts will be mitigated through onsite mitigation, offsite mitigation, purchase of wetland bank credits, or use of a separate strategy, to both jurisdictional and non-jurisdictional wetlands at a minimum of a 1:1 ratio.	CDOT Engineering and Environmental	Pre- construction/ Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Equipment shall be refueled within a designated refueling containment area away from wetlands. The refueling containment area shall be located greater than 100 horizontal feet away from wetlands and other sensitive environmental areas.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Construction fencing and appropriate sediment control BMPs will be used to mark wetland boundaries and sensitive habitats during construction.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Seed and mulch disturbance areas adjacent to wetlands to reduce erosion and promote revegetation; plant supplemental vegetation as needed.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Work occurring in and near wetlands during construction activities will be monitored to ensure protection of wetlands.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Prohibit construction equipment from entering the OHWM except where identified on design plans.	CDOT Engineering and Environmental	Pre- construction/ Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and	Closely monitor construction activities to ensure that additional fill is not placed within the OHMW.	CDOT Engineering and Environmental	Construction

# Table 6-1. Mitigation Commitments

Activity Location Triggering Activit Mitigation		Impact	Mitigation Commitment	Responsible Branch	Timing/Phase That Mitigation Will Be Implemented
		other Waters of the United States			
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Use timber mats or geotextile/straw to minimize temporary impacts to wetlands from construction equipment traversing wetland areas.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Locate construction staging and materials stockpiling at least 50 feet from the edge of wetlands or open water, when possible. No staging will be allowed in wetlands.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Ensure BMPs and containment structures are in place for work conducted within and adjacent to the OHWM and mapped wetlands to prevent concrete washout and other potential pollutants from reaching open water and wetlands.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Ground disturbance promoting noxious weed growth	Follow Sections 207, 212, and 217 of the CDOT Standard Specifications to avoid and minimize potential for noxious weed spread.	CDOT Engineering and Environmental	Pre- construction/ Construction

# Table C. 1. Mittaatian Committee anto

Source: Jacobs

#### Section 404 Permitting 6.4

A Section 404 permit will be required for this project. It is anticipated that a series of Nationwide Permits (NWPs) will be used to permit the proposed work (less than 0.50 acre of total permanent impacts to waters of the U.S.), including but not limited to NWP 14 for linear transportation projects and NWP 3 for maintenance (repair, rehabilitation, or replacement) of serviceable structures. Each NWP will constitute a separate and complete action, per the USACE definition. The project is located within the USACE Omaha District. Each district must permit project activities within their respective jurisdictional boundaries. Coordination with USACE is ongoing.

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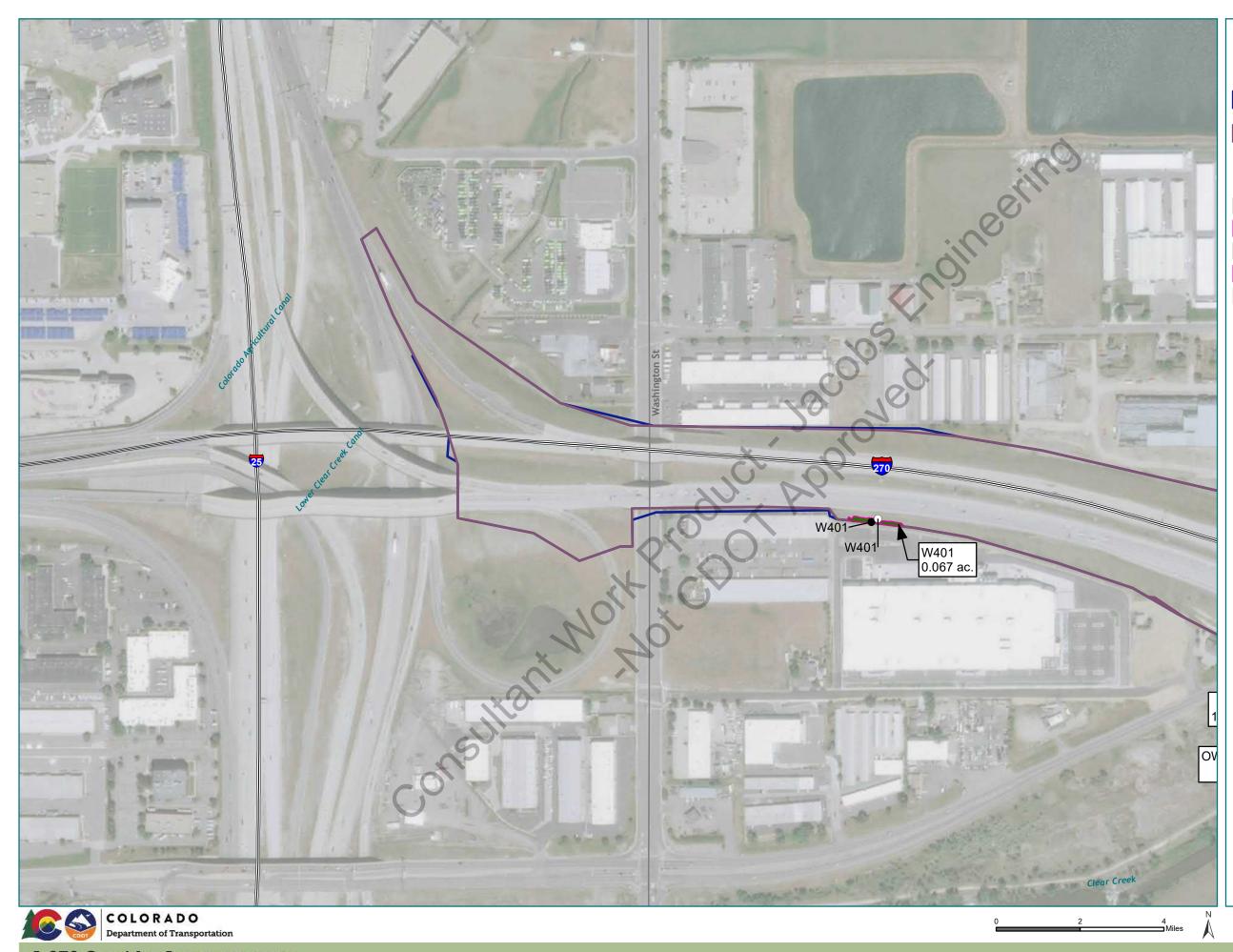
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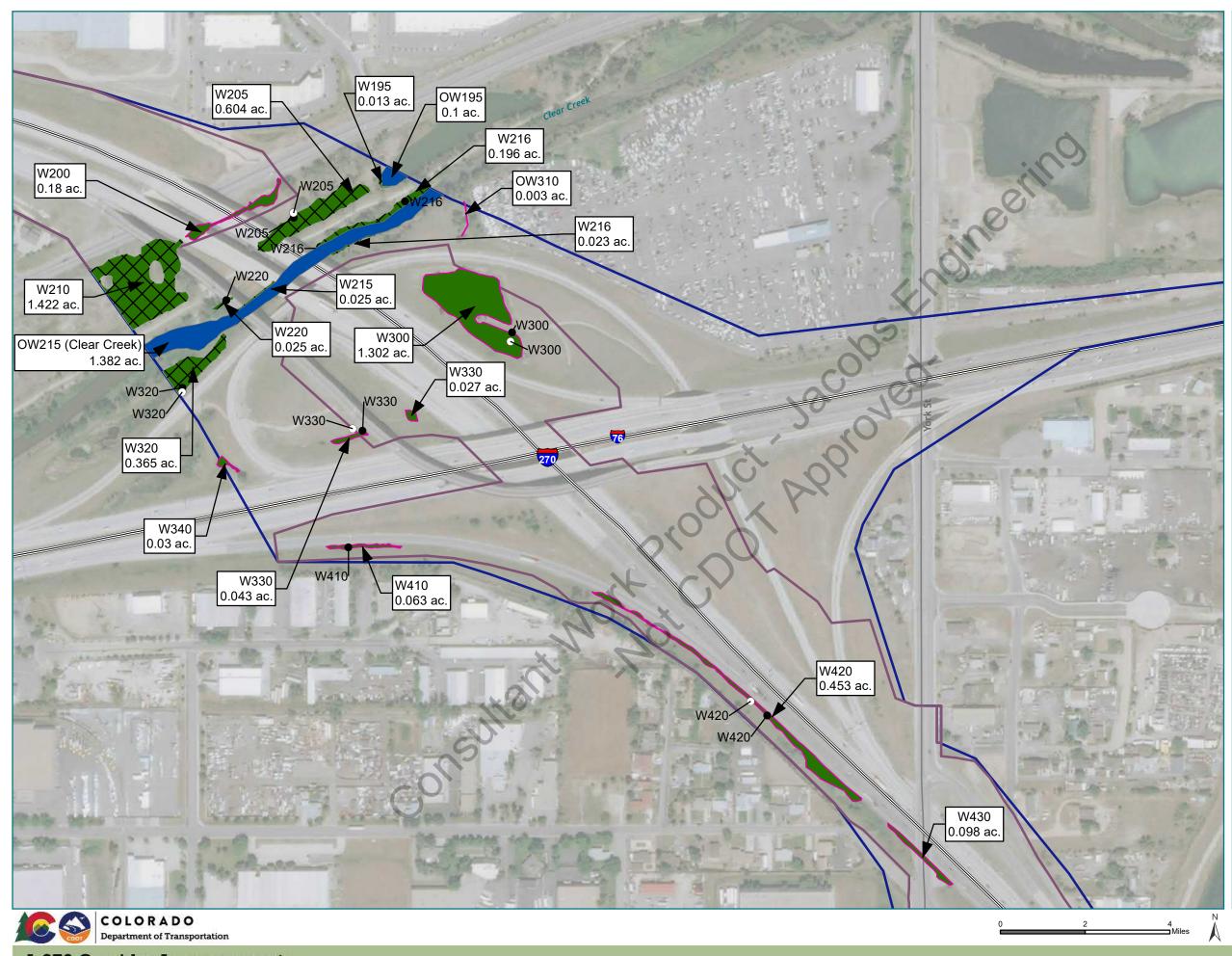


# I-270 ENVIRONMENTAL ASSESSMENT WETLAND DELINEATION MAPBOOK

- Study Area
- Approximate Project
- Wetland Data Point
- Upland Data Point
- OWUS, OW, Jurisdictional
- OWUS, OW, Non-Jurisdictional
- Wetland, PEM, Jurisdictional
- Wetland, PEM, Non-Jurisdictional
- Wetland, PSS, Jurisdictional

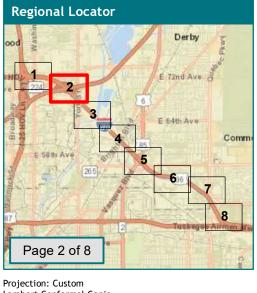


North American Datum 1983 (2011) Source: ESRI and its data partners

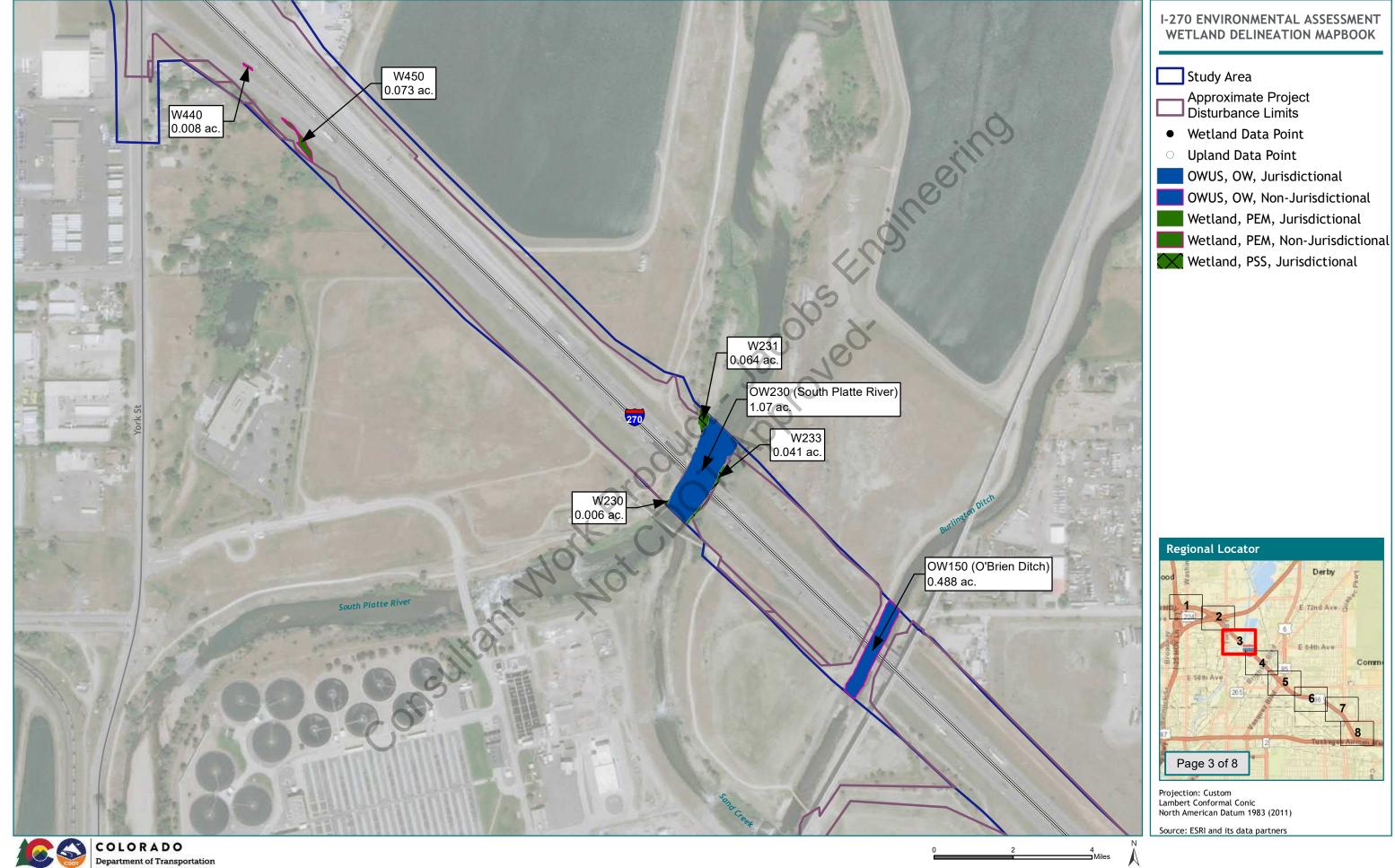


# I-270 ENVIRONMENTAL ASSESSMENT WETLAND DELINEATION MAPBOOK

- Study Area
- Approximate Project Disturbance Limits
- Wetland Data Point
- Upland Data Point
- OWUS, OW, Jurisdictional
- OWUS, OW, Non-Jurisdictional
- Wetland, PEM, Jurisdictional
- Wetland, PEM, Non-Jurisdictional
- Wetland, PSS, Jurisdictional



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)



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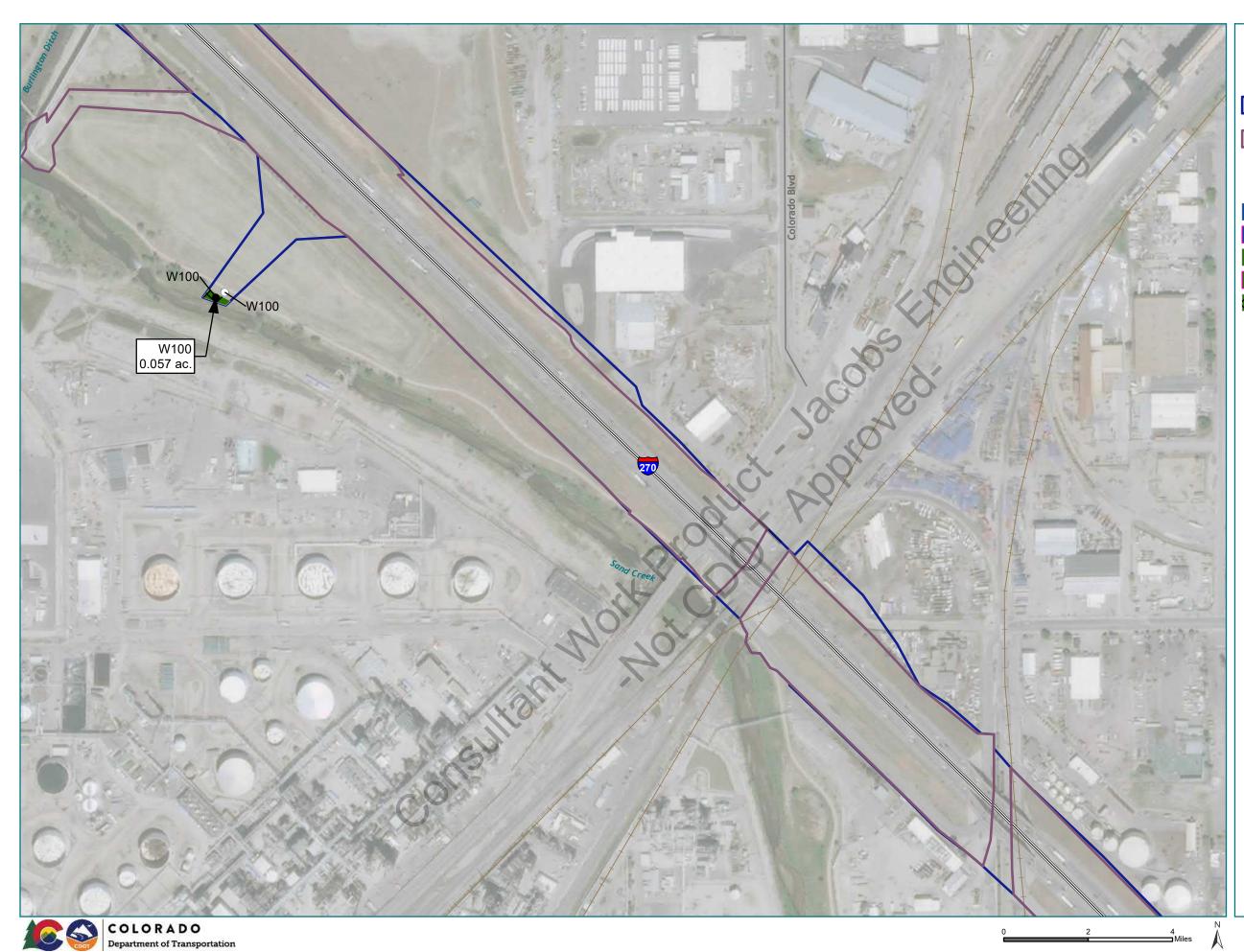
Source: ESRI and its data partners

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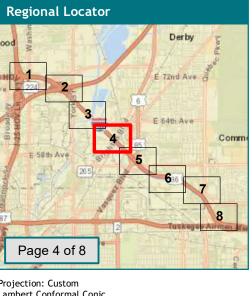
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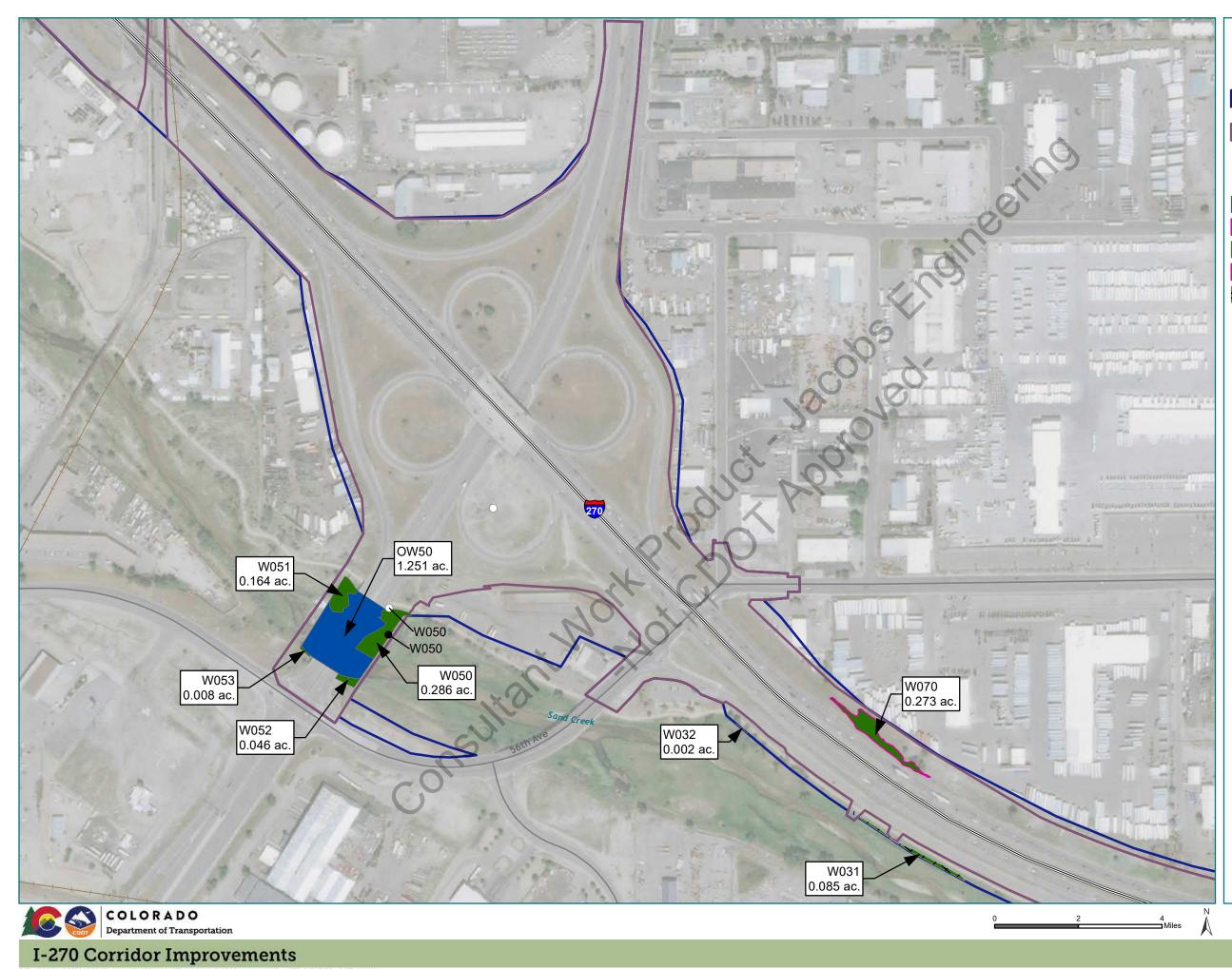
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# I-270 ENVIRONMENTAL ASSESSMENT WETLAND DELINEATION MAPBOOK

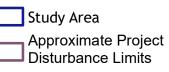
- Study Area
- Approximate Project Disturbance Limits
- Wetland Data Point
- Upland Data Point
- OWUS, OW, Jurisdictional
- OWUS, OW, Non-Jurisdictional
- Wetland, PEM, Jurisdictional
- Wetland, PEM, Non-Jurisdictional
- Wetland, PSS, Jurisdictional



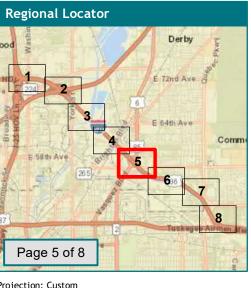
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# I-270 ENVIRONMENTAL ASSESSMENT WETLAND DELINEATION MAPBOOK



- Wetland Data Point
- Upland Data Point
- OWUS, OW, Jurisdictional
- OWUS, OW, Non-Jurisdictional
- Wetland, PEM, Jurisdictional
- Wetland, PEM, Non-Jurisdictional
- Wetland, PSS, Jurisdictional

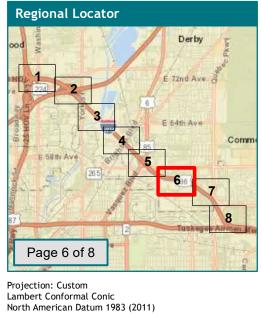


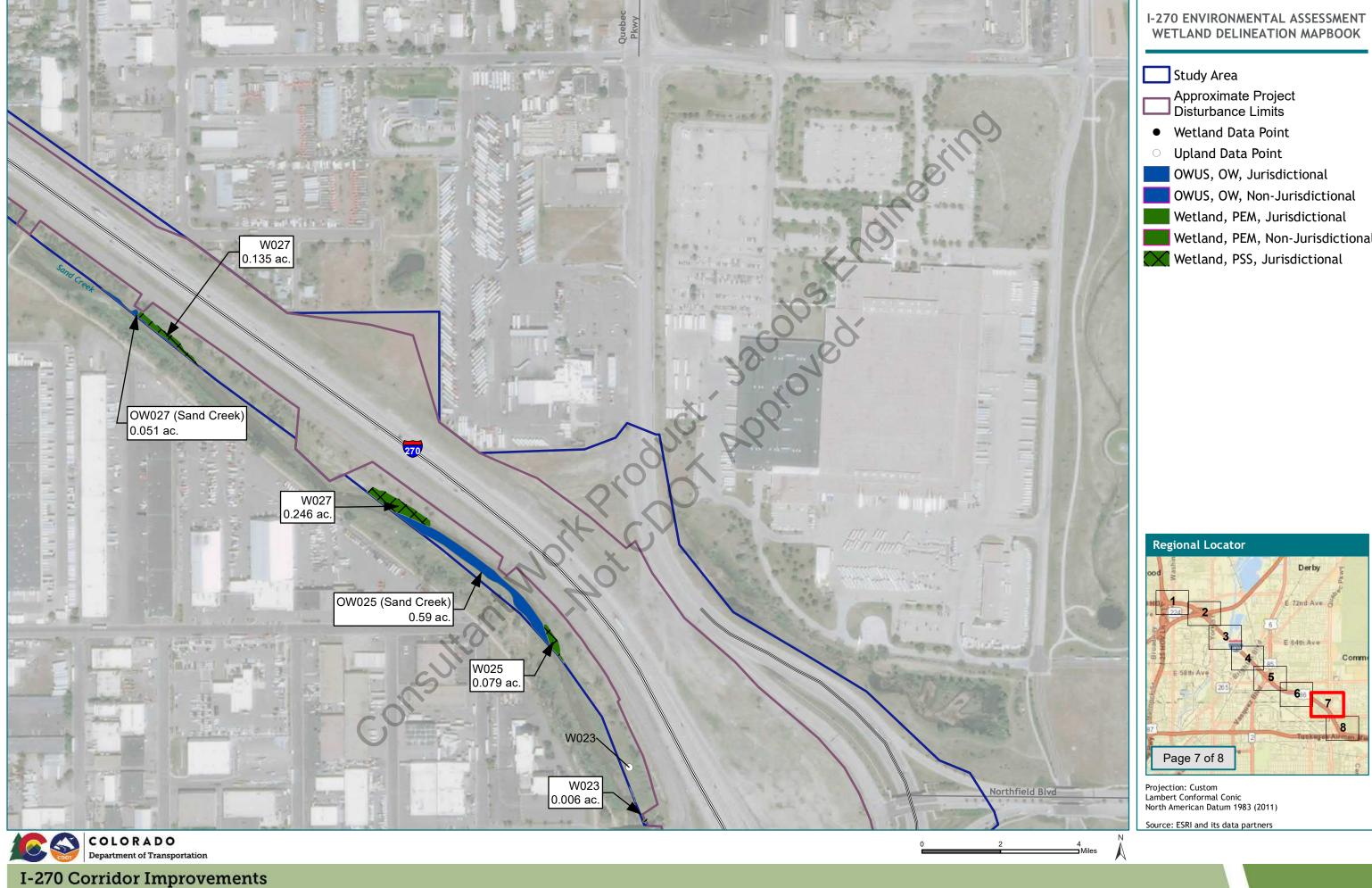
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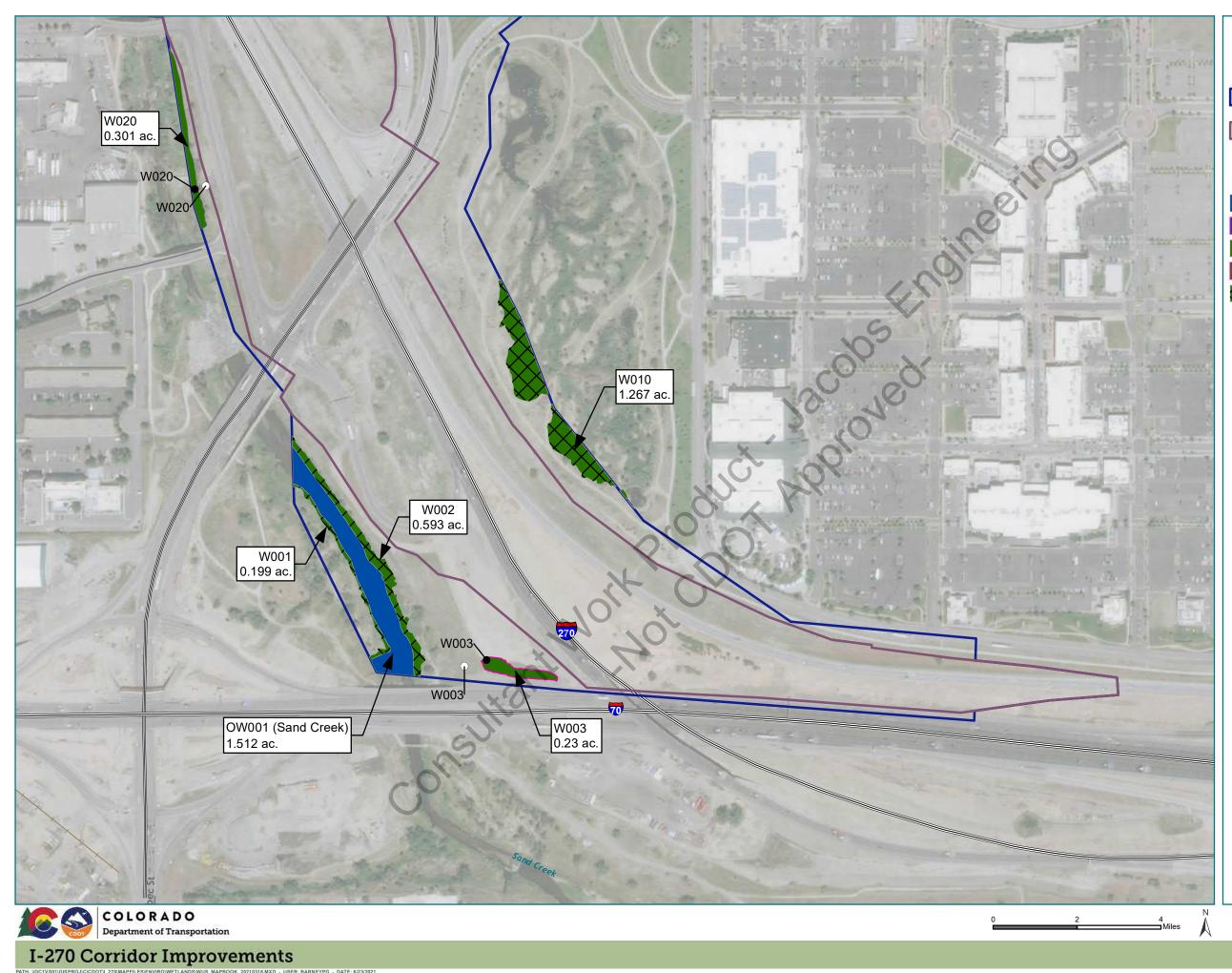
# I-270 ENVIRONMENTAL ASSESSMENT WETLAND DELINEATION MAPBOOK

- Study Area
- Approximate Project Disturbance Limits
- Wetland Data Point
- Upland Data Point
- OWUS, OW, Jurisdictional
- OWUS, OW, Non-Jurisdictional
- Wetland, PEM, Jurisdictional
- Wetland, PEM, Non-Jurisdictional
- Wetland, PSS, Jurisdictional

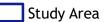


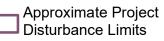


- Wetland, PEM, Non-Jurisdictional

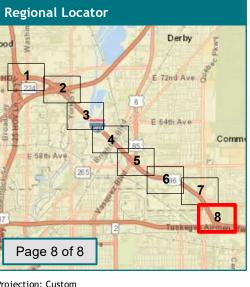


# I-270 ENVIRONMENTAL ASSESSMENT WETLAND DELINEATION MAPBOOK





- Wetland Data Point
- Upland Data Point
  - OWUS, OW, Jurisdictional
  - OWUS, OW, Non-Jurisdictional
  - Wetland, PEM, Jurisdictional
  - Wetland, PEM, Non-Jurisdictional
- Wetland, PSS, Jurisdictional



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Appendix B Wetland Delineation Data Sheets Month Consultant Workshot

# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 1-270		_ City/County: Ada	ams		Sampling Date	<u>    6/09/20                                  </u>
Applicant/Owner: Colorado Department of	ransportation		S	tate: Colorado	Sampling Point	W003 upl
Investigator(s): Brett Hartmann, Pat Hickey		_ Section, Townsh	ip, Range: <u>S21</u>	I T3S R67W		
Landform (hillslope, terrace, etc.): swale		Local relief (con	cave, convex, r	none): <u>Convex</u>	S	lope (%): <u>5</u>
Subregion (LRR): LRR G	Lat: <u>3</u>	9.77877	Long:	-104.8987	Da	tum:
Soil Map Unit Name: NOTCOM				NWI classifica	ation: None	$\cdot \circ$
Are climatic / hydrologic conditions on the s	ite typical for this time of	year? Yes	No X (II	f no, explain in Re	marks.)	$\sim$
Are Vegetation, Soil, or Hyd	Irology Xsignificant	lly disturbed?	Are "Normal (	Circumstances" pr	esent? Yes	<u>No X</u>
Are Vegetation, Soil X, or Hyd	lrology naturally p	problematic?	(If needed, ex	plain any answers	s in Remarks.)	
SUMMARY OF FINDINGS – Atta	ch site map showir	ng sampling po	oint locatior	ıs, transects,	important	features, etc.
Hydrophytic Vegetation Present?	Yes <u>No X</u>	la tha Ca			2	
	Yes No X	is the Sa	mpled Area Wetland?	Yes	No X	
Wetland Hydrology Present?	Yes No <u>X</u>		wettand:	res		-
Remarks:				S		
Swale had 2" of standing wa	ter at time of insp	pection due t	o heavy ra	ins over the	e past 12 h	iours.

# **VEGETATION – Use scientific names of plants.**

•	nts.			
Tree Stratum (Plot size: )		Dominant Species?		Dominance Test worksheet:
		<u>-Species :</u>	Status	Number of Dominant Species That Are OBL, FACW, or FAC
1				(excluding FAC-): $1$ (A)
2				0
3		$\overline{\nabla}$	$ \rightarrow $	Total Number of Dominant           Species Across All Strata:         2         (B)
4		- Tatal Car		
Sapling/Shrub Stratum (Plot size:)		= Total Cov	er	Percent of Dominant Species That Are OBL, FACW, or FAC: <sup>50</sup> (A/B)
1		$\sim$		
2.				Prevalence Index worksheet:
3.				Total % Cover of:Multiply by:
4				OBL species x 1 =
5.				FACW species $5$ x 2 = $10$
	10	= Total Cov	er	FAC species $72$ x 3 = $216$
Herb Stratum (Plot size: 10' x 10')				FACU species <u>2</u> x 4 = <u>8</u>
1. Bromus japonicus	5	Ν	NL	UPL species <u>16</u> x 5 = <u>80</u>
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	Ν	FACW	Prevalence Index = $B/A = \frac{3.3}{3}$
4. Bouteloua dactyloides	2	Ν	FACU	
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:
6. Convolvulus arvensis	1	Ν	NL	1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	Ν	FAC	2 - Dominance Test is >50%
8. Cultivated rye-grass, erosion control	10	Y	NL	3 - Prevalence Index is ≤3.0 <sup>1</sup>
9.				<ul> <li>4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)</li> </ul>
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	er	
Woody Vine Stratum (Plot size:)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1				be present, unless disturbed of problematic.
2				Hydrophytic
		= Total Cov	er	Vegetation Present? Yes <u>No <sup>X</sup></u>
% Bare Ground in Herb Stratum 5				

Profile Des	cription: (Describ	e to the depth nee	eded to docun	nent the	indicator	or confirr	n the absence o	f indicators.)
Depth	Matrix			x Feature		2		
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0 - 2"	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
				·				
				·	·			
								0
					·			
<sup>1</sup> Type: C=C	oncentration, D=De	pletion RM=Redu	ced Matrix CS	S=Covere	d or Coate	d Sand G	rains <sup>2</sup> Loca	tion: PL=Pore Lining, M=Matrix.
	Indicators: (Appli							or Problematic Hydric Soils <sup>3</sup> :
Histosol								uck (A9) (LRR I, J)
	· · /			Gleyed Ma Redox (S5				rairie Redox (A16) ( <b>LRR F, G, H</b> )
	pipedon (A2) istic (A3)			Matrix (S				Inface (S7) ( <b>LRR G</b> )
	en Sulfide (A4)				neral (F1)			ains Depressions (F16)
	d Layers (A5) ( <b>LRR</b>	P E)		Gleyed M				R H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G			d Matrix (	• •			d Vertic (F18)
	d Below Dark Surfa			Dark Surfa	,	C		rent Material (TF2)
-	ark Surface (A12)				urface (F7)			allow Dark Surface (TF12)
	Aucky Mineral (S1)			Depressio	· · · · · · · · · · · · · · · · · · ·			Explain in Remarks)
	Mucky Peat or Peat	(S2) (L <b>RR G. H</b> )			essions (F	16)		f hydrophytic vegetation and
	ucky Peat or Peat (				73 of LRR			hydrology must be present,
			(					listurbed or problematic.
Restrictive	Layer (if present):						) · · · · · · · · · · · · · · · · · · ·	
Type:	· · · · · · · · · · · · · · · · · · ·				)			
Depth (in	abaa):				7	X	Hudria Sail F	Present? Yes <u>No <math>\times</math></u>
	cnes).		(				Hydric Soli F	
Remarks:						×		
	dav							
no re	aox	•	O					
	<b>•</b> )/	4	$\mathbf{X}$					
HYDROLO	GY			$\mathbf{\nabla}$				
Wetland Hy	drology Indicators	s:		)				
Primary Indi	cators (minimum of	one required; che	ck all that apply	y)			Secondar	y Indicators (minimum of two required)
	Water (A1)	~~~~	Salt Crust				Surfa	ce Soil Cracks (B6)
	ater Table (A2)		Aquatic Inv	. ,	e (B13)			sely Vegetated Concave Surface (B8)
X Saturati			Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					
		-	-					zed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)	-	Oxidized F			ing Roots		nere tilled)
	posits (B3)			not tilled)				ish Burrows (C8)
	at or Crust (B4)	-	Presence			1)		ation Visible on Aerial Imagery (C9)
	posits (B5)	-	Thin Muck				Geon	norphic Position (D2)
Inundati	ion Visible on Aeria	I Imagery (B7)	Other (Exp	plain in Re	emarks)		FAC-	Neutral Test (D5)
Water-S	Stained Leaves (B9)	)					Frost	-Heave Hummocks (D7) (LRR F)
Field Obser	vations:							
Surface Wat	er Present?	Yes X No	Depth (ind	ches): 2		_		
Water Table		Yes X No						
Saturation P		Yes X No				Wet	land Hydrology	Present? Yes X No
	pillary fringe)			. <u>-</u>			and rightology	NU
	corded Data (strea	m gauge, monitorii	ng well, aerial p	photos, pr	evious ins	pections),	, if available:	
Remarks:								
		1	-4: ·	I		1		
Standing	y water due to	o solí compa	ction and	neavy	rain ev	/ents.		

# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 1-270		City/County: <u>Adams</u>		Sampling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Transpor	tation		State: Colorado	Sampling Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range	S21 T3S R67W			
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%):				
Subregion (LRR): LRR G	Lat: 39.7	77877 Lo	ong: <u>-104.8987</u>	Datum:		
Soil Map Unit Name: <u>NOTCOM</u>			NWI classifica	tion: None		
Are climatic / hydrologic conditions on the site typic: Are Vegetation, Soil, or Hydrology Are Vegetation, Soil X, or Hydrology SUMMARY OF FINDINGS – Attach site	Xsignificantly	disturbed? Are "Nor oblematic? (If neede	mal Circumstances" pro	esent? Yes No X		
Hydric Soil Present? Yes	No X No X No X	Is the Sampled Are within a Wetland?		<u>у</u> No <u>×</u>		
Remarks: Swale had 2" of standing water at	time of inspe	ection due to heav	v rains over the	nast 12 hours		
				past 12 nouis.		

# **VEGETATION – Use scientific names of plants.**

•					
	Absolute			Dominance Test worksheet:	
		Species?	Status	Number of Dominant Species	
1				That Are OBL, FACW, or FAC (excluding FAC-): 1(A	• )
2					.)
3				Total Number of Dominant	
4				Species Across All Strata: 2 (B)	)
		= Total Cov	ver	Percent of Dominant Species	
Sapling/Shrub Stratum (Plot size:)	$\mathbf{\mathcal{T}}$			That Are OBL, FACW, or FAC: 50 (A/	/B)
1				Prevalence Index worksheet:	
2					
3				Total % Cover of: Multiply by:	
4	C			OBL species x 1 =	
5				FACW species $\frac{5}{70}$ x 2 = $\frac{10}{210}$	
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$	
Herb Stratum (Plot size: 10' x 10')				FACU species $\frac{2}{x4} = \frac{8}{x4}$	
1. Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>	
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B	B)
3. Hordeum jubatum	5	Ν	FACW		
4. Bouteloua dactyloides	2	Ν	FACU	Prevalence Index = $B/A = \frac{3.3}{2}$	
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:	
6. Convolvulus arvensis	1	Ν	NL	$\frac{X}{X}$ 1 - Rapid Test for Hydrophytic Vegetation	
7. Rumex crispus	1	N	FAC	$\frac{\overline{X}}{\overline{X}}$ 2 - Dominance Test is >50%	
8 Cultivated rye-grass, erosion control	10	Y	NL	<u>X</u> 3 - Prevalence Index is $\leq 3.0^1$	
9				4 - Morphological Adaptations <sup>1</sup> (Provide support	ting
10.				data in Remarks or on a separate sheet)	
10	95	= Total Cov		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
Woody Vine Stratum (Plot size:)		- 10(a) CO		<sup>1</sup> Indicators of hydric soil and wetland hydrology must	t
1				be present, unless disturbed or problematic.	
2				Hydrophytic	
		= Total Cov	/er	Vegetation	
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>	
Remarks:				1	
1					

Profile Desc	cription: (Describ	e to the depth ne	eded to docun	nent the i	indicator	or confirn	n the absence	of indicators.)
Depth	Matrix			k Feature				
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0 - 2"	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								À
					·			
					·			
					·			
<sup>1</sup> Type: C=C	oncentration, D=De	epletion, RM=Redu	iced Matrix, CS	=Covered	d or Coate	d Sand G	rains. <sup>2</sup> Loc	cation: PL=Pore Lining, M=Matrix.
	Indicators: (Appl							for Problematic Hydric Soils <sup>3</sup> :
Histosol				Bleyed Ma				Muck (A9) ( <b>LRR I, J</b> )
	pipedon (A2)		X Sandy F					Prairie Redox (A16) (LRR F, G, H)
	istic (A3)			Matrix (S	,			Surface (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			lains Depressions (F16)
	d Layers (A5) (LRR	(F)		Sleyed Ma	. ,			R H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G			d Matrix (				ed Vertic (F18)
	d Below Dark Surfa		Redox [	ark Surfa	ace (F6)	C	Red Pa	arent Material (TF2)
Thick Da	ark Surface (A12)		Deplete	d Dark Su	Irface (F7)		Very S	hallow Dark Surface (TF12)
Sandy M	Mucky Mineral (S1)		Redox D	)epressio	ns (F8) 📏	0	Other	(Explain in Remarks)
2.5 cm I	Mucky Peat or Peat	t (S2) (LRR G, H)	High Pla	ins Depre	essions (F	16)	<sup>3</sup> Indicators	of hydrophytic vegetation and
5 cm Mi	ucky Peat or Peat (	S3) ( <b>LRR F</b> )	(ML	RA 72 & 1	73 of LRR	<b>H</b> )	wetland	d hydrology must be present,
					ĸ		unless	disturbed or problematic.
Restrictive	Layer (if present):			C	~			
Туре:								
Depth (in	ches):						Hydric Soil	Present? Yes <u>No X</u>
Remarks:								
no re	dox				<b>N</b>			
	UUX	4						
HYDROLO	GY	× 1						
	drology Indicators			$\sim$				
-	•••		-11. 414				0	
	cators (minimum of	one requirea; cne						ary Indicators (minimum of two required)
X Surface		N .	Salt Crust					ace Soil Cracks (B6)
-	ater Table (A2)		Aquatic Inv					rsely Vegetated Concave Surface (B8)
X Saturati	on (A3)		Hydrogen				Drai	nage Patterns (B10)
Water M	larks (B1)		Dry-Seaso	n Water 1	Table (C2)		Oxic	dized Rhizospheres on Living Roots (C3)
Sedime	nt Deposits (B2)		X Oxidized R	hizosphe	res on Liv	ing Roots	(C3) (w	vhere tilled)
Drift De	posits (B3)		(where r	ot tilled)			Cra	yfish Burrows (C8)
Algal Ma	at or Crust (B4)		Presence of	of Reduce	ed Iron (C4	+)	Satu	uration Visible on Aerial Imagery (C9)
Iron Dep	posits (B5)		Thin Muck	Surface (	(C7)		Geo	morphic Position (D2)
Inundati	ion Visible on Aeria	I Imagery (B7)	Other (Exp	lain in Re	emarks)		FAC	C-Neutral Test (D5)
Water-S	Stained Leaves (B9)	)					Fros	st-Heave Hummocks (D7) (LRR F)
Field Obser								
Surface Wat	ter Present?	Yes X No	Depth (ind	thes). 2				
Water Table		Yes X No						
								y Present? Yes $\frac{X}{X}$ No
Saturation P	resent? pillary fringe)	Yes X No	Depth (Ind	nes): <u> </u>			and Hydrolog	y Present? Yes <u></u> No
	corded Data (strea	m gauge, monitori	ng well, aerial p	hotos, pr	evious ins	pections),	if available:	
				<i>.</i>		. ,,		
Remarks:								
Standing	g water due to	o soll compa	ction and	neavy	rain ev	/ents.		

# WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 1-270	City/County: Adams Sampling Date: 6/09/20
Applicant/Owner: Colorado Department of Transportation	State: <u>Colorado</u> Sampling Point: <u>W003 upl</u>
Investigator(s): Brett Hartmann, Pat Hickey	Section, Township, Range: S21 T3S R67W
Landform (hillslope, terrace, etc.): swale	Local relief (concave, convex, none): Convex Slope (%): 5
Subregion (LRR): LRR G Lat: 39.	.77877 Long: <u>-104.8987</u> Datum:
Soil Map Unit Name: <u>NOTCOM</u>	NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of ye	
Are Vegetation, Soil, or Hydrology X significantly	/ disturbed? Are "Normal Circumstances" present? Yes No X
Are Vegetation, Soil X, or Hydrology naturally pr	oblematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing	g sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes No X	Is the Semaled Area
Hydric Soil Present?         Yes         No         X	IS the patholet Area
Wetland Hydrology Present? Yes No X	
Remarks:	S
Swale had 2" of standing water at time of insp	ection due to heavy rains over the past 12 hours.

# **VEGETATION – Use scientific names of plants.**

VEGETATION – Use scientific names of plan	ts.		. ~	
<u>Tree Stratum</u> (Plot size:) 1		Dominant Species?		Dominance Test worksheet:           Number of Dominant Species           That Are OBL, FACW, or FAC           (excluding FAC-):
2 3 4		Ŝ	Ŕ	Total Number of Dominant         Species Across All Strata:
Sapling/Shrub Stratum (Plot size:) 1	0	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
2		$\bigcirc$		Prevalence Index worksheet: Total % Cover of: Multiply by:
4	67			OBL species         x 1 =           FACW species         5         x 2 =         10
Herb Stratum (Plot size: 10' x 10')	10	= Total Cov	ver	FAC species72 $x 3 = 216$ FACU species2 $x 4 = 8$
1. Bromus japonicus	5	Ν	NL	UPL species $16$ x 5 = $80$
2. Sporobolus airoides	70	Υ	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	Ν	FACW	2.2
4. Bouteloua dactyloides	2	Ν	FACU	Prevalence Index = $B/A = 3.3$
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:
6. Convolvulus arvensis	1	Ν	NL	1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	Ν	FAC	2 - Dominance Test is >50%
8. Cultivated rye-grass, erosion control	10	Y	NL	3 - Prevalence Index is ≤3.0 <sup>1</sup>
9.				4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
Woody Vine Stratum (Plot size:)	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2 % Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Hydrophytic Vegetation Present? Yes <u>No <sup>X</sup></u>
Remarks:				

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confiri	m the absence o	f indicators.)
Depth	Matrix			x Feature		12	Tautum	Dementer
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								$\mathbf{A}$
	· ·				·		·	
					·		·	
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :
-								ck (A9) (LRR I, J)
Histoso	pipedon (A2)			Gleyed Ma Redox (S5				rairie Redox (A16) (LRR F, G, H)
	listic (A3)		-	d Matrix (S				face (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			ins Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M				H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G	,	-	d Matrix (				I Vertic (F18)
	d Below Dark Surf			Dark Surfa	,	С		ent Material (TF2)
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Sha	allow Dark Surface (TF12)
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍	0	Other (E	xplain in Remarks)
	Mucky Peat or Pea				essions (F			hydrophytic vegetation and
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	RH)		nydrology must be present,
					<u>k</u>		unless d	isturbed or problematic.
Restrictive	Layer (if present)	:		. C				
Туре:					7	V.		×
Depth (in	iches):						Hydric Soil P	resent? Yes No X
Remarks:				5			•	
			~ { U					
no re	dox		O		)			
HYDROLC								
				$\mathbf{N}$				
-	drology Indicator		als all theat area				Casandan	( la dia stara ( asisina an affaira na autina d)
		f one required; che						<u>v Indicators (minimum of two required)</u>
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface (B8)
	ion (A3)		Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)
	posits (B3)			not tilled)				sh Burrows (C8)
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					orphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:	V		0				
Surface Wa	ter Present?	Yes X No				_		
Water Table	e Present?	Yes X No				_		×
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)	m aquaq monitori	na well parial	abataa ni		nontiona)	if available:	
Describe Re	Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:							
Domenter								
Remarks:	<u> </u>							
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.		

Project/Site: 1-270		City/County: <u>Adams</u>		Sampling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Transpor	tation		State: Colorado	Sampling Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		_ Section, Township, Range: <u>S21 T3S R67W</u>				
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>				
Subregion (LRR): LRR G	77877 Lo	ong: <u>-104.8987</u>	Datum:			
Soil Map Unit Name: <u>NOTCOM</u>			NWI classifica	tion: None		
Are climatic / hydrologic conditions on the site typic: Are Vegetation, Soil, or Hydrology Are Vegetation, Soil X, or Hydrology SUMMARY OF FINDINGS – Attach site	Xsignificantly	disturbed? Are "Nor oblematic? (If neede	mal Circumstances" pro	esent? Yes No X		
Hydric Soil Present? Yes	No X No X No X	Is the Sampled Are within a Wetland?		<u>у</u> No <u>×</u>		
Remarks: Swale had 2" of standing water at	time of inspe	ection due to heav	v rains over the	nast 12 hours		
				past 12 nouis.		

•					
	Absolute			Dominance Test worksheet:	
		Species?	Status	Number of Dominant Species	
1				That Are OBL, FACW, or FAC (excluding FAC-): 1(A	• )
2		~			.)
3				Total Number of Dominant	
4				Species Across All Strata: 2 (B)	)
		= Total Cov	ver	Percent of Dominant Species	
Sapling/Shrub Stratum (Plot size:)	$\mathbf{\mathcal{T}}$			That Are OBL, FACW, or FAC: 50 (A/	/B)
1				Prevalence Index worksheet:	
2					
3				Total % Cover of: Multiply by:	
4	C			OBL species x 1 =	
5				FACW species $\frac{5}{70}$ x 2 = $\frac{10}{210}$	
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$	
Herb Stratum (Plot size: 10' x 10')				FACU species $\frac{2}{x4} = \frac{8}{x4}$	
1. Bromus japonicus	5	Ν	NL	UPL species <u>16</u> x 5 = <u>80</u>	
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B	B)
3. Hordeum jubatum	5	Ν	FACW		
4. Bouteloua dactyloides	2	Ν	FACU	Prevalence Index = $B/A = \frac{3.3}{2}$	
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:	
6. Convolvulus arvensis	1	Ν	NL	$\frac{X}{X}$ 1 - Rapid Test for Hydrophytic Vegetation	
7. Rumex crispus	1	N	FAC	$\frac{\overline{X}}{\overline{X}}$ 2 - Dominance Test is >50%	
8 Cultivated rye-grass, erosion control	10	Y	NL	<u>X</u> 3 - Prevalence Index is $\leq 3.0^1$	
9				4 - Morphological Adaptations <sup>1</sup> (Provide support	ting
10.				data in Remarks or on a separate sheet)	
10	95	= Total Cov		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
Woody Vine Stratum (Plot size:)		- 10(a) CO		<sup>1</sup> Indicators of hydric soil and wetland hydrology must	t
1				be present, unless disturbed or problematic.	
2				Hydrophytic	
		= Total Cov	/er	Vegetation	
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>	
Remarks:				1	
1					

Profile Desc	cription: (Descri	be to the depth ne	eded to docur	nent the i	ndicator	or confirm	n the absence	of indicators.)	
Depth	Matrix			x Feature	S1				
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remark	S
0 - 2"	10 YR 3/2	100					. <u> </u>		
2 - 12"	10 YR 4/3	100							
					·				
					<u> </u>				
								C	7
								01	
1							. 2.		••••
		Depletion, RM=Redu				ed Sand Gr		cation: PL=Pore Lining	
-		blicable to all LRRs						for Problematic Hydr	
Histosol				Bleyed Ma				Nuck (A9) (LRR I, J)	
	pipedon (A2)			Redox (S5				Prairie Redox (A16) ( <b>LI</b> surface (S7) ( <b>LRR G</b> )	RF,G,H)
	istic (A3) en Sulfide (A4)			Matrix (S	neral (F1)			lains Depressions (F16	<b>`</b>
	d Layers (A5) ( <b>LR</b>	R F)		Gleyed Ma				R H outside of MLRA	
	uck (A9) (LRR F,			d Matrix (	. ,			ed Vertic (F18)	12 (110)
	d Below Dark Sur			Dark Surfa		C		arent Material (TF2)	
	ark Surface (A12)		Deplete	d Dark Su	irface (F7)			hallow Dark Surface (T	F12)
Sandy M	Aucky Mineral (S1	)	Redox [	Depressio	ns (F8) 📏	0	Other (	(Explain in Remarks)	
		at (S2) ( <b>LRR G, H</b> )			essions (F			of hydrophytic vegetati	
5 cm Mi	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 & 1	73 of LRR	RH)		d hydrology must be pre	
					<u> </u>	<u> </u>	unless	disturbed or problemat	ic.
Restrictive	Layer (if present	):		C	~				
Туре:				. / `	7				N/
Depth (in	ches):						Hydric Soil	Present? Yes	No
Remarks:				5					
			U s						
no re	dox		$\circ$						
		4	$\mathbf{X}$						
HYDROLO		N		$\mathbf{\nabla}$					
-	drology Indicato			)					
Primary Indi	<u>cators (minimum d</u>	of one required; che	ck all that apply	y)			<u>Seconda</u>	ary Indicators (minimum	of two required)
X Surface	Water (A1)		Salt Crust	(B11)			Surf	ace Soil Cracks (B6)	
X High Wa	ater Table (A2)		Aquatic Inv	/ertebrate	s (B13)		Spa	rsely Vegetated Conca	ve Surface (B8)
X Saturati	on (A3)	7	X Hydrogen	Sulfide O	dor (C1)		Drai	nage Patterns (B10)	
Water M	larks (B1)		Dry-Seaso	n Water T	able (C2)		Oxic	lized Rhizospheres on	Living Roots (C3)
Sedime	nt Deposits (B2)	·	Oxidized F	Rhizosphe	res on Liv	ing Roots	(C3) (w	here tilled)	
Drift De	posits (B3)		(where r	not tilled)			Cray	yfish Burrows (C8)	
Algal Ma	at or Crust (B4)		Presence	of Reduce	ed Iron (C4	4)	Satu	uration Visible on Aerial	Imagery (C9)
Iron Dep	posits (B5)		Thin Muck	Surface (	C7)		X Geo	morphic Position (D2)	
Inundati	ion Visible on Aer	ial Imagery (B7)	Other (Exp	lain in Re	emarks)		FAC	C-Neutral Test (D5)	
Water-S	Stained Leaves (B	9)					Fros	st-Heave Hummocks (D	7) (LRR F)
Field Obser	vations:								
Surface Wat	er Present?	Yes X No	Depth (ind	ches): 2					
Water Table	Present?	Yes X No							
Saturation P		Yes X No				Wetl	and Hydrology	y Present? Yes X	No
	pillary fringe)							,	
Describe Re	corded Data (stre	am gauge, monitori	ng well, aerial p	photos, pr	evious ins	pections),	if available:		
Remarks:									
Standing	water due	to soil compa	ction and	heavv	rain ev	/ents.			
1	-	1		,					

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W			
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>				
Subregion (LRR): LRR G	77877 Lo	ng: <u>-104.8987</u>	Datum:			
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None		
Are climatic / hydrologic conditions on the site typi	rks.)					
Are Vegetation, Soil, or Hydrology	X significantly	y disturbed? Are "Normal Circumstances" present? Yes No X				
Are Vegetation, Soil X, or Hydrology	naturally pro	roblematic? (If needed, explain any answers in Remarks.)				
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.		
Hydrophytic Vegetation Present? Yes	No X					
	No X	Is the Sampled Are within a Wetland?		No X		
Wetland Hydrology Present? Yes	No <u>X</u>					
Remarks:			5			
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.		

VEGETATION – Use scientific names of plants.								
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC				
2		X		(excluding FAC-): <u>1</u> (A)				
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)				
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)				
1 2				Prevalence Index worksheet:				
3.				Total % Cover of: Multiply by:				
4.	CN			OBL species x 1 =				
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$				
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$				
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$				
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$				
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)				
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$				
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:				
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation				
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%				
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$				
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting				
9.				data in Remarks or on a separate sheet)				
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)				
	95	= Total Cov	/er					
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
2				Hydrophytic				
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>				
Remarks:				·				

Profile Des	cription: (Describ	be to the depth ne				or confirm	m the absence o	f indicators.)
Depth	Matrix			x Feature	S1	. 2		
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0 - 2"	10 YR 3/2	100					·	
2 - 12"	10 YR 4/3	100						
								$\mathbf{\hat{\mathbf{A}}}$
						·	·	
<sup>1</sup> Type: C=C	oncentration D=D	epletion, RM=Redu	iced Matrix CS	S=Covere	d or Coate	d Sand G	irains <sup>2</sup> Loca	tion: PL=Pore Lining, M=Matrix.
		licable to all LRRs						or Problematic Hydric Soils <sup>3</sup> :
Histoso				Gleyed Ma				ick (A9) (LRR I, J)
	pipedon (A2)			Redox (S5				rairie Redox (A16) ( <b>LRR F, G, H</b> )
	istic (A3)		-	d Matrix (S				rface (S7) (LRR G)
	en Sulfide (A4)		Loamy	Mucky Mi	neral (F1)			ins Depressions (F16)
Stratifie	d Layers (A5) ( <b>LRI</b>	<b>R F</b> )	Loamy	Gleyed M	atrix (F2)		(LRR	H outside of MLRA 72 & 73)
1 cm M	uck (A9) (LRR F, G	6, H)		d Matrix (	,			d Vertic (F18)
-	d Below Dark Surf	ace (A11)		Dark Surfa	( )	С		ent Material (TF2)
	ark Surface (A12)				urface (F7)			allow Dark Surface (TF12)
	Mucky Mineral (S1)			Depressio				xplain in Remarks)
	Mucky Peat or Pea ucky Peat or Peat (				essions (F <b>73 of LRR</b>			f hydrophytic vegetation and hydrology must be present,
	ucky real of real	(33) ( <b>LKK F</b> )				. п)		isturbed or problematic.
Restrictive	Layer (if present)						unicas u	
Type:		•			)	$\mathbf{O}$		
Depth (in	iches):			$\sim$	7	$\mathbf{X}$	Hydric Soil P	resent? Yes <u>No X</u>
Remarks:	iciles).						Tryunc Son P	
			0					
no re	dox		Q					
HYDROLO	GY	N						
Wetland Hy	drology Indicator	's:		)				
Primary Indi	cators (minimum o	f one required; che	ck all that appl	y)			Secondary	/ Indicators (minimum of two required)
Surface	Water (A1)		Salt Crust	(B11)			Surfac	ce Soil Cracks (B6)
High Wa	ater Table (A2)		Aquatic In	vertebrate	es (B13)		Spars	ely Vegetated Concave Surface (B8)
Saturati	ion (A3)	7	Hydrogen	Sulfide O	dor (C1)		Draina	age Patterns (B10)
Water N	/larks (B1)		Dry-Seaso	on Water <sup>-</sup>	Table (C2)		Oxidiz	ed Rhizospheres on Living Roots (C3)
Sedime	nt Deposits (B2)		Oxidized F	Rhizosphe	eres on Liv	ing Roots	(C3) (wh	ere tilled)
Drift De	posits (B3)		(where I	not tilled)	)		Crayfi	sh Burrows (C8)
Algal M	at or Crust (B4)		Presence	of Reduce	ed Iron (C4	4)	Satura	ation Visible on Aerial Imagery (C9)
Iron De	posits (B5)		Thin Muck	Surface	(C7)		Geom	orphic Position (D2)
Inundat	ion Visible on Aeria	al Imagery (B7)	Other (Exp	olain in Re	emarks)		FAC-I	Neutral Test (D5)
Water-S	Stained Leaves (B9	))					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:			_				
Surface Wat	ter Present?	Yes X No	Depth (in	ches): <u>2</u>		_		
Water Table	Present?	Yes X No	Depth (in	ches): <u>-2</u>				
Saturation F	Present?	Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	(includes capillary fringe) Dependence of the second seco							
Describe Re	ecorded Data (strea	am gauge, monitori	ng well, aerial	photos, pr	evious ins	pections)	, if available:	
Remarks:								
	n water due t	o soil compa	ction and	heevu	rain ev	/onte		
Juanuni	ງ ໜລະວາ ບິນອີ ໂ	o son compa	ouon anu	ncavy	ian cl	CIIIO.		

Project/Site: 1-270		City/County: <u>Adams</u>		Sampling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Transpor	tation		State: Colorado	Sampling Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		_ Section, Township, Range: <u>S21 T3S R67W</u>				
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>				
Subregion (LRR): LRR G	77877 Lo	ong: <u>-104.8987</u>	Datum:			
Soil Map Unit Name: <u>NOTCOM</u>			NWI classifica	tion: None		
Are climatic / hydrologic conditions on the site typic: Are Vegetation, Soil, or Hydrology Are Vegetation, Soil X, or Hydrology SUMMARY OF FINDINGS – Attach site	Xsignificantly	disturbed? Are "Nor oblematic? (If neede	mal Circumstances" pro	esent? Yes No X		
Hydric Soil Present? Yes	No X No X No X	Is the Sampled Are within a Wetland?		<u>у</u> No <u>×</u>		
Remarks: Swale had 2" of standing water at	time of inspe	ection due to heav	v rains over the	nast 12 hours		
				past 12 nouis.		

•					
	Absolute			Dominance Test worksheet:	
		Species?	Status	Number of Dominant Species	
1				That Are OBL, FACW, or FAC (excluding FAC-): 1(A	• )
2		~			.)
3				Total Number of Dominant	
4				Species Across All Strata: 2 (B)	)
		= Total Cov	ver	Percent of Dominant Species	
Sapling/Shrub Stratum (Plot size:)	$\mathbf{\mathcal{T}}$			That Are OBL, FACW, or FAC: 50 (A/	/B)
1				Prevalence Index worksheet:	
2					
3				Total % Cover of: Multiply by:	
4	C			OBL species x 1 =	
5				FACW species $\frac{5}{70}$ x 2 = $\frac{10}{210}$	
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$	
Herb Stratum (Plot size: 10' x 10')				FACU species $\frac{2}{x4} = \frac{8}{x4}$	
1. Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>	
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B	B)
3. Hordeum jubatum	5	Ν	FACW		
4. Bouteloua dactyloides	2	Ν	FACU	Prevalence Index = $B/A = \frac{3.3}{2}$	
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:	
6. Convolvulus arvensis	1	Ν	NL	$\frac{X}{X}$ 1 - Rapid Test for Hydrophytic Vegetation	
7. Rumex crispus	1	N	FAC	$\frac{\overline{X}}{\overline{X}}$ 2 - Dominance Test is >50%	
8 Cultivated rye-grass, erosion control	10	Y	NL	<u>X</u> 3 - Prevalence Index is $\leq 3.0^1$	
9				4 - Morphological Adaptations <sup>1</sup> (Provide support	ting
10.				data in Remarks or on a separate sheet)	
10	95	= Total Cov		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
Woody Vine Stratum (Plot size:)		- 10(a) CO		<sup>1</sup> Indicators of hydric soil and wetland hydrology must	t
1				be present, unless disturbed or problematic.	
2				Hydrophytic	
		= Total Cov	/er	Vegetation	
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>	
Remarks:				1	
1					

Profile Des	cription: (Descri	be to the depth ne	eded to docur	nent the i	ndicator	or confirn	n the absence	of indicators.	.)	
Depth	Matrix			x Feature						
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0 - 2"	10 YR 3/2	100								
2 - 12"	10 YR 4/3	100								
										$\overline{\mathbf{A}}$
———				·		<u> </u>				
					. <u> </u>	<u> </u>				
									0	
									0,~	
					·					
					·					
		Depletion, RM=Redu				ed Sand Gi		ation: PL=Po		
-		blicable to all LRRs						for Problema	-	Solls":
Histosol				Bleyed Ma				luck (A9) (LRI		
	pipedon (A2)			Redox (S5				Prairie Redox		F, G, H)
	istic (A3)			Matrix (S				urface (S7) (L		
	en Sulfide (A4) d Layers (A5) ( <b>LR</b>			Mucky Mir Gleyed Ma	, ,			lains Depressi R H outside o	. ,	8 73)
	uck (A9) (LRR F, 0	,		d Matrix (	. ,			ed Vertic (F18		& <i>1</i> 3)
	d Below Dark Sur		X Redox [			C		arent Material	,	
X Thick D	ark Surface (A12)				Irface (F7)			hallow Dark S		2)
	Aucky Mineral (S1			Depressio		0		Explain in Rer		
2.5 cm l	Mucky Peat or Pea	at (S2) ( <b>LRR G, H</b> )	High Pla	ains Depre	essions (F	16)	<sup>3</sup> Indicators	of hydrophytic	vegetation	and
5 cm Mi	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 & 1	73 of LRR	H)	wetland	d hydrology mu	ust be prese	nt,
					κ ΄	<u> </u>	unless	disturbed or p	oroblematic.	
Restrictive	Layer (if present	):		С						
Туре:										
Depth (in	ches):						Hydric Soil	Present? Y	/es	No <u>×</u>
Remarks:			~							
no re	dox		$\sim$	(						
	0.071		X							
HYDROLO	GY									
Wetland Hy	drology Indicato	rs:	- (-	) <b>*</b>						
-	•••	of one required; che	ck all that apply	v)			Seconda	ry Indicators (	minimum of	two required)
	Water (A1)		Salt Crust					ace Soil Crack		
	ater Table (A2)		Aquatic Inv		s (B13)			rsely Vegetate		Surface (B8)
Saturati		~ ~	Hydrogen					nage Patterns		
	Aarks (B1)		Dry-Seaso		. ,			-		ng Roots (C3)
	nt Deposits (B2)		X Oxidized F					here tilled)		ing 1 (000)
37	posits (B3)			not tilled)		ing ricoto		/fish Burrows (	(C8)	
	at or Crust (B4)		Presence	,		1)	-	ration Visible		agery (C9)
-	posits (B5)		Thin Muck			r)	X Geo	morphic Positi	ion (D2)	
	ion Visible on Aeri	ial Imagery (B7)	Other (Exp					-Neutral Test		
	Stained Leaves (B				indixo)			t-Heave Hum		(I RR F)
Field Obser										()
Surface Wat		Yes X No	Depth (in	(hes). 2						
Water Table		Yes X No				—				
						-	and Hydrology	. D	X	N
Saturation P		Yes X No	Depth (ind	cnes): <u> </u>		_ weu		/ Present?	res <u> </u>	NO
	(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:									
Remarks:										
	water due :	to soil compa	ction and	heavy	rain o	onto				
	y water une	to son compa		neavy		CIIIS.				

Project/Site: 1-270		City/County: Adams		Samplinç	_ Sampling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Transportation			State: Colora	ado Samplinç	Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		_ Section, Township, Range: <u>S21 T3S R67W</u>					
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	77877	Long: -104.8987		Datum:			
Soil Map Unit Name: <u>NOTCOM</u>			NWI cla	ssification: No	ne		
Are climatic / hydrologic conditions on the site typical for th							
Are Vegetation, Soil, or Hydrology X		y disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology	naturally pro	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach site map	showing	g sampling point l	ocations, trans	ects, impor	tant features, etc.		
Hydrophytic Vegetation Present? Yes I	No X	In the Common	A	$\sim$			
Hydric Soil Present? Yes !		Is the Sampled within a Wetlar		No	х		
Wetland Hydrology Present? Yes I	No X	within a wetia	10: 163				
Remarks:			S				
Swale had 2" of standing water at time	e of inspe	ection due to he	avy rains ove	r the past	12 hours.		
1			$\frown$				

				-O - X - O.
VEGETATION – Use scientific names of plan	ts.		. ~	
	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC
2		_		(excluding FAC-): $1$ (A)
3		<u> </u>	-	Total Number of Dominant
4				Species Across All Strata: <u>2</u> (B)
		= Total Cov	ver	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)	$\cap$		Ÿ	That Are OBL, FACW, or FAC: 50 (A/B)
1				Prevalence Index worksheet:
2				Total % Cover of: Multiply by:
3				
4				OBL species         x 1 =           FACW species         5         x 2 =         10
5				
101 11 101	10	= Total Cov	ver	FAC species $\frac{72}{2}$ $x_3 = \frac{216}{8}$
Herb Stratum (Plot size: 10' x 10')	_	N		FACU species $\frac{2}{16}$ x 4 = $\frac{8}{80}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{05}$ x 5 = $\frac{80}{244}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:
6. Convolvulus arvensis	1	Ν	NL	1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	Ν	FAC	$\mathbf{X}$ 2 - Dominance Test is >50%
8. Cultivated rye-grass, erosion control	10	Υ	NL	3 - Prevalence Index is ≤3.0 <sup>1</sup>
9.				4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
10				· · · · · · · · · · · · · · · · · · ·
<u> </u>	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size:)		10101 000		<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2				Hydrophytic
		= Total Cov	/er	Vegetation
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>
Remarks:				

Profile Des	cription: (Describ	be to the depth ne				or confirm	m the absence o	f indicators.)
Depth	Matrix			x Feature	S1	. 2		
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0 - 2"	10 YR 3/2	100					·	
2 - 12"	10 YR 4/3	100						
								$\mathbf{\hat{\mathbf{A}}}$
						·	·	
					·			
<sup>1</sup> Type: C=C	oncentration D=D	epletion, RM=Redu	iced Matrix CS	S=Covere	d or Coate	d Sand G	irains <sup>2</sup> Loca	tion: PL=Pore Lining, M=Matrix.
		licable to all LRRs						or Problematic Hydric Soils <sup>3</sup> :
Histoso				Gleyed Ma				ick (A9) (LRR I, J)
	pipedon (A2)			Redox (S5				rairie Redox (A16) ( <b>LRR F, G, H</b> )
	istic (A3)		-	d Matrix (S				rface (S7) (LRR G)
	en Sulfide (A4)		Loamy	Mucky Mi	neral (F1)			ins Depressions (F16)
Stratifie	d Layers (A5) ( <b>LRI</b>	<b>R F</b> )	Loamy	Gleyed M	atrix (F2)		(LRR	H outside of MLRA 72 & 73)
1 cm M	uck (A9) (LRR F, G	6, H)		d Matrix (	,			d Vertic (F18)
-	d Below Dark Surf	ace (A11)		Dark Surfa	( )	С		ent Material (TF2)
	ark Surface (A12)				urface (F7)			allow Dark Surface (TF12)
	Mucky Mineral (S1)			Depressio				xplain in Remarks)
	Mucky Peat or Pea ucky Peat or Peat (				essions (F <b>73 of LRR</b>			f hydrophytic vegetation and hydrology must be present,
	ucky real of real	(33) ( <b>LKK F</b> )				. п)		isturbed or problematic.
Restrictive	Layer (if present)						unicas u	
Type:		•			)	$\mathbf{O}$		
Depth (in	iches):			$\sim$	7	$\mathbf{X}$	Hydric Soil P	resent? Yes <u>No X</u>
Remarks:	iciles).						Tryunc Son P	
			0					
no re	dox		Q					
HYDROLO	GY	N						
Wetland Hy	drology Indicator	's:		)				
Primary Indi	cators (minimum o	f one required; che	ck all that appl	y)			Secondary	/ Indicators (minimum of two required)
Surface	Water (A1)		Salt Crust	(B11)			Surfac	ce Soil Cracks (B6)
High Wa	ater Table (A2)		Aquatic In	vertebrate	es (B13)		Spars	ely Vegetated Concave Surface (B8)
Saturati	ion (A3)	7	Hydrogen	Sulfide O	dor (C1)		Draina	age Patterns (B10)
Water N	/larks (B1)		Dry-Seaso	on Water <sup>-</sup>	Table (C2)		Oxidiz	ed Rhizospheres on Living Roots (C3)
Sedime	nt Deposits (B2)		Oxidized F	Rhizosphe	eres on Liv	ing Roots	(C3) (wh	ere tilled)
Drift De	posits (B3)		(where I	not tilled)	)		Crayfi	sh Burrows (C8)
Algal M	at or Crust (B4)		Presence	of Reduce	ed Iron (C4	4)	Satura	ation Visible on Aerial Imagery (C9)
Iron De	posits (B5)		Thin Muck	Surface	(C7)		Geom	orphic Position (D2)
Inundat	ion Visible on Aeria	al Imagery (B7)	Other (Exp	olain in Re	emarks)		FAC-I	Neutral Test (D5)
Water-S	Stained Leaves (B9	))					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:			_				
Surface Wat	ter Present?	Yes X No	Depth (in	ches): <u>2</u>		_		
Water Table	Present?	Yes X No	Depth (in	ches): <u>-2</u>				
Saturation F	Present?	Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)			-				
Describe Re	ecorded Data (strea	am gauge, monitori	ng well, aerial	photos, pr	evious ins	pections)	, if available:	
Remarks:								
	n water due t	o soil compa	ction and	heevu	rain ev	/onte		
Juanuni	ງ ໜລະວາ ບິນອີ ໂ	o son compa	ouon anu	ncavy	ian cl	CIIIO.		

