APPENDIX A16

WETLAND TECHNICAL MEMORANDUM

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INTRODUCTION AND BACKGROUND

The I-70 West Vail Pass Auxiliary Lanes project is located in Eagle and Summit Counties, with the eastern terminus just east of the Vail Pass Rest Area and the western terminus in the Town of Vail. The project study limits include eastbound (EB) and westbound (WB) I-70 from mile post (MP) 179.5 to MP 191.5. The project location and approximate study area are shown in **Figure 1**.

As part of the initial National Environmental Policy Act (NEPA) analysis, a Tier 1 Environmental Impact Statement (EIS) for the I-70 Mountain Corridor (C-470 to Glenwood Springs) was completed in 2011. This EIS, the *I-70 Mountain Corridor Programmatic Final Environmental Impact Statement* (PEIS), recommended the addition of auxiliary lanes EB and WB on the west side of Vail Pass from MP 180 to MP 190 as part of the Preferred Alternative's Minimum Program of Improvements. The PEIS also identified the potential for an elevated Advanced Guideway System (AGS) for transit along the I-70 corridor, including the West Vail Pass project corridor. A follow-up AGS Feasibility Study in 2014 analyzed potential alignments and costs for an AGS system and determined there were three feasible alignments for future AGS. While AGS is not part of the West Vail Pass Auxiliary Lanes project, the AGS Feasibility Study was used to ensure the project did not preclude the favored alignment of the three, which would be partially within CDOT right-of-way (ROW).

A Tier 2 NEPA analysis is the next step required to move highway improvements forward. The project is following the CDOT and Federal Highway Administration (FHWA) NEPA process to confirm the needs for improvements to the West Vail Pass, identify a Proposed Action, investigate the anticipated benefits and impacts of the proposed improvements (through an Environmental Assessment), produce conceptual design plans, and make funding, scheduling, and phasing recommendations.

This memorandum describes the wetland and other water features present in the study area, summarizes the potential impacts to those resources from the Proposed Action, and identifies preliminary mitigation strategies to improve overall stream and wetland conditions. Wetlands are defined by the US Environmental Protection Agency (EPA) and US Army Corps of Engineers (Corps) as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (EPA 2019)." For this project, other water features are defined as rivers, streams, creeks, channels, ponds, reservoirs, or other water bodies that either hold water or carry water regularly enough to generally lack vegetation.

I-70 FINAL PEIS AND RECORD OF DECISION (TIER 1 ANALYSIS)

The I-70 Mountain Corridor PEIS Wetlands and Other Waters of the U.S. Technical Report identified the following for the I-70 Mountain Corridor (Corridor):

- Methods used to identify wetlands, fens, and other waters of the U.S. and determine potential impacts of Action Alternatives.

- Coordination with local, state, and federal agencies.
- Description of wetlands and other waters of the U.S. in the Corridor.
- Consequences of the Action Alternatives evaluated in the I-70 Mountain Corridor PEIS.
- Considerations for Tier 2 processes.
- Proposed mitigation strategies for wetlands and other waters of the U.S.

The following were identified as potential impacts for the entirety of the Corridor:

- Loss of wetlands, fens, and other waters of the U.S.
- Reduced function of wetlands, fens, and other waters of the U.S.
- Changes in surface and subsurface hydrology and water quality (for example, inflows, sedimentation, and winter maintenance) that result in loss of either area or function.
- Indirect impacts of sedimentation and stormwater runoff on wetlands and other waters of the U.S. during construction, during road maintenance operation, and post-construction.

The I-70 Mountain Corridor Record of Decision (ROD) identified mitigation strategies that would address potential wetland and waters of the U.S. impacts during the Tier 2 NEPA analysis. All mitigation measures recommended in this document are consistent with the mitigation strategies identified in the I-70 Mountain Corridor ROD.

As part of the I-70 Mountain Corridor Context Sensitive Solutions Process and ROD commitments, this project is subject to the Stream and Wetland Ecological Enhancement Program (SWEEP), which represents an effort by FHWA and CDOT to involve various federal, state, county, and local agencies, as well as local interest groups, in identifying water-related issues associated with improvement projects in the I-70 Mountain Corridor. The SWEEP Memorandum of Understanding (MOU) between FHWA/CDOT and multiple other stakeholders was signed in 2011. The signatories agreed on a desire to "improve stream and wetland conditions" in the corridor. Thus, the MOU requires them to identify and recommend mitigation strategies for potential impacts to water quality and natural habitats (including wetlands) from their projects, and to address data gaps regarding general watershed health.

LEGISLATION

The following federal and state regulations or policies may apply to wetlands and other water features:

- Section 404 of the Clean Water Act (CWA) – The CWA regulates waters of the United States (including wetlands) such that the placement of dredged or fill material into waters of the US requires authorization from the Corps.
- CDOT also has wetland-specific requirements beyond those required by the CWA. For instance, a Wetland Finding Report is required if permanent wetland impacts exceed 500 square feet, or if temporary and permanent impacts combined exceed 1,000 square feet. The Wetland Finding is required by CDOT to comply with Executive Order 11990. CDOT requires compensatory wetland mitigation for all permanent impacts to wetlands, regardless of Corps

jurisdiction, and as defined in the 2019 Memorandum of Agreement (MOA) between the Colorado Division of FHWA and CDOT (FHWA 2019). This MOA allows for the programmatic approval of Wetland Findings by the CDOT Wetland Program Manager if the project meets all of the following criteria:

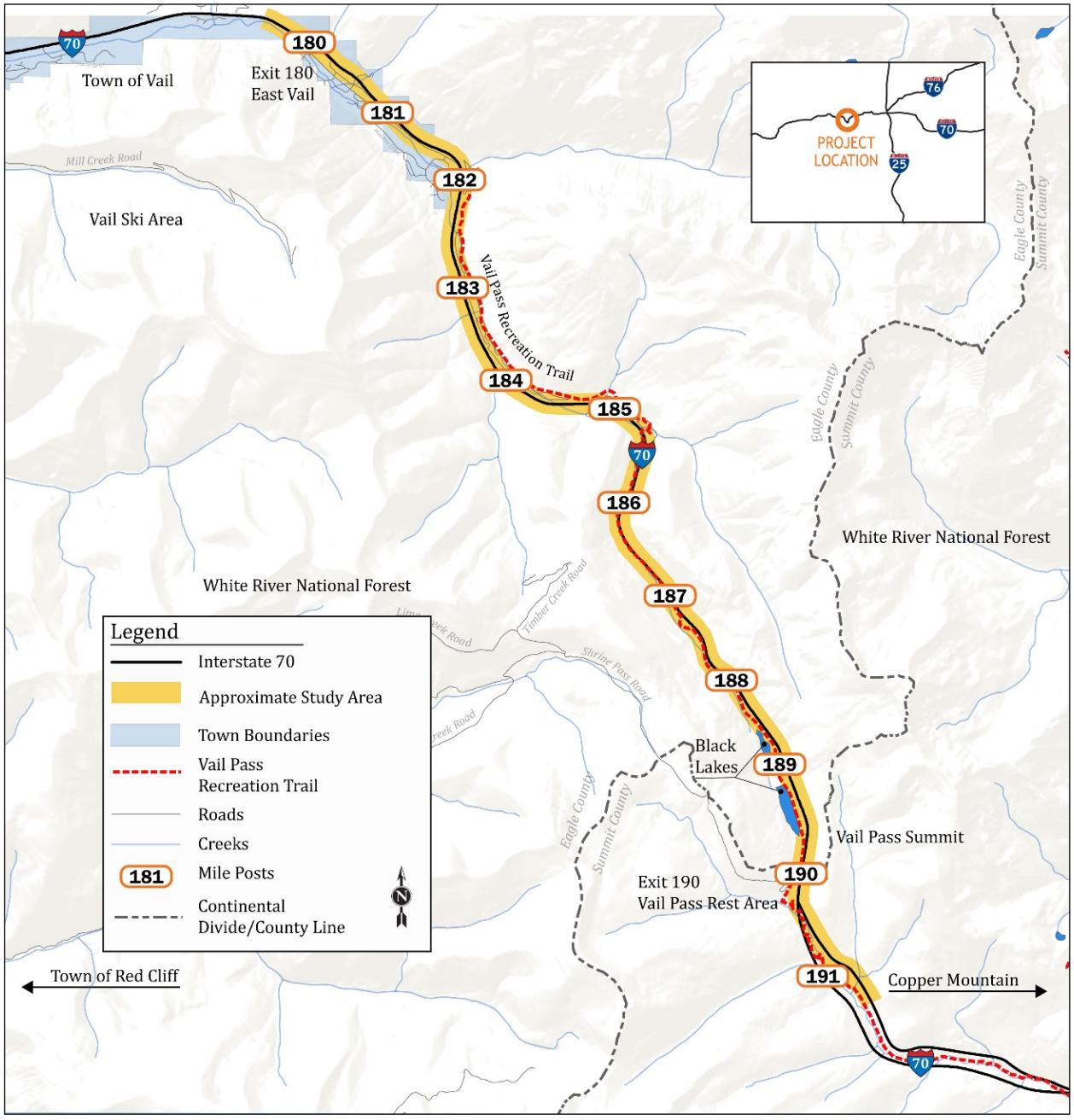
- The project is being prepared as a categorically-excluded minor project as defined in 23 CFR 771.117.
- Project activities will involve at least 500 square feet (SF) of permanent wetland impacts or 1,000 SF of combined temporary and permanent wetland impacts. Projects with wetland impacts less than above do not require a Wetland Finding.
- Less than one acre of wetlands will be impacted either temporarily, permanently, or in a combination of the two.
- All practicable alternatives to avoid and minimize impacts have been addressed and documented in the Wetland Finding, as specified by EO 11990 and the FHWA Technical Advisory T6640.8A.
- The wetland compensatory mitigation ratio is no less that 1:1, regardless of jurisdictional status, unless the mitigation plan will replace functions with a lower mitigation ratio.
- No state or federally threatened or endangered species will be affected by project activities.
- The project will not impact a Gold Medal Trout Stream, a designated National Wild and Scenic River, or other areas of special ecological concern (i.e. fen wetland, fish spawning ground, etc.)
- The project does not require a CWA Section 404 permit or the project is authorized under a Section 404 Nationwide Permit.

If the project does not meet these criteria, a Non-Programmatic Wetland Finding must be prepared and requires approval from the FHWA Division Administrator.

Study Area

The study area for wetlands and other water features encompasses over 1,251 acres and includes approximately 12 miles of I-70 from approximately the East Vail Interchange (MP 180) to just east of the Vail Pass Rest Area exit (MP 191.5), as depicted on **Figure 1**. The width of the study area varies depending on the topography, the existing highway alignment, and other factors. The detailed study area boundary is shown on the maps in **Appendix A**.

Figure 1. Project Location and Study Area



Source: DEA Project Team

Purpose and Need

The purpose of the project is to improve safety and operations on EB and WB I-70 on West Vail Pass.