Project/Site: 1-270		City/County: <u>Adams</u>		Sampling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Transpor	tation		State: Colorado	Sampling Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		_ Section, Township, Range: <u>S21 T3S R67W</u>				
Landform (hillslope, terrace, etc.): swale		Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>				
Subregion (LRR): LRR G Lat: 39.		77877 Lo	ong: <u>-104.8987</u>	Datum:		
Soil Map Unit Name: <u>NOTCOM</u>			NWI classifica	tion: None		
Are climatic / hydrologic conditions on the site typic: Are Vegetation, Soil, or Hydrology Are Vegetation, Soil X, or Hydrology SUMMARY OF FINDINGS – Attach site	Xsignificantly	disturbed? Are "Nor oblematic? (If neede	mal Circumstances" pro	esent? Yes No X		
Hydric Soil Present? Yes	No X No X No X	Is the Sampled Are within a Wetland?		<u>у</u> No <u>×</u>		
Remarks: Swale had 2" of standing water at	time of inspe	ection due to heav	v rains over the	nast 12 hours		
				past 12 nouis.		

•					
	Absolute			Dominance Test worksheet:	
		Species?	Status	Number of Dominant Species	
1				That Are OBL, FACW, or FAC (excluding FAC-): 1(A	• )
2					.)
3				Total Number of Dominant	
4				Species Across All Strata: 2 (B)	)
		= Total Cov	ver	Percent of Dominant Species	
Sapling/Shrub Stratum (Plot size:)	$\mathbf{\mathcal{T}}$			That Are OBL, FACW, or FAC: 50 (A/	/B)
1				Prevalence Index worksheet:	
2					
3				Total % Cover of: Multiply by:	
4	C			OBL species x 1 =	
5				FACW species $\frac{5}{70}$ x 2 = $\frac{10}{210}$	
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$	
Herb Stratum (Plot size: 10' x 10')				FACU species $\frac{2}{x4} = \frac{8}{x4}$	
1. Bromus japonicus	5	Ν	NL	UPL species <u>16</u> x 5 = <u>80</u>	
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B	B)
3. Hordeum jubatum	5	Ν	FACW		
4. Bouteloua dactyloides	2	Ν	FACU	Prevalence Index = $B/A = \frac{3.3}{2}$	
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:	
6. Convolvulus arvensis	1	Ν	NL	$\frac{X}{X}$ 1 - Rapid Test for Hydrophytic Vegetation	
7. Rumex crispus	1	N	FAC	$\frac{\overline{X}}{\overline{X}}$ 2 - Dominance Test is >50%	
8 Cultivated rye-grass, erosion control	10	Y	NL	<u>X</u> 3 - Prevalence Index is $\leq 3.0^1$	
9				4 - Morphological Adaptations <sup>1</sup> (Provide support	ting
10.				data in Remarks or on a separate sheet)	
10	95	= Total Cov		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
Woody Vine Stratum (Plot size:)		- 10(a) CO		<sup>1</sup> Indicators of hydric soil and wetland hydrology must	t
1				be present, unless disturbed or problematic.	
2				Hydrophytic	
		= Total Cov	/er	Vegetation	
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>	
Remarks:				1	
1					

Profile Des	cription: (Descri	be to the depth ne	eded to docur	nent the i	indicator	or confirn	n the absence	of indicators	.)	
Depth	Matri			x Feature						
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0 - 2"	10 YR 3/2	100		. <u></u>						
2 - 12"	10 YR 4/3	100								
								-		$\overline{\mathbf{A}}$
———										
					·					
				<u></u>						
									0	
									0	
				·	·					
				·						
		Depletion, RM=Redu				ed Sand G		ation: PL=Po		
-		blicable to all LRRs						for Problema	-	Solls":
Histosol				Sleyed Ma				luck (A9) (LR		
	pipedon (A2)			Redox (S5				Prairie Redox	, , ,	F, G, H)
	istic (A3) en Sulfide (A4)			Matrix (S				urface (S7) (I	,	
	d Layers (A5) ( <b>LR</b>			Gleyed Ma	neral (F1)			lains Depress R H outside	. ,	8 73)
	uck (A9) (LRR F,			d Matrix (				ed Vertic (F18		a 13)
	d Below Dark Sur			Dark Surfa		C		arent Material	,	
	ark Surface (A12)				Inface (F7)			hallow Dark S		2)
	Aucky Mineral (S1		Redox [	Depressio	ns (F8)	0		Explain in Re		,
X 2.5 cm	Mucky Peat or Pe	at (S2) ( <b>LRR G, H</b> )	High Pla	ains Depre	essions (F	16)	<sup>3</sup> Indicators	of hydrophytic	vegetation	and
5 cm Mi	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 & 1	73 of LRR	R H)	wetland	d hydrology m	ust be prese	nt,
					ĸ	5	unless	disturbed or p	problematic.	
Restrictive	Layer (if present	):		С						
Туре:										
Depth (in	ches):						Hydric Soil	Present?	res	No <u>×</u>
Remarks:					$\overline{\mathbf{X}}$					
no re	dox		$\sim$	(						
	0.071		X							
HYDROLO	GY									
Wetland Hy	drology Indicato	ors:	- (-	) -						
-	•••	of one required; che	ck all that appl	v)			Seconda	ry Indicators (	minimum of	two required)
	Water (A1)		Salt Crust				-	ace Soil Crack		<u>-</u> <u>/</u> /
	ater Table (A2)		Aquatic In		es (B13)			rsely Vegetate		Surface (B8)
X Saturati		7 ~	Hydrogen		• •			nage Patterns		
	larks (B1)		Dry-Seaso					-		ng Roots (C3)
	nt Deposits (B2)		Oxidized F					here tilled)		
	posits (B3)			not tilled)		ing rooto	. , .	/fish Burrows	(C8)	
	at or Crust (B4)		Presence	,		1)	-	ration Visible		agery (C9)
-	posits (B5)		Thin Muck			· /		morphic Posit		
	ion Visible on Aer	ial Imagery (B7)	Other (Exp					-Neutral Test		
	Stained Leaves (B				markoj			t-Heave Hum		(I RR F)
Field Obser		• • •								()
Surface Wat		Yes X No	Depth (in	-hes). 2						
		Yes X No				_				
Water Table						-		<b>D</b> (0)	. X	
Saturation P	resent? pillary fringe)	Yes X No	Depth (in	ches): <u> </u>		Weti	and Hydrology	Present?	res <u>~                                    </u>	No
		am gauge, monitori	ng well, aerial j	photos, pr	evious ins	pections),	if available:			
	`		- '	••		- //				
Remarks:										
	water due	to goil compo	otion and	hoovar	roin a	onto				
Sianding	g water due	to soil compa	cuon and	neavy	rain el	ents.				

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>			
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl			
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W				
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	77877 Lo	ng: <u>-104.8987</u>	Datum:				
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None			
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	X significantly	v disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology	naturally pro	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.			
Hydrophytic Vegetation Present? Yes	No X						
	No X	Is the Sampled Are within a Wetland?		No X			
Wetland Hydrology Present? Yes	No <u>X</u>	within a wetland.	163	<u> </u>			
Remarks:			5				
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.			

VEGETATION – Use scientific names of plan	ts.		. 0	
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC
2		X		(excluding FAC-): <u>1</u> (A)
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1 2				Prevalence Index worksheet:
3.				Total % Cover of: Multiply by:
4.	CN			OBL species x 1 =
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9.				data in Remarks or on a separate sheet)
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	/er	
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2				Hydrophytic
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>
Remarks:				·

Profile Des	cription: (Describ	be to the depth ne				or confirm	m the absence o	f indicators.)
Depth	Matrix			x Feature	S1	. 2		
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0 - 2"	10 YR 3/2	100					·	
2 - 12"	10 YR 4/3	100						
								$\mathbf{\hat{\mathbf{A}}}$
						·	·	
<sup>1</sup> Type: C=C	oncentration D=D	epletion, RM=Redu	iced Matrix CS	S=Covere	d or Coate	d Sand G	irains <sup>2</sup> Loca	tion: PL=Pore Lining, M=Matrix.
		licable to all LRRs						or Problematic Hydric Soils <sup>3</sup> :
Histoso				Gleyed Ma				ick (A9) (LRR I, J)
	pipedon (A2)			Redox (S5				rairie Redox (A16) ( <b>LRR F, G, H</b> )
	istic (A3)		-	d Matrix (S				rface (S7) (LRR G)
	en Sulfide (A4)		Loamy	Mucky Mi	neral (F1)			ins Depressions (F16)
Stratifie	d Layers (A5) ( <b>LRI</b>	<b>R F</b> )	Loamy	Gleyed M	atrix (F2)		(LRR	H outside of MLRA 72 & 73)
1 cm M	uck (A9) (LRR F, G	6, H)		d Matrix (	,			d Vertic (F18)
-	d Below Dark Surf	ace (A11)		Dark Surfa	( )	С		ent Material (TF2)
	ark Surface (A12)				urface (F7)			allow Dark Surface (TF12)
	Mucky Mineral (S1)			Depressio				xplain in Remarks)
	Mucky Peat or Pea ucky Peat or Peat (				essions (F <b>73 of LRR</b>			f hydrophytic vegetation and hydrology must be present,
	ucky real of real	(33) ( <b>LKK F</b> )				. п)		isturbed or problematic.
Restrictive	Layer (if present)						unicas u	
Type:		•			)	$\mathbf{O}$		
Depth (in	iches):			$\sim$	7	$\mathbf{X}$	Hydric Soil P	resent? Yes <u>No X</u>
Remarks:	iciles).						Tryunc Son P	
			0					
no re	dox		Q					
HYDROLO	GY	N						
Wetland Hy	drology Indicator	's:		)				
Primary Indi	cators (minimum o	f one required; che	ck all that appl	y)			Secondary	/ Indicators (minimum of two required)
Surface	Water (A1)		Salt Crust	(B11)			Surfac	ce Soil Cracks (B6)
High Wa	ater Table (A2)		Aquatic In	vertebrate	es (B13)		Spars	ely Vegetated Concave Surface (B8)
Saturati	ion (A3)	7	Hydrogen	Sulfide O	dor (C1)		Draina	age Patterns (B10)
Water N	/larks (B1)		Dry-Seaso	on Water <sup>-</sup>	Table (C2)		Oxidiz	ed Rhizospheres on Living Roots (C3)
Sedime	nt Deposits (B2)		Oxidized F	Rhizosphe	eres on Liv	ing Roots	(C3) (wh	ere tilled)
Drift De	posits (B3)		(where I	not tilled)	)		Crayfi	sh Burrows (C8)
Algal M	at or Crust (B4)		Presence	of Reduce	ed Iron (C4	4)	Satura	ation Visible on Aerial Imagery (C9)
Iron De	posits (B5)		Thin Muck	Surface	(C7)		Geom	orphic Position (D2)
Inundat	ion Visible on Aeria	al Imagery (B7)	Other (Exp	olain in Re	emarks)		FAC-I	Neutral Test (D5)
Water-S	Stained Leaves (B9	))					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:			_				
Surface Wat	ter Present?	Yes X No	Depth (in	ches): <u>2</u>		_		
Water Table	Present?	Yes X No	Depth (in	ches): <u>-2</u>				
Saturation F	Present?	Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)			-				
Describe Re	ecorded Data (strea	am gauge, monitori	ng well, aerial	photos, pr	evious ins	pections)	, if available:	
Remarks:								
	n water due t	o soil compa	ction and	heevu	rain ev	/onte		
Juanuni	ງ ໜລະວາ ບິນອີ ໂ	o son compa	ouon anu	ncavy	ian cl	CIIIO.		

Project/Site: 1-270		City/County: <u>Adams</u>		Sampling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Transpor	tation		State: Colorado	Sampling Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		_ Section, Township, Range: <u>S21 T3S R67W</u>				
Landform (hillslope, terrace, etc.): swale		Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>				
Subregion (LRR): LRR G Lat: 39.		77877 Lo	ong: <u>-104.8987</u>	Datum:		
Soil Map Unit Name: <u>NOTCOM</u>			NWI classifica	tion: None		
Are climatic / hydrologic conditions on the site typic: Are Vegetation, Soil, or Hydrology Are Vegetation, Soil X, or Hydrology SUMMARY OF FINDINGS – Attach site	Xsignificantly	disturbed? Are "Nor oblematic? (If neede	mal Circumstances" pro	esent? Yes No X s in Remarks.)		
Hydric Soil Present? Yes	No X No X No X	Is the Sampled Are within a Wetland?		<u>у</u> No <u>×</u>		
Remarks: Swale had 2" of standing water at	time of inspe	ection due to heav	v rains over the	nast 12 hours		
				past 12 nouis.		

•					
	Absolute			Dominance Test worksheet:	
		Species?	Status	Number of Dominant Species	
1				That Are OBL, FACW, or FAC (excluding FAC-): 1 (A	• )
2		~			.)
3				Total Number of Dominant	
4				Species Across All Strata: 2 (B)	)
		= Total Cov	ver	Percent of Dominant Species	
Sapling/Shrub Stratum (Plot size:)	$\mathbf{\mathcal{T}}$			That Are OBL, FACW, or FAC: 50 (A/	/B)
1				Prevalence Index worksheet:	
2					
3				Total % Cover of: Multiply by:	
4	C			OBL species x 1 =	
5				FACW species $\frac{5}{70}$ x 2 = $\frac{10}{210}$	
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$	
Herb Stratum (Plot size: 10' x 10')				FACU species $\frac{2}{x4} = \frac{8}{x4}$	
1. Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>	
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B	B)
3. Hordeum jubatum	5	Ν	FACW		
4. Bouteloua dactyloides	2	Ν	FACU	Prevalence Index = $B/A = \frac{3.3}{2}$	
5. Lactuca serriola	1	Ν	FAC	Hydrophytic Vegetation Indicators:	
6. Convolvulus arvensis	1	Ν	NL	$\frac{X}{X}$ 1 - Rapid Test for Hydrophytic Vegetation	
7. Rumex crispus	1	N	FAC	$\frac{\overline{X}}{\overline{X}}$ 2 - Dominance Test is >50%	
8 Cultivated rye-grass, erosion control	10	Y	NL	<u>X</u> 3 - Prevalence Index is $\leq 3.0^1$	
9				4 - Morphological Adaptations <sup>1</sup> (Provide support	ting
10.				data in Remarks or on a separate sheet)	
10	95	= Total Cov		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
Woody Vine Stratum (Plot size:)		- 10(a) CO		<sup>1</sup> Indicators of hydric soil and wetland hydrology must	t
1				be present, unless disturbed or problematic.	
2				Hydrophytic	
		= Total Cov	/er	Vegetation	
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>	
Remarks:				1	
1					

Profile Des	cription: (Descri	be to the depth ne	eded to docur	nent the i	ndicator	or confirm	n the absence	of indicator	s.)	
Depth	Matri			x Feature						
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0 - 2"	10 YR 3/2	100		. <u></u>						
2 - 12"	10 YR 4/3	100								
———										
									•	
									0	
									0	
				·	·					
				·	·					
		Depletion, RM=Redu				ed Sand Gr		ation: PL=P		
-		blicable to all LRRs						for Problem	-	Solls
Histosol				Sleyed Ma				luck (A9) (LF		
	pipedon (A2)		X Sandy F		,			Prairie Redox		F, G, H)
	istic (A3) en Sulfide (A4)			Matrix (S				urface (S7)	. ,	
	d Layers (A5) ( <b>LR</b>			Gleyed Ma	neral (F1)			lains Depres: R H outside	. ,	8 73)
	uck (A9) (LRR F,	,		d Matrix (	. ,			ed Vertic (F1		(d 13)
	d Below Dark Sur			Dark Surfa		C		arent Materia		
	ark Surface (A12)	, ,			irface (F7)			hallow Dark		2)
	Aucky Mineral (S1			Depressio		0		Explain in Re		,
2.5 cm l	Mucky Peat or Pe	at (S2) ( <b>LRR G, H</b> )	High Pla	ains Depre	essions (F	16)	<sup>3</sup> Indicators	of hydrophyti	c vegetation	and
5 cm Mi	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 & 1	73 of LRR	H)	wetland	l hydrology n	nust be prese	ent,
					κ ΄		unless	disturbed or	problematic.	
Restrictive	Layer (if present	):		С						
Туре:										
Depth (in	ches):						Hydric Soil	Present?	Yes	No <u>×</u>
Remarks:				5	X					
			C s							
no re	dox	4	$\sim$	(						
			X							
HYDROLO	GY									
Wetland Hy	drology Indicato	rs:	- (-	)						
Primary Indi	cators (minimum o	of one required; che	ck all that apply	v)			Seconda	ry Indicators	(minimum of	two required)
	Water (A1)		Salt Crust				Surf	ace Soil Crac	ks (B6)	
	ater Table (A2)		Aquatic Inv		s (B13)					Surface (B8)
Saturati			Hydrogen					nage Pattern		
	larks (B1)		Dry-Seaso					-		ing Roots (C3)
	nt Deposits (B2)		Oxidized F					here tilled)		g
	posits (B3)			not tilled)			. ,	/fish Burrows	(C8)	
	at or Crust (B4)		Presence	,		1)	-	ration Visible		agery (C9)
	posits (B5)		Thin Muck			.,		morphic Pos		
	on Visible on Aer	ial Imagery (B7)	Other (Exp					-Neutral Tes		
	Stained Leaves (B				inanco)			t-Heave Hun		(LRR F)
Field Obser										()
Surface Wat		Yes X No	Depth (in	-hes). 2						
		Yes X No				_				
Water Table						_		<b>B</b> (0)	., X	
Saturation P	resent? pillary fringe)	Yes X No	Depth (ind	ches): <u> </u>		vveti	and Hydrology	/ Present?	Yes <u>//</u>	No
		am gauge, monitori	ng well, aerial p	ohotos, pr	evious ins	pections),	if available:			
	Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:									
Remarks:										
	watardua	to goil compo	otion and	hoovar	roin a	onto				
Sianding	water due	to soil compa	cuon and	neavy	rain ev	ents.				

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>			
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl			
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W				
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	77877 Lo	ng: <u>-104.8987</u>	Datum:				
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None			
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	X significantly	v disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology	naturally pro	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.			
Hydrophytic Vegetation Present? Yes	No X						
	No X	Is the Sampled Are within a Wetland?		No X			
Wetland Hydrology Present? Yes	No <u>X</u>	within a wetland.	103	<u> </u>			
Remarks:			5				
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.			

VEGETATION – Use scientific names of plan	ts.		. 0	
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC
2		X		(excluding FAC-): <u>1</u> (A)
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1 2				Prevalence Index worksheet:
3.				Total % Cover of: Multiply by:
4.	CN			OBL species x 1 =
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9.				data in Remarks or on a separate sheet)
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	/er	
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2				Hydrophytic
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>
Remarks:				·

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confiri	m the absence o	f indicators.)
Depth	Matrix			x Feature		12	Tautum	Dementer
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								$\mathbf{A}$
	· ·				·		·	
					·		·	
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :
-								ck (A9) (LRR I, J)
Histoso	pipedon (A2)			Gleyed Ma Redox (S5				rairie Redox (A16) (LRR F, G, H)
	listic (A3)		-	d Matrix (S				face (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			ins Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M				H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G	,	-	d Matrix (				I Vertic (F18)
	d Below Dark Surf			Dark Surfa	,	С		ent Material (TF2)
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Sha	allow Dark Surface (TF12)
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍	0	Other (E	xplain in Remarks)
	Mucky Peat or Pea				essions (F			hydrophytic vegetation and
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	RH)		nydrology must be present,
					<u>k</u>		unless d	isturbed or problematic.
Restrictive	Layer (if present)	:		. C				
Туре:					7	V.		×
Depth (in	iches):						Hydric Soil P	resent? Yes No X
Remarks:				5			•	
			~ { U					
no re	dox		O		)			
HYDROLC								
				$\mathbf{N}$				
-	drology Indicator		als all theat area				Casandan	( la dia stara ( asisina an affaira na autina d)
		f one required; che						<u>v Indicators (minimum of two required)</u>
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface (B8)
	ion (A3)		Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)
	posits (B3)			not tilled)				sh Burrows (C8)
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					orphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:	V		0				
Surface Wa	ter Present?	Yes X No				_		
Water Table	e Present?	Yes X No				_		×
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)	m aquaq monitori	na well parial	abataa ni		nontiona)	if available:	
Describe Re	Storueu Data (Strea	am gauge, monitori	ng well, aerial	priotos, pl	evious Ins	pections)	, ii avallable:	
Domontori								
Remarks:	<u> </u>							
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.		

Project/Site: 1-270	City	/County: <u>Adams</u>		Sampling Date	: 6/09/20
Applicant/Owner: Colorado Department of Transportation			State: Colorado	Sampling Point	t: W003 upl
Investigator(s): Brett Hartmann, Pat Hickey	Sec	tion, Township, Range:	S21 T3S R67W		
Landform (hillslope, terrace, etc.): swale	Loc	al relief (concave, conv	ex, none): <u>Convex</u>	S	lope (%): <u>5</u>
Subregion (LRR): LRR G	Lat: <u>39.7787</u>	ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	ng: <u>-104.8987</u>	Da	tum:
Soil Map Unit Name: NOTCOM			NWI classifi	cation: None	
Are climatic / hydrologic conditions on the site typical for this		Yes No _X	_ (If no, explain in F	Remarks.)	
Are Vegetation, Soil, or Hydrology $X$ si	ignificantly dist	urbed? Are "Norr	mal Circumstances"	present? Yes_	No X
Are Vegetation, Soil X, or Hydrology na	aturally probler	natic? (If neede	d, explain any answe	ers in Remarks.)	
SUMMARY OF FINDINGS – Attach site map	showing sa	mpling point loca	tions, transect	s, important	features, etc.
Hydrophytic Vegetation Present? Yes No	o <u>X</u>	Is the Sampled Are		5	
Hydric Soil Present? Yes No	o <u>X</u>	within a Wetland?	Yes	No X	
Wetland Hydrology Present? Yes No	o <u>X</u>		res		_
Remarks:		-	G		
Swale had 2" of standing water at time	of inspecti	on due to heavy	rains over th	ie past 12 h	nours.

VEGETATION – Use scientific names of plar	nts.			
	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC         (excluding FAC-):
2				
3			$\rightarrow$	Total Number of Dominant
4		<u> </u>		Species Across All Strata: <u>2</u> (B)
Carling (Chryle Chatter (District)		= Total Cov	ver	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		$\sim$		That Are OBL, FACW, or FAC: 50 (A/B)
1		<u> </u>	·	Prevalence Index worksheet:
2			·	Total % Cover of:Multiply by:
3		)	. <u> </u>	OBL species x 1 =
4	-()×		·	FACW species $5$ x 2 = $10$
5	10		·	FAC species 72 x 3 = 216
Herb Stratum (Plot size: 10' x 10')	-10	= Total Cov	/er	FACU species $2$ x 4 = $8$
1 Bromus japonicus	5	N	NL	UPL species $16$ x 5 = $80$
2. Sporobolus airoides	70	Y	FAC	Column Totals: 95 (A) 314 (B)
3. Hordeum jubatum	5	N	FACW	
4. Bouteloua dactyloides	2	N	FACU	Prevalence Index = B/A = <u>3.3</u>
5 Lactuca serriola	1	N	FAC	Hydrophytic Vegetation Indicators:
6 Convolvulus arvensis	1	N	NL	X 1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	N	FAC	X 2 - Dominance Test is >50%
8 Cultivated rye-grass, erosion control	10	Y	NL	$\underline{X}$ 3 - Prevalence Index is $\leq 3.0^{1}$
9				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
10				data in Remarks or on a separate sheet)
	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size:)		- 101ai 00		<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2.				Hydrophytic
		= Total Cov	/er	Vegetation
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>
Remarks:				

Depth       Matrix       Record (most)       %       Tope       Loc*         10:40:es       100       100       100       100       100       100         2:-12       10 YR 4/3       100       100       100       100       100         2:-12       10 YR 4/3       100       100       100       100       100         11       100       100       100       100       100       100         11       100       100       100       100       100       100         11       100       100       100       100       100       100       100         11       100 <th>Profile Desc</th> <th>cription: (Descri</th> <th>be to the depth nee</th> <th>eded to docun</th> <th>nent the i</th> <th>indicator</th> <th>or confirn</th> <th>n the absence o</th> <th>of indicators</th> <th>.)</th> <th></th>	Profile Desc	cription: (Descri	be to the depth nee	eded to docun	nent the i	indicator	or confirn	n the absence o	of indicators	.)	
0 - 2"         10 YR 3/2         100           2 - 12"         10 YR 4/3         100							2				
2 - 12"       10 YR 4/3       100				olor (moist)	%	Type'	Loc	Texture		Remarks	
"Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains." Location: PL=Pore Lining, M=Matrix.         Hydric Soll Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators (Applicable to all LRRs, unless otherwise noted.)         Histos (A)       Sandy Glege Matrix (S4)       Indicators: (Applicable to all LRRs, unless otherwise noted.)         Histos (A)       Sandy Redox (S5)       Coast Praine Redox (A16) (LRR F, G, H)         Back Hiles (A)       Singped Matrix (S6)       Coast Praine Redox (A16) (LRR F, G, H)         Depleted Boark Surface (A1)       Redox Dark Surface (F7)       Redox Dark Surface (F7)         The Work (A9) (LRR F, G, H)       Depleted Dark Surface (F1)       Redox Dark Surface (F1)         S or Mucky Peat or Peat (S2) (LRR G, H)       High Plans Depressions (F16)       Redox Dark Surface (F12)         S or Mucky Peat or Peat (S2) (LRR G, H)       High Plans Depressions (F16)       Redox Dark Surface (F12)         S or Mucky Peat or Peat (S2) (LRR G, H)       High Plans Depressions (F16)       Redox Dark Surface (F12)         S or Mucky Peat or Peat (S2) (LRR G, H)       High Plans Depressions (F16)       Redox Dark Surface (F12)         S or Mucky Peat or Peat (S2) (LRR G, H)       High Plans Depressions (F16)       Redox Dark Surface (F12)         Surface Matrix (M1)       SafeTorus (R11)       SafeTorus (R11)       SafeTorus (R11)         Surface Soll Cracks	0 - 2"	10 YR 3/2	100								
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :	2 - 12"	10 YR 4/3	100								
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :											
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :					·	·					
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :					·	·		<u> </u>		•	
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :											
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :										0	
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :										0	
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :						·					
Hydric Soli Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators for Problematic Hydric Solis <sup>1</sup> :											
<ul> <li>Histosol (A1)             </li> <li>Histic Epipedon (A2)             </li> <li>Sandy Redox (S5)             </li> <li>Sandy Redox (S5)             </li> <li>Coast Fraine Redox (A16) (LRR F, G, H)             </li> <li>Depieted Below Dark Surface (A11)             </li> <li>Depieted Below Dark Surface (A12)             </li> <li>S of Mucky Peat or Peat (S2) (LRR F, I)             </li> <li>S of Mucky Peat or Peat (S2) (LRR F, I)             </li> <li>S of Mucky Peat or Peat (S2) (LRR F, I)             </li> <li>Might Peat or Peat (S2) (LRR F, I)             </li> <li>Might Peat or Peat (S2) (LRR F, I)             </li> <li>Might Piper Implementation (F16)             </li> <li>S of Mucky Peat or Peat (S2) (LRR F, I)             </li> <li>Might Piper Implementation and Vertice (F17)             </li> <li>Might Piper Implementation and Vertice (F17)             </li> <li>Might Piper Implementation and Vertice (F18)             </li> <li>Might Piper Implement Piper Implementatis (F18)             </li> <li>Migh</li></ul>							ed Sand Gi				
	Hydric Soil	Indicators: (App	plicable to all LRRs	, unless other	wise not	ed.)				-	Soils':
Back Histic (A3)       Stripped Matrix (S6)       Dark Surface (S7) (LRR R)         Hydrogen Sulfide (A4)       Loamy Gleyed Matrix (F2)       High Plains Depressions (F16)         1 cm Muck (A9) (LRR F, G, H)       Depleted Matrix (F2)       Reduced Veritic (F18)         Thick Dark Surface (A12)       Depleted Dark Surface (F7)       Reduced Veritic (F18)         2 S cm Mucky Peat or Peat (S2) (LRR F, H)       High Plains Depressions (F19)       Miceafors of hydrophytic vegetation and vectametral (TF2)         2 S cm Mucky Peat or Peat (S2) (LRR F, H)       High Plains Depressions (F19)       Miceafors of hydrophytic vegetation and vectametral (TF2)         7 pre:       Depleted Dark Surface (T7)       Redux Surface (T7)       No X         Retrictive Layer (If present):       Type:       Depleted Dark Surface (T12)       No X         Permary Indicators (minimum of one tequined, check all that apply)       Secondary Indicators (minimum of two required)         Surface Water (A1)       Salt Crust (B11)       Surface Soil Cracks (B6)         High Water Table (A2)       Adjuatic Invertebrates (B13)       Sparsely Vegetated Concave Surface (B8)         Surface Water (A1)       Salt Crust (B11)       Surface Soil Cracks (B6)         Saturation (A3)       Adjuatic Invertebrates (B13)       Sparsely Vegetated Concave Surface (B8)         Saturation (A3)       Hydrogen Sulfide Odor (C1)       Drintage	Histosol	(A1)									
→ Hydrogen Sulfide (A4)       → Loamy Mucky Mineral (F1)       → High Plains Depressions (F16)         → Stratified Layers (A5) (LRR F)       → Loamy Mucky Mineral (F1)       → High Plains Depressions (F16)         → Depleted Berw Dark Surface (A11)       → Depleted Matrix (F2)       → Reduced Veftic (F18)         → Depleted Berw Dark Surface (A11)       → Depleted Matrix (F2)       → Reduced Veftic (F18)         ▲ 2.5 cm Mucky Peat or Peat (S2) (LRR F)       → High Plains Depressions (F16)       → Micrace (T12)         ▲ 5 cm Mucky Peat or Peat (S2) (LRR F)       → High Plains Depressions (F16)       → Micrace (T12)         Bedrictive Layer (if present):       → High Plains Depressions (F16)       → Micracors of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.         Remarks:       mot ecdoxs       → Hydrolog Indicators:       → No ×         Primary Indicators (minimum of one teouring): check all that apply)       Secondary Indicators (minimum of two required)         → Sufface Water (A1)       → Adjuatic Invertebrates (B13)       → Sayrasel Vegetated Concave Sufface (B8)         → Sufface Water (A1)       → Adjuatic Invertebrates (B13)       → Sayrasel Vegetated Concave Sufface (B8)         → Sufface Water (A1)       → Adjuate Invertebrates (B13)       → Sayrasel Vegetated Concave Sufface (B8)         Saturation (A3)       → Hydrogen Sufface Odr (C1)       → Draiage Patterns (B10)						,				. , .	F, G, H)
					,	```				. ,	
□ Depleted Below Dark Surface (A11)       □ Depleted Dark Surface (F6)       □ Red a Dark Surface (F7)         □ Thick Dark Surface (A12)       □ Depleted Dark Surface (F7)       □ Very Shallow Dark Surface (TF12)         ○ Sandy Mucky Mineral (S1)       □ Redox Depressions (F16)       □ Very Shallow Dark Surface (TF12)         ○ Sond Mucky Peat or Peat (S2) (LRR 6, H)       □ High Plains Depressions (F16)       □ Very Shallow Dark Surface (TF12)         ○ Sond Mucky Peat or Peat (S3) (LRR F)       □ Very Shallow Dark Surface (TF12)       □ Very Shallow Dark Surface (TF12)         Restrictive Layer (If present):       □ Very Shallow Dark Surface (TF12)       □ Very Shallow Dark Surface (TF12)         Ype:       □ Depletin (inches):       □ Very Shallow Dark Surface (TF12)       □ Very Shallow Dark Surface (TF12)         Remarks:       Present?       Yes       No X				-	-						& 73)
				·		,				,	
Sandy Mucky Mineral (S1)						· · ·					2)
X       2.5 cm Mucky Peat or Peat (S2) (LRR G, H)       High Plains Depressions (F16)       Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.         Restrictive Layer (if present):       Type:		, ,				· · · · · · · · · · · · · · · · · · ·					2)
5 cm Mucky Peat or Peat (S3) (LRR F)       (MLRA 72 & 73 of LRR H)       wetland hydrology must be present, unless disturbed or problematic.         Restrictive Layer (If present):		•	,				(16)		•	,	and
unless disturbed or problematic.         Restrictive Layer (if present):         Type:										-	
Restrictive Layer (if present):         Type:			()	(							,
Type:	Restrictive	Layer (if present	):		Ċ			1 · · · · ·	'		
Depth (inches):       Hydric Soil Present?       Yes       No X         Remarks: <b>And Secondary Indicators:</b> Primary Indicators (minimum of one required; check all that apply)       Secondary Indicators (minimum of two required)							$\mathbf{O}$				
Remarks:         no redox         HYDROLOGY         Wetland Hydrology Indicators:         Primary Indicators (minimum of one tequired; check all that apply)       Secondary Indicators (minimum of two required)		ches).						Hydric Soil F	Present?	Yes	No X
Non redox         HYDROLOGY         Wetland Hydrology Indicators:         Primary Indicators (minimum of one required; Check all that apply)       Secondary Indicators (minimum of two required)		<u> </u>					<u> </u>				
HYDROLOGY         Wetland Hydrology Indicators:         Primary Indicators (minimum of one reduired; check all that apply)       Secondary Indicators (minimum of two required)	Remarks.										
HYDROLOGY         Wetland Hydrology Indicators:         Primary Indicators (minimum of one required; check all that apply)       Secondary Indicators (minimum of two required)	no ro	dov			C						
Wetland Hydrology Indicators:         Primary Indicators (minimum of one required: check all that apply)       Secondary Indicators (minimum of two required)		UUN	4								
Wetland Hydrology Indicators:         Primary Indicators (minimum of one required: check all that apply)       Secondary Indicators (minimum of two required)	HYDROLO	GY	×1								
Primary Indicators (minimum of one tequired; check all that apply)       Secondary Indicators (minimum of two required)			re'		$\mathbf{N}$						
Surface Water (A1)       Salt Crust (B11)       Surface Soil Cracks (B6)         High Water Table (A2)       Aquatic Invertebrates (B13)       Sparsely Vegetated Concave Surface (B8)         Saturation (A3)       Hydrogen Sulfide Odor (C1)       Drainage Patterns (B10)         X       Water Marks (B1)       Dry-Season Water Table (C2)       Oxidized Rhizospheres on Living Roots (C3)         Sediment Deposits (B3)       Oxidized Rhizospheres on Living Roots (C3)       (where not tilled)       Crayfish Burrows (C8)         Algal Mat or Crust (B4)       Presence of Reduced Iron (C4)       Saturation Visible on Aerial Imagery (C9)       Saturation Visible on Aerial Imagery (C9)         X       Inundation Visible on Aerial Imagery (B7)       Other (Explain in Remarks)       FAC-Neutral Test (D5)         Water Table Present?       Yes X       No       Depth (inches): 2         Water Table Present?       Yes X       No       Depth (inches): -2         Water Table Present?       Yes X       No       Depth (inches): -2         Water Table Present?       Yes X       No       Depth (inches): -2         Water Table Present?       Yes X       No       Depth (inches): -2         Water Table Present?       Yes X       No       Depth (inches): -2         Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), i	-	•••		al all that apply				Cocondor	Indicatora	(minimum of	two required)
			or one required, cried					-			two required)
Saturation (A3)       X       Hydrogen Sulfide Odor (C1)       Drainage Patterns (B10)         X       Water Marks (B1)      Dry-Season Water Table (C2)      Oxidized Rhizospheres on Living Roots (C3)         Sediment Deposits (B2)      Oxidized Rhizospheres on Living Roots (C3)      (where tilled)      Cayfish Burrows (C8)         X       Drift Deposits (B3)      (where not tilled)      Cayfish Burrows (C8)											
X       Water Marks (B1)	-										Surface (B8)
Sediment Deposits (B2)       Oxidized Rhizospheres on Living Roots (C3)       (where tilled)         X       Drift Deposits (B3)       (where not tilled)       Crayfish Burrows (C8)         Algal Mat or Crust (B4)       Presence of Reduced Iron (C4)       Saturation Visible on Aerial Imagery (C9)         Iron Deposits (B5)       Thin Muck Surface (C7)       X       Geomorphic Position (D2)         X       Inundation Visible on Aerial Imagery (B7)       Other (Explain in Remarks)       FAC-Neutral Test (D5)         Water-Stained Leaves (B9)       Depth (inches): 2       Frost-Heave Hummocks (D7) (LRR F)         Field Observations:       Surface Water Present?       Yes X       No       Depth (inches): -2         Water Table Present?       Yes X       No       Depth (inches): -2       Wetland Hydrology Present? Yes X       No         Saturation Present?       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:       Remarks:											
X       Drift Deposits (B3)       (where not tilled)       Crayfish Burrows (C8)         Algal Mat or Crust (B4)       Presence of Reduced Iron (C4)       Saturation Visible on Aerial Imagery (C9)         Iron Deposits (B5)       Thin Muck Surface (C7)       X       Geomorphic Position (D2)         X       Inundation Visible on Aerial Imagery (B7)       Other (Explain in Remarks)       FAC-Neutral Test (D5)         Water-Stained Leaves (B9)       Toppth (inches): 2       Frost-Heave Hummocks (D7) (LRR F)         Field Observations:       Surface Water Present?       Yes X       No       Depth (inches): 2         Water Table Present?       Yes X       No       Depth (inches): -2       Wetland Hydrology Present?       Yes X       No         Saturation Present?       Yes X       No       Depth (inches): -2       Wetland Hydrology Present?       Yes X       No         Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:       Remarks:       Remarks:			-	-						heres on Liv	ing Roots (C3)
			-				ing Roots			(00)	
				•	,						
X Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) FAC-Neutral Test (D5)   Water-Stained Leaves (B9) Frost-Heave Hummocks (D7) (LRR F)   Field Observations:   Surface Water Present? Yes X No   Depth (inches): 2   Water Table Present? Yes X No   Depth (inches): 0   Wetland Hydrology Present? Yes X No Depth (inches): One present? Yes X No Depth (inches): Present? Yes X No Depth (inches): One present? Yes X No Depth (inches): Present? Yes X No Depth (inches): One present? Yes X No Depth (inches): Present? Yes X No Depth (inches): One present? Yes X No Present?<	-		-				4)				agery (C9)
			-			. ,					
Field Observations:         Surface Water Present?       Yes X       No Depth (inches): 2         Water Table Present?       Yes X       No Depth (inches): -2         Saturation Present?       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:       Remarks:				Other (Exp	lain in Re	emarks)					
Surface Water Present?       Yes X       No Depth (inches): 2         Water Table Present?       Yes X       No Depth (inches): -2         Saturation Present?       Yes X       No Depth (inches): 0         Wetland Hydrology Present?       Yes X       No         Cincludes capillary fringe)       Depth (inches): 0       Wetland Hydrology Present?       Yes X       No         Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:       Remarks:       Remarks:	Water-S	Stained Leaves (B	9)					Frost	-Heave Hum	mocks (D7)	(LRR F)
Water Table Present?       Yes X       No       Depth (inches): -2         Saturation Present?       Yes X       No       Depth (inches): 0         Wetland Hydrology Present?       Yes X       No         Cincludes capillary fringe)       Depth (inches): 0       Wetland Hydrology Present?         Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:       Remarks:	Field Obser	vations:	V		0						
Saturation Present?       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:       Remarks:	Surface Wat	ter Present?									
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:	Water Table	Present?	Yes X No	Depth (ind	ches): <u>-2</u>		_				
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:	Saturation P	resent?	Yes X No	Depth (ind	ches): 0		Wetl	and Hydrology	Present?	Yes X	No
Remarks:							``	if a vall-1-1			
	Describe Re	corded Data (stre	am gauge, monitorir	ig well, aerial p	motos, pr	evious ins	pections),	ir avallable:			
Standing water due to soil compaction and heavy rain events.	Remarks:										
	Standing	water due	to soil compa	ction and	heavy	rain e	/ents.				

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>	
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl	
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W		
Landform (hillslope, terrace, etc.): swale		Local relief (concave, conv	ex, none): <u>Convex</u>	Slope (%): <u>5</u>	
Subregion (LRR): LRR G	Lat: <u>39.</u>	77877 Lo	ng: <u>-104.8987</u>	Datum:	
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None	
Are climatic / hydrologic conditions on the site typi	cal for this time of ye	ar? Yes No X	_ (If no, explain in Remar	rks.)	
Are Vegetation, Soil, or Hydrology	X significantly	disturbed? Are "Norr	nal Circumstances" prese	nt? Yes No X	
Are Vegetation, Soil X, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.	
Hydrophytic Vegetation Present? Yes	No X				
	No X	Is the Sampled Are within a Wetland?		No X	
Wetland Hydrology Present? Yes	No <u>X</u>	within a wetland.	103	<u> </u>	
Remarks:			5		
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.	

VEGETATION – Use scientific names of plan	ts.		. 0	
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC
2		X		(excluding FAC-): <u>1</u> (A)
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1 2				Prevalence Index worksheet:
3.				Total % Cover of: Multiply by:
4.	CN			OBL species x 1 =
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9.				data in Remarks or on a separate sheet)
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	/er	
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2				Hydrophytic
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>
Remarks:				·

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confiri	m the absence o	f indicators.)
Depth	Matrix			x Feature		12	Tautum	Dementer
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								$\mathbf{A}$
	· ·				·		·	
					·		·	
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :
-								ck (A9) (LRR I, J)
Histoso	pipedon (A2)			Gleyed Ma Redox (S5				rairie Redox (A16) (LRR F, G, H)
	listic (A3)		-	d Matrix (S				face (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			ins Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M				H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G	,	-	d Matrix (				I Vertic (F18)
	d Below Dark Surf			Dark Surfa	,	С		ent Material (TF2)
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Sha	allow Dark Surface (TF12)
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍	0	Other (E	xplain in Remarks)
	Mucky Peat or Pea				essions (F			hydrophytic vegetation and
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	RH)		nydrology must be present,
					<u>k</u>		unless d	isturbed or problematic.
Restrictive	Layer (if present)	:		. C				
Туре:					7	V.		×
Depth (in	iches):						Hydric Soil P	resent? Yes No X
Remarks:				5			•	
			~ { U					
no re	dox		O		)			
HYDROLC								
				$\mathbf{N}$				
-	drology Indicator		als all theat area				Casandan	( la dia stara ( asisina an affaira na autina d)
		f one required; che						<u>v Indicators (minimum of two required)</u>
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface (B8)
	ion (A3)		Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)
	posits (B3)			not tilled)				sh Burrows (C8)
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					orphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:	V		0				
Surface Wa	ter Present?	Yes X No				_		
Water Table	e Present?	Yes X No				_		×
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)	m aquaq monitori	na well parial	abataa ni		nontiona)	if available:	
Describe Re	Storueu Data (Strea	am gauge, monitori	ng well, aerial	priotos, pl	evious Ins	pections)	, ii avallable:	
Domontori								
Remarks:	<u> </u>							
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.		

Project/Site: 1-270	City	/County: <u>Adams</u>		Sampling Date	<u>:</u> 6/09/20
Applicant/Owner: Colorado Department of Transportation			State: Colorado	Sampling Point	t: W003 upl
Investigator(s): Brett Hartmann, Pat Hickey	Sec	tion, Township, Range:	S21 T3S R67W		
Landform (hillslope, terrace, etc.): swale	Loc	al relief (concave, conv	ex, none): <u>Convex</u>	S	lope (%): <u>5</u>
Subregion (LRR): LRR G	Lat: <u>39.7787</u>	7 Lo	ng: <u>-104.8987</u>	Da	tum:
Soil Map Unit Name: NOTCOM			NWI classifi	cation: None	
Are climatic / hydrologic conditions on the site typical for this		Yes No _X	_ (If no, explain in F	Remarks.)	
Are Vegetation, Soil, or Hydrology X si	ignificantly dist	urbed? Are "Norr	mal Circumstances"	present? Yes_	No X
Are Vegetation, Soil X, or Hydrology na	aturally probler	natic? (If neede	d, explain any answe	ers in Remarks.)	
SUMMARY OF FINDINGS – Attach site map	showing sa	mpling point loca	tions, transect	s, important	features, etc.
Hydrophytic Vegetation Present? Yes No	o <u>X</u>	Is the Sampled Are		5	
Hydric Soil Present? Yes No	o <u>X</u>	within a Wetland?	Yes	No X	
Wetland Hydrology Present? Yes No	o <u>X</u>		res		_
Remarks:		-	G		
Swale had 2" of standing water at time	of inspecti	on due to heavy	rains over th	ie past 12 h	nours.

VEGETATION – Use scientific names of plar	nts.			
	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC         (excluding FAC-):
2				
3			$\rightarrow$	Total Number of Dominant
4		<u> </u>		Species Across All Strata: <u>2</u> (B)
Carling (Chryle Chatter (Distaire)		= Total Cov	ver	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		$\sim$		That Are OBL, FACW, or FAC: 50 (A/B)
1		<u> </u>	·	Prevalence Index worksheet:
2			·	Total % Cover of:Multiply by:
3		)	. <u> </u>	OBL species x 1 =
4	-()×		·	FACW species $5$ x 2 = $10$
5	10		·	FAC species 72 x 3 = 216
Herb Stratum (Plot size: 10' x 10')	-10	= Total Cov	/er	FACU species $2$ x 4 = $8$
1 Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>
2. Sporobolus airoides	70	Y	FAC	Column Totals: 95 (A) 314 (B)
3. Hordeum jubatum	5	N	FACW	
4. Bouteloua dactyloides	2	N	FACU	Prevalence Index = B/A = <u>3.3</u>
5 Lactuca serriola	1	N	FAC	Hydrophytic Vegetation Indicators:
6 Convolvulus arvensis	1	N	NL	X 1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	N	FAC	X 2 - Dominance Test is >50%
8 Cultivated rye-grass, erosion control	10	Y	NL	$\underline{X}$ 3 - Prevalence Index is $\leq 3.0^1$
9				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
10				data in Remarks or on a separate sheet)
	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size:)		- 101ai 00		<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2.				Hydrophytic
		= Total Cov	/er	Vegetation
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>
Remarks:				

Depth (inches)       Matrix       Redox Features Color (moist)       Type1       Loc2       Texture       Remarks         0 - 2"       10 YR 3/2       100
0 - 2"       10 YR 3/2       100         2 - 12"       10 YR 4/3       100
2 - 12"       10 YR 4/3       100
Image:
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)       Indicators: (Applicable to all LRRs, unless otherwise noted.)
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) Festrictive Layer (if present): Type: Depth (inches): Remarks: Hydrogen Sulfide (A4) High Plains Depressions (F16) Mucky Peat or Peat (S3) (LRR F) High Plains Depressions (F16) High Plains Depressions (F16) High Plains Depressions (F16) Wery Shallow Dark Surface (TF12) Depted Dark Surface (F16) High Plains Depressions (F16) High Plains Depressions (F16) Wert (Explain in Remarks) High Plains Depressions (F16) Wetland hydrology must be present, unless disturbed or problematic. Remarks:
Stratified Layers (A5) (LRR F)
1 cm Muck (A9) (LRR F, G, H)      Depleted Matrix (F3)      Reduced Vertic (F18)
Depleted Below Dark Surface (A11)        X       Redox Dark Surface (F6)        Red Parent Material (TF2)          Sandy Mucky Mineral (S1)        Depleted Dark Surface (F7)        Very Shallow Dark Surface (TF12)          Sandy Mucky Peat or Peat (S2) (LRR G, H)        High Plains Depressions (F16)        Other (Explain in Remarks)          5 cm Mucky Peat or Peat (S3) (LRR F)        MLRA 72 & 73 of LRR H)        Wetland hydrology must be present, unless disturbed or problematic.         Restrictive Layer (if present):
Sandy Mucky Mineral (S1) 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) 5 cm Mucky Peat or Peat (S3) (LRR F) High Plains Depressions (F16) (MLRA 72 & 73 of LRR H) Other (Explain in Remarks) Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. Restrictive Layer (if present): Type: Depth (inches): Remarks: High Plains Depressions (F16) (MLRA 72 & 73 of LRR H) High Plains Depressions (F16) (MLRA 72 & 73 of LRR H) High Plains Depressions (F16) (MLRA 72 & 73 of LRR H) Other (Explain in Remarks) Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. No X
2.5 cm Mucky Peat or Peat (S2) (LRR G, H)       High Plains Depressions (F16)       3 Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.         Type: Depth (inches):       No X         Remarks:       No X
5 cm Mucky Peat or Peat (S3) (LRR F)       (MLRA 72 & 73 of LRR H)       wetland hydrology must be present, unless disturbed or problematic.         Restrictive Layer (if present):
unless disturbed or problematic.         Restrictive Layer (if present):         Type:
Restrictive Layer (if present):         Type:         Depth (inches):         Remarks:
Type:
Depth (inches):
Remarks:
no redox
no redox
HYDROLOGY
Wetland Hydrology Indicators:
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required)
Surface Water (A1) Salt Crust (B11) Surface Soil Cracks (B6)
High Water Table (A2) Aquatic Invertebrates (B13) Sparsely Vegetated Concave Surface (B8)
X       Saturation (A3)       Hydrogen Sulfide Odor (C1)       Drainage Patterns (B10)
X       Water Marks (B1)       Dry-Season Water Table (C2)       Oxidized Rhizospheres on Living Roots (C3)
Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) (where tilled)
Drift Deposits (B3) (where not tilled) Crayfish Burrows (C8)
Algal Mat or Crust (B4) Presence of Reduced Iron (C4) Saturation Visible on Aerial Imagery (C9)
Iron Deposits (B5) Thin Muck Surface (C7) X Geomorphic Position (D2)
X Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) FAC-Neutral Test (D5)
Water-Stained Leaves (B9) Frost-Heave Hummocks (D7) (LRR F)
Field Observations:
Surface Water Present? Yes X No Depth (inches): 2
Water Table Present? Yes X No Depth (inches): -2
Saturation Present? Yes X No Depth (inches): 0 Wetland Hydrology Present? Yes X No
(includes capillary fringe)
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
Remarks:

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>	
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl	
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W		
Landform (hillslope, terrace, etc.): swale		Local relief (concave, conv	ex, none): <u>Convex</u>	Slope (%): <u>5</u>	
Subregion (LRR): LRR G	Lat: <u>39.</u>	77877 Lo	ng: <u>-104.8987</u>	Datum:	
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None	
Are climatic / hydrologic conditions on the site typi	cal for this time of ye	ar? Yes No X	_ (If no, explain in Remar	rks.)	
Are Vegetation, Soil, or Hydrology	X significantly	disturbed? Are "Norr	nal Circumstances" prese	nt? Yes No X	
Are Vegetation, Soil X, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.	
Hydrophytic Vegetation Present? Yes	No X				
	No X	Is the Sampled Are within a Wetland?		No X	
Wetland Hydrology Present? Yes	No <u>X</u>	within a wetland.	163	<u> </u>	
Remarks:			5		
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.	

VEGETATION – Use scientific names of plan	ts.		. 0	
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC
2		X		(excluding FAC-): <u>1</u> (A)
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1 2				Prevalence Index worksheet:
3.				Total % Cover of: Multiply by:
4.	CN			OBL species x 1 =
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9.				data in Remarks or on a separate sheet)
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	/er	
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2				Hydrophytic
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>
Remarks:				·

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confiri	m the absence o	f indicators.)
Depth	Matrix			x Feature		12	Tautum	Dementer
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								$\mathbf{A}$
	· ·				·		·	
					·		·	
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :
-								ck (A9) (LRR I, J)
Histoso	pipedon (A2)			Gleyed Ma Redox (S5				rairie Redox (A16) (LRR F, G, H)
	listic (A3)		-	d Matrix (S				face (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			ins Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M				H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G	,	-	d Matrix (				I Vertic (F18)
	d Below Dark Surf			Dark Surfa	,	С		ent Material (TF2)
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Sha	allow Dark Surface (TF12)
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍	0	Other (E	xplain in Remarks)
	Mucky Peat or Pea				essions (F			hydrophytic vegetation and
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	RH)		nydrology must be present,
					<u>k</u>		unless d	isturbed or problematic.
Restrictive	Layer (if present)	:		. C				
Туре:					7	V.		×
Depth (in	iches):						Hydric Soil P	resent? Yes No X
Remarks:				5			•	
			~ { U					
no re	dox		O		)			
HYDROLC								
				$\mathbf{N}$				
-	drology Indicator		als all theat area				Casandan	( le die stars ( asisian as a faus as auties d)
		f one required; che						<u>v Indicators (minimum of two required)</u>
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface (B8)
	ion (A3)		Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)
	posits (B3)			not tilled)				sh Burrows (C8)
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					orphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:	V		0				
Surface Wa	ter Present?	Yes X No				_		
Water Table	e Present?	Yes X No				_		×
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)	m aquaq monitori	na well parial	abataa ni		nontiona)	if available:	
Describe Re	Storueu Data (Strea	am gauge, monitori	ng well, aerial	priotos, pl	evious Ins	pections)	, ii avallable:	
Domontori								
Remarks:	<u> </u>							
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.		

Project/Site: 1-270	City	/County: <u>Adams</u>	Sampling Date	<u>:</u> 6/09/20			
Applicant/Owner: Colorado Department of Transportation			State: Colorado	Sampling Point	t: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey	Sec	tion, Township, Range:	S21 T3S R67W				
Landform (hillslope, terrace, etc.): swale	Loc	Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	Lat: <u>39.7787</u>	ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	ng: <u>-104.8987</u>	Da	tum:		
Soil Map Unit Name: NOTCOM			NWI classifi	cation: None			
Are climatic / hydrologic conditions on the site typical for this		Yes No _X	_ (If no, explain in F	Remarks.)			
Are Vegetation, Soil, or Hydrology X si	ignificantly dist	ly disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology na	aturally probler	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach site map	showing sa	mpling point loca	tions, transect	s, important	features, etc.		
Hydrophytic Vegetation Present? Yes No	o <u>X</u>	Is the Sampled Are		5			
Hydric Soil Present? Yes No	o <u>X</u>	within a Wetland?	Yes	No X			
Wetland Hydrology Present? Yes No	o <u>X</u>		res		_		
Remarks:		-	G				
Swale had 2" of standing water at time	of inspecti	on due to heavy	rains over th	ie past 12 h	nours.		

VEGETATION – Use scientific names of plar	nts.			
	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC         (excluding FAC-):
2				
3			$\rightarrow$	Total Number of Dominant
4		<u> </u>		Species Across All Strata: <u>2</u> (B)
Carling (Chryle Chatter (District)		= Total Cov	ver	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		$\sim$		That Are OBL, FACW, or FAC: 50 (A/B)
1		<u> </u>	·	Prevalence Index worksheet:
2			·	Total % Cover of:Multiply by:
3		)	. <u> </u>	OBL species x 1 =
4	-()×		·	FACW species $5$ x 2 = $10$
5	10		·	FAC species 72 x 3 = 216
Herb Stratum (Plot size: 10' x 10')	-10	= Total Cov	/er	FACU species $2$ x 4 = $8$
1 Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>
2. Sporobolus airoides	70	Y	FAC	Column Totals: 95 (A) 314 (B)
3. Hordeum jubatum	5	N	FACW	
4. Bouteloua dactyloides	2	N	FACU	Prevalence Index = B/A = <u>3.3</u>
5 Lactuca serriola	1	N	FAC	Hydrophytic Vegetation Indicators:
6 Convolvulus arvensis	1	N	NL	X 1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	N	FAC	X 2 - Dominance Test is >50%
8 Cultivated rye-grass, erosion control	10	Y	NL	$\underline{X}$ 3 - Prevalence Index is $\leq 3.0^1$
9				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
10				data in Remarks or on a separate sheet)
	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size:)		- 101ai 00		<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2.				Hydrophytic
		= Total Cov	/er	Vegetation
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>
Remarks:				

Profile Desc	cription: (Describ	e to the depth nee	eded to docun	nent the i	indicator	or confirn	n the absence	of indicators.)
Depth	Matrix			x Feature	s			
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0 - 2"	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								À
					·			
					·	. <u> </u>	·	
								· · · · ·
<sup>1</sup> Type: C=C	oncentration, D=De	pletion, RM=Redu	ced Matrix, CS	=Covere	d or Coate	d Sand G	rains. <sup>2</sup> Loc	cation: PL=Pore Lining, M=Matrix.
	Indicators: (Appli							for Problematic Hydric Soils <sup>3</sup> :
Histosol				Bleyed Ma				Muck (A9) ( <b>LRR I, J</b> )
	pipedon (A2)			Redox (S5				Prairie Redox (A16) ( <b>LRR F, G, H</b> )
	istic (A3)			Matrix (S				Surface (S7) (LRR G)
	en Sulfide (A4)				neral (F1)			lains Depressions (F16)
	d Layers (A5) (LRR	2 F)		Gleyed Ma				R H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G			d Matrix (				ed Vertic (F18)
	d Below Dark Surfa		Redox [	ark Surfa	ace (F6)	C	Red Pa	arent Material (TF2)
X Thick D	ark Surface (A12)		Deplete	d Dark Su	rface (F7)		Very S	hallow Dark Surface (TF12)
Sandy N	Mucky Mineral (S1)		Redox I	Depressio	ns (F8) 🔪	0	Other	(Explain in Remarks)
2.5 cm I	Mucky Peat or Peat	t (S2) (LRR G, H)			essions (F		<sup>3</sup> Indicators	of hydrophytic vegetation and
5 cm Mi	ucky Peat or Peat (	S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	<b>H</b> )	wetland	d hydrology must be present,
					K		unless	disturbed or problematic.
Restrictive	Layer (if present):			С				
Type:								
Depth (in	ches):						Hydric Soil	Present? Yes <u>No X</u>
Remarks:								
no re	dox							
	uux	4						
HYDROLO	GY	× 1						
	drology Indicators			$\sim$				
-	•••		1	2			0	
	cators (minimum of	one requirea; cne					-	ary Indicators (minimum of two required)
	Water (A1)	N	Salt Crust	. ,				ace Soil Cracks (B6)
-	ater Table (A2)		Aquatic Inv					rsely Vegetated Concave Surface (B8)
Saturati	on (A3)		<u>x</u> Hydrogen				Drai	nage Patterns (B10)
X Water M	larks (B1)		Dry-Seaso	n Water 7	Table (C2)		Oxic	dized Rhizospheres on Living Roots (C3)
Sedime	nt Deposits (B2)		Oxidized R	hizosphe	res on Liv	ing Roots	(C3) (w	vhere tilled)
Drift De	posits (B3)		(where r	ot tilled)			Cray	yfish Burrows (C8)
Algal Ma	at or Crust (B4)		Presence of	of Reduce	ed Iron (C4	4)	Satu	uration Visible on Aerial Imagery (C9)
Iron Dep	posits (B5)	-	Thin Muck	Surface (	(C7)		X Geo	morphic Position (D2)
Inundati	ion Visible on Aeria	I Imagery (B7)	Other (Exp	lain in Re	emarks)		FAC	C-Neutral Test (D5)
Water-S	Stained Leaves (B9)	)			,			st-Heave Hummocks (D7) (LRR F)
Field Obser								
Surface Wat	ter Present?	Yes X No	Depth (inc	thes). 2				
Water Table		Yes X No				_		
						-		
Saturation P	resent? pillary fringe)	Yes X No	Depth (ind	ches): <u> </u>		vveti	and Hydrolog	y Present? Yes X No
	corded Data (streat	m gauge, monitorii	ng well, aerial p	photos, pr	evious ins	pections),	if available:	
		0 0-,	<b>U</b> ,	· · · · · · · · · · · · · · · · · · ·				
Remarks:								
		.,						
Standing	g water due to	o soil compa	ction and	heavy	rain ev	/ents.		

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>			
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl			
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W				
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	Lat: <u>39.</u>	77877 Lo	ng: <u>-104.8987</u>	Datum:			
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None			
Are climatic / hydrologic conditions on the site typi	cal for this time of ye	ar? Yes No X	_ (If no, explain in Remar	rks.)			
Are Vegetation, Soil, or Hydrology	X significantly	ly disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology	naturally pro	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.			
Hydrophytic Vegetation Present? Yes	No X						
	No X	Is the Sampled Are within a Wetland?		No X			
Wetland Hydrology Present? Yes	No <u>X</u>	within a wetland.	103	<u> </u>			
Remarks:			5				
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.			

VEGETATION – Use scientific names of plan	ts.		. 0	
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC
2		X		(excluding FAC-): <u>1</u> (A)
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1 2				Prevalence Index worksheet:
3.				Total % Cover of: Multiply by:
4.	CN			OBL species x 1 =
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9.				data in Remarks or on a separate sheet)
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	/er	
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2				Hydrophytic
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>
Remarks:				·

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confiri	m the absence o	f indicators.)
Depth	Matrix			x Feature		12	Tautum	Dementer
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								$\mathbf{A}$
	· ·				·		·	
					·		·	
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :
-								ck (A9) (LRR I, J)
Histoso	pipedon (A2)			Gleyed Ma Redox (S5				rairie Redox (A16) (LRR F, G, H)
	listic (A3)		-	d Matrix (S				face (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			ins Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M				H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G	,	-	d Matrix (				I Vertic (F18)
	d Below Dark Surf			Dark Surfa	,	С		ent Material (TF2)
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Sha	allow Dark Surface (TF12)
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍	0	Other (E	xplain in Remarks)
	Mucky Peat or Pea				essions (F			hydrophytic vegetation and
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	RH)		nydrology must be present,
					<u>k</u>		unless d	isturbed or problematic.
Restrictive	Layer (if present)	:		. C				
Туре:					7	V.		×
Depth (in	iches):						Hydric Soil P	resent? Yes No X
Remarks:				5			•	
			~ { U					
no re	dox		O		)			
HYDROLC								
				$\mathbf{N}$				
-	drology Indicator		als all theat area				Casandan	( le die stars ( asisian as a faus as auties d)
		f one required; che						<u>v Indicators (minimum of two required)</u>
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface (B8)
	ion (A3)		Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)
	posits (B3)			not tilled)				sh Burrows (C8)
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					orphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:	V		0				
Surface Wa	ter Present?	Yes X No				_		
Water Table	e Present?	Yes X No				_		×
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)	m aquaq monitori	na well parial	abataa ni		nontiona)	if available:	
Describe Re	Storueu Data (Strea	am gauge, monitori	ng well, aerial	priotos, pl	evious Ins	pections)	, ii avallable:	
Domontori								
Remarks:	<u> </u>							
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.		

Project/Site: 1-270	City	/County: <u>Adams</u>	Sampling Date	: 6/09/20			
Applicant/Owner: Colorado Department of Transportation			State: Colorado	Sampling Point	t: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey	Sec	tion, Township, Range:	S21 T3S R67W				
Landform (hillslope, terrace, etc.): swale	Loc	Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	Lat: <u>39.7787</u>	ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	ng: <u>-104.8987</u>	Da	tum:		
Soil Map Unit Name: NOTCOM			NWI classifi	cation: None			
Are climatic / hydrologic conditions on the site typical for this		Yes No _X	_ (If no, explain in F	Remarks.)			
Are Vegetation, Soil, or Hydrology $X$ si	ignificantly dist	ly disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology na	aturally probler	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach site map	showing sa	mpling point loca	tions, transect	s, important	features, etc.		
Hydrophytic Vegetation Present? Yes No	o <u>X</u>	Is the Sampled Are		5			
Hydric Soil Present? Yes No	o <u>X</u>	within a Wetland?	Yes	No X			
Wetland Hydrology Present? Yes No	o <u>X</u>		res		_		
Remarks:		-	G				
Swale had 2" of standing water at time	of inspecti	on due to heavy	rains over th	ie past 12 h	nours.		

VEGETATION – Use scientific names of plar	nts.			
	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC         (excluding FAC-):
2				
3			$\rightarrow$	Total Number of Dominant
4		<u> </u>		Species Across All Strata: <u>2</u> (B)
Carling (Chryle Chatter (District)		= Total Cov	ver	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		$\sim$		That Are OBL, FACW, or FAC: 50 (A/B)
1		<u> </u>	·	Prevalence Index worksheet:
2			·	Total % Cover of:Multiply by:
3		)	. <u> </u>	OBL species x 1 =
4	-()×		·	FACW species $5$ x 2 = $10$
5	10		·	FAC species 72 x 3 = 216
Herb Stratum (Plot size: 10' x 10')	-10	= Total Cov	/er	FACU species $2$ x 4 = $8$
1 Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>
2. Sporobolus airoides	70	Y	FAC	Column Totals: 95 (A) 314 (B)
3. Hordeum jubatum	5	N	FACW	
4. Bouteloua dactyloides	2	N	FACU	Prevalence Index = B/A = <u>3.3</u>
5 Lactuca serriola	1	N	FAC	Hydrophytic Vegetation Indicators:
6 Convolvulus arvensis	1	N	NL	X 1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	N	FAC	X 2 - Dominance Test is >50%
8 Cultivated rye-grass, erosion control	10	Y	NL	$\underline{X}$ 3 - Prevalence Index is $\leq 3.0^1$
9				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
10				data in Remarks or on a separate sheet)
	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size:)		- 101ai 00		<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2.				Hydrophytic
		= Total Cov	/er	Vegetation
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>
Remarks:				

Profile Desc	cription: (Describ	be to the depth ne	eded to docur	nent the i	ndicator	or confirn	n the absence	of indicators.)
Depth	Matrix			x Feature		. 2	_	
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0 - 2"	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								A
				·				
<sup>1</sup> Tvpe: C=C	oncentration. D=D	epletion, RM=Redu	uced Matrix. CS	S=Covered	d or Coate	ed Sand G	rains. <sup>2</sup> Loc	ation: PL=Pore Lining, M=Matrix.
		licable to all LRRs						for Problematic Hydric Soils <sup>3</sup> :
Histosol				Gleyed Ma				1uck (A9) (LRR I, J)
	pipedon (A2)		<u>x</u> Sandy F	-				Prairie Redox (A16) ( <b>LRR F, G, H</b> )
	istic (A3)		-	Matrix (S				urface (S7) ( <b>LRR G</b> )
	en Sulfide (A4)			Mucky Mir				lains Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed Ma				R H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G			d Matrix (	• •			ed Vertic (F18)
	d Below Dark Surf			Dark Surfa		C		arent Material (TF2)
	ark Surface (A12)		Deplete	d Dark Su	Irface (F7)		Very S	hallow Dark Surface (TF12)
	Mucky Mineral (S1)	)		Depressio	· · · · · · · · · · · · · · · · · · ·			Explain in Remarks)
-		t (S2) (LRR G, H)	High Pla	ains Depre	essions (F	16)		of hydrophytic vegetation and
	ucky Peat or Peat				73 of LRR		wetland	hydrology must be present,
	-							disturbed or problematic.
Restrictive	Layer (if present)	:		Ċ			2	
Type:						$\mathbf{O}$		
Depth (in							Hydric Soil	Present? Yes <u>No X</u>
Remarks:						<u> </u>	inguite con	
Remarks.					$\frown$			
no ro	dov							
no re	uux		O					
HYDROLO				$\mathbf{N}$				
-	drology Indicator			)				
Primary Indi	<u>cators (minimum o</u>	f one required; che	eck all that apply	y)			<u>Seconda</u>	ry Indicators (minimum of two required)
Surface	Water (A1)		Salt Crust	(B11)			Surf	ace Soil Cracks (B6)
	ater Table (A2)		Aquatic Inv	vertebrate	s (B13)		Spa	rsely Vegetated Concave Surface (B8)
X Saturati		7 ~	Hydrogen				<u> </u>	nage Patterns (B10)
	larks (B1)		Dry-Seaso					lized Rhizospheres on Living Roots (C3)
	nt Deposits (B2)	Ť	Oxidized F					here tilled)
	posits (B3)			not tilled)		ing roots		/fish Burrows (C8)
				,		4)		
	at or Crust (B4)		Presence			+)		ration Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					morphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			-Neutral Test (D5)
	Stained Leaves (B9	))					Fros	t-Heave Hummocks (D7) (LRR F)
Field Obser	vations:	X		0				
Surface Wat	ter Present?	Yes X No						
Water Table	Present?	Yes X No	Depth (ind	ches): <u>-2</u>				
Saturation P	Present?	Yes X No	Depth (inc	ches); 0		Wetl	and Hydrology	y Present? Yes X No
(includes ca	pillary fringe)							·
Describe Re	corded Data (strea	am gauge, monitori	ng well, aerial p	photos, pr	evious ins	spections),	if available:	
Remarks:								
Standing	n water due t	o soil compa	iction and	heavy	rain ev	iente		
Juanung	ງ ໜລເວເ ບິນອີ ເ	o son compa	UUUT and	ncavy	I all C	CIIIO.		

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>			
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl			
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W				
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	Lat: <u>39.</u>	77877 Lo	ng: <u>-104.8987</u>	Datum:			
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None			
Are climatic / hydrologic conditions on the site typi	cal for this time of ye	ar? Yes No X	_ (If no, explain in Remar	rks.)			
Are Vegetation, Soil, or Hydrology	X significantly	ly disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology	naturally pro	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.			
Hydrophytic Vegetation Present? Yes	No X						
	No X	Is the Sampled Are within a Wetland?		No X			
Wetland Hydrology Present? Yes	No <u>X</u>	within a wetland.	103	<u> </u>			
Remarks:			5				
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.			

VEGETATION – Use scientific names of plan	ts.		. 0	
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC
2		X		(excluding FAC-): <u>1</u> (A)
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1 2				Prevalence Index worksheet:
3.				Total % Cover of: Multiply by:
4.	CN			OBL species x 1 =
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9.				data in Remarks or on a separate sheet)
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	/er	
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2				Hydrophytic
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>
Remarks:				·

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confirm	n the absence o	f indicators.)			
Depth	Matrix			x Feature		1 2	Tautom	Dementer			
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks			
	10 YR 3/2	100									
2 - 12"	10 YR 4/3	100									
								(	$\mathbf{A}$		
									$\overline{\mathbf{y}}$		
	· ·				·						
					·						
								•			
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.			
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :			
-								ck (A9) (LRR I, J)			
Histoso	pipedon (A2)			Gleyed Ma				rairie Redox (A16) (LRR F, G, H)	<b>`</b>		
	listic (A3)		Sandy Redox (S5) Stripped Matrix (S6)				Dark Surface (S7) (LRR G)				
	en Sulfide (A4)			•	neral (F1)		High Plains Depressions (F16)				
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M			(LRR H outside of MLRA 72 & 73)				
	uck (A9) (LRR F, G	,	-	d Matrix (			Reduced Vertic (F18)				
	d Below Dark Surf			Dark Surfa	,	С	Red Parent Material (TF2)				
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Shallow Dark Surface (TF12)				
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍		Other (Explain in Remarks)				
	Mucky Peat or Pea				essions (F			<sup>3</sup> Indicators of hydrophytic vegetation and			
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	( <b>H</b> )		hydrology must be present,			
					<u>K</u>	5	unless d	isturbed or problematic.			
Restrictive	Layer (if present)	:		. C							
Туре:					7	V.		×			
Depth (in	iches):						Hydric Soil P	resent? Yes No <u>X</u>			
Remarks:				5			•				
			~ { U								
no re	dox		O		)						
HYDROLO				$\frown$							
	drology Indicator			$\sim$							
-	•••		ak all that appl				Casandan	Indiactors (minimum of two road	uired)		
		f one required; che						/ Indicators (minimum of two req	uirea)		
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)			
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface	(B8)		
	ion (A3)		Hydrogen					age Patterns (B10)			
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Root	ts (C3)		
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)			
	posits (B3)			not tilled)				sh Burrows (C8)			
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C	C9)		
	posits (B5)		Thin Muck					orphic Position (D2)			
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)			
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F	)		
Field Obser	rvations:	V		0							
Surface Wat	ter Present?	Yes X No									
Water Table	e Present?	Yes X No				_		~			
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes <mark>X</mark> No			
	(includes capillary fringe)										
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:											
Domenter											
Remarks:	<u> </u>										
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.					

Project/Site: 1-270		City/County: Adams		_ Sampling Date:	6/09/20		
Applicant/Owner: Colorado Department of Transpo	ortation		State: Colorado	_ Sampling Point:	W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		_ Section, Township, Range: <u>S21 T3S R67W</u>					
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>					
Subregion (LRR): LRR G	Lat: <u>39.</u>	77877 L	.ong: <u>-104.8987</u>	Datu	.m:		
Soil Map Unit Name: <u>NOTCOM</u>			NWI classif	ication: None			
Are climatic / hydrologic conditions on the site typi	cal for this time of ye						
Are Vegetation, Soil, or Hydrology	X significantly	ly disturbed? Are "Normal Circumstances" present? Yes No X					
Are Vegetation, Soil X, or Hydrology	naturally pro	roblematic? (If needed, explain any answers in Remarks.)					
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loc	ations, transect	s, important fe	atures, etc.		
Hydrophytic Vegetation Present? Yes	No X			9			
	No X	Is the Sampled A		No X			
Wetland Hydrology Present? Yes	No <u>X</u>	within a Wetland? Yes No X					
Remarks:		· ·	S				
Swale had 2" of standing water a	it time of inspe	ection due to heav	y rains over th	ne past 12 ho	ours.		
			$\neg$				

VEGETATION – Use scientific names of plar	nts.					
	Absolute			Dominance Test worksheet:		
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species		
1				That Are OBL, FACW, or FAC         (excluding FAC-):		
2						
3			$\rightarrow$	Total Number of Dominant		
4				Species Across All Strata: <u>2</u> (B)		
Carling (Chryle Chatter (District)		= Total Cov	ver	Percent of Dominant Species		
Sapling/Shrub Stratum (Plot size:)		$\sim$		That Are OBL, FACW, or FAC: 50 (A/B)		
1		Ċ	<u> </u>	Prevalence Index worksheet:		
2			·	Total % Cover of:Multiply by:		
3		)		OBL species x 1 =		
4	-()×		·······	FACW species $5$ x 2 = $10$		
5	10			FAC species 72 x 3 = 216		
Herb Stratum (Plot size: 10' x 10')	-10	= Total Cov	/er	FACU species $2$ x 4 = $8$		
1 Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>		
2. Sporobolus airoides	70	Y	FAC	Column Totals: 95 (A) 314 (B)		
3. Hordeum jubatum	5	N	FACW			
4. Bouteloua dactyloides	2	N	FACU	Prevalence Index = B/A = <u>3.3</u>		
5. Lactuca serriola	1	N	FAC	Hydrophytic Vegetation Indicators:		
6 Convolvulus arvensis	1	N	NL	X 1 - Rapid Test for Hydrophytic Vegetation		
7. Rumex crispus	1	N	FAC	X 2 - Dominance Test is >50%		
8 Cultivated rye-grass, erosion control	10	Y	NL	$\underline{X}$ 3 - Prevalence Index is ≤3.0 <sup>1</sup>		
9		·	·······	4 - Morphological Adaptations <sup>1</sup> (Provide supporting		
10		·	·······	data in Remarks or on a separate sheet)		
	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
Woody Vine Stratum (Plot size:)		- 101ai 00		<sup>1</sup> Indicators of hydric soil and wetland hydrology must		
1				be present, unless disturbed or problematic.		
2				Hydrophytic		
	= Total Cover		/er	Vegetation		
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>		
Remarks:						

Profile Desc	cription: (Descri	be to the depth nee	eded to docun	nent the i	ndicator	or confirm	n the absence o	f indicators	s.)		
Depth	Matri			x Feature		. 2			<b>_</b> .		
(inches)	Color (moist)		lor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks		
0 - 2"	10 YR 3/2	100									
2 - 12"	10 YR 4/3	100									
										$\mathbf{A}$	
				·							
							<u> </u>				
				·	. <u> </u>					<u> </u>	
										×	
								* *	$\sim$		
$\frac{1}{1}$ Type: C=C	oncentration D=[	Depletion, RM=Redu	cod Matrix CS		d or Coate	d Sand Gr	raine <sup>2</sup> l oca	tion: PI = Pr	ore Lining, M=	Matrix	
		plicable to all LRRs							atic Hydric S		
Histosol				Bleyed Ma				ick (A9) ( <b>LR</b>	-		
	pipedon (A2)			Redox (S5					(A16) ( <b>LRR</b>	F. G. H)	
	istic (A3)			Matrix (S			Dark Surface (S7) (LRR G)				
	en Sulfide (A4)		Loamy N	Mucky Mir	neral (F1)			ins Depress			
Stratifie	d Layers (A5) (LR	RRF)	Loamy (	Gleyed Ma	atrix (F2)		(LRR H outside of MLRA 72 & 73)				
1 cm Mu	uck (A9) (LRR F,	G, H)	X Deplete	d Matrix (I	F3)	(	Reduced Vertic (F18)				
-	d Below Dark Sur			Dark Surfa	. ,	С	Red Parent Material (TF2)				
	ark Surface (A12)				Irface (F7)		Very Shallow Dark Surface (TF12)				
-	Mucky Mineral (S1			Depressio		NO.		Other (Explain in Remarks) <sup>3</sup> Indicators of hydrophytic vegetation and			
	-	at (S2) ( <b>LRR G, H</b> )			essions (F				-		
	ucky Peat or Peat	(53) ( <b>LRR F</b> )		RA / 2 & /	73 of LRR	(П)			nust be preser problematic.	11,	
Restrictive	Layer (if present	).			<u> </u>			ISTUIDED OI	problematic.		
Type:					)						
Depth (in	ches).				7	$\boldsymbol{\times}$	Hydric Soil P	resent?	Vas	No X	
Remarks:	cnes).						Hyune Son P	resent:			
Remarks.					$\frown$						
no re	dov		$\sim$	C							
	uux										
HYDROLO	GY	<u></u>									
Wetland Hy	drology Indicato	ors:									
-	•••	of one required; chec	ck all that apply	v)			Secondary	/ Indicators	(minimum of	two required)	
	Water (A1)		x_ Salt Crust					ce Soil Crac	•	<u>-</u>	
	ater Table (A2)		Aquatic Inv		s (B13)				ed Concave S	Surface (B8)	
Saturati			Hydrogen				·	age Patterns			
	larks (B1)		Dry-Seaso					-		ng Roots (C3)	
	nt Deposits (B2)	-	Oxidized R					ere tilled)		·g···· ()	
X Drift De		-		not tilled)		ing i tooto		sh Burrows	(C8)		
	at or Crust (B4)		Presence (	,		1)			on Aerial Ima	agery (C9)	
-	posits (B5)	-	Thin Muck			.,		hic Position		.go.j (00)	
	ion Visible on Aer	ial Imagery (B7)	Other (Exp		. ,		FAC-I	Neutral Test	(D5)		
	Stained Leaves (B				inanco)				mocks (D7)	(LRR F)	
Field Obser		- )								(,	
Surface Wat		Yes X No	Depth (ind	ches): 2							
Water Table		Yes X No				_					
Saturation P		Yes X No				Wetl	and Hydrology	Present?	Yes X	No	
(includes ca	pillary fringe)			-						-	
Describe Re	Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:										
Remarks:											
Standing	y water due	to soil compa	ction and	heavy	rain ev	/ents.					

Project/Site: 1-270		City/County: Adams		_ Sampling Date: <u>6/09/20</u>		
Applicant/Owner: Colorado Department of Tra	nsportation		State: Colorado	_ Sampling Point: W003 upl		
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Ra	nge: S21 T3S R67W			
Landform (hillslope, terrace, etc.): swale		_ Local relief (concave, convex, none): <u>Convex</u> Slope (%): <u>5</u>				
Subregion (LRR): LRR G	Lat: <u>39</u>	0.77877	_ Long: <u>-104.8987</u>	Datum:		
Soil Map Unit Name: <u>NOTCOM</u>			NWI classif	ication: None		
Are climatic / hydrologic conditions on the site	typical for this time of y	ear? Yes No 🗴				
Are Vegetation, Soil, or Hydro	logy X significantly	y disturbed? Are "Normal Circumstances" present? Yes No X				
Are Vegetation, Soil X, or Hydro	logy naturally pr	roblematic? (If needed, explain any answers in Remarks.)				
SUMMARY OF FINDINGS – Attach	site map showing	g sampling point l	ocations, transect	s, important features, etc.		
Hydrophytic Vegetation Present? Ye	s No_X	le the Complete		9		
	s No X	is the Sampled		No X		
Wetland Hydrology Present? Ye	s No <u>X</u>	within a Wetland? Yes No X				
Remarks:			5			
Swale had 2" of standing wate	er at time of insp	ection due to he	avy rains over th	າe past 12 hours.		

VEGETATION – Use scientific names of plan	ts.		. 0			
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC		
2		X		(excluding FAC-): <u>1</u> (A)		
3 4			2	Total Number of Dominant Species Across All Strata: _2 (B)		
Sapling/Shrub Stratum (Plot size:)	$\overline{\mathbf{O}}$	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)		
1 2				Prevalence Index worksheet:		
3.				Total % Cover of: Multiply by:		
4.	CN			OBL species x 1 =		
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$		
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$		
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$		
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$		
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)		
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$		
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:		
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation		
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%		
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$		
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting		
9.				data in Remarks or on a separate sheet)		
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)		
	95	= Total Cov	/er			
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.		
2				Hydrophytic		
% Bare Ground in Herb Stratum <u>5</u>		= Total Cover		Vegetation Present? Yes <u>No X</u>		
Remarks:				·		

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confiri	m the absence o	f indicators.)
Depth	Matrix			x Feature		12	Tautum	Dementer
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								$\mathbf{A}$
	· ·				·		·	
					·		·	
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :
-								ck (A9) (LRR I, J)
Histoso	pipedon (A2)			Gleyed Ma Redox (S5				rairie Redox (A16) (LRR F, G, H)
	listic (A3)		-	d Matrix (S				face (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			ins Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M				H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G	,	-	d Matrix (				I Vertic (F18)
	d Below Dark Surf			Dark Surfa	,	С		ent Material (TF2)
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Sha	allow Dark Surface (TF12)
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍	0	Other (E	xplain in Remarks)
	Mucky Peat or Pea				essions (F			hydrophytic vegetation and
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	RH)		nydrology must be present,
					<u>k</u>		unless d	isturbed or problematic.
Restrictive	Layer (if present)	:		. C				
Туре:					7	V.		×
Depth (in	iches):						Hydric Soil P	resent? Yes No X
Remarks:				5			•	
			~ { U					
no re	dox		O		)			
HYDROLC								
				$\mathbf{N}$				
-	drology Indicator		als all theat area				Casandan	( le die stars ( asisian as a faus as auties d)
		f one required; che						<u>v Indicators (minimum of two required)</u>
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface (B8)
	ion (A3)		Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)
	posits (B3)			not tilled)				sh Burrows (C8)
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					orphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:	V		0				
Surface Wa	ter Present?	Yes X No				_		
Water Table	e Present?	Yes X No				_		×
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)	m aquaq monitori	na well parial	abataa ni		nontiona)	if available:	
Describe Re	Storueu Data (Strea	am gauge, monitori	ng well, aerial	priotos, pl	evious Ins	pections)	, ii avallable:	
Domontori								
Remarks:	<u> </u>							
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.		

### WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 1-270	City	/County: <u>Adams</u>		Sampling Date	: 6/09/20
Applicant/Owner: Colorado Department of Transportation			State: Colorado	Sampling Point	t: W003 upl
Investigator(s): Brett Hartmann, Pat Hickey	Sec	tion, Township, Range:	S21 T3S R67W		
Landform (hillslope, terrace, etc.): swale	Loc	al relief (concave, conv	ex, none): <u>Convex</u>	S	lope (%): <u>5</u>
Subregion (LRR): LRR G	Lat: <u>39.7787</u>	ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	ng: <u>-104.8987</u>	Da	tum:
Soil Map Unit Name: NOTCOM			NWI classifi	cation: None	
Are climatic / hydrologic conditions on the site typical for this		Yes No _X	_ (If no, explain in F	Remarks.)	
Are Vegetation, Soil, or Hydrology $X$ si	ignificantly dist	urbed? Are "Norr	mal Circumstances"	present? Yes_	No X
Are Vegetation, Soil X, or Hydrology na	aturally probler	natic? (If neede	d, explain any answe	ers in Remarks.)	
SUMMARY OF FINDINGS – Attach site map	showing sa	mpling point loca	tions, transect	s, important	features, etc.
Hydrophytic Vegetation Present? Yes No	o <u>X</u>	Is the Sampled Are		5	
Hydric Soil Present? Yes No	o <u>X</u>	within a Wetland?	Yes	No X	
Wetland Hydrology Present? Yes No	o <u>X</u>		res		_
Remarks:		-	G		
Swale had 2" of standing water at time	of inspecti	on due to heavy	rains over th	ie past 12 h	nours.

### **VEGETATION – Use scientific names of plants.**

VEGETATION – Use scientific names of plar	nts.			
	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC         (excluding FAC-):
2				
3			$\rightarrow$	Total Number of Dominant
4		<u> </u>		Species Across All Strata: <u>2</u> (B)
Carling (Chryle Chatter (District)		= Total Cov	ver	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		$\sim$		That Are OBL, FACW, or FAC: 50 (A/B)
1		<u> </u>	·	Prevalence Index worksheet:
2			·	Total % Cover of:Multiply by:
3		)	. <u> </u>	OBL species x 1 =
4	-()×		·	FACW species $5$ x 2 = $10$
5	10		·	FAC species 72 x 3 = 216
Herb Stratum (Plot size: 10' x 10')	-10	= Total Cov	/er	FACU species $2$ x 4 = $8$
1 Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>
2. Sporobolus airoides	70	Y	FAC	Column Totals: 95 (A) 314 (B)
3. Hordeum jubatum	5	N	FACW	
4. Bouteloua dactyloides	2	N	FACU	Prevalence Index = B/A = <u>3.3</u>
5 Lactuca serriola	1	N	FAC	Hydrophytic Vegetation Indicators:
6 Convolvulus arvensis	1	N	NL	X 1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	N	FAC	X 2 - Dominance Test is >50%
8 Cultivated rye-grass, erosion control	10	Y	NL	$\underline{X}$ 3 - Prevalence Index is $\leq 3.0^1$
9				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
10				data in Remarks or on a separate sheet)
	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size:)		- 101ai 00		<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2.				Hydrophytic
		= Total Cov	/er	Vegetation
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>
Remarks:				

Profile Des	cription: (Descri	be to the depth ne	eded to docur	nent the i	ndicator	or confirn	n the absence	of indicator	's.)	
Depth	Matri			x Feature						
(inches)	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0 - 2"	10 YR 3/2	100								
2 - 12"	10 YR 4/3	100								
										$\overline{\mathbf{A}}$
				·						
				·		<u> </u>			•	
									0	
									0	
					·		. <u></u>		<u> </u>	
				·	·					
		Depletion, RM=Redu				ed Sand G			Pore Lining, M	
-		blicable to all LRRs							natic Hydric S	Solls":
Histosol				Bleyed Ma				luck (A9) (Ll		
	pipedon (A2)			Redox (S5					x (A16) ( <b>LRR</b>	F, G, H)
	istic (A3) en Sulfide (A4)			Matrix (S				urface (S7)		
	d Layers (A5) ( <b>LR</b>			Mucky Mir Gleyed Ma	, ,			lains Depres	e of MLRA 72	8, 73)
	uck (A9) (LRR F,	,		d Matrix (I	. ,			ed Vertic (F1		a 13)
	d Below Dark Sur		X Redox [			C		arent Materia	,	
	ark Surface (A12)				irface (F7)				Surface (TF12	2)
	Aucky Mineral (S1			Depressio		0		Explain in R		,
2.5 cm l	Mucky Peat or Pe	at (S2) ( <b>LRR G, H</b> )	High Pla	ains Depre	essions (F	16)	<sup>3</sup> Indicators	of hydrophyt	tic vegetation a	and
5 cm Mi	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 & 7	73 of LRR	H)	wetland	l hydrology i	must be prese	nt,
					κ ΄		unless	disturbed or	problematic.	
Restrictive	Layer (if present	):		С						
Туре:										
Depth (in	ches):						Hydric Soil	Present?	Yes	No <u>X</u>
Remarks:				5	X					
			C s							
no re	dox		$\sim$	(						
			X							
HYDROLO	GY									
Wetland Hy	drology Indicato	rs:	- (-	)						
Primary Indi	cators (minimum o	of one required; che	ck all that apply	<b>v</b> )			Seconda	ry Indicators	(minimum of	two required)
	Water (A1)		X Salt Crust					ace Soil Cra		
	ater Table (A2)		Aquatic Inv		s (B13)				ted Concave S	Surface (B8)
Saturati		7 ~	Hydrogen					nage Patterr		
	larks (B1)		Dry-Seaso		. ,			-		ng Roots (C3)
	nt Deposits (B2)		Oxidized F					here tilled)	p	
X Drift De				not tilled)		ing riceto		fish Burrows	s (C8)	
	at or Crust (B4)		Presence	,		1)	-		e on Aerial Im	agery (C9)
-	posits (B5)		Thin Muck			r)		phic Position		
	ion Visible on Aer	ial Imagery (B7)	Other (Exp				FAC	- Neutral Tes	at (D5)	
	Stained Leaves (B				indixo)				mmocks (D7)	(I RR F)
Field Obser		0)								()
Surface Wat		Yes X No	Dopth (in	shoe). 2						
		Yes X No				—				
Water Table						-		-	X	
Saturation P		Yes X No	Depth (ind	ches): 0		_ Wetl	and Hydrology	/ Present?	Yes <u>^</u>	No
	pillary fringe) corded Data (stre	am gauge, monitori	ng well, aerial r	photos, pr	evious ins	pections).	if available:			
	,	0 0 /	0	71		. ,,				
Remarks:										
		te esil esirer -	ation and	h		(ant-				
Standing	g water due	to soil compa	ction and	neavy	rain ev	ents.				

### WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 1-270		City/County: Adams	San	npling Date: <u>6/09/20</u>
Applicant/Owner: Colorado Department of Transpo	ortation		_ State: Colorado _ San	npling Point: W003 upl
Investigator(s): Brett Hartmann, Pat Hickey		Section, Township, Range:	S21 T3S R67W	
Landform (hillslope, terrace, etc.): swale		Local relief (concave, conv	ex, none): <u>Convex</u>	Slope (%): <u>5</u>
Subregion (LRR): LRR G	Lat: <u>39.</u>	77877 Lo	ng: <u>-104.8987</u>	Datum:
Soil Map Unit Name: <u>NOTCOM</u>			NWI classification	: None
Are climatic / hydrologic conditions on the site typi	cal for this time of ye	ar? Yes No X	_ (If no, explain in Remar	rks.)
Are Vegetation, Soil, or Hydrology	X significantly	disturbed? Are "Norr	nal Circumstances" prese	nt? Yes No X
Are Vegetation, Soil X, or Hydrology	naturally pro	oblematic? (If neede	d, explain any answers in	Remarks.)
SUMMARY OF FINDINGS – Attach sit	te map showing	sampling point loca	tions, transects, im	portant features, etc.
Hydrophytic Vegetation Present? Yes	No X			
	No X	Is the Sampled Are within a Wetland?		No X
Wetland Hydrology Present? Yes	No <u>X</u>	within a wetland.	103	<u> </u>
Remarks:			5	
Swale had 2" of standing water a	at time of inspe	ection due to heavy	rains over the pa	ast 12 hours.

### **VEGETATION – Use scientific names of plants.**

VEGETATION – Use scientific names of plan	ts.		. 0	
Tree Stratum         (Plot size:)           1)		Dominant Species?		Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC
2		X		(excluding FAC-): <u>1</u> (A)
3 4			2	Total Number of Dominant Species Across All Strata: _2(B)
Sapling/Shrub Stratum (Plot size:)	<u>0</u>	= Total Cov	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1 2				Prevalence Index worksheet:
3.				Total % Cover of: Multiply by:
4.	CN			OBL species x 1 =
5	$\mathbf{r}$			FACW species $\frac{5}{2}$ x 2 = $\frac{10}{2}$
	10	= Total Cov	/er	FAC species $\frac{72}{2}$ x 3 = $\frac{216}{2}$
Herb Stratum (Plot size: <u>10' x 10'</u> )				FACU species $\frac{2}{10}$ x 4 = $\frac{8}{10}$
1. Bromus japonicus	5	N	NL	UPL species $\frac{16}{25}$ x 5 = $\frac{80}{254}$
2. Sporobolus airoides	70	Y	FAC	Column Totals: <u>95</u> (A) <u>314</u> (B)
3. Hordeum jubatum	5	N	FACW	Prevalence Index = $B/A = 3.3$
4. Bouteloua dactyloides	2	N	FACU	Hydrophytic Vegetation Indicators:
5. Lactuca serriola	1	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
6. Convolvulus arvensis	1	N	NL	2 - Dominance Test is >50%
7. Rumex crispus	1	N	FAC	$3$ - Prevalence Index is $\leq 3.0^{1}$
8. Cultivated rye-grass, erosion control	10	Y	NL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
9.				data in Remarks or on a separate sheet)
10				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	95	= Total Cov	/er	
Woody Vine Stratum (Plot size:) 1)				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2				Hydrophytic
% Bare Ground in Herb Stratum <u>5</u>		= Total Cov	/er	Vegetation Present? Yes <u>No X</u>
Remarks:				·

Profile Des	cription: (Describ	be to the depth ne	eded to docur	nent the	indicator	or confiri	m the absence o	f indicators.)
Depth	Matrix			x Feature		12	Tautum	Dementer
<u>(inches)</u> 0 - 2"	Color (moist)		olor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	10 YR 3/2	100						
2 - 12"	10 YR 4/3	100						
								$\mathbf{A}$
	· ·				·		·	
					·		·	
	anoantration D-D	anlation PM-Radu	Lood Matrix CS	S=Covoro	d or Coate	d Sand C	21 0 00	tion: PL=Pore Lining, M=Matrix.
		epletion, RM=Redu licable to all LRRs				a Sana G		or Problematic Hydric Soils <sup>3</sup> :
-								ck (A9) (LRR I, J)
Histoso	pipedon (A2)			Gleyed Ma Redox (S5				rairie Redox (A16) (LRR F, G, H)
	listic (A3)		-	d Matrix (S				face (S7) (LRR G)
	en Sulfide (A4)			•	neral (F1)			ins Depressions (F16)
	d Layers (A5) ( <b>LRI</b>	R F)		Gleyed M				H outside of MLRA 72 & 73)
	uck (A9) (LRR F, G	,	-	d Matrix (				I Vertic (F18)
	d Below Dark Surf			Dark Surfa	,	С		ent Material (TF2)
Thick D	ark Surface (A12)		Deplete	d Dark Su	urface (F7)		Very Sha	allow Dark Surface (TF12)
	Mucky Mineral (S1)		Redox [	Depressio	ns (F8) 📍	0	Other (E	xplain in Remarks)
	Mucky Peat or Pea				essions (F			hydrophytic vegetation and
5 cm M	ucky Peat or Peat	(S3) ( <b>LRR F</b> )	(ML	RA 72 &	73 of LRR	RH)		nydrology must be present,
					<u>k</u>		unless d	isturbed or problematic.
Restrictive	Layer (if present)	:		. C				
Туре:					7	V.		×
Depth (in	iches):						Hydric Soil P	resent? Yes No X
Remarks:				5			•	
			~ { U					
no re	dox		O		)			
HYDROLC								
				$\mathbf{N}$				
-	drology Indicator		als all theat area				Casandan	( le die stars ( asisian as a faus as auties d)
		f one required; che						<u>v Indicators (minimum of two required)</u>
	Water (A1)	$, \ n$	Salt Crust					ce Soil Cracks (B6)
	ater Table (A2)		Aquatic In					ely Vegetated Concave Surface (B8)
	ion (A3)		Hydrogen					age Patterns (B10)
	Marks (B1)		Dry-Seaso					ed Rhizospheres on Living Roots (C3)
	nt Deposits (B2)		Oxidized F			ing Roots		ere tilled)
	posits (B3)			not tilled)				sh Burrows (C8)
-	at or Crust (B4)		Presence			4)		ation Visible on Aerial Imagery (C9)
	posits (B5)		Thin Muck					orphic Position (D2)
	ion Visible on Aeria		Other (Exp	plain in Re	emarks)			Neutral Test (D5)
Water-S	Stained Leaves (B9	9)					Frost-	Heave Hummocks (D7) (LRR F)
Field Obser	rvations:	V		0				
Surface Wa	ter Present?	Yes X No				_		
Water Table	e Present?	Yes X No				_		×
Saturation F		Yes X No	Depth (in	ches): 0		Wet	land Hydrology	Present? Yes X No
	pillary fringe)	m aquaq monitori	na well parial	abataa ni		nontiona)	if available:	
Describe Re	Storueu Data (Strea	am gauge, monitori	ng well, aerial	priotos, pl	evious Ins	pections)	, ii avallable:	
Domenter								
Remarks:	<u> </u>							
Standing	g water due t	o soil compa	ction and	heavy	rain e	/ents.		

### WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 1-270	City	/County: <u>Adams</u>		Sampling Date	: 6/09/20
Applicant/Owner: Colorado Department of Transportation			State: Colorado	Sampling Point	t: W003 upl
Investigator(s): Brett Hartmann, Pat Hickey	Sec	tion, Township, Range:	S21 T3S R67W		
Landform (hillslope, terrace, etc.): swale	Loc	al relief (concave, conv	ex, none): <u>Convex</u>	S	lope (%): <u>5</u>
Subregion (LRR): LRR G	Lat: <u>39.7787</u>	7 Lo	ng: <u>-104.8987</u>	Da	tum:
Soil Map Unit Name: NOTCOM			NWI classifi	cation: None	
Are climatic / hydrologic conditions on the site typical for this		Yes No _X	_ (If no, explain in F	Remarks.)	
Are Vegetation, Soil, or Hydrology $X$ si	ignificantly dist	urbed? Are "Norr	mal Circumstances"	present? Yes_	No X
Are Vegetation, Soil X, or Hydrology na	aturally probler	natic? (If neede	d, explain any answe	ers in Remarks.)	
SUMMARY OF FINDINGS – Attach site map	showing sa	mpling point loca	tions, transect	s, important	features, etc.
Hydrophytic Vegetation Present? Yes No	o <u>X</u>	Is the Sampled Are		5	
Hydric Soil Present? Yes No	o <u>X</u>	within a Wetland?	Yes	No X	
Wetland Hydrology Present? Yes No	o <u>X</u>		res		_
Remarks:		-	G		
Swale had 2" of standing water at time	of inspecti	on due to heavy	rains over th	ie past 12 h	nours.

### **VEGETATION – Use scientific names of plants.**

VEGETATION – Use scientific names of plar	nts.			
	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:)		Species?	Status	Number of Dominant Species
1				That Are OBL, FACW, or FAC         (excluding FAC-):
2				
3			$\rightarrow$	Total Number of Dominant
4		<u> </u>		Species Across All Strata: <u>2</u> (B)
Carling (Chryle Chatter (District)		= Total Cov	ver	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		$\sim$		That Are OBL, FACW, or FAC: 50 (A/B)
1		<u> </u>	·	Prevalence Index worksheet:
2			·	Total % Cover of:Multiply by:
3		)	. <u> </u>	OBL species x 1 =
4	-()×		·	FACW species $5$ x 2 = $10$
5	10		·	FAC species 72 x 3 = 216
Herb Stratum (Plot size: 10' x 10')	-10	= Total Cov	/er	FACU species $2$ x 4 = $8$
1 Bromus japonicus	5	N	NL	UPL species <u>16</u> x 5 = <u>80</u>
2. Sporobolus airoides	70	Y	FAC	Column Totals: 95 (A) 314 (B)
3. Hordeum jubatum	5	N	FACW	
4. Bouteloua dactyloides	2	N	FACU	Prevalence Index = B/A = <u>3.3</u>
5 Lactuca serriola	1	N	FAC	Hydrophytic Vegetation Indicators:
6 Convolvulus arvensis	1	N	NL	X 1 - Rapid Test for Hydrophytic Vegetation
7. Rumex crispus	1	N	FAC	X 2 - Dominance Test is >50%
8 Cultivated rye-grass, erosion control	10	Y	NL	$\underline{X}$ 3 - Prevalence Index is $\leq 3.0^1$
9				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
10				data in Remarks or on a separate sheet)
	95	= Total Cov	/er	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size:)		- 101ai 00		<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2.				Hydrophytic
		= Total Cov	/er	Vegetation
% Bare Ground in Herb Stratum 5				Present? Yes <u>No X</u>
Remarks:				

Profile Desc	cription: (Descri	be to the depth nee	eded to docun	nent the i	ndicator	or confirn	n the absence o	f indicators	s.)	
Depth	Matri			x Feature		. 2			<b>_</b>	
(inches)	Color (moist)		lor (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0 - 2"	10 YR 3/2	100								
2 - 12"	10 YR 4/3	100								
										$\sim$
				·						
							<u> </u>			
				·						
										·
								*.*	$\sim$	
$\frac{1}{1}$ Type: C=C	oncentration D=[	Depletion, RM=Redu	cod Matrix CS		d or Coate	d Sand G	raine <sup>2</sup> l oca	tion: PI = Pr	ore Lining, M=	Matrix
		plicable to all LRRs							atic Hydric S	
Histosol				Bleyed Ma				ick (A9) ( <b>LR</b>	-	
	pipedon (A2)			Redox (S5					(A16) ( <b>LRR I</b>	<b> G. H</b> )
	istic (A3)			Matrix (S				rface (S7) (	. , .	, -, ,
	en Sulfide (A4)		Loamy N	Mucky Mir	neral (F1)			ins Depress		
Stratifie	d Layers (A5) (LR	RRF)	Loamy (	Gleyed Ma	atrix (F2)		(LRR	H outside	of MLRA 72	<b>&amp; 73</b> )
1 cm Mu	uck (A9) (LRR F,	G, H)	X Deplete	d Matrix (I	F3)	(	Reduced	Vertic (F18	3)	
-	d Below Dark Sur			Dark Surfa	. ,	С		ent Material		
	ark Surface (A12)				rface (F7)				Surface (TF12	)
-	Mucky Mineral (S1			Depressio		NO.		xplain in Re	,	
	-	at (S2) ( <b>LRR G, H</b> )			essions (F 73 of LRR				c vegetation a	
	ucky Peat or Peat	(53) ( <b>LKK F</b> )		KA / 2 & /	13 OI LKK	(п)			nust be preser problematic.	π,
Restrictive	Layer (if present	).						ISTUIDED OI	problematic.	
Type:					)					
Depth (in	ches).				7	$\boldsymbol{\times}$	Hydric Soil P	resent?	Voc	No X
Remarks:	cnes).						Hyune Son P	resent:	163	
Remarks.					$\frown$					
no re	dov		$\sim$	C						
	uux									
HYDROLO	GY	<u>st</u>								
Wetland Hy	drology Indicato	ors:								
-	•••	of one required; che	ck all that apply	v)			Secondary	/ Indicators	(minimum of t	wo required)
	Water (A1)		x_ Salt Crust					ce Soil Crac	•	
	ater Table (A2)		Aquatic Inv		s (B13)				ed Concave S	urface (B8)
Saturati			Hydrogen				·	age Patterns		
	larks (B1)		Dry-Seaso					-		ng Roots (C3)
	nt Deposits (B2)	· · · ·	Oxidized R					ere tilled)		.g . tooto (00)
X Drift De		-		not tilled)		ing i tooto		sh Burrows	(C8)	
	at or Crust (B4)		Presence (	,		4)			on Aerial Ima	aerv (C9)
-	posits (B5)	-	Thin Muck			,		hic Position		.ger) ()
	ion Visible on Aer	ial Imagery (B7)	Other (Exp		,		FAC-I	Neutral Test	(D5)	
	Stained Leaves (B				,				nmocks (D7)(	LRR F)
Field Obser		,								,
Surface Wat	er Present?	Yes X No	Depth (ind	ches): 2						
Water Table		Yes X No				_				
Saturation P		Yes X No				Wetl	and Hydrology	Present?	Yes X	No
(includes ca	pillary fringe)			-						-
Describe Re	corded Data (stre	am gauge, monitorir	ng well, aerial p	photos, pr	evious ins	pections),	if available:			
Remarks:										
Standing	y water due	to soil compa	ction and	heavy	rain ev	/ents.				

Consultant Work of COO



W001 — View of W001. Looking north, from north end of feature



W002 - View of W002, looking south east.



W010 — View of W010. Looking north, from middle of feature



W001 — View of W001. Looking north, from south end of feature



W003 — View of W003, looking southwest.



W010 — View of W011. Looking east, from south end of feature



W020- View of W020, looking north.



W025 — View of W025, looking northwest.



W030 — View of W030, looking northeast.

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W023 — View of W023, looking west.



W027 — View of W027, looking west.



W031 - View of W031, looking southeast.

#### Photographic Log Colorado Department of Transportation - I-270 Corridor Improvements Wetland Findings Report



W032 - View W032, looking southeast.



W051 - View of W051, looking sothwest.



W100 — View of W100, looking west.



W050 - View of W050, looking southwest.



W070 — View of W070, looking southeast.



W195/Gravel Pit - View of W195 and gravel pit, looking northwest.



W200 - View of W200, looking south.



W210 – View of W210, looking west



W230 — View of W230, looking northeast.



W205 - View of W205, looking southwest.



W216 — View of W216, looking southwest.



W231 — View of W231, looking southwest.



W232 — View of W232, looking southwest.



W300 - View of W300, looking northwest.



W320 — View of W320, looking southwest.



W330 — View of W330, looking east.



W330 — View of W330, looking west.



W340 — View of W340, looking south.



W401 — View of W401, looking west.



W410 - View of W410, looking northwest.



W420 — View of W420, looking northwest.

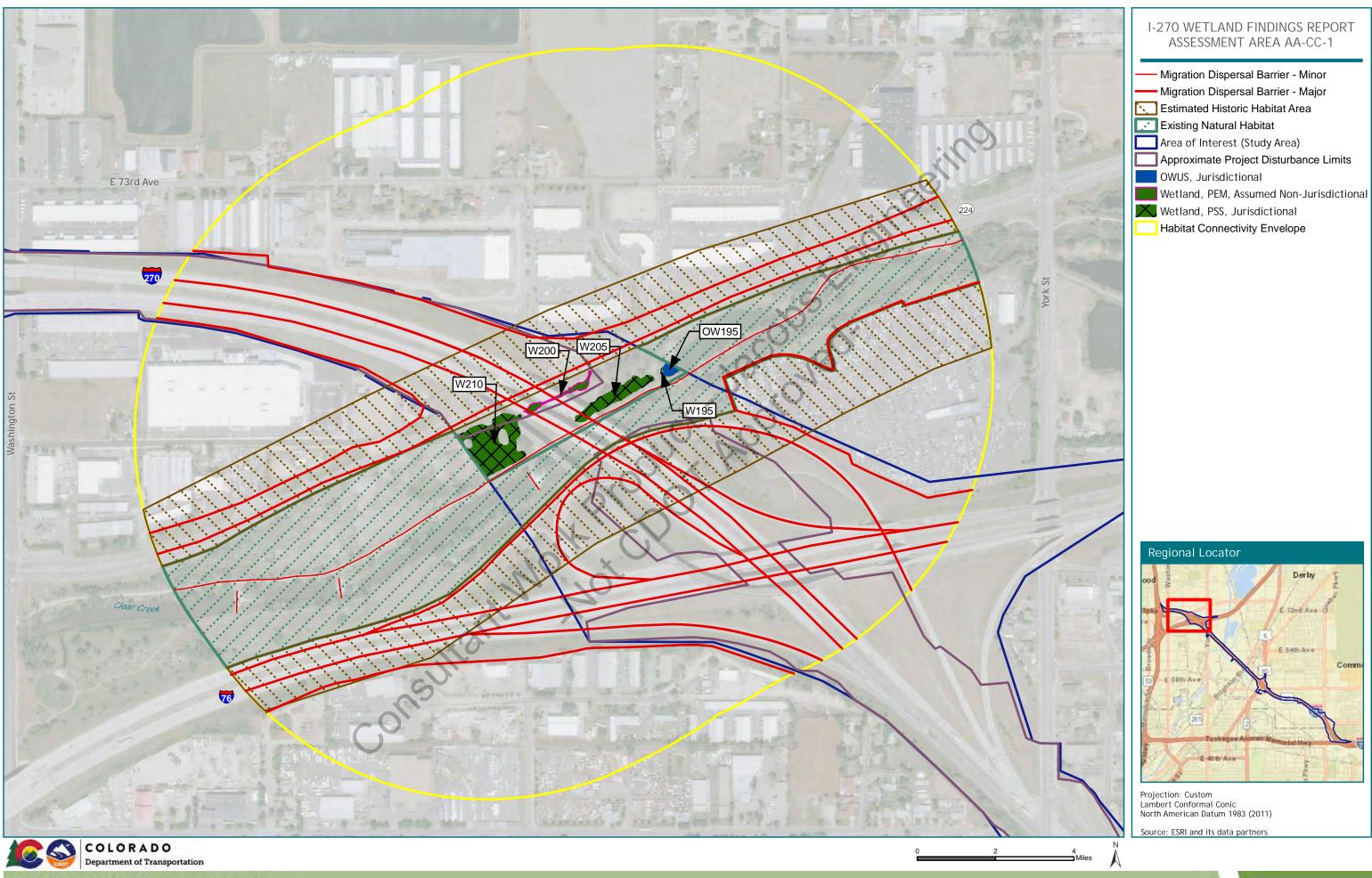


W440 — View of W440, looking northwest.



W430 — View of W430, looking northwest.

Appendix D EACWET Maps and Data Sheets



I-270 Corridor Improvements

# ADMINISTRATIVE CHARACTERIZATION

General Informa	tion	А	A-CC-1	Date o Evaluation	4/00/0004		
Site Name or ID:	AA-CC-1 - W1 W205, and W2	95, W200,		Project Name	I-270 (ST	U 2706-043)	2
404 or Other Permit Application #:	NA			Applicant Name	CDOT		20
Evaluator Name(s):	Brett Hartman and Pat Hicke		Evaluator's pro	fessional position an organizatior		(Jacobs)	
Location Information	ation:				- V		
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Clear (	ggregated So Creek Wetlan 39.825479, -		Geographic Datum Used (NAD 83): Elevation	NAD83	5127	
Location Information	: Constru	ucted, depres	sional wetlands a	djacent to and wi	thin flood p	F lain of Clear	Creek
Associated stream/w	ater body name:		Clear Creek		Stream O	rder:	Riverine
USGS Quadrangle Map:	Commerce Cit	y, CO 2019		Map Scale: (Circle one)		1:24,000 Other	1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000	)3	00.1	Wetland Ownership:	CDOT		
Project Informat	X Project We Mitigation S		Purpose of Evaluation (check all applicable):	Potentially Impa Mitigation; Pre- Mitigation; Post Monitoring Other (Describe	construction t-construction	n	
Intent of Project: (Che	eck all applicable)		Restoration		nhancement		Creation
Total Size of Wetland (Record Area, Check and Measurement Method Use	Describe	ac.	× Measured: 2.2 Estimated	19879			
Assessment Area (A Area, check appropriate box. used to record acreage when included in a single assessme	Additional spaces are more than one AA is	ac.	X Measured Estimated	ac. ac.	ac. ac.	ac. ac.	ac. ac.
Characteristics or Me AA boundary determi			), W205, and W2 Therefore, these				
Notes: Measu	ured with Collect	or Web Map					

## ECOLOGICAL DESCRIPTION 1

Image: colis including listances or Histo Epipatons are present in the AA (i.e., AA includes core for habits).       Image: colis are known to accur anywhere within the contiguous wetland of which the AA is part.       Image: colis are known to accur anywhere within the contiguous wetland of which the AA is part.       Image: colis are known to accur anywhere within the contiguous wetland of which the AA is part.       Image: colis are known to accur anywhere within the contiguous wetland of which the AA is part.       Image: colis are known to accur anywhere within the contiguous wetland of which the AA is part.       Image: colis are known to accur anywhere within the contiguous wetland of which the AA is part.       Image: colis are known to accur anywhere within the contiguous wetland of which the AA is part.       Image: colis are known to accur anywhere within the contiguous wetland of which the AA?       Image: colis are known to accur anywhere within the contiguous wetland of which the AA?       Image: colis are known to accur anywhere within the contiguous wetland of which the AA?       Image: colis are known to accur anywhere within a potential concerne buffer area as determined to Chirare area and area concernes (please describe)         Image: Control of the AA?       Image: Control of C	Special Cor	ncerns	Check all that apply				
Image: construction of the webland conservation area or element occurrence buffer area as determined by CNHP?         Image: construction of the AA? List Below.         Image: construction of the AA?						d species are	
Image: Intervention of the webland conservation area or relearner to currence buffer area as determined by CNHP?         Image: Intervention of the AR?         Image: Interventing of the Interventing of the	including are				Ute Lady's tresse	es	715
Image: Intervention of the webland conservation area or relearner to currence buffer area as determined by CNHP?         Image: Intervention of the AR?         Image: Interventing of the Interventing of the							001
Federally threatened or endangered species are KNOWN         to occur in the AA? List Below.           Other special concerns (please describe)             HYDROGEOMORPHIC SETTINE           AA wettand maintains its fundamental natural hydrogeomorphic characteristic:             AA wettand maintains its fundamental natural hydrogeomorphic characteristic:           AA wettand maintains describe the original wetland type if discornable using the table below.             AA wettand was created from an upland setting.           Describe the hydrogeomorphic setting of the wetland by citaling all conditions         thria apply.             Water source           Surface flow             Watar source           Surface flow             Watar source           Surface flow             Origing Narraite           Describe             Watar source           Surface flow             Origing Narraite           Occeptional             Watar source           Surface flow             Origing Narraite           Occeptional             Watar source           Occeptional             HGM Setting           Watar source             Watar source			otherwise dry or	area or elemer			in
AA wetland maintains its fundamental natural hydrogeomorphic characteristic:         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.         Water source       Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Bi-directional         Wetland Gradient       0 - 2%       2.4%       4.10%       >10%         # Surface Inlets       Overbank       0       1       2       3       3         HGM Setting       # Surface Outlets       0       1       2       3       3         HGM Setting       # Surface Inlets       Overbank       1       2       3       3         HGM Setting       # Surface Outlets       0       1       2       3       3         HGM Setting       # Surface Outlets       0       1       2       3       3         Geomorphic       Setting (Narrative Description. Include approx. stream order for orgentration.       Constructed depressional wetland adja			d species are KNOWN		concerns (please de	scribe)	22
A wetland maintains its fundamental natural hydrogeomorphic characteristics         A wetland has been subject to change in HGM classes as a result of anthropogenic modification <i>if the above is checked, please describe the original wetland type if discernable using the table below.</i> A wetland was created from an upland setting.         Current Conditions       Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.         Water source       Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Bit directional       Wetnown         # Surface Inlets       Over bank       0       2       3       3         # Surface Inlets       Over bank       0       1       2       3       3         HGM Setting       # Surface Inlets       Over bank       0       1       2       3       3         HGM Class       Riverine       Slope       Depressional       Lacustrine         Historical Conditions       Riverine       Slope       Depressional       Lacustrine         Historical Conditions       Unidirectional       Vertical       Setting Unarative Description Unknown       Hydrodynamics       Unidirectional       Vertical         Previous wetland typology       Water source       Surface flow <th></th> <th></th> <th></th> <th></th> <th></th> <th>2</th> <th></th>						2	
A 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. A wetland was created from an upland setting. Current Conditions bescribe the hydrogeomorphic setting of the wetland by circling all conditions that apply. Water source Surface flow Groundwater Precipitation HGM Setting Wetland Gradient 0 2% 2.4% 4.10% 5.10% # Surface Outlets 0 1 2 3 >3 Geomorphic Setting (Narative Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply. Water source Surface flow Surface flow Groundwater Surface outlets 0 1 2 3 >3 Geomorphic Setting (Narative Describe the flow of plain. Potential remediated pit mine associated with highway construction. HGM class Riverine Slope Depressional Lacustrine Water source Surface flow Surface flow Groundwater Previous Water source Surface flow Surface flow Surface flow Surface flow Surface flow Groundwater Precipitation Unknown Hydrodynamics Unidirectional Vertical Surface flow Surface flow Groundwater Precipitation Unknown Hydrodynamics Surface flow Surface flow Surf		Н	<b>YDROGEOMOR</b>	RPHIC SETTIN	G		
Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.         Water source       Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Bisdirectional       Unknown         # Surface Inlets       Overbank       0       2       3       >3         # Surface Inlets       Overbank       0       1       2       3       >3         # Surface Outlets       0       1       2       3       >3         Geomorphic       Setting (Narrative Description. Include approx. stream order for Niverine)       Constructed depressional wetland adjacent to clear creek and located with the Clear Creek flood plain. Potential remediated pit mine associated with highway construction.         Historical Conditions       Image: Surface flow       Groundwater       Precipitation       Unknown         Previous wetland typology       Water source       Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Setting (Narrative Description)       Previous HGM       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek       Previous HGM       Previous HGM       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek       Previous HGM       Previous HGM       Riverine	AA wetland If the above	has been subject to o is checked, please o	change in HGM classes lescribe the original we	as a result of anthro	pogenic modificati		
Water source       Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Bi-directional       Unknown         HGM Setting       # Surface Inlets       Over-bank       0       2       3       >3         # Geomorphic       Setting (Narrative Description. Include approx. stream order for riverine)       Constructed depressional wetland adjacent to clear creek and located with the clear Creek flood plain. Potential remediated pit mine associated with highway construction.         Historical Conditions       Riverine       Slope       Depressional       Lacustrine         Hydrodynamics       Unidirectional       Vertical       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Precipitation       Unknown <th></th> <th></th> <th></th> <th>omorphic setting of th</th> <th>e wetland by circli</th> <th>ng all conditions</th> <th></th>				omorphic setting of th	e wetland by circli	ng all conditions	
Hydrodynamics       Unidirectional       Vertical       Bi-directional         Wetland Gradient       0 - 2%       2-4%       4-10%       >10%         # Surface Inlets       Over-bank       0       1       2       3       >3         HGM Setting       # Surface Outlets       0       1       2       3       >3         # Surface Outlets       0       1       2       3       >3         Geomorphic       Setting (Narrative Description. Include approx. stream order for riverine)       Constructed depressional wetland adjacent to clear creek and located with the clear Creek flood plain. Potential remediated pit mine associated with highway construction.         Historical Conditions       Neter source       Surface flow       Depressional       Lacustrine         Hydrodynamics       Unidirectional       Vertical       Geomorphic Setting (Narrative Description)       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek         Previous wetland typology       Riverine       Slope       Depressional       Lacustrine         Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show       Slope       Depressional       Lacustrine	Current Col	nditions	that apply.		$-\mathcal{A}$		
HGM Setting       Wetland Gradient       0 - 2%       2-4%       4-10%       >10%         # Surface Inlets       Over-bank       0       1       2       3       >3         # Surface Inlets       O       1       2       3       >3         # Surface Outlets       0       1       2       3       >3         Geomorphic       Setting (Narrative Description. Include approx. stream order for riverine)       Constructed depressional wetland adjacent to clear creek and located with the Clear Creek flood plain. Potential remediated pit mine associated with highway construction.         HGM class       Riverine       Slope       Depressional       Lacustrine         Historical Conditions       Image: Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Image: Sufface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Image: Sufface flow       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Image: Sufface flow       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Image: Sufface flow       Precipitation       Image: Sufface flow <tr< th=""><th></th><th>Water source</th><th>Surface flow</th><th>Groundwater</th><th>Precipitation</th><th>Unknown</th><th></th></tr<>		Water source	Surface flow	Groundwater	Precipitation	Unknown	
HGM Setting       # Surface Inlets       Over-bank       0       1       2       3       >3         HGM Setting       # Surface Outlets       0       1       2       3       >3         Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)       Constructed depressional wetland adjacent to clear creek and located with the Clear Creek flood plain. Potential remediated pit mine associated with highway construction.         HGM class       Riverine       Slope       Depressional       Lacustrine         Historical Conditions		Hydrodynamics	Unidirectional	Vertical	<b>Bi-directional</b>		
HGM Setting       # Surface Outlets       0       1       2       3         Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)       Constructed depressional wetland adjacent to clear creek and located with the clear Creek flood plain. Potential remediated pit mine associated with highway construction.         HGM class       Riverine       Slope       Depressional       Lacustrine         Historical Conditions       Vater source       Surface flow       Groundwater       Precipitation       Unknown         Previous wetland typology       Water source       Surface flow       Groundwater       Precipitation       Unknown         Previous wetland       Water source       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek       Previous HGM Class       Riverine       Slope       Depressional       Lacustrine         Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show       State of the subclass in the subclass): Historical imagery appears to show		Wetland Gradient	0 - 2%	6 2-4%	4-10% >10	)%	
Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)       Constructed depressional wetland adjacent to clear creek and located with the Clear Creek flood plain. Potential remediated pit mine associated with highway construction.         HGM class       Riverine       Slope       Depressional       Lacustrine         Historical Conditions       Water source       Surface flow       Groundwater       Precipitation       Unknown         Previous wetland typology       Water source       Surface flow       Groundwater       Precipitation       Unknown         Previous wetland typology       Water source       Surface flow       Groundwater       Precipitation       Unknown         Previous methand       Riverine       Slope       Depressional       Lacustrine         Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show       Slope       Depressional       Lacustrine		# Surface Inlets	Over-bank	0 1	2 3	>3	
Setting (Narrative Description. Include approx. stream order for riverine)       Constructed depressional wetland adjacent to clear creek and located with the clear Creek flood plain. Potential remediated pit mine associated with highway construction.         HGM class       Riverine       Slope       Depressional       Lacustrine         Historical Conditions         Water source       Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical       Precipitation       Unknown         Hypology       Previous MedM (Narrative Description)       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek       Previous Include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show	HGM Setting	# Surface Outlets		0 1	2 3	>3	
Water source       Surface flow       Groundwater       Precipitation       Unknown         Previous wetland typology       Water source       Surface flow       Groundwater       Precipitation       Unknown         Previous wetland typology       Exercise       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek       Previous HGM Class       Riverine       Slope       Depressional       Lacustrine         Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show       Station of the text of the text of te	Ū	Setting (Narrative Description. Include approx. stream order for	Clear Creek flood plai				
Water source       Surface flow       Groundwater       Precipitation       Unknown         Hydrodynamics       Unidirectional       Vertical         Wetland       Geomorphic       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek         Previous HGM       Riverine       Slope       Depressional       Lacustrine         Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show       Notes       Historical imagery appears to show		HGM class	Riverine	Slope	Depressional	Lacustrine	
Hydrodynamics       Unidirectional       Vertical         Wetland typology       Geomorphic Setting (Narrative Description)       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek         Previous HGM Class       Riverine       Slope       Depressional       Lacustrine	Historical Co	nditions	N				
Geomorphic wetland typology       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek         Previous HGM Class       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek         Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show		Water source	Surface flow	Groundwater	Precipitation	Unknown	
Geomorphic typology       Geomorphic Setting (Narrative Description)       Prior to 1994 appeard to be upland habitat adjacent to Clear Creek         Previous HGM Class       Riverine       Slope       Depressional       Lacustrine	Provious	Hydrodynamics	Unidirectional	Vertical			
Description)         Prior to 1994 appeard to be upland habitat adjacent to Clear Creek           Previous HGM Class         Riverine         Slope         Depressional         Lacustrine           Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show         Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show	wetland						
Class         Riverine         Slope         Depressional         Lacustrine           Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show         Image: Class         Image:	typology	Description)	Prior to 1994 appeard	to be upland habitat	adjacent to Clear 0	Creek	
<b>o j o j i</b>	C .	Class		•	•		
				gional subclass): Hist	orical imagery app	ears to show	

## **ECOLOGICAL DESCRIPTION 2**

System	n Habitat D Subsystem	Class		WS habitat clas		er Regir			Modifiers	% AA
P	P	E		RV	vval			Cilei		
	1					E			h	80
		SS		BLD		E			h	20
										6
									•	
										$\mathbf{N}^{\mathbf{i}}$
										D
	Littoral;							Нуре	rsaline(7) ;	
Lacustrine	Limnoral	Book Bet (DD)	Floati	ing vascular;		Examples		Eus	aline(8); e(9); Fresh(0);	
Palustrine	Palustrine	Rock Bot. (RB) Uncon Bottom(UB)		ed vascular; ; Persistent;	Sa	Saturated(B);			cid(a); nneutral(c);	
		Aquatic Bed(AB) Rocky Shore(RS)	Non-	-Persistent; aved deciduous;	Seas.	nally flooded -flood./sat.(	(E);	Alkaline/	calcareous(i); g); Mineral(n);	
	Lower perennial;	Uncon Shore(US) Emergent(EM)	Needle-leaved evergreen; Cobble - gravel;		Semi-Perm. flooded(F); Intermittently exposed(G);		Beaver(b); Partially Drained/ditched(d);			
Riverine	Upper perennial; Intermittent	Shrub-scrub(SS) Forested (FO)	Sa	and; Mud; Organic	Sat./sem	Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)		Farmed(f); Diked/impounded(h);		
								Artificial Substrate(r); Spoil(s); Excavated(x)		
				organic	Int. expo	sed/permen	nant(Z)	Artificial	Substrate(r);	
					Int. expo	sed/permen	nant(Z)	Artificial	Substrate(r);	
Site Map		a sketch map of ti	he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
		a sketch map of ti es, and other sign	he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
Site Map			he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
			he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
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		es, and other sign	he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
			he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
		es, and other sign	he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
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		es, and other sign	he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
		es, and other sign	he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
		es, and other sign	he site inclu	uding relevant p		2	2	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat

### Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables - Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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### SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

#### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
6		
Notes:		

### Variable 1: Habitat Connectivity p. 2

#### SV 1.2: Migration/Dispersal Barriers

This sub-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.

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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	C	Comments/description				
	Х	Major Highway	ŀ	-270				
	artificial barriers	Secondary Highway	ŀ	-76 6				
	X	Tertiary Roadway	E	E-70th				
1	q	Railroad						
	Х	Bike Path	(	Clear Creek Trail				
3.7	≣ X	Urban Development	ι	Jrban environment				
	9 1	Agricultural Developn	nent					
		Artificial Water Body	e	excavated portions: potentially road base mining				
	Stressors X X X X	Fence						
	8 X	Ditch or Aqueduct		Constructed system				
đ	Σ. K	Aquatic Organism Ba	rriers F	Rip-rap, culverts				
-								
	Variable Score	Condition Grade	Scoring	g Guidelines				
	1.0 - 0.9	A Reference Standard		ciable barriers exist between the AA and other wetland and riparian habitats in or there are no other wetland and riparian areas in the HCE.				
	<0.9 - 0.8	B Highly Functioning Bight Fun						
	<0.8 - 0.7	<b>c</b> Functioning	between t propagule times of d culverted commonly	o migration and dispersal retard the ability of many organisms/propagules to pass he AA and up to 66% of wetland/riparian habitat. Passage of organisms and ss through such barriers is still possible, but it may be constrained to certain ay, be slow, dangerous or require additional travel. Busy two-lane roads, areas, small to medium artificial water bodies or small earthen dams would y rate a score in this range. More significant barriers (see "functioning impaired" below) could affect migration to up to 10% of surrounding wetland/riparian				
	<0.7 - 0.6	D Functioning Impaired	organisms habitat. T restricted	o migration and dispersal preclude the passage of some types of s/propagules between the AA and up to 66% of surrounding wetland/riparian ravel of those animals which can potential negotiate the barrier are strongly and may include a high chance of mortality. Up to 33% of surrounding parian habitat could be functionally isolated from the AA.				
	<0.6	F Non-functioning	migration conveyan	entially isolated from surrounding wetland/riparian habitat by impermeable and dispersal barriers. An interstate highway or concrete-lined water ce canal are examples of barriers which would generally create functional etween the AA and wetland/riparian habitat in the HCE.				
		SV 1.1 Score	0.70	Add SV 1.1 and 1.2 scores and divide by				
		SV 1.2 Score	0.75	two to calculate variable score Variable 1 Score 0.73				

### Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

#### SV 2.1 - Buffer Condition

0.6 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

#### SV 2.2 - Buffer Extent

0.

00 Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines
	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
70 SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer
10 SV Z.Z - Buller Extent	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
	<0.6	Non-functioning	0-25% of AA with Buffer

Va	ariab	le 2: Contrik	outing	Area	(p. 2)					
SV	2.3 - /	Average Buffer V	Vidth		Record	meası	red buffer	widths in	the spaces below and average.	
Buf Wic	fer Ith (m)	15 25	14	12	10	5	8	8	12	
Lin	e #	1 2	3	4	5	6	7	8	Avg. Buffer Width (m)	
					Subvari Scor		Condition	Grade	Buffer Width Scoring Guidelines	e
		SV 2.3 - Avera	age Bu	ffer	1.0 - 0	0.9	Reference	Standard	Average Buffer width is 190-250m	+
0.6	65	Width S	-		<0.9 -	0.8	Highly Fur	ctioning	Average Buffer width is 101-189m	
					<0.8 -	0.7	Functio	ning	Average Buffer width is 31-100m	
					<0.7 -	0.6	Functioning	Impaired	Average Buffer width is 6-30m	
					<0.6	ô	Non-fund	tioning	Average Buffer width is 0-5m	
SV	2.4 - \$	Surrounding Lan	d Use	1						
		v 2.4 - Surrou		1	0.1.1					
0.	7	Land Use Sc			Catalog landsca			land use	changes in the surrounding	,
	$\checkmark$	Stressors			ents/des					
	х	Industrial/comm	ercial				facilities	adjacent	6	1
a di	x x	Urban Booidoptiol		Urban e	environm	nent				1
		Residential Rural								
Stressors – Land Lise Changes	5 -	Dryland Farming	1						N X	
a v	, —	Intensive Agricu								
	3	Orchards or Nur						~		
00	1	Livestock Grazir	ng							
ī	i X	Transportation C		I-270, I·					S O	
oro	2 X	Urban Parklands			stem adja	acent	<u> </u>	*		
	S x	Dams/impoundn		Manage				at a sle se a		
t.	x	Artificial Water b Physical Resource E							tentially road base mining pite	
	X	Biological Resource		potentia	potentially road base mining pits					
	ariable Score	Condition Grade			~	s	coring G	uideline	s	
1	.0 - 0.9	A Reference	No appre	ciable land	d use chan	ige has	been impos	ed Surrou	nding Landscape.	
		Standard	Some lar	d use cha	nge has og	ccurred	in the Surro	unding La	ndscape, but changes have minimal	
<(	0.9 - 0.8	B Highly Functioning	effect on	the the lar	ndscape's o	capacit	/ to support	characteri	stic aquatic functioning, either grazing, or low intensity silviculture,	
					-			-	an 10% of the area.	1
		C.							hift in land use, however, the land tion and it is not an overt source of	
<(	0.8 - 0.7	Functioning	pollutants	s or sedime	ent. Mode	rate-int	ensity land u	ses such	as dry-land farming, urban "green"	1
									aced within this scoring range.	1
			I and use	Land use changes within the Surrounding Landscape has been substantial including the a					5	
				moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surfaces; considerable in-flow urban runoff or fertilizer-rich waters common. Supportive						
	0.7 - 0.6	D Functioning	moderate surfaces;	considera						
	0.7 - 0.6		moderate surfaces; capacity	considera of the land	has been	greatly	diminished	out not tot	ally extinguished. Intensively	
	0.7 - 0.6	Functioning	moderate surfaces; capacity logged at situations	considera of the land eas, low-d would cor	has been lensity urba mmonly ra	greatly an deve te a sco	diminished lopments, s pre within thi	out not tot ome urbai s range.	ally extinguished. Intensively n parklands and many cropping	
	3	Functioning Impaired F	moderate surfaces; capacity logged at situations The Surr	considera of the land reas, low-d s would con ounding La	has been lensity urba mmonly ra andscape i	greatly an deve te a sco s esser	diminished elopments, s ore within thi itially comle	out not tot ome urbai <u>s range.</u> ely develo	ally extinguished. Intensively n parklands and many cropping oped or is otherwise a cause of	
	0.7 - 0.6 <0.6	Functioning Impaired	moderate surfaces; capacity logged a situations The Surr severe e	considera of the land eas, low-d would con ounding La cological s	has been lensity urba mmonly ra andscape i tress on w	greatly an deve te a sco s esser etland l	diminished elopments, s ore within thi itially comle	out not tota ome urbai <u>s range.</u> ely develo mmercial	ally extinguished. Intensively n parklands and many cropping	
	<0.6	Functioning Impaired F	moderate surfaces; capacity logged ar situations The Surr severe er landscap	considera of the land reas, low-d s would con ounding La cological si es general unding	has been lensity urba mmonly ra andscape i tress on w	greatly an deve te a sco s esser etland l	diminished elopments, sore within thin tially comlem nabitats. Co	out not tota ome urbai <u>s range.</u> ely develo mmercial	ally extinguished. Intensively n parklands and many cropping oped or is otherwise a cause of	
	<0.6	Functioning Impaired F Non-functioning	moderate surfaces; capacity logged ar situations The Surr severe er landscap	considera of the land reas, low-d would con ounding La cological si es general	has been lensity urba mmonly ra andscape i tress on w	greatly an deve te a sco s esser etland l	diminished elopments, sore within thin tially comlem nabitats. Co	out not tota ome urbai <u>s range.</u> ely develo mmercial	ally extinguished. Intensively n parklands and many cropping oped or is otherwise a cause of	
	<0.6	Functioning Impaired F Non-functioning Buffer Score	moderate surfaces; capacity logged ar situations The Surr severe er landscap	considera of the land reas, low-d s would con ounding La cological si es general unding	has been lensity urba mmonly ra andscape i tress on w	greatly an deve te a sco s esser etland l	diminished elopments, s ore within thi titally comle- nabitats. Co less than 0.6	out not tot ome urbar <u>s range.</u> ely develo mmercial 5.	ally extinguished. Intensively n parklands and many cropping oped or is otherwise a cause of	

### Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

#### 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.

$\checkmark$	Str	essors		Comments/description					
$\times$	Ditc	hes or Drains (	(tile, etc.)	road side ditches and structur	e help feed AA's hydrology				
	Dan	าร				20			
	Dive	ersions							
	Gro	undwater pum	ping						
	Draw-downs								
$\times$	Culverts or Constrictions			erts and other stormwater structure create and manage hydrology to the					
$\times$	Point Source (urban, ind., ag.)			Heavily managed urban environment					
	Non	-point Source							
	Incr	eased Drainag	e Area						
$\times$	-	m Drain/Urbar		AA used to manage SW drain	n/ runoff				
$\times$	Impe	ermeable Surfa	ace Runoff	adjace to highway surfaces					
	-	ation Return F							
	-	ng/Natural Ga							
		nsbasin Divers							
	Activ	vely Managed	Hydrology						
					$\sim$				
Varia	ble	Condition							
Sco	re	Grade		Depletion	Augmentation				
		Α		lown events minor, rare or non-	Unnatural high-water events minor, rat				
1.0 -	0.9	Reference	alteration of hyd	ght uniform depletion, or trivial	existent, slight uniform increase in amo inflow, or trivial alteration of hydrodyna				
		Standard		lown events occasional, short					
		В		mild; or uniform depletion up to 20%;	Occasional unnatural high-water even duration and/or mild in intensity; or uni				
<0.9 -	0.8	Highly		rate reduction of peak flows or	augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to				
		Functioning	capacity of wate	r to perform work.					
					perform work.				
				lown events common and of mild to ity and/or duration; or uniform	Common occurrence of unnatural high				
<0.8 -	07	С		50%; or moderate to substantial	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.				
<b>\0.0</b> -	0.7	Functioning		k flows or capacity of water to					
			perform work.						
		XO		lown events occur frequently with a	Common occurrence of unnatural high				
				n intensity and/or duration; or uniform	events, some of which may be severe				
		D		75%; or substantial reduction of peak of water to perform work. Wetlands	exist for a substantial portion of the gro season; or uniform augmentation more				
<0.7 -	0.0	Functioning Impaired		anaged or wholly artificial	or capacity of water to perform work.				
		mpanoa	hydrology will u	usually score in this range or lower.	with actively managed or wholly arti				
					hydrology will usually score in this	range or			
2		F		minished enough to threaten or	Frequency, duration or magnitude of u				
<0.	6	Non-	extinguish wetla	nd hydrology in the AA.	high-water great enough to change the				
		functioning			fundamental characteristics of the wet	iand.			
						0.05			
					Variable 3 Score	0.65			

Variable 3 Score

0.65

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### Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

#### Scoring rules:

sour the \ 0.85 the s	rce, <b>in most</b> Water Sourc 5. Additional score from th	t cases the Water Sou e variable is rated at 0 stressors within or out he maximum value.	ute water in a characteristic fashion is fundament <b>irce variable score will define the upper limit</b> 85, the Water Distribution score will usually have tside the lower end of the AA effecting water dist	Water Distribution score. For example, if ve the potential to attain a maximum score of	
1. lo 2. C	considering	acts to the natural di all of the stressors	stribution of water throughout the AA and o identified, assign an overall variable score score will set the upper limit for the Water I	catalog them in the stressor table. using the scoring guidelines. In most Distribution score.	neerino
/	Stresso	rs	Comments/description		
×	Alteration of	of Water Source	water source is an	tificially constructed	
×	Ditches		ditches fee	ed hydrology	
×		npoundment		er in AA seasonally	
×	Culverts	•	culverts feed a	and release flow	
×	Road Grad	les	adjacent and feed	by run off from road	
	Channel In	cision/Entrenchment			
×	Hardened/	Engineered Channel	concrete structu	Ires manage flow	
	Enlarged C	-			
×	Artificial Ba	anks/Shoreline	constructe	ed wetland	
	Weirs				
×	Dikes/Leve	ees/Berms	Berm seperating wet	land from Clear Creek	
	Diversions				
	Sediment/I	Fill Accumulation			
Vari	able Score	Condition Grade	Non-riverine	Riverine Natural active floodplain areas flood on a	
1	1.0 - 0.9	A Reference Standard	hydrologic regime.	normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.	
<	0.9 - 0.8	<b>B</b> Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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 C 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.	
v Ç	0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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.	
5	<0.6	<b>F</b> 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	<b>4 Score</b> 0.7	

### Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

#### 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.

$\checkmark$	Stres	sors	Comments/description
×	Alterati	on of Water Source	artificial water source
	Ditches	3	
	Dikes/l	evees	
×	Road C	Grades	bike trail raised on berms between wetland and Clear Creek
×	Culver	S	X O
	Diversi	ons	
×	Constr		culverts themselves and and obstruction in culverts are constrictions
		el Incision/Entrenchment	
		ed/Engineered Channel	
×		al Stream Banks	wetland edges and artifical and berms in places
	Weirs		
	Confine	ed Bridge Openings	
	riable core	Condition Grade	Scoring Guidelines
1.0	1.0 - 0.9 A Reference Standard		Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA wate outflow regime.
		Reference Standard	
<0.9	9 - 0.8	Reference Standard B 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.
	9 - 0.8 8 - 0.7	В	· · · · · · · · · · · · · · · · · · ·
<0.8		B Highly Functioning C	levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level

Variable 5 Score

0.6

### Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

#### **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.

	1		Stressor	s	Comments					
$\times$		Dredg	ing/Excavation	/Mining	ars to be created from mining mitigation associated with highway constru					
$\times$		Fill, in	cluding dikes, r	oad grades, etc	Adjacent to roadways and under highway					
$\times$		Gradir	ng		road and walking trail adjacent					
$\times$	-	Comp	action		due to construction and siturbance					
	era	Plowir	ng/Disking							
	General	Exces	sive Sedimenta	ation						
	G	Dumping								
		Hoof Shear/Pugging								
×		Aggregate or Mineral Mining			potential aggregate mining					
×		Sand	Accumulation		loose sediment from runoff and erosion					
		Chanr	nel Instability/O	ver Widening						
	Only	Exces	sive Bank Eros	sion						
	ō	Chanr	nelization							
	sle		nfigured Stream							
	ŭ		al Banks/Shore							
	Channels		er Dam Remova							
	S		rate Embedded							
		Lack o	or Excess of W	oody Debris						
Varia	able	Score	Condition Grade		Scoring Guidelines					
1	.0 - 0	).9	<b>A</b> Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported.					
<	0.9 -	0.8	<b>B</b> Highly Functioning		pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.					
<	0.8 -	0.7	<b>C</b> Functioning	0	topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA.					
×			D Functioning Impaired	strongly impact Evidence that v alterations. Mo	bortant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. <i>videspread diminishment or alteration of native plant community exist due to physical habitat</i> st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.					
	<0.6	5	F Non- functioning	•	norphic alterations have caused a fundamental change in site character and functioning, Iting in a conversion to upland or deepwater habitat.					
					Variable 6 Score					

## Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

1. Stressors are grouped into sub-variables which have a similar signature or set of causes.

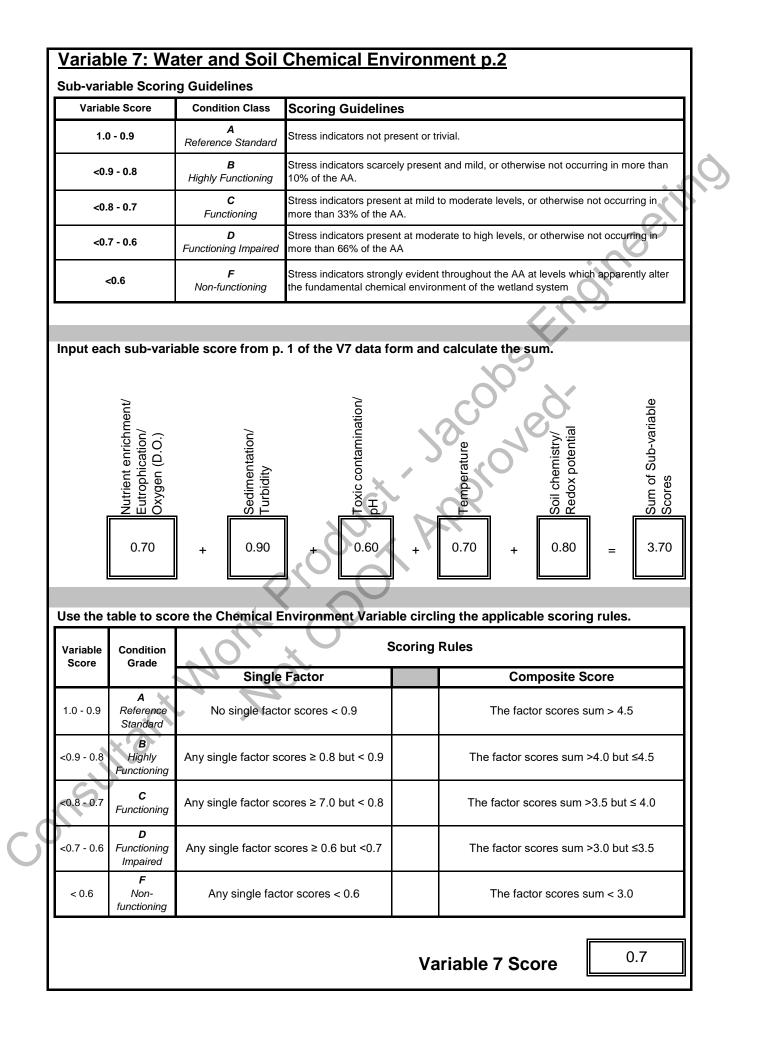
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.