This project is needed to address safety concerns and operational issues due to geometric conditions (steep grades and tight curves) and slow-moving vehicle and passenger vehicle interactions that result in inconsistent and slow travel times along the corridor. The I-70 Mountain Corridor PEIS identified safety and mobility issues on West Vail Pass related to speed differentials due to slow-

moving vehicles. *(Mobility is defined as the ability to travel along the I-70 Mountain Corridor safely and efficiently in a reasonable amount of time.)*

- Safety Concerns: A high number of crashes occur along the corridor related to speed, tight curves, narrow roadway area, and inclement weather/poor road conditions. Speed differentials between passenger vehicles and slow-moving vehicles cause erratic lane changes and braking maneuvers resulting in crashes and spin outs. Emergency response is hampered by vehicular speeds and lack of roadway width to provide room for emergency vehicles to pass.
- Operational Issues: The steep grades and resulting speed differentials causes slow and unreliable travel times through the corridor. Tight curves also cause drivers to slow down. The corridor is frequently closed by vehicle incidents, due to lack of width to maintain a single lane of traffic adjacent to emergency responders, resulting in substantial traffic backups and delays. During winter months, the travel lanes and shoulders are severely impacted by snow accumulation, impacting the overall capacity of the corridor. *(Operations is intended to describe the flow of traffic at desirable speeds given the geometric and prevailing weather conditions.)*

No Action Alternative

The No Action Alternative is included as a baseline for comparison to the action alternative. Under the No Action Alternative, only programmed projects that are planned and funded by CDOT or other entities would be completed. Currently, there are no large-scale transportation projects to add safety improvements, operational improvements, vehicular capacity, and multimodal facilities along I-70 within the project area. The No Action Alternative would leave West Vail Pass as it currently is configured and would not provide substantial improvements beyond typical current maintenance (e.g. resurfacing and plowing) activities. The roadway would remain the same, with 2 EB and 2 WB lanes (each 12 feet in width), an inside shoulder typically 4 feet in width, and an outside shoulder typically 10 feet in width.

Proposed Action Alternative

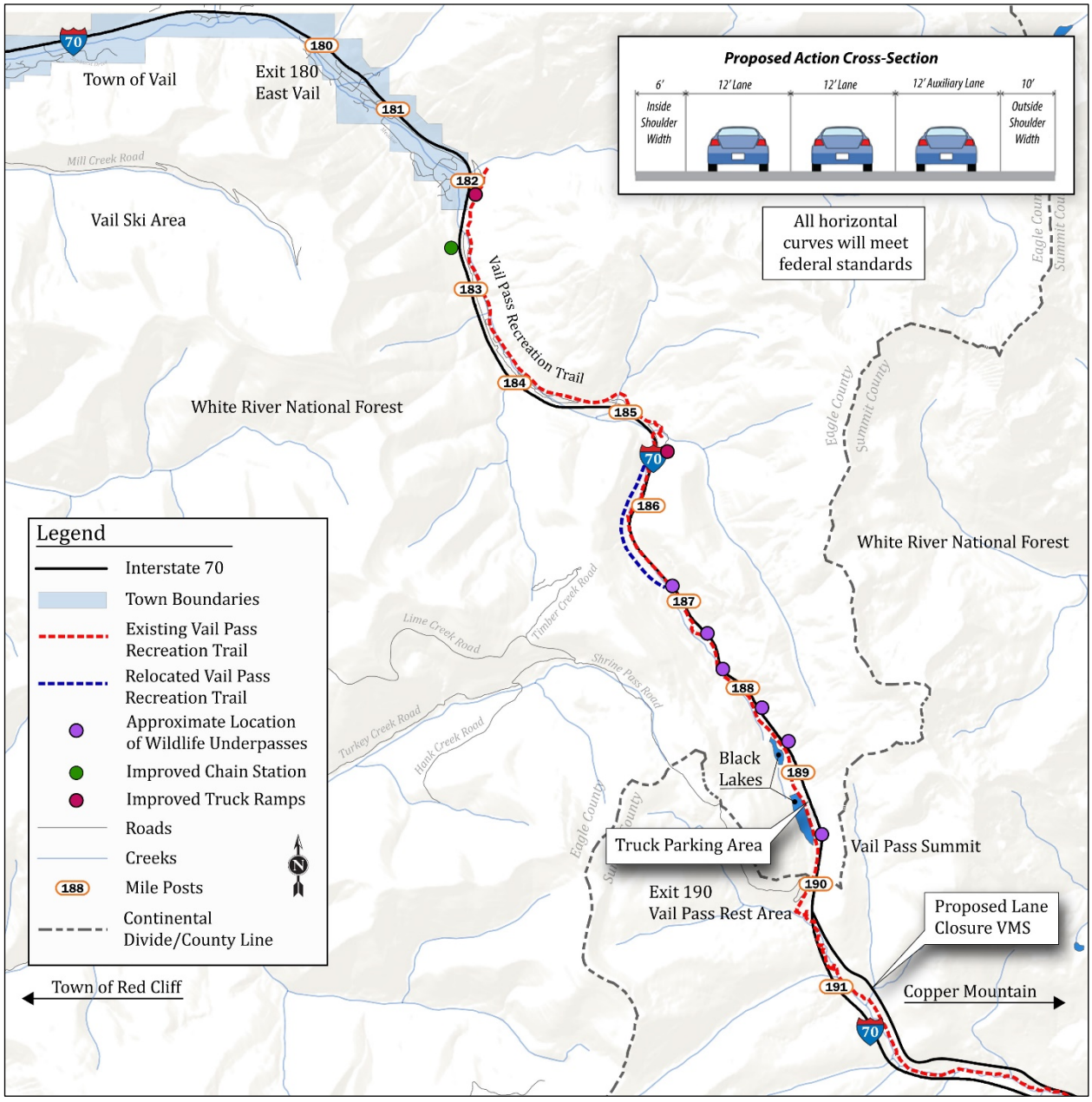
The Proposed Action (**Figure 2**) will add a 12-foot auxiliary lane, both EB and WB, for 10 miles from approximately the East Vail exit (MP 180) to the Vail Pass Rest Area exit (MP 190). Existing lanes will be maintained at 12 feet and the shoulders would be widened to a minimum of 6 feet for inside shoulders and maintained at 10 feet for outside shoulders. All existing curves will be modified as needed to meet current federal design standards.

Intelligent Transportation System equipment will also be installed along the I-70 project corridor, consistent with recent study recommendations. Additional variable message signs (VMSs) will be installed at key locations to warn drivers of upcoming curves, grades, and incidents. Additional variable speed limit signs will be installed to manage driver speeds to conditions. Automated lane closure signage will be installed approaching the East Vail exit on EB I-70 and approaching the WB I-70 Vail Pass Rest Area exit to quickly and efficiently close lanes when needed.

Additional elements of the Proposed Action include:

- The Vail Pass Recreation Trail will be directly impacted by the addition of the I-70 auxiliary lane and therefore relocated for approximately two miles from MP 185 to MP 187.
- Existing emergency truck ramps, located at approximately MP 182.2 and 185.5, will be upgraded to current design standards.
- Six wildlife underpasses and wildlife fencing will be constructed throughout the corridor.
- Additional capacity will be added to the existing commercial truck parking area at the top of Vail Pass.
- Widened shoulders (minimum of eight feet of additional width beyond the 10' shoulder) at multiple locations to accommodate emergency pull-offs, emergency truck parking, and staging for tow trucks.
- Improved median emergency turnaround locations to accommodate emergency and maintenance vehicle turnaround maneuvers.
- Improved chain station located at approximately MP 182.5 with additional parking, signage, lighting, and separation from the I-70 mainline.
- Avalanche protection located at approximately MP 186.

Figure 2. I-70 West Vail Pass Auxiliary Lanes Proposed Action Alternative



Source: DEA Project Team

METHODOLOGY

LITERATURE REVIEW

Prior to conducting the field survey, numerous sources of data were reviewed to gain a general understanding of the ecology of the study area. These sources included aerial photographs, topographic maps, U.S. Fish and Wildlife (USFWS) *Wetlands Mapper* (USFWS 2019), Natural Resources Conservation Service (NRCS) *Web Soil Survey* (NRCS 2019), *National Wetland Plant List (NWPL)* (Corps 2019), other state and federal agency websites, the *I-70 Mountain Corridor*

Programmatic Environmental Impact Statement (CDOT 2010), various other existing studies/reports, and other relevant data.

Field Data Collection

Andy Herb (senior ecologist) surveyed the entire study area on multiple days in August, September, and October 2018 and July, August, and September 2019 to identify wetlands and other water features larger than approximately 100 square feet. These features were mapped in the field on 1-inch equals 200-foot scale aerial photographs based on the dominance of hydrophytic vegetation (facultative or wetter) and evidence of wetland hydrology (assuming the presence of hydric soil), as defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps 2010). This methodology is a conservative approach to estimating the size and location of these features and may have resulted in the inclusion of some areas that may not meet the Corps' three-parameter definition of a wetland. Thus, a subsequent waters of the US delineation that includes a detailed examination of soils may result in a slight reduction in overall wetland area.

In addition to mapping wetlands and other water features, the following data were also collected in the field electronically and stored in real-time for wetlands:

- Location
- Wetland type
- Dominant vegetation (three most dominant species)
- Indicator(s) and source(s) of wetland hydrology
- Functional condition (including major ecological stressors observed)
- Photograph(s)

Geographic Information Systems (GIS) technology was used to digitize and present all field data. The first digit(s) of the wetland and other water features identification (ID) numbers generally correspond to the map number on which the feature occurs. All plant nomenclature used in this report follows the NWPL (Corps 2019).

Wetlands in the study area suspected to be fens during the initial wetland mapping fieldwork were further investigated for the presence of organic soils in summer 2019. If at least 16 inches of organic soils, as defined by USFWS (1999), were observed at any given location within a wetland polygon, the entire wetland polygon was included as a fen. While some (or all) of these may actually be fen/wetland complexes, the extent of organic soils within the wetland polygon(s) was not recorded. Additionally, wetlands previously characterized in the study area as a fens by Jones, et al. (2009) or Lemly, et al. (2018) were also included as fens.

Some portions of the study area were not accessible during the field survey, namely the neighborhoods of East Vail. This includes the wetlands along most of Pitkin and Gore Creeks downstream of I-70. The size and location of wetlands and other water features in this area were estimated using aerial photography and visual confirmation from public access points.

Wetland Classification

Wetlands in the study area were classified in accordance with the *Hydrogeomorphic Method* (HGM) (Brinson 1993) and *Classification of Wetlands and Deep Water Habitats of the United States* (Cowardin, et al. 1979).

The HGM method of classification includes five wetland types: mineral soil flat, lacustrine fringe, depressional, riverine, and slope. The HGM types applicable to wetlands in the study area include lacustrine fringe, riverine, depressional, and slope. Wetlands along the margin of waterbodies greater than 10 acres (fringe wetlands) are considered lacustrine by this method. Depressional wetlands are those that are situated in closed contour topography, including the margins of waterbodies smaller than 10 acres. Riverine wetlands are those that are associated with a channel and subject to overbank flooding. Slope wetlands are mainly supported by groundwater and are generally not subject to overbank flooding.

The wetland types described by Cowardin, et al. (1979) include riverine, lacustrine, and palustrine. The only type relevant to wetlands in the study area is palustrine, including both palustrine emergent (PEM) and palustrine scrub-shrub (PSS). PEM wetlands are those dominated by herbaceous vegetation (grasses, grass-likes, and forbs). PSS wetlands are those dominated by shrubs or trees less than 20 feet tall. Although waterbodies greater than 20 acres are included in the lacustrine system, vegetated wetlands around those waterbodies (fringe wetlands) are considered part of the palustrine system. Additionally, while the riverine system includes unvegetated channels, the wetlands along those channels are considered part of the palustrine system.