3. For each sub-variable, determine its score using the scoring guideline table provided on the second page of the scoring sheet. Scoring sub-variables is carried out in exactly the same way as normal variable scoring.
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. The lowest sub-variable score sets the letter grade range. The composite of sub-variables influences the score within that range.

estock cultural Runoff tic/Sewage essive Algae or Aquatic Veg. hulative Watershed NPS PHE Impairment/TMDL List essive Erosion essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site	x x x x x x	agriculture upstream agriculture upstream placed in an urban enviroment urban environment Clear Creek unstable banks		variable Score
tic/Sewage essive Algae or Aquatic Veg. nulative Watershed NPS PHE Impairment/TMDL List essive Erosion essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site	x x x X	placed in an urban enviroment urban environment Clear Creek		
essive Algae or Aquatic Veg. hulative Watershed NPS PHE Impairment/TMDL List essive Erosion essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site	x x X	urban environment Clear Creek		0.70
nulative Watershed NPS PHE Impairment/TMDL List essive Erosion essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site	x X	Clear Creek		0.70
PHE Impairment/TMDL List essive Erosion essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site	x X	Clear Creek		
essive Erosion essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site	x			
essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site		unstable banks	/	
essive Deposition e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site		unstable banks		
e Sediment Plumes cultural Runoff essive Turbidity rby Construction Site				
cultural Runoff essive Turbidity rby Construction Site			$\mathbf{\Lambda}$	
essive Turbidity rby Construction Site				
rby Construction Site	Х	agriculture upstream	ĺ	0.90
	X	urban run off		0.90
	Х	urban environment		
nulative Watershed NPS	Х	urban environment		
PHE Impairment/TMDL List	х	Clear Creek	/	
			/	
ent Chemical Spills	х	urban environment		
rby Industrial Sites	х	urban environment	\	
d Drainage/Runoff	Х	adjacent to roadways, run off div		
stock	х	agriculture upstream		
cultural Runoff	Х	agriculture upstream		
m Water Runoff	х	urban environment		0.60
/Wildlife Impacts	Х	urban environment		0.60
etation Impacts	х	weedy	ľ	
nulative Watershed NPS	Х	urban environment		
Mine Drainage				
nt Source Discharge	Х	sewer treatment plant, Urban en	/	
PHE Impairment/TMDL List	Х	Clear Creek	/	
al staining on rocks and veg.			/	
essive Temperature Regime			$\mathbf{N}$	
k of Shading	Х	tree removal		
ervoir/Power Plant Discharge	Х	stormwater	Ī	0.70
strial Discharge	Х	urban/industrial environment		0.70
nulative Watershed NPS	х	urban environment		
PHE Impairment/TMDL List	х	Clear Creek		
			/	
atural Saturation/Desaturation				
chanical Soil Disturbance	х	urban environment	ך	0.00
aning/introduced Soil	х	construction		0.80
iping/introduced Soli	х	Clear Creek		
PHE Impairment/TMDL List				
	Mine Drainage t Source Discharge HE Impairment/TMDL List al staining on rocks and veg. essive Temperature Regime s of Shading ervoir/Power Plant Discharge strial Discharge nulative Watershed NPS HE Impairment/TMDL List atural Saturation/Desaturation hanical Soil Disturbance ping/introduced Soil	Mine Drainage       X         t Source Discharge       X         HE Impairment/TMDL List       X         al staining on rocks and veg.       Sessive Temperature Regime         as of Shading       X         ervoir/Power Plant Discharge       X         strial Discharge       X         PHE Impairment/TMDL List       X         astrial Discharge       X         PHE Impairment/TMDL List       X         atural Saturation/Desaturation       Nanical Soil Disturbance         hanical Soil Disturbance       X         apping/introduced Soil       X	Mine Drainage       x       sewer treatment plant, Urban en         t Source Discharge       x       Sewer treatment plant, Urban en         PHE Impairment/TMDL List       x       Clear Creek         al staining on rocks and veg.	Mine Drainage       x       sewer treatment plant, Urban en         t Source Discharge       x       Sewer treatment plant, Urban en         PHE Impairment/TMDL List       x       Clear Creek         al staining on rocks and veg.



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wet ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being e. It particularly focuses on the wetla normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	e of variabili	ity exhibited	the HGM s	ubclass or	regetation stratum differs functionally from its natural regional subclass. This variable has four sub-variables, arbaceous Layer; and Aquatics.	
Rules for Scoring:						1
additional layers were historic	ally preser	nt using dir	rect evider	nce such	n the AA. Make a judgment as to whether as stumps, root wads or historical photographs. so be used in this determination.	$\wedge$
2. Do not score vegetation la	yers that w	vould not n	ormally be	e present	in the wetland type being assessed.	
	ndard or e	xpected pe	ercent cov	erage of	r at the top of the table. each vegetation layer to create the sub-variable a greater influence on the variable score than do	ineering
5. Enter the percent cover val Cover of Layer". Note, percent					sor table labeled " Reference/expected Percent	
6. Determine the severity of s	stressors a stressor tal	acting on ea	ach individ	dual canc	opp layers, indicating their presence with checks in the expected and observed stratum coverages is	
	n sub-varia	able score i	in the app	ropriate c	using the scoring guidelines on the second page of cell of the row labeled "Veg. Layer Sub-variable	
	These are t	the weighte	ed sub-vai		ts Veg. Layer Sub-variable scores and enter the res. Individually sum the <i>Reference Percent</i>	
9. Divide the sum of "Veg. L Variable 8 score. Enter this n					coverage of all layers scored. This product is the of this page.	Jacobs L
	١	Vegetatio	n Layers	s	]	6
Current % Coverage of					]	
Layer	0.2	0	0.8	0		
Stressor	Tree	Shrub	Herb	Aquatio	Comments	
Noxious Weeds Exotic/Invasive spp.		<u> </u>		-		
Tree Harvest	1	1	1	1		
Brush Cutting/Shrub Removal	1	1	1	1	-	
Livestock Grazing						
Excessive Herbivory						
Mowing/Haying			20%			
Herbicide		<u> </u>	700/	-		
Loss of Zonation/Homogenization		<u> </u>	70%	-	*	
Dewatering Over Saturation	20%	<u> </u>	20%	-		
	20 /0		2070	-		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.25	0.15	0.05	0		
Reference/Expected % Cover of Layer	0.45 +	0.15 +	0.85 +	+ 0.00	= 1.45	
Veg. Layer Sub- variable Score	0.8	0.5	0.8	0	See sub-variable scoring guidelines on following page	
Weighted Sub-variable Score	" 0.36 +	" 0.08 +	ا 0.68 +		= 1.115	
I					Variable 8 Score 0.77	

#### Variable 8: Vegetation Structure and Complexity p. 2

variable 8 Scoring Guideline

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	A 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	B 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 welfand. 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	<b>C</b> 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	D 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	F 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.

### **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.

ering 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

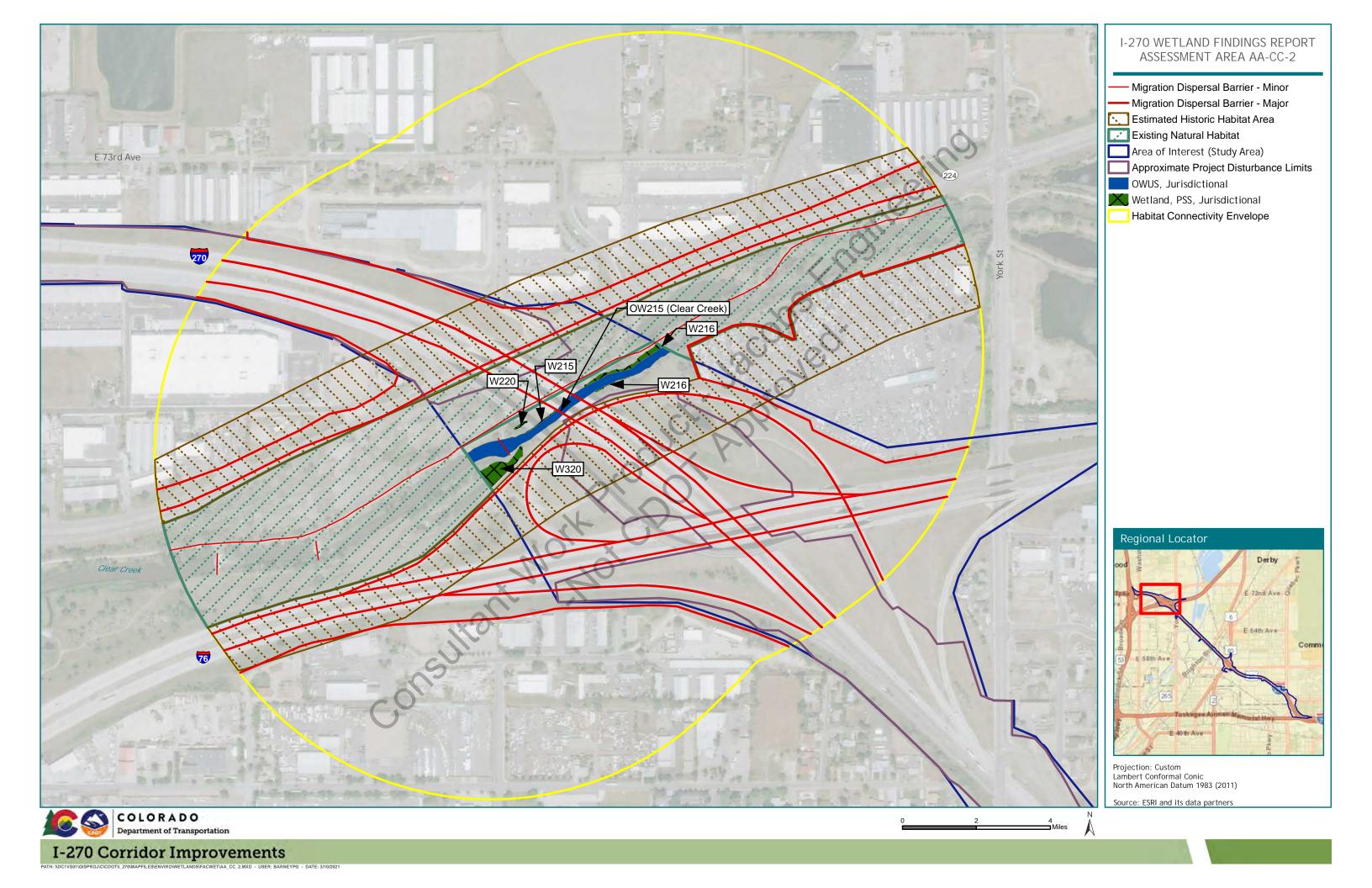
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & .andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.73
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.65
λĒ	Variable 3:	Water Source (Source)	0.65
Hydrology	Variable 4:	Water Distribution (Dist)	0.70
I	Variable 5:	Water Outflow (Outflow)	0.60
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.70
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.70
Abiotic Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.77

### Functional Capacity Indices

r unctional oapacity indices	
Function 1 Support of Characteristic Wildlife Habitat	Total Functional FCI
$V1_{connect}$ + $V2_{CA}$ + $(2 \times V8_{veg})$	Points
0.73 + 0.65 + 1.54 + + +	+ <b>=</b> 2.91 ÷ <b>4</b> = 0.73
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	
	+ <b>5</b> .95 ÷ <b>9</b> = 0.66
Function 3 Flood Attenuation	
$V2_{CA} + (2 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom}$	+ V8 <sub>veg</sub>
	+ 0.77 = $6.02 \div 9 = 0.67$
Function 4 Short- and Long-term Water Storage	
$V3_{source}$ + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
	+ <b>3</b> .95 ÷ <b>6</b> = 0.66
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA})$ + $(2 \times V4_{dist})$ + $V6_{geom}$ $V7_{chem}$	
1.30 + 1.40 + 0.70 + 0.70 +	+ = $4.10 \div 6 = 0.68$
Function 6 Sediment Retention/Shoreline Stabilization	
$V2_{CA}$ + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.65 + 1.40 + 1.54 + +	+ <b>3</b> .59 ÷ <b>5</b> = 0.72
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
0.73 + 1.20 + 0.70 + 0.70 + 1.54	+ = $4.86 \div 7 = 0.69$
	Sum of Individual FCI Scores 4.81
Divi	de by the Number of Functions Scored ÷7
	Composite FCI Score 0.69



# ADMINISTRATIVE CHARACTERIZATION

General Informat	tion	۸	A-CC-2	Date of Evaluation:	1/21/2021		
	AA-CC-2: W21	5, W216,		I-270 (STU 2706-043)			
Site Name or ID: 404 or Other Permit Application #:	W220, W320 ( NA	Clear Creek)		Project Name: Applicant Name:	СДОТ	0	S
Evaluator Name(s):	Brett Hartmani and Pat Hickey		Evaluator's pro	ofessional position and organization:	Biologists (Jaco	ıbs)	
Location Informa	ation:						
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Clear C	Aggregated Score for multiple Creek Wetland polygons I: 39.825044, -104.968267) Geographic Datum Used (NAD 83): Elevation			NAD83 5121		
Location Information:		Riverii	ne wetlands asso	ciated with edges	of Clear Creek		
Associated stream/wa	ater body name:	: Clear Creek		~ <u>~</u>	Stream Order:	Riv	verine
USGS Quadrangle Map:	Commerce Cit	y, CO 2019		Map Scale: (Circle one)	<mark>1:24,(</mark> Other		00,000
Sub basin Name (8 digit HUC):	HUC: 1019000	13	00° <	Wetland Ownership:	СDOT		
Project Information This evaluation is being performed at: (Check applicable box)	on: X Project We Mitigation S		Purpose of Evaluation (check all applicable):	<ul> <li>Potentially Impa</li> <li>Mitigation; Pre-o</li> <li>Mitigation; Post-</li> <li>Monitoring</li> <li>Other (Describe)</li> </ul>	construction -construction		
Intent of Project: (Che	ck all applicable)		Restoration		hancement	Cre	eation
Total Size of Wetland (Record Area, Check and Measurement Method Use	Describe	ac.	X Measured: 0.6 Estimated	33255			
Assessment Area (AA Area, check appropriate box. used to record acreage when included in a single assessme	Additional spaces are more than one AA is	ac	X Measured Estimated	ac. ac.	ac. ac. ac. ac.	ac. ac.	
Characteristics or Me AA boundary determin				20 are similar wet wetlands are grou	•	-	
Notes: Measu	red with Collect	or Web Map					

## ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply				
	ls including Histosols of he AA (i.e., AA includes			tened or endangere to occur in the AA?	d species are	
	directly impact organic eas possessing either h			Ute Lady's tresse	S	eeril
	Is are known to occur a wetland of which the A			cern according to th P) are known to occ		
The wetland urbanized la	d is a habitat oasis in ar andscape?	otherwise dry or	The site is loca area or elemer by CNHP?			
	reatened or endangere the AA? List Below.	d species are KNOWN		concerns (please des	scribe)	0
					S	
	F	IYDROGEOMOR	RPHIC SETTIN	G		
If the abov		change in HGM classes lescribe the original we upland setting.				
 Current Co	nditiono	Describe the hydroge	omorphic setting of th	e wetland by circlin	ng all conditions	
Current Co	nations	that apply.	C~			
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	Bi-directional		
	Wetland Gradient	0 - 29		4-10% >10	%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
HGM Setting	# Surface Outlets Geomorphic Setting (Narrative			2 3	>3	
	Description. Include approx. stream order for riverine)	Wetlands associated wetlands are sloped a			cised and	
	HGM class	Riverine	Slope	Depressional	Lacustrine	
Historical Co	onditions	N				
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics	Unidirectional	Vertical			
wetland typology	Geomorphic Setting (Narrative Description)	Wetland has been con 1994 according to aer		ay and walking trai	I berms since pre-	
S	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
INOTES (INClude In	normation on the AA's	HGM subclass and re-	gional subclass):			

## **ECOLOGICAL DESCRIPTION 2**

_		Description		WS habitat cla		-				
System	Subsystem		SI	ubclass	vvat	er Regim	e	Uther	Modifiers	% AA
P P		E		RV		Е			h	80
		SS		BLD		Е			h	20
										0
									\$	
									~	ろ
									$\bigcirc$	
								6	₩	
Lacustrine	Littoral; Limnoral								saline(7) ; aline(8);	
Palustrine	Palustrine	Rock Bot. (RB)		ing vascular; ed vascular:	Tempo	Examples rarily flooded	(A);	Mixosalin	e(9); Fresh(0); cid(a);	
alustille	FaluStrine	Uncon Bottom(UB) Aquatic Bed(AB)	Rooted vascular; Algal; Persistent;		Sa Seaso	Saturated(B); Seasonally flooded(C); Seas,-flood./sat.(E); Semi-Perm. flooded(F);		Actu(a), Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d);		
		Rocky Shore(RS) Uncon Shore(US)	Broad-lea	Non-Persistent; Broad-leaved deciduous;						
Riverine	Lower perennial; verine Upper perennial; Intermittent			Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Orranic		ently exposed	d(G);			
						Artificially flooded(K); Sat./semiperm./Seas. (Y);		Farmed(f); Diked/impounded(h);		
		Shrub-scrub(SS) Forested (FO)						Diked/in	nounded(h).	
		. ,		and; Mud; Organic		niperm./Seas sed/permena		Artificial	Substrate(r);	
		. ,						Artificial		
Site Map	Intermittent	. ,		Organic	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	pitat
	Intermittent	Forested (FO) w a sketch map of t	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	vitat
	Intermittent	Forested (FO) w a sketch map of t	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	pitat
	Intermittent	Forested (FO) w a sketch map of t	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent	Forested (FO) w a sketch map of t	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	pitat
	Intermittent Dra clas	Forested (FO) w a sketch map of t	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
Scale: 1 sq. =	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	Ditat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	Ditat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	Ditat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	bitat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	Ditat
	Intermittent Dra clas	Forested (FO)	he site inclu	Organic uding relevant p	Int. expo	sed/permena	nt(Z)	Artificial Spoil(s);	Substrate(r); Excavated(x)	Ditat

### Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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### SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

#### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Notes:		

## Variable 1: Habitat Connectivity p. 2

### SV 1.2: Migration/Dispersal Barriers

This sub-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.

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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.

	$\checkmark$	Stressors		Comments/description					
	x Major Highway			1-270					
= artificial barriers	х	Secondary Highway		I-76					
arrie	х	Tertiary Roadway		E 70th and parking lots					
p8		Railroad							
cia	х	Bike Path		Clear Creek trail					
tifi	х	Urban Development		Located in an urban setting nt upstream					
ติ	х	Agricultural Developr	nent						
ູ ເ		Artificial Water Body							
Stressors	х	Fence		multiple properties					
es	х	Ditch or Aqueduct		feed by ditches					
St	х	Aquatic Organism Ba	arriers	flow control structures					
v	ariable		Π						
	Score	Condition Grade	Scorin	ng Guidelines					
4		А	No appreciable barriers exist between the AA and other wetland and riparian habita						
1	.0 - 0.9	Reference Standard	the HCE	the HCE; or there are no other wetland and riparian areas in the HCE.					
			Barriers	impeding migration/dispersal between the AA and up to 33% of surrounding					
				nd/riparian habitat highly permeable and easily passed by most organisms.					
<(	0.9 - 0.8	Highly Functioning		Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More					
		5 7 4 4 4 5		significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.					
				to migration and dispersal retard the ability of many organisms/propagules to pas					
				the AA and up to 66% of wetland/riparian habitat. Passage of organisms and					
			propagu	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,					
<(	0.8 - 0.7	Functioning							
		r unedoming		d areas, small to medium artificial water bodies or small earthen dams would ly rate a score in this range. More significant barriers (see "functioning impaired"					
				/ below) could affect migration to up to 10% of surrounding wetland/riparian					
			le a le it a t	, , , , , , , , , , , , , , , , , , , ,					
				to migration and dispersal preclude the passage of some types of ns/propagules between the AA and up to 66% of surrounding wetland/riparian					
<	0.7 - 0.6	D		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.					
		Functioning Impaired	restricte						
			wetland/						
	2			sentially isolated from surrounding wetland/riparian habitat by impermeable					
	<0.6	F		tion and dispersal barriers. An interstate highway or concrete-lined water					
		Non-functioning		ance canal are examples of barriers which would generally create functional between the AA and wetland/riparian habitat in the HCE.					
		I	isolation						
			<b></b>	Add SV(11 and 12					
		SV 1.1 Score	0.60	Add SV 1.1 and 1.2 scores and divide by					
		SV 1.1 Score SV 1.2 Score	0.60 0.70	Add SV 1.1 and 1.2 scores and divide by two to calculate variable score Variable 1 Score 0.65					

## Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

### SV 2.1 - Buffer Condition

0.7 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

### SV 2.2 - Buffer Extent

0.

,80 Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines
	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
0.70 SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer
	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
	<0.6	Non-functioning	0-25% of AA with Buffer
	-		

		e 2: C			<u>,</u> 1			red huffer	vidths in	the spaces below a	ind average	
		werage		lati		Record	measu	red buller		line spaces below a	ind average.	
Buffer Width		10	12	20	25	8	5	15	22	15		
Line #	• •	1	2	3	4	5	6	7	8	Avg. Buffer Width (	(m)	
						Subvar	iahla			-		
						Subvar		Condition	Grade	Buffer Width Scorin	ng Guidelines	وأ
	1.	SV 2.3	- Avera	nge Bu	ffer	1.0 - (	0.9	Reference	Standard	Average Buffer width	n is 190-250m	•
0.7			/idth Se			<0.9 -	0.8	Highly Fun	ctioning	Average Buffer width	n is 101-189m	
						<0.8 -	0.7	Functio	ning	Average Buffer width	h is 31-100m	$\mathbf{O}$
						<0.7 -	0.6	Functioning	Impaired	Average Buffer wid		0.
						<0.6	6	Non-func	ioning	Average Buffer with	dth is 0-5m	Ø
SV 2	.4 - 5	Surround	ling Lan	d Use								
		/ 2.4 - §	-		_1	<b>.</b>						
0.7		, 2.4 - C Land L				Catalog landsca			land use	changes in the surr	rounding	
				Jie	0.0							
	<u> </u>	Stresso	ors al/comme	arcial		ents/des ndustria	-					
S	^ X	Urban		FICIAI		Environn		onnent		6	I	
:əɓi	<u> </u>	Residen	ntial		c.sair							
har		Rural								OY I		
= Land Use Changes			Farming							<u> </u>		
Ns			e Agricul									
put			ls or Nur: k Grazin									
La La	x		ortation C	0	I-76, I-270							
LS =	x		arklands			Clear creek trail and park adjacent flow control structures potential road base quarry						
Stressors	x		npoundm									
itre	х	Artificial	Water b	ody	potentia							
S	х		Resource E		road ba	ase extra	oction					
		Biological	Resource	Extraction					<u> </u>			
				Ī		-0	<b>—</b>					
Vari Sc		Conditio	on Grade				S	coring Gu	ideline	s		
			4									
1.0	0.9		erence ndard	No appre	ciable land	d use chan	ige has	been impos	ed Surrou	nding Landscape.		
										ndscape, but changes		
<0.9	- 0.8		B unctioning							stic aquatic functioning grazing, or low intensi		
		i iigiiiy Ft	anouorning							an 10% of the area.		
										hift in land use, howeve		
<0.8	- 0.7		C tioning		retains much of its capacity to support natural wetland function and it is not an overt source of pollutants or sediment. Moderate-intensity land uses such as dry-land farming, urban "green"							
		<b>S</b>		corridors, or moderate cattle grazing would commonly be placed within this scoring range.						ig range.		
					•			•	•	een substantial includi faces, bare soil, or oth	•	
<0.7	- 0.6		<b>D</b> tioning	surfaces;	considera	ble in-flow	urban	runoff or fert	lizer-rich	waters common. Supp	portive	
		-	aired			f the land has been greatly diminished but not totally extinguished. Intensively eas, low-density urban developments, some urban parklands and many cropping						
C	$\sim$			situations	s would co	mmonly ra	ite a sco	ore within thi	range.	,	11 0	
	0.6		F		-			-	-	ped or is otherwise a d developments or highly		
		Non-fur	nctioning					less than 0.6				
/		Buffer S	core	Surro	unding							
		(Lowest se			d Use							
	-					~						
	(	0.7	+	0.7	) ÷	2		= Var	able	2 Score	0.70	

# Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

### 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.

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	Stressors	Comments/description
$\times$	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
	Dams	
×	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
×	Point Source (urban, ind., ag.)	Heavily managed urban environment
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
×	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
$\times$	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

	Variable Score	Condition Grade	Depletion	Augmentation
	1.0 - 0.9	<b>A</b> 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	<b>B</b> 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	<b>C</b> 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	D 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
	<0.6	<b>F</b> 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.
ľ				Variable 3 Score 0.7

# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

### Scoring rules:

sour the \ 0.85	rce, <b>in most</b> Water Sourc 5. Additional	t cases the Water Sou the variable is rated at 0	ute water in a characteristic fashion is fundamer <b>urce variable score will define the upper limit</b> 1.85, the Water Distribution score will usually hav tside the lower end of the AA effecting water dis	Water Distribution score. For example, if	Ó
1. lo 2. C	onsidering	acts to the natural di all of the stressors	istribution of water throughout the AA and o identified, assign an overall variable score score will set the upper limit for the Water	catalog them in the stressor table. using the scoring guidelines. In most Distribution score.	erimo
$\checkmark$	Stresso	rs	Comments/description		
×	Alteration of	of Water Source	surrounding lands and water stuctur	es in constant flux due to construction	
×	Ditches		ditches fee	ed hydrology	
×	Ponding/In	npoundment	caused at diversion an	d stormwater structures	
×	Culverts		runoff from culverts c	ontributes to hydrology	
×	Road Grad	les	adjacent and feed by run of	f from road and path grading.	
×	Channel In	cision/Entrenchment	Channelshows signs of Incision and Er	trenchment. Substrate prone to erosion.	
		Engineered Channel	concrete structures man	age flow and armor banks	
	Enlarged C			n places to slow flow	
×		anks/Shoreline	heavily manag	jed urban creek	
II	Weirs				
×	Dikes/Leve		Berms and grading	contain Clear Creek	
	Diversions				
×	Sealment/	Fill Accumulation	runon from	urban setting	
Vari	able Score	Condition Grade	Non-riverine	Riverine	
1	1.0 - 0.9	<b>A</b> 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	B Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> 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.	
< C	0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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	<b>F</b> 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	4 Score 0.7	

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

### 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.

-		sors	Comments/description
	Alterati	ion of Water Source	
	Ditches	8	
	Dikes/Levees		
	Road Grades		
	Culverts		× N
	Diversi	ons	
	Constr	ictions	
$\times$	Chann	el Incision/Entrenchment	substrate prone to erosion
$\times$	Harder	ned/Engineered Channel	Urban environment
	Artificia	al Stream Banks	
	Weirs		
	Confine	ed Bridge Openings	
	riable core	Condition Grade	Scoring Guidelines
1.0	) - 0.9	A Reference Standard	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
		В	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal")
<0.9	9 - 0.8	Highly Functioning	levels flow continues essentially unaltered in quantity or character.
	9 - 0.8 8 - 0.7	Highly Functioning C Functioning	levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.8	-	С	High- or low-water outflows are moderately affected, mild alteration of intermediate level

Variable 5 Score

0.95

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

### **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.

			Stressor	s	Comments				
$\times$	1	Dredg	ing/Excavation	/Mining	appears to be created from mining mitigation associated with highway				
$\times$		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to roadways and under highway				
$\times$		Gradi	ng		road and walking trail adjacent				
$\times$		Comp	action		due to construction and siturbance				
	ers	Plowi	ng/Disking						
×	General	Exces	sive Sediment	ation	loose sediment from runoff and erosion				
	G	Dump	ing						
		Hoof	Shear/Pugging						
		Aggre	Aggregate or Mineral Mining						
×		Sand Accumulation			loose sediment from runoff and erosion				
		Channel Instability/Over Widening		ver Widening	erosion prone substrate				
	≥	Excessive Bank Erosion		sion	erosion prone substrate				
×	Only	Channelization			erosion prone substrate				
×	<u>s</u>	Recor	nfigured Strean	n Channels	Urban environment				
×	Channels	Artific	ial Banks/Shore	eline	Urban environment				
×	าลr	Beave	er Dam Remov	al	Urban environment				
	U U		rate Embeddeo						
×		Lack	or Excess of W	oody Debris	Urban environment				
Vari	able	Score	Condition Grade		Scoring Guidelines				
1	1.0 - (	0.9	<b>A</b> Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ties are still supported.				
<	:0.9 -	0.8	<b>B</b> Highly Functioning		pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.				
<	208.07		•	topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA.					
V	<0.7 - 0.6		D 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 habita 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	ô	F Non- functioning		norphic alterations have caused a fundamental change in site character and functioning, Iting in a conversion to upland or deepwater habitat.				
					Variable 6 Score				

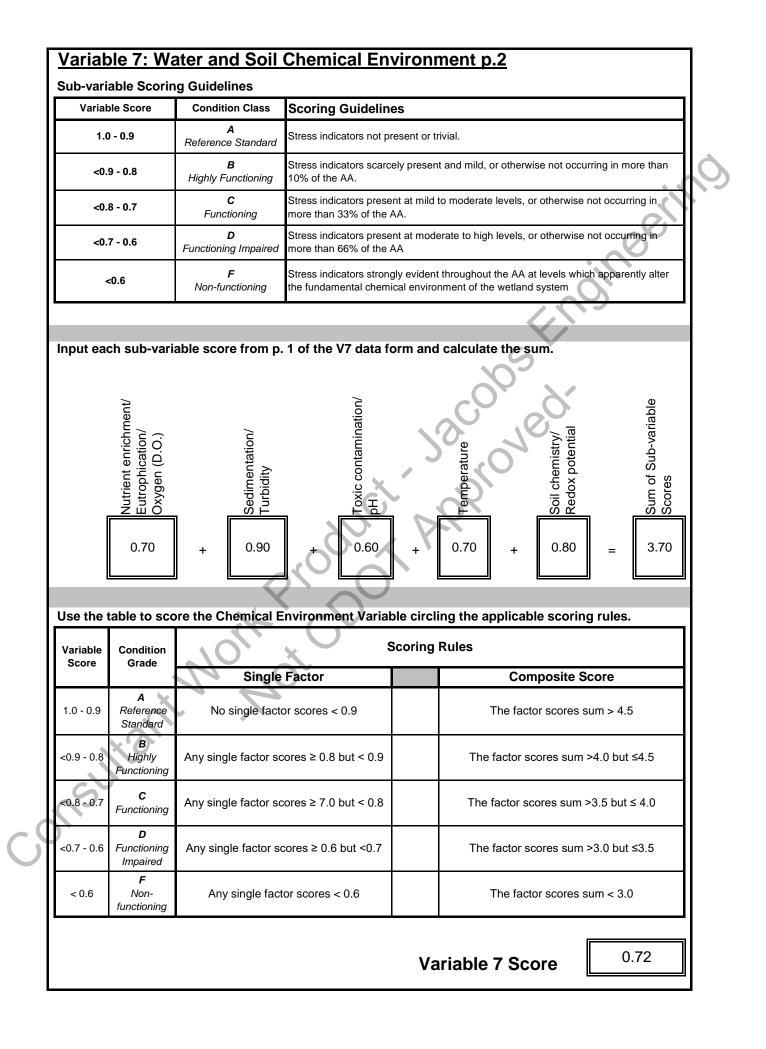
### Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

~,C

B. For each sub-variable, scoring sheet. Scoring sheet. Scoring sufficiency sheet is part of a wat the AA is part of a wat the sheet sh	ub-variables is carried out in exa	coring	guideline table provided on the seco e same way as normal variable scori I or recommended for TMDL develop	ng.		ori	()
. Transcribe sub-variable	e scores to the following variable		ng page and compute the sum. ne composite of sub-variables influer	ices the score		0,	
vithin that range.	Stressor Indicator	1	Comments	Sub-		Jana	ριαιι
	Livestock	x	agriculture upstream	variable	pg 89	pg106	pg1(
	Agricultural Runoff	x	agriculture upstream	Score	P3 00	19.00	r910
SV 7.1	Septic/Sewage	x	placed in an urban enviroment				
Nutrient Enrichment/	Excessive Algae or Aquatic Veg.	~		0.70			
Eutrophication/	Cumulative Watershed NPS	х	urban environment				
Oxygen (D.O.)	CDPHE Impairment/TMDL List	x	Clear Creek				
		^					
	Excessive Erosion	Х	unstable banks				
	Excessive Deposition						
	Fine Sediment Plumes						
SV 7.2	Agricultural Runoff	Х	agriculture upstream				
Sedimentation/	Excessive Turbidity	X	urban run off	0.90	6		
Turbidity	Nearby Construction Site	Х	urban environment				
	Cumulative Watershed NPS	x	urban environment				
	CDPHE Impairment/TMDL List	x	Clear Creek				
		~					
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	x	adjacent to roadways, run off di	Jλ			
	Livestock	x	agriculture upstream				
	Agricultural Runoff	X	agriculture upstream				
SV 7.3	Storm Water Runoff	x	urban environment				
Toxic contamination/	Fish/Wildlife Impacts	X	urban environment	0.60			
pН	Vegetation Impacts	x	weedy				
	Cumulative Watershed NPS	x	urban environment	/			
	Acid Mine Drainage			/			
	Point Source Discharge	x	sewer treatment plant, Urban er	1/			
	CDPHE Impairment/TMDL List	x	Clear Creek	1/			
	Metal staining on rocks and veg.			/			
	Excessive Temperature Regime	X					
	Lack of Shading	х	tree removal				
0.47.4	Reservoir/Power Plant Discharge	x	stormwater	0.70			
SV 7.4	Industrial Discharge	х	urban/industrial environment	0.70			
Temperature	Cumulative Watershed NPS	х	urban environment				
	CDPHE Impairment/TMDL List	х	Clear Creek	1/			
				7			
	Unnatural Saturation/Desaturation			$\mathbb{N}$			
SV 7.5	Mechanical Soil Disturbance	х	urban environment				
Soil chemistry/	Dumping/introduced Soil	x	construction	0.80			
	· · · · · · · · · · · · · · · · · · ·		Clear Creek		I		



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the we ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, e. It particularly focuses on the wetla diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	•	n: Tree Car	the HGM su nopy; Shrub		babboab Eayon, and riqualito.				
Rules for Scoring:									
additional layers were historic Indirect evidence such as loca	ally preser al knowled	nt using dir Ige and exp	rect evider pert opinio	nce such a on can als	n the AA. Make a judgment as to whether as stumps, root wads or historical photographs o be used in this determination.				
<ol> <li>Do not score vegetation layers that would not normally be present in the wetland type being assessed.</li> <li>Estimate and record the current coverage of each vegetation layer at the top of the table.</li> <li>Record the Reference Standard or expected percent coverage of each vegetation layer to create the sub-variable weighting factor. The condition of predominant vegetation layers has a greater influence on the variable score than do minor components.</li> <li>Enter the percent cover values as decimals in the row of the stressor table labeled * Reference/expected Percent Cover of Layer*. Note, percentages will often sum to more than 100% (1.0).</li> </ol>									
6. Determine the severity of s the appropriate boxes of the s one measure of stratum altera	stressors a stressor tab ation.	acting on ea ble. The d	ach individ lifference b	dual canop between th	oy layers, indicating their presence with checks ne expected and observed stratum coverages				
	h sub-varia	able score i	in the app	ropriate ce	sing the scoring guidelines on the second page ell of the row labeled "Veg. Layer Sub-variable				
	These are t	the weighte	ed sub-var		s Veg. Layer Sub-variable scores and enter the res. Individually sum the <i>Reference Percent</i>				
9. Divide the sum of "Veg. L Variable 8 score. Enter this n					overage of all layers scored. This product is the of this page.				
	V	Vegetatio	on Layers	6					
Current % Coverage of	0.2	0.05	0.83	0					
Layer Stressor	0.2 Tree	0.05 Shrub	0.83 Herb	Aquatic	Comments				
Noxious Weeds			2%	/ iquuito	Leafy Spurge, teasel				
Exotic/Invasive spp.									
Tree Harvest		<b></b>							
Brush Cutting/Shrub Removal		-							
Brush Cutting/Shrub Removal Livestock Grazing									
Livestock Grazing Excessive Herbivory									
Livestock Grazing Excessive Herbivory Mowing/Haying			20%						
Livestock Grazing Excessive Herbivory			20% 70%						
Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering			70%						
Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization	20%								
Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering		0.1	70%	0					
Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND	20% 0.25 0.45 +	0.15 +	70% 20% 0.02 0.85 +	0.00	= 1.45				
Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected %	20% 0.25 0.45 + x 0.8	0.15 + x 0.7	70% 20% 0.02 0.85 + x 0.8		= 1.45 See sub-variable scorin guidelines on following pr				
Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected % Cover of Layer Veg. Layer Sub-	20% 0.25 0.45 + x	0.15 + x	70% 20% 0.02 0.85 + x	0.00 x	See sub-variable scorin				

#### Variable 8: Vegetation Structure and Complexity p. 2

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Sub-variable 8 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 Grade	Scoring Guidelines						
1.0 - 0.9	A 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	B 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	<b>C</b> 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 vegetatior 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	D 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	F 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.						
	Based on the list each vegetation la variable Score 1.0 - 0.9 -0.9 - 0.8 -0.8 - 0.7 -0.8 - 0.7	Based on the list of stressors ide each vegetation layer. Variable Score Condition Grade 1.0 - 0.9 Reference Standard 6.0.9 - 0.8 B Highly Functioning -0.8 - 0.7 C Functioning -0.7 - 0.6 D Functioning Impaired C -0.6 Non-						

### **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, ering however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted

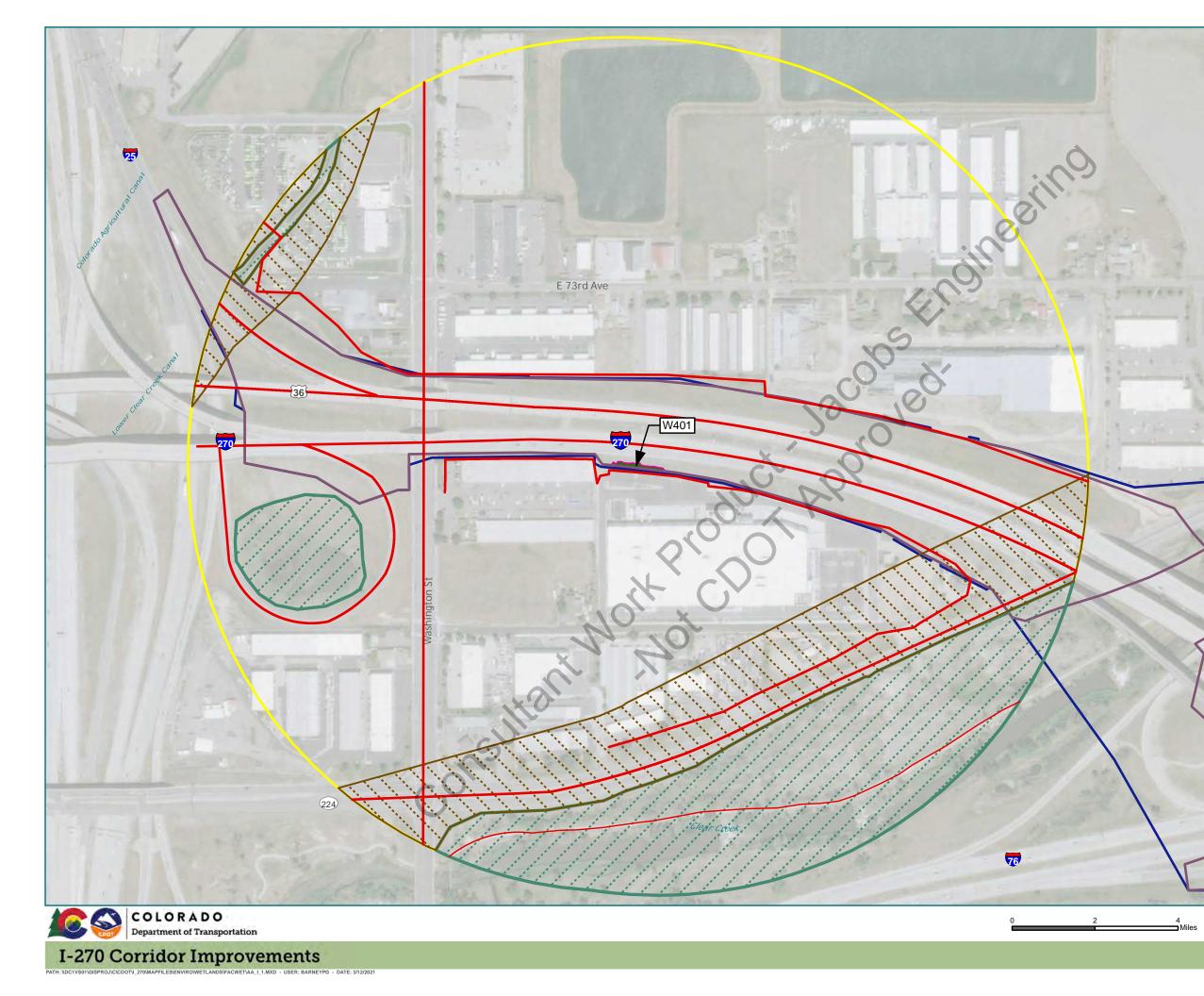
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & _andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.65
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.70
λť	Variable 3:	Water Source (Source)	0.70
Hydrology	Variable 4:	Water Distribution (Dist)	0.70
I	Variable 5:	Water Outflow (Outflow)	0.95
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.70
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.79

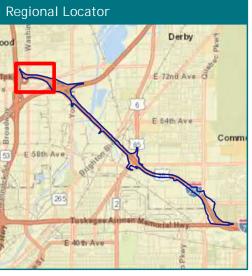
### Functional Capacity Indices

r unctional oapacity indices	
Function 1 Support of Characteristic Wildlife Habitat	Total Functional FCI
$V1_{connect}$ + $V2_{CA}$ + $(2 \times V8_{veg})$	Points
0.65 + 0.70 + 1.58 + +	+ <b>=</b> 2.93 ÷ <b>4</b> = 0.73
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	
2.10 + 1.40 + 1.90 + 0.70 + 0.72	+ <b>=</b> 6.82 ÷ <b>9</b> = 0.76
Function 3 Flood Attenuation	
$V2_{CA}$ + (2 x V3 <sub>source</sub> ) + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) + V6 <sub>geom</sub>	+ V8 <sub>veg</sub>
0.70 + 1.40 + 1.40 + 1.90 + 0.70	+ 0.79 = $6.89 \div 9 = 0.77$
Function 4 Short- and Long-term Water Storage	
V3 <sub>source</sub> + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
0.70 + 1.40 + 1.90 + 0.70 +	+ = 4.70 ÷ 6 = 0.78
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA})$ + $(2 \times V4_{dist})$ + $V6_{geom}$ $V7_{chem}$	
1.40 + 1.40 + 0.70 + 0.72 +	+ <b>=</b> 4.22 ÷ <b>6</b> = 0.70
Function 6 Sediment Retention/Shoreline Stabilization	
V2 <sub>CA</sub> + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.70 + 1.40 + 1.58 + +	+ <b>3</b> .68 ÷ <b>5</b> = 0.74
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
0.65 + 1.90 + 0.70 + 0.72 + 1.58	+ <b>=</b> 5.55 ÷ <b>7</b> = 0.79
	Sum of Individual FCI Scores 5.27
Div	ide by the Number of Functions Scored ÷7
	Composite FCI Score 0.75



### I-270 WETLAND FINDINGS REPORT ASSESSMENT AREA AA-I-1

- Migration Dispersal Barrier Minor
- Migration Dispersal Barrier Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PEM, Assumed Non-Jurisdictional
- Habitat Connectivity Envelope



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

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# ADMINISTRATIVE CHARACTERIZATION

General Informat	tion	AA-I-1		Date of Evaluation	f 1/21/2021		(
Site Name or ID:	AA-I-1: W401	(Infrastructure)		Project Name:	I-270 (STL	J 2706-043)	
404 or Other Permit Application #:	NA		ļ	Applicant Name:	CDOT		Ser.
Evaluator Name(s):	Brett Hartmanr and Pat Hickey		tor's profe	ssional position and organization		(Jacobs)	
Location Informa	ation:						
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Infrastru	1, Score for single sture Wetland polygons 39.827195, -104.975384)Geographic Datum Used (NAD 83): Elevation			NAD83 5160		
Location Information:		Depressional wetla	and asso	ociated with infra	astructure ru	un of.	
Associated stream/wa	ater body name:	Highwa	ay runoff		Stream Or	der:	NA
USGS Quadrangle Map:	Commerce Cit	y, CO 2019		Map Scale: (Circle one)	-	<mark>1:24,000</mark> Other	1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000	3		Wetland Ownership:	CDOT		
Project Informati	on: X Project We Mitigation S	(CHECK)	e of tion all le):	Potentially Impa Mitigation; Pre-o Mitigation; Post- Monitoring Other (Describe,	construction -constructio	)	
Intent of Project: (Che	ck all applicable)	Restoration	on	Er Er	hancement		Creation
Total Size of Wetland (Record Area, Check and Measurement Method Use	Describe	ac. X Measure		621			
Assessment Area (AA Area, check appropriate box. used to record acreage when included in a single assessme	Additional spaces are more than one AA is	ac		ac. ac.		ac. ac.	ас. ас.
Characteristics or Me AA boundary determin		W401 is placed alone a other AAs.	ssessme	ent area (AA) du	ue to its dist	ance and is	olation from
Notes:							

# ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply				
	ls including Histosols or he AA (i.e., AA includes			tened or endangere to occur in the AA?	ed species are	
	directly impact organic s eas possessing either H					eerin
	Is are known to occur ar wetland of which the AA			cern according to th P) are known to occ	ne Colorado Natural cur in the AA?	CC'
The wetland urbanized la	d is a habitat oasis in an andscape?	otherwise dry or		ated within a potenti at occurrence buffer	al conservation area as determined	diffe
	reatened or endangered the AA? List Below.	species are KNOWN	Other special of	concerns (please de	scribe)	8
				4	S	
	н	YDROGEOMOR	RPHIC SETTIN	G		
AA wetland	d maintains its fundame	hange in HGM classes	s as a result of anthro	pogenic modificati		
	e is checked, please d	Ŭ	tland type if discerna	ble using the table	below.	
AA wetland	d was created from an	upland setting.	amorphic patting of th	a watland by airely	ng all conditions	r -
Current Co	nditions	that apply.	Smorphic setting of th		ng all conditions	
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	<b>Bi-directional</b>		
	Wetland Gradient	0 - 29	<u>% 2-4%</u>	4-10% >1	0%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
IGM Setting	# Surface Outlets		0 1	2 3	>3	
0	Geomorphic Setting (Narrative Description. Include approx. stream order for	Wetlands associated	with highway run off.	Wetland is located	l in a highway	
	riverine)	ditch and fed by runof	<b>U U</b>			
	HGM class	Riverine	Slope	Depressional	Lacustrine	
listorical Co	onditions	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics	Unidirectional	Vertical			
wetland typology	Geomorphic Setting (Narrative Description)	Depressional wetland the highway. Run off f down hill in this locatio	rom recently construct			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
	oformation on the AA's acc creation of highway		gional subclass): Dep	pressional wetland	appears to have	•

# **ECOLOGICAL DESCRIPTION 2**

<u> </u>	n Habit								class				-		ed in Co			-
System	Subsys	stem		Class		Su	bcla	ISS		١	Nate	er Re	gime	Э	Other	Modifi	ers	% AA
Р	Р			Е			RV					Е				h		100
																	÷	
																	1	
																		2
																$\checkmark$		
	Littorali														6			
Lacustrine	Littoral; Limnoral										<b>F</b> .	am-1	26	N	Eu	rsaline(7) aline(8);		
Palustrine	Palustrine			k Bot. (RB)		Floatir Roote				Te	empora		oded(/	A);	Mixosalir		h(0);	
Falustille	FaluStrine			n Bottom(UI atic Bed(AB		Algal;	Persi	stent;		s	Sat easona	urated ally floo	(B); oded(C	:):	Circu	nneutral(c	;);	
			Rock	xy Shore(RS	) В	Non- oad-lea	Persis		us;	:	SeasI	flood./s	sat.(E)	;	Organic	calcareou g); Minera	al(n);	
<b>.</b> .	Lower pere		Em	ergent(EM)	' NE	edle-lea	aved e Ile - gr		en;	Inte	emi-Pe ermitter	ntly ex	posed	(G);		(b); Partia d/ditched(		
Riverine	Upper pere Intermittent			b-scrub(SS ested (FO)		Sa	nd; M	ud;			Artificia ./semi				Fa	rmed(f);		
				( )		C	Organi	С		Int.	expos	ed/per	menar	it(Z)		npounded Substrate		
															Spoil(s);	Excavate	ed(x)	
Site Map					<i>cu</i>		r.				S							· · - ·
				etch map c nd other si				reieva	ant po	nions	or the	wetta	ana, A	AA DOI	undary, s	ructures	s, nap	itat
Scale: 1 sq. =							C							1				
						K I		$\square$										
							C											
	-						$\leftarrow$	)										
	See	e Map	o atta	ched	·	X												
						$\square$												
					$\rightarrow$													
	XC															_		

## Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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### SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

## Variable 1: Habitat Connectivity p. 2

### SV 1.2: Migration/Dispersal Barriers

This sub-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.

neering

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.

	$\checkmark$	Stressors		Comments/description						
	х	Major Highway		I-270						
– artificial barriare	0	Secondary Highway		S						
rri		Tertiary Roadway								
4	00	Railroad								
	cia	Bike Path								
+ifi,	x	Urban Development		Located in an urban setting						
ō	x	Agricultural Developr	nent	upstream						
0	n N	Artificial Water Body								
CtraceOre	λ χ	Fence		multiple properties						
0	Вx	Ditch or Aqueduct		is a ditch						
ŧ	л х	Aquatic Organism Ba	arriers	infrastructure						
_										
	Variable Score	Condition Grade	Scorin	ng Guidelines						
	1.0 - 0.9	<b>A</b> Reference Standard		eciable barriers exist between the AA and other wetland and riparian habitats in E; or there are no other wetland and riparian areas in the HCE.						
	<0.9 - 0.8	<b>B</b> Highly Functioning	wetland Example significa	s impeding migration/dispersal between the AA and up to 33% of surrounding l/riparian habitat highly permeable and easily passed by most organisms. les could include gravel roads, minor levees, ditches or barbed-wire fences. More ant barriers (see "functioning category below) could affect migration to up to 10% of nding wetland/riparian habitat.						
	<0.8 - 0.7	C Functioning	betweer propagu times of culverte commoi	to migration and dispersal retard the ability of many organisms/propagules to pass in the AA and up to 66% of wetland/riparian habitat. Passage of organisms and ules through such barriers is still possible, but it may be constrained to certain day, be slow, dangerous or require additional travel. Busy two-lane roads, d areas, small to medium artificial water bodies or small earthen dams would nly rate a score in this range. More significant barriers (see "functioning impaired" y below) could affect migration to up to 10% of surrounding wetland/riparian						
	<0.7 - 0.6	D Functioning Impaired	organisr habitat. restricte	to migration and dispersal preclude the passage of some types of ms/propagules between the AA and up to 66% of surrounding wetland/riparian Travel of those animals which can potential negotiate the barrier are strongly d and may include a high chance of mortality. Up to 33% of surrounding /riparian habitat could be functionally isolated from the AA.						
S	<0.6	<b>F</b> Non-functioning	migratio conveya	ssentially isolated from surrounding wetland/riparian habitat by impermeable n and dispersal barriers. An interstate highway or concrete-lined water ance canal are examples of barriers which would generally create functional between the AA and wetland/riparian habitat in the HCE.						
		SV 1.1 Score	0.60	Add SV 1.1 and 1.2 scores and divide by						
				two to calculate Variable 1 Score 0.60						

## Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

### SV 2.1 - Buffer Condition

0.6 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

### SV 2.2 - Buffer Extent

0

0,50 Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines
	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
0.60 SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer
5.00 SV 2.2 - Buller Extern	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
	<0.6	Non-functioning	0-25% of AA with Buffer

		e 2: C			Area	(p. 2)	)							
SV 2	.3 - 7	Average	Buffer W	/idth		Record	d measu	red buffer	widths in	the spaces below	w and average.			
Buffer		10	16	0										
Width	• •	18 1	16 2	8 3	2	2 5	10 6	15 7	14 8		4h ()			
Line #		I	2	3	4	-		1	0	Avg. Buffer Wid	tn (m)			
						Subva Sco		Condition	Grade	Buffer Width Sco	oring Guidelines			
	1.	SV 2.3	- Avera	ae Bu	ffer	1.0 -		Reference	Standard	Average Buffer wi	idth is 190-250m	e		
0.6			Vidth Se	-		<0.9		Highly Fur		Average Buffer wi				
						<0.8	- 0.7	Functio		Average Buffer w	vidth is 31-100m			
						<0.7	- 0.6	Functioning	Impaired	Average Buffer		0		
						<0	.6	Non-fund	tioning	Average Buffer	width is 0-5m			
SV 2	.4 - 8	Surround	ding Lan	d Use	1									
	I SI	/ 2.4 - S	Surrour	ndina		Catalor	a and cl	aracterize	land use	changes in the s				
0.6			Jse Sco	•			ape and			changes in the s	surrounding			
		Stresso			Comm	ents/de	escripti	on						
	х		al/comme	ercial		industria				C				
es	х	Urban			Urban	Environ	ment				)	1		
= Land Use Changes		Resider Rural	ntial									1		
ő			Farming	1						<u> </u>				
Jse			e Agricul											
ים ר			ls or Nur											
Lar			ck Grazin	-					)					
ll S	х		ortation C		adjace	nt to I-2	70							
Stressors	x		Parklands		flow co	ntrol str	uctures			$\sim$				
ires	x		Water b						corridors	s and runnoff				
Ś	х	Physical F	Resource E	xtraction				and const						
	х	Biological	Resource	Extractior	constru	iction ar	nd mair	tenance		*				
				Ī										
	able ore	Conditio	on Grade			$\sim$	S	oring G	uideline	s				
1.0	· 0.9		<b>A</b> erence	No oppr	vojeble lon		and has		od Surrou	nding Landscape.				
1.0	0.9		ndard											
			в							ndscape, but chang				
<0.9	- 0.8		<b>ь</b> unctioning		*	he the landscape's capacity to support characteristic aquatic functioning, either and use is not intensive, for example haying, light grazing, or low intensity silviculture,								
			7		_					an 10% of the area				
			c.							hift in land use, how tion and it is not an				
<0.8	- 0.7	Funci	tioning	E .	ts or sediment. Moderate-intensity land uses such as dry-land farming, urban "green"									
					, or moderate cattle grazing would commonly be placed within this scoring range.									
		K 0	D		•	<b>.</b> .	•	<i>,</i> .		faces, bare soil, or				
<0.7	- 0.6		tioning							waters common. So ally extinguished. In				
	V		aired	logged a	reas, low-o	density urb	ban deve	lopments, s	ome urbai	n parklands and ma		1		
	)		F	The Surr	ounding L	andscape	is esser		ely develo	ped or is otherwise				
<(	.6		<b>r</b> nctioning					abitats. Co ess than 0.0		developments or hig	ghly urban			
		Buffer S	core	-	unding									
		(Lowest s			d Use									
		r	1		1							1		
						~				~ ~				
	(	0.6	+	0.6	) ÷	2		- Var	iable	2 Score	0.60			

# Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

### 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.

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$\times$	Str	essors		Comments/description	**							
	Ditc	hes or Drains	(tile, etc.)	Is a ditch								
	Dan	ns										
×	Dive	ersions		trash, elevation changes, aggregate								
	Gro	undwater pum	ping									
	Dra	w-downs										
×	Culv	verts or Constr	ictions	feeds ditch								
$\times$	Poir	nt Source (urba	an, ind., ag.)	Heavily managed urban environment								
	Nor	-point Source										
	Incr	eased Drainag	je Area									
×	Stor	m Drain/Urba	n Runoff	SW drain/ runoff contributes t								
$\times$	Imp	ermeable Surf	ace Runoff	adjace to highway and other o	compacted surfaces due to urban							
	Irrig	ation Return F	lows									
	Min	ing/Natural Ga	s Extraction									
	Trai	nsbasin Divers	ion									
	Actively Managed Hydrology											
Varia	able	Condition										
Sco		Grade		Depletion	Augmentation							
		A	Unnatural drawd	lown events minor, rare or non-	Unnatural high-water events minor, rare or non-							
1.0 -	0.9	Reference	existent, very slig	ght uniform depletion, or trivial	existent, slight uniform increase in amount of							
		Standard	alteration of hydr	rodynamics.	inflow, or trivial alteration of hydrodynamics.							
				lown events occasional, short	Occasional unnatural high-water events, short in							
		В		mild; or uniform depletion up to 20%;	duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate							
<0.9 -	- 0.8	Highly Functioning		ate reduction of peak flows or r to perform work.	increase of peak flows or capacity of water to							
		Functioning	capacity of water	no penomi work.	perform work.							
			Unnatural drawd	lown events common and of mild to	Common occurrence of unnatural high-water							
		•		ity and/or duration; or uniform	events, of a mild to moderate intensity and/or							
				50%; or moderate to substantial	duration; or uniform augmentation up to 50%; or							
<0.8 -	- 0.7	Eurotioning										
<0.8 -	- 0.7	Functioning	reduction of pea	k flows or capacity of water to	moderate to substantial increase of peak flows or							
<0.8 -	- 0.7	Functioning	reduction of peat perform work.	k flows or capacity of water to	moderate to substantial increase of peak flows or capacity of water to perform work.							
<0.8 -	- 0.7	Functioning	reduction of peal perform work. Unnatural drawd	k flows or capacity of water to lown events occur frequently with a	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water							
<0.8 -	- 0.7	Functioning	reduction of peal perform work. Unnatural drawd moderate to high	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or							
		D	reduction of pear perform work. Unnatural drawd moderate to high depletion up to 7	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform ′5%; or substantial reduction of peak	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing							
<0.8 -		D Functioning	reduction of pear perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform ′5%; or substantial reduction of peak	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or							
		D	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma	k flows or capacity of water to hown events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial	moderate to substantial increase of peak flows or capacity of water to perform work. 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							
		D Functioning	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma	k flows or capacity of water to hown events occur frequently with a in intensity and/or duration; or uniform 75%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial	moderate to substantial increase of peak flows or capacity of water to perform work. 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. <b>Wetlands</b>							
		D Functioning	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally							
	-0.6	D Functioning Impaired F Non-	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak / of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower.	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally high-water great enough to change the							
<0.7 -	-0.6	D Functioning Impaired	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally							
<0.7 -	-0.6	D Functioning Impaired F Non-	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally high-water great enough to change the							

## Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

Because the wetland's ability to distribute water in a characteristic fashion is fundamentally dependent on the condition of its water source, **in most cases the Water Source variable score will define the upper limit Water Distribution score**. For example, if the Water Source variable is rated at 0.85, the Water Distribution score will usually have the potential to attain a maximum score of 0.85. Additional stressors within or outside the lower end of the AA effecting water distribution (e.g., ditches and levees) will reduce the score from the maximum value.

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### 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.

$\checkmark$	Stresso	rs	Comments/description								
×	Alteration of	of Water Source	surrounding lands and water stuctures in constant flux due to construction								
×	Ditches		Is a ditch								
	Ponding/Im	poundment									
×	Culverts		runoff from culverts c	ontributes to hyd	rology						
×	Road Grad	es	adjacent and feed by ru	in off from road g	grading.						
	Channel In	cision/Entrenchment									
	Hardened/I	Engineered Channel			$\mathbf{O}$						
	Enlarged C	hannel									
×	Artificial Ba	inks/Shoreline	heavily manag	ged urban ditch							
	Weirs			10							
×	Dikes/Leve	es/Berms	Road	grade							
	Diversions										
×	Sediment/F	Fill Accumulation	runoff from urb	an setting, trash							
			<u>C</u> N	$ \rightarrow $							
				NV.							
Varia	ble Score	Condition Grade	Non-riverine		Riverine						
1.	.0 - 0.9	A 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.	normal recurren	oodplain areas flood on a ice interval. No evidence of oding and subirrigation duration						
<0	<0.9 - 0.8 B Highly Functioning		Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> 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.		cent area, periods of drying or nmon; or uniform shift in the r root depth.						
<0	0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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.	drying or floodin	channel, unnatural periods of Ig are the norm; or uniform ograph greater than root depth.						
5	<0.6	F 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.	never wetted fro	floodplain areas are almost m overbank flooding, and/or iltration is effectively cut off.						
			Variable	4 Score	0.65						

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

### 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.

Y	Stressors		Comments/description					
Х	× Alteration of Water Source		Road grade and barriers					
×	Ditches	3	is a ditch					
	Dikes/Levees							
х	× Road Grades		confined by roads					
х			placed at outflow					
х	Diversi	ons	road grade					
х	Constri	ctions	urban envronment					
	Channe	el Incision/Entrenchment						
х	Harder	ed/Engineered Channel	Compacted soils from grading					
	Artificia	I Stream Banks						
	Weirs							
	Confine	ed Bridge Openings						
	ariable Score Condition Grade							
		Condition Grade	Scoring Guidelines					
So		Condition Grade A Reference Standard	Scoring Guidelines Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.					
Sc 1.0	core	A	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water					
So 1.0 <0.9	- 0.9	A Reference Standard B	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime. High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal")					
So 1.0 <0.9 <0.8	- 0.9 - 0.8	A Reference Standard B Highly Functioning C	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime. High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level					

Variable 5 Score

0.7

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

### **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.

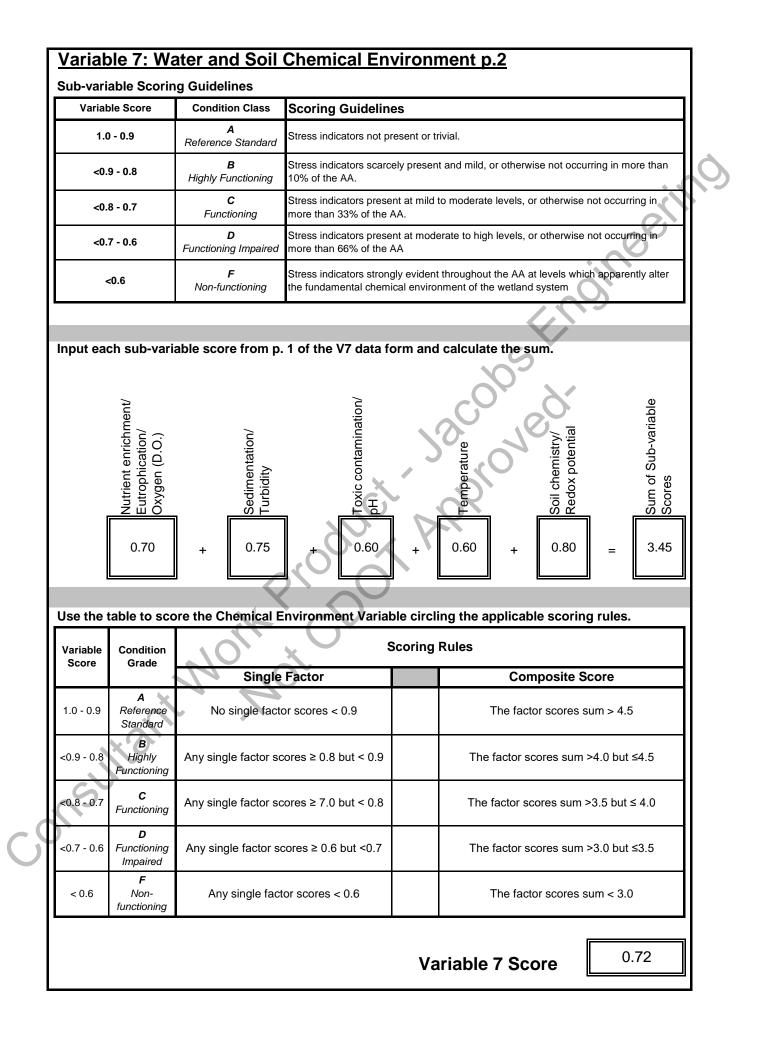
		Stressors			Comments
		Dredg	ing/Excavation	/Mining	
×		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to highway and infrastructure
Х		Gradii	ng		Adjacent to highway and infrastructure
Х	le	Comp	action		grading
	era	Plowir	ng/Disking		
×	General	Exces	sive Sediment	ation	loose sediment from runoff and erosion
×	G	Dump	ing		Adjacent to highway, lots of trash
		Hoof \$	Shear/Pugging		
		Aggre	gate or Minera	l Mining	
×		Sand	Accumulation		loose sediment from runoff and erosion
		Chanr	nel Instability/O	ver Widening	
	Ŋ	Exces	sive Bank Eros	sion	
	Only	Chanr	nelization		
	s i	Recor	nfigured Strean	n Channels	
	Channels	Artifici	al Banks/Shore	eline	
	าลเ	Beave	er Dam Remov	al	
	ប	Subst	rate Embeddeo	Iness	
		Lack of	or Excess of W	oody Debris	
			Condition		
Varia	able	Score	Condition Grade		Scoring Guidelines
Varia	able	Score			sentially unaltered from the natural state, or alterations appear to have a minimal effect on
	able : .0 - 0		Grade A Reference	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native
			Grade A Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on
1	.0 - 0	0.9	Grade A Reference Standard B	wetland function plant communit	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native
1		0.9	Grade A Reference Standard B Highly	wetland function plant communit Alterations to to	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported.
1	.0 - 0	0.9	Grade A Reference Standard B Highly Functioning	wetland function plant communit Alterations to to AA; or more se	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.
1	.0 - 0	0.9	Grade A Reference Standard B Highly Functioning C	wetland function plant communit Alterations to to AA; or more se Changes to AA	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include
1	.0 - 0 0.9 -	0.9	Grade A Reference Standard B Highly Functioning	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
1	.0 - 0 0.9 -	0.9	Grade A Reference Standard B Highly Functioning C	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include
1 <(	.0 - 0 0.9 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA.
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning D	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning Impaired	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickespread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. cortant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower. norphic alterations have caused a fundamental change in site character and functioning, lting in a conversion to upland or deepwater habitat.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickespread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.

### Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

scoring sheet. Scoring s	ub-variables is carried out in exa ter body that is recognized as im	ctly th	guideline table provided on the seco e same way as normal variable scor d or recommended for TMDL develo	ring.		- OS	
	e scores to the following variable e score sets the letter grade ran		ng page and compute the sum. he composite of sub-variables influe	ences the score		S	
Sub-variable	Stressor Indicator	$\checkmark$	Comments	Sub-	ucai	Janu	
	Livestock	х	agriculture upstream	variable	pg 89	pg106	
SV 7.1	Agricultural Runoff	х	agriculture upstream	Score			
Nutrient Enrichment/	Septic/Sewage	х	placed in an urban enviroment	0.70			
Eutrophication/	Excessive Algae or Aquatic Veg.			0.70			
Oxygen (D.O.)	Cumulative Watershed NPS	х	urban environment				
exygen (B.e.)	CDPHE Impairment/TMDL List						
				4			
	Excessive Erosion	V					
	Excessive Deposition	Х	highway run of				
01/7.0	Fine Sediment Plumes	V					
SV 7.2 Sedimentation/	Agricultural Runoff Excessive Turbidity	X X	agriculture upstream	0.75			
Turbidity		X	urban environment	4 ┝━━━	1		
Turbluity	Nearby Construction Site Cumulative Watershed NPS	^ X	urban environment				
	CDPHE Impairment/TMDL List	^					
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	x	adjacent to highway				
	Livestock	х	agriculture upstream				
	Agricultural Runoff	х	agriculture upstream				
SV 7.3	Storm Water Runoff	х	adjacent to highway	0.60			
Toxic contamination/	Fish/Wildlife Impacts	X		0.00			
рН	Vegetation Impacts	х	weedy				
	Cumulative Watershed NPS	х					
	Acid Mine Drainage			4/			
	Point Source Discharge	х	urban environment				
	CDPHE Impairment/TMDL List			_/			
	Metal staining on rocks and veg.		concrete adiacent	-			
	Excessive Temperature Regime Lack of Shading	x x	concrete adjacent No trees	-1			
	Reservoir/Power Plant Discharge	x	stormwater	┨ ┢━━━━	า		
SV 7.4	Industrial Discharge	X	urban environment	0.60			
Temperature	Cumulative Watershed NPS	x		┥╱╧══	1 1		
	CDPHE Impairment/TMDL List	~		۲/			
				-/			
	Unnatural Saturation/Desaturation		1	1			
SV 7.5	Mechanical Soil Disturbance	х	urban environment		ור		
Soil chemistry/	Dumping/introduced Soil	x	construction	0.80			
Redox potential	CDPHE Impairment/TMDL List			1/	<sup>2</sup>		
5				7			
				—			



#### Variable 8: Vegetation Structure and Complexity

e. It particularly focuses on the wetla I nis variable is a measure or the containon of the wetland's vegetation relative to its narive state. It particularly rocuses on the we ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being and any composition for the variable, stressor severity is a measure of how much each vegetation strate moment assessed. For this variable, stressor severity is a measure of how much each vegetation stratural titlers functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy; Shrub Layer; Herbaceous Layer; and Aquatics.

#### Rules for Scoring:

each corresponding to a stratum of	e of variabili	ity exhibited	the HGM s	subclass or	regional subclass. This variable has four s				
Rules for Scoring:									
additional layers were historic	ally preser	nt using di	rect evide	nce such	n the AA. Make a judgment as to whe as stumps, root wads or historical pho o be used in this determination.				
<ol> <li>Do not score vegetation layers that would not normally be present in the wetland type being assessed.</li> <li>Estimate and record the current coverage of each vegetation layer at the top of the table.</li> </ol>									
4. Record the Reference Star	ndard or e	xpected pe	ercent cov	verage of e	at the top of the table. each vegetation layer to create the su a greater influence on the variable so				
Cover of Layer". Note, percer									
	tressor tal				py layers, indicating their presence w he expected and observed stratum co				
	n sub-varia	able score	in the app	propriate c	sing the scoring guidelines on the sec ell of the row labeled "Veg. Layer Sub				
	hese are	the weighte	ed sub-va		ts Veg. Layer Sub-variable scores and res. Individually sum the <i>Reference</i> of				
9. Divide the sum of "Veg. L Variable 8 score. Enter this n					overage of all layers scored. This proof this page.	oduct is the			
	١	Vegetatio	n Layer	s					
Current % Coverage of	0	0	1	0					
Layer Stressor	0 Tree	0 Shrub	1 Herb	O	Comments				
Noxious Weeds	1100	Ginab	TICI D	Aquallo	Comments				
Exotic/Invasive spp.									
Tree Harvest									
Brush Cutting/Shrub Removal					adjacent to highway	1			
Livestock Grazing Excessive Herbivory			<u> </u>	+					
Excessive Herbivory Mowing/Haying			1	+					
Herbicide			1	1					
Loss of Zonation/Homogenization		1	1	1	Urban environment				
Dewatering									
Over Saturation					fed by highway run of	f			
DIFFERENCE BETWEEN			I						
CURRENT COVERAGE AND REFERENCE/EXPECTED	0.45	0.15	0.2	0					
Reference/Expected % Cover of Layer	0.45 + x	0.15 + x	0.85 x	+ 0.00 ×	= 1.45	$\langle \rangle$			
Veg. Layer Sub- variable Score	0.5	0.5	0.8	0	See sub-variab guidelines on fol				
Weighted Sub-variable Score	" 0.23 +	0.08 +	" 0.68 -	" + 0.00	= 0.98				
	_	_	C		Variable 8 Score	0.68			

#### Variable 8: Vegetation Structure and Complexity p. 2

h. .

each vegetation la		ntified above, rate the severity of their cumulative effect on vegetation structure and complexity for
Variable Score	Grade	Scoring Guidelines
1.0 - 0.9	A 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	B 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	<b>C</b> 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. AX'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	D 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 weltand. 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	F 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.