Wetland Functional Condition

A basic assessment of wetland functional condition was performed for all wetlands in the study area using the principles presented in the *Functional Assessment of Colorado Wetlands (FACWet) Method* (Johnson, et al. 2013). FACWet is a rapid assessment method that provides a reliable and consistent approach to rating the condition of wetlands relative to their natural potential by identifying ecological stressors. These stressors are human-caused changes to a wetland or adjacent lands that alter a wetland's ability to perform ecological functions and processes.

A complete FACWet assessment involves assigning numeric (0.5 to 1.0) or corresponding letter grades (A, B, C, D, or F) to eight FACWet variables. The letter grades are defined as: A (Reference), B (Highly Functioning), C (Functioning), D (Functioning Impaired), and F (Non-Functioning). The FACWet variables are organized into three groups: Buffer and Landscape Context, Hydrology, and Abiotic and Biotic Habitat. Rather than conducting a complete assessment for this project, an expedited approach of assigning one overall letter grade to each wetland was used. This letter grade was based on the quantity and severity of the ecological stressors observed in the field as they relate to the three groups of attributes.

Existing Conditions

The study area contains 130.10 acres of wetlands, including 71.72 acres of slope, 41.82 acres of riverine, 15.61 acres of stormwater-related, and 0.95 acre of reservoir fringe wetlands (**Table 1**). Included in these wetlands are 19 fens, encompassing a total of 20.79 acres. The wetlands (including fens) are summarized in the following sections and shown on the maps in **Appendix A**. A summary table of all the wetlands listing identification number, size, classification (Cowardin and HGM),

dominant vegetation, hydrology indicators, water source, functional condition, and general notes is in **Appendix B**. Photographs of typical wetlands from each group are in **Appendix C**.

Table 1. Wetlands in the Study Area

Type	Area (acres)	% of Total Wetland Area	Functional Condition (acres and % of wetland area)				Major Stressors	Major Impact of Stressors
			Reference (A)	Highly Functioning	Functioning (C)	Functioning Impaired (D)		
Slope	71.72	55	0	13.42 (19%)	32.03 (45%)	26.27 (36%)	Historic and current land use	Reduced quality of wildlife and fish/aquatic habitat; loss of wetlands
Riverine	41.82	32	0	0.28 (1%)	34.29 (82%)	7.25 (17%)	Historic and current land use, managed/ altered water source	Reduced quality of wildlife and fish/aquatic habitat; loss of wetlands; reduced plant community complexity
Stormwater	15.61	12	0	0	0	15.61 (100%)	Artificial water source, pollutants, current land use	Loss of wetlands; reduced plant community complexity
Reservoir Fringe	0.95	1	0	0	0.73 (77%)	0.21 (23%)	Managed water source, historic and current land use	Reduced quality of wildlife and fish/aquatic habitat; loss of wetlands; reduced plant community complexity
Total	130.10	100	0 (0%)	13.70 (10%)	67.05 (52%)	49.34 (38%)	-	-

Slope Wetlands

Summary

- 71.72 acres (55 percent of all wetlands)
- Both PEM and PSS wetlands on slopes and in other places where groundwater discharges
- Functional condition: 19 percent highly functioning, 45 percent functioning, 36 percent functioning impaired
- Main stressors: historic and current land use

General

Slope wetlands account for most of the wetlands in the study area (55 percent). They include all wetlands where groundwater is the primary source of water, including numerous very large wetlands on both shallow open slopes and steep forested slopes, many small wetlands situated on steep roadcuts and stream banks, and wetlands in the bottom of narrow gullies and canyons that do not contain a perennial stream.

VEGETATION

Most of the wetlands in this group are classified as PSS which generally have an overstory dominated by various willow species (*Salix* spp.) and/or speckled alder (*Alnus incana*). In areas with dense willow or other shrub cover, there is often very little understory. If understory is present, the most common plants are bluejoint (*Calamagrostis canadensis*), leafy tussock sedge (*Carex aquatilis*), Northwest Territory sedge (*Carex utriculata*), and field horsetail (*Equisetum arvense*), with meadow foxtail (*Alopecurus pratensis*), large-leaf avens (*Geum macrophyllum*), dagger-leaf rush (*Juncus ensifolius*), tall fringe bluebells (*Mertensia ciliata*), and arrow-leaf ragwort (*Senecio triangularis*) also often present.

The PEM wetlands in this group are mainly on open slopes and roadcuts. They are most commonly dominated by the PSS understory plants and usually contain scattered willow and pockets of open water.

Many of the slope wetlands are in forested areas and have overhanging tree cover. The most common tree species include Rocky Mountain alpine fir (*Abies bifolia*), lodgepole pine (*Pinus contorta*), Engelmann's spruce (*Picea engelmannii*), and quaking aspen (*Populus tremuloides*).

HYDROLOGY

While some of the slope wetlands contain small channels that appear to flow ephemerally (mainly during snowmelt and rain events), the wetlands in this group are primarily supported by groundwater discharge. This discharge appears to be seasonal (spring/early summer) in most wetlands but may be permanent or semi-permanent in some locations. The most common indicators of wetland hydrology observed in these wetlands include the presence of surface water, saturation, drainage patterns, and geomorphic position.

FUNCTIONAL CONDITION

The most important functions that slope wetlands in the study area provide are general wildlife habitat, food chain support, and water storage. Additionally, many of the slope wetlands are situated in headwater areas of Black Gore Creek or its tributaries, or directly abutting those waterways so this group also contributes substantially to the health of fish and aquatic habitat in the corridor. The highest scored wetlands generally perform these functions better than those that scored lower. The biggest stressor to these wetlands is the presence of I-70 and related facilities, which has generally altered vegetated buffers and modified the water source (stormwater inputs that may contain pollutants and/or sediment) and distribution (ditches, fill, or other changes) in these wetlands.

Of the 71.72 acres of wetlands in this group, 13.42 acres (19 percent) are scored as highly functioning or equivalent to a letter grade of "B" (none are scored as reference or "A"). Most of the highly functioning wetlands are generally those furthest from I-70 and subject to very few stressors. They are somewhat insulated from direct impacts from anthropogenic activities and essentially undisturbed except for modifications to their contributing area. These modifications are mostly associated with I-70 and related facilities which have resulted in historic wetland loss in the vicinity, an overall increase in migration/dispersal barriers for organisms, and reduction or alteration of natural vegetated buffers. Without this degradation to the contributing area, most of these wetlands would be scored as reference (letter grade "A").

Approximately 45 percent (32.03 acres) of the slope wetlands are scored as functioning (letter grade "C"). These wetlands are those that are generally closer to I-70 and more directly affected by

associated facilities and activities than the highly functioning wetlands. They typically have many more alterations within the contributing area, often receive some stormwater flows from I-70 or other developed areas, and are affected by direct water distribution and/or outflow alterations (ditching or being on a roadcut). The presence of these stressors usually means the modification or loss of naturally complex vegetation communities and a reduction in overall wetland function.

The remaining 36 percent (26.27 acres) of slope wetlands scored as functioning impaired (letter grade "D"). These wetlands are much more obviously impaired by direct and indirect alterations to the contributing area, as well as within the wetland itself; receive substantial amounts of stormwater from I-70 or other developed areas; and are often situated on a roadcut. These stressors result in the alteration of natural water source(s), distribution, and outflow, and a reduction in overall wetland function.

Riverine Wetlands

Summary

- 41.82 acres (32 percent of all wetlands)
- Mainly narrow "fringe" wetlands along creeks
- Functional condition: 1 percent highly functioning, 82 percent functioning, 17 percent functioning impaired
- Main stressors: current and past land use and managed/altered water source

General

The riverine wetlands are associated with creeks in the study area, including Bighorn, Black Gore, Gore, Miller, Pitkin, Polk, Timber, and West Tenmile, as well as Wilder Gulch and some unnamed channels. These wetlands account for approximately 32 percent of the wetlands in the study area and are generally narrow "fringe" wetlands along both sides of the channels. In areas where there is a wider valley or very low channel banks, the fringe wetlands often widen and encompass much of the floodplain. Good examples of wider riverine wetlands are Wetlands 5-1 (Gore Creek); Wetlands 11-2, 13-5, and 18-1 (Black Gore Creek); Wetland 12-2 (Miller Creek); and Wetland 23-1 (West Tenmile Creek).

Vegetation

Like slope wetlands, most of the wetlands in this group are classified as PSS which generally have an overstory dominated by speckled alder and/or various willow species. The most common willow species observed include short-fruit (*Salix brachycarpa*), Drummond's (*S. drummondiana*), park (*S. monticola*), and tea-leaf (*S. planifolia*), with substantial Geyer's (*S. geyeriana*), narrowleaf (*S. exigua*), whiplash (*S. lasiandra*), strap-leaf (*S. ligulifolia*), and Idaho (*S. wolfii*) in some locations. Many PSS wetlands contain very dense willow with very little understory but in areas with understory, the most common plants are bluejoint, large mountain bittercress (*Cardamine cordifolia*), leafy tussock sedge, field horsetail, large-leaf avens, and arrow-leaf ragwort.

The PEM riverine wetlands are typically very small and narrow fringes along the channels, except for the reach of Black Gore Creek just below Black Lake No. 2 (Wetland 18-1) which is a very large floodplain wetland that also receives substantial groundwater inputs. PEM wetlands are most commonly dominated by leafy tussock sedge and Northwest Territory sedge (as well as other species listed above as PSS understory plants) and usually contain scattered willow.

Also, like slope wetlands, many riverine wetlands are in forested areas and have overhanging tree cover. The most common trees adjacent to these wetlands are Rocky Mountain alpine fir, lodgepole pine, Engelmann's spruce, and quaking aspen.

HYDROLOGY

Riverine wetlands in the study area are either supported by water in creeks through overbank flooding or capillary action associated with high alluvial groundwater. The main sources of water for these wetlands are direct precipitation (mainly snow), stormwater runoff (from I-70 and related facilities), and groundwater discharge from adjacent areas. The most common indicators of wetland hydrology observed include the presence of surface water, saturation, drainage patterns, and geomorphic position.

FUNCTIONAL CONDITION

The most important functions that riverine wetlands in the study area provide are wildlife and fish/aquatic habitat, food chain support, flood attenuation, and sediment retention. The biggest stressors to these wetlands are the presence of I-70 and related facilities, controlled water source (mainly just Black Gore Creek as a result of Black Lake No. 1 and Black Lake No. 2), and current and past road-sanding operations. The presence of these stressors usually means the modification or loss of naturally complex vegetation communities and a reduction in overall wetland function.

Of the 41.82 acres of wetlands in this group, 82 percent (34.29 acres) are scored as functioning (only 1 percent are scored as highly functioning and none are scored as reference). Nearly all these wetlands would have scored as highly functioning but are impaired mainly by the accumulation of excess sediment (especially Black Gore Creek). This sediment appears to be mainly road sand but likely also includes some natural sediments (although much of it may have been mobilized by alterations in land use). The excess sediment has been deposited on stream point bars, behind beaver dams, in lower-gradient reaches, at natural floodplain constrictions, and in other areas resulting in the relatively recent modification of wetlands and adjacent floodplains throughout most of the study area.