### **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.

ering 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

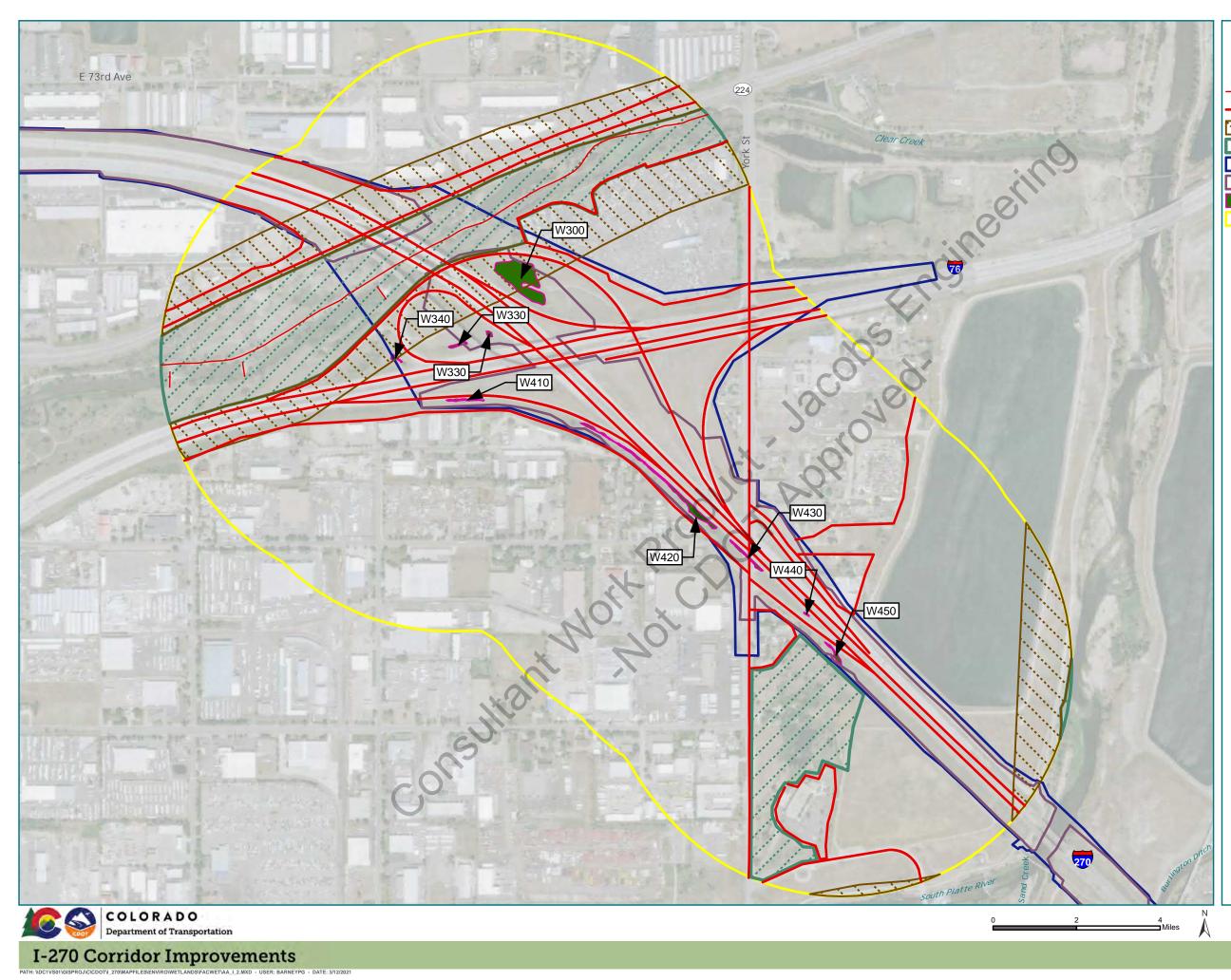
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.60
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.60
λť	Variable 3:	Water Source (Source)	0.65
Hydrology	Variable 4:	Water Distribution (Dist)	0.65
I	Variable 5:	Water Outflow (Outflow)	0.70
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.60
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic a Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.68

### Functional Capacity Indices

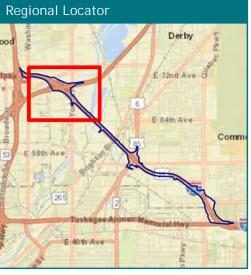
Function 1 Support of Characteristic Wildlife Habitat	FCI
V1 <sub>connect</sub> + V2 <sub>CA</sub> + (2 x V8 <sub>veg</sub> ) Points	1
0.60 + 0.60 + 1.35 + + + + = 2.55 ÷ 4 =	0.64
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	_
	0.66
Function 3 Flood Attenuation	
$V2_{CA} + (2 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V8_{veg}$	
	0.65
Function 4 Short- and Long-term Water Storage	
$V3_{source}$ + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
	0.66
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA}) + (2 \times V4_{dist}) + V6_{geom} V7_{chem}$	
$1.20 + 1.30 + 0.60 + 0.72 + + = 3.82 \div 6 =$	0.64
Function 6 Sediment Retention/Shoreline Stabilization	
$V_{2_{CA}}$ + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.60 + 1.20 + 1.35 + + + = 3.15 ÷ 5 =	0.63
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
$0.60 + 1.40 + 0.60 + 0.72 + 1.35 + = 4.67 \div 7 = $	0.67
Sum of Individual FCI Scores	4.55
Divide by the Number of Functions Scored	÷7
Composite FCI Score	0.65



### I-270 WETLAND FINDINGS REPORT ASSESSMENT AREA AA-I-2

- Migration Dispersal Barrier - Minor

- Migration Dispersal Barrier Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PEM, Assumed Non-Jurisdictional
- Habitat Connectivity Envelope



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

# ADMINISTRATIVE CHARACTERIZATION

			Date of Evaluation:	1/21/2021	
General Informat	ion AA-I-2: W300,	AA-I-2 W330_W340	Evaluation.		
Site Name or ID:	W401, W410,		Project Name:	I-270 (STU 2706-04	43)
404 or Other Permit Application #:	NA		Applicant Name:	СDOT	eeli
Evaluator Name(s):	Brett Hartmani and Pat Hickey		professional position and organization:	Biologists (Jacobs)	
Location Informa	tion:		·		
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Infrastru	ggregated Score for similar ucture Wetland polygons : 39.821518, -104.962088)	Geographic Datum Used (NAD 83): Elevation	NAD83	0
Location Information:		Depressional wetland a	associated with infra	astructure runoff.	
Associated stream/wa	ater body name:	Highway ru	noff	Stream Order:	NA
USGS Quadrangle Map:	Commerce Cit	y, CO 2019	Map Scale: (Circle one)	<mark>1:24,000</mark> Other	1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000	)3	Wetland Ownership:	CDOT	
Project Informati	on: X Project We Mitigation S	(check all	<ul> <li>X Potentially Impa</li> <li>Mitigation; Pre-c</li> <li>Mitigation; Post-</li> <li>Monitoring</li> <li>Other (Describe)</li> </ul>	construction	
Intent of Project: (Che	ck all applicable)	Restoration	En	hancement	Creation
Total Size of Wetland (Record Area, Check and I Measurement Method Use	Describe	ac. × 2.096336 Estimated			
Assessment Area (AA Area, check appropriate box. J used to record acreage when r included in a single assessment	Additional spaces are more than one AA is	ac. — Estimated	ac. ac.	ac. ac. ac. ac.	ac. ac.
Characteristics or Me AA boundary determin		W300, W330, W340, W401, wetlands in close proximty w grouped into a single assess	vith in same HGM cl		
Notes: Measu	red with Collect	or Web Map			

# ECOLOGICAL DESCRIPTION 1

Special Co	oncerns	Check all that apply				
	ils including Histosols o the AA (i.e., AA includes			tened or endangere to occur in the AA?	d species are	
	directly impact organic reas possessing either					eeri
	bils are known to occur a wetland of which the A			cern according to th		
	nd is a habitat oasis in a landscape?	n otherwise dry or		ated within a potentiant occurrence buffer		nin
	hreatened or endangere the AA? List Below.	d species are KNOWN		concerns (please des	scribe)	29
					S	
	ŀ	IYDROGEOMOR	RPHIC SETTIN	G	イン	
If the abo			tland type if discerna	ble using the table	below.	
Current Co	onditions	Describe the hydroge that apply.	omorphic setting of th	ne wetland by circlii	ng all conditions	
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	<b>Bi-directional</b>		
	Wetland Gradient	0 - 29	% 2-4%	4-10% >10	1%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
HGM Setting	# Surface Outlets		0 1	2 3	>3	
Hom Setting	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands associated ditch and fed by runof		Wetland is located	in a highway	
	HGM class	Riverine	Slope	Depressional	Lacustrine	
Historical C	onditions					
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics	Unidirectional	Vertical			
wetland	Geomorphic	Depressional wetland Run off from recently				
typology	Setting (Narrative Description)	the South Platte flood				
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
		HGM subclass and re				

# **ECOLOGICAL DESCRIPTION 2**

P       P       E       RV       E       h       95         SS       BLD       E       h       5         Image: Signal system       SS       BLD       E       h       5         Image: Signal system       Image	System	on Habitat D	Class		WS habitat clas Ibclass		-			Modifiers	% AA
Image: Signal state in the state including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.     Image: Signal state in the state including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.						vval			Guier		
intermittent     SG     intermittent     SG       intermittent     SG     intermittent     SG       intermittent     Intermittent     SG     intermittent											
acustrine       Limnoral         alustrine       Palustrine         alustrine       Palustrine         alustrine       Palustrine         Acuatic Bed(AB)         Aquatic Bed(AB)         Acustic Bed(AB)         Broad-leaved deciduous;         Non-Persistent;         Broad-leaved deciduous;         Non-Persistent;         Broad-leaved deciduous;         Needle-leaved evergree;         Cobble - gravel;         Sand; Mud;         Organic         Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat         classes, and other significant features.			SS		BLU		E			h	5
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alustrine       Palustrine       Nock Bott (mU) Uncon Bott(mU) Aquatic Bed(AB) Aquatic Bed(AB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Intermittent       Rooted vascular; Algal; Persistent; Broal-leaved decidous; Non-Persistent; Broal-leaved decidous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic       Saturated(B); Seas-fload/sat.(E); Semi-Perm. flooded(C); Seasfload(sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)         Site Map       Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat         Site Map       Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat         Brance       Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat	Lacustrine	Limnoral		Floatii	ng vascular:				Eus	aline(8);	
iverine       Lower perennial; Upper perennial; Intermittent       Addatic bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)       Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Sand; Mud; Organic       Seas_flood./sat.(E): Semi-Perm. flooded(F): Intermittently exposed(G); Artificially flooded(K); Sat/semiperm./Seas. (N); Int. exposed/permenant(Z)       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 iscale: 1 sq. =       Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat	Palustrine	Palustrine	Uncon Bottom(UB)	Roote	ed vascular;	Sa	aturated(B);		A	cid(a);	
Lower perennial; Upper perennial; Intermittent       Dincon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)       Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic       Semi-Perm, flooged(F); Intermittenty exposed(G); Artificially flooded(K); Sat/semiperm./Seas. (Y); Int. exposed/permenant(Z)       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			Rocky Shore(RS)	Non-	Persistent;	Seas	-flood./sat.(	E);	Alkaline/calcareous(i);		
Site Map       Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat         Site I sq. =       Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat			Emergent(EM)	Needle-lea	aved evergreen;	Intermitt	ently expose	ed(G);	Beaver	(b); Partially	
Site Map     Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.	Riverine		. ,	Sand; Mud;		Sat./semiperm./Seas. (Y);		Farmed(f);			
Site Map       Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.         Scale: 1 sq. =       Image: Classes and other significant features.					Organic				Artificial Substrate(r);		
classes, and other significant features.								Spoil(S), Excavaled(X)			
Scale: 1 sq. =						<u> </u>	$\overline{\mathbf{O}}$		-1 - (-7)		
Image:	Site Map					ortions of th	e wetland	, AA bo			bitat
Image:						ortions of th	e wetland	, AA bo			bitat
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			ses, and other sign			portions of the	e wetland	, AA bo			
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## Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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### SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

## Variable 1: Habitat Connectivity p. 2

### SV 1.2: Migration/Dispersal Barriers

This sub-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.

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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.

	$\checkmark$	Stressors		Comments/description					
	х	Major Highway		I-270					
= artificial barriers	х	Secondary Highway		I-76					
arrie	х	Tertiary Roadway		multiple roads adjacent and leading to highways					
pa		Railroad							
cial		Bike Path							
tifi	х	Urban Development		Located in an urban setting					
ar	х	Agricultural Developn	nent	upstream					
II S		Artificial Water Body							
Stressors	х	Fence		multiple properties					
es	х	Ditch or Aqueduct		is a ditch					
Str	х	Aquatic Organism Ba	rriers	infrastructure					
`	Variable Score	Condition Grade	Scorin	ng Guidelines					
	1.0 - 0.9	<b>A</b> Reference Standard		reciable barriers exist between the AA and other wetland and riparian habitats in E; or there are no other wetland and riparian areas in the HCE.					
<	:0.9 - 0.8	<b>B</b> Highly Functioning	wetland Example significa	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. 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					
<	:0.8 - 0.7	C Functioning	betweer propagu times of culverte commoi						
<	<pre>orga comparison c</pre>			arriers to migration and dispersal preclude the passage of some types of ganisms/propagules between the AA and up to 66% of surrounding wetland/riparian abitat. Travel of those animals which can potential negotiate the barrier are strongly estricted and may include a high chance of mortality. Up to 33% of surrounding etland/riparian habitat could be functionally isolated from the AA.					
	<0.6	<b>F</b> Non-functioning	migratio conveya	sentially isolated from surrounding wetland/riparian habitat by impermeable n and dispersal barriers. An interstate highway or concrete-lined water ance canal are examples of barriers which would generally create functional between the AA and wetland/riparian habitat in the HCE.					
		SV 1.1 Score	0.60	Add SV 1.1 and 1.2 scores and divide by					
		SV 1.2 Score	0.60	two to calculate variable score Variable 1 Score 0.60					

## Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

### SV 2.1 - Buffer Condition

0.6 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

SV 2.2 - Buffer Extent

0.50

0.60

Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines		
-	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer		
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer		
SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer		
3V 2.2 - Buller Exterit	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer		
_	<0.6	Non-functioning	0-25% of AA with Buffer		

		e 2: C			Area	(p. 2)	<u>)</u>					
SV 2	.3 - 7	verage E	Buffer W	/idth		Record	meası	red buffer	widths in	the spaces	below and average	e.
Buffe Width		5	10	6	0	2	10	8	3	6		
Line #	ł	1	2	3	4	5	6	7	8	Avg. Buffe	r Width (m)	
						Subvar Sco		Condition	Grade	Buffer Widt	h Scoring Guideline	n n
	1,	SV 2.3 -	- Avera	qe Bu	ffer	1.0 -	0.9	Reference	Standard	Average But	ffer width is 190-250r	m 🄸
0.6			idth So	-		<0.9 -	0.8	Highly Fur	ctioning	Average But	ffer width is 101-189r	m
						<0.8 -	0.7	Functio	ning	Average Bu	Iffer width is 31-100m	n
						<0.7 -	0.6	Functioning	Impaired	Average B	Suffer width is 6-30m	
						<0.	6	Non-fund	tioning	Average I	Buffer width is 0-5m	
SV 2	.4 - 5	Surround	ling Lan	d Use								
	l si	/ 2.4 - S	Surrour	ndina	-4	Cataloo	and cl	aracterize	land use	changes in	the surrounding	N
0.6		Land U	lse Sco			landsca				changes in	and surrounding	
	$\checkmark$	Stresso				ents/de	-					4 1
	х	Industria	al/comme	ercial		ndustria		onment			6	41
ges	×	Urban Residen	tial		Urban	Environr	nent				~	
anç	<u> </u>	Residen	lidi									
ප්	<u> </u>	Dryland	Farming							20		-1
Stressors = Land Use Changes		Intensive			1					$\mathbf{\nabla}$		11
ЧГ			s or Nur						1	<u>)</u>	10	
Lan		Livestoc	k Grazin	g							2	
	х	Transpo			adjacent to highways							
sors	х	Urban P			adjacent					41		
ese	X	Dams/im Artificial			flow control structures ditch created by transportation corridors and runnoff road base extraction and construction							
Sti	×	Physical R									- 1	
	X	Biological						ntenance				- 1
	able ore	Conditio	on Grade			~	S	coring G	uideline	s		
1.0	- 0.9		rence	No appre	ciable lan	d use char	nge has	been impos	ed Surrou	nding Landsca	ape.	
<u> </u>		้อเลก	dard	Some la	nd use cha	nge has o	ccurred	in the Surro	unding La	ndscape, but	changes have minim	al
<0.9	- 0.8	E Highly Fu									nctioning, either w intensity silviculture	e,
			7_			-			-	nan 10% of the		41
	<i></i>	6	2	Surrounding Landscape has been subjected to a marked shift in land use, however, the land retains much of its capacity to support natural wetland function and it is not an overt source of								
<0.8	- 0.7	Functi		pollutants or sediment. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.								
<u> </u>							0		, ,		is scoring range. al including the a	
					•				•		bil, or other artificial	
<0.7	- 0.6	Functi	ioning								on. Supportive	
_		lmpa	aired								ed. Intensively nd many cropping	
								ore within thi		ned or is othe	erwise a cause of	-1 1
<	0.6	F Non-fun	F Inctioning	severe e	cological s	tress on w	etland h	abitats. Co	mmercial		or highly urban	
_					-	ny rate a s	core of	less than 0.6	).			-
		Buffer So (Lowest so			unding d Use							
		,	,		1							<b>¬</b>
					I	2		= Var		~ ~		
	(	0.6	+	0.6	) ÷	2		= Vai		2 Score	0.60	

# Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

### 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					
$\times$	Ditche	Ditches or Drains (tile, etc.)		Is a ditch					
	Dams	Jams							
×	Divers	Diversions		trash, elevation changes, aggregate					
	Groundwater pumping		ping						
	Draw-downs								
$\times$				feeds ditch					
$\times$	➤ Point Source (urban, ind., ag.)			Heavily managed urban environment					
	Non-point Source								
	Increased Drainage Area								
$\times$	Storm Drain/Urban Runoff			SW drain/ runoff contributes to hydrology of AA					
$\times$	Impermeable Surface Runoff		ace Runoff	adjace to highway and other compacted surfaces due to urban					
	Irrigat	tion Return F	lows						
	Mining	g/Natural Ga	s Extraction						
	Trans	basin Divers	ion						
	Active	ely Managed	Hydrology						
Varia	ble	Condition							
Sco		Grade		Depletion	Augmentation				
		А	Unnatural drawd	lown events minor, rare or non-	Unnatural high-water events minor, rare or non-				
1.0 -	0.9	Reference		ght uniform depletion, or trivial	existent, slight uniform increase in amount of				
		Standard	alteration of hydi	rodynamics.	inflow, or trivial alteration of hydrodynamics.				
				lown events occasional, short	Occasional unnatural high-water events, short in				
		В		mild; or uniform depletion up to 20%;	duration and/or mild in intensity; or uniform				
< 0.9 -			or mild to moder						
	0.8	Highly		ate reduction of peak flows or	augmentation up to 20%; or mild to moderate				
		Highly Functioning		r to perform work.	augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.				
		•••	capacity of water	r to perform work.	increase of peak flows or capacity of water to perform work.				
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# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

Because the wetland's ability to distribute water in a characteristic fashion is fundamentally dependent on the condition of its water source, **in most cases the Water Source variable score will define the upper limit Water Distribution score**. For example, if the Water Source variable is rated at 0.85, the Water Distribution score will usually have the potential to attain a maximum score of 0.85. Additional stressors within or outside the lower end of the AA effecting water distribution (e.g., ditches and levees) will reduce the score from the maximum value.

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### 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.

$\checkmark$	Stresso	rs	Comments/description							
×	Alteration of	of Water Source	surrounding lands and water stuctures in constant flux due to construction							
×	Ditches		Is a ditch							
	Ponding/Im	poundment								
×	Culverts		runoff from culverts c	ontributes to hyd	rology					
×	Road Grad	es	adjacent and feed by ru	in off from road g	grading.					
	Channel In	cision/Entrenchment								
	Hardened/I	Engineered Channel			$\mathbf{O}$					
	Enlarged C	hannel								
×	Artificial Ba	inks/Shoreline	heavily manag	ged urban ditch						
	Weirs			10						
×	Dikes/Leve	es/Berms	Road	grade						
	Diversions									
×	Sediment/F	Fill Accumulation	runoff from urb	an setting, trash						
			<u>C</u> N	$ \rightarrow $						
				NY.						
Varia	ble Score	Condition Grade	Non-riverine		Riverine					
1.	1.0 - 0.9 A 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 duratio and intensity.						
<0	<0.9 - 0.8 B Highly Functioning		Less than 10% of the AA is affected by <i>in situ</i> 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	<0.8 - 0.7 C 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	<0.7 - 0.6 D Functioning Impaired		33 to 66% of the AA is affected by <i>in situ</i> 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.	, , , , , ,						
5	<0.6 F 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	4 Score	0.65					

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

### 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		Road grade and barriers							
×	Ditches		is a ditch							
	Dikes/Levees									
×	Road C	Grades	confined by roads							
×	Culvert	is	placed at outflow							
×	Diversi	ons	road grade							
×	Constri	ictions	urban envronment							
	Channe	el Incision/Entrenchment								
×	Harder	ned/Engineered Channel	Compacted soils from grading							
	Artificia	al Stream Banks								
	Weirs									
	Confine	ed Bridge Openings								
_										
	iable core	Condition Grade	Scoring Guidelines							
1.0	- 0.9	A Reference Standard	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.							
<0.9	9 - 0.8	<b>B</b> 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	:0.8 - 0.7 C Functioning		High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.							
<0.7	7 - 0.6	<b>D</b> 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.							
	<pre>&lt;0.6</pre> Functioning impaired <pre>F F Non-functioning</pre>		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 5 Score

0.75

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

### **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.

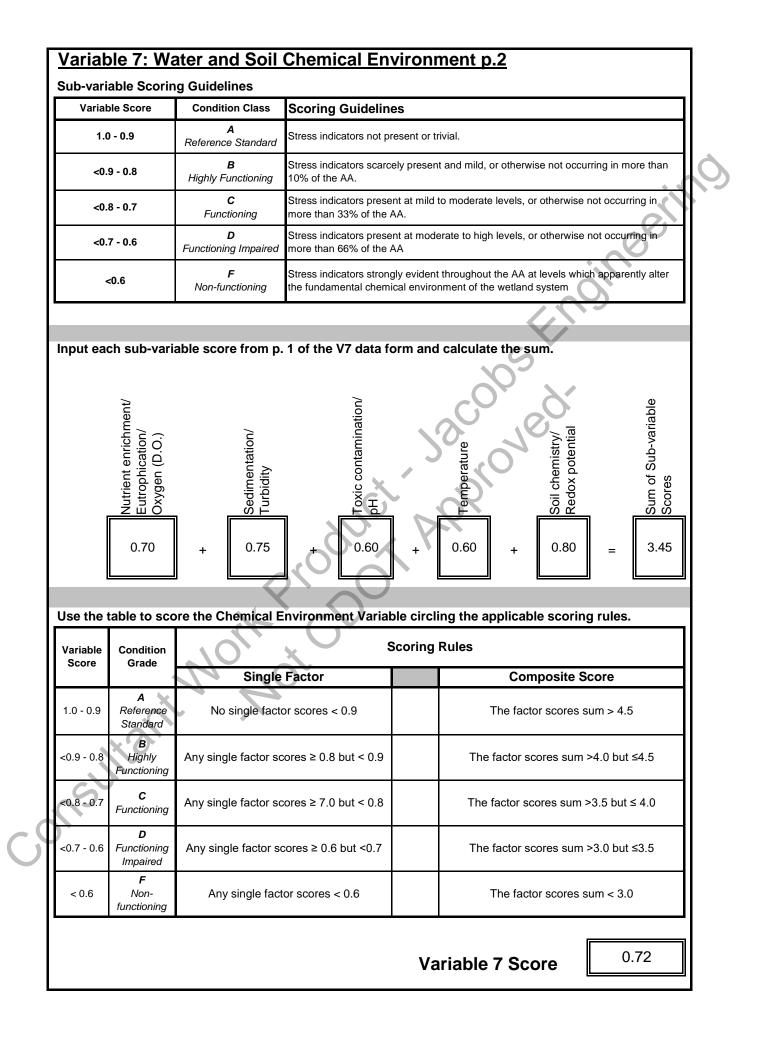
		Stressors			Comments
		Dredg	ing/Excavation	/Mining	
×		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to highway and infrastructure
Х		Gradii	ng		Adjacent to highway and infrastructure
Х	le	Comp	action		grading
	era	Plowir	ng/Disking		
×	General	Exces	sive Sediment	ation	loose sediment from runoff and erosion
×	G	Dump	ing		Adjacent to highway, lots of trash
		Hoof \$	Shear/Pugging		
		Aggre	gate or Minera	l Mining	
×		Sand	Accumulation		loose sediment from runoff and erosion
		Chanr	nel Instability/O	ver Widening	
	Ŋ	Exces	sive Bank Eros	sion	
	Only	Chanr	nelization		
	s i	Recor	nfigured Strean	n Channels	
	Channels	Artifici	al Banks/Shore	eline	
	าลเ	Beave	er Dam Remov	al	
	ប	Subst	rate Embeddeo	Iness	
		Lack of	or Excess of W	oody Debris	
			Condition		
Varia	able	Score	Condition Grade		Scoring Guidelines
Varia	able	Score			sentially unaltered from the natural state, or alterations appear to have a minimal effect on
	able : .0 - 0		Grade A Reference	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native
			Grade A Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on
1	.0 - 0	0.9	Grade A Reference Standard B	wetland function plant communit	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native
1		0.9	Grade A Reference Standard B Highly	wetland function plant communit Alterations to to	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported.
1	.0 - 0	0.9	Grade A Reference Standard B Highly Functioning	wetland function plant communit Alterations to to AA; or more se	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.
1	.0 - 0	0.9	Grade A Reference Standard B Highly Functioning C	wetland function plant communit Alterations to to AA; or more se Changes to AA	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include
1	.0 - 0 0.9 -	0.9	Grade A Reference Standard B Highly Functioning	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
1	.0 - 0 0.9 -	0.9	Grade A Reference Standard B Highly Functioning C	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include
1 <(	.0 - 0 0.9 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA.
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning D	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning Impaired	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. cortant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower. norphic alterations have caused a fundamental change in site character and functioning, lting in a conversion to upland or deepwater habitat.
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.

## Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

scoring sheet. Scoring s	ub-variables is carried out in exa ter body that is recognized as im	ctly th	guideline table provided on the seco e same way as normal variable scor d or recommended for TMDL develo	ring.		- OS	
	e scores to the following variable e score sets the letter grade ran		ng page and compute the sum. he composite of sub-variables influe	ences the score		S	
Sub-variable	Stressor Indicator	$\checkmark$	Comments	Sub-	ucai	Janu	
	Livestock	х	agriculture upstream	variable	pg 89	pg106	
SV 7.1	Agricultural Runoff	х	agriculture upstream	Score			
Nutrient Enrichment/	Septic/Sewage	х	placed in an urban enviroment	0.70			
Eutrophication/	Excessive Algae or Aquatic Veg.			0.70			
Oxygen (D.O.)	Cumulative Watershed NPS	х	urban environment				
exygen (B.e.)	CDPHE Impairment/TMDL List						
				4			
	Excessive Erosion	V					
	Excessive Deposition	Х	highway run of				
01/7.0	Fine Sediment Plumes	V					
SV 7.2 Sedimentation/	Agricultural Runoff Excessive Turbidity	X X	agriculture upstream	0.75			
Turbidity		X	urban environment	4 ┝━━━	1		
Turbluity	Nearby Construction Site Cumulative Watershed NPS	^ X	urban environment				
	CDPHE Impairment/TMDL List	^					
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	x	adjacent to highway				
	Livestock	х	agriculture upstream				
	Agricultural Runoff	х	agriculture upstream				
SV 7.3	Storm Water Runoff	х	adjacent to highway	0.60			
Toxic contamination/	Fish/Wildlife Impacts	X		0.00			
рН	Vegetation Impacts	х	weedy				
	Cumulative Watershed NPS	х					
	Acid Mine Drainage			4/			
	Point Source Discharge	х	urban environment				
	CDPHE Impairment/TMDL List			_/			
	Metal staining on rocks and veg.		concrete adiacent	-			
	Excessive Temperature Regime Lack of Shading	x x	concrete adjacent No trees	-1			
	Reservoir/Power Plant Discharge	x	stormwater	┨ ┢━━━━	า		
SV 7.4	Industrial Discharge	X	urban environment	0.60			
Temperature	Cumulative Watershed NPS	x		┥╱╧══	1 1		
	CDPHE Impairment/TMDL List	~		۲/			
				-/			
	Unnatural Saturation/Desaturation		1	1			
SV 7.5	Mechanical Soil Disturbance	х	urban environment		ור		
Soil chemistry/	Dumping/introduced Soil	x	construction	0.80			
Redox potential	CDPHE Impairment/TMDL List			1/	<sup>2</sup>		
5				7			
				—			



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wet ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being e. It particularly focuses on the wetla normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	/ vegetation	1: Tree Can	nopy; Shrub	b Layer; Her	rbaceous Layer; and Aquatics.	
Rules for Scoring:						
additional layers were historica	ally preser	nt using dir	rect evider	nce such a	n the AA. Make a judgment as to whe as stumps, root wads or historical pho o be used in this determination.	
	-				in the wetland type being assessed.	
	ndard or ex	xpected pe	ercent cov	/erage of e	at the top of the table. each vegetation layer to create the su a greater influence on the variable so	
5. Enter the percent cover val Cover of Layer". Note, percent					or table labeled " Reference/expected (1.0).	d Percent
	stressor tab				by layers, indicating their presence with the expected and observed stratum co	
	n sub-varia	ble score i	in the app	propriate ce	sing the scoring guidelines on the sec ell of the row labeled "Veg. Layer Sub	
	These are t	the weighte	ed sub-va		s Veg. Layer Sub-variable scores and res. Individually sum the <i>Reference</i> I	
9. Divide the sum of "Veg. L Variable 8 score. Enter this n					overage of all layers scored. This pro of this page.	roduct is the
	<u>۱</u>	/egetatio	on Layers	s		
Current % Coverage of						
Layer	0	0.05	0.9	0	0	1
Stressor Noxious Weeds	Tree	Shrub	Herb	Aquatic	Comments	
Exotic/Invasive spp.						
Tree Harvest						
Brush Cutting/Shrub Removal	<b> </b> '	'	──		adjacent to highway	· · · · ·
Livestock Grazing Excessive Herbivory	<b> </b> '	<sup> </sup>	──			
Excessive Herbivory Mowing/Haying						
Herbicide			-			
Loss of Zonation/Homogenization					Urban environment	
					. ((	
Dewatering					fed by highway run of	ff .
Dewatering Over Saturation		ļ	-			
Over Saturation				+ +	i i i i i i i i i i i i i i i i i i i	
v	0.45	0.1	0.05	0	2 V	
Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND	0.45 +	0.15 +	0.05 0.85 +	0.00 + 0.00	= 1.45	
Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected %	0.45 + x 0.5	0.15 + x 0.6	0.85 + x 0.8	+ 0.00 x 0		ble scoring
Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected % Cover of Layer Veg. Layer Sub-	0.45 + x	0.15 + x	0.85 + x	+ 0.00 x	= 1.45	ble scoring

#### Variable 8: Vegetation Structure and Complexity p. 2

variable 8 Scoring Guideline

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	A 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	B 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	<b>C</b> 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. Arks with a high proportion of non-native grasses will commonly tall 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 65% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	D 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	F 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.

## **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.

ering 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

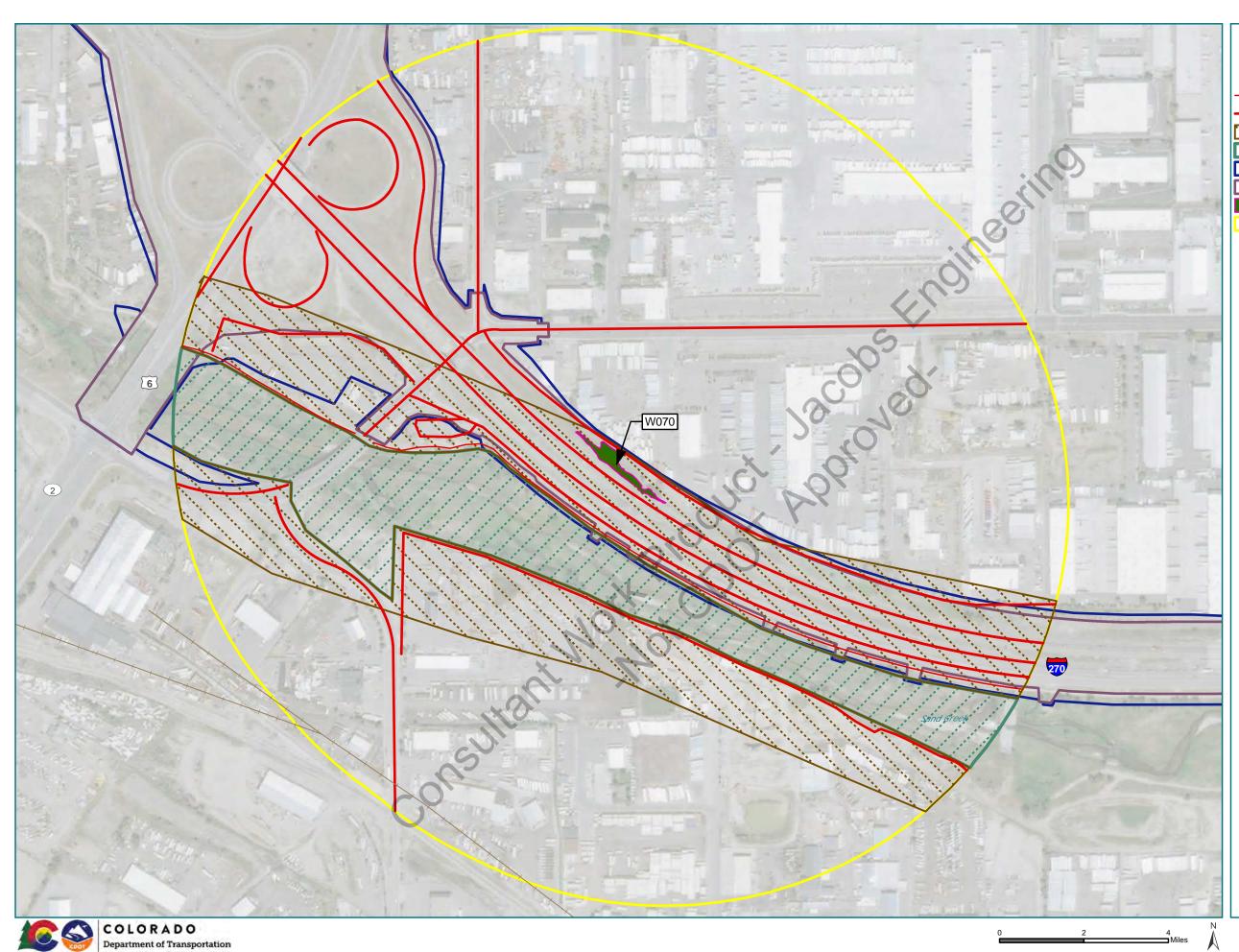
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & .andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.60
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.60
λť	Variable 3:	Water Source (Source)	0.65
Hydrology	Variable 4:	Water Distribution (Dist)	0.65
I	Variable 5:	Water Outflow (Outflow)	0.75
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.60
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.69

## Functional Capacity Indices

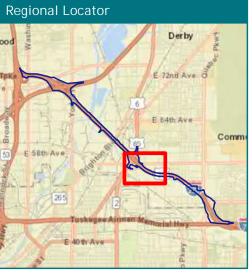
r unctional oapacity malees	
Function 1 Support of Characteristic Wildlife Habitat	Total Functional FCI
$V1_{connect}$ + $V2_{CA}$ + $(2 \times V8_{veg})$	Points
0.60 + 0.60 + 1.37 + +	+ <b>=</b> 2.57 ÷ <b>4</b> = 0.64
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	
1.95 + 1.30 + 1.50 + 0.60 + 0.72	+ <b>=</b> 6.07 ÷ <b>9</b> = 0.67
Function 3 Flood Attenuation	
$V2_{CA} + (2 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom}$	+ V8 <sub>veg</sub>
0.60 + 1.30 + 1.30 + 1.50 + 0.60	+ 0.69 = 5.99 ÷ 9 = 0.67
Function 4 Short- and Long-term Water Storage	
V3 <sub>source</sub> + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
0.65 + 1.30 + 1.50 + 0.60 +	+ 4.05 $\div$ 6 = 0.68
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA})$ + $(2 \times V4_{dist})$ + $V6_{geom}$ $V7_{chem}$	
1.20 + 1.30 + 0.60 + 0.72 +	+ <b>3</b> .82 ÷ <b>6</b> = 0.64
Function 6 Sediment Retention/Shoreline Stabilization	
V2 <sub>CA</sub> + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.60 + 1.20 + 1.37 + +	+ <b>=</b> 3.17 ÷ <b>5</b> = 0.63
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
0.60 + 1.50 + 0.60 + 0.72 + 1.37	+ <b>=</b> 4.79 ÷ <b>7</b> = 0.68
	Sum of Individual FCI Scores 4.61
Div	vide by the Number of Functions Scored ÷7
	Composite FCI Score 0.66



I-270 Corridor Improvements

## I-270 WETLAND FINDINGS REPORT ASSESSMENT AREA AA-I-3

- Migration Dispersal Barrier Minor
- Migration Dispersal Barrier Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PEM, Assumed Non-Jurisdictional
- Habitat Connectivity Envelope



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

# ADMINISTRATIVE CHARACTERIZATION

General Informat	ion	A	f : 1/21/202	1/21/2021			
Site Name or ID:	AA-I-3: W070	(Infrastructure)	nfrastructure) Project Name:				3)
404 or Other Permit Application #:	NA			Applicant Name	CDOT		eeli
Evaluator Name(s):	Brett Hartmanr and Pat Hickey		Evaluator's pro	ofessional position an organizatior	u -	s (Jacobs)	
Location Informa	ition:				< C		
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Infrastr	I-3, Score for ucture Wetlan 39.797111, -′	d polygon	Geographic Datum Used (NAD 83): Elevation	NAD83	5180	)
Location Information:		Depress	ional wetland as	sociated with infra	astructure	run off.	
Associated stream/wa	ater body name:		Highway runc	off C	Stream C	Order:	NA
USGS Quadrangle Map:	Commerce Cit	y, CO 2019		Map Scale: (Circle one)		1:24,000 Other	1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000	3	20° X	Wetland Ownership:	CDOT		
Project Informati	on: X Project We Mitigation S		Purpose of Evaluation (check all applicable):	<ul> <li>Potentially Impa</li> <li>Mitigation; Pre-</li> <li>Mitigation; Post</li> <li>Monitoring</li> <li>Other (Described)</li> </ul>	constructic -constructi	n	
Intent of Project: (Che	ck all applicable)		Restoration		nhancemen	t 🖸	Creation
Total Size of Wetland (Record Area, Check and I Measurement Method Use	Describe	ac.	K Measured: .02	72599			
Assessment Area (AA Area, check appropriate box. used to record acreage when included in a single assessme	Additional spaces are more than one AA is	ac.	< Measured Estimated	ac. ac.	ac. ac.	ac. ac.	ac. ac.
Characteristics or Me AA boundary determin		W070 is place other AAs.	ed alone assess	ment area (AA) di	ue to its dis	stance and	isolation from
Notes:							

# ECOLOGICAL DESCRIPTION 1

Special Co	oncerns	Check all that apply				
	ils including Histosols c he AA (i.e., AA include			tened or endangere to occur in the AA?	ed species are	
	directly impact organic reas possessing either					eeri
	ils are known to occur a wetland of which the A			cern according to the	ne Colorado Natural cur in the AA?	e e i
	d is a habitat oasis in a andscape?	n otherwise dry or		ated within a potenti nt occurrence buffer	al conservation area as determined	in
	nreatened or endangere the AA? List Below.	ed species are KNOWN		concerns (please de	escribe)	8
			-	4	S	
	ł	HYDROGEOMOR	RPHIC SETTIN	G	Y X	
If the abov		change in HGM classes describe the original we upland setting.				
Current Co	onditions	Describe the hydroge that apply.	omorphic setting of th	ne wetland by circli	ing all conditions	
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	<b>Bi-directional</b>		
	Wetland Gradient	0 - 29	% 2-4%	4-10% >1	0%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
HGM Setting	# Surface Outlets		0 1	2 3	>3	
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands associated ditch and fed by runof		Wetland is located	l in a highway	
	HGM class	Riverine	Slope	Depressional	Lacustrine	
Historical Co	onditions					
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics Geomorphic	Unidirectional Depressional wetland	Vertical appears to have forr	ned with the creation	on of the highway.	
wetland typology	Setting (Narrative	Run off from recently location.	constructed highway	collected and flow	ed down hill in this	
Š	Description) Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
	nformation on the AA's noce creation of highwa	s HGM subclass and re y	gional subclass): Dep	pressional wetland	appears to have	

# **ECOLOGICAL DESCRIPTION 2**

Vegetatio													ardin et al.		
System	Subsyst	em	Class	S	S	ubcla	ass	,	Nater	Regi	me	Other	Modifiers	% A	١A
Р	Р		Е			RV				Е			h	10	0
															0
															-
													(j	_	
												6			
	Littoral;												saline(7) ;		
Lacustrine	Limnoral		<b>.</b>		Floa	ting vas	scular:	_		mples		Eus Mixosaline	aline(8); e(9); Fresh(0)	:	
Palustrine	Palustrine	I.	Rock Bot. ( ncon Bottor		Roo	ted vas	cular;	Te		ily floode rated(B)		A	cid(a);	·	
			Aquatic Bec	d(AB)		ıl; Persi n-Persis			easonall	ly floode	ed(C);		neutral(c); calcareous(i);		
		l	Rocky Shore				eciduous;			ood./sat. n. floode		Organic(	g); Mineral(n)		
Riverine	Lower perenn		Emergent(			ble - g	evergreen ravel;	Inte	rmittent	ly expos	sed(G);		(b); Partially /ditched(d);		
	Upper perennial; Intermittent		Shrub-scrub(SS) Forested (FO)		Sand; Mud; Organic		Sat	Artificially flooded(K); Sat./semiperm./Seas. (Y);		Farmed(f); Diked/impounded(h);					
						Organi	C	Int	exposed	d/perme	nant(Z)				
										· •			Substrate(r);		
											$Q^{-}$		Substrate(r); Excavated(x)		
Sita Man	<u> </u>							<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
Site Map							relevant	<u> </u>	7	S	2	Spoil(s);			
			sketch ma				relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
							relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
							relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
							relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
							relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii			relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
				er signii			relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii			relevant	<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
Scale: 1 sq. =			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		
			, and othe	er signii				<u> </u>	7	S	2	Spoil(s);	Excavated(x)		

# Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

eerino

## SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

# Variable 1: Habitat Connectivity p. 2

## SV 1.2: Migration/Dispersal Barriers

This sub-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.

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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.

	$\overline{}$	Stressors		Comments/description					
	х	Major Highway		I-270					
artificial barriers	x	Secondary Highway		adjacent					
arrie	х	Tertiary Roadway		adjacent					
q	2	Railroad							
cia		Bike Path							
tifi	х	Urban Development		Located in an urban setting					
ar	x	Agricultural Developn	nent	upstream					
اا رە		Artificial Water Body							
Stressors	x	Fence		multiple properties					
es	x	Ditch or Aqueduct		is a ditch					
Str	x	Aquatic Organism Ba	rriers	infrastructure					
			I						
	Variable Score	Condition Grade	Scorin	ng Guidelines					
	1.0 - 0.9	<b>A</b> Reference Standard		ppreciable barriers exist between the AA and other wetland and riparian habitats in ICE; or there are no other wetland and riparian areas in the HCE.					
<	<0.9 - 0.8	<b>B</b> 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	C Functioning	betweer propagu times of culverte commoi	to migration and dispersal retard the ability of many organisms/propagules to pass in the AA and up to 66% of wetland/riparian habitat. Passage of organisms and ules through such barriers is still possible, but it may be constrained to certain day, be slow, dangerous or require additional travel. Busy two-lane roads, d areas, small to medium artificial water bodies or small earthen dams would nly rate a score in this range. More significant barriers (see "functioning impaired" y below) could affect migration to up to 10% of surrounding wetland/riparian					
	<0.7 - 0.6	D Functioning Impaired	organisr habitat. restricte	to migration and dispersal preclude the passage of some types of ms/propagules between the AA and up to 66% of surrounding wetland/riparian Travel of those animals which can potential negotiate the barrier are strongly d and may include a high chance of mortality. Up to 33% of surrounding /riparian habitat could be functionally isolated from the AA.					
	<0.6	<b>F</b> Non-functioning	migratio conveya	ssentially isolated from surrounding wetland/riparian habitat by impermeable n and dispersal barriers. An interstate highway or concrete-lined water ance canal are examples of barriers which would generally create functional between the AA and wetland/riparian habitat in the HCE.					
		SV 1.1 Score	0.60	Add SV 1.1 and 1.2 scores and divide by					
		SV 1.2 Score	0.60	two to calculate variable score Variable 1 Score 0.60					

# Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

### SV 2.1 - Buffer Condition

0.6 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

## SV 2.2 - Buffer Extent

0

0,50 Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines
	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
0.60 SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer
5.00 SV 2.2 - Buller Extern	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
	<0.6	Non-functioning	0-25% of AA with Buffer

Va	riabl	le 2: C	ontrib	outing	Area	(p. 2)						
SV 2	2.3 - <i>A</i>	Average I	Buffer W	/idth		Record	measur	ed buffer	widths in	the spaces below	and average.	
Buffe Widtl		8	8	9	3	2	6	7	2	6		
Line	#	1	2	3	4	5	- 6	7	8	Avg. Buffer Width	h (m)	
						Subvar Sco		Condition	Grade	Buffer Width Scor	ring Guidelines	or
0.6		SV 2.3 ·	- Avera	ige Bu	ffer	1.0 -	0.9	Reference	Standard	Average Buffer wid		
0.0		W	/idth So	core		<0.9 -	0.8	Highly Fur	ctioning	Average Buffer wid		
						<0.8 -		Functio		Average Buffer with		
						<0.7 -		-unctioning		Average Buffer w Average Buffer v		0
						<0.	0	Non-fund	uoning	Average Buller		
SV 2	2.4 - 5	Surround	ling Lan	d Use								
0.6		/ 2.4 - S		-	-				land use	changes in the su	irrounding	Ď
	_	Land L		ore		landsca						
	<b>_</b>	Stresso	al/comme	arcial		ents/de ndustria	-			_		
6	x x	Industria Urban		loidi		ndustria Environr		mment		G		
= Land Use Changes	^	Residen	itial		C.Duiri					$-\infty$	7	
har		Rural										
C 0			Farming									
Us(			e Agricul								2	
pu			s or Nur									
	x		k Grazin	0	adiacer	nt to I-27	70					
-s'	^		arklands		aujacci	11 10 1 27	0		<u></u>			
Stressors	х		npoundm		flow co	ntrol stru	uctures			0		
itre	х	Artificial	Water b	ody		-				s and runnoff		
0	х		Resource E					nd const	ruction			
	х	Biological	Resource	Extraction	constru	ction an	id main	tenance	<u> </u>			
Var	riable	1				70						
	core	Conditio	on Grade				Sc	oring G	uideline	s		
1.0	- 0.9		<b>A</b> erence odard	No appre	ciable land	d use char	nge has t	een impos	ed Surrou	nding Landscape.		
<0.9	9 - 0.8		B Inctioning	effect on because	the the lar land use is	ndscape's s not inten	capacity sive, for	to support example ha	characteri: iying, light	ndscape, but change stic aquatic functionin grazing, or low inten an 10% of the area.	ng, either nsity silviculture,	
<0.8	8 - 0.7		C Tioning	Surround retains m pollutants corridors	ling Lands uch of its s or sedime , or moder	cape has l capacity to ent. Mode ate cattle	been sub o support erate-inte grazing w	jected to a natural we nsity land u ould comm	marked sl tland funct ses such ionly be pl	hift in land use, howe ion and it is not an o as dry-land farming, aced within this scor	ever, the land overt source of urban "green" ring range.	
<0.7	7 - 0.6	Funct	<b>D</b> iioning aired	moderate surfaces; capacity logged at situations	e to high co considera of the land reas, low-co would co	overage (u ble in-flow has been lensity urb mmonly ra	ip to 50% v urban ru greatly c an devel ate a scoi	<ul> <li>of imperrunoff or ferrunoff or</li></ul>	neable sur ilizer-rich out not tota ome urbar s range.	een substantial inclu faces, bare soil, or o waters common. Su ally extinguished. Int n parklands and man	other artificial pportive tensively by cropping	
	:0.6		F actioning	severe e	cological s	tress on w	etland h		mmercial	ped or is otherwise a developments or hig		
r		Buffer So (Lowest so			unding d Use <b>1</b>							
	(	0.6	+	0.6	) ÷	2	=	Var	iable	2 Score	0.60	

# Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

## 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.

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$\times$	Stressors			Comments/description	**
	Ditc	hes or Drains	(tile, etc.)	Is a ditch	
	Dan	ns			
×	Dive	ersions		trash, elevation changes, agg	regate
	Gro	undwater pum	ping		
	Dra	w-downs			
×	× Culverts or Constrictions			feeds ditch	6
$\times$	Poir	nt Source (urba	an, ind., ag.)	Heavily managed urban envir	onment
	Nor	-point Source			
	Incr	eased Drainag	je Area		
×	Stor	m Drain/Urba	n Runoff	SW drain/ runoff contributes t	
$\times$	Imp	ermeable Surf	ace Runoff	adjace to highway and other o	compacted surfaces due to urban
	Irrig	ation Return F	lows		
	Min	ing/Natural Ga	s Extraction		
	Trai	nsbasin Divers	ion		
	Acti	vely Managed	Hydrology		
Varia	able	Condition			
Sco		Grade		Depletion	Augmentation
		A	Unnatural drawd	lown events minor, rare or non-	Unnatural high-water events minor, rare or non-
1.0 -	0.9	Reference	existent, very slig	ght uniform depletion, or trivial	existent, slight uniform increase in amount of
		Standard	alteration of hydr	rodynamics.	inflow, or trivial alteration of hydrodynamics.
				lown events occasional, short	Occasional unnatural high-water events, short in
		В		mild; or uniform depletion up to 20%;	duration and/or mild in intensity; or uniform
<0.9 -	- 0.8	Highly Functioning		ate reduction of peak flows or r to perform work.	augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to
		Functioning	capacity of water	no penomi work.	perform work.
			Unnatural drawd	lown events common and of mild to	Common occurrence of unnatural high-water
		•		ity and/or duration; or uniform	events, of a mild to moderate intensity and/or
		C	depletion up to 5	50%; or moderate to substantial	duration; or uniform augmentation up to 50%; or
<0.8 -	- 0.7	Eurotioning			
<0.8 -	- 0.7	Functioning	reduction of pea	k flows or capacity of water to	moderate to substantial increase of peak flows or
<0.8 -	- 0.7	Functioning	reduction of peat perform work.	k flows or capacity of water to	moderate to substantial increase of peak flows or capacity of water to perform work.
<0.8 -	- 0.7	Functioning	reduction of peal perform work. Unnatural drawd	k flows or capacity of water to lown events occur frequently with a	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water
<0.8 -	- 0.7	Functioning	reduction of peal perform work. Unnatural drawd moderate to high	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or
		D	reduction of pear perform work. Unnatural drawd moderate to high depletion up to 7	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform ′5%; or substantial reduction of peak	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing
<0.8 -		D Functioning	reduction of pear perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform ′5%; or substantial reduction of peak	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or
		D	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma	k flows or capacity of water to hown events occur frequently with a n intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial	moderate to substantial increase of peak flows or capacity of water to perform work. 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
		D Functioning	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma	k flows or capacity of water to hown events occur frequently with a in intensity and/or duration; or uniform 75%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial	moderate to substantial increase of peak flows or capacity of water to perform work. 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. <b>Wetlands</b>
		D Functioning	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally
	-0.6	D Functioning Impaired F Non-	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak / of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower.	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally high-water great enough to change the
<0.7 -	-0.6	D Functioning Impaired	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally
<0.7 -	-0.6	D Functioning Impaired F Non-	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally high-water great enough to change the

# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

Because the wetland's ability to distribute water in a characteristic fashion is fundamentally dependent on the condition of its water source, **in most cases the Water Source variable score will define the upper limit Water Distribution score**. For example, if the Water Source variable is rated at 0.85, the Water Distribution score will usually have the potential to attain a maximum score of 0.85. Additional stressors within or outside the lower end of the AA effecting water distribution (e.g., ditches and levees) will reduce the score from the maximum value.

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### 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.

$\checkmark$	Stresso	rs	Comments/description				
×	Alteration of	of Water Source	surrounding lands and water stucture	es in constant flu	x due to construction		
×	Ditches		ls a	ditch			
	Ponding/Im	poundment					
×	Culverts		runoff from culverts c	ontributes to hyd	rology		
×	Road Grad	es	adjacent and feed by ru	in off from road g	grading.		
	Channel In	cision/Entrenchment					
	Hardened/I	Engineered Channel			$\mathbf{O}$		
	Enlarged C	hannel					
×	Artificial Ba	inks/Shoreline	heavily manag	ged urban ditch			
	Weirs			10			
×	Dikes/Leve	es/Berms	Road	grade			
	Diversions						
×	Sediment/F	Fill Accumulation	runoff from urb	an setting, trash			
			<u>C</u> N	$ \rightarrow $			
				NY.			
Varia	ble Score	Condition Grade	Non-riverine		Riverine		
1.	.0 - 0.9	A 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.	normal recurren	oodplain areas flood on a ice interval. No evidence of oding and subirrigation duration		
<0	).9 - 0.8	<b>B</b> Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> 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.		cent area, periods of drying or nmon; or uniform shift in the r root depth.		
<0	0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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 c drying or flooding are the norm; or uniform shift in the hydrograph greater than root dep			
5	<0.6	F 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.	never wetted fro	floodplain areas are almost m overbank flooding, and/or iltration is effectively cut off.		
			Variable	4 Score	0.65		

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

## 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.

Y	Stres	sors	Comments/description
Х	Alteration of Water Source		Road grade and barriers
×	Ditches	3	is a ditch
	Dikes/L	evees	
х	Road Grades		confined by roads
х	Culvert	S	placed at outflow
х	Diversi	ons	road grade
х	Constri	ctions	urban envronment
	Channe	el Incision/Entrenchment	
х	Harder	ed/Engineered Channel	Compacted soils from grading
	Artificia	I Stream Banks	
	Weirs		
	Confine	ed Bridge Openings	
	iable core	Condition Grade	Scoring Guidelines
So		Condition Grade A Reference Standard	Scoring Guidelines Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
Sc 1.0	core	A	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water
So 1.0 <0.9	- 0.9	A Reference Standard B	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime. High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal")
So 1.0 <0.9 <0.8	- 0.9 - 0.8	A Reference Standard B Highly Functioning C	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime. High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level

Variable 5 Score

0.7

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

### **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.

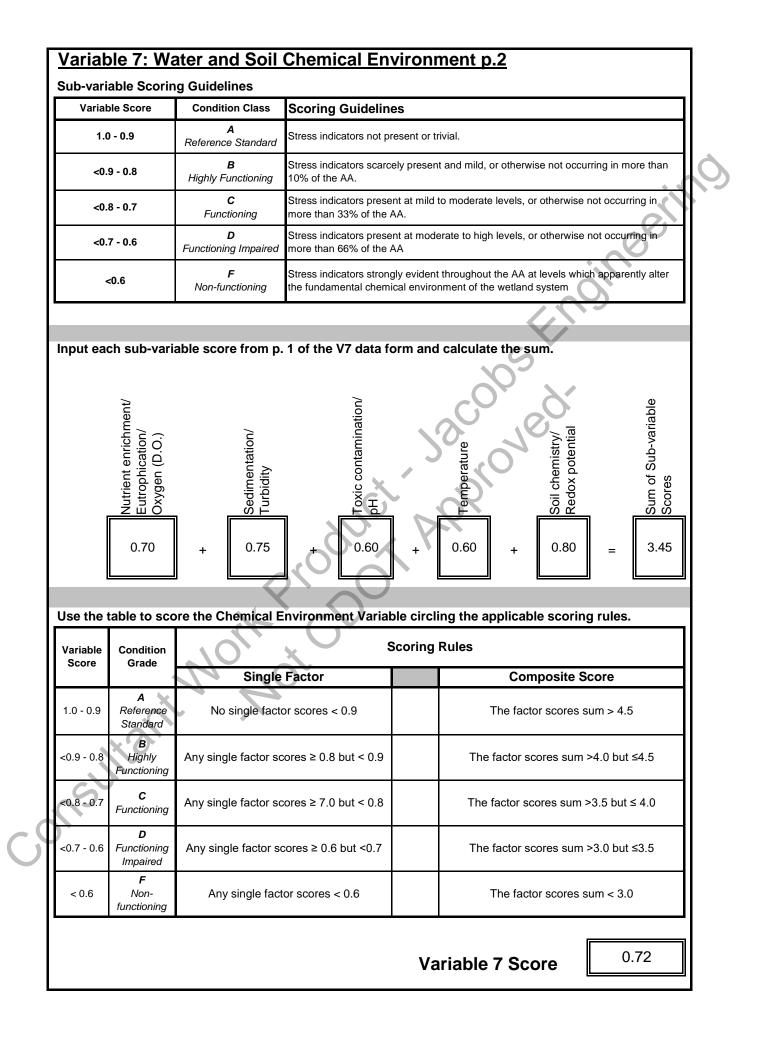
	Stressors				Comments						
		Dredg	ing/Excavation	/Mining							
×		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to highway and infrastructure						
Х		Gradii	ng		Adjacent to highway and infrastructure						
Х	le	Comp	action		grading						
	era	Plowir	ng/Disking								
×	General	Exces	sive Sediment	ation	loose sediment from runoff and erosion						
×	G	Dump	ing		Adjacent to highway, lots of trash						
		Hoof \$	Shear/Pugging								
		Aggre	gate or Minera	l Mining							
×		Sand	Accumulation		loose sediment from runoff and erosion						
		Chanr	nel Instability/O	ver Widening							
	Ŋ	Exces	sive Bank Eros	sion							
	Only	Chanr	nelization								
	s i	Recor	nfigured Strean	n Channels							
	Channels	Artifici	al Banks/Shore	eline							
	าลเ	Beave	er Dam Remov	al							
	ប	Subst	rate Embeddeo	Iness							
		Lack of	or Excess of W	oody Debris							
	ariable Score		Condition								
Varia	able	Score	Condition Grade		Scoring Guidelines						
Varia	able	Score			sentially unaltered from the natural state, or alterations appear to have a minimal effect on						
	able : .0 - 0		Grade A Reference	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native						
			Grade A Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on						
1	.0 - 0	0.9	Grade A Reference Standard B	wetland function plant communit	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native						
1		0.9	Grade A Reference Standard B Highly	wetland function plant communit Alterations to to	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported.						
1	.0 - 0	0.9	Grade A Reference Standard B Highly Functioning	wetland function plant communit Alterations to to AA; or more se	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.						
1	.0 - 0	0.9	Grade A Reference Standard B Highly Functioning C	wetland function plant communit Alterations to to AA; or more se Changes to AA	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include						
1	.0 - 0 0.9 -	0.9	Grade A Reference Standard B Highly Functioning	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA.						
1	.0 - 0 0.9 -	0.9	Grade A Reference Standard B Highly Functioning C	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include						
1 <(	.0 - 0 0.9 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA.						
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning D	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like						
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7	Grade A Reference Standard B Highly Functioning C Functioning Impaired	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA.						
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F	wetland function plant communit Alterations to to AA; or more se Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. portant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like						
1 <(	.0 - 0 0.9 - 0.8 -	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.						
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.						
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. cortant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower. norphic alterations have caused a fundamental change in site character and functioning, lting in a conversion to upland or deepwater habitat.						
1 <(	.0 - 0 D.9 - 1 D.8 - 1	0.9 0.8 0.7 0.6	Grade A Reference Standard B Highly Functioning C Functioning Impaired F Non-	wetland function plant communit Alterations to to AA; or more see Changes to AA patches of more At least one imp strongly impact Evidence that v alterations. Mo would score in Pervasive geor	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported. pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA. topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA. bootnat surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. stickspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.						

## Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

scoring sheet. Scoring s	ub-variables is carried out in exa ter body that is recognized as im	ctly th	guideline table provided on the seco e same way as normal variable scor d or recommended for TMDL develo	ring.		- OS	
	e scores to the following variable e score sets the letter grade ran		ng page and compute the sum. he composite of sub-variables influe	ences the score		S	
Sub-variable	Stressor Indicator	$\checkmark$	Comments	Sub-	ucai	Janu	
	Livestock	х	agriculture upstream	variable	pg 89	pg106	
SV 7.1	Agricultural Runoff	х	agriculture upstream	Score			
Nutrient Enrichment/	Septic/Sewage	х	placed in an urban enviroment	0.70			
Eutrophication/	Excessive Algae or Aquatic Veg.			0.70			
Oxygen (D.O.)	Cumulative Watershed NPS	х	urban environment				
exygen (B.e.)	CDPHE Impairment/TMDL List						
				4			
	Excessive Erosion	V					
	Excessive Deposition	Х	highway run of				
01/7.0	Fine Sediment Plumes	V					
SV 7.2 Sedimentation/	Agricultural Runoff Excessive Turbidity	X X	agriculture upstream	0.75			
Turbidity		X	urban environment	4 ┝━━━	1		
Turbluity	Nearby Construction Site Cumulative Watershed NPS	^ X	urban environment				
	CDPHE Impairment/TMDL List	^					
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	x	adjacent to highway				
	Livestock	х	agriculture upstream				
	Agricultural Runoff	х	agriculture upstream				
SV 7.3	Storm Water Runoff	х	adjacent to highway	0.60			
Toxic contamination/	Fish/Wildlife Impacts	X		0.00			
рН	Vegetation Impacts	х	weedy				
	Cumulative Watershed NPS	х					
	Acid Mine Drainage			4/			
	Point Source Discharge	х	urban environment				
	CDPHE Impairment/TMDL List			_/			
	Metal staining on rocks and veg.		concrete adiacent	-			
	Excessive Temperature Regime Lack of Shading	x x	concrete adjacent No trees	-1			
	Reservoir/Power Plant Discharge	x	stormwater	┨ ┢━━━━	า		
SV 7.4	Industrial Discharge	X	urban environment	0.60			
Temperature	Cumulative Watershed NPS	x		┥╱╧══	1 1		
	CDPHE Impairment/TMDL List	~		۲/			
				-/			
	Unnatural Saturation/Desaturation		1	1			
SV 7.5	Mechanical Soil Disturbance	х	urban environment		ור		
Soil chemistry/	Dumping/introduced Soil	x	construction	0.80			
Redox potential	CDPHE Impairment/TMDL List			1/	<sup>2</sup>		
5				7			
				—			



#### Variable 8: Vegetation Structure and Complexity

e. It particularly focuses on the wetla I nis variable is a measure or the containon of the wetland's vegetation relative to its narive state. It particularly rocuses on the we ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being and any composition for the variable, stressor severity is a measure of how much each vegetation strate more integration approximation of the strategies of the stressor severity is a measure of how much each vegetation stratural fifters functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy; Shrub Layer; Herbaceous Layer; and Aquatics.

#### Rules for Scoring:

	e of variabili	ity exhibited	the HGM s	subclass or	vegeration stratum differs functionally from its natural regional subclass. This variable has four sub-variables, erbaceous Layer; and Aquatics.
Rules for Scoring:					
additional layers were historic	ally prese	nt using di	rect evide	ence such	in the AA. Make a judgment as to whether as stumps, root wads or historical photographs. so be used in this determination.
2. Do not score vegetation la	yers that v	vould not n	normally b	e present	in the wetland type being assessed.
	ndard or e	xpected pe	ercent cov	verage of	r at the top of the table. each vegetation layer to create the sub-variable a greater influence on the variable score than do
Cover of Layer". Note, perce	ntages will	often sum	n to more	than 100%	
	stressor ta				ppy layers, indicating their presence with checks in the expected and observed stratum coverages is
	n sub-varia	able score	in the app	propriate c	using the scoring guidelines on the second page of cell of the row labeled "Veg. Layer Sub-variable
	These are	the weight	ed sub-va		its Veg. Layer Sub-variable scores and enter the pres. Individually sum the <i>Reference Percent</i>
, ,	_ayer Sub-	variable S	cores" by		coverage of all layers scored. This product is the of this page.
	١	/egetatic	on Layer	s	
Current % Coverage of					
Layer	0	0	0.9	0	
Stressor	Tree	Shrub	Herb	Aquatio	Comments
Noxious Weeds		L			
Exotic/Invasive spp. Tree Harvest					
Brush Cutting/Shrub Removal					adjacent to highway
Livestock Grazing			1	1	adjucent to highway
Excessive Herbivory					
Mowing/Haying					
Herbicide			I		
Loss of Zonation/Homogenization			+		Urban environment
Dewatering Over Saturation	1		1		fed by highway run off
Sto. Saturation					
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.45	0.15	0.2	0	201
Reference/Expected % Cover of Layer	0.45 + x	0.15 + x	+ 0.85 ·	+ 0.00 x	] = 1.45
Veg. Layer Sub- variable Score	0.5	0.5	0.8	0	See sub-variable scoring guidelines on following pag
Weighted Sub-variable Score	" 0.23 +	" 0.08 +	" ⊦ 0.68	" + 0.00	= 0.98
			C		Variable 8 Score

#### Variable 8: Vegetation Structure and Complexity p. 2

h. .

	each vegetation la		ntified above, rate the severity of their cumulative effect on vegetation structure and complexity for
	Variable Score	Grade	Scoring Guidelines
	1.0 - 0.9	A 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	B 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	<b>C</b> 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. AX'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	D 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 weltand. 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	F 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.

## **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.

ering 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

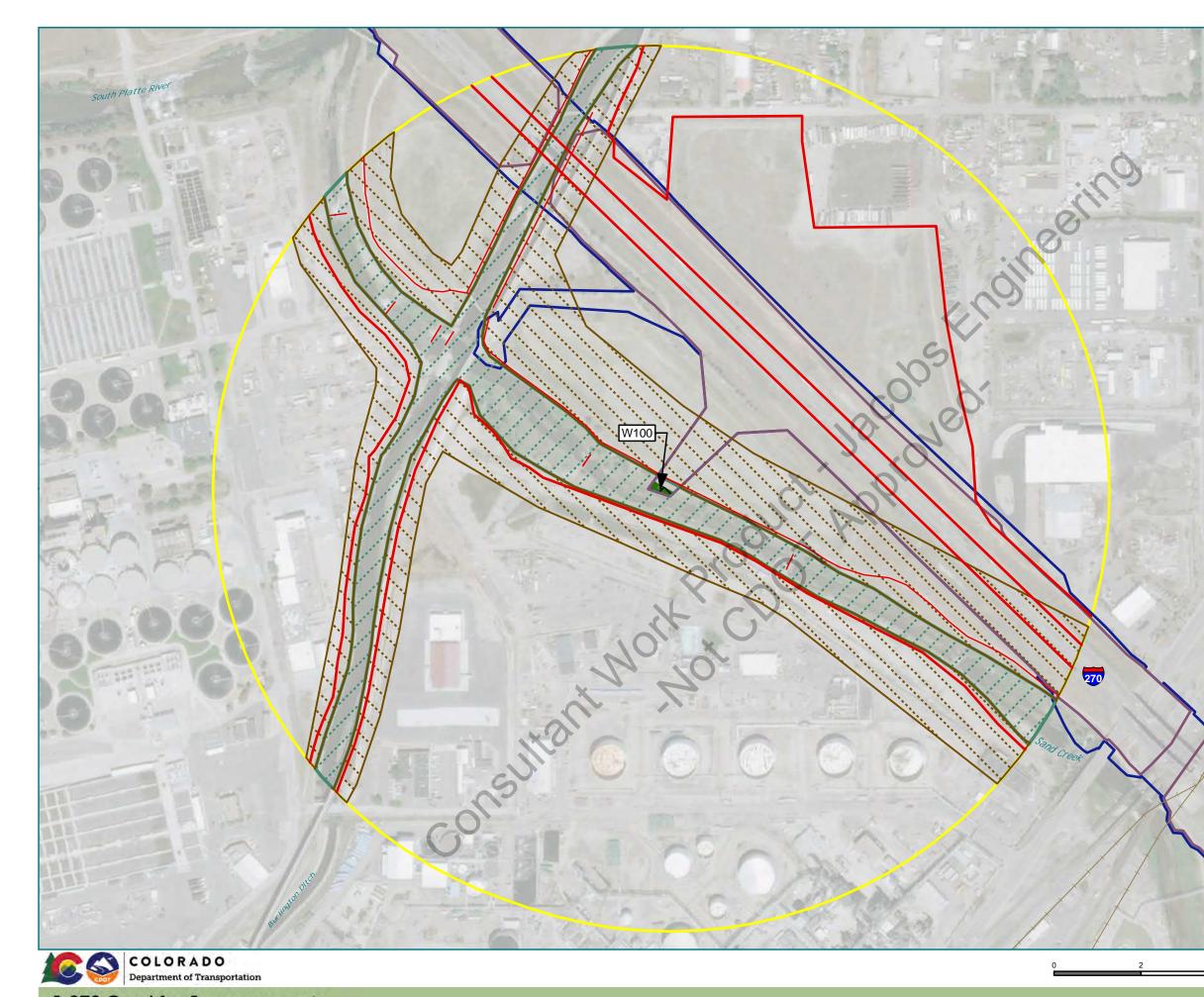
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.60
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.60
λť	Variable 3:	Water Source (Source)	0.65
Hydrology	Variable 4:	Water Distribution (Dist)	0.65
I	Variable 5:	Water Outflow (Outflow)	0.70
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.60
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic a Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.68

## Functional Capacity Indices

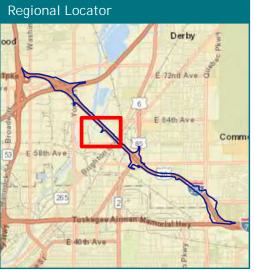
Function 1 Support of Characteristic Wildlife Habitat	FCI
V1 <sub>connect</sub> + V2 <sub>CA</sub> + (2 x V8 <sub>veg</sub> ) Points	1
0.60 + 0.60 + 1.35 + + + + = 2.55 ÷ 4 =	0.64
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	_
	0.66
Function 3 Flood Attenuation	
$V2_{CA} + (2 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V8_{veg}$	
	0.65
Function 4 Short- and Long-term Water Storage	
$V3_{source}$ + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
	0.66
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA}) + (2 \times V4_{dist}) + V6_{geom} V7_{chem}$	
$1.20 + 1.30 + 0.60 + 0.72 + + = 3.82 \div 6 =$	0.64
Function 6 Sediment Retention/Shoreline Stabilization	
$V_{2_{CA}}$ + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.60 + 1.20 + 1.35 + + + = 3.15 ÷ 5 =	0.63
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
$0.60 + 1.40 + 0.60 + 0.72 + 1.35 + = 4.67 \div 7 = $	0.67
Sum of Individual FCI Scores	4.55
Divide by the Number of Functions Scored	÷7
Composite FCI Score	0.65



I-270 Corridor Improvements

## I-270 WETLAND FINDINGS REPORT ASSESSMENT AREA AA-SC-1

- Migration Dispersal Barrier Minor
  Migration Dispersal Barrier Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PSS, Jurisdictional
  - Habitat Connectivity Envelope



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

4 Miles

# ADMINISTRATIVE CHARACTERIZATION

	-			Date of	1/21/202	1	
General Informat			A-SC-1	Evaluation:	1/2 1/202	1	
Site Name or ID:	AA-SC-1: W10 Creek)	10 (Sand		Project Name:	I-270 (ST	U 2706-04	3)
404 or Other Permit Application #:	NA			Applicant Name:	CDOT		eeli
Evaluator Name(s):	Brett Hartmanr and Pat Hickey		Evaluator's pro	fessional position and organization:	Biologists	s (Jacobs)	
Location Informa	tion:				Ń		
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Sand (	A-SC-1, Score Creek Wetland 39.808580, -	d polygon	Geographic Datum Used (NAD 83): Elevation	NAD83	5145	
Location Information:		Riverin	e wetlands asso	ciated with edges	of Sand C	reek	
Associated stream/wa	I Iter body name:		Sand Creek		Stream C	Order:	Riverine
USGS Quadrangle Map:	Commerce Cit	y, CO 2019		Map Scale: (Circle one)		1:24,000 Other	1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000	3	2005	Wetland Ownership:	CDOT		
Project Informati	on: X Project We Mitigation S		Purpose of Evaluation (check all applicable):	<ul> <li>Potentially Impa</li> <li>Mitigation; Pre-c</li> <li>Mitigation; Post-</li> <li>Monitoring</li> <li>Other (Describe)</li> </ul>	constructio constructi	n	
Intent of Project: (Che	ck all applicable)		Restoration	En	hancement		Creation
Total Size of Wetland (Record Area, Check and I Measurement Method Use	Describe	ac.	X Measured: .05	6801			
Assessment Area (AA Area, check appropriate box. used to record acreage when r included in a single assessmer	Additional spaces are nore than one AA is	) ac.	X Measured	ac. ac.	ac. ac.	ac. ac.	ac. ac.
Characteristics or Mel AA boundary determir		W100 is place other AAs.	ed alone assessr	ment area (AA) du	e to its dis	stance and	isolation from
Notes:							

# ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply				
	ls including Histosols or he AA (i.e., AA includes			tened or endangere to occur in the AA?	d species are	
	directly impact organic eas possessing either h			Ute Lady's tresse	S	eerin
	Is are known to occur a wetland of which the AA			cern according to th P) are known to occ		op'
The wetland urbanized la	d is a habitat oasis in ar andscape?	otherwise dry or		ated within a potentiant occurrence buffer		diff
	reatened or endangere the AA? List Below.	d species are KNOWN	Other special of	concerns (please des	scribe)	9
					S	
	F	YDROGEOMOR	<b>RPHIC SETTIN</b>	G	~ ~	
		ental natural hydrogeor	·		.0,0	
		change in HGM classes describe the original we				
AA wetland	d was created from an	upland setting.	4	, s	0	
Current Co	nditions	Describe the hydroged that apply.	omorphic setting of th	ne wetland by circlin	ng all conditions	
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	Bi-directional		
	Wetland Gradient	0 - 29		4-10% >10	%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
HGM Setting	# Surface Outlets		0 1	2 3	>3	
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands associated associated wetlands a industrial facilities, and	re been confined bet	ween highway, wal		
	HGM class	Riverine	Slope	Depressional	Lacustrine	
Historical Co	onditions	1				
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics	Unidirectional	Vertical			
wetland typology	Geomorphic Setting (Narrative Description)	Flood plane had been	encroached on by u	ban and industrial	development.	
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
Notes (include ir	nformation on the AA's	HGM subclass and re	jional subclass):			

# **ECOLOGICAL DESCRIPTION 2**

System	on Habitat D Subsystem	Class		WS habitat clas		er Regim			Modifiers	% AA
P	P	E		RV	vval			Guiel		
F	P	E				E			h	80
		SS		BLD		Е			h	20
										0
	_								+	
										ろ
	-								$O^{-}$	
								6	-	
Lacustrine	Littoral; Limnoral								saline(7) ; aline(8);	
		Rock Bot. (RB)		ng vascular;		Examples arily flooded	(A);	Mixosaline	e(9); Fresh(0);	
Palustrine	Palustrine	Uncon Bottom(UB) Aquatic Bed(AB)		ed vascular; ; Persistent;	Sa	turated(B); hally flooded(		Circum	cid(a); nneutral(c);	
		Rocky Shore(RS)		Persistent; aved deciduous;	Seas.	-flood./sat.(E	:);		calcareous(i); g); Mineral(n);	
	Lower perennial;	Uncon Shore(US) Emergent(EM)	Needle-le	aved evergreen;	Intermitte	erm. flooded ently expose	d(G);	Beaver	(b); Partially	
Riverine	Upper perennial; Intermittent	Shrub-scrub(SS) Forested (FO)	Sa	ole - gravel; ind; Mud;	Artifici Sat /sem	ally flooded(l iperm./Seas	<); (Y)·	Far	l/ditched(d); med(f);	
			(	Drganic		sed/permena			pounded(h); Substrate(r);	
								Spoil(s);	Excavated(x)	
Site Man					5	Ŕ				
Site Map		v a sketch map of ti ses, and other sign			ortions of th	e wetland,	AA bo			bitat
		v a sketch map of ti ses, and other sign.			prtions of th	e wetland,	AA bo			bitat
					prtions of th	e wetland,	AA bo			bitat
					portions of th	e wetland,	AA bo			bitat
					ortions of th	e wetland,				
		ses, and other sign			portions of th	e wetland,				bitat
					ortions of th	e wetland,				
		ses, and other sign			ortions of th	e wetland,				
Site Map		ses, and other sign			ortions of th	e wetland,	AA bo			bitat
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# Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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## SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

# Variable 1: Habitat Connectivity p. 2

## SV 1.2: Migration/Dispersal Barriers

This sub-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.

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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.

	$\overline{}$	Stressors		Comments/description				
	х	Major Highway		I-270				
= artificial barriers		Secondary Highway		S				
arrie	х	Tertiary Roadway		adjacent				
q		Railroad						
cial	х	Bike Path		Colorado Front Range Trail				
tifi	х	Urban Development		Located in an urban setting				
ar	х	Agricultural Developr	nent	upstream				
u v		Artificial Water Body						
Stressors	х	Fence		multiple properties				
es	х	Ditch or Aqueduct		feed by ditch				
St	х	Aquatic Organism Ba	arriers	infrastructure and flow controls				
	-							
-								
`	/ariable Score	Condition Grade	Scorin	ng Guidelines				
1	1.0 - 0.9	<b>A</b> Reference Standard		reciable barriers exist between the AA and other wetland and riparian habitats in E; or there are no other wetland and riparian areas in the HCE.				
<	0.9 - 0.8	<b>B</b> 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	C Functioning	betweer propagu times of culverte commoi	Barriers to migration and dispersal retard the ability of many organisms/propagules to pas 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				
<	<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	<b>F</b> Non-functioning	migratio conveya	ssentially isolated from surrounding wetland/riparian habitat by impermeable n and dispersal barriers. An interstate highway or concrete-lined water ance canal are examples of barriers which would generally create functional between the AA and wetland/riparian habitat in the HCE.				
		SV 1.1 Score	0.60	Add SV 1.1 and 1.2 scores and divide by				

# Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

### SV 2.1 - Buffer Condition

0.7 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

SV 2.2 - Buffer Extent

0.55

0.70

Subvariable Score	Condition Class	% Buffer Scoring Guidelines
1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
<0.8 - 0.7	Functioning	51-69% of AA with Buffer
<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
<0.6	Non-functioning	0-25% of AA with Buffer
	Score 1.0 - 0.9 <0.9 - 0.8 <0.8 - 0.7 <0.7 - 0.6	ScoreCondition Class1.0 - 0.9Reference Standard<0.9 - 0.8

		e 2: Contril	outing	Area	(p. 2)						
SV 2	2.3 - A	Verage Buffer V	Nidth		Record	measure	d buffer v	vidths in	the spaces below	and average.	
Buffe		20 40	35	• •	(0.0			• •			
Width	. ,	1 2	35	20 4	120 5	115 6	80 7	20 8	56 Avg. Buffer Widt	h (m)	
Line #	4	1 2	3	4	-	-	1	0	Avg. Buffer widt	n (m)	
					Subvari Scor		Condition	Grade	Buffer Width Sco	ring Guidelines	o
	1.	SV 2.3 - Aver	age Bu	ffer	1.0 - 0		eference S	Standard	Average Buffer with	dth is 190-250m	۰.
0.7		Width S	-		<0.9 -		lighly Fun		Average Buffer with		
					<0.8 -		Functio		Average Buffer with	idth is 31-100m	
					<0.7 -	<b>0.6</b> Fu	Inctioning	Impaired	Average Buffer v		0
					<0.6	;	Non-funci	ioning	Average Buffer	width is 0-5m	
SV 2	2.4 - 8	Surrounding Lar	nd Use	]							
		/ 2.4 - Surrou		1	Catalag	andaha	rootori <del>z</del> o	land una	changes in the s		
0.7		Land Use Sc	•			be and so		anu use	changes in the s	unounaing	
		Stressors		Comm	ents/des	scription	n		4		
	x	Industrial/comm	ercial		ndustrial	-			-		
SS	х	Urban			Environm						
ange		Residential									
Cha	<b> </b>	Rural									
= Land Use Changes	$\vdash$	Dryland Farming Intensive Agricu							$\mathbf{O}$		
∩p		Orchards or Nu								0	
an		Livestock Grazi	ng								
11	х	Transportation (		,	nt to I-27				30		
sors	X	Urban Parkland	s/impoundments flow control structures								
Stressors	X X	Artificial Water				and runnoff					
St	x	Physical Resource		road base extraction and construction Urban Environment							
	х	Biological Resource	Extraction								
_											
	iable core	Condition Grade		Scoring Guidelines							
		А	Ť								
1.0	- 0.9	Reference Standard	No appre	ciable land	l use chan	ge has be	en impose	ed Surrou	nding Landscape.		
			A								
	Some land								ndscape, but chang		
<0.9	9 - 0.8	<b>B</b> Hiahly Functioning	effect on	the the lan	dscape's d	capacity to	support of	haracteris	stic aquatic function	ing, either	
<0.9	9 - 0.8	<b>B</b> Highly Functioning	effect on because	the the lan land use is	dscape's of not intens	capacity to sive, for ex	support o cample ha	haracteris ying, light		ing, either nsity silviculture,	
		Highly Functioning	effect on because or more Surround	the the lan land use is substantia ing Landso	dscape's o not intens I changes o cape has b	capacity to sive, for ex occur in ap been subje	support of cample hat pproximat ected to a	haracteris ying, light ely less th narked sh	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how	ing, either nsity silviculture, ever, the land	
	9 - 0.8 3 - 0.7		effect on because or more Surround retains m	the the lan land use is substantia ing Landso uch of its o	dscape's of not intens changes of cape has b capacity to	capacity to sive, for ex occur in ap been subje support n	e support of cample ha pproximat ected to a atural wet	haracteris ying, light ely less th marked sh land funct	stic aquatic function grazing, or low inter an 10% of the area	ing, either nsity silviculture, ever, the land overt source of	
		Highly Functioning	effect on because or more Surround retains m pollutants corridors,	the the lan land use is substantial ing Landso uch of its o or sedime or modera	dscape's of not intens I changes of cape has b capacity to ent. Moder ate cattle g	capacity to sive, for ex occur in ap peen subje support n rate-intens grazing wo	a support of cample ha pproximat ected to a atural wet sity land u uld comm	haracteris ying, light ely less th marked sh and funct ses such a only be pl	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an as dry-land farming, aced within this sco	ing, either nsity silviculture, - ever, the land overt source of urban "green" ring range.	
		Highly Functioning C Functioning	effect on because or more s Surround retains m pollutants corridors, Land use	the the lan land use is substantial ing Landso uch of its o or sedime or modera changes	dscape's of not intens I changes of cape has b capacity to ent. Moder ate cattle g within the S	capacity to sive, for ex- occur in ap- eeen subje support n rate-intens grazing wo Surroundir	e support of cample ha pproximat acted to a atural wet sity land u uld comm ng Landsc	haracteris ying, light ely less th marked sh and funct ses such a only be pl ape has b	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an o as dry-land farming,	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a	
<0.8		Highly Functioning C Functioning D Functioning	effect on because or more s Surround retains m pollutants corridors, Land use moderate surfaces;	the the lan land use is substantial ing Landso uch of its o or sedime or modera changes o to high co considera	dscape's of not intension cape has b capacity to ent. Model ate cattle g within the S overage (up ble in-flow	capacity to sive, for ex occur in ap een subje support n rate-intens grazing wo Surroundir p to 50%) urban run	o support of cample ha pproximat acted to a atural wet sity land u uld comm ng Landsc of imperm off or ferti	haracteris ying, light ely less th marked sh land funct ses such a only be pl ape has b eable sur lizer-rich v	stic aquatic function grazing, or low inter an 10% of the area. iff in land use, how ion and it is not an d as dry-land farming, aced within this sco een substantial incl faces, bare soil, or o waters common. Su	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive	
<0.8	3 - 0.7	Highly Functioning C Functioning D	effect on because or more Surround retains m pollutants corridors, Land use moderate surfaces; capacity of logged ar	the the lan land use is substantial ing Landso uch of its of or sedime or modera changes v to high cc considera of the land eas, low-d	dscape's c not intens cape has b cape has b capacity to ent. Model ate cattle g within the s overage (up ble in-flow has been ensity urba	capacity to sive, for ex occur in ap eeen subje support n rate-intens grazing wo Surroundir p to 50%) urban run greatly dir an develop	o support of cample ha pproximat acted to a atural wet sity land u uld comm ng Landsc of imperm off or ferti ninished b poments, so	haracteris ying, light ely less th marked sh and funct ses such a only be pl ape has b eable sur lizer-rich v out not tota ome urbar	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an as dry-land farming, aced within this sco een substantial incl faces, bare soil, or of	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive itensively	
<0.8	3 - 0.7	Highly Functioning C Functioning D Functioning Impaired	effect on because or more s Surround retains m pollutants corridors, Land use moderate surfaces; capacity o logged ar situations	the the lan land use is substantial ing Landso uch of its of or sedime or modera changes v to high co considera of the land eas, low-d swould cor	dscape's c a not intense cape has b capacity to ent. Moder ate cattle g within the S overage (up ble in-flow has been ensity urba mmonly rat	capacity to sive, for ex- occur in ap- peen subje support n rate-intens grazing wo Surroundir p to 50%) urban run greatly din an develop te a score	a support of cample ha pproximat acted to a atural wet sity land us uld comm ng Landsc of imperm noff or ferti ninished t poments, so within this	haracteris ying, light ely less th narked sh and funct ses such a only be pl ape has b eable sur izer-rich v ut not tota me urbar ; range.	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an or as dry-land farming, aced within this sco een substantial incl faces, bare soil, or or waters common. Su ally extinguished. In parklands and man	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive itensively ny cropping	
<0.8	3 - 0.7	Highly Functioning C Functioning D Functioning Impaired F	effect on because or more s Surround retains m pollutants corridors, Land use moderate surfaces; capacity of logged ar situations The Surro severe effect	the the lan land use is substantial ing Landso uch of its of or modera changes v to high oc considera of the land eas, low-d would con punding La cological si	dscape's c a not intense cape has b capacity to ent. Moder ate cattle g within the S overage (up ble in-flow has been ensity urba mmonly rat andscape is tress on we	capacity too sive, for ex- occur in ap- peen subje support n rate-intens rrazing wo Surroundir p to 50%) urban run greatly dir an develop te a score te a score	a support of cample has pproximat reted to a latural wet sity land u uld comm ng Landsc of imperm rooff or ferti ninished b oments, so within this illy comlete. Con	haracteris ying, light ely less th narked sh land funct ses such a only be pl ape has b eable sur izer-rich v ut not tota ome urbar range. ely develo nmercial o	stic aquatic function grazing, or low inter an 10% of the area. ifft in land use, how ion and it is not an d as dry-land farming, aced within this sco een substantial incl faces, bare soil, or waters common. Su ally extinguished. In	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive itensively ny cropping a cause of	
<0.8	3 - 0.7 7 - 0.6 0.6	Highly Functioning C Functioning D Functioning Impaired F Non-functioning	effect on because or more Surround retains m pollutants corridors, Land use moderate surfaces; capacity of logged ar situations The Surro severe eco landscap	the the lan land use is substantial ing Landso uch of its of or sedime or modera changes to to high cc considera of the land eas, low-d would cor bunding La cological si es general	dscape's c a not intensi l changes c cape has b capacity to ent. Moder ate cattle g within the S overage (up ble in-flow has been ensity urba mmonly rate	capacity too sive, for ex- occur in ap- peen subje support n rate-intens rrazing wo Surroundir p to 50%) urban run greatly dir an develop te a score te a score	a support of cample has pproximat reted to a latural wet sity land u uld comm ng Landsc of imperm rooff or ferti ninished b oments, so within this illy comlete. Con	haracteris ying, light ely less th narked sh land funct ses such a only be pl ape has b eable sur izer-rich v ut not tota ome urbar range. ely develo nmercial o	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an as dry-land farming, aced within this sco een substantial incl faces, bare soil, or or waters common. Su ally extinguished. In a parklands and man ped or is otherwise	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive itensively ny cropping a cause of	
<0.8	3 - 0.7 7 - 0.6 0.6	Highly Functioning C Functioning D Functioning Impaired F Non-functioning Buffer Score	effect on because or more Surround retains m pollutants corridors, Land use moderate surfaces; capacity of logged ar situations The Surro severe eco landscapp	the the land use is substantial ing Landso uch of its consideration or moderation to high co- consideration consideration sound cor- bunding La- cological sizes general unding	dscape's c a not intense cape has b capacity to ent. Moder ate cattle g within the S overage (up ble in-flow has been ensity urba mmonly rat andscape is tress on we	capacity too sive, for ex- occur in ap- peen subje support n rate-intens rrazing wo Surroundir p to 50%) urban run greatly dir an develop te a score te a score	a support of cample has pproximat reted to a latural wet sity land u uld comm ng Landsc of imperm rooff or ferti ninished b oments, so within this illy comlete. Con	haracteris ying, light ely less th narked sh land funct ses such a only be pl ape has b eable sur izer-rich v ut not tota ome urbar range. ely develo nmercial o	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an as dry-land farming, aced within this sco een substantial incl faces, bare soil, or or waters common. Su ally extinguished. In a parklands and man ped or is otherwise	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive itensively ny cropping a cause of	
<0.8	3 - 0.7 7 - 0.6 0.6	Highly Functioning C Functioning D Functioning Impaired F Non-functioning	effect on because or more Surround retains m pollutants corridors, Land use moderate surfaces; capacity of logged ar situations The Surro severe eco landscapp	the the lan land use is substantial ing Landso uch of its of or sedime or modera changes to to high cc considera of the land eas, low-d would cor bunding La cological si es general	dscape's c a not intense cape has b capacity to ent. Moder ate cattle g within the S overage (up ble in-flow has been ensity urba mmonly rat andscape is tress on we	capacity too sive, for ex- occur in ap- peen subje support n rate-intens rrazing wo Surroundir p to 50%) urban run greatly dir an develop te a score te a score	a support of cample has pproximat reted to a latural wet sity land u uld comm ng Landsc of imperm rooff or ferti ninished b oments, so within this illy comlete. Con	haracteris ying, light ely less th narked sh land funct ses such a only be pl ape has b eable sur izer-rich v ut not tota ome urbar range. ely develo nmercial o	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an as dry-land farming, aced within this sco een substantial incl faces, bare soil, or or waters common. Su ally extinguished. In a parklands and man ped or is otherwise	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive itensively ny cropping a cause of	
<0.8	3 - 0.7 7 - 0.6 0.6	Highly Functioning C Functioning D Functioning Impaired F Non-functioning Buffer Score	effect on because or more Surround retains m pollutants corridors, Land use moderate surfaces; capacity of logged ar situations The Surro severe eco landscapp	the the land use is substantial ing Landso uch of its consideration or moderation to high co- consideration consideration sound cor- bunding La- cological sizes general unding	dscape's c a not intense cape has b capacity to ent. Moder ate cattle g within the S overage (up ble in-flow has been ensity urba mmonly rat andscape is tress on we	capacity too sive, for ex- occur in ap- peen subje support n rate-intens rrazing wo Surroundir p to 50%) urban run greatly dir an develop te a score te a score	a support of cample ha pproximat incted to a atural wet sity land u uld comm ing Landsc of imperm innished b orments, s within this Illy comlet itats. Con s than 0.6	haracteris ying, light ely less th narked sh land funct ses such a only be pl ape has b eable sur- lizer-rich v ut not tota ome urbar range. ely develo nmercial d	stic aquatic function grazing, or low inter an 10% of the area. hift in land use, how ion and it is not an as dry-land farming, aced within this sco een substantial incl faces, bare soil, or or waters common. Su ally extinguished. In a parklands and man ped or is otherwise	ing, either nsity silviculture, ever, the land overt source of urban "green" ring range. uding the a other artificial upportive itensively ny cropping a cause of	

# Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

## 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.

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$\checkmark$	Stressors	Comments/description
$\times$	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
$\times$	Dams	Dam in place to control flow
$\times$	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
$\times$	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
×	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
$\times$	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
×	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
$\times$	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

Variable Score	Condition Grade	Depletion	Augmentation
1.0 - 0.9	<b>A</b> 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	<b>B</b> 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	<b>C</b> 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	D 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
<0.6	<b>F</b> 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 3 Score 0.7

# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

## Scoring rules:

soui the 0.85	rce, <b>in most</b> Water Sourc 5. Additional	t cases the Water Sou ce variable is rated at 0	ute water in a characteristic fashion is fundamer urce variable score will define the upper limit 0.85, the Water Distribution score will usually hav tside the lower end of the AA effecting water dis	Water Distribution score. For example, if	
1. lo 2. C	Considering	acts to the natural di all of the stressors	istribution of water throughout the AA and d identified, assign an overall variable score score will set the upper limit for the Water	catalog them in the stressor table. using the scoring guidelines. In most Distribution score.	eerino
$\mathbf{i}$	Stresso	rs	Comments/description		
×	Alteration	of Water Source	surrounding lands and water stuctur	es in constant flux due to construction	
×	Ditches		ditches fee	ed hydrology	
×	Ponding/In	npoundment	caused at diversion an	d stormwater structures	
×	Culverts		runoff from culverts c	ontributes to hydrology	
×	Road Grad	des	adjacent and feed by run of	f from road and path grading.	
	-	ncision/Entrenchment	-	trenchment. Substrate prone to erosion.	
		Engineered Channel		age flow and armor banks	
	Enlarged C		· · ·	n places to slow flow	
×		anks/Shoreline	heavily manag	ed urban creek	
	Weirs	(5			
X	Dikes/Leve		Berms and grading	contain Sand Creek	
×	Diversions	Fill Accumulation	runoff from	urban setting	
	Sediment	ThirAccumulation	Turion nom	urban setting	
Vari	able Score	Condition Grade	Non-riverine	Riverine	
	1.0 - 0.9	<b>A</b> 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	B Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> 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.	
Š	:0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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	<b>F</b> 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	<b>4 Score</b> 0.7	

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

## 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.

V	Stressors		Comments/description				
	Alteration of Water Source						
	Ditches	3					
	Dikes/l	evees					
	Road Grades						
	Culverts		× ·				
	Diversions						
	Constrictions						
$\times$	< Channel Incision/Entrenchment		substrate prone to erosion				
$\times$	<ul> <li>Hardened/Engineered Channel</li> </ul>		Urban environment				
	Artificial Stream Banks						
	Weirs						
	Confine	ed Bridge Openings					
	riable core	Condition Grade	Scoring Guidelines				
	core						
	) - 0.9	A Reference Standard	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.				
1.0		A	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water				
1.0	) - 0.9	A Reference Standard B	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA wate outflow regime. High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal")				
1.0 <0.9 <0.8	) - 0.9 9 - 0.8	A Reference Standard B Highly Functioning C	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA wate outflow regime. High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level				

Variable 5 Score

0.95

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

### **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		s	Comments					
$\times$	1	Dredging/Excavation/Mining			appears to be created from mining mitigation associated with highway				
$\times$		Fill, including dikes, road grades, etc			Adjacent to roadways and under highway				
$\times$		Gradi	ng		road and walking trail adjacent due to construction and siturbance				
$\times$		Comp	action						
	ers	Plowi	ng/Disking						
×	ly General	Exces	Excessive Sedimentation		loose sediment from runoff and erosion				
		Dump	umping						
		Hoof	oof Shear/Pugging						
		Aggre	ggregate or Mineral Mining						
×		Sand	Sand Accumulation		loose sediment from runoff and erosion				
		Chan	nannel Instability/Over Widening		erosion prone substrate				
		Exces	cessive Bank Erosion		erosion prone substrate				
×	Only	Chan	annelization		erosion prone substrate				
×	<u>s</u>	Recor	nfigured Strean	n Channels	Urban environment				
×	Jue	Artific	ficial Banks/Shoreline		Urban environment				
×	Channels	Beave	aver Dam Removal		Urban environment				
	U U		bstrate Embeddedness						
×		Lack	or Excess of W	oody Debris	Urban environment				
Varia	able	Score	Condition Grade		Scoring Guidelines				
1.0 - 0.9		0.9	<b>A</b> Reference Standard	wetland function	phy essentially unaltered from the natural state, or alterations appear to have a minimal effect on functioning and condition. Patch or microtopographic complexity may be slightly altered, but native nmunities are still supported.				
<0.9 - 0.8		0.8	<b>B</b> Highly Functioning		to topography result in small but detectable changes to habitat conditions in some or all of the a severe impacts exist but affect less than 10% of the AA.				
<0.8 - 0.7		0.7	<b>C</b> Functioning	•	nanges to AA topography may be pervasive but generally mild to moderate in severity. May include tches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.				
V	<0.7 - 0.6		D 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		ô	F Non- functioning		ve geomorphic alterations have caused a fundamental change in site character and functioning, nly resulting in a conversion to upland or deepwater habitat.				
					Variable 6 Score				

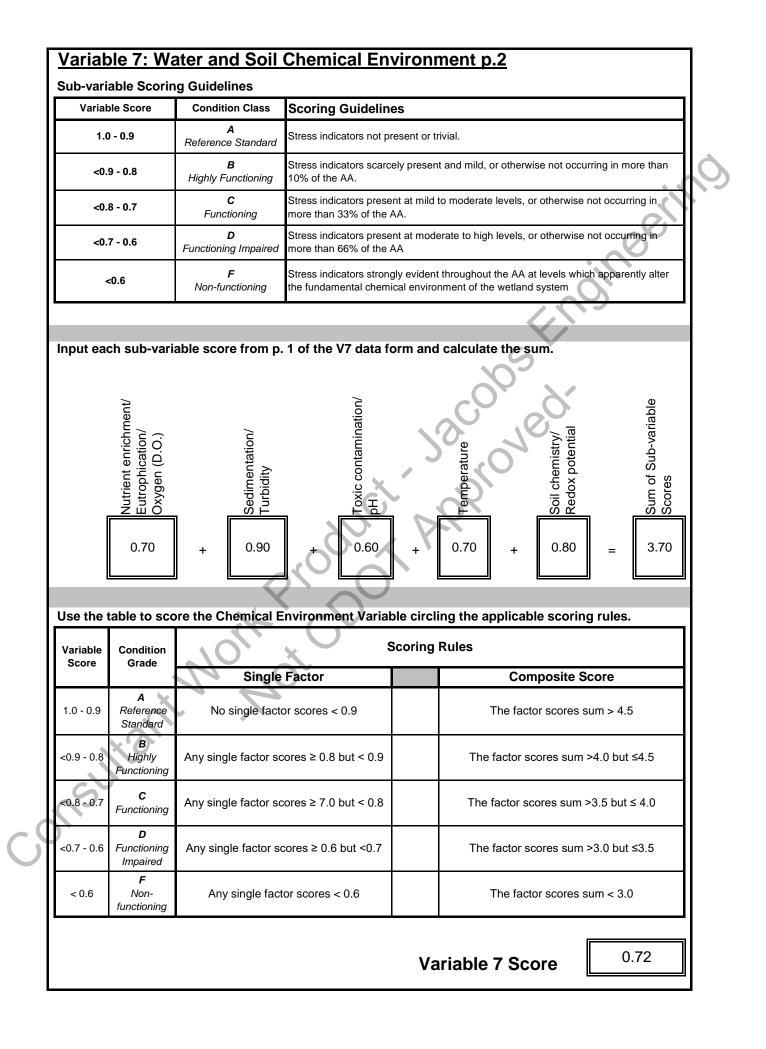
## Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

~,C

B. For each sub-variable, scoring sheet. Scoring sheet. Scoring sheet and sheet a wat she has been been been been been been been bee	ub-variables is carried out in exa	coring	guideline table provided on the seco e same way as normal variable scori l or recommended for TMDL develop	ng.		ori	
. Transcribe sub-variable	e scores to the following variable		ng page and compute the sum. ne composite of sub-variables influer	nces the score		0,	
vithin that range.	Stressor Indicator	1	Comments	Sub-		Jana	ριαιι
	Livestock	x	agriculture upstream	variable	pg 89	pg106	pg1(
	Agricultural Runoff	x	agriculture upstream	Score	P3 00	rg.00	791
SV 7.1	Septic/Sewage	x	placed in an urban enviroment				
Nutrient Enrichment/	Excessive Algae or Aquatic Veg.	~		0.70			
Eutrophication/	Cumulative Watershed NPS	х	urban environment	/ <del></del>			
Oxygen (D.O.)	CDPHE Impairment/TMDL List	x	Clear Creek				
		^					
	Excessive Erosion	Х	unstable banks				
	Excessive Deposition						
	Fine Sediment Plumes						
SV 7.2	Agricultural Runoff	Х	agriculture upstream				
Sedimentation/	Excessive Turbidity	X	urban run off	0.90	6		
Turbidity	Nearby Construction Site	X	urban environment	┲┝══╤╝			
	Cumulative Watershed NPS	x	urban environment				
	CDPHE Impairment/TMDL List	x	Clear Creek				
		~					
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	x	adjacent to roadways, run off di	Jλ			
	Livestock	x	agriculture upstream	₹\\			
	Agricultural Runoff	X	agriculture upstream	1 \			
SV 7.3	Storm Water Runoff	x	urban environment				
Toxic contamination/	Fish/Wildlife Impacts	X	urban environment	0.60			
pН	Vegetation Impacts	x	weedy	/=====			
	Cumulative Watershed NPS	x	urban environment	1/			
	Acid Mine Drainage			1/			
	Point Source Discharge	x	sewer treatment plant, Urban er				
	CDPHE Impairment/TMDL List	х	Clear Creek	1/			
	Metal staining on rocks and veg.			Y			
	Excessive Temperature Regime	X					
	Lack of Shading	х	tree removal	1 \			
0.47.4	Reservoir/Power Plant Discharge	x	stormwater	0.70			
SV 7.4	Industrial Discharge	х	urban/industrial environment	0.70			
Temperature	Cumulative Watershed NPS	х	urban environment				
	CDPHE Impairment/TMDL List	х	Clear Creek	1/			
				1/			
	Unnatural Saturation/Desaturation			$\mathbb{N}$			
SV 7.5	Mechanical Soil Disturbance	х	urban environment				
Soil chemistry/	Dumping/introduced Soil	x	construction	0.80			
			Clear Creek		1		



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wet ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being e. It particularly focuses on the wetla normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	e of variabili	ity exhibited	the HGM s	subclass or	vegetation stratum differs functionally from its natural r regional subclass. This variable has four sub-variab lerbaceous Layer; and Aquatics.	
Rules for Scoring:						
additional layers were historic	ally preser	nt using dir	rect evider	nce such	in the AA. Make a judgment as to whether a sstumps, root wads or historical photograph so be used in this determination.	hs.
<ol> <li>Do not score vegetation la</li> <li>Estimate and record the cu</li> </ol>					t in the wetland type being assessed. er at the top of the table.	
					each vegetation layer to create the sub-variab s a greater influence on the variable score than	
5. Enter the percent cover val Cover of Layer". Note, percent					sor table labeled " Reference/expected Percen % (1.0).	nt
	tressor tal				opy layers, indicating their presence with check the expected and observed stratum coverages	
	n sub-varia	able score i	in the app	propriate c	using the scoring guidelines on the second pag cell of the row labeled "Veg. Layer Sub-variable	
	hese are	the weighte	ed sub-vai		its Veg. Layer Sub-variable scores and enter the ores. Individually sum the Reference Percent	
9. Divide the sum of "Veg. L Variable 8 score. Enter this n					coverage of all layers scored. This product is of this page.	; the
	١	Vegetatio	on Layers	s	]	
Current % Coverage of Layer	0.2	0	0.8	0	)	
Stressor	Tree	Shrub	Herb	Aquatio		
Noxious Weeds			5%	1		
Exotic/Invasive spp.						
Tree Harvest				I		
Brush Cutting/Shrub Removal			$\square$	$\perp$	<u> </u>	1
Livestock Grazing		l	──			
Excessive Herbivory Mowing/Haying		<del> </del>	20%	+	+	
Mowing/Haying Herbicide		<u> </u>	20%	+	+	
Loss of Zonation/Homogenization		1	70%	1		-
Dewatering		1		1		
Over Saturation	20%		20%	1		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.35	0.03	0	0		
Reference/Expected % Cover of Layer	0.45 + x	0.15 + x	0.85 +	+ 0.00	= 1.45	
Veg. Layer Sub- variable Score	0.8	0.5	0.85	0	See sub-variable scorin guidelines on following p	
Weighted Sub-variable Score	" 0.36 +	" 0.08 +	" 0.72 +	- - - - - - - - - - - - - -	= 1.1575	
<b>_</b>			C		Variable 8 Score	30

### Variable 8: Vegetation Structure and Complexity p. 2

variable 8 Scoring Guideline

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	A 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	B 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	<b>C</b> 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 vegetatio 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 (is stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	<b>D</b> 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 weltand. 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	F 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.

## **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, ering however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted

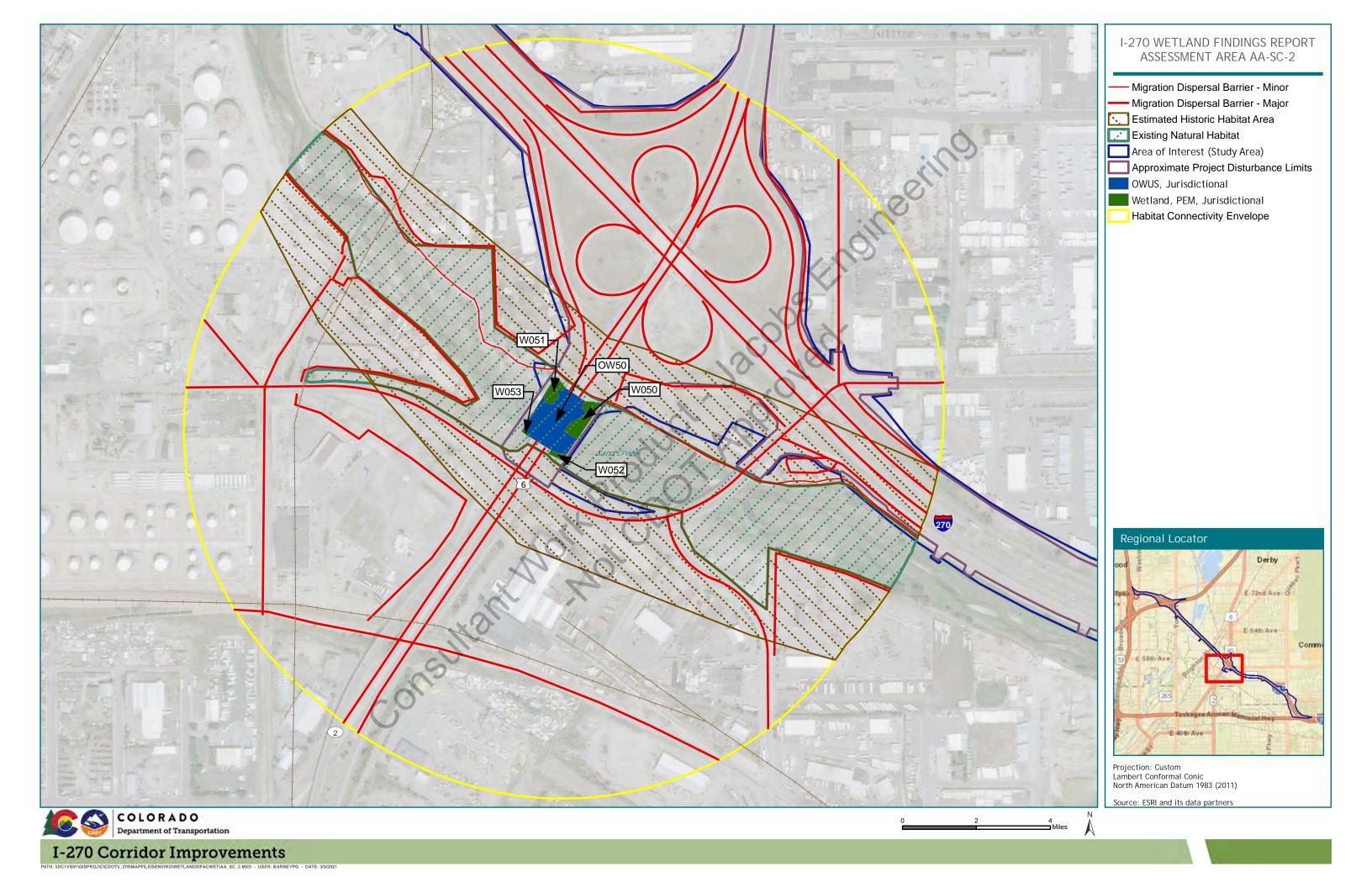
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.65
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.70
λť	Variable 3:	Water Source (Source)	0.70
Hydrology	Variable 4:	Water Distribution (Dist)	0.70
I	Variable 5:	Water Outflow (Outflow)	0.95
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.70
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic a Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.80

## Functional Capacity Indices

Function 1 Support of Characteristic Wildlife Habitat	FCI
V1 <sub>connect</sub> + V2 <sub>CA</sub> + (2 x V8 <sub>veg</sub> ) Points	-
0.65 + 0.70 + 1.60 + + + = 2.95 ÷ 4 =	0.74
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	_
$2.10 + 1.40 + 1.90 + 0.70 + 0.72 + = 6.82 \div 9 = $	0.76
Function 3 Flood Attenuation	
$V2_{CA} + (2 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V8_{veg}$	
$0.70 + 1.40 + 1.40 + 1.90 + 0.70 + 0.80 = 6.90 \div 9 = $	0.77
Function 4 Short- and Long-term Water Storage	
$V3_{source}$ + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
$0.70 + 1.40 + 1.90 + 0.70 + + = 4.70 \div 6 = $	0.78
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA}) + (2 \times V4_{dist}) + V6_{geom} V7_{chem}$	
$1.40 + 1.40 + 0.70 + 0.72 + + = 4.22 \div 6 =$	0.70
Function 6 Sediment Retention/Shoreline Stabilization	
$V_{2_{CA}}$ + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.70 + 1.40 + 1.60 + + + = 3.70 ÷ 5 =	0.74
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
$0.65 + 1.90 + 0.70 + 0.72 + 1.60 + = 5.57 \div 7 = $	0.80
Sum of Individual FCI Scores	5.28
Divide by the Number of Functions Scored	÷7
Composite FCI Score	0.75



# ADMINISTRATIVE CHARACTERIZATION

				Date of	f		
General Informat			A-SC-2	Evaluation	1/21/2021		(
Site Name or ID:	AA-SC-2: W05 W052, and W0	· ·		Project Name:	I-270 (STU	2706-043)	
404 or Other Permit Application #:	NA			Applicant Name:	CDOT		Ser.
Evaluator Name(s):	Brett Hartmann and Pat Hickey	-	Evaluator's pro	fessional position and organization		acobs)	
Location Informa	tion:						
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Sand C	Creek Wetlan	core for multiple d polygons -104.935695)	Geographic Datum Used (NAD 83): Elevation	NAD83	5150	
Location Information:		Riveri	ne wetlands assoc	ciated with edges	of Sand Cree	эk	
Associated stream/wa	ter body name:		Sand Creek		Stream Ord	er: I	Riverine
USGS Quadrangle Map:	Commerce Cit	y, CO 2019		Map Scale: (Circle one)			1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000	03	200	Wetland Ownership:	CDOT		
Project Informati	on: X Project We Mitigation S		Purpose of Evaluation (check all applicable):	Potentially Impa Mitigation; Pre-o Mitigation; Post- Monitoring Other (Describe)	construction -construction	Is	
Intent of Project: (Che	ck all applicable)		Restoration		hancement		Creation
Total Size of Wetland (Record Area, Check and I Measurement Method Use	Describe	ac.	× Measured: 0.50 Estimated	)341			
Assessment Area (AA Area, check appropriate box. / used to record acreage when r included in a single assessmer	Additional spaces are nore than one AA is	ac.	X Measured Estimated	ас. ас.	ac. ao ac. ao		ac. ac.
Characteristics or Met AA boundary determir			1, W052, and W05 Therefore, these				
Notes:							

# ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply						
	ls including Histosols of he AA (i.e., AA includes			tened or endangered to occur in the AA?	d species are			
	directly impact organic eas possessing either h			Ute Lady's tresses	S			
	ls are known to occur a wetland of which the A/			cern according to the P) are known to occu				
The wetland urbanized la	d is a habitat oasis in ar andscape?	n otherwise dry or		ted within a potential				
	reatened or endangere he AA? List Below.	d species are KNOWN		concerns (please des	scribe)			
					S			
	ŀ	IYDROGEOMOR	<b>RPHIC SETTIN</b>	G				
AA wetland		ental natural hydrogeor						
AA wetland	has been subject to	change in HGM classes lescribe the original we	as a result of anthro	pogenic modificatio				
AA wetland	d was created from an	upland setting.			O			
Current Co	nditions	Describe the hydroged that apply.	omorphic setting of th	e wetland by circlin	g all conditions			
	Water source	Surface flow	Groundwater	Precipitation	Unknown			
	Hydrodynamics	Unidirectional	Vertical	<b>Bi-directional</b>				
	Wetland Gradient	0 - 29	6 <mark>2-4%</mark>	4-10% >10	%			
	# Surface Inlets	Over-bank	0 1	2 3	>3			
HGM Setting	# Surface Outlets Geomorphic		0 1	2 3	>3			
	Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands associated confined by bridge in t		nd Creek. Creek and	d wetlands are			
	HGM class	Riverine	Slope	Depressional	Lacustrine			
Historical Co	onditions							
	Water source	Surface flow	Groundwater	Precipitation	Unknown			
Previous	Hydrodynamics	Unidirectional	Vertical					
wetland typology	Geomorphic Setting (Narrative Description)	Wetland has been cor	nfined between highway and industrial facilities.					
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine			
Notes (include in		HGM subclass and reg	gional subclass):					

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# **ECOLOGICAL DESCRIPTION 2**

-			escription		Subclass		ification according as reporte		Other Modifiers		
System P	Sub	system	Class	5			Water Regime				% AA
Р		Р	E		RV		E			h	80
			SS		BLD		Е			h	15
											-0
										\$	
											ろ
										$O^{-}$	
									G	•	
Lacustrine	Littoral; Limnora	d					_			saline(7) ; aline(8);	
			Rock Bot. (RB)		ing vascular;	Tem	Example porarily floo		Mixosaline	(9); Fresh(0);	
Palustrine	Palustri	ne	Uncon Bottom(UB) Aquatic Bed(AB)	Alga	ed vascular; l; Persistent;		Saturated( sonally floo	(B);	Circum	cid(a); neutral(c);	
			Rocky Shore(RS)		-Persistent; aved deciduous;	Se	asflood./s	sat.(E);		alcareous(i); ); Mineral(n);	
	Lower perennial;		Uncon Shore(US) Emergent(EM)	Needle-le	eaved evergreen ble - gravel;	; Sem	i-Perm. floo nittently exp	posed(G);	Beaver(	b); Partially /ditched(d);	
Riverine		pper perennial; Shrub-s itermittent Forest		Sa	and; Mud;		ficially flood emiperm./S		Far	med(f);	
					Organic		Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)			Diked/impounded(h); Artificial Substrate(r);	
						<b>G</b> ,~		X		Excavated(x)	
Site Man		Direct		ha aita inal		<u> </u>	5		Spoil(s);		
			a sketch map of t ses, and other sign			portions of	the wetla	and, AA bo	Spoil(s);		oitat
						portions of	the wetla	and, AA bo	Spoil(s);		vitat
						portions of	the wetla	and, AA bo	Spoil(s);		oitat
						portions of	the wetle	and, AA bo	Spoil(s);		itat
						portions of	the wetla	and, AA bo	Spoil(s);		
			es, and other sign			portions of	the wetla	and, AA bo	Spoil(s);		
Site Map						portions of		and, AA bo	Spoil(s);		
			es, and other sign			portions of		and, AA bo	Spoil(s);		
			es, and other sign					and, AA bo	Spoil(s);		
			es, and other sign					and, AA bo	Spoil(s);		
			es, and other sign					and, AA bo	Spoil(s);		
			es, and other sign					and, AA bo	Spoil(s);		
			es, and other sign						Spoil(s);		
			es, and other sign						Spoil(s);		
			es, and other sign					and, AA bo	Spoil(s);		
			es, and other sign						Spoil(s);		bitat
			es, and other sign					and, AA bo	Spoil(s);		bitat
			es, and other sign						Spoil(s);		bitat
			es, and other sign						Spoil(s);		bitat

# Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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## SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

# Variable 1: Habitat Connectivity p. 2

## SV 1.2: Migration/Dispersal Barriers

This sub-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.

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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.

x x x x x x x x x x x x x x x x x x x	Major Highway Secondary Highway Tertiary Roadway Railroad Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	I-270 HWY-85 adjacent Colorado Front Range Trail Located in an urban setting upstream
x x x x x	Tertiary Roadway Railroad Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	adjacent Colorado Front Range Trail Located in an urban setting
x x x x x	Railroad Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	Colorado Front Range Trail Located in an urban setting
x x	Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	Located in an urban setting
x x	Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	Located in an urban setting
x x	Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	
x x	Artificial Water Body Fence Ditch or Aqueduct	nent	upstream
x x x	Fence Ditch or Aqueduct		
x x x	Ditch or Aqueduct		
x x			multiple properties
х			feed by ditch
	Aquatic Organism Ba	rriers	infrastructure and flow controls
ariah la		1	
	Condition Grade	Scorin	ng Guidelines
0-09	Α		eciable barriers exist between the AA and other wetland and riparian habitats in
.0 - 0.3	Reference Standard	the HCE	; or there are no other wetland and riparian areas in the HCE.
			impeding migration/dispersal between the AA and up to 33% of surrounding
	В		riparian habitat highly permeable and easily passed by most organisms. es could include gravel roads, minor levees, ditches or barbed-wire fences. More
J.9 - 0.8	Highly Functioning		nt barriers (see "functioning category below) could affect migration to up to 10% o
		surroun	ding wetland/riparian habitat.
		Barriers	to migration and dispersal retard the ability of many organisms/propagules to pas
			the AA and up to 66% of wetland/riparian habitat. Passage of organisms and
	C	1 1 0	les through such barriers is still possible, but it may be constrained to certain day, be slow, dangerous or require additional travel. Busy two-lane roads,
J.8 - U. <i>1</i>	Functioning		d areas, small to medium artificial water bodies or small earthen dams would
			nly 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
		Barriers	to migration and dispersal preclude the passage of some types of
		0	ns/propagules between the AA and up to 66% of surrounding wetland/riparian
0.7 - 0.6	_		Travel of those animals which can potential negotiate the barrier are strongly d and may include a high chance of mortality. Up to 33% of surrounding
			(riparian habitat could be functionally isolated from the AA.
			sentially isolated from surrounding wetland/riparian habitat by impermeable
	F		n and dispersal barriers. An interstate highway or concrete-lined water
<0.6	Non-functioning		ance canal are examples of barriers which would generally create functional
		isolation	between the AA and wetland/riparian habitat in the HCE.
	SV 1 1 Score	0.60	Add SV 1.1 and 1.2
	5V 1.1 5CULE	0.00	scores and divide by
	SV 1.2 Score	0.70	two to calculate variable score Variable 1 Score 0.65
	ariable Score .0 - 0.9 0.9 - 0.8 0.8 - 0.7 0.7 - 0.6 <0.6	Score       Condition Grade         .0 - 0.9       A         .0 - 0.9       Reference Standard         0.9 - 0.8       B         Highly Functioning         0.8 - 0.7       C         Functioning         0.7 - 0.6       D         Functioning Impaired         <0.6	Score         Condition Grade         Scori           .0 - 0.9         A         No appr Reference Standard         No appr the HCE           0.9 - 0.8         B         Barriers           Highly Functioning         Wetland, Example significa         Surroun           0.8 - 0.7         C         Barriers           C         Functioning         Barriers           0.8 - 0.7         C         Functioning           C         Functioning         Barriers           0.8 - 0.7         C         Barriers           0.8 - 0.7         Functioning         Barriers           0.8 - 0.7         C         Barriers           C         Functioning         Barriers           0.7 - 0.6         P         Barriers           0.7 - 0.6         Functioning Impaired         Barriers           Non-functioning         AA is esting         Solation

# Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

### SV 2.1 - Buffer Condition

0.7 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

SV 2.2 - Buffer Extent

0.55

0.70

Subvariable Score	Condition Class	% Buffer Scoring Guidelines
1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
<0.8 - 0.7	Functioning	51-69% of AA with Buffer
<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
<0.6	Non-functioning	0-25% of AA with Buffer
	Score 1.0 - 0.9 <0.9 - 0.8 <0.8 - 0.7 <0.7 - 0.6	ScoreCondition Class1.0 - 0.9Reference Standard<0.9 - 0.8

SV 2	.3 - A	verage E	Buffer W	/idth		Record	measur	ed buffer	widths in	the spaces below and average.	
Buffe		10	20	18	05		10	45	45		
Width	• •	10	20	3	25 4	30 5	12 6	15 7	15 8	18 Avg. Buffer Width (m)	
Line #	ŧ.	I	2	3	4	-	-	'	0	Avg. Buner Width (m)	
						Subvar		Condition	Grade	Buffer Width Scoring Guidelines	
<b></b>	-	<u> </u>	Avore		for	Sco	-			-	
0.7		SV 2.3 -		•	Ter	1.0 -		Reference		Average Buffer width is 190-250m Average Buffer width is 101-189m Average Buffer width is 31-100m	
		VV	idth S	core		<0.9 - <0.8 -		Highly Fun Functio		Average Buffer width is 31-100m	
						<0.8 -		unctioning	0	Average Buffer width is 6-30m	
						<0.0		Non-func		Average Buffer width is 0-5m	
					1		-		5		
SV 2	.4 - S	Surround	ing Lan	d Use							
0.7	sv	/ 2.4 - S	urroui	nding		Catalog	and cha	aracterize	land use	e changes in the surrounding	
0.7		Land U		•		-	pe and s				
		Stresso	rs		Comm	ents/de	scrintic	n			
	×	Industria		ercial		ndustria	-				
s	^ X	Urban	.,			Environr					
эдс		Resident	tial			-					
Changes		Rural									
C 0		Dryland									
Land Use		Intensive	0								
pu			Orchards or Nurseries								
		Livestoc		0	a dia a av	4 4 4 1 0 7	70				
II S	x x	Transpor Urban Pa				nt to I-27		e and tra	Sil		
Stressors	× X	Dams/im							a11		
res	x					flow control structures ditches and basins created for transportation corridors and runnoff					
ŭ	x	Physical R		-							
	х	Biological I	Resource	Extraction	Urban I	Environr	nent		Y		
	iable	Conditio	n Grade		6	3	Sc	oring G	ideline	s	
Sc	ore	A	-								
1.0	- 0.9	Refer		No appre	ciable land	l use char	nge has b	een impos	ed Surrou	Inding Landscape.	
		Stand	dard								
			2			0			0	andscape, but changes have minimal istic aquatic functioning, either	
<0.9	- 0.8	ם Highly Fu	, nctioning							t grazing, or low intensity silviculture,	
			Š			-			-	han 10% of the area.	
				-						hift in land use, however, the land tion and it is not an overt source of	
<0.8	8 - 0.7	Functi								as dry-land farming, urban "green"	
										laced within this scoring range.	
		$\sim$			0			0		been substantial including the a rfaces, bare soil, or other artificial	
┣─	- 0.6	Functi				<b>.</b> .	•	•		waters common. Supportive	
-07	0.0	Impa	•				0 ,			ally extinguished. Intensively	
<0.7	$\sim$			00	,	,		pments, s e within thi		n parklands and many cropping	
<0.7	N)		-	The Surro	ounding La	andscape	is essenti	ally comlet	ely develo	oped or is otherwise a cause of	
C		F						bitats. Co ss than 0.6		developments or highly urban	
C	0.6	F Non-fund	ctioning		0	.,		23	-	·	
	0.6	Non-fund	_	C	undir -						
C	0.6	Non-fund Buffer Sc	ore	Surro	•						
C	0.6	Non-fund	ore		unding I Use						
	0.6	Non-fund Buffer Sc	ore		•	2	=	Var	ahlo '	<b>2 Score</b> 0.70	

## Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

## 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.

eerino

$\checkmark$	Stressors	Comments/description
$\times$	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
$\times$	Dams	Dam in place to control flow
$\times$	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
$\times$	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
×	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
$\times$	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
×	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
$\times$	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

Variable Score	Condition Grade	Depletion	Augmentation
1.0 - 0.9	<b>A</b> 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	<b>B</b> 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	<b>C</b> 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	D 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
<0.6	<b>F</b> 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 3 Score 0.7

# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

## Scoring rules:

soui the 0.85	rce, <b>in most</b> Water Sourc 5. Additional	t cases the Water Sou ce variable is rated at 0	ute water in a characteristic fashion is fundamer urce variable score will define the upper limit 0.85, the Water Distribution score will usually hav tside the lower end of the AA effecting water dis	Water Distribution score. For example, if	
1. lo 2. C	Considering	acts to the natural di all of the stressors	istribution of water throughout the AA and d identified, assign an overall variable score score will set the upper limit for the Water	catalog them in the stressor table. using the scoring guidelines. In most Distribution score.	eerino
$\mathbf{i}$	Stresso	rs	Comments/description		
×	Alteration	of Water Source	surrounding lands and water stuctur	es in constant flux due to construction	
×	Ditches		ditches fee	ed hydrology	
×	Ponding/In	npoundment	caused at diversion an	d stormwater structures	
×	Culverts		runoff from culverts c	ontributes to hydrology	
×	Road Grad	des	adjacent and feed by run of	f from road and path grading.	
	-	ncision/Entrenchment	-	trenchment. Substrate prone to erosion.	
		Engineered Channel		age flow and armor banks	
	Enlarged C		· · ·	n places to slow flow	
×		anks/Shoreline	heavily manag	ed urban creek	
	Weirs	(5			
X	Dikes/Leve		Berms and grading	contain Sand Creek	
×	Diversions	Fill Accumulation	runoff from	urban setting	
	Sediment	ThirAccumulation	Turion nom	urban setting	
Vari	able Score	Condition Grade	Non-riverine	Riverine	
	1.0 - 0.9	<b>A</b> 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	B Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> 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.	
Š	:0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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	<b>F</b> 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	<b>4 Score</b> 0.7	

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

## 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.

V	Stres	sors	Comments/description
	Alteration of Water Source		
	Ditches		
	Dikes/l	_evees	
	Road C	Grades	
	Culver	ts	× N
	Diversi	ons	
	Constr	ictions	
$\times$	Chann	el Incision/Entrenchment	substrate prone to erosion
$\times$	Harder	ned/Engineered Channel	Urban environment
	Artificia	al Stream Banks	
	Weirs		
	Confine	ed Bridge Openings	
	riable core	Condition Grade	Scoring Guidelines
1.0	) - 0.9	<b>A</b> Reference Standard	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
		В	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal")
<0.9	9 - 0.8	Highly Functioning	levels flow continues essentially unaltered in quantity or character.
	9 - 0.8 8 - 0.7	Highly Functioning C Functioning	levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.8	-	С	High- or low-water outflows are moderately affected, mild alteration of intermediate level

Variable 5 Score

0.95

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

### **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.

			Stressor	s	Comments		
$\times$	1	Dredg	ing/Excavation	/Mining	appears to be created from mining mitigation associated with highway		
$\times$		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to roadways and under highway		
$\times$		Gradi	ng		road and walking trail adjacent		
$\times$		Comp	action		due to construction and siturbance		
	ers	Plowi	ng/Disking				
×	General	Exces	sive Sediment	ation	loose sediment from runoff and erosion		
	G	Dump	ing				
		Hoof	Shear/Pugging				
		Aggre	gate or Minera	l Mining			
×		Sand	Accumulation		loose sediment from runoff and erosion		
		Chan	nel Instability/O	ver Widening	erosion prone substrate		
	≥	Exces	sive Bank Eros	sion	erosion prone substrate		
×	Only	Chan	nelization		erosion prone substrate		
×	<u>s</u>	Recor	nfigured Strean	n Channels	Urban environment		
×	Reconfigured Stream Channels Artificial Banks/Shoreline Beaver Dam Removal			eline	Urban environment		
×	าลr	Beave	er Dam Remov	al	Urban environment		
	U U		rate Embeddeo				
×		Lack	or Excess of W	oody Debris	Urban environment		
Vari	able	Score	Condition Grade		Scoring Guidelines		
1	1.0 - (	0.9	<b>A</b> Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported.		
<	:0.9 -	0.8	<b>B</b> Highly Functioning		pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.		
<	0.8 -	0.7	<b>C</b> Functioning	•	topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA.		
V	:0.7 -	0.6	D Functioning Impaired	strongly impact Evidence that v alterations. Mo	bortant surface type or landform has been eliminated or created; microtopography has been ed throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. videspread diminishment or alteration of native plant community exist due to physical habitat st incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.		
	<0.6	ô	F Non- functioning		norphic alterations have caused a fundamental change in site character and functioning, Iting in a conversion to upland or deepwater habitat.		
					Variable 6 Score		

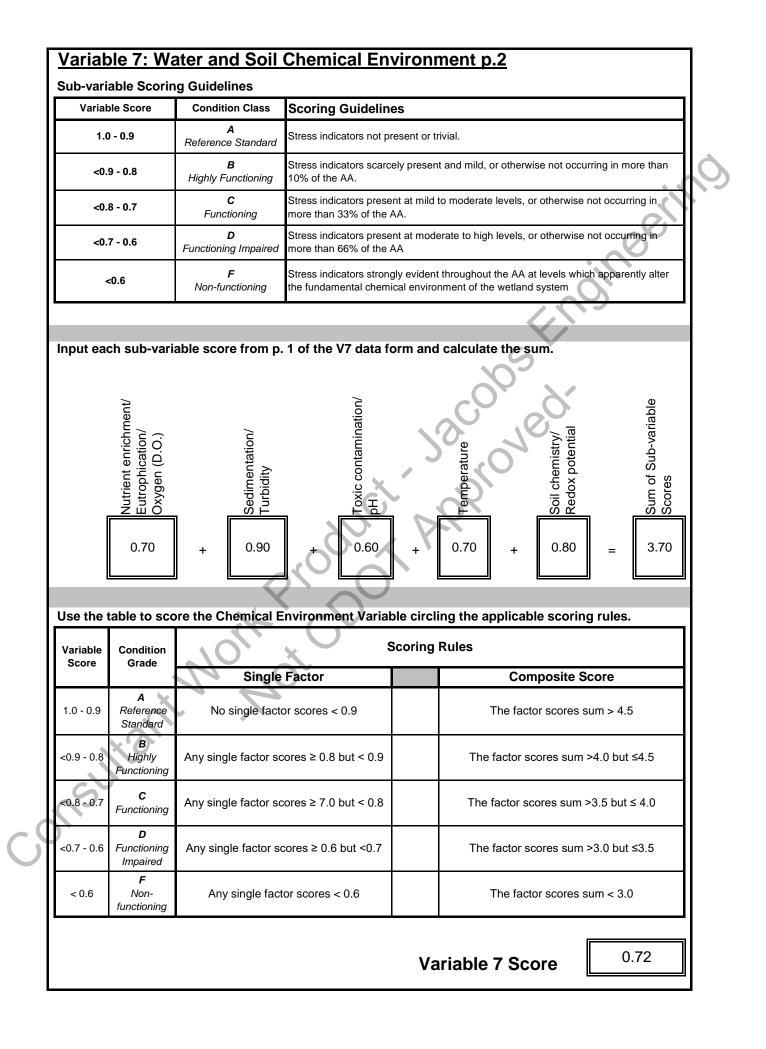
## Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

### Scoring rules:

~,C

	identify each stressor impacting determine its score using the so	-	guideline table provided on the seco	nd page of the		ori	
			e same way as normal variable scor				
	, ,	pairec	l or recommended for TMDL develop	ment for one of the			•
,	ub-variable 0.65 or lower.					0	
	e scores to the following variable					$\overline{\mathbf{O}}$	
ithin that range.	e score sets the letter grade ran	ge. T	ne composite of sub-variables influer	ices the score		0	
Sub-variable	Stressor Indicator	_/	Comments	Sub-		запа	ριαι
	Livestock	x	agriculture upstream	variable	pg 89	pg106	pg1(
	Agricultural Runoff	x	agriculture upstream	Score	pgoo	pgroo	pgro
SV 7.1	Septic/Sewage	х	placed in an urban enviroment				
Nutrient Enrichment/	Excessive Algae or Aquatic Veg.			0.70			
Eutrophication/	Cumulative Watershed NPS	х	urban environment				
Oxygen (D.O.)	CDPHE Impairment/TMDL List	х	Clear Creek	1/ 6-	<b>~</b>		
	· ·						
	Excessive Erosion	Х	unstable banks				
	Excessive Deposition						
	Fine Sediment Plumes						
SV 7.2	Agricultural Runoff	Х	agriculture upstream	0.90			
Sedimentation/ Turbidity	Excessive Turbidity	Х	urban run off	0.50	D		
	Nearby Construction Site	Х	urban environment		T		
	Cumulative Watershed NPS	х	urban environment				
	CDPHE Impairment/TMDL List	х	Clear Creek				
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	X	adjacent to roadways, run off d	¥ \			
	Livestock Agricultural Runoff	X X	agriculture upstream agriculture upstream	Τ` \			
SV 7.3	Storm Water Runoff	x	urban environment				
Toxic contamination/	Fish/Wildlife Impacts	^ X	urban environment	0.60			
pH	Vegetation Impacts	x	weedy	┨ ╠━━━━┛			
F	Cumulative Watershed NPS	x	urban environment	1 /			
	Acid Mine Drainage	~		1/			
	Point Source Discharge	x	sewer treatment plant, Urban e				
	CDPHE Impairment/TMDL List	х	Clear Creek	1/			
	Metal staining on rocks and veg.		$\sim$	Y			
	Excessive Temperature Regime	X					
	Lack of Shading	х	tree removal	1 \			
SV 7.4	Reservoir/Power Plant Discharge	x	stormwater	0.70			
Temperature	Industrial Discharge	х	urban/industrial environment	0.70			
romporataro	Cumulative Watershed NPS	х	urban environment				
	CDPHE Impairment/TMDL List	х	Clear Creek	4/			
				4			
	Unnatural Saturation/Desaturation						
SV 7.5	Mechanical Soil Disturbance	х	urban environment	0.80			
Soil chemistry/	Dumping/introduced Soil	х	construction	┨╞┻┻┻┛			
Redox potential	CDPHE Impairment/TMDL List	х	Clear Creek		1		



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wet ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by kisting stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being e. It particularly focuses on the wetla normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	of vegetatio				regional subclass. This variable has four sub-variables, rbaceous Layer; and Aquatics.
Rules for Scoring:					
additional layers were historica	ally prese	nt using di	rect evider	nce such a	n the AA. Make a judgment as to whether as stumps, root wads or historical photographs. o be used in this determination.
<ol> <li>Estimate and record the cu</li> <li>Record the Reference Star</li> </ol>	irrent cove	erage of ea	ach vegeta ercent cov	ation layer rerage of e	in the wetland type being assessed. at the top of the table. aach vegetation layer to create the sub-variable a greater influence on the variable score than do
5. Enter the percent cover valu Cover of Layer". Note, percent					or table labeled " Reference/expected Percent (1.0).
6. Determine the severity of s	tressors a	icting on e	ach individ	dual cano	py layers, indicating their presence with checks in he expected and observed stratum coverages is
the scoring sheet. Enter each Score". If a stratum has been	sub-varia wholly ren	ible score noved scor	in the app re it as 0.5	oropriate c 5.	sing the scoring guidelines on the second page of ell of the row labeled "Veg. Layer Sub-variable
products in the labled cells. T Cover of Layer and Weighted	hese are Sub-varia	the weighten the score	ed sub-vai es.	riable sco	s Veg. Layer Sub-variable scores and enter the res. Individually sum the <i>Reference Percent</i>
9. Divide the sum of "Veg. L Variable 8 score. Enter this no					overage of all layers scored. This product is the of this page.
	\ \	/egetatio	on Layers	s	
Current % Coverage of Layer	0.1	0.12	0.77	0	
Layer Stressor	Tree	Shrub	Herb	Aquatic	Comments
Noxious Weeds			19%		Canada thistle, teasel, pepperweed
Exotic/Invasive spp.					
Tree Harvest Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying Herbicide			20%		
Loss of Zonation/Homogenization			70%		
Dewatering					
Over Saturation	20%		20%		
				+	
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.35	0.03	0.08	0	
DIFFERENCE BETWEEN CURRENT COVERAGE AND	0.45 +	0.15 +	0.85 +	0.00	= 1.45
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected %	0.45 + x 0.7	0.15 + x 0.9	0.85 + x 0.75		= 1.45
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected % Cover of Layer Veg. Layer Sub-	0.45 + x	0.15 + x	0.85 + x	+ 0.00 ×	See sub-variable scoring

### Variable 8: Vegetation Structure and Complexity p. 2

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Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	A 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	B 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 welfand. 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 welfand.
<0.8 - 0.7	<b>C</b> 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 tall 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 welland. 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 welland.
<0.7 - 0.6	<b>D</b> 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	F 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.

## **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, sering however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted

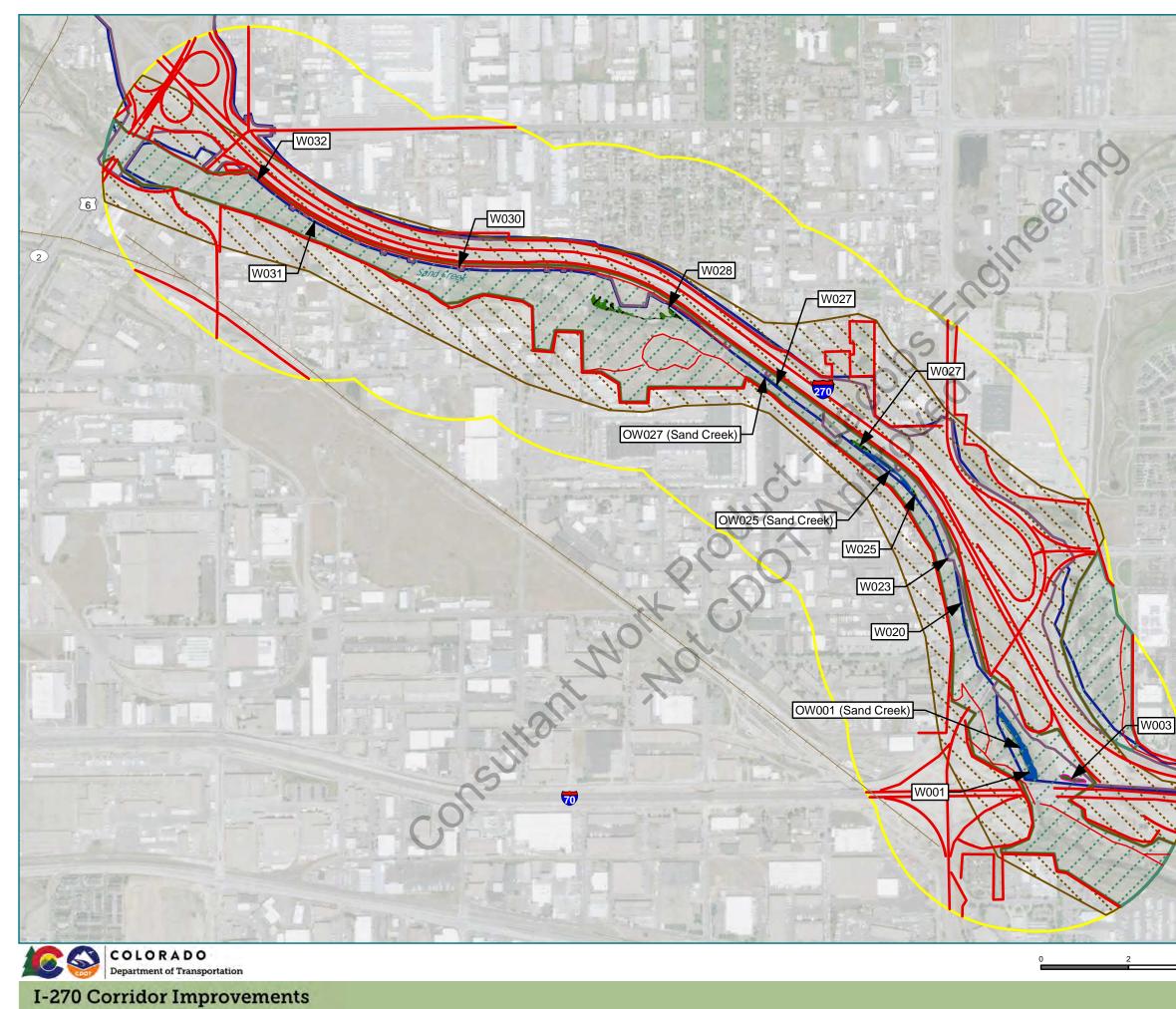
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.65
Buffer Landsca Contey	Variable 2:	Contributing Area (CA)	0.70
λť	Variable 3:	Water Source (Source)	0.70
Hydrology	Variable 4:	Water Distribution (Dist)	0.70
I	Variable 5:	Water Outflow (Outflow)	0.95
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.70
tic and B Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.75

## Functional Capacity Indices

Function 1 Support of Characteristic Wildlife Habitat	Total Functional FCI
$V1_{connect}$ + $V2_{CA}$ + $(2 \times V8_{veg})$	Points
0.65 + 0.70 + 1.50 + +	+ <b>2</b> .85 ÷ <b>4</b> = 0.71
Function 2 Support of Characteristic Fish/aquatic Habitat	
$\frac{(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}}{4 \times V6_{geom}}$	
2.10 + 1.40 + 1.90 + 0.70 + 0.72	+ = 6.82 ÷ 9 = 0.76
Function 3 Flood Attenuation	
$V2_{CA}$ + (2 x V3 <sub>source</sub> ) + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) + V6 <sub>geom</sub>	+ V8 <sub>veg</sub>
0.70 + 1.40 + 1.40 + 1.90 + 0.70	+ 0.75 = $6.85 \div 9 = 0.76$
Function 4 Short- and Long-term Water Storage	
$V3_{source}$ + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
0.70 + 1.40 + 1.90 + 0.70 +	+ = 4.70 ÷ 6 = 0.78
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA})$ + $(2 \times V4_{dist})$ + $V6_{geom}$ $V7_{chem}$	
1.40 + 1.40 + 0.70 + 0.72 +	+ <b>=</b> 4.22 ÷ 6 = 0.70
Function 6 Sediment Retention/Shoreline Stabilization	
$V2_{CA}$ + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.70 + 1.40 + 1.50 + +	+ <b>3</b> .60 ÷ <b>5</b> = 0.72
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
0.65 + 1.90 + 0.70 + 0.72 + 1.50	+ <b>=</b> 5.47 ÷ <b>7</b> = 0.78
	Sum of Individual FCI Scores 5.22
Div	vide by the Number of Functions Scored ÷7
	Composite FCI Score 0.75



## I-270 WETLAND FINDINGS REPORT ASSESSMENT AREA AA-SC-3

- Migration Dispersal Barrier Minor
- Migration Dispersal Barrier Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- OWUS, Jurisdictional
- Wetland, PEM, Jurisdictional
- Wetland, PEM, Assumed Non-Jurisdictional
- Wetland, PSS, Jurisdictional
  - Habitat Connectivity Envelope



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

Ν

4 Miles

# ADMINISTRATIVE CHARACTERIZATION

			Date of		
General Information		AA-SC-3	Evaluation:	1/21/2021	
Site Name or ID:	AA-SC-3: W00 W003, W020,		Project Name:	I-270 (STU 2706-	-043)
404 or Other Permit Application #:	NA		Applicant Name:	CDOT	COL
Evaluator Name(s):	Brett Hartmani and Pat Hickey		rofessional position and organization:	Biologists (Jacob	s)
Location Informa	ation:				
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Sand C	ggregated Score for multiple Creek Wetland polygons : 39.793515, -104.916033)	Geographic Datum Used (NAD 83): Elevation	NAD83	190
Location Information:		Riverine wetlands asso	ociated with edges	of Sand Creek	
Associated stream/wa	ater body name:	Sand Cree	k	Stream Order:	Riverine
USGS Quadrangle Map:	Commerce Cit	y, CO 2019	Map Scale: (Circle one)	<mark>1:24,00</mark> Other	00 1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000	3	Wetland Ownership:	СДОТ	
Project Information is being performed at: (Check applicable box)	ion: X Project We Mitigation S	(check all	X Potentially Impa Mitigation; Pre-c Mitigation; Post- Monitoring Other (Describe)	construction construction	
Intent of Project: (Che	eck all applicable)	Restoration		hancement	Creation
Total Size of Wetland (Record Area, Check and Measurement Method Use	Describe	ac. × Measured: 2.8 Estimated	821396		
Assessment Area (AA Area, check appropriate box. used to record acreage when included in a single assessme	Additional spaces are more than one AA is	ac. — Estimated	ac. ac.	ac. ac. ac. ac.	ac. ac.
Characteristics or Me AA boundary determi		W001, W002, W003, W020, similar wetlands in close prov wetlands are grouped into a s	kimty with in same	HGM class. There	
Notes: Measu	ired in collector	web map			

# ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply				
	ls including Histosols or he AA (i.e., AA includes			tened or endangere to occur in the AA?	d species are	
	directly impact organic eas possessing either H			Ute Lady's tresse	S	eerin
	Is are known to occur a wetland of which the AA			cern according to th P) are known to occ		op'
The wetland urbanized la	d is a habitat oasis in ar andscape?	otherwise dry or		ated within a potentiant occurrence buffer		diff
	reatened or endangere the AA? List Below.	d species are KNOWN	Other special of	concerns (please des	scribe)	9
					S	
	F	YDROGEOMOR	<b>RPHIC SETTIN</b>	G	~ ~	
		ental natural hydrogeor	·		.0,0	
		change in HGM classes describe the original we				
AA wetland	d was created from an	upland setting.	4	, s	0	
Current Co	nditions	Describe the hydroged that apply.	omorphic setting of th	ne wetland by circlin	ng all conditions	
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	Bi-directional		
	Wetland Gradient	0 - 29		4-10% >10	%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
HGM Setting	# Surface Outlets		0 1	2 3	>3	
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands associated associated wetlands a industrial facilities, and	re been confined bet	ween highway, wal		
	HGM class	Riverine	Slope	Depressional	Lacustrine	
Historical Co	onditions	1				
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics	Unidirectional	Vertical			
wetland typology	Geomorphic Setting (Narrative Description)	Flood plane had been	encroached on by u	ban and industrial	development.	
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
Notes (include ir	nformation on the AA's	HGM subclass and re	jional subclass):			

# **ECOLOGICAL DESCRIPTION 2**

System	n Habitat D Subsystem	Class		WS habitat clas Ibclass		er Regin			Modifiers	% AA
P	P	E	30	RV	vvat		ie	Unel		
F	F	E.				E			h	75
		SS		BLD		E			h	25
										0
									+	
										2
									$\bigcirc$	
					<u> </u>			6	~	
Lacustrine	Littoral; Limnoral				_				saline(7) ; aline(8);	
		Rock Bot. (RB)		ng vascular;	Tempor	<b>xamples</b> arily flooded		Mixosaline	(9); Fresh(0); cid(a);	
Palustrine	Palustrine	Uncon Bottom(UB) Aquatic Bed(AB)	Algal;	ed vascular; Persistent;	Season	turated(B); ally flooded	(C)	Circum	neutral(c);	
		Rocky Shore(RS)		Persistent; wed deciduous;	Seas.	-flood./sat.(l	Ξ);		alcareous(i); ); Mineral(n);	
	Lower perennial;	Uncon Shore(US) Emergent(EM)		aved evergreen; ble - gravel;	Intermitte	erm. flooded ently expose	d(G);	Beaver(	b); Partially /ditched(d);	
Riverine	Upper perennial; Intermittent	Shrub-scrub(SS) Forested (FO)	Sa	nd; Mud;	Artificia Sat./sem	ally flooded( iperm./Seas	K); 5. (Y);	Far	med(f);	
			C	Organic		sed/permen			pounded(h); Substrate(r);	
								Spoil(s):	Excavated(x)	
									( )	
Site Man	Drou	u o okotoh mon of t	ha aita inalu	iding relevant of	rtions of th	e wetland	AA bo			bitot
		v a sketch map of ti ses, and other sign			ortions of th	e wetland,	AA bo			bitat
					ortions of th	e wetland,	AA bo			bitat
					ortions of th	e wetland,	AA bo			bitat
					prtions of th	e wetland,	AA bo			bitat
					prtions of th	e wetland,	AA bo			
		ses, and other sign			prions of th	e wetland,	AA bo			
					prtions of th	e wetland,	AA bo			
		ses, and other sign			prtions of th	e wetland,	AA bo			
		ses, and other sign			prtions of th	e wetland,	AA bo			
Scale: 1 sq. =		ses, and other sign			ortions of th	e wetland,				
		ses, and other sign				e wetland,				
		ses, and other sign			prtions of th	e wetland,				
		ses, and other sign				e wetland,				Ditat
		ses, and other sign								
		ses, and other sign								Ditat       Image:
		ses, and other sign								Ditat
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		ses, and other sign								Ditat       Image:
		ses, and other sign								Ditat

# Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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## SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

# Variable 1: Habitat Connectivity p. 2

## SV 1.2: Migration/Dispersal Barriers

This sub-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.

neering

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.

x x x x x x x x x x x x x x x x x x x	Major Highway Secondary Highway Tertiary Roadway Railroad Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	I-270 HWY-85 adjacent Colorado Front Range Trail Located in an urban setting upstream					
x x x x x	Tertiary Roadway Railroad Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	adjacent Colorado Front Range Trail Located in an urban setting					
x x x x x	Railroad Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	Colorado Front Range Trail Located in an urban setting					
x x	Bike Path Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	Located in an urban setting					
x x	Urban Development Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent	Located in an urban setting					
x x	Agricultural Developn Artificial Water Body Fence Ditch or Aqueduct	nent						
x x	Artificial Water Body Fence Ditch or Aqueduct	nent	upstream					
x x x	Fence Ditch or Aqueduct							
x x x	Ditch or Aqueduct							
x x			multiple properties					
х			feed by ditch					
	Aquatic Organism Ba	rriers	infrastructure and flow controls					
ariah la		1						
	Condition Grade	Scorin	ng Guidelines					
0-09	Α		eciable barriers exist between the AA and other wetland and riparian habitats in					
.0 - 0.3	Reference Standard	the HCE	; or there are no other wetland and riparian areas in the HCE.					
			impeding migration/dispersal between the AA and up to 33% of surrounding					
	В	wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More						
J.9 - 0.8	Highly Functioning	significant barriers (see "functioning category below) could affect migration to up to 10% of						
		surrounding wetland/riparian habitat.						
		Barriers	to migration and dispersal retard the ability of many organisms/propagules to pas					
		between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and						
	C	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"						
J.8 - U. <i>1</i>	Functioning							
		category	/ below) could affect migration to up to 10% of surrounding wetland/riparian					
		Barriers	to migration and dispersal preclude the passage of some types of					
		0	ns/propagules between the AA and up to 66% of surrounding wetland/riparian					
0.7 - 0.6	_	habitat. Travel of those animals which can potential negotiate the barrier are strongly						
			ricted and may include a high chance of mortality. Up to 33% of surrounding and/riparian habitat could be functionally isolated from the AA.					
			sentially isolated from surrounding wetland/riparian habitat by impermeable					
	F		n and dispersal barriers. An interstate highway or concrete-lined water					
<0.6	Non-functioning		evance canal are examples of barriers which would generally create functional					
		isolation	between the AA and wetland/riparian habitat in the HCE.					
	SV 1 1 Score	0.60	Add SV 1.1 and 1.2					
	5V 1.1 5CULE	0.00	scores and divide by					
	SV 1.2 Score	0.70	two to calculate variable score Variable 1 Score 0.65					
	ariable Score .0 - 0.9 0.9 - 0.8 0.8 - 0.7 0.7 - 0.6 <0.6	Score       Condition Grade         .0 - 0.9       A         .0 - 0.9       Reference Standard         0.9 - 0.8       B         Highly Functioning         0.8 - 0.7       C         Functioning         0.7 - 0.6       D         Functioning Impaired         <0.6	Score         Condition Grade         Scori           .0 - 0.9         A         No appr Reference Standard         No appr the HCE           0.9 - 0.8         B         Barriers           Highly Functioning         Wetland, Example significa         Surroun           0.8 - 0.7         C         Barriers           C         Functioning         Barriers           0.8 - 0.7         C         Functioning           C         Functioning         Barriers           0.8 - 0.7         C         Barriers           0.8 - 0.7         Functioning         Barriers           0.8 - 0.7         C         Barriers           C         Functioning         Barriers           0.7 - 0.6         P         Barriers           0.7 - 0.6         Functioning Impaired         Barriers           Non-functioning         AA is esting         Solation					

# Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

### SV 2.1 - Buffer Condition

0.7 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

## SV 2.2 - Buffer Extent

0.