The remaining 17 percent (7.25 acres) of riverine wetlands scored as functioning impaired. These wetlands are generally those that are much more impaired by direct road sand accumulation (especially those directly under I-70 bridges where ridges of road sand running parallel to the bridges are evident). This has altered the topography which has changed the water distribution and outflow within the wetlands, often resulting in the loss of characteristic vegetation communities and the creation of uplands. These are mainly the wetlands directly under the I-70 bridges (Gore, Timber, Black Gore, Polk, and Miller creeks, and Wilder Gulch) or otherwise altered by infrastructure development (Pitkin and Bighorn creeks).

STORMWATER WETLANDS

SUMMARY

- 15.61 acres (12 percent of all wetlands)
- Mostly PEM and some PSS wetlands along the roadside
- Functional condition: 100 percent functioning impaired
- Main stressors: artificial water source, pollutants, current and past land use

General

Stormwater-related wetlands account for 15.61 acres of wetlands in the study area (12 percent). They include all wetlands primarily supported by stormwater runoff from I-70 and associated facilities. Most of these wetlands are situated immediately adjacent to I-70 and/or the Vail Pass Recreational Trail, and classified as PEM. Most are associated with stormwater ponds and roadside ditches that are regularly maintained/dredged, including numerous very small ponds designed to capture road sand.

Vegetation

The stormwater-related wetlands are the least vegetatively diverse wetlands in the study area. They are generally dominated by just a few species and often contain considerable bare ground as a result of maintenance activities or the accumulation of road sand. The most common species present in PEM wetlands include meadow foxtail, black bent (*Agrostis gigantea*), Baltic rush (*Juncus balticus*), dagger-leaf rush, fox-tail barley (*Hordeum jubatum*), bluejoint, field horsetail, and leafy tussock sedge. The PSS wetlands often contain similar herbaceous species but also have an overstory of either willow or speckled alder.

Hydrology

The wetlands in this group are primarily supported by stormwater runoff. This runoff is most pronounced during snowmelt and rainfall events. Most of these wetlands do not have another reliable source of water and as a result, experience substantial dry periods between precipitation events. The most common indicators of wetland hydrology observed include the presence of surface water, saturation, drainage patterns, and geomorphic position.

Functional Condition

The most important functions that stormwater wetlands in the study area provide is sediment retention, toxicant removal, and short-term water storage. The biggest stressors to these wetlands are the artificial water source carrying road sand (and potentially other pollutants) and the proximity of I-70 and related facilities.

All 15.61 acres of wetlands in this group are scored as functioning impaired. While some of these wetlands may perform functions well for some period, they are considered a "novel" wetland type that either formed spontaneously in response to land use changes (namely the construction and operation of I-70 and related facilities) or were created with the goal of sediment retention. Thus, they generally lack characteristic traits of natural and sustainable wetlands (Johnson, et al. 2013). They are impaired by direct and indirect alterations to the contributing area, as well as within the wetlands themselves; receive large amounts of stormwater from I-70 or other developed areas; are situated adjacent to the road; and are often regularly (and intentionally) disturbed/dredged by maintenance activities. These stressors result in the alteration of natural water distribution and outflow, which translates to the modification or loss of naturally complex vegetation communities and a reduction in overall wetland function.

Reservoir Fringe Wetlands

Summary

- 0.95 acre (1 percent of all wetlands)
- Narrow PEM and PSS fringe wetlands along ordinary high water mark of reservoirs

- Functional condition: 77 percent functioning, 23 percent functioning impaired
- Stressors: managed water source, current and past land use

GENERAL

Reservoir fringe wetlands comprise only 1 percent of all the wetlands in the study area. There are only three wetlands in this group and they are associated with three artificial bodies of water: Black Lake No. 1 (Wetland 21-2), Black Lake No. 2 (Wetland 19-6) and an unnamed pond associated with the Bighorn Diversion (Wetland 3-2). These wetlands are generally situated at the ordinary high-water mark (OHWM) of the reservoirs, although some extend slightly above or below depending on the dominant species and the depth/type of soil present.

VEGETATION

The wetlands associated with Black Lake No. 1 and Black Lake No. 2 are classified as PEM and dominated by leafy tussock sedge, Northwest Territory sedge, and bluejoint, with widely scattered willow. The wetlands along the unnamed pond are classified as PSS and dominated by park willow with an understory mainly composed of sedges (*Carex* spp.).

HYDROLOGY

These wetlands are supported by water in the reservoirs through direct flooding or capillary action. The most common indicators of wetland hydrology observed include the presence of surface water, saturation, inundation visible on imagery, and geomorphic position.

FUNCTIONAL CONDITION

While the main functions provided by wetlands in this group are shoreline stabilization and wildlife habitat, all three wetlands are substantially impaired by having a managed water regime as the primary source of wetland hydrology. Water levels in the reservoirs are subject to the needs of the water users and are easily manipulated. During long draw-down periods, these wetlands may become stressed which generally reduces their ability to support more natural plant assemblages and the structural diversity that is more characteristic of wetlands in the region. Other stressors include modifications to the contributing area, and receiving runoff from I-70 and related facilities.

The wetlands associated with Black Lake No. 1 and Black Lake No. 2 are considered functioning and scored slightly higher than the other wetland in this group (functioning impaired) because of less development in the contributing area.

FENS

According to the US Army Corps of Engineers (Corps 2019), a fen is defined as a groundwater-fed wetland that contains saturated organic soil (generally referred to as peat) greater than or equal to 16 inches in thickness that is classified as a histosol in the *Field Indicators of Hydric Soils in the United States* (NRCS 2018). Peat is organic soil material that is saturated with water for long periods and, excluding live roots, has an organic-carbon content (by weight) of 12 to 18 percent, depending on the mineral fractions (USFWS 1999).

During fieldwork to map wetlands and other water features, 19 fens encompassing a total of 20.79 acres were identified in the study area. While most of them are classified as slope wetlands (15), four are classified as riverine because surface water appears to be a major input. While there may be more wetlands in or adjacent to the study area with small areas of peat, the wetlands included in this

section are those that were preliminarily confirmed in the field (through soil examination) as meeting the above criteria. Further analysis of these and other wetlands is recommended prior to project permitting and construction to confirm the extent of organic soils. The fens are listed in **Table 2** (from west to east) and shown on the maps in **Appendix A**.

Other Water Features

There are 51 other water features in the study area, encompassing a total of 59.80 acres. These include the 17 natural creeks and channels (21.41 acres), 27 stormwater features (0.73 acre), and seven ponds and reservoirs (37.66 acres). Most of the features, except for some of the stormwater ponds and channels, appear to have relatively permanent connections to perennial streams which ultimately connect to Gore Creek. Gore Creek flows west out of the study area to meet the Eagle River which is a tributary to the Colorado River. **Table 3** summarizes all 51 features (listed generally from west to east under each group), and they are shown on the maps in **Appendix A**.

Table 2. Fens in the Study Area

ID	Area (acres)	Type	Functional Condition[1]	Notes
8-4	0.42	Slope	C (Functioning)	Immediately adjacent to EB lanes; water outflow disrupted by I-70; lowest areas receive some stormwater; area of peat very small; PSS
9-2	0.22	Slope	C (Functioning)	At toe of WB embankment; area of peat very small; PSS
10-5	0.19	Slope	C (Functioning)	At toe of WB embankment; likely continuation of Wetland 10-14 (also fen); PSS
10-14	2.96	Slope	B (Highly Functioning)	Immediately adjacent to EB lanes; PSS/PFO
13-19	0.78	Slope	B (Highly Functioning)	Immediately adjacent to EB lanes but above cliffs; PEM
14-8[c]	0.48	Slope	C (Functioning)	Immediately adjacent to WB lanes; at top of very steep roadcut/cliff area; outflow disrupted by I-70; PEM
15-4	0.98	Slope	B (Highly Functioning)	On far side of Black Gore Creek; on steep slope adjacent to creek; PSS with some PFO areas
16-1	1.17	Slope	D (Functioning Impaired)	At toe of EB embankment; receives stormwater from I-70; severe road sand accumulation; possibly also impaired by groundwater flow alteration associated with embankment fill; PSS; potential mitigation area
16-5[c]	1.30	Slope	C (Functioning)	At toe of EB embankment; receives stormwater from I-70; possibly impaired by groundwater flow alteration associated with embankment fill; PSS
16-6	0.59	Slope	B (Highly Functioning)	On far side of Black Gore Creek; on steep slope adjacent to creek; PEM
17-12[c]	1.98	Riverine	C (Functioning)	Black Gore Creek floodplain wetland that receives groundwater; PSS
18-1[c]	3.62	Riverine	C (Functioning)	Black Gore Creek floodplain wetland that receives groundwater; PEM
19-17	0.15	Slope	B (Highly Functioning)	On edge of Black Lake No. 2; may be impaired by lake; PEM
20-7[b]	1.07	Slope	D (Functioning Impaired)	Behind and up-gradient of CDOT maintenance facility; impaired by ditching and other historic earthwork; PSS; potential mitigation area
21-3 [abc]	0.52	Slope	C (Functioning)	On edge of Black Lake No. 1; impaired by lake and recreationists; PEM
22-3[abc]	2.57	Riverine	C (Functioning)	West Ten Mile Creek headwaters; PSS
22-8 [ab]	1.22	Slope	D (Functioning Impaired)	Abutting fill for WB lanes; unknown portion filled for roadway; receives some stormwater; water distribution and outflow impaired by roadway fill; PEM
23-3[abc]	0.44	Riverine	D (Functioning Impaired)	Wilder Gulch; impaired by roadway sand; PSS
23-11[bc]	0.13	Slope	B (Highly Functioning)	Just up-gradient of WB lanes; shallow bedrock; PSS
Total	**20.79**			

[1] See *Methodology Section* for an explanation of functional condition
[a] Also identified as fen by Jones, et al. (2009)
[b] Also identified as fen by Lemly, et al. (2018)
[c] Also identified as potential fen by CNHP (2019)

Table 3. Other Water Features in the Study Area

ID[1]	Area (acres)	Length[2] (feet)	Cowardin Type[3]	Notes
Natural Creeks and Channels				
Pitkin Creek	0.150	565	R3RB	Very steep, rocky, and urban in study area; no access downstream of I-70 so wetlands estimated
Bighorn Creek	0.295	954	R3RB	Very few wetlands present; very steep, rocky, and urban in study area
Gore Creek	9.313	13,652	R3RB	Substantially impaired by road sand and other geomorphic modifications at bridge; large urban reach with limited access so wetlands estimated in most areas
Black Gore Creek	10.142	33,139	R3RB	Substantially impaired by road sand and by controlled flow associated with dams
Unnamed Creek (OW 8-5)	0.006	267	R4RB	May not be perennial
Timber Creek	0.140	760	R3RB	Substantially impaired by road sand and other geomorphic modifications at bridge
Miller Creek	0.307	2,136	R3RB	Substantially impaired by road sand and other geomorphic modifications at bridge
Polk Creek	0.265	1,268	R3RB	Substantially impaired by road sand and other geomorphic modifications at bridge
Unnamed Creek (OW 13-8)	0.032	350	R3RB	Next to Polk Creek, just upstream of WB bridge; may not be perennial
Unnamed Channel (OW 17-2)	0.009	146	R4RB	Mostly seasonal/snowmelt
Unnamed Channel (OW 17-9)	0.016	227	R4RB	Mostly seasonal/snowmelt
Unnamed Channel (OW 17-8)	0.023	329	R4RB	Mostly seasonal/snowmelt
Unnamed Channel (OW 17-11)	0.016	230	R4RB	Mostly seasonal/snowmelt
Unnamed Channel (OW 18-13)	0.008	174	R4RB	Mostly seasonal/snowmelt
Unnamed Channel (OW 19-14)	0.028	411	R3RB	Appears to carry substantial groundwater associated with Wetlands 19-15 and 20-7
West Tenmile Creek	0.624	3,678	R3RB	In culvert under I-70 (no bridge)
Wilder Gulch	0.036	196	R3RB	Substantially impaired by road sand and other geomorphic modifications at bridge
Subtotal	**21.41**	**58,482**	-	-
Stormwater Channels and Ponds				
Bighorn Diversion	0.038	555	R4SB	Carries water from Bighorn Creek to Bighorn Diversion Pond; may also receive some stormwater
OW 5-4	0.001	46	R4SB	Stormwater channel
OW 8-1	0.009	0	PUB	Stormwater pond

ID[1]	Area (acres)	Length[2] (feet)	Cowardin Type[3]	Notes
OW 8-10	0.005	0	PUB	Stormwater pond
OW 9-6	0.006	0	PUB	Stormwater pond
OW 9-7	0.006	0	PUB	Stormwater pond
OW 12-11a	0.003	0	PUB	Stormwater pond; on Map 11 (WB roadside)
OW 12-11b	0.008	0	PUB	Stormwater pond; on Map 11 (WB roadside)
OW 12-11c	0.002	0	PUB	Stormwater pond; on Map 11 (EB roadside)
OW 12-11d	0.009	0	PUB	Stormwater pond; on Map 12 (EB roadside)
OW 12-4	0.065	757	R4SB	Stormwater channel below Wetland 12-4
OW 12-7	0.024	459	R4SB	Stormwater/snowmelt channel connecting Wetland 12-7 to Wetland 12-11
OW 12-11e	0.046	0	PUB	Stormwater pond; on Map 13 (under bridge for Polk Creek)
OW 13-1	0.012	133	R4SB	Stormwater channel below Wetland 13-1
OW 13-7	0.033	0	PUB	Stormwater pond
OW 13-6	0.016	240	R4SB	Stormwater channel
OW 12-11f	0.003	0	PUB	Stormwater pond; on Map 13 (EB roadside)
OW 12-11g	0.009	0	PUB	Stormwater pond on Map 14 (EB roadside)
OW 13-9	0.035	0	PUB	Stormwater pond on Map 13 (WB roadside)
OW 14-6	0.005	74	R4SB	Stormwater channel below Wetland 14-6
OW 14-5	0.092	0	PUB	Stormwater pond
OW 12-11h	0.004	0	PUB	Stormwater pond on Map 14 (EB roadside)
OW 15-6	0.189	0	PUB	Stormwater pond below road next to Black Gore Creek
OW 17-4	0.057	905	R4SB	Stormwater channel
OW 18-8	0.006	0	PUB	Stormwater pond
OW 20-1	0.009	198	R4SB	Stormwater channel
OW 22-3	0.041	0	PUB	Stormwater pond adjacent to West Tenmile Creek
Subtotal	**0.73**	**3,367**	-	-
Ponds and Reservoirs				
Bighorn Diversion Pond	0.590	0	PUB	Associated with Bighorn Diversion and Wetland 3-2

ID[1]	Area (acres)	Length[2] (feet)	Cowardin Type[3]	Notes
OW 4-5	0.017	0	PUB	Small groundwater pond in condo complex; associated with Wetland 4-5
OW 6-1	0.054	0	PUB	Beaver pond in Wetland 6-1
OW 8-7	0.049	0	PUB	Pond behind bike path; snowmelt and groundwater
Black Lake No. 2	9.819	0	PUB	
Black Lake No. 1	26.975	0	L1UB	
OW 21-1	0.158	0	PUB	Beaver ponds above Black Lake No. 1
Subtotal	**37.66**	**0**	-	-
Total	**59.80**	**61,849**	-	-

[1]The first digit(s) of the ID numbers generally correspond to the map number in **Appendix A**.

[2]Lengths are only provided for linear features (creeks and channels)

[3]Cowardin classifications: L1UB = Lacustrine Limnetic Unconsolidated Bottom, PUB = Palustrine Unconsolidated Bottom, R3UB = Riverine Upper Perennial Unconsolidated Bottom, R4SB = Riverine Intermittent Streambed

Impacts

No Action Alternative

As stated above, the No Action Alternative would leave West Vail Pass as it currently is configured and would not provide substantial improvements beyond typical current maintenance (e.g. resurfacing and plowing) activities. Sedimentation of the wetlands and water features would continue to occur. No additional impacts to wetlands or other water features are expected.

Proposed Action Alternative

The Proposed Action would result in potential direct and permanent impact of wetlands and other water features from the placement of earthen fill and other materials associated with roadway improvements. The potential impacts discussed in this section are estimated and will be confirmed during final design. Approximately 9.44 acres of wetlands, including 3.84 acres of slope, 0.03 acre of riverine, and 5.56 acres of stormwater-related wetlands would be lost. No reservoir fringe wetlands would be impacted. In addition, there is the potential for some indirect permanent impacts as a result of unintended hydrologic modifications or other unexpected causes but are not quantifiable. Temporary impacts for vehicle access and other construction-related activities are also expected to occur but have not been quantified because they depend on construction techniques, specific access routes, control measure installation methods and locations, and other factors.

Table 4 lists the potential permanent impacts to wetlands by group and **Table 5** lists the potential impacts by wetland identification number. The maps in **Appendix D** show the impacted wetlands.

Table 4. Summary of Wetlands Potentially Impacted by the Proposed Action

Type	Existing Area (acres)	Area Permanently Impacted (Acres and % of Total Wetland Area)				Total Area Permanently Impacted (Acres and % of Total Wetland Area)
		Reference (A)	Highly Functioning (B)	Functioning (C)	Functioning Impaired (D)	
Slope	71.72	0.00 (0%)	0.43 (<1%)	0.53 (<1%)	2.88 (4%)	3.84 (5%)
Riverine	41.82	0.00 (0%)	0.00 (0%)	0.03 (<1%)	<0.00 (<1%)	0.03 (<1%)
Stormwater	15.61	0.00 (0%)	0.00 (0%)	0.00 (0%)	5.56 (37%)	5.56 (37%)
Reservoir Fringe	0.95	0.00 (0%)	0.00 (0%)	0.00 (0%)	0.00 (0%)	0.00 (0%)
Total	**130.10**	**0.00 (0%)**	**0.43 (<1%)**	**0.56 (<1%)**	**8.45 (7%)**	**9.44 (7%)**

Table 5. Wetlands Potentially Permanently Impacted by the Proposed Action

ID	Functional Condition	Permanent Impact (acres)
Slope Wetlands (including fens)		
4-1	D (Functioning Impaired)	0.220
5-3	D (Functioning Impaired)	0.002
5-4	D (Functioning Impaired)	0.780
6-1	C (Functioning)	0.394
6-5	D (Functioning Impaired)	0.013
7-6	D (Functioning Impaired)	0.099
8-2	C (Functioning)	0.037
8-4[a]	C (Functioning)	0.018
8-10	D (Functioning Impaired)	0.035
9-1	C (Functioning)	0.023
9-4	D (Functioning Impaired)	0.104
10-8	B (Highly Functioning)	0.201
10-13	C (Functioning)	0.014
10-14[a]	B (Highly Functioning)	0.212
11-6	D (Functioning Impaired)	0.092
11-9	D (Functioning Impaired)	0.024

ID	Functional Condition	Permanent Impact (acres)
12-5	D (Functioning Impaired)	0.000
12-6	D (Functioning Impaired)	0.002
12-7	D (Functioning Impaired)	0.111
12-8	C (Functioning)	0.012
10-5A	D (Functioning Impaired)	0.154
13-1	D (Functioning Impaired)	0.026
13-13	D (Functioning Impaired)	0.051
13-21	D (Functioning Impaired)	0.078
13-3	C (Functioning)	0.006
14-11	B (Highly Functioning)	0.019
15-1	C (Functioning)	0.030
17-8	D (Functioning Impaired)	0.035
18-13	D (Functioning Impaired)	0.523
18-14	D (Functioning Impaired)	0.023
20-4	D (Functioning Impaired)	0.102
20-5	D (Functioning Impaired)	0.194
20-6	D (Functioning Impaired)	0.017
22-8[a]	D (Functioning Impaired)	0.191
	Subtotal	**3.842**
Riverine Wetlands		
2-1	D (Functioning Impaired)	0.003
13-5	C (Functioning)	0.028
	Subtotal	**0.031**
Stormwater Wetlands		
4-3	D (Functioning Impaired)	0.024
7-1	D (Functioning Impaired)	0.180
7-5	D (Functioning Impaired)	0.126
8-1	D (Functioning Impaired)	0.092
8-3	D (Functioning Impaired)	0.054
8-6	D (Functioning Impaired)	0.004
8-9	D (Functioning Impaired)	0.005
9-3	D (Functioning Impaired)	0.360
9-6	D (Functioning Impaired)	0.020
10-7	D (Functioning Impaired)	0.300
11-7	D (Functioning Impaired)	0.024
12-11	D (Functioning Impaired)	0.704
13-2	D (Functioning Impaired)	0.003
13-7	D (Functioning Impaired)	0.033

ID	Functional Condition	Permanent Impact (acres)
13-15	D (Functioning Impaired)	0.056
13-17	D (Functioning Impaired)	0.258
14-4	D (Functioning Impaired)	0.011
14-5	D (Functioning Impaired)	0.053
14-6	D (Functioning Impaired)	0.034
14-9	D (Functioning Impaired)	0.030
16-9	D (Functioning Impaired)	0.537
17-10	D (Functioning Impaired)	0.172
17-11	D (Functioning Impaired)	0.035
18-12	D (Functioning Impaired)	0.110
18-8	D (Functioning Impaired)	0.089
19-16	D (Functioning Impaired)	0.027
20-8	D (Functioning Impaired)	0.179
20-9	D (Functioning Impaired)	0.106
22-1	D (Functioning Impaired)	1.938
	Subtotal	**5.564**
	Total	**9.437**

[a]This wetland is a fen and is also listed in Table 6.

Slope Wetlands

Approximately 3.84 acres of the 9.44 acres of permanent wetland impacts (41 percent of all impacts) are to slope wetlands. Most of these impacts would be a result of roadway widening and curve modifications. Key impact areas for slope wetlands include (listed west to east):

- WB near MP 181.5; numerous slope wetlands are present on the existing roadcut and roadside ditch to the north (Wetlands 4-1, 5-4, and 12-11) where widening would occur; while all the wetlands that would be lost here are rated as functioning impaired, the total losses of nearly 1.7 acres account for almost half of the slope wetland impacts and 18 percent of all permanent wetland impacts
- EB near MP 182; approximately 0.39 acre of impacts to Wetland 6-1 would occur as a result of widening; this accounts for about 10 percent of the impacts to slope wetlands and 4 percent of all permanent wetland impacts
- EB from just west of MP 183 to the Black Gore Creek Bridge near MP 184.5; numerous slope wetlands are present above the existing roadway, including Wetlands 8-4 (fen/functioning) and 10-14 (fen/highly functioning), as well as Wetland 10-8 (highly functioning/partial PFO) and several others for a total of 0.74 acre of permanent impact. This accounts for 19 percent of all slope wetland impacts and 8 percent of all impacts, and approximately two-thirds of all fen impacts.
- WB near MP 188.5; 0.52 acre of Wetland 18-13 (functioning impaired) impacted which accounts for 13 percent of all slope wetland impacts and 5 percent of all wetland impacts

- WB, just west of MP 190; 0.19 acre of Wetland 22-8 (fen/functioning impaired) impacted which accounts for about one-third of the fen impacts

Riverine Wetlands

Approximately 0.03 acre of the 9.44 acres of permanent wetland impacts are to riverine wetlands (less than one percent of all impacts). These impacts would to Wetlands 2-1 (Bighorn Creek) and 13-5 (Black Gore Creek) as a result of road widening.