,60 Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines
	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
.70 SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer
.10 SV 2.2 - Buller Extern	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
	<0.6	Non-functioning	0-25% of AA with Buffer

SV 2	.3 - 7	Average I	Buffer W	lidth	<u> </u>	Record	meası	ired buffer	widths in	the spaces belo	w and average	э.
Buffe Width												
Line #		1	2	3	4	5	6	7	8	Avg. Buffer Wid	tth (m)	
Line			L	Ū	7	Subvari Scor	able	Conditio		Buffer Width Sc	. ,	es
	1.	SV 2.3 ·	- Avera	ae Ru	ffer	1.0 - 0	-	Reference	Standard	Average Buffer w	vidth is 190-250r	m n
0.7			/idth So	•		<0.9 -		Highly Fu		Average Buffer w		
						<0.8 -		Functi		Average Buffer		
						<0.7 -	0.6	Functioning	g Impaired		width is 6-30m	
						<0.6	6	Non-fun	ctioning	Average Buffe	r width is 0-5m	
SV 2	.4 - 5	Surround	ling Lan	d Use	1							
		/ 2.4 - S	-		1							
0.7		, 2.4 - 3 Land U				Catalog landscaj			land use	changes in the	surrounding	2
		Stresso	rs			ents/des	-					
	х		al/comme	ercial		ndustrial		onment		C		
les	х	Urban	4 1		Urban F	Environm	nent				)	
Changes	<u> </u>	Residen Rural	tial		<b> </b>							
S			Farming							~0`	- <del>``</del>	-1 1
lse	-		e Agricul								- 1	
Land Use			s or Nurs									-1 1
Lan			k Grazin	0								
Ш	х		rtation C								41	
Stressors	X		arklands		adjacent to public space and trail nts flow control structures						-	
res	X X		Water b			itches and basins created for transportation corridors and runnoff					- 1	
ţ	x		Resource E	-		road base extraction and construction					-1 1	
	х	Biological	Resource	Extraction								
												<u> </u>
	Variable Score Condition Grade				0	~	S	coring G	uideline	S		
A 1.0 - 0.9 Reference Standard					C				nding Landscape.			
<0.9 - 0.8 B Highly Functioning				Some land use change has occurred in the Surrounding Landscape, but changes have minimal effect on the the landscape's capacity to support characteristic aquatic functioning, 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 area.								
<0.8	<0.8 - 0.7 C retains Functioning polluta corrido				uch of its of or sedime or modera	capacity to ent. Mode ate cattle g	suppo rate-int razing	rt natural we ensity land would com	etland funct uses such a nonly be pl	hift in land use, how ion and it is not an as dry-land farming aced within this so een substantial ing	overt source of g, urban "green" coring range.	
<0.7 - 0.6 Functioning Impaired			moderate surfaces; capacity logged ar situations	to high co considera of the land reas, low-d would cor	overage (up ble in-flow has been ensity urba mmonly rai	p to 50 urban greatly an deve te a sce	%) of imper runoff or fer diminished elopments, sore within th	meable sur tilizer-rich v but not tota some urbar is range.	faces, bare soil, or waters common. S ally extinguished. In parklands and m	r other artificial Supportive Intensively any cropping		
×	0.6		= actioning	severe eo landscap	cological st es general	tress on we	etland I		mmercial o	ped or is otherwise developments or h		
		Buffer So (Lowest so			unding d Use <b>1</b>						<b></b>	-
	(	0.7	+	0.7	) ÷	2		= Var	iable	2 Score	0.70	

## Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

## 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.

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$\checkmark$	Stressors	Comments/description
$\times$	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
$\times$	Dams	Dam in place to control flow
$\times$	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
$\times$	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
×	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
$\times$	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
×	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
$\times$	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

Variable Score	Condition Grade	Depletion	Augmentation
1.0 - 0.9	<b>A</b> 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	<b>B</b> 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	<b>C</b> 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	D 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
<0.6	<b>F</b> 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 3 Score 0.7

# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

## Scoring rules:

soui the 0.85	rce, <b>in most</b> Water Sourc 5. Additional	t cases the Water Sou ce variable is rated at 0	ute water in a characteristic fashion is fundamer urce variable score will define the upper limit 0.85, the Water Distribution score will usually hav tside the lower end of the AA effecting water dis	Water Distribution score. For example, if	
1. lo 2. C	Considering	acts to the natural di all of the stressors	istribution of water throughout the AA and d identified, assign an overall variable score score will set the upper limit for the Water	catalog them in the stressor table. using the scoring guidelines. In most Distribution score.	eerino
$\mathbf{i}$	Stresso	rs	Comments/description		
×	Alteration	of Water Source	surrounding lands and water stuctur	es in constant flux due to construction	
×	Ditches		ditches fee	ed hydrology	
×	Ponding/In	npoundment	caused at diversion an	d stormwater structures	
×	Culverts		runoff from culverts c	ontributes to hydrology	
×	Road Grad	des	adjacent and feed by run of	f from road and path grading.	
	-	ncision/Entrenchment	-	trenchment. Substrate prone to erosion.	
		Engineered Channel		age flow and armor banks	
	Enlarged C		· · ·	n places to slow flow	
×		anks/Shoreline	heavily manag	ed urban creek	
	Weirs	(5			
X	Dikes/Leve		Berms and grading	contain Sand Creek	
×	Diversions	Fill Accumulation	runoff from	urban setting	
	Sediment	ThirAccumulation	Turion nom	urban setting	
Vari	able Score	Condition Grade	Non-riverine	Riverine	
	1.0 - 0.9	<b>A</b> 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	B Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> 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.	
Š	:0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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	<b>F</b> 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	<b>4 Score</b> 0.7	

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

## 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.

V	Stres	sors	Comments/description
	Alteration of Water Source		
	Ditches		
	Dikes/Levees		
	Road C	Grades	
	Culver	ts	× N
	Diversi	ons	
	Constr	ictions	
$\times$	Chann	el Incision/Entrenchment	substrate prone to erosion
$\times$	Harder	ned/Engineered Channel	Urban environment
	Artificia	al Stream Banks	
	Weirs		
	Confine	ed Bridge Openings	
	riable core	Condition Grade	Scoring Guidelines
1.0	) - 0.9	<b>A</b> Reference Standard	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
		В	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal")
<0.9	9 - 0.8	Highly Functioning	levels flow continues essentially unaltered in quantity or character.
	9 - 0.8 8 - 0.7	Highly Functioning C Functioning	levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.8	-	С	High- or low-water outflows are moderately affected, mild alteration of intermediate level

Variable 5 Score

0.95

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

### **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.

			Stressor	s	Comments				
$\times$	1	Dredg	ing/Excavation	/Mining	appears to be created from mining mitigation associated with highway				
$\times$		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to roadways and under highway				
$\times$		Gradi	ng		road and walking trail adjacent				
$\times$		Comp	action		due to construction and siturbance				
	ers	Plowi	ng/Disking						
×	General	Exces	sive Sediment	ation	loose sediment from runoff and erosion				
	G	Dump	ing						
		Hoof	Shear/Pugging						
		Aggre	gate or Minera	l Mining					
×		Sand	Accumulation		loose sediment from runoff and erosion				
		Chan	nel Instability/O	ver Widening	erosion prone substrate				
	≥	Exces	sive Bank Eros	sion	erosion prone substrate				
×	Only	Chan	nelization		erosion prone substrate				
×	<u>s</u>	Recor	nfigured Strean	n Channels	Urban environment				
×	Channels	Artific	ial Banks/Shore	eline	Urban environment				
×	าลr	Beave	er Dam Remov	al	Urban environment				
	U U		rate Embeddeo						
×		Lack	or Excess of W	oody Debris	Urban environment				
Vari	able	Score	Condition Grade		Scoring Guidelines				
1	1.0 - (	0.9	<b>A</b> Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported.				
<	:0.9 -	0.8	<b>B</b> Highly Functioning		pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.				
<	0.8 -	0.7	<b>C</b> Functioning	•	topography may be pervasive but generally mild to moderate in severity. May include e significant habitat alteration; or more severe alterations affect up to 20 % of the AA.				
V	<0.7 - 0.6		D Functioning Impaired	strongly impact Evidence that v alterations. Mo	ist one important surface type or landform has been eliminated or created; microtopography has been gly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. ince that widespread diminishment or alteration of native plant community exist due to physical habitat tions. Most incidentally created wetland habitat such as that created by roadside ditches and the like d score in this range or lower.				
	<0.6	ô	F Non- functioning		norphic alterations have caused a fundamental change in site character and functioning, Iting in a conversion to upland or deepwater habitat.				
					Variable 6 Score				

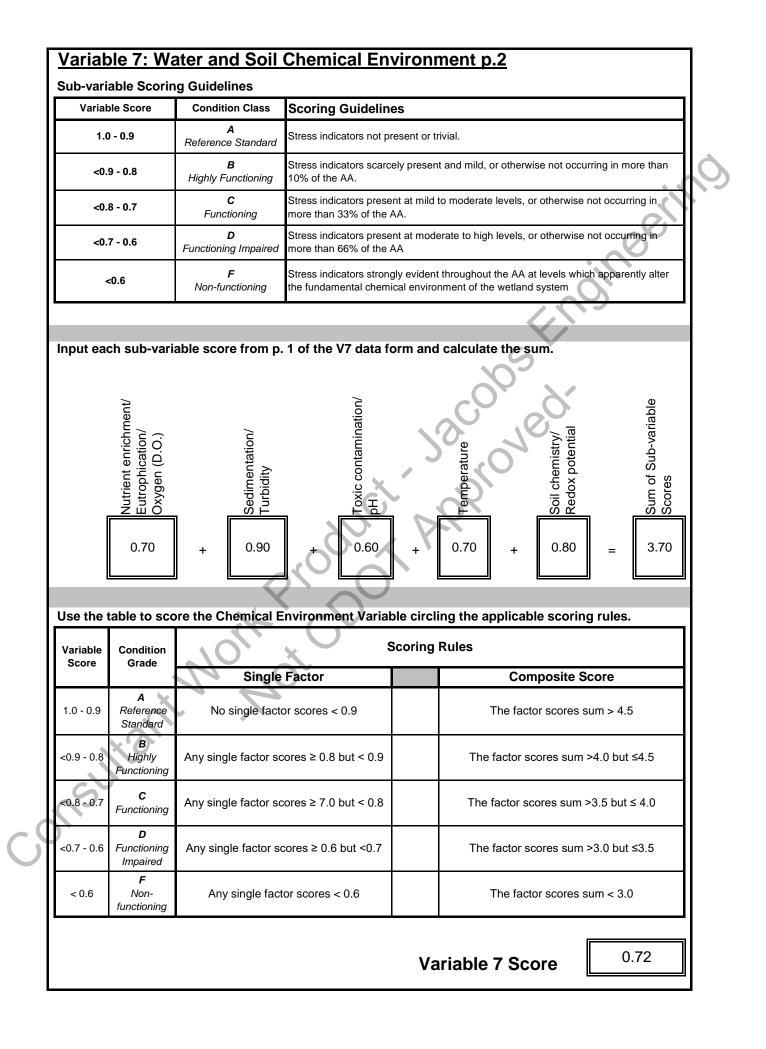
## Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

### Scoring rules:

~,C

	identify each stressor impacting determine its score using the so	-	guideline table provided on the seco	nd page of the		ori	
			e same way as normal variable scor				
	, ,	pairec	l or recommended for TMDL develop	ment for one of the			•
,	ub-variable 0.65 or lower.					0	
	e scores to the following variable					$\overline{\mathbf{O}}$	
ithin that range.	e score sets the letter grade ran	ge. T	ne composite of sub-variables influer	ices the score		0	
Sub-variable	Stressor Indicator	_/	Comments	Sub-		запа	ριαι
	Livestock	x	agriculture upstream	variable	pg 89	pg106	pg1(
	Agricultural Runoff	x	agriculture upstream	Score	pgoo	pgroo	pgro
SV 7.1	Septic/Sewage	х	placed in an urban enviroment				
Nutrient Enrichment/	Excessive Algae or Aquatic Veg.			0.70			
Eutrophication/	Cumulative Watershed NPS	х	urban environment				
Oxygen (D.O.)	CDPHE Impairment/TMDL List	х	Clear Creek	1/ 6-	<b>~</b>		
	· ·						
	Excessive Erosion	Х	unstable banks				
	Excessive Deposition						
	Fine Sediment Plumes						
SV 7.2	Agricultural Runoff	Х	agriculture upstream	0.90			
Sedimentation/	Excessive Turbidity	Х	urban run off	0.50	D		
Turbidity	Nearby Construction Site	Х	urban environment		T		
	Cumulative Watershed NPS	х	urban environment				
	CDPHE Impairment/TMDL List	х	Clear Creek				
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	X	adjacent to roadways, run off d	¥ \			
	Livestock Agricultural Runoff	X X	agriculture upstream agriculture upstream	Τ` \			
SV 7.3	Storm Water Runoff	x	urban environment				
Toxic contamination/	Fish/Wildlife Impacts	^ X	urban environment	0.60			
pH	Vegetation Impacts	x	weedy	┨ ╠━━━━┛			
F	Cumulative Watershed NPS	x	urban environment	1 /			
	Acid Mine Drainage	~		1/			
	Point Source Discharge	x	sewer treatment plant, Urban e				
	CDPHE Impairment/TMDL List	х	Clear Creek	1/			
	Metal staining on rocks and veg.		$\sim$	Y			
	Excessive Temperature Regime	X					
	Lack of Shading	х	tree removal	1 \			
SV 7.4	Reservoir/Power Plant Discharge	x	stormwater	0.70			
Temperature	Industrial Discharge	х	urban/industrial environment	0.70			
romporataro	Cumulative Watershed NPS	х	urban environment				
	CDPHE Impairment/TMDL List	х	Clear Creek	4/			
				4			
	Unnatural Saturation/Desaturation						
SV 7.5	Mechanical Soil Disturbance	х	urban environment	0.80			
Soil chemistry/	Dumping/introduced Soil	х	construction	┨╞┻┻┻┛			
Redox potential	CDPHE Impairment/TMDL List	х	Clear Creek		1		



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wet ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by kisting stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being e. It particularly focuses on the wetla normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	number and types of vegetation layers present within the AA. Make a judgment as to will were historically present using direct evidence such as stumps, root wads or historical phe such as local knowledge and expert opinion can also be used in this determination. vegetation layers that would not normally be present in the wetland type being assessed. record the current coverage of each vegetation layer at the top of the table. ference Standard or expected percent coverage of each vegetation layer to create the so The condition of predominant vegetation layers has a greater influence on the variable site. In cover values as decimals in the row of the stressor table labeled " Reference/expecter Note, percentages will often sum to more than 100% (1.0). severity of stressors acting on each individual canopy layers, indicating their presence or tratum alteration.				
Rules for Scoring:					
additional layers were historic	cally preser	nt using dir	rect evider	nce such a	as stumps, root wads or historical photograp
<ol> <li>Estimate and record the cu</li> <li>Record the Reference Stat weighting factor. The condition minor components.</li> </ol>	tional layers were historically present using direct evidence such as stumps, not wads or historical photo ect evidence such as local knowledge and expert opinion can also be used in this determination. Io not score vegetation layers that would not normally be present in the wetland type being assessed. stimate and record the current coverage of each vegetation layer at the top of the table. Lecord the Reference Standard or expected percent coverage of each vegetation layer to create the sub- hiting factor. The condition of predominant vegetation layers has a greater influence on the variable score or components. The other stressor table is the row of the stressor table labeled " Reference/expected P ar of Layer". Note, percentages will often sum to more than 100% (1.0). Letermine the severity of stressors acting on each individual canopy layers, indicating their presence with appropriate boxes of the stressor table. The difference between the expected and observed stratum cover measure of stratum alteration. Letermine the sub-variable score for each valid vegetation layer using the scoring guidelines on the secor scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable scores and e ucts in the labled cells. These are the weighted sub-variable scores. Individually sum the <i>Reference Percent Cover of Layer</i> score by its Veg. Layer Sub-variable scores and e ucts in the labled cells. These are the weighted sub-variable scores. Individually sum the <i>Reference Percent Cover and Weighted Sub-variable scores</i> . Divide the sum of "Veg. Layer Sub-variable scores" by the total coverage of all layers scored. This produ able 8 score. Enter this number in the labeled box at the bottom of this page. <b>Vegetation Layers</b>				
the appropriate boxes of the stressor table. The difference between the expected and observed stratum coverages is					
6. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table. The difference between the expected and observed stratum coverages is one measure of stratum alteration.					
the scoring sheet. Enter each	h sub-varia	ble score i	in the app	ropriate c	
products in the labled cells. T	These are t	he weighte	ed sub-vai		
	\ \	/egetatio	n Layers	5	
Current % Coverage of Layer	0.25	0	0.85	0	
Stressor	Tree	Shrub	Herb	Aquatic	Comments
Noxious Weeds			5%		Canada thistle
Exotic/Invasive spp.				<u> </u>	
Tree Harvest Brush Cutting/Shrub Removal					
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing					
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory			20%		
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing			20%		
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization			20% 70%		
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering			70%		
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation	20%				
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering		0.03	70%	0	
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND	20% 0.35 0.45 +	0.15 +	70% 20% 0 0.85 +	0.00	= 1.45
Tree Harvest Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DiFFERENCE BETWEEN CURRENT COVERACE AND REFERENCE/EXPECTED Reference/Expected %	20% 0.35 0.45 + x 0.8	0.15 + x 0.5	0 0.85 0.85		= 1.45 See sub-variable sco guidelines on following
Tree Harvest Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/EXPECTED Reference/Expected % Cover of Layer Veg. Layer Sub-	20% 0.35 0.45 + x	0.15 + x	70% 20% 0 0.85 + x	0.00 x	See sub-variable sco

### Variable 8: Vegetation Structure and Complexity p. 2

richle 9 Section Cuidelin

Variable Score	Condition Grade	Scoring Guidelines		
1.0 - 0.9	A 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	B 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 welfand. 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 welfand.		
<0.8 - 0.7	<b>C</b> 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 tall 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 welland. 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 welland.		
<0.7 - 0.6	<b>D</b> 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	F 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.		

## **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, ering however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted

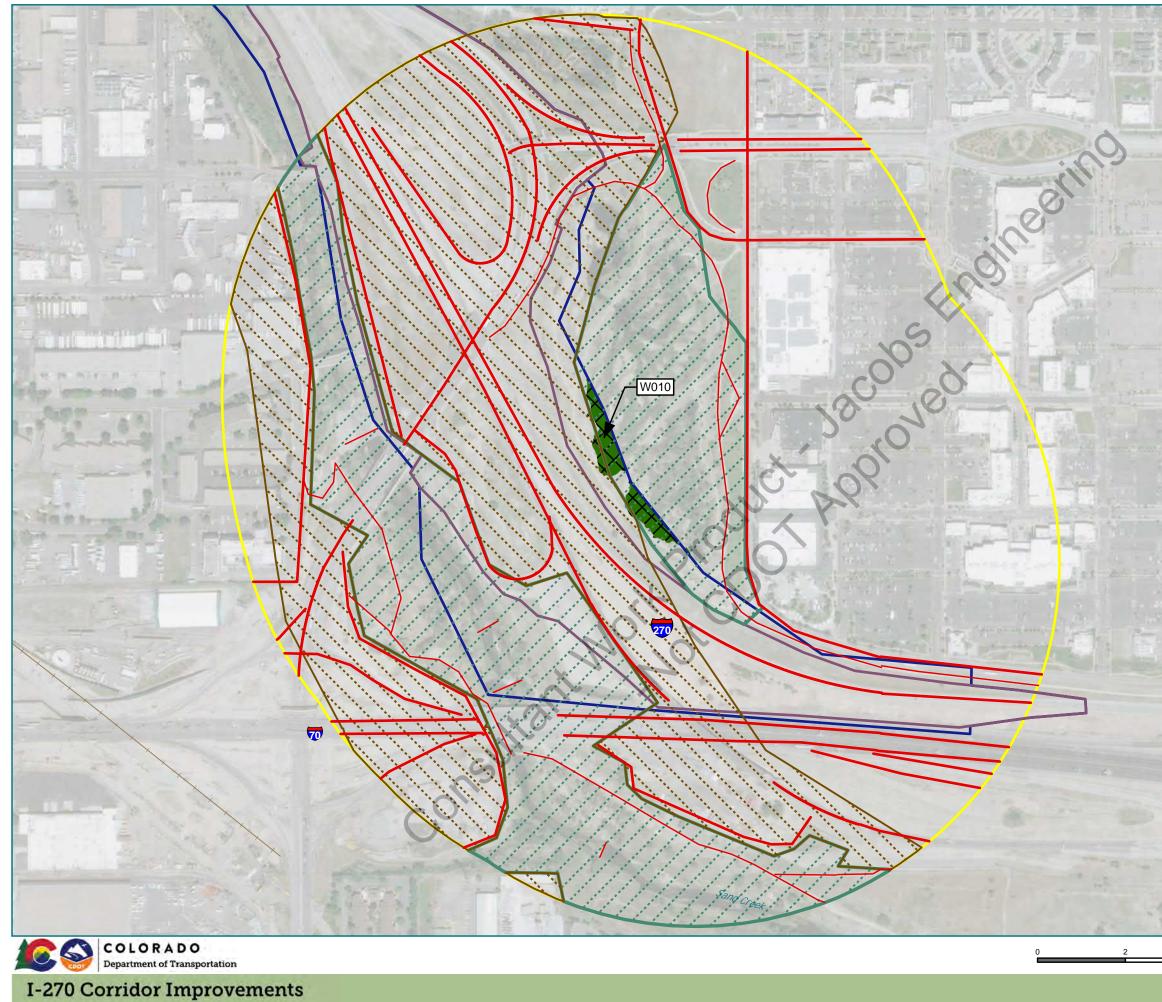
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

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 (Connect)	0.65				
	Variable 2:	Contributing Area (CA)	0.70				
Hydrology	Variable 3:	Water Source (Source)	0.70				
	Variable 4:	Water Distribution (Dist)	0.70				
	Variable 5:	Water Outflow (Outflow)	0.95				
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.70				
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72				
Abiotic	Variable 8:	Vegetation Structure and Complexity (Veg)	0.80				

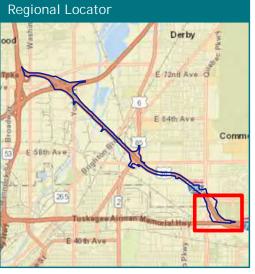
## Functional Capacity Indices

Function 1 Support of Characteristic Wildlife Habitat	FCI
$V1_{connect}$ + $V2_{CA}$ + $(2 \times V8_{veg})$ Points	-
0.65 + 0.70 + 1.60 + + + = 2.95 ÷ 4 =	0.74
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	
$2.10 + 1.40 + 1.90 + 0.70 + 0.72 + = 6.82 \div 9 = $	0.76
Function 3 Flood Attenuation	
$V2_{CA}$ + (2 x V3 <sub>source</sub> ) + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) + V6 <sub>geom</sub> + V8 <sub>veg</sub>	
$0.70 + 1.40 + 1.40 + 1.90 + 0.70 + 0.80 = 6.90 \div 9 = 0.00$	0.77
Function 4 Short- and Long-term Water Storage	
$V3_{source}$ + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
	0.78
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA}) + (2 \times V4_{dist}) + V6_{geom} V7_{chem}$	
$1.40 + 1.40 + 0.70 + 0.72 + + = 4.22 \div 6 = $	0.70
Function 6 Sediment Retention/Shoreline Stabilization	
$V_{2_{CA}}$ + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.70 + 1.40 + 1.60 + + + = 3.70 ÷ 5 =	0.74
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
$0.65 + 1.90 + 0.70 + 0.72 + 1.60 + = 5.57 \div 7 = $	0.80
Sum of Individual FCI Scores	5.28
Divide by the Number of Functions Scored	÷7
Composite FCI Score	0.75



# I-270 WETLAND FINDINGS REPORT ASSESSMENT AREA AA-SC-4 Migration Dispersal Barrier - Minor

- Migration Dispersal Barrier Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PSS, Jurisdictional
  - Habitat Connectivity Envelope



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

Ν

4 Miles

# ADMINISTRATIVE CHARACTERIZATION

				Data	of		
General Informat	ion	AA-I-4		Date Evaluation	4/04/000	21	(
Site Name or ID:	AA-I-4: W010	(Infrastructure)		Project Name	e: I-270 (S	TU 2706-04	43)
404 or Other Permit Application #:	NA			Applicant Name	CDOT		eeli
Evaluator Name(s):	Brett Hartmani and Pat Hickey		aluator's prof	essional position an organizatio	na -	s (Jacobs)	
Location Informa	tion:				X		
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	Infrastru	C-4, Score for single acture Wetland polygo 39.781646, -104.898	ons	Geographic Datum Used (NAD 83): Elevation	NAD83	523	0
Location Information:	essional wetlar	nd associated with infr	rastructure	e run off. Constr	ucted wetla	and for stor	rmwater manage
Associated stream/wa	iter body name:	High	way runof	#	Stream	Order:	NA
USGS Quadrangle Map:	Commerce Cit	y, CO 2019	C.	Map Scale: (Circle one)		<mark>1:24,000</mark> Other	1:100,000 1:
Sub basin Name (8 digit HUC):	HUC: 1019000			Wetland Ownership:	CDOT		
Project Informati	on: X Project We Mitigation S	tland Evalution (che	X ose of uation eck all cable):	Potentially Imp Mitigation; Pre Mitigation; Pos Monitoring Other (Describ	-constructi st-construct	on	
Intent of Project: (Che	ck all applicable)	Restor	ration		Enhancemer	nt [	Creation
Total Size of Wetland (Record Area, Check and I Measurement Method Use	Describe	ac. X Meas	ured: 1.25 ated	58935			
Assessment Area (AA Area, check appropriate box. / used to record acreage when r included in a single assessmer	Additional spaces are nore than one AA is	ac. <mark>X Meas</mark>		ас. ас.	ac. ac.	ac. ac.	ac. ac.
Characteristics or Met AA boundary determir		W010 is placed alone other AAs.	e assessm	nent area (AA) c	due to its di	stance and	l isolation from
Notes:							

# ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply				
	ils including Histosols on he AA (i.e., AA include			tened or endangere to occur in the AA?	d species are	
	directly impact organic reas possessing either	soil portions of the AA Histosol soils or histic				eeri
	ils are known to occur a wetland of which the A			cern according to th P) are known to occ		
The wetlan urbanized I	d is a habitat oasis in a andscape?	n otherwise dry or		ated within a potentiant occurrence buffer	al conservation area as determined	in
	nreatened or endangere the AA? List Below.	ed species are KNOWN	-	concerns (please de	scribe)	2
					S	
		HYDROGEOMOR	RPHIC SETTIN	G	イン	
If the abov		1 8	tland type if discerna	ble using the table	below.	
Current Co	onditions	Describe the hydroge that apply.	omorphic setting of th	ne wetland by circli	ng all conditions	
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	Bi-directional		
	Wetland Gradient	0 - 29	% 2-4%	4-10% >10	)%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
HGM Setting	# Surface Outlets		0 1	2 3	>3	
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands associated structure. Stormwater natural wetland.				
	HGM class	Riverine	Slope	Depressional	Lacustrine	
Historical Co	onditions	1				
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics	Unidirectional	Vertical			
wetland typology	Geomorphic Setting (Narrative Description)	Once upland environn in the location of the c	0	/ appear to show a	prarie dog colony	
SV	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
	nformation on the AA' nce creation of highwa	s HGM subclass and re ay	gional subclass): Dep	pressional wetland	appears to have	

# **ECOLOGICAL DESCRIPTION 2**

System	n Habitat D Subsystem	Class		WS habitat clas Ibclass		er Regin			Modifiers	% AA
P	P	E	30	RV	vvat		ie	Unel		
F	F	E.				E			h	75
		SS		BLD		E			h	25
										0
									+	
										2
									$\bigcirc$	
					<u> </u>			6	~	
Lacustrine	Littoral; Limnoral				_				saline(7) ; aline(8);	
		Rock Bot. (RB)		ng vascular;	Tempor	<b>xamples</b> arily flooded		Mixosaline	(9); Fresh(0); cid(a);	
Palustrine	Palustrine	Uncon Bottom(UB) Aquatic Bed(AB)	Algal;	ed vascular; Persistent;	Season	turated(B); ally flooded	(C)	Circum	neutral(c);	
		Rocky Shore(RS)		Persistent; wed deciduous;	Seas.	-flood./sat.(l	Ξ);		alcareous(i); ); Mineral(n);	
	Lower perennial;	Uncon Shore(US) Emergent(EM)		aved evergreen; ble - gravel;	Intermitte	erm. flooded ently expose	d(G);	Beaver(	b); Partially /ditched(d);	
Riverine	Upper perennial; Intermittent	Shrub-scrub(SS) Forested (FO)	Sa	nd; Mud;	Artificia Sat./sem	ally flooded( iperm./Seas	K); 5. (Y);	Far	med(f);	
			C	Organic		sed/permen			pounded(h); Substrate(r);	
								Spoil(s):	Excavated(x)	
									( )	
Site Man	Drou	u o okotoh mon of t	ha aita inalu	iding relevant of	rtions of th	e wetland	AA bo			bitot
		v a sketch map of ti ses, and other sign			ortions of th	e wetland,	AA bo			bitat
					ortions of th	e wetland,	AA bo			bitat
					ortions of th	e wetland,	AA bo			bitat
					prtions of th	e wetland,	AA bo			bitat
					prtions of th	e wetland,	AA bo			
		ses, and other sign			prions of th	e wetland,	AA bo			
					prtions of th	e wetland,	AA bo			
		ses, and other sign			prtions of th	e wetland,	AA bo			
		ses, and other sign			prtions of th	e wetland,	AA bo			
Scale: 1 sq. =		ses, and other sign			ortions of th	e wetland,				
		ses, and other sign				e wetland,				
		ses, and other sign			prtions of th	e wetland,				Ditat
		ses, and other sign				e wetland,				Ditat
		ses, and other sign								
		ses, and other sign								Ditat       Image:
		ses, and other sign								Ditat
		ses, and other sign					AA bo			Ditat
		ses, and other sign								Ditat       Image:
		ses, and other sign								Ditat

# Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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# SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

#### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

# Variable 1: Habitat Connectivity p. 2

### SV 1.2: Migration/Dispersal Barriers

This sub-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.

neering

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.

	$\checkmark$	Stressors		Comments/description						
	х	Major Highway		I-70						
= artificial barriers		Secondary Highway		S						
arrie	х	Tertiary Roadway		Quebec Street and others						
pa		Railroad								
cial	х	Bike Path		Northfield Pond Park						
tifi	х	Urban Development		shopping center adjaent						
ar	х	Agricultural Developn	nent	upstream						
u v		Artificial Water Body								
Stressors	х	Fence		multiple properties						
es	х	Ditch or Aqueduct		Constructed, feed by runoff						
Sti	х	Aquatic Organism Ba	rriers	flow control structures						
V	/ariable									
	Score	Condition Grade	Scorin	ng Guidelines						
1	1.0 - 0.9	А		eciable barriers exist between the AA and other wetland and riparian habitats in						
-		Reference Standard		ne HCE; or there are no other wetland and riparian areas in the HCE.						
				impeding migration/dispersal between the AA and up to 33% of surrounding						
	0.9 - 0.8	В		riparian habitat highly permeable and easily passed by most organisms. as could include gravel roads, minor levees, ditches or barbed-wire fences. More						
<	0.9 - 0.0	Highly Functioning	significant barriers (see "functioning category below) could affect migration to up to 10% of							
			surrounding wetland/riparian habitat.							
			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							
		C		propagules through such barriers is still possible, but it may be constrained to certain						
<	0.8 - 0.7	Functioning		day, be slow, dangerous or require additional travel. Busy two-lane roads, d areas, small to medium artificial water bodies or small earthen dams would						
				ly 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						
			Barriers	to migration and dispersal preclude the passage of some types of						
		D D	0	ns/propagules between the AA and up to 66% of surrounding wetland/riparian						
<	0.7 - 0.6	Functioning Impaired	habitat. Travel of those animals which can potential negotiate the barrier are strongly							
		r anotoning impanot		d and may include a high chance of mortality. Up to 33% of surrounding riparian habitat could be functionally isolated from the AA.						
h		F		sentially isolated from surrounding wetland/riparian habitat by impermeable n and dispersal barriers. An interstate highway or concrete-lined water						
	<0.6	Non-functioning		ince canal are examples of barriers which would generally create functional						
		· · · · · · · · · · · · · · · · · · ·	isolation	between the AA and wetland/riparian habitat in the HCE.						
, <b></b>										
		SV 1.1 Score	0.70	Add SV 1.1 and 1.2						
		SV 1.1 Score	0.70	scores and divide by						
		SV 1.2 Score	0.70	two to calculate variable score Variable 1 Score 0.70						

# Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

#### SV 2.1 - Buffer Condition

0.8 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

# SV 2.2 - Buffer Extent

0,70 Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines
	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
0.80 SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer
0.00 SV 2.2 - Buller Extent	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
	<0.6	Non-functioning	0-25% of AA with Buffer

SV/	<u>,,,,</u>	e 2: Conti			<u>Area</u>			rod buffer	widtha in	the space below and a	Vorago
		Average Buffe	r width	1		Record	measu	ea butter	wiaths in	the spaces below and a	verage.
Buffe Width		20 35	6	60	55	55	20	50	50	43	
Line	#	1 2		3	4	5	6	7	8	Avg. Buffer Width (m)	
						Subvar		Condition	Grade	Buffer Width Scoring Gu	lidelines
—	-			<b>D</b> 4	for	Sco					
0.7	, '	SV 2.3 - Ave			Ter	1.0 - 0		Reference		Average Buffer width is 19 Average Buffer width is 10	90-250m
		Width	Scor	e		<0.9 - <0.8 -	_	Highly Fun Functio		Average Buffer width is 3	1-100m
						<0.8 -		Functioning	·	Average Buffer width is	6-30m
						<0.0		Non-func		Average Buffer width is	
SV 2	2.4 - 5	Surrounding L	and Us	se							
		/ 2.4 - Surro				0-1-1			1	-h	
0.6	<b>`</b>	Land Use S		'9		landsca			iana use	changes in the surround	aing
	$\checkmark$	Stressors				ents/de				X	
	х	Industrial/com	mercia			ndustria		onment		G	
les	х	Urban			Urban I	Environn	nent				
ang	' <u> </u>	Residential									
Ch		Rural Dryland Farm	ina							<u>, U. </u>	
= Land Use Changes		Intensive Agri	<u> </u>						_		
Пр		Orchards or N									
anc		Livestock Gra							<u> </u>		
"	х	Transportation	n Corrio	dor	adjacent to highways						
Stressors	х	Urban Parklaı		is in a park. Park is there because of created wetland							
SSS	х	Dams/impoun		5		ntrol stru	uctures				
Stre	х	Artificial Wate			sw basi						
	х	Physical Resource Biological Resource			road ba	ise extra	action a	ind const	uction		
		Diological resou		Clion			$\Theta$				
	riable core	Condition Grad	de			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Sc	oring G	ideline	s	
1.0	0 - 0.9	A Reference	No a		ciable land	l use char	nge has l	een impos	ed Surrou	nding Landscape.	
		Standard	Sor		duso cha		courred	n the Surre	unding La	ndscape, but changes have	minimal
		В	effe	ct on t	he the lar	dscape's	capacity	to support	characteri	stic aquatic functioning, eith	er
<0.9	<0.9 - 0.8 Highly Functioning because							•		grazing, or low intensity silv an 10% of the area.	vicuiture,
<0.!	9-0.0					ana haa k				aift in lond upp houses of the	
		C.	Surr	-						hift in land use, however, the tion and it is not an overt so	
	8 - 0.7	<b>C</b> Functioning	Surr retai pollu	ins mu utants	uch of its of or sedime	capacity to ent. Mode	support erate-inte	natural we	land funct	tion and it is not an overt so as dry-land farming, urban "	urce of 'green"
			Surr retai pollu corri	ins mu utants idors,	or sedime or modera	capacity to ent. Mode ate cattle g	o support erate-inte grazing v	natural we nsity land u vould comm	land funct ses such only be pl	tion and it is not an overt so	urce of 'green" ge.
<0.8	8 - 0.7		Surr retai pollu corri Land mod	ins mu utants idors, d use lerate	or sedime or modera changes to high co	capacity to ent. Mode ate cattle g within the overage (u	o support erate-inte grazing v Surround ip to 50%	natural we nsity land u vould comm ding Landso b) of impern	land funct ses such ionly be pl ape has b neable sur	tion and it is not an overt so as dry-land farming, urban ' aced within this scoring ran ween substantial including th faces, bare soil, or other an	urce of 'green" ige. ne a tificial
<0.8		Functioning D Functioning	Surr retai pollu corri Land mod surfa	ins mu utants idors, d use lerate aces;	or sedime or modera changes to high co considera	capacity to ent. Mode ate cattle g within the overage (u ble in-flow	support rate-inte grazing v Surround p to 50% v urban r	natural we nsity land u vould comm ding Landso b) of impern unoff or fert	land funct ses such only be pl ape has b neable sur lizer-rich	tion and it is not an overt so as dry-land farming, urban " laced within this scoring ran peen substantial including th	urce of 'green" ige. ie a tificial e
<0.8	8 - 0.7	Functioning	Surr retai pollu corri Land mod surfa capa logg	ins mu utants idors, d use lerate aces; acity o ed are	or sedime or modera changes to high co considera f the land eas, low-d	capacity to ent. Mode ate cattle over within the overage (u ble in-flow has been lensity urb	o support erate-inte grazing v Surround p to 50% v urban r greatly o an devel	natural we nsity land u vould comm ding Landso b) of impern unoff or fert diminished l opments, s	land funct ses such only be pl ape has b neable sur lizer-rich out not tot ome urban	tion and it is not an overt so as dry-land farming, urban ' laced within this scoring ran been substantial including th faces, bare soil, or other an waters common. Supportive	urce of 'green" ge. he a tificial e ly
<0.8	8 - 0.7	Functioning D Functioning Impaired	Surr retai pollu corri Land surfa capa logg situa	ins mu utants idors, d use lerate aces; acity o ed are ations	ich of its of or sedime or modera changes to high co considera f the land eas, low-d would co	capacity to ent. Mode ate cattle g within the overage (u ble in-flow has been lensity urb mmonly ra	o support erate-inte grazing v Surround p to 50% / urban r greatly o an devel tte a sco	natural we nsity land u vould comm ding Landso of impern unoff or fert diminished opments, s re within thi	land funct ses such a only be pl ape has b neable sur lizer-rich out not tota ome urban s range.	tion and it is not an overt so as dry-land farming, urban " laced within this scoring ran been substantial including th faces, bare soil, or other an waters common. Supportivi ally extinguished. Intensive	urce of 'green" ge. ie a tificial e ly ping
<0.8	8 - 0.7	Functioning D Functioning	Surr retai pollu corri Land mod surfa capa logg situa The seve	ins mu utants idors, d use lerate aces; acity o ed are ations Surro ere eco	ich of its of or sedime or modera changes to high cc considera f the land eas, low-d would con unding La ological s	capacity to ent. Mode ate cattle overage (u ble in-flow has been lensity urb mmonly ra andscape is	o support erate-inte grazing v Surround p to 50% v urban r greatly o an devel tte a sco is essen retland h	natural we nsity land u vould comm ding Landso o) of impern unoff or fert diminished opments, s re within thi itially comlet	and funct ses such a only be pl ape has b neable sur lizer-rich out not tot ome urban s range. ely develo mmercial	tion and it is not an overt so as dry-land farming, urban " aced within this scoring ran been substantial including th faces, bare soil, or other ar waters common. Supportiv ally extinguished. Intensive in parklands and many cropp	urce of 'green" ige. ie a tificial e ly ping e of
<0.8	8 - 0.7 7 - 0.6 <0.6	Functioning D Functioning Impaired F	Surr retai pollu corri Land mod surfa capa logg situa seve g land	ins mu idants idors, d use lerate acces; acity o ed are ations Surro ere eco scape	ich of its of or sedime or modera changes to high cc considera f the land eas, low-d would con unding La ological s	capacity to ent. Mode ate cattle overage (u ble in-flow has been lensity urb mmonly ra andscape is	o support erate-inte grazing v Surround p to 50% v urban r greatly o an devel tte a sco is essen retland h	natural we nsity land u vould comm ding Landso of impern unoff or fert diminished opments, s re within thi tially comlet abitats. Co	and funct ses such a only be pl ape has b neable sur lizer-rich out not tot ome urban s range. ely develo mmercial	tion and it is not an overt so as dry-land farming, urban " aced within this scoring ran ween substantial including th faces, bare soil, or other ar waters common. Supportiv- ally extinguished. Intensive in parklands and many cropp oped or is otherwise a cause	urce of 'green" ige. ie a tificial e ly ping e of
<0.8	8 - 0.7 7 - 0.6 <0.6	Functioning D Functioning Impaired F Non-functionin	Surr retai pollu corri Land mod surfa capa logg situa The seve land	ins mu utants idors, d use lerate aces; acity o ed are ations Surro scape urrou	ich of its of or sedime or modera changes of to high co considera f the land eas, low-d would con unding La ological siss general	capacity to ent. Mode ate cattle overage (u ble in-flow has been lensity urb mmonly ra andscape is	o support erate-inte grazing v Surround p to 50% v urban r greatly o an devel tte a sco is essen retland h	natural we nsity land u vould comm ding Landso of impern unoff or fert diminished opments, s re within thi tially comlet abitats. Co	and funct ses such a only be pl ape has b neable sur lizer-rich out not tot ome urban s range. ely develo mmercial	tion and it is not an overt so as dry-land farming, urban " aced within this scoring ran ween substantial including th faces, bare soil, or other ar waters common. Supportiv- ally extinguished. Intensive in parklands and many cropp oped or is otherwise a cause	urce of 'green" ige. ie a tificial e ly ping e of
<0.8	8 - 0.7 7 - 0.6 <0.6	Functioning D Functioning Impaired F Non-functionin Buffer Score	Surr retai pollu corri Land mod surfa capa situa situa g situa g seve land	ins mu utants idors, d use lerate aces; acity o ed are ations Surro scape urrou	ich of its of or sedimo changes to high coconsiderat f the land aas, low-d would con unding La ological sis general unding	capacity to ent. Mode ate cattle overage (u ble in-flow has been lensity urb mmonly ra andscape is	o support erate-inte grazing v Surround p to 50% v urban r greatly d an devel tte a sco is essen retland h core of lo	natural we nsity land u vould comm ding Landso of impern unoff or fert diminished l opments, s opments, s re within thi ially comlet abitats. Co ess than 0.6	land funct ses such a lonly be pl ape has b neable sur lizer-rich to both not toto bome urbans s range. ely develo mmercial b.	tion and it is not an overt so as dry-land farming, urban " aced within this scoring ran been substantial including th faces, bare soil, or other ar waters common. Supportive ally extinguished. Intensive in parklands and many cropp oped or is otherwise a caused developments or highly urba	urce of 'green" ige. ie a tificial e ly ping e of

# Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

### 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.

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$\times$	Str	essors		Comments/description	**				
	Ditc	hes or Drains	(tile, etc.)	Is a ditch					
	Dan	ns							
×	Dive	ersions		trash, elevation changes, aggregate					
	Gro	undwater pum	ping						
	Dra	w-downs							
×	Culv	verts or Constr	ictions	feeds ditch	6				
$\times$	Poir	nt Source (urba	an, ind., ag.)	Heavily managed urban envir	onment				
	Nor	-point Source							
	Incr	eased Drainag	je Area						
×	Stor	m Drain/Urba	n Runoff	SW drain/ runoff contributes t					
$\times$	Imp	ermeable Surf	ace Runoff	adjace to highway and other o	compacted surfaces due to urban				
	Irrig	ation Return F	lows						
	Min	ing/Natural Ga	s Extraction						
	Trai	nsbasin Divers	ion						
	Acti	vely Managed	Hydrology						
Varia	able	Condition							
Sco		Grade		Depletion	Augmentation				
		A	Unnatural drawd	lown events minor, rare or non-	Unnatural high-water events minor, rare or non-				
1.0 -	0.9	Reference	existent, very slig	ght uniform depletion, or trivial	existent, slight uniform increase in amount of				
		Standard	alteration of hydr	rodynamics.	inflow, or trivial alteration of hydrodynamics.				
				lown events occasional, short	Occasional unnatural high-water events, short in				
		В		mild; or uniform depletion up to 20%;	duration and/or mild in intensity; or uniform				
<0.9 -	- 0.8	Highly Functioning		ate reduction of peak flows or r to perform work.	augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to				
		Functioning	capacity of water	no penomi work.	perform work.				
			Unnatural drawd	lown events common and of mild to	Common occurrence of unnatural high-water				
		•		ity and/or duration; or uniform	events, of a mild to moderate intensity and/or				
		C	depletion up to 5	50%; or moderate to substantial	duration; or uniform augmentation up to 50%; or				
<0.8 -	- 0.7	Eurotioning							
<0.8 -	- 0.7	Functioning	reduction of pea	k flows or capacity of water to	moderate to substantial increase of peak flows or				
<0.8 -	- 0.7	Functioning	reduction of peat perform work.	k flows or capacity of water to	moderate to substantial increase of peak flows or capacity of water to perform work.				
<0.8 -	- 0.7	Functioning	reduction of peal perform work. Unnatural drawd	k flows or capacity of water to lown events occur frequently with a	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water				
<0.8 -	- 0.7	Functioning	reduction of peal perform work. Unnatural drawd moderate to high	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or				
		D	reduction of pear perform work. Unnatural drawd moderate to high depletion up to 7	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform ′5%; or substantial reduction of peak	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing				
<0.8 -		D Functioning	reduction of pear perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity	k flows or capacity of water to down events occur frequently with a n intensity and/or duration; or uniform ′5%; or substantial reduction of peak	moderate to substantial increase of peak flows or capacity of water to perform work. Common occurrence of unnatural high-water events, some of which may be severe in nature or				
		D	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma	k flows or capacity of water to hown events occur frequently with a n intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial	moderate to substantial increase of peak flows or capacity of water to perform work. 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				
		D Functioning	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma	k flows or capacity of water to hown events occur frequently with a in intensity and/or duration; or uniform 75%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial	moderate to substantial increase of peak flows or capacity of water to perform work. 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. <b>Wetlands</b>				
		D Functioning	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally				
	-0.6	D Functioning Impaired F Non-	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak / of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower.	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally high-water great enough to change the				
<0.7 -	-0.6	D Functioning Impaired	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally				
<0.7 -	-0.6	D Functioning Impaired F Non-	reduction of peal perform work. Unnatural drawd moderate to high depletion up to 7 flows or capacity with actively ma hydrology will u Water source din	k flows or capacity of water to down events occur frequently with a in intensity and/or duration; or uniform '5%; or substantial reduction of peak of water to perform work. Wetlands anaged or wholly artificial usually score in this range or lower. minished enough to threaten or	moderate to substantial increase of peak flows or capacity of water to perform work. 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 Frequency, duration or magnitude of unnaturally high-water great enough to change the				

# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

Because the wetland's ability to distribute water in a characteristic fashion is fundamentally dependent on the condition of its water source, **in most cases the Water Source variable score will define the upper limit Water Distribution score**. For example, if the Water Source variable is rated at 0.85, the Water Distribution score will usually have the potential to attain a maximum score of 0.85. Additional stressors within or outside the lower end of the AA effecting water distribution (e.g., ditches and levees) will reduce the score from the maximum value.

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#### 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.

$\checkmark$	Stresso	rs	Comments/description						
×	Alteration of	of Water Source	surrounding lands and water stuctures in constant flux due to construction						
$\times$	< Ditches		Is a ditch						
	Ponding/Im	poundment							
$\times$	Culverts		runoff from culverts co	ontributes to hydrology					
$\times$	Road Grad	es	adjacent and feed by ru	in off from road grading.					
	Channel In	cision/Entrenchment							
	Hardened/I	Engineered Channel							
	Enlarged C	hannel							
$\times$	Artificial Ba	nks/Shoreline	heavily manag	ged urban ditch					
	Weirs								
×	Dikes/Leve	es/Berms	Road	grade					
	Diversions								
×	Sediment/F	Fill Accumulation	runoff from urb	an setting, trash					
			<u>C</u> N						
Varia	ble Score	Condition Grade	Non-riverine	Riverine					
1.	.0 - 0.9	<b>A</b> 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	<b>B</b> Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> 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	0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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.					
5	<0.6	F 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	<b>4 Score</b> 0.8					

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

### 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.

$\checkmark$	Stres	sors	Comments/description
×	Alteration of Water Source		Road grade and barriers
×	Ditches	3	is a ditch
	Dikes/l	_evees	
×	Road C	Grades	confined by roads
×	Culver	is	placed at outflow
×	Diversi	ons	road grade
х	Constr	ictions	urban envronment
	Chann	el Incision/Entrenchment	
Х	Harder	ned/Engineered Channel	Compacted soils from grading
х	Artificia	al Stream Banks	artificial wetland
	Weirs		
	Confine	ed Bridge Openings	
_			
	iable core	Condition Grade	Scoring Guidelines
1.0	- 0.9	A Reference Standard	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9	9 - 0.8	<b>B</b> 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	3 - 0.7	<b>C</b> Functioning	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7	7 - 0.6	<b>D</b> 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.
			The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection

Variable 5 Score

0.75

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

#### **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.

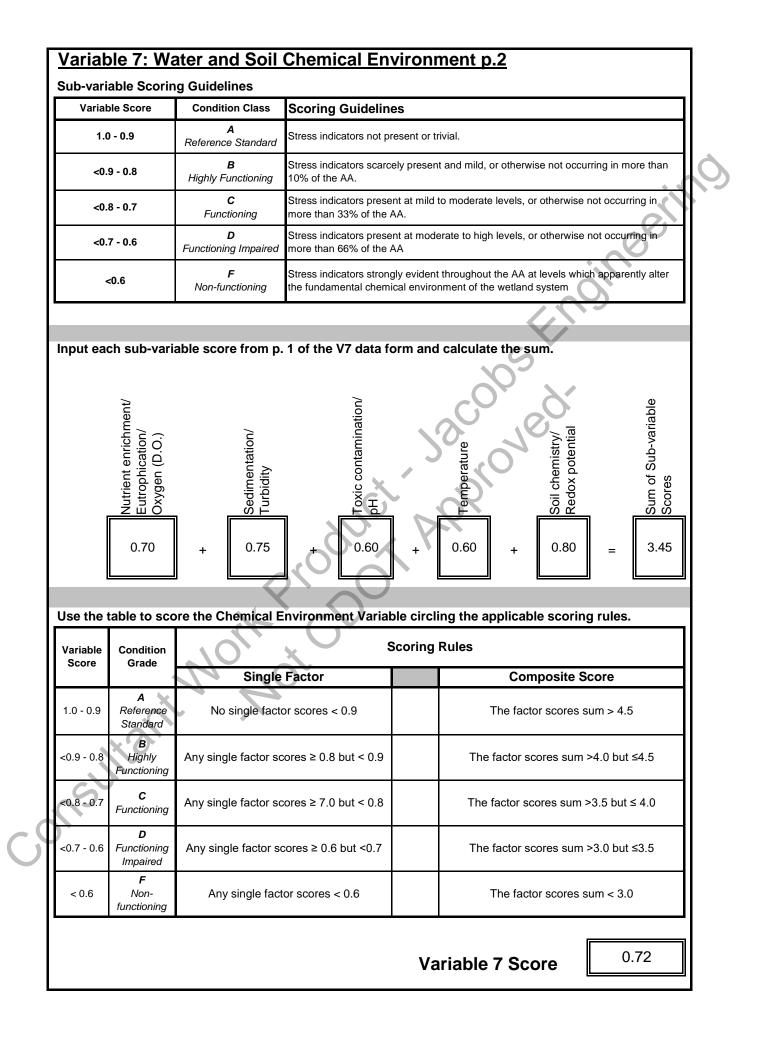
	<i></i>		Stressor	s	Comments					
		Dredg	ing/Excavation	/Mining						
$\times$		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to highway and infrastrue	cture				
$\times$		Gradii	ng		Adjacent to highway and infrastructure					
$\times$	_	Comp	action		grading					
×	eneral	Plowir	ng/Disking		graded to lower elevation to support wetland					
×	en	Exces	sive Sediment	ation	loose sediment from runoff and ere					
×	Ō	Dump	ing		Adjacent to highway, public space, sor	ne trash				
		Hoof \$	Shear/Pugging							
		Aggre	gate or Minera	l Mining						
×		Sand	Accumulation		loose sediment from runoff and ere	bsion				
		Chanr	nel Instability/O	ver Widening						
	Only	Exces	sive Bank Eros	sion						
		Chanr	nelization							
	<u>el</u> s		nfigured Strean							
	un.	Artifici	ial Banks/Shore	eline						
	Reconfigured Stream Channels Artificial Banks/Shoreline Beaver Dam Removal Substrate Embeddedness									
	Lack or Excess of Woody Debris		oody Debris							
Vari	able	Score	Condition Grade		Scoring Guidelines					
1	1.0 - 0	).9	<b>A</b> Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to ning and condition. Patch or microtopographic complexity may be ies are still supported.					
<	0.9 -	0.8	<b>B</b> Highly Functioning		pography result in small but detectable changes to habitat condit vere impacts exist but affect less than 10% of the AA.	ions in some or all of the				
<	0.8 -	0.7	<b>C</b> Functioning		topography may be pervasive but generally mild to moderate in s e significant habitat alteration; or more severe alterations affect up					
v C	<ul> <li>-0.7 - 0.6</li> <li><i>D</i> strongly impactive view of the strongly impactive vi</li></ul>		strongly impact Evidence that v alterations. Mo	portant surface type or landform has been eliminated or created; microtopography has been ted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. widespread diminishment or alteration of native plant community exist due to physical habitat ost incidentally created wetland habitat such as that created by roadside ditches and the like this range or lower.						
	<0.6	5	F Non- functioning		norphic alterations have caused a fundamental change in site cha Iting in a conversion to upland or deepwater habitat.	aracter and functioning,				
					Variable 6 Score	0.6				

### Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

scoring sheet. Scoring s	ub-variables is carried out in exa ter body that is recognized as im	ctly th	guideline table provided on the seco e same way as normal variable scor d or recommended for TMDL develo	ring.		- OS	
	e scores to the following variable e score sets the letter grade ran		ng page and compute the sum. he composite of sub-variables influe	ences the score		S	
Sub-variable	Stressor Indicator	$\checkmark$	Comments	Sub-	ucai	Janu	
	Livestock	х	agriculture upstream	variable	pg 89	pg106	
SV 7.1	Agricultural Runoff	х	agriculture upstream	Score			
Nutrient Enrichment/	Septic/Sewage	х	placed in an urban enviroment	0.70			
Eutrophication/	Excessive Algae or Aquatic Veg.			0.70			
Oxygen (D.O.)	Cumulative Watershed NPS	х	urban environment				
exygen (B.e.)	CDPHE Impairment/TMDL List						
				4			
	Excessive Erosion	V					
	Excessive Deposition	Х	highway run of				
01/7.0	Fine Sediment Plumes	V					
SV 7.2 Sedimentation/	Agricultural Runoff Excessive Turbidity	X X	agriculture upstream	0.75			
Turbidity		X	urban environment	4 ┝━━━	1		
Turbluity	Nearby Construction Site Cumulative Watershed NPS	^ X	urban environment				
	CDPHE Impairment/TMDL List	^					
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	x	adjacent to highway				
	Livestock	х	agriculture upstream				
	Agricultural Runoff	х	agriculture upstream				
SV 7.3	Storm Water Runoff	х	adjacent to highway	0.60			
Toxic contamination/	Fish/Wildlife Impacts	X		0.00			
рН	Vegetation Impacts	х	weedy				
	Cumulative Watershed NPS	х					
	Acid Mine Drainage			4/			
	Point Source Discharge	х	urban environment				
	CDPHE Impairment/TMDL List			_/			
	Metal staining on rocks and veg.		concrete adiacent	-			
	Excessive Temperature Regime Lack of Shading	x x	concrete adjacent No trees	-1			
	Reservoir/Power Plant Discharge	x	stormwater	┨ ┢━━━━	า		
SV 7.4	Industrial Discharge	X	urban environment	0.60			
Temperature	Cumulative Watershed NPS	x		┥╱╧══	1 1		
	CDPHE Impairment/TMDL List	~		۲/			
				-/			
	Unnatural Saturation/Desaturation		1	1			
SV 7.5	Mechanical Soil Disturbance	х	urban environment		ור		
Soil chemistry/	Dumping/introduced Soil	x	construction	0.80			
Redox potential	CDPHE Impairment/TMDL List			1/	<sup>2</sup>		
5				7			
				—			



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wet ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by fixing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being e. It particularly focuses on the wetla normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	e of variabili	ity exhibited	the HGM s	subclass or	regetation stratum differs functionally from its natural regional subclass. This variable has four sub-variables, rbaceous Layer; and Aquatics.	
Rules for Scoring:						1
additional layers were historic	cally prese	nt using di	rect evide	nce such	n the AA. Make a judgment as to whether as stumps, root wads or historical photographs. o be used in this determination.	$\sim$
2. Do not score vegetation la	ayers that w	vould not n	normally be	e present	in the wetland type being assessed.	
	indard or e	xpected pe	ercent cov	verage of e	r at the top of the table. each vegetation layer to create the sub-variable a greater influence on the variable score than do	incerimo
5. Enter the percent cover va Cover of Layer". Note, perce					or table labeled " Reference/expected Percent 6 (1.0).	
	stressor ta				py layers, indicating their presence with checks in he expected and observed stratum coverages is	
	h sub-varia	able score	in the app	propriate c	sing the scoring guidelines on the second page of ell of the row labeled "Veg. Layer Sub-variable	
	These are	the weighte	ed sub-va		ts Veg. Layer Sub-variable scores and enter the res. Individually sum the <i>Reference Percent</i>	
9. Divide the sum of "Veg. I Variable 8 score. Enter this r					coverage of all layers scored. This product is the of this page.	Jacobski
	<b></b>	/egetatio	on Layers	s		S
Current % Coverage of		-		_		
Layer	0 Tree	0 Shrub	1 Herb	0	Commonto	
Stressor Noxious Weeds	Tree	Shrub	nerb	Aquatic	Comments	
Exotic/Invasive spp.		<u> </u>				
Tree Harvest						
Brush Cutting/Shrub Removal					adjacent to highway	
Livestock Grazing						
Excessive Herbivory				_		J O
Mowing/Haying Herbicide						
Loss of Zonation/Homogenization	1		1	+	Urban environment	
Dewatering	1	1	1	1		
Over Saturation					fed by highway run off	
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.45	0.15	0.2	0		
Reference/Expected % Cover of Layer	0.45 +	0.15 +	0.85 +	+ 0.00	= 1.45	
Veg. Layer Sub- variable Score	x 0.5	x 0.5	x 0.8	x 0	See sub-variable scoring guidelines on following page	
	"	"	"			
Weighted Sub-variable Score	0.23 +	0.08 +	0.68	+ 0.00	= 0.98	
					Variable 8 Score 0.68	

#### Variable 8: Vegetation Structure and Complexity p. 2

richle 9 Secring Cuidelin

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	A 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	B 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	C 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	D 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 weltand. 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	F 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.

# **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.

ering 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

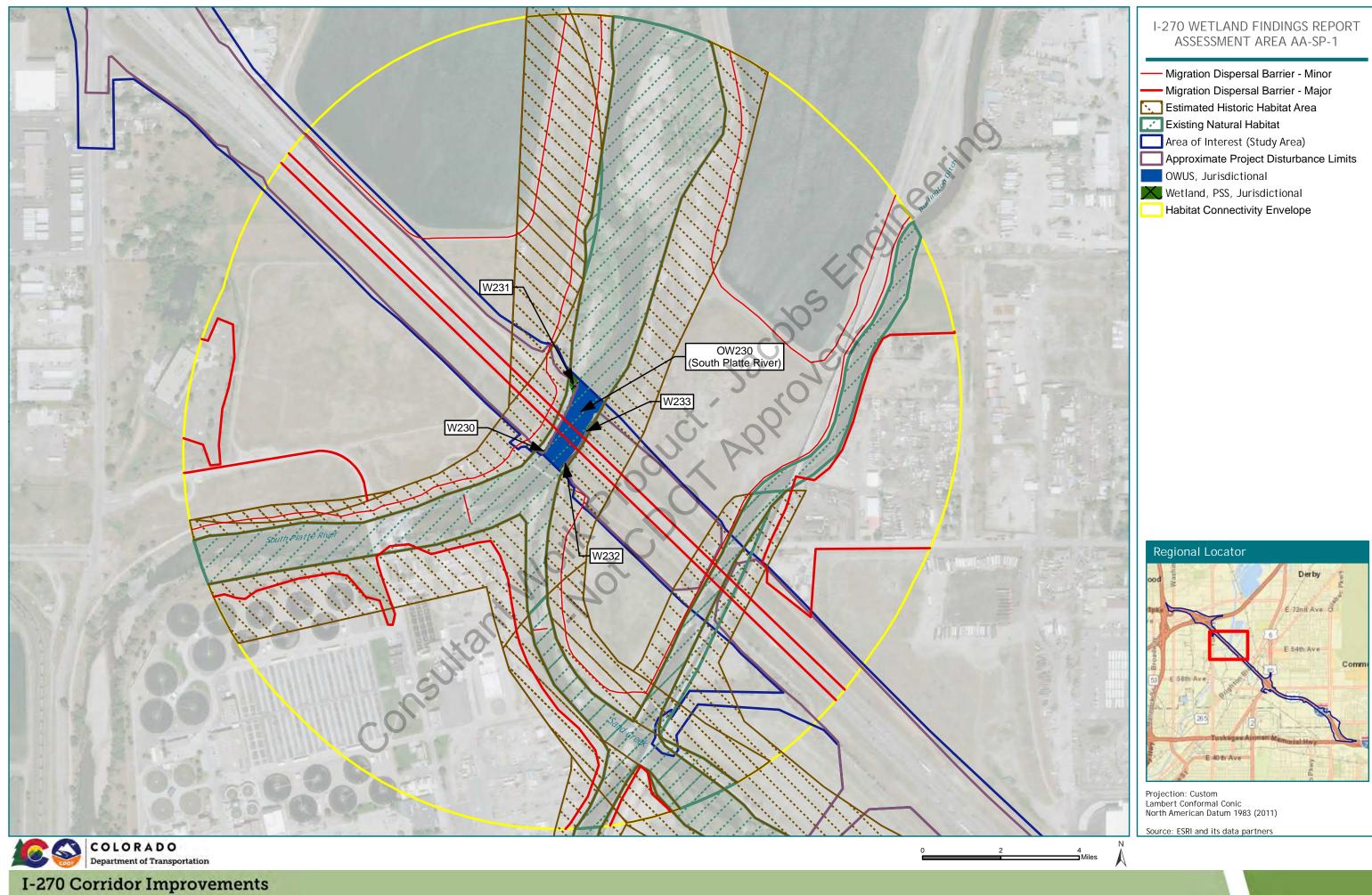
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).

6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIA	BLE SCORE	TABLE	
Buffer & _andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.70
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.65
λĒ	Variable 3:	Water Source (Source)	0.65
Hydrology	Variable 4:	Water Distribution (Dist)	0.80
I	Variable 5:	Water Outflow (Outflow)	0.75
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.60
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.68

# Functional Capacity Indices

r unctional capacity indices	
Function 1 Support of Characteristic Wildlife Habitat	Total Functional FCI
$V1_{connect}$ + $V2_{CA}$ + $(2 \times V8_{veg})$	Points
0.70 + 0.65 + 1.35 + + + +	$=$ 2.70 $\div$ <b>4</b> $=$ 0.68
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	
1.95 + 1.60 + 1.50 + 0.60 + 0.72 +	$= 6.37 \div 9 = 0.71$
Function 3 Flood Attenuation	
$V2_{CA} + (2 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V6_{geo$	V8 <sub>veg</sub>
0.65 + 1.30 + 1.60 + 1.50 + 0.60 +	$-0.68 = 6.33 \div 9 = 0.70$
Function 4 Short- and Long-term Water Storage	
$V3_{source}$ + (2 x V4 <sub>dist</sub> ) + (2 x V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
0.65 + 1.60 + 1.50 + 0.60 +	$=$ 4.35 $\div$ 6 $=$ 0.73
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA})$ + $(2 \times V4_{dist})$ + $V6_{geom}$ V7 <sub>chem</sub>	
1.30 + 1.60 + 0.60 + 0.72 +	$=$ 4.22 $\div$ 6 $=$ 0.70
Function 6 Sediment Retention/Shoreline Stabilization	
V2 <sub>CA</sub> + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.65 + 1.20 + 1.35 + + + +	<b>=</b> 3.20 ÷ <b>5</b> = 0.64
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
0.70 + 1.50 + 0.60 + 0.72 + 1.35 +	<b>=</b> 4.87 ÷ <b>7</b> = 0.70
	Sum of Individual FCI Scores 4.85
Divio	be by the Number of Functions Scored ÷7
	Composite FCI Score 0.69



SER: BARNEYPG - DATE: 3/11/202

# ADMINISTRATIVE CHARACTERIZATION

General Informat	ion	AA	-SC-3	Date of Evaluation:	1/21/2021	(	
Site Name or ID:	AA-SP-1: W23 W232, W233	0, W231,		Project Name:	I-270 (STU 2706	-043)	
404 or Other Permit Application #:	NA			Applicant Name:	CDOT	eel.	
Evaluator Name(s):	Brett Hartmann and Pat Hickey		Evaluator's prof	essional position and organization:	Biologists (Jacob	)S)	
Location Informa	tion:						
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	South Plat	Aggregated Score for multiple tte River Wetland polygons I: 39.814083, -104.951943) Geographic Datum Used (NAD 83): Elevation			NAD83 5110		
Location Information:		Riverine wet	lands associated	l with edges of th	e South Platte Riv	/er	
Associated stream/wa	ater body name:		Sand Creek		Stream Order:	Riverine	
USGS Quadrangle Map:	Commerce Cit	y, CO 2019	, C	Map Scale: (Circle one)	<mark>1:24,0</mark> 0 Other	<mark>00 </mark> 1:100,000 1:	
Sub basin Name (8 digit HUC):	HUC: 1019000	3		Wetland Ownership:	CDOT		
Project Information is being performed at: (Check applicable box)	on: X Project We Mitigation S		Purpose of       Evaluation       (check all       applicable):	Potentially Impa Mitigation; Pre-c Mitigation; Post- Monitoring Other (Describe)	construction construction		
Intent of Project: (Che	ck all applicable)		Restoration	En En	hancement	Creation	
Total Size of Wetland (Record Area, Check and I Measurement Method Use	Describe	ac.	Measured: .109 Estimated	9583			
Assessment Area (AA Area, check appropriate box. used to record acreage when included in a single assessme	Additional spaces are more than one AA is	ac.	Measured Estimated	ас. ас.	ac. ac. ac. ac.	ac. ac.	
Characteristics or Me AA boundary determin						ximty with in same assessment area	
Notes: Measu	red in collector	web map					

# ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply				
	ls including Histosols or he AA (i.e., AA includes			tened or endangere to occur in the AA?	d species are	
	directly impact organic eas possessing either h			Ute Lady's tresse	S	eerin
	Is are known to occur a wetland of which the AA			cern according to th P) are known to occ		op'
The wetland urbanized la	d is a habitat oasis in ar andscape?	otherwise dry or		ated within a potentiant occurrence buffer		diff
	reatened or endangere the AA? List Below.	d species are KNOWN	Other special of	concerns (please des	scribe)	9
					S	
	F	YDROGEOMOR	<b>RPHIC SETTIN</b>	G	~ ~	
		ental natural hydrogeor	·		.0,0	
		change in HGM classes bescribe the original we				
AA wetland	d was created from an	upland setting.	4	, s	0	
Current Co	nditions	Describe the hydroged that apply.	omorphic setting of th	ne wetland by circlin	ng all conditions	
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
	Hydrodynamics	Unidirectional	Vertical	Bi-directional		
	Wetland Gradient	0 - 29		4-10% >10	%	
	# Surface Inlets	Over-bank	0 1	2 3	>3	
HGM Setting	# Surface Outlets		0 1	2 3	>3	
	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	Wetlands associated associated wetlands a industrial facilities, and	re been confined bet	ween highway, wal		
	HGM class	Riverine	Slope	Depressional	Lacustrine	
Historical Co	onditions	1				
	Water source	Surface flow	Groundwater	Precipitation	Unknown	
Previous	Hydrodynamics	Unidirectional	Vertical			
wetland typology	Geomorphic Setting (Narrative Description)	Flood plane had been	encroached on by u	ban and industrial	development.	
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine	
Notes (include ir	nformation on the AA's	HGM subclass and re	jional subclass):			

# **ECOLOGICAL DESCRIPTION 2**

System	n Habitat D Subsystem	Class		WS habitat clas Ibclass		er Regin			Modifiers	% AA
P	P	E	30	RV	vvat		ie	Unel		
F	F	E.				E			h	75
		SS		BLD		E			h	25
										0
									+	
										2
									$\bigcirc$	
					<u> </u>			6	~	
Lacustrine	Littoral; Limnoral				_				saline(7) ; aline(8);	
		Rock Bot. (RB)		ng vascular;	Tempor	<b>xamples</b> arily flooded		Mixosaline	(9); Fresh(0); cid(a);	
Palustrine	Palustrine	Uncon Bottom(UB) Aquatic Bed(AB)	Algal;	ed vascular; Persistent;	Season	turated(B); ally flooded	(C)	Circum	neutral(c);	
		Rocky Shore(RS)		Persistent; wed deciduous;	Seas.	-flood./sat.(l	Ξ);		alcareous(i); ); Mineral(n);	
	Lower perennial;	Uncon Shore(US) Emergent(EM)		aved evergreen; ble - gravel;	Intermitte	erm. flooded ently expose	d(G);	Beaver(	b); Partially /ditched(d);	
Riverine	Upper perennial; Intermittent	Shrub-scrub(SS) Forested (FO)	Sa	nd; Mud;	Artificia Sat./sem	ally flooded( iperm./Seas	K); 5. (Y);	Far	med(f);	
			C	Organic		sed/permen			pounded(h); Substrate(r);	
								Spoil(s):	Excavated(x)	
									( )	
Site Man	Drou	u o okotoh mon of t	ha aita inalu	iding relevant of	rtions of th	e wetland	AA bo			bitot
		v a sketch map of ti ses, and other sign			ortions of th	e wetland,	AA bo			bitat
					ortions of th	e wetland,	AA bo			bitat
					ortions of th	e wetland,	AA bo			bitat
					prtions of th	e wetland,	AA bo			bitat
					prtions of th	e wetland,	AA bo			
		ses, and other sign			prions of th	e wetland,	AA bo			
					prtions of th	e wetland,	AA bo			
		ses, and other sign			prtions of th	e wetland,	AA bo			
		ses, and other sign			prtions of th	e wetland,	AA bo			
Scale: 1 sq. =		ses, and other sign			ortions of th	e wetland,				
		ses, and other sign				e wetland,				
		ses, and other sign			prtions of th	e wetland,				Ditat
		ses, and other sign				e wetland,				Ditat
		ses, and other sign								
		ses, and other sign								Ditat       Image:
		ses, and other sign								Ditat
		ses, and other sign					AA bo			Ditat
		ses, and other sign								Ditat       Image:
		ses, and other sign				e wetland,				Ditat

# Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

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# SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

#### **Rules for Scoring:**

1. On the aerial photo, create a 500 m 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 no 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 can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	<b>A</b> Reference Standard	Very little or no loss of wetlands in the HCEor negligible.
<0.9 - 0.8	<b>B</b> 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	<b>C</b> 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	<b>D</b> 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	F Non- functioning	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).
Mathat		
Notes:		

# Variable 1: Habitat Connectivity p. 2

### SV 1.2: Migration/Dispersal Barriers

This sub-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.

neering

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.

	$\checkmark$	Stressors		Comments/description					
	х	Major Highway		I-270					
= artificial barriers	х	Secondary Highway		6					
arrie	х	Tertiary Roadway		adjacent					
pa		Railroad							
cial	х	Bike Path		Colorado Front Range Trail					
tifi	х	Urban Development		Located in an urban setting					
ar	х	Agricultural Developr	nent	upstream					
u v		Artificial Water Body							
Stressors	х	Fence		multiple properties					
es	х	Ditch or Aqueduct		feed by ditch					
Sti	х	Aquatic Organism Ba	rriers	infrastructure and flow controls					
V	ariabla		I						
	ariable Score	Condition Grade	Scorin	ng Guidelines					
1.	.0 - 0.9	A Reference Standard	No appreciable barriers exist between the AA and other wetland and riparian habitats the HCE; or there are no other wetland and riparian areas in the HCE.						
		Reference Standard							
				impeding migration/dispersal between the AA and up to 33% of surrounding /riparian habitat highly permeable and easily passed by most organisms.					
<0	).9 - 0.8	B		Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More					
		Highly Functioning	significant barriers (see "functioning category below) could affect migration to up to 10% of						
			surroun	ding wetland/riparian habitat.					
		1		to migration and dispersal retard the ability of many organisms/propagules to pass					
				n the AA and up to 66% of wetland/riparian habitat. Passage of organisms and les through such barriers is still possible, but it may be constrained to certain					
<0	).8 - 0.7	C		day, be slow, dangerous or require additional travel. Busy two-lane roads,					
		Functioning		d areas, small to medium artificial water bodies or small earthen dams would					
				nly rate a score in this range. More significant barriers (see "functioning impaired"					
			categor	y below) could affect migration to up to 10% of surrounding wetland/riparian					
				to migration and dispersal preclude the passage of some types of					
	).7 - 0.6	D		ns/propagules between the AA and up to 66% of surrounding wetland/riparian Travel of those animals which can potential negotiate the barrier are strongly					
<0	).7 - 0.6	Functioning Impaired		d and may include a high chance of mortality. Up to 33% of surrounding					
		·		/riparian habitat could be functionally isolated from the AA.					
H			AA is es	sentially isolated from surrounding wetland/riparian habitat by impermeable					
$\mathbf{\Gamma}$		F		n and dispersal barriers. An interstate highway or concrete-lined water					
	<0.6	Non-functioning	-	ance canal are examples of barriers which would generally create functional					
			isolation	between the AA and wetland/riparian habitat in the HCE.					
-									
		SV 1.1 Score	0.60	Add SV 1.1 and 1.2					
		341.130016	0.00	scores and divide by					
		SV 1.2 Score	0.70	two to calculate variable score Variable 1 Score 0.65					

# Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

#### **Rules for Scoring:**

Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
 Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.

. 3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.

4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.

5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.

6.Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.

7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.

8.Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.

9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the average of the two sub-variable scores.

#### SV 2.1 - Buffer Condition

0.7 SV 2.1 - Buffer Condition Score

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	Reference Standard	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	Highly Functioning	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	Functioning	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	Functioning Impaired	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	Non-functioning	Buffer is nearly or entirely absent.

### SV 2.2 - Buffer Extent

0.

,60 Percent of AA with Buffer	Subvariable Score	Condition Class	% Buffer Scoring Guidelines
	1.0 - 0.9	Reference Standard	90 - 100% of AA with Buffer
	<0.9 - 0.8	Highly Functioning	70-90% of AA with Buffer
.70 SV 2.2 - Buffer Extent	<0.8 - 0.7	Functioning	51-69% of AA with Buffer
.10 SV 2.2 - Buller Extern	<0.7 - 0.6	Functioning Impaired	26-50% of AA with Buffer
	<0.6	Non-functioning	0-25% of AA with Buffer

			ontrib				-	,,			
SV 2	3-4	verage	Buffer W	lidth		Record	measu	ired buffer	widths in	the spaces below and ave	rage.
Buffer Width		5	10	2	2	5	8	5	10	6	
Line #	• •	1	2	3	4	5	6	7	8	Avg. Buffer Width (m)	
Line #			2	5	-	-	-	I	0	Avg. Bullet widdi (ili)	
						Subvar Sco		Conditio	n Grade	Buffer Width Scoring Guide	elines
	1.	SV 2.3	- Avera	ae Bu	ffer	1.0 -		Reference	Standard	Average Buffer width is 190-	elines -250m -189m 100m 30m
0.6 SV 2.3 - Average Buf Width Score										-189m	
						<0.8 -	0.7	Functio	oning	Average Buffer width is 31-1	100m
						<0.7 -	0.6	Functioning	Impaired	Average Buffer width is 6-3	
						<0.	6	Non-fund	tioning	Average Buffer width is 0-	-5m
SV 2	4 - 3	Surround	ding Lan	d Use	1						
	I SI	/2.4 - 5	Surrour	ndina		Catalog	and o	haraatari <del>z</del> a	land use	changes in the surroundin	
0.7			Jse Sco	•		landsca			ianu use	changes in the surroundin	9
		Stresso		-	Comm	ents/de	script	ion			
	х		al/comme	ercial				onment		Ca	-1
es	Х	Urban			Urban	Environr	ment				
= Land Use Changes		Resider	ntial								<u> </u>
ĊĻ		Rural Dryland	Farming							$-\mathcal{O}^{\cdot}$	
Jse			e Agricul								
קר			ds or Nur								
Lar			ck Grazin	-	adjacent to I-270 adjacent to public space and trail						
II S	X		ortation C								
Stressors	X X		Parklands			ntrol stru			all		
tres	x		Water b						transpor	tation corridors and runr	noff
Ś	х	Physical F	Resource E	xtraction				and const	ruction		
	х	Biological	Resource	Extraction	Urban	Environr	ment			*	
							-				
varı Sc	able ore	Condition	on Grade				S	coring G	uideline	S	
1.0	0.0		A	No oppre	vojabla lap			haan imnaa	od Surrou	nding Landacana	
1.0	0.9		erence ndard	NO appre		use char	nge nas	been impos	ed Sunou	nding Landscape.	
									•	ndscape, but changes have m	
<0.9	- 0.8		<b>B</b> unctioning							stic aquatic functioning, either grazing, or low intensity silvice	
			<u></u>			-				an 10% of the area.	
<b>.</b> .	<b>.</b> -		c.							hift in land use, however, the lation and it is not an overt source	
<0.8	- 0.7		tioning	pollutant	ants or sediment. Moderate-intensity land uses such as dry-land farming, urban "green" ors, or moderate cattle grazing would commonly be placed within this scoring range.						een"
							<u> </u>		, ,	aced within this scoring range been substantial including the a	
		KO.	D	moderate	e to high co	overage (u	up to 50	%) of imperi	neable sur	faces, bare soil, or other artific	
<0.7	- 0.6		tioning		urfaces; considerable in-flow urban runoff or fertilizer-rich waters common. Supportive apacity of the land has been greatly diminished but not totally extinguished. Intensively gged areas, low-density urban developments, some urban parklands and many cropping tuations would commonly rate a score within this range.						
	V	- imp	aired	logged a							.g
	)		F	The Surr	ounding La	andscape	is esser	ntially comle	tely develo	ped or is otherwise a cause of	
<0	.6		<b>r</b> nctioning					nabitats. Co less than 0.		developments or highly urban	
		Buffer S	core		unding						<b>—</b>
		(Lowest s			d Use						
			1		1	_		_			
	-							\/			
	(	0.6	+	0.7	) ÷	2		= Var	iable	2 Score 0.6	55

# Variable 3: Water Source

This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and 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. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

### 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.

eerino

<b>\</b>	Stressors	Comments/description
$\times$	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
$\times$	Dams	Dam in place to control flow
×	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
×	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
×	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
×	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
×	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

Variable Score	Condition Grade	Depletion	Augmentation
1.0 - 0.9	<b>A</b> 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	<b>B</b> 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	<b>C</b> 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	D 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
<0.6	<b>F</b> 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 3 Score 0.7

# Variable 4: 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 within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.

#### Scoring rules:

soui the 0.85	rce, <b>in most</b> Water Sourc 5. Additional	t cases the Water Sou the variable is rated at 0	ute water in a characteristic fashion is fundamer <b>urce variable score will define the upper limit</b> 0.85, the Water Distribution score will usually hav tside the lower end of the AA effecting water dis	Water Distribution score. For example, if e the potential to attain a maximum score of	
1. lo 2. C	Considering	acts to the natural di all of the stressors	istribution of water throughout the AA and o identified, assign an overall variable score score will set the upper limit for the Water I	using the scoring guidelines. In most	neerino
$\mathbf{i}$	Stresso	rs	Comments/description		)K
×	Alteration	of Water Source	surrounding lands and water stucture	es in constant flux due to construction	
×	Ditches		ditches fee	d hydrology	
×	Ponding/In	npoundment	caused at diversion an	d stormwater structures	
×	Culverts		runoff from culverts c	ontributes to hydrology	
×	Road Grad	les	adjacent and feed by run of	from road and path grading.	
	-	cision/Entrenchment		trenchment. Substrate prone to erosion.	
		Engineered Channel		age flow and armor banks	-11
	Enlarged C			n places to slow flow	-11
×		anks/Shoreline	heavily manag	ed urban creek	-11
	Weirs	(5			-
X	Dikes/Leve		Berms and grading	contain Sand Creek	-
×	Diversions	Fill Accumulation	runoff from	-	
	Sediment		Turior Torritori	and an setting	
Vari	able Score	Condition Grade	Non-riverine	Riverine	
	1.0 - 0.9	<b>A</b> 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 duratio and intensity.	n
<	:0.9 - 0.8	B Highly Functioning	Less than 10% of the AA is affected by <i>in situ</i> 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	<b>C</b> Functioning	Between 10 and 33% of the AA is affected by <i>in situ</i> 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.	
Š	:0.7 - 0.6	D Functioning Impaired	33 to 66% of the AA is affected by <i>in situ</i> 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	ı.
	<0.6	<b>F</b> 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	4 Score 0.7	

# Variable 5: Water Outflow

This variable is concerned with **down-gradient** hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. 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, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. 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. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, **in most cases the Water Source variable score will define the upper limit Water Outflow score**.

### 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.

V	Stres	sors	Comments/description
	Alterati	ion of Water Source	
	Ditches		
	Dikes/l	_evees	
	Road C	Grades	
	Culver	ts	× N
	Diversi	ons	
	Constr	ictions	
$\times$	Chann	el Incision/Entrenchment	substrate prone to erosion
$\times$		ned/Engineered Channel	Urban environment
		al Stream Banks	
	Weirs		
	Confine	ed Bridge Openings	
	riable core	Condition Grade	Scoring Guidelines
			Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water
1.0	- 0.9	A Reference Standard	outflow regime.
	9 - 0.9 9 - 0.8		outflow regime. High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.9		Reference Standard B	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal")
<0.9 <0.9	9 - 0.8	Reference Standard B Highly Functioning C	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character. High- or low-water outflows are moderately affected, mild alteration of intermediate level

Variable 5 Score

0.95

# Variable 6: 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, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations 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 these resultant effects of geomorphic change, rather focus on the physical impacts within the **footprint** of the alteration within the **AA** – For example, the width and depth of a ditch or the size of a levee within the **AA** would describe the extent of the stressors. The secondary 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 can be significant but not immediately obvious.

#### **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.

			Stressor	s	Comments					
$\times$	1	Dredg	ing/Excavation	/Mining	appears to be created from mining mitigation associated with highway					
$\times$		Fill, in	cluding dikes, ı	oad grades, etc	Adjacent to roadways and under highway					
$\times$		Gradi	ng		road and walking trail adjacent					
$\times$		Comp	action		due to construction and siturbance					
	ers	Plowi	ng/Disking							
×	General	Exces	sive Sediment	ation	loose sediment from runoff and erosion					
	G	Dump	ing							
		Hoof	Shear/Pugging							
		Aggre	gate or Minera	l Mining						
×		Sand	Accumulation		loose sediment from runoff and erosion					
		Chan	nel Instability/O	ver Widening	erosion prone substrate					
	≥	Exces	sive Bank Eros	sion	erosion prone substrate					
×	Only	Chan	nelization		<ul> <li>erosion prone substrate</li> </ul>					
×	<u>s</u>	Recor	nfigured Stream	n Channels	Urban environment					
×	ne	Artific	ial Banks/Shore	eline	Urban environment					
×	Channels	Beave	er Dam Remov	al	Urban environment					
	U U		rate Embeddeo							
×		Lack or Excess of Woody Debris			Urban environment					
Vari	able	Score	Condition Grade		Scoring Guidelines					
1	1.0 - (	0.9	<b>A</b> Reference Standard	wetland function	sentially unaltered from the natural state, or alterations appear to have a minimal effect on ning and condition. Patch or microtopographic complexity may be slightly altered, but native ies are still supported.					
<	:0.9 -	0.8	<b>B</b> Highly Functioning		pography result in small but detectable changes to habitat conditions in some or all of the vere impacts exist but affect less than 10% of the AA.					
<	0.8 -	0.7	<b>C</b> 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.					
V	:0.7 -	At least one important surface type or landform has been eliminated or created; microtopography has be strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the A Evidence that widespread diminishment or alteration of native plant community exist due to physical has alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the would score in this range or lower.								
	<0.6	ô	F Non- functioning		norphic alterations have caused a fundamental change in site character and functioning, Iting in a conversion to upland or deepwater habitat.					
					Variable 6 Score					

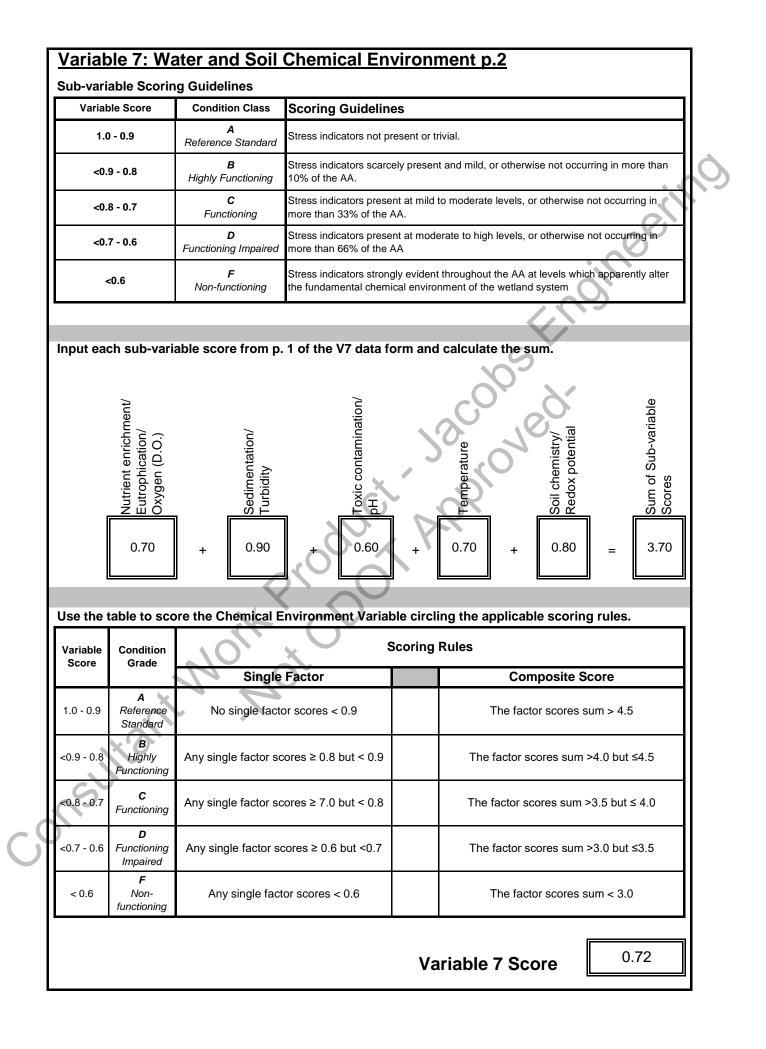
### Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. 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 stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

#### Scoring rules:

~,C

For each sub-variable, coring sheet. Scoring su If the AA is part of a wat	ub-variables is carried out in exa	coring	guideline table provided on the seco e same way as normal variable scori l or recommended for TMDL develop	ng.		ori	()
. Transcribe sub-variable	e scores to the following variable		ng page and compute the sum. ne composite of sub-variables influer	ices the score		0,	
vithin that range.	Stressor Indicator	1	Comments	Sub-		Jana	MEAN
	Livestock	x	agriculture upstream	variable	pg 89	pg106	•
	Agricultural Runoff	x	agriculture upstream	Score	P3 00	19.00	791
SV 7.1	Septic/Sewage	x	placed in an urban enviroment				
Nutrient Enrichment/	Excessive Algae or Aquatic Veg.	~		0.70			
Eutrophication/	Cumulative Watershed NPS	х	urban environment				
Oxygen (D.O.)	CDPHE Impairment/TMDL List	x	Clear Creek				
		^					
	Excessive Erosion	Х	unstable banks				
	Excessive Deposition						
	Fine Sediment Plumes						
SV 7.2 Sedimentation/ Turbidity	Agricultural Runoff	Х	agriculture upstream				
	Excessive Turbidity	X	urban run off	0.90	6		
	Nearby Construction Site	X	urban environment				
	Cumulative Watershed NPS	x	urban environment				
	CDPHE Impairment/TMDL List	x	Clear Creek				
		~					
	Recent Chemical Spills	х	urban environment				
	Nearby Industrial Sites	x	urban environment				
	Road Drainage/Runoff	x	adjacent to roadways, run off di	Jλ			
	Livestock	x	agriculture upstream				
	Agricultural Runoff	X	agriculture upstream				
SV 7.3	Storm Water Runoff	x	urban environment				
Toxic contamination/	Fish/Wildlife Impacts	X	urban environment	0.60			
pН	Vegetation Impacts	x	weedy	/======"			
	Cumulative Watershed NPS	x	urban environment	/			
	Acid Mine Drainage			1/			
	Point Source Discharge	x	sewer treatment plant, Urban e	1/			
	CDPHE Impairment/TMDL List	х	Clear Creek	1/			
	Metal staining on rocks and veg.			Y			γιαιι
	Excessive Temperature Regime	X					
	Lack of Shading	х	tree removal				
0) ( 7 4	Reservoir/Power Plant Discharge	x	stormwater	0.70			
SV 7.4	Industrial Discharge	х	urban/industrial environment	0.70			
Temperature	Cumulative Watershed NPS	х	urban environment				
	CDPHE Impairment/TMDL List	х	Clear Creek	1/			
				1			
	Unnatural Saturation/Desaturation			$\land$			
SV 7.5	Mechanical Soil Disturbance	х	urban environment				
Soil chemistry/	Dumping/introduced Soil	X	construction	0.80			
	-	х	Clear Creek	1 /	1		



#### Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wet ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being e. It particularly focuses on the wetla normally, composition and core of experiation regardiant ratio and in the monthly of present in the right regardiant additional assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables each corresponding to a stratum of vegetation: Tree Canopy, Shrub Layer, Herbaceous Layer, and Aquatics.

#### Rules for Scoring:

	or vegetation				regional subclass. This variable has four sub-variable rbaceous Layer; and Aquatics.
Rules for Scoring:					
additional layers were historica	ally preser	nt using dir	rect evider	nce such	n the AA. Make a judgment as to whether as stumps, root wads or historical photographs. o be used in this determination.
<ol> <li>Estimate and record the cu</li> <li>Record the Reference Star weighting factor. The condition minor components.</li> </ol>	urrent cove ndard or ex on of predo	rage of ea pected pe minant ve	ach vegeta ercent cov getation la	ation layer erage of e ayers has	each vegetation layer to create the sub-variable a greater influence on the variable score than o
5. Enter the percent cover val Cover of Layer". Note, percer					or table labeled " Reference/expected Percent 6 (1.0).
the appropriate boxes of the s one measure of stratum altera	stressor tab ation.	ole. The d	lifference b	between t	py layers, indicating their presence with checks he expected and observed stratum coverages i
	n sub-varia	ble score i	in the app	ropriate c	sing the scoring guidelines on the second page ell of the row labeled "Veg. Layer Sub-variable
	These are t	he weighte	ed sub-vai		ts Veg. Layer Sub-variable scores and enter the res. Individually sum the <i>Reference Percent</i>
9. Divide the sum of "Veg. L Variable 8 score. Enter this n					overage of all layers scored. This product is the of this page.
	V	/egetatio	n Layers	5	
Current % Coverage of Layer	0.25	0	0.85	0	
Stressor	0.25 Tree	Shrub	Herb	Aquatic	Comments
Noxious Weeds			5%		Canada thistle
Exotic/Invasive spp.					
Tree Herset					
Tree Harvest Brush Cutting/Shrub Removal					
Tree Harvest Brush Cutting/Shrub Removal Livestock Grazing					
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory					
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying			20%		
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory			20%		
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering			70%		
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization	20%				
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering	20%	0.03	70%	0	
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND	0.35	0.15 +	70% 20% 0 0.85 +	0.00	= 1.45
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected %	0.35 0.45 + x 0.8	0.15 + x 0.5	0 0.85 0.85		
Brush Cutting/Shrub Removal Livestock Grazing Excessive Herbivory Mowing/Haying Herbicide Loss of Zonation/Homogenization Dewatering Over Saturation DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED Reference/Expected % Cover of Layer Veg. Layer Sub-	0.35 0.45 + x	0.15 + x	70% 20% 0 0.85 + x	0.00 x	= 1.45

#### Variable 8: Vegetation Structure and Complexity p. 2

variable 8 Scoring Guideline

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	A 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	B 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	<b>C</b> 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 vegetatio 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 (is stressors are confined to patches comprising less than 25% of the wetland.
D <0.7 - 0.6 Functionin 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	F 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.

# **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, ering 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.

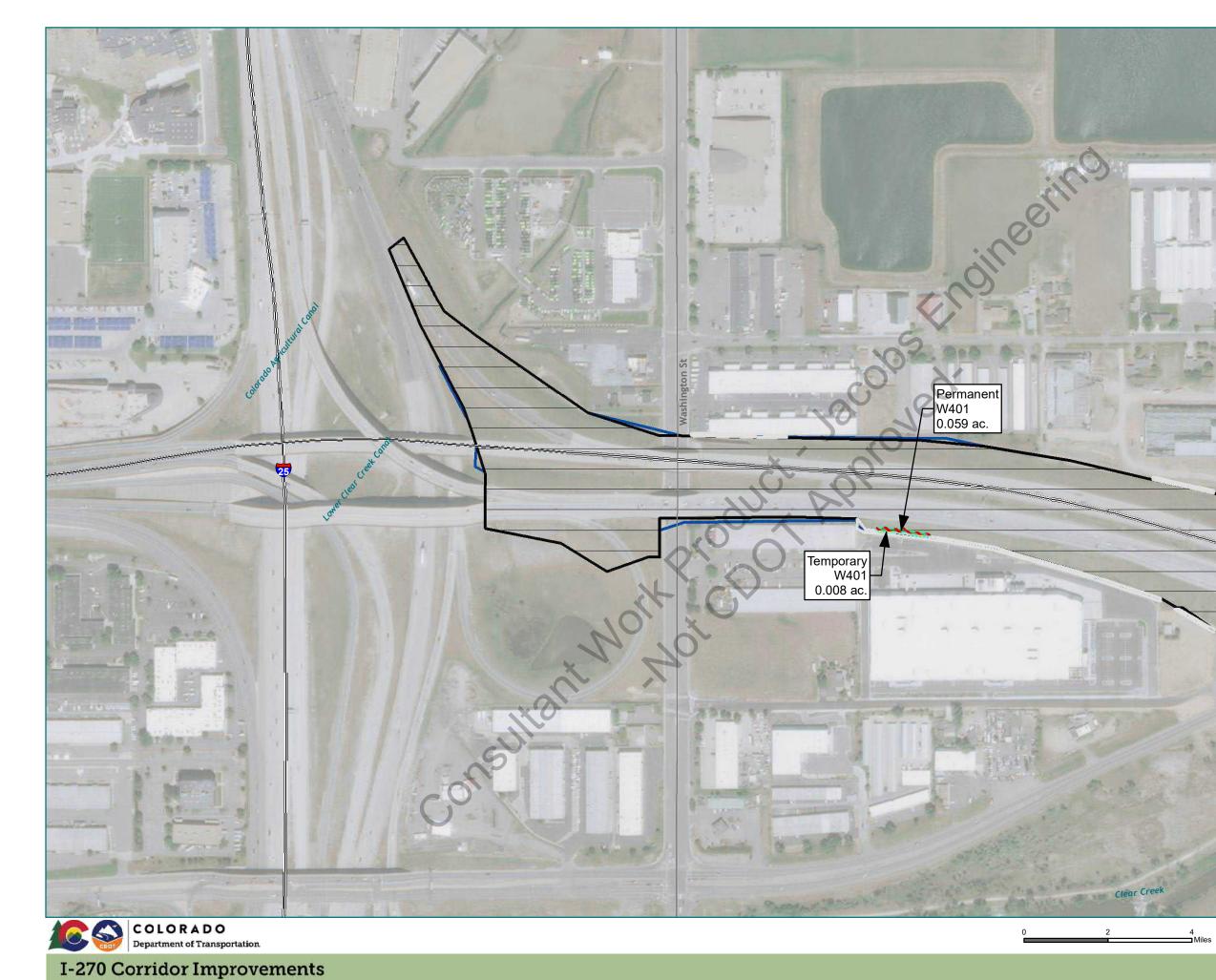
VARIA	BLE SCORE	TABLE	
Buffer & _andscape Context	Variable 1:	Habitat Connectivity (Connect)	0.65
Buffer Landsca Conte:	Variable 2:	Contributing Area (CA)	0.65
Λť	Variable 3:	Water Source (Source)	0.70
Hydrology	Variable 4:	Water Distribution (Dist)	0.70
I	Variable 5:	Water Outflow (Outflow)	0.95
and Biotic abitat	Variable 6:	Geomorphology (Geom)	0.70
ic and E Habitat	Variable 7:	Chemical Environment (Chem)	0.72
Abiotic a Ha	Variable 8:	Vegetation Structure and Complexity (Veg)	0.80

# Functional Capacity Indices

Function 1 Support of Characteristic Wildlife Habitat	FCI
V1 <sub>connect</sub> + V2 <sub>CA</sub> + (2 x V8 <sub>veg</sub> ) Points	1
0.65 + 0.65 + 1.60 + + + = 2.90 ÷ 4 =	0.72
Function 2 Support of Characteristic Fish/aquatic Habitat	
$(3 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem}$	
2.10 + 1.40 + 1.90 + 0.70 + 0.72 + = 6.82 ÷ 9 =	0.76
Function 3 Flood Attenuation	
$V2_{CA} + (2 \times V3_{source}) + (2 \times V4_{dist}) + (2 \times V5_{outflow}) + V6_{geom} + V8_{veg}$	
	0.76
Function 4 Short- and Long-term Water Storage	
V3 <sub>source</sub> + (2 × V4 <sub>dist</sub> ) + (2 × V5 <sub>outflow</sub> ) V6 <sub>geom</sub>	
	0.78
Function 5 Nutrient/Toxicant Removal	
$(2 \times V2_{CA}) + (2 \times V4_{dist}) + V6_{geom} V7_{chem}$	
$1.30 + 1.40 + 0.70 + 0.72 + + = 4.12 \div 6 = $	0.69
Function 6 Sediment Retention/Shoreline Stabilization	
$V_{2_{CA}}$ + (2 x V6 <sub>geom</sub> ) + (2 x V8 <sub>veg</sub> )	
0.65 + 1.40 + 1.60 + + + = 3.65 ÷ 5 =	0.73
Function 7 Production Export/Food Chain Support	
$V1_{connect} + (2 \times V5_{outflow}) + V6_{geom} + V7_{chem} + (2 \times V8_{veg})$	
0.65 + 1.90 + 0.70 + 0.72 + 1.60 + = 5.57 ÷ 7 =	0.80
Sum of Individual FCI Scores	5.24
Divide by the Number of Functions Scored	÷7
Composite FCI Score	0.75

Appendix E Wetland Impacts Maps and Impact Summary Table

Wetland Impac



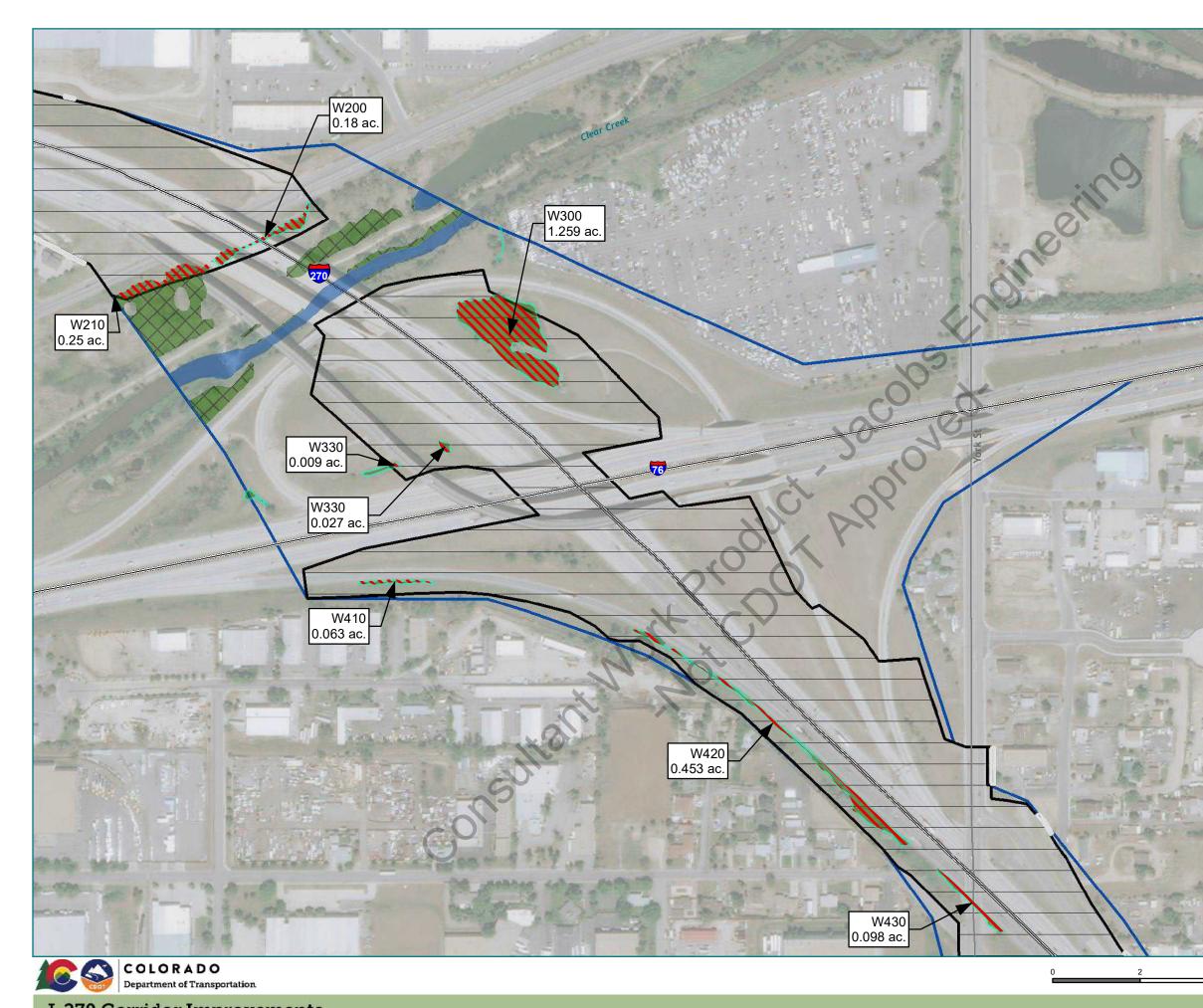
# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

Jurisdictional Other Waters Non-Jurisdictional Other Waters Jurisdictional PEM Wetland Jurisdictional PSS Wetland Non-Jurisdictional Wetland **W** Permanently Impacted Temporarily Impacted Permanent Impact Area Temporary Impact Area Study Area



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners



I-270 Corridor Improvements

# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

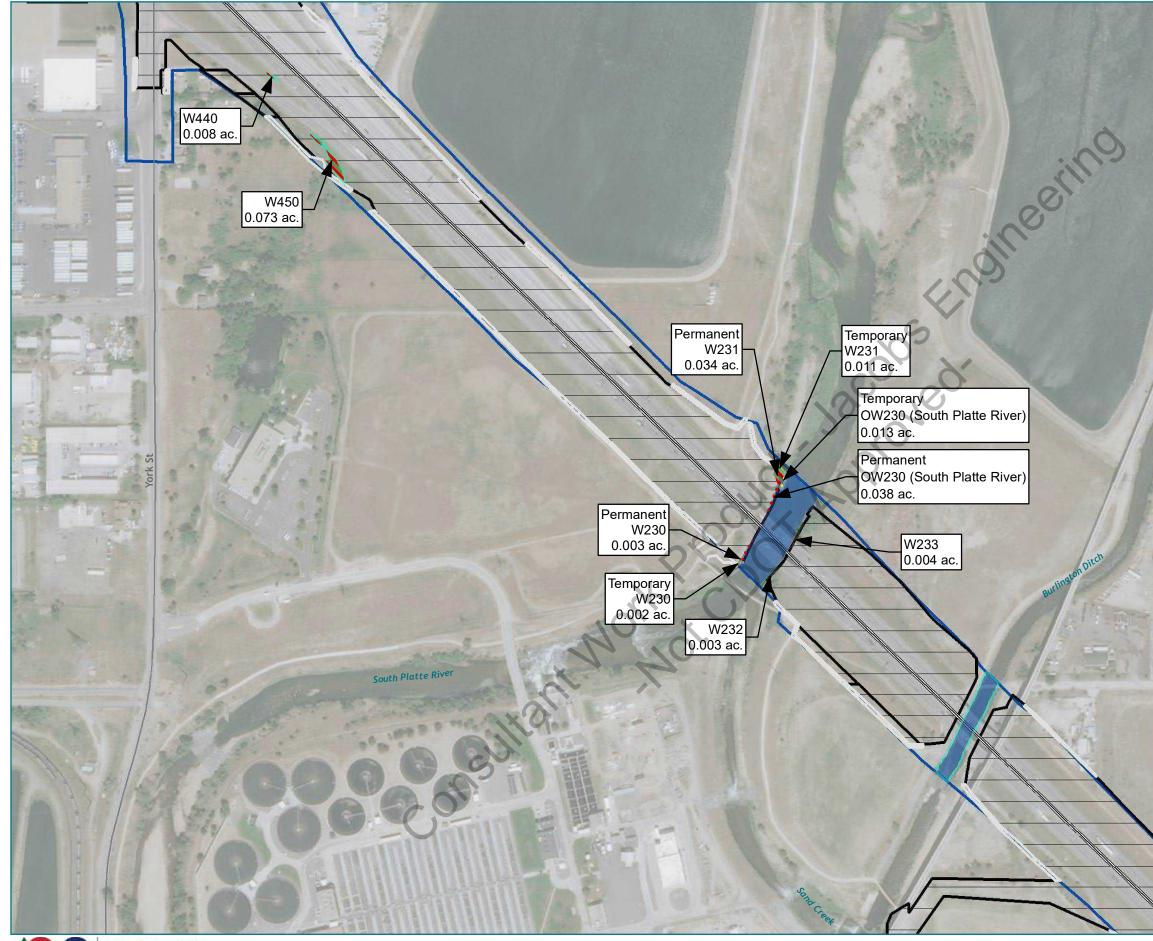
Jurisdictional Other Waters
Non-Jurisdictional Other Waters
Jurisdictional PEM Wetland
Jurisdictional PSS Wetland
Non-Jurisdictional Wetland
Permanently Impacted
Temporarily Impacted
Permanent Impact Area
Temporary Impact Area
Study Area



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

4 Miles





I-270 Corridor Improvements

# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

Jurisdictional Other Waters
 Non-Jurisdictional Other Waters
 Jurisdictional PEM Wetland
 Jurisdictional PSS Wetland
 Non-Jurisdictional Wetland
 Permanently Impacted
 Temporarily Impact Area
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 Study Area

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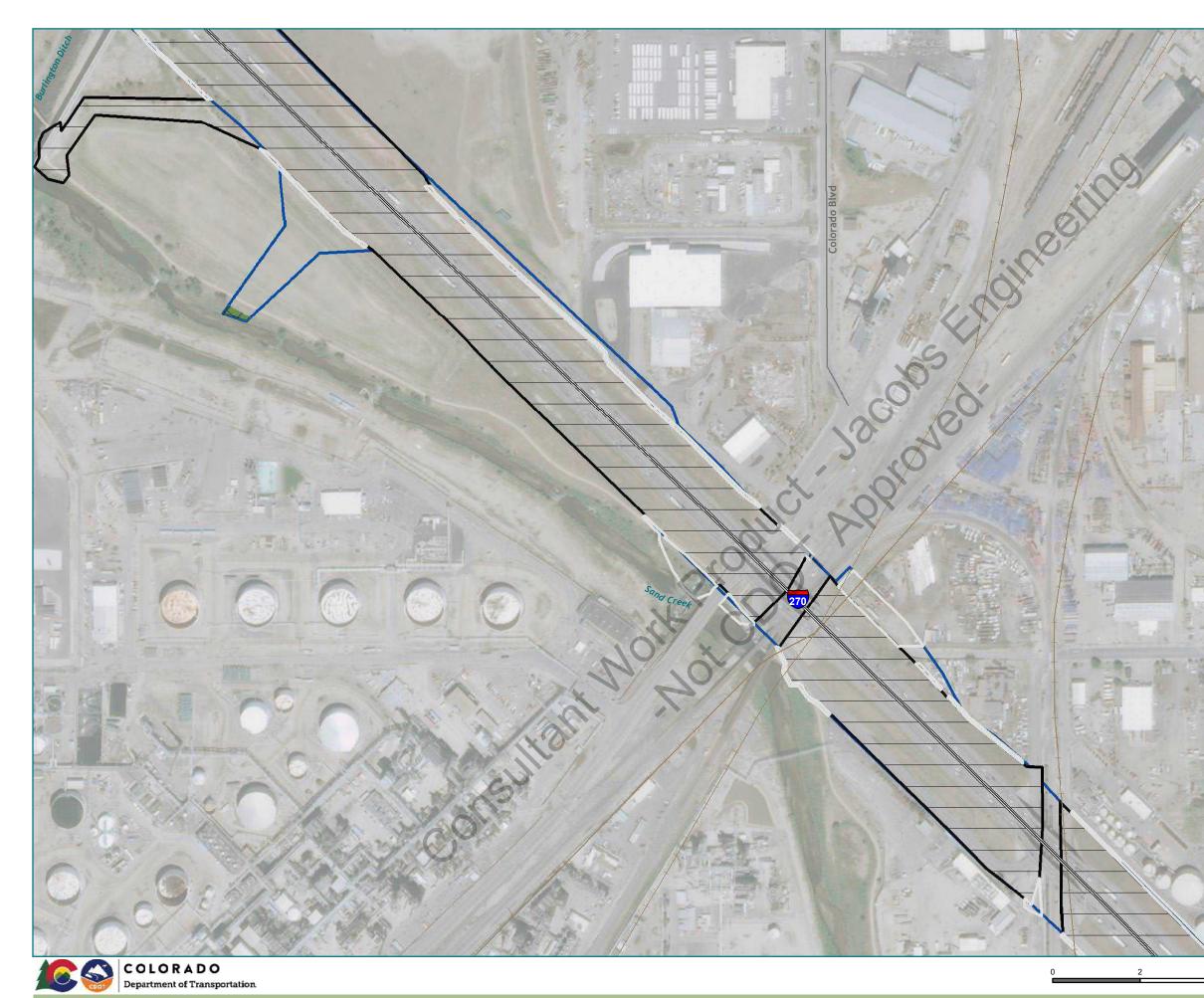
4 Miles

2



Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners



I-270 Corridor Improvements

# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

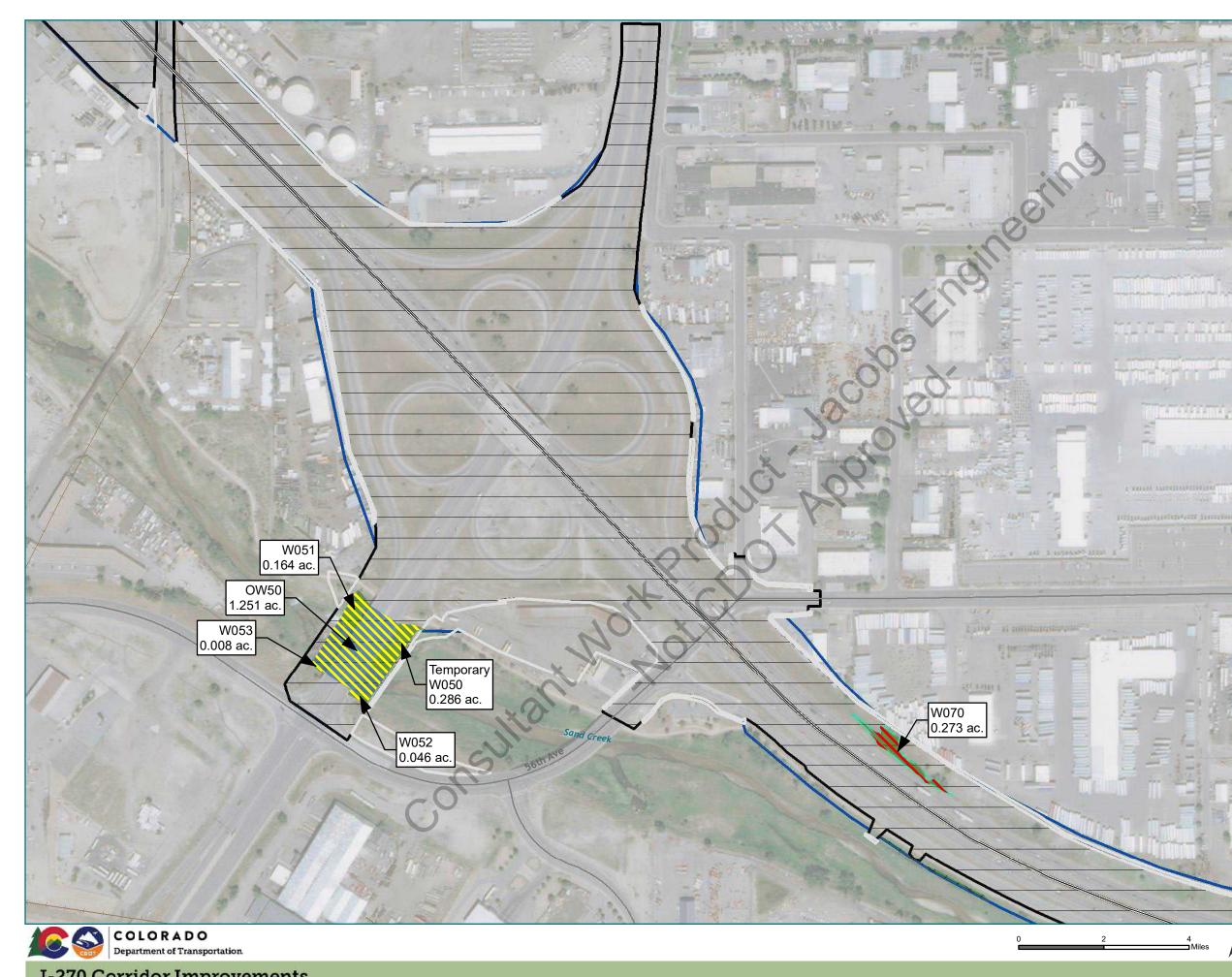




Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

4 Miles



I-270 Corridor Improvements

# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

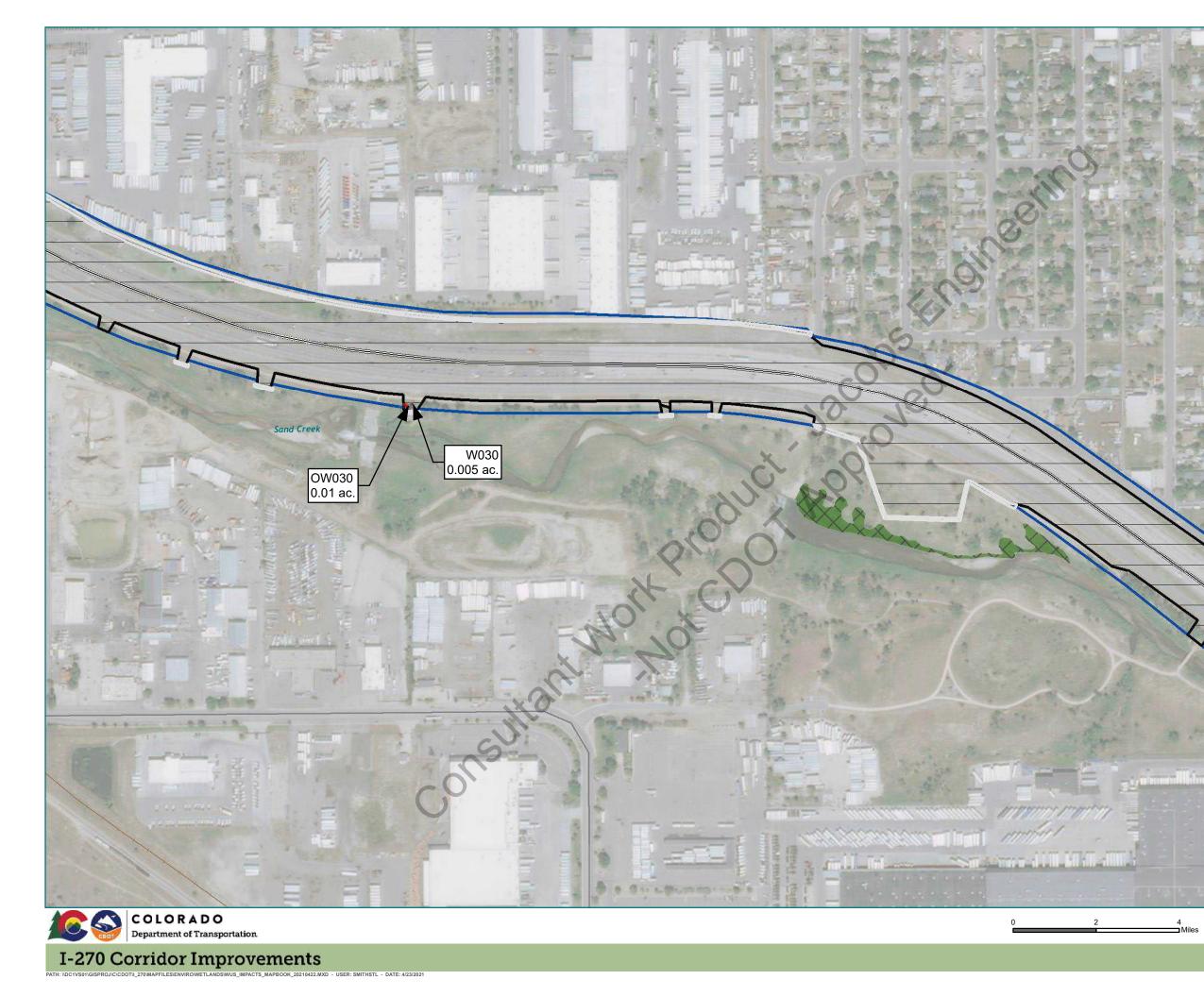




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Source: ESRI and its data partners

4 Miles



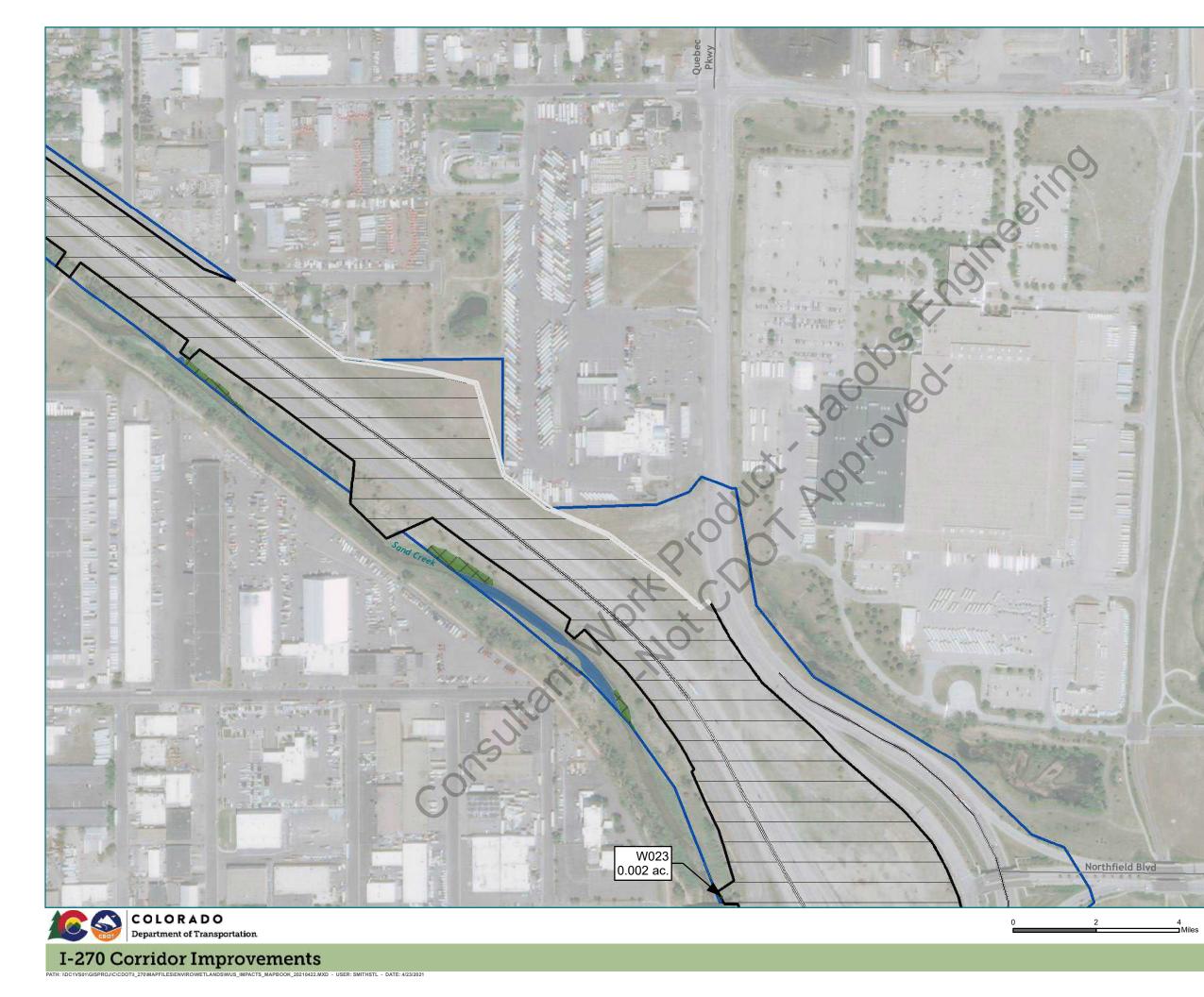
# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

Jurisdictional Other Waters Non-Jurisdictional Other Waters Jurisdictional PEM Wetland Jurisdictional PSS Wetland Non-Jurisdictional Wetland **W** Permanently Impacted Temporarily Impacted Permanent Impact Area Temporary Impact Area Study Area



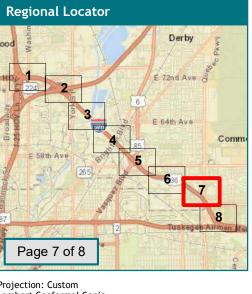
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Source: ESRI and its data partners



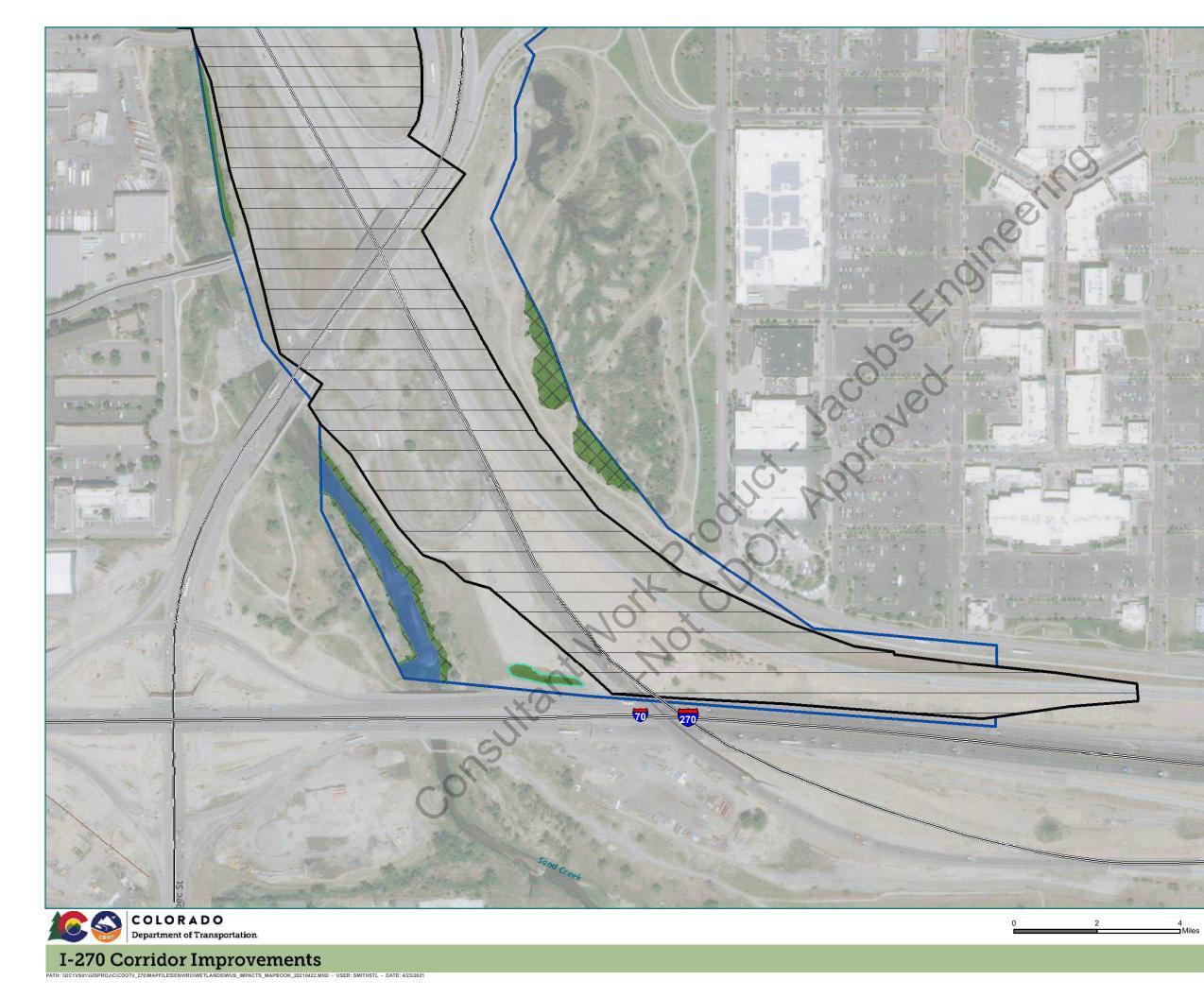
# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

Jurisdictional Other Waters
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 Permanent Impact Area
 Temporary Impact Area
 Study Area



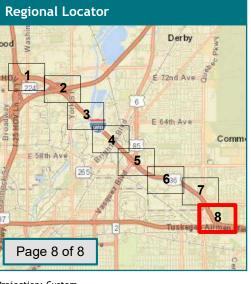
Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners



# I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK





Projection: Custom Lambert Conformal Conic North American Datum 1983 (2011)

Source: ESRI and its data partners

Kitigati. consultant work of Preliminary Onsite Wetland Mitigation Concept Summary



# COLORADO **Department of Transportation** Region 1

# I-270 Preliminary Wetland Mitigation Concepts ineerin

PREPARED FOR:	CDOT Region 1
COPY TO:	FHWA CO Division
PREPARED BY:	EA Team
DATE:	June 14, 2021

The purpose of this memorandum is to summarize preliminary conceptual wetland mitigation alternatives for the I-270 Corridor Improvements project (project) in accordance with Executive Order 11990 and CDOT's agreement with FHWA which requires 1 to 1 replacement of all wetlands.

The mitigation evaluation process identified potential mitigation, including onsite locations within or immediately adjacent to the study area that appear to have potential for wetland restoration, creation, enhancement, or preservation. The evaluation looked for signs of anthropogenic related ecological stress that may have led to altered or degraded wetland conditions. This evaluation was completed with both desktop evaluation and onsite inspections. Through this process, several mitigation alternatives were developed to meet compensatory wetland mitigation needs. These alternatives are briefly summarized in this document.

Based on preliminary design concepts, permanent impacts resulting from this project are anticipated to be approximately 122,000 square feet (2.803 acres). Temporary impacts are anticipated to be approximately 22,700 square feet (0.525 acre). Permanent impacts to other waters are anticipated to be approximately 2,000 square feet (.048 acre). Temporary impacts to other waters are anticipated to be approximately 55,000 square feet (1.264 acres). These impacts, which will be refined as project design progresses, are the result of likely grading needed to accommodate the widened highway, as well as related infrastructure such as bridges, culverts, and utilities.

It is assumed that roadside ditch and stormwater related wetlands will be mitigated through the reestablishment of new roadside drainage wetlands and other stormwater facilities. It is also assumed that SB40 mitigation needs may be accommodated within the onsite wetland mitigation concepts. If offsite, wetland mitigation bank credits are used for the project, then additional SB40 mitigation (riparian plantings) may be needed.

All potential mitigation concepts and locations discussed in this document would require further evaluation prior to site selection and design.

# **Onsite Mitigation Alternatives**

# Concept 1: Sand Creek Floodplain Wetland Enhancement

Sand Creek generally follows the south side of I-270 through most of the urbanized project corridor and presents opportunities for wetland and riparian restoration or enhancement. The creek and adjacent floodplain wetlands are degraded due to urban development which has channelized Sand Creek and affected water quality and stormwater runoff hydrology. Therefore, wetland mitigation was prioritized in areas that offered an opportunity to help improve water quality, abate the urban stormwater flooding and help restore original floodplain conditions. Two sites (A and B) were identified as higher priority locations due to CDOT property ownership and proximity to stormwater management outlets and water quality facilities.

#### Site A: Sand Creek Floodplain Milepost 3.4

Site A (Figure 1) may offer the most cost-effective option for wetland mitigation due to the fact that CDOT already owns most of the floodplain at this location. Wetland mitigation at this location would seek to restore historic floodplain wetlands. The primary hydrology sources would be Sand Creek seasonal flooding and shallow floodplain groundwater. The project also plans to locate a permanent water quality control basin or vault at this location, which could outlet into the wetland mitigation area to provide a secondary source of hydrology and also help to provide secondary water quality treatment and stormwater flood abatement. The site is also located adjacent to a Commerce City Park and the Sand Creek Regional Greenway Trail, which provides opportunity for community engagement and education.

#### Site B: Sand Creek Floodplain Milepost 3.9

Site B (Figure 2) also involves some existing CDOT property but would likely require a land acquisition or work with Commerce City to develop a wetland conservation easement. This site is also located at the outlet of a proposed permanent water quality and stormwater detention facility. Therefore, like Site A, this site offers opportunities to restore historic floodplain wetlands, provide secondary water quality treatment, and potentially additional stormwater flood abatement.

#### Concept 2: Vasquez Bridge Channel and Riparian Restoration.

#### Site C: Sand Creek Floodplain at the Vasquez Bridge

A large metal sheet-pile weir exists just downstream of the Vasquez Bridge. There has been some discussion of removing this structure and replacing it with a more natural grade control feature such as a rock ramp that would allow for fish passage and improve other ecological functions (refer to light blue area on Figure 3). Such an activity may serve as mitigation along with some ecological enhancement of the adjacent floodplain, including expanded floodplain wetland area. Area of wetland restoration is undetermined.

#### **Concept 3: Clear Creek Floodplain Wetland Enhancement**

#### Site D and E: Clear Creek Floodplain Left and Right Bank

A large section of the Clear Creek floodplain near the I-270 interchange with I-76 is somewhat disconnected from the stream on both the north and south banks (Figure 4). An opportunity may exist to improve floodplain connectivity, create new riparian wetlands, and enhance existing wetlands. A gravel pond exists on river left, north, that presents an opportunity for enhancement with the creation of wetlands to change the gravel pond into a more natural floodplain wetland and pond. The enhancements would improve many functions including water quality, flood abatement, and habitat availably and continuity. The concept involves connecting the river to its natural floodplain; therefore, this proposal may require some floodplain analysis.

#### Concept 4: Interchange Infield Wetland

#### Site F: Infield Wetland at I-270 and I-76 Interchange

A few stormwater related wetland areas exist within the infield of the I-270/I-76 Interchange. This condition presents an opportunity to increase the size of the stormwater wetland features and enhance the existing wetlands (Figure 5). These features would provide secondary water quality treatment and would help to abate stormwater surges in Clear Creek, but otherwise have limited ecological function due to the location in the infield of two major highways.



Figure 1: Aerial Image of Site A

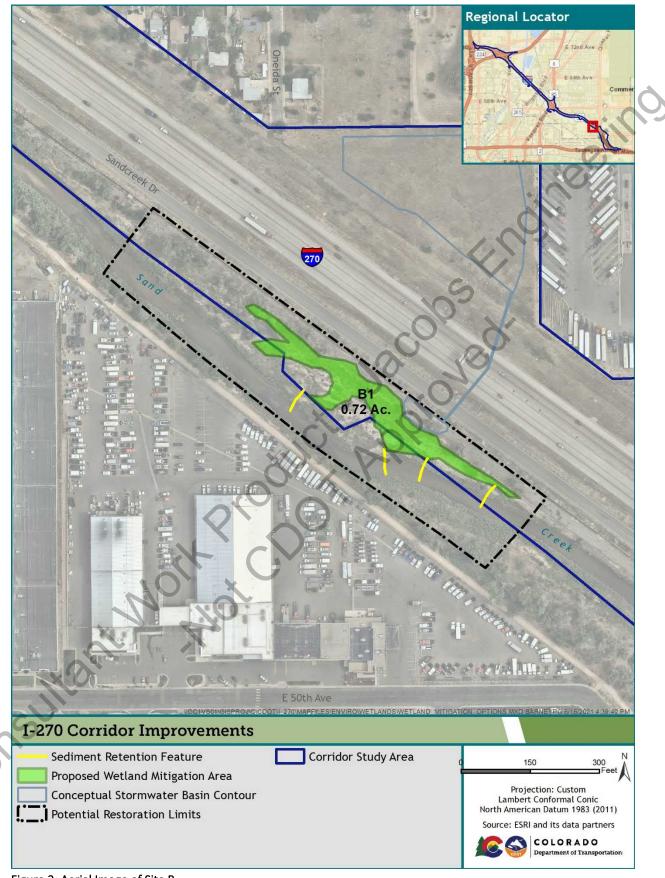
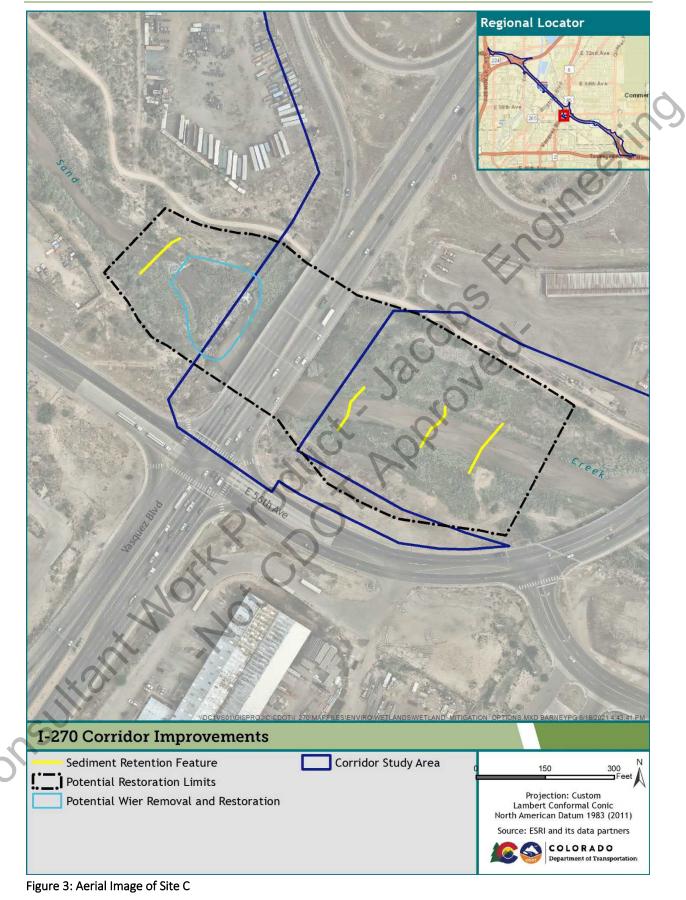
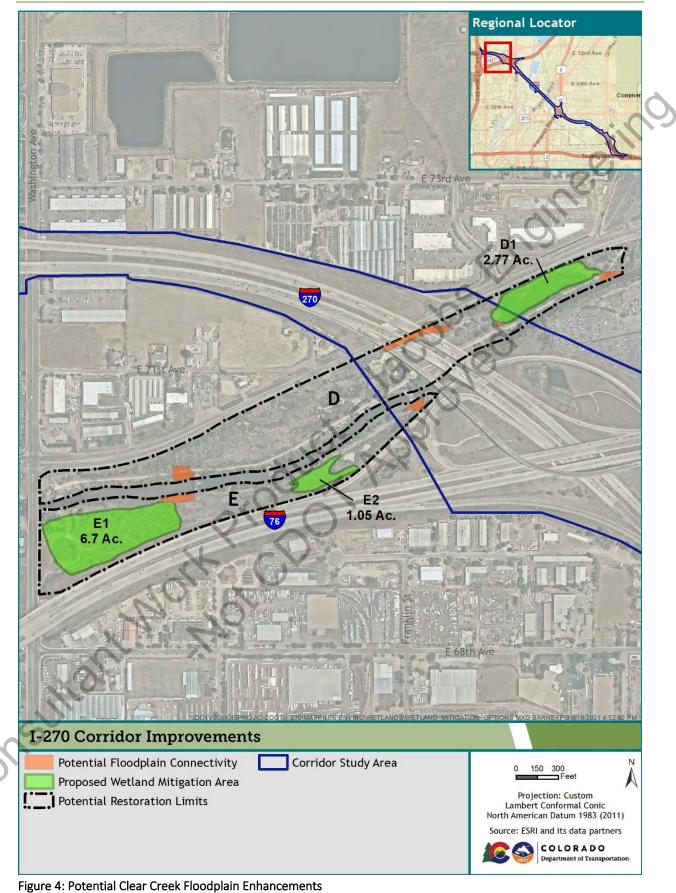


Figure 2: Aerial Image of Site B





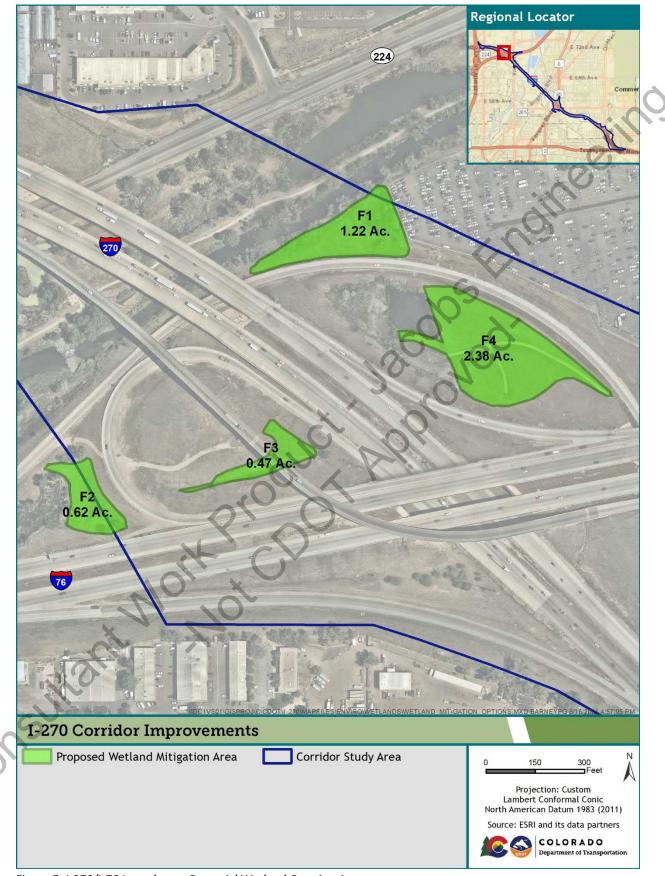


Figure 5: I-270/I-76 Interchange Potential Wetland Creation Areas

# Offsite Mitigation Alternatives

#### **Concept 5: Wetland Mitigation Bank Credits**

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