Stormwater Wetlands

Approximately 5.56 acres of the 9.44 acres of permanent wetland impacts (59 percent of all impacts) are to stormwater wetlands. Most of these impacts would be a result of road widening. Key impact areas for stormwater wetlands include (listed west to east):

- Between MP 182.5 and 185.5; 1.4 acres of impact to Wetlands 9-3, 9-6, 10-7, 11-7, 12-11, (all functioning impaired), accounting for 24 percent of all impacted stormwater wetlands and 15 percent of all impacted wetlands
- WB near MP 186; 0.29 acre of impact to Wetlands 13-17 and 14-9, accounting for 5 percent of impacted stormwater wetlands
- Near MP 187; 0.54 acre of impact to Wetland 16-9, accounting for 9 percent of impacted stormwater wetlands
- Between MP 189 and 190; 2.12 acres of impact to Wetland 20-8 and 22-1, which accounts for over 40 percent of impacted stormwater wetlands and 24 percent of all wetland impacts

Reservoir Fringe Wetlands

There would be no impacts to this wetland group from the Proposed Action.

Fens

Of the 19 fens encompassing 20.79 acres, three would be permanently impacted by the Proposed Action for a total of 0.421 acre (2.0 percent of the total fen area). **Table 6** lists the impacted fens and the main reason for impacts (note: these impacts are included in Tables 4 and 5).

Table 6. Fens Potentially Impacted by the Proposed Action

ID	Functional Condition	Existing Area (Acres)	Impacted Area (Acres)	Main Cause of Impact
8-4	C (Functioning)	0.42	0.018	Road widening
10-14	B (Highly Functioning)	2.96	0.212	Road widening
22-8	D (Functioning Impaired)	1.22	0.191	Road widening
	Total	**4.60**	**0.421**	

Other Water Features

A total of approximately 0.19 acre and 415 linear feet of other water features would be potentially permanently impacted by the Proposed Action. Most of the impacts are a result of road widening and will be confirmed during final design. **Table 7** lists the potentially impacted waters and they are shown on the maps in **Appendix D**.

Table 7. Other Water Features Potentially Impacted by the Proposed Action

ID	Existing Area (acres)	Area Permanently Impacted (acres)	Existing Length (feet)	Length Permanently Impacted (acres)
Natural Creeks and Channels				
Unnamed Channel (OW 17-11)	0.016	0.001	230	19
Subtotal	**0.016**	**0.001**	**230**	**19**
Stormwater Channels and Ponds				
OW 8-1 (pond)	0.009	0.009	0	0
OW 8-10 (pond)	0.005	0.005	0	0
OW 9-6 (pond)	0.006	0.006	0	0
OW 9-7 (pond)	0.006	0.006	0	0
OW 12-11b (pond)	0.008	0.008	0	0
OW 12-7	0.024	0.015	459	389
OW 13-1	0.012	0.001	133	7
OW 13-7 (pond)	0.033	0.033	0	0
OW 12-11g (pond)	0.009	0.006	0	0
OW 14-5 (pond)	0.092	0.092	0	0
OW 12-11h (pond)	0.004	0.004	0	0
OW 18-8 (pond)	0.006	0.006	0	0
Subtotal	**0.213**	**0.191**	**592**	**396**
Total	**0.229**	**0.192**	**822**	**415**

Mitigation Measures and Best Management Strategies

The following mitigation measures will be implemented to mitigate direct and indirect potential impacts to wetlands and other water features. There are three general types of mitigation for wetland impacts: avoidance, minimization, and compensatory mitigation. During refinement of the Proposed Action during final design, all efforts will be made to avoid any additional wetland impacts, minimize potential impacts to the maximum extent practicable, and then provide compensatory mitigation for unavoidable impacts. **Table 8** provides a summary of mitigation.

- Mitigate permanently impacted non-fen wetlands on-site at a 1:1 ratio
- Mitigate permanently impacted fens according to Corps requirements
- Consult with CDOT Environmental staff during preliminary/final design to confirm specific compensatory wetland mitigation strategies and locations

- Use temporary soil stabilization measures and structures to prevent and/or slow run off across disturbed areas and/or divert runoff to sediment basins
- Use sediment control measures, including erosion logs, check dams, silt fences, sediment traps and/or sediment basins
- Use timber mats or similar portable mats for temporary wetland protection.
- Use water quality treatment measures to capture and treat runoff and to prevent runoff from entering wetlands and other water features (see the *I-70 West Vail Pass Auxiliary Lanes Water Quality Technical Memorandum* for specific water quality mitigation measures).
- Roadside ditches will be restored for drainage purposes
- Use designated areas for vehicle staging to minimize disturbance of wetlands and vegetated areas
- Avoid unnecessary impacts to wetlands and other water features by fencing the limits of construction. There shall be no vehicle access in wetland or other water feature areas outside the limits of construction.
- Do not store or stockpile construction equipment, fuels, lubricants, and other petroleum distillates within 50 horizontal feet of wetlands or other water features. Equipment fueling and servicing shall occur only within approved designated areas.
- Use chemicals such as soil stabilizers, dust palliatives, herbicides, growth inhibitors, fertilizers, deicing salts, etc., in accordance with the manufacturer's recommended application rates, frequency, and instructions. These chemicals shall not be used, stored, or stockpiled within 50 horizontal feet of wetlands or other water features.
- Revegetate disturbed areas as quickly as possible with native vegetation known to occur in the vicinity

Table 8. Resource Mitigation Measures

CONTEXT			
130.10 acres of wetlands (including 20.79 acres of fens) and 59.80 acres of other water features were mapped in the 1,251-acre study area.			
IMPACT TYPE	**NO ACTION ALTERNATIVE**	**PROPOSED ACTION ALTERNATIVE**	**MITIGATION**
Wetlands and Other Water Features	**Permanent Impacts**: None – no wetlands or other water features would be impacted.	**Permanent Impacts**: Approximately 9.44 acres of wetlands (including 0.42 acre of fen) and 0.19 acre of other water features would be permanently impacted. This will be confirmed during final design. Some indirect impacts to wetlands may also occur but are not quantifiable. **Temporary Impacts:** Some temporary impacts for access or installation of control measures may occur during construction.	Prior to construction, all wetlands/waters of the US will be formally delineated using the US Army Corps of Engineers (Corps) standards and the Section 404 permitting process will be followed. During refinement of the Proposed Action in final design, all efforts will be made to avoid any additional wetland impacts, minimize potential impacts to the maximum extent practicable, and then provide compensatory mitigation for unavoidable impacts. **Permanent:** • All permanently impacted non-fen wetlands will be replaced at a 1:1 ratio. • CDOT Environmental staff will be consulted during preliminary/final design to confirm specific compensatory wetland mitigation strategies and locations. CDOT is committed to utilizing onsite mitigation and will work with the Corps to confirm specific compensatory wetland mitigation strategies. • Fens may need to be replaced at a higher ratio, if determined by the Corps. **Temporary:** • Use temporary soil stabilization measures and structures to prevent and/or slow run off across disturbed areas and/or divert runoff to sediment basins

Impact Type	No Action Alternative	Proposed Action Alternative	Mitigation
			• Use sediment control measures, including erosion logs, check dams, silt fences, sediment traps and/or sediment basins • Use water quality treatment measures to capture and treat runoff and to prevent runoff from entering wetlands and other water features (see Water Quality mitigation measures) • Roadside ditches will be restored for drainage purposes • Use designated areas for vehicle staging to minimize disturbance of wetlands and vegetated areas • Avoid unnecessary impacts to wetlands and other water features by fencing the limits of construction. There shall be no vehicle access in wetland or other water feature areas outside the limits of construction. • Do not store or stockpile construction equipment, fuels, lubricants, and other petroleum distillates within 50 horizontal feet of wetlands or other water features. • Equipment fueling and servicing shall occur only within approved designated areas. • Use chemicals such as soil stabilizers, dust palliatives, herbicides, growth inhibitors, fertilizers, deicing salts, etc., in accordance with the manufacturer's recommended application rates, frequency, and instructions. These chemicals shall not be used, stored, or stockpiled within 50 horizontal feet of wetlands or other water features.

Impact Type	No Action Alternative	Proposed Action Alternative	Mitigation
			• Revegetate disturbed areas as quickly as possible with native vegetation known to occur in the vicinity.

Potential Compensatory Wetland Mitigation Areas

During fieldwork to map wetlands and other water features, 15 potential compensatory wetland mitigation areas were identified in the Study Area. These sites are not the only potential mitigation areas present in the project corridor but they represent excellent opportunities to compensate for wetland losses by restoring, enhancing, and/or protecting important wetland resources. The exact area of wetland losses to be compensated for will be determined during final design and project permitting, after a formal wetland delineation is completed. CDOT will work with the Corps during the Section 404 permitting process to determine if onsite compensatory mitigation is appropriate as part of the project. The 15 sites are listed in **Table 9** and shown on the maps in **Appendix A**.

Table 9. Potential Compensatory Wetland Mitigation Areas in the Study Area

ID[1]	Approximate Area (acres)[2]	Target Wetland Mitigation Type(s)	Associated Existing Feature(s)	Notes
5	1.20	Riverine	Gore Creek Wetland 5-1	Remove old fill to restore wider Gore Creek floodplain
5A	0.78	Slope, Depressional	Wetland 5-2	Remove old road grade; restore connection to Gore Creek (under frontage road); restore ditched portions of Wetland 5-2
7	4.88	Riverine	Black Gore Creek Wetland 10-4	Restore this reach of Black Gore Creek and its floodplain to more natural condition
8	4.44	Riverine	Black Gore Creek Wetland 10-4 Wetland 8-2 Wetland 8-9	Restore/create Black Gore Creek floodplain and flow path for water associated with Wetlands 8-2 and 8-9
10	1.20	Riverine	Timber Creek Wetland 10-1 Wetland 10-2	Remove accumulated road sand and restore/enlarge Timber Creek floodplain
10A	0.22	Riverine	Black Gore Creek Wetland 10-4 Wetland 10-6 Wetland 10-9	Remove old fill from floodplain and restore/enlarge Black Gore Creek floodplain
11	3.82	Riverine	Black Gore Creek Wetland 11-2	Remove accumulated road sand and restore/enlarge Black Gore Creek floodplain
11A	2.61	Slope, Depressional	Wetland 11-3 Wetland 11-7 Wetland 11-8 Wetland 12-11	Create stormwater swale that connects to natural wetlands; designate a portion of the swale for regular maintenance (sediment removal)
12	1.94	Riverine	Miller Creek Wetland 12-1 Wetland 12-2	Remove accumulated road sand and restore/enlarge Miller Creek floodplain; improve stormwater pond (Wetland 12-1) connection to floodplain
12A	0.19	Slope	Wetland 12-9	Remove old fill and restore natural topography to enlarge slope wetland

ID[1]	Approximate Area (acres)[2]	Target Wetland Mitigation Type(s)	Associated Existing Feature(s)	Notes
13	1.86	Riverine	Polk Creek Wetland 13-8	Remove accumulated road sand and restore/enlarge Polk Creek floodplain
15	1.37	Slope, Riverine	Black Gore Creek Wetland 15-6	Reconfigure existing stormwater pond to restore/create floodplain for Black Gore Creek
16	1.64	Slope/Fen	Wetland 16-1	Remove accumulated road sand from existing wetland and fen, and improve area around stormwater input to prevent further sedimentation
20	3.96	Slope/Fen	Wetland 20-7	Restore ditched portions of wetland and fen to maintain natural flow path(s) and rewet relic wetland areas
22	5.01	Slope/Fen	Wetland 22-8	Narrow roadway embankment (install retaining wall if possible) to restore wetland and fen area; remove other areas of fill
Total	**35.12**			

[1]The ID numbers correspond to the map number in **Appendix A**.
[2]This is the approximate total area of the potential mitigation site, not the area of wetlands that could be restored, enhanced, or created in this location.

PERMITS

A Section 404 of the Clean Water Act permit is the only permit potentially required for impacts related to wetlands or other water features.

CONCLUSIONS

A total of 130.10 acres of wetlands and 59.80 acres of other water features were mapped in 2018 and 2019. The wetlands belong to one of four groups: slope (55 percent of all wetlands), riverine (32 percent), stormwater (12 percent), and reservoir fringe (1 percent). In terms of functional condition, most of the wetlands (52 percent) are considered "functioning," with approximately 37 percent considered "functioning impaired." Included in the 130.10 acres of wetlands are 20.79 acres of fens (19 different sites).

Other water features belong to one of three groups: ponds and reservoirs (63 percent of all waters), natural creeks and channels (36 percent), and stormwater channels/ponds (1 percent). Nearly all of the ponds and reservoirs acreage is attributed to Black Lakes. The natural creeks and channels group includes 11 perennial streams, including over 10 acres of Black Gore Creek and 9 acres of Gore Creek.

A total of 9.44 acres of wetlands and 0.19 acre of other water features would be permanently impacted by the Proposed Action. The impacts include the total loss of 0.42 acre of fen at three separate sites. Most of the impacts to wetlands and other water features are a result of roadway widening.

Fifteen (15) potential compensatory wetland mitigation areas were identified in the study area. These sites represent excellent opportunities to compensate for wetland losses by restoring, enhancing, and/or protecting important wetland resources inside the project corridor.

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Appendix A

Wetland Maps

I-70 Frontage Rd

Fall Line Dr

70

East Vail Interchange
Exit 180

6-3

6-3

1-1

Gore Creek

Gore Valley Trail

Bighorn Rd

6-3

Gore Creek

Lupine Dr

Legend

Wetlands (130.10 acres)
- B: Highly Functioning (13.70 acres)
- C: Functioning (67.05 acres)
- D: Functioning Impaired (49.34 acres)
- Approximate Study Area (1,251.13 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Potential Mitigation Area (35.12 acres)
- Milepost

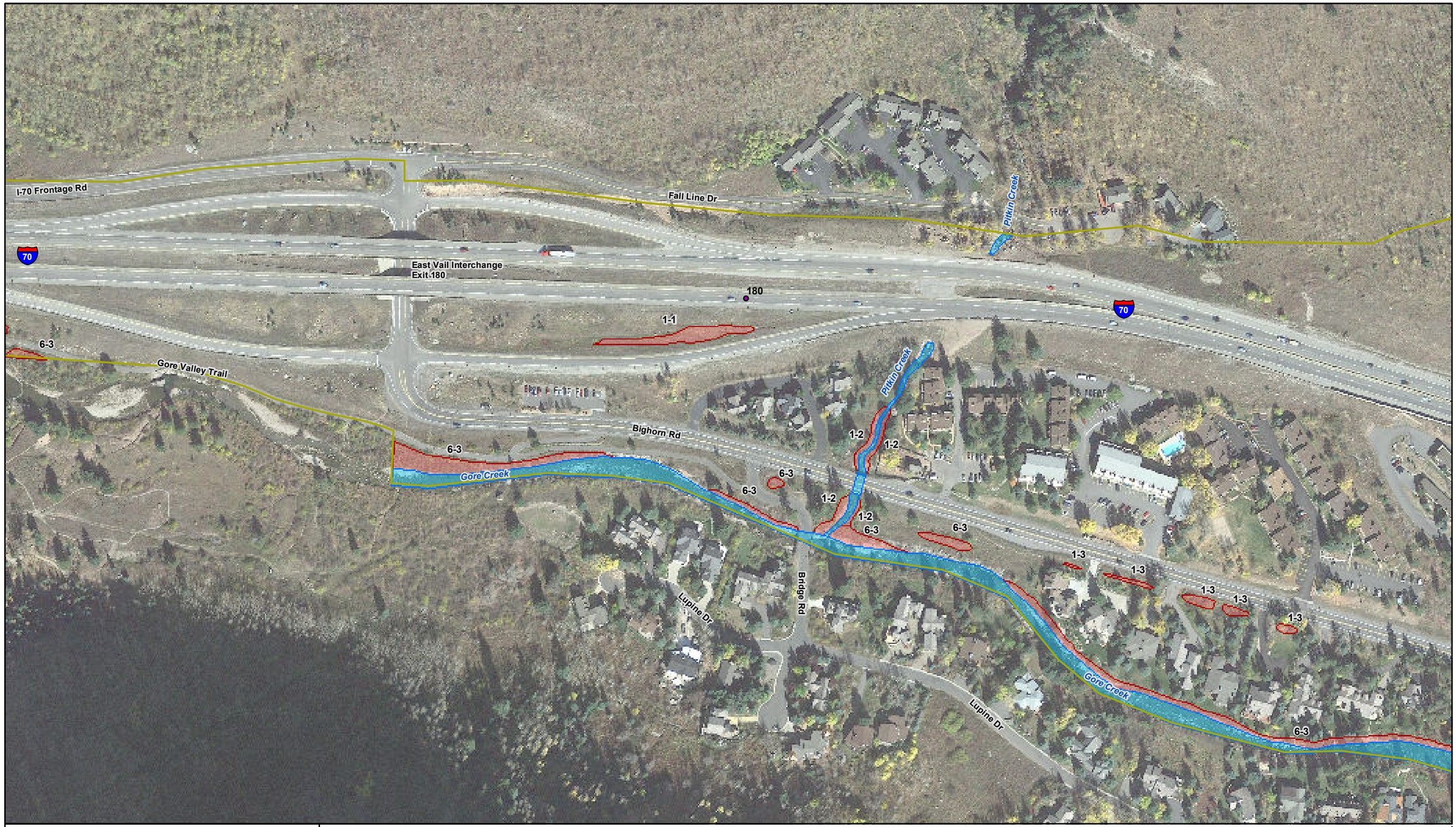
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 1A of 24
March 18, 2020



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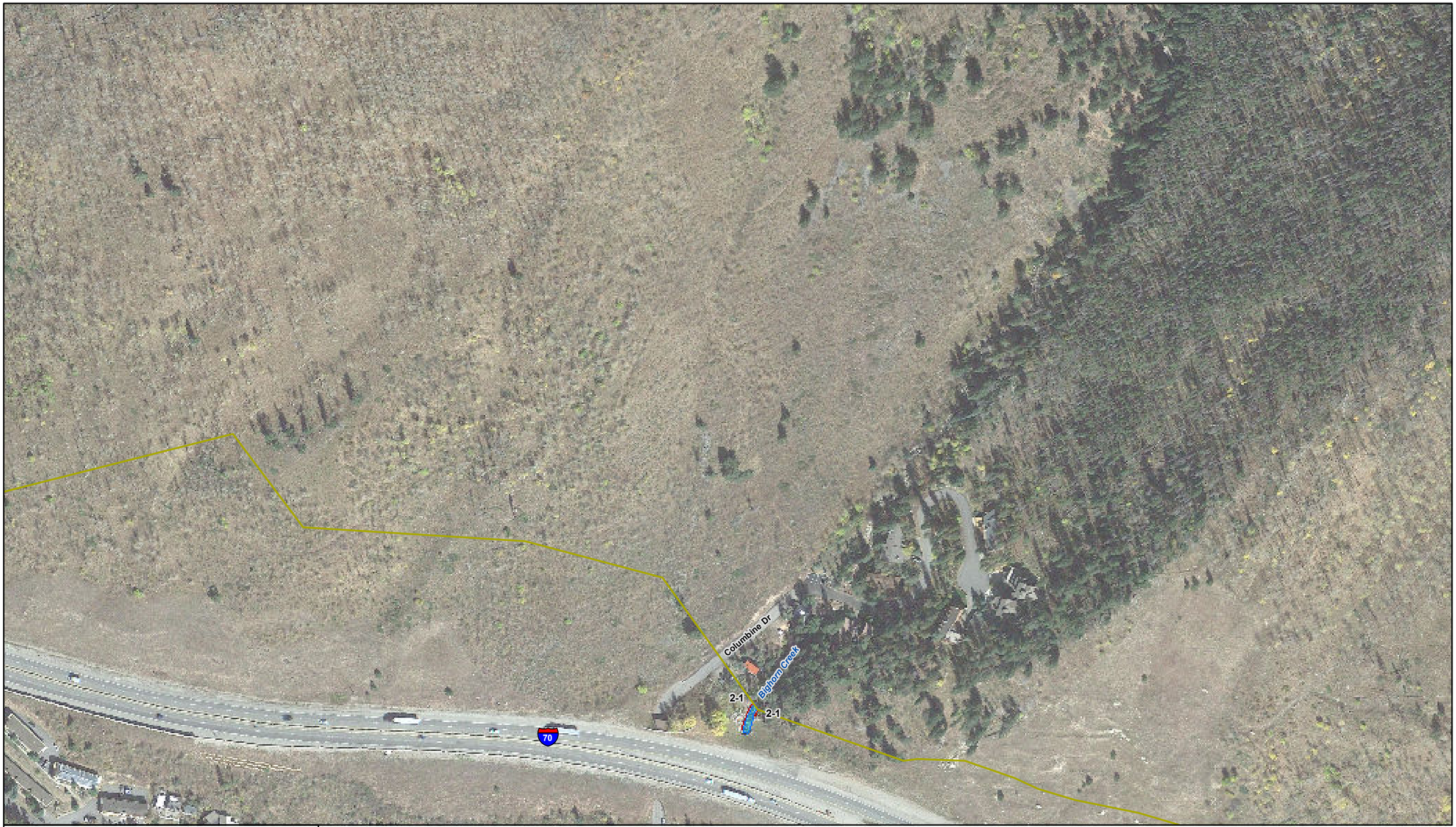
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 1 of 24
March 18, 2020



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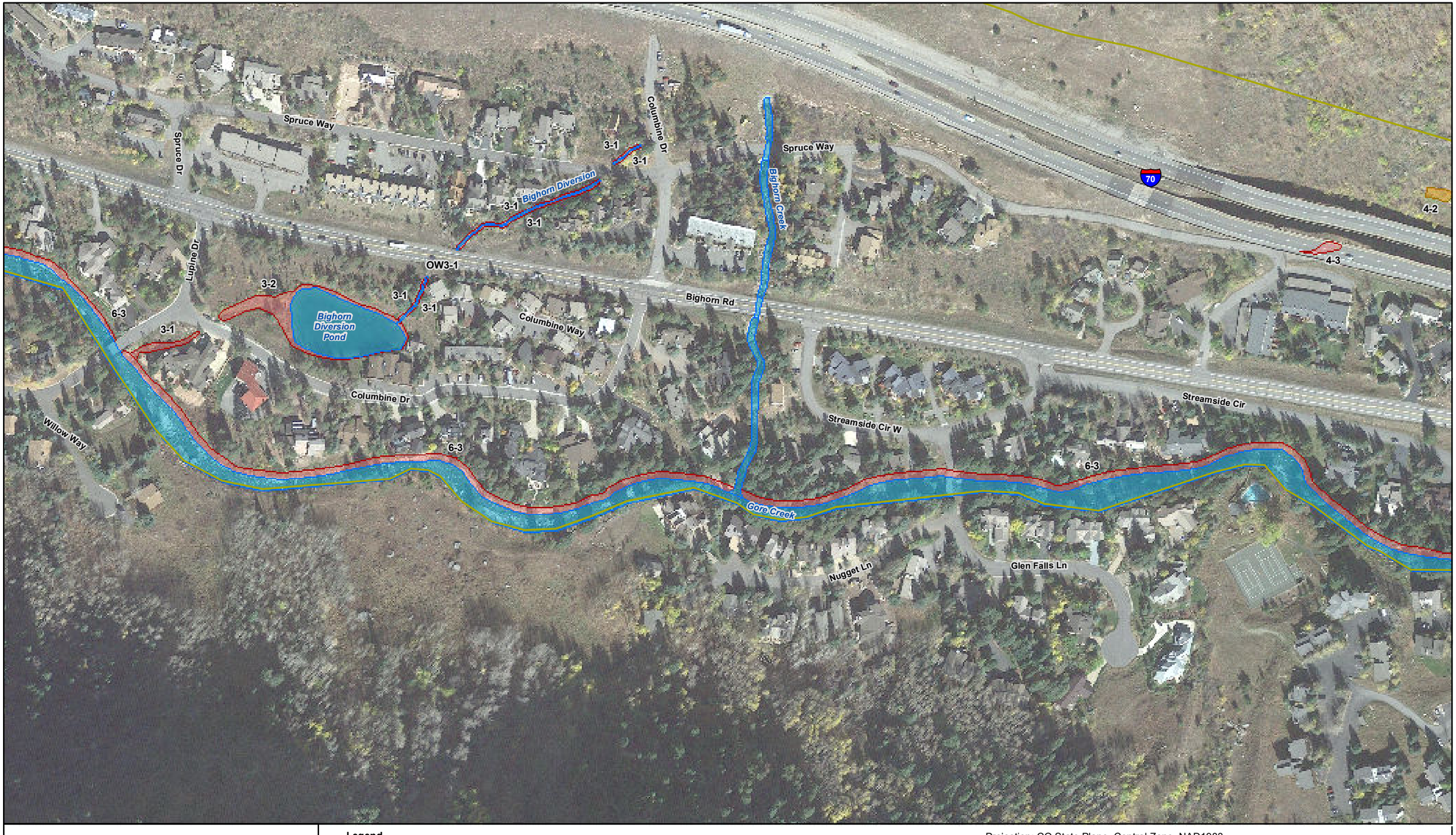
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 2 of 24
March 18, 2020



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- Milepost

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Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 3 of 24
March 18, 2020

Legend

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- Milepost

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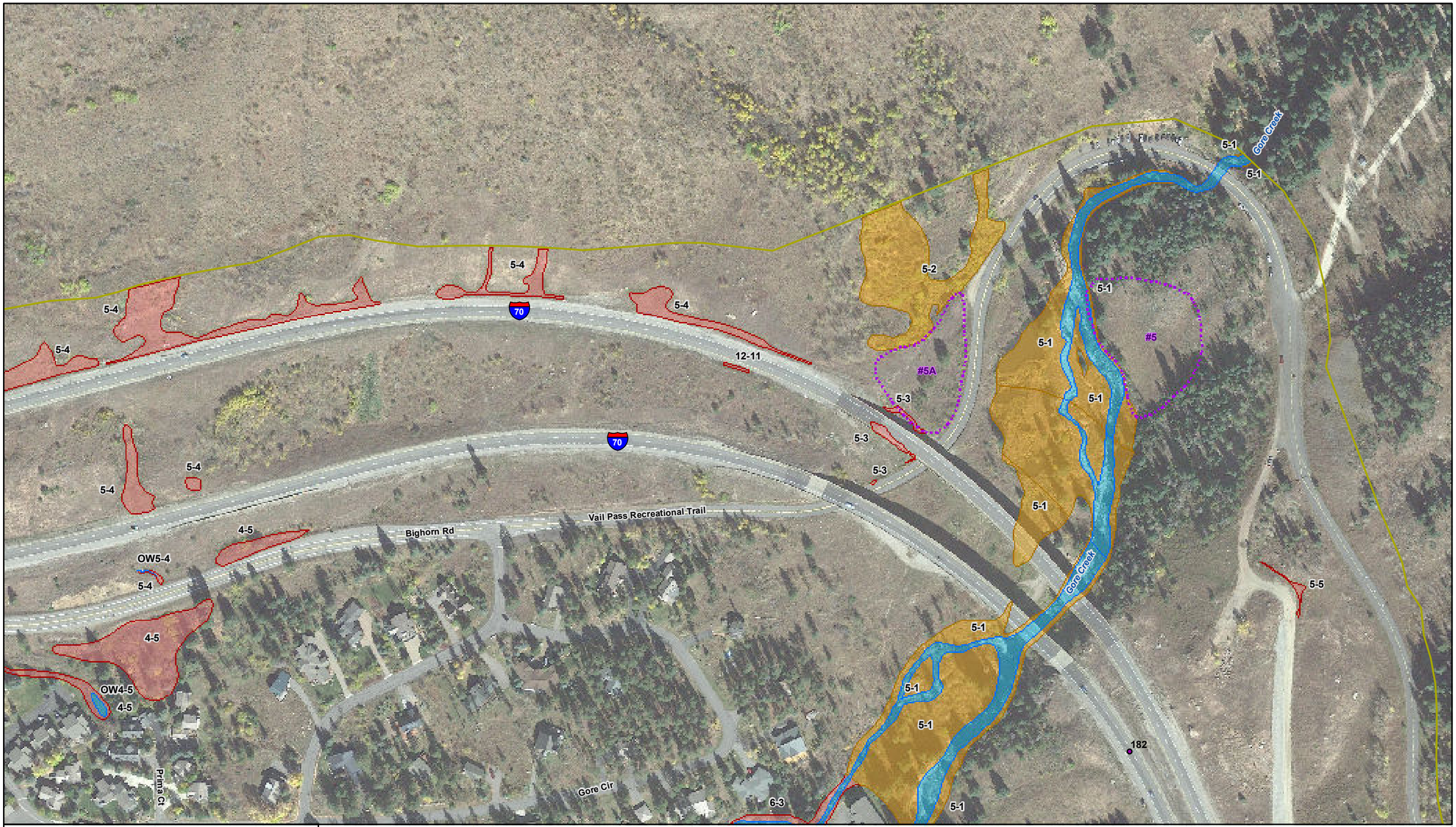
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 4 of 24
March 18, 2020



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- Milepost

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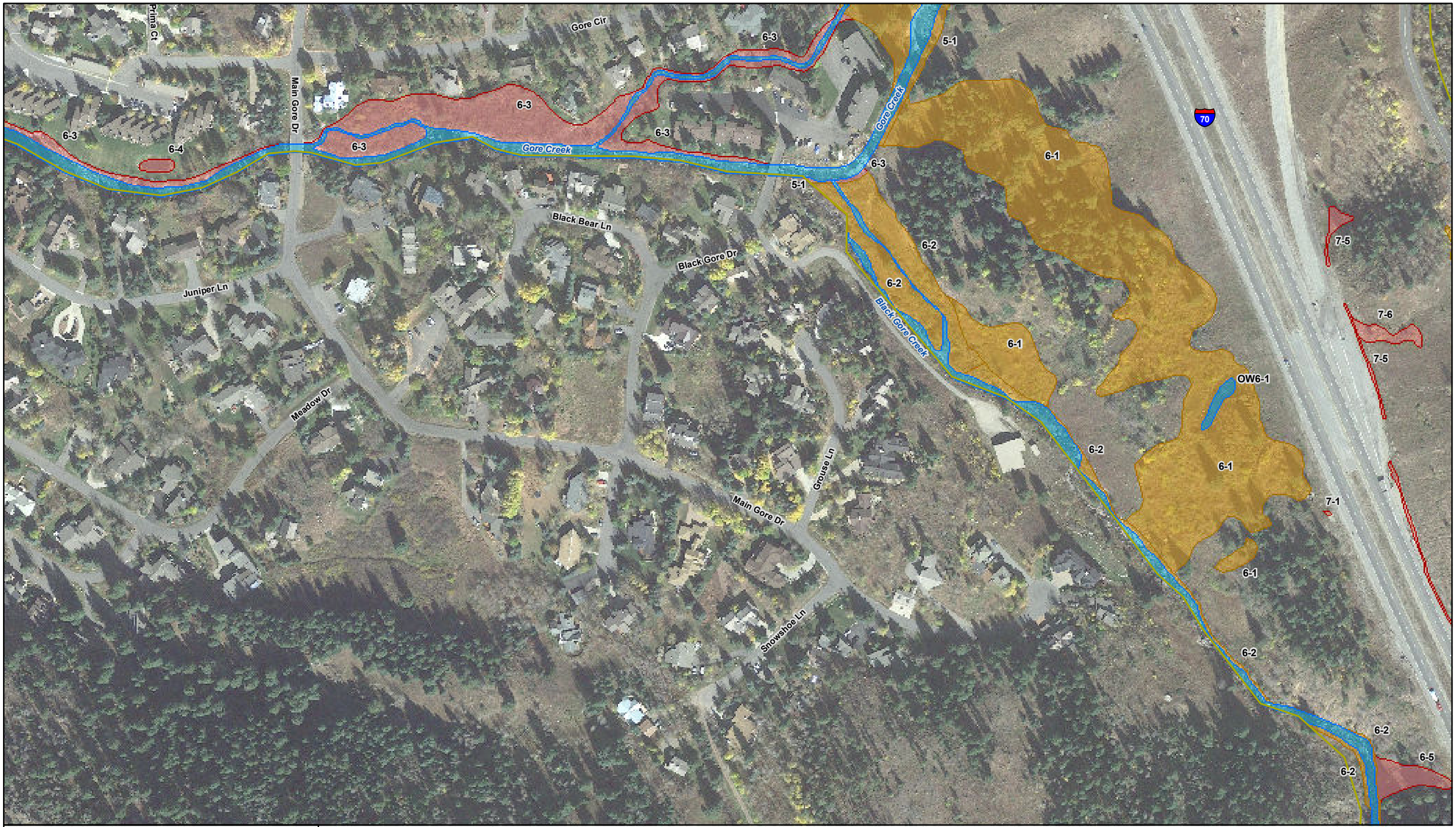
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 5 of 24
March 18, 2020



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- Milepost

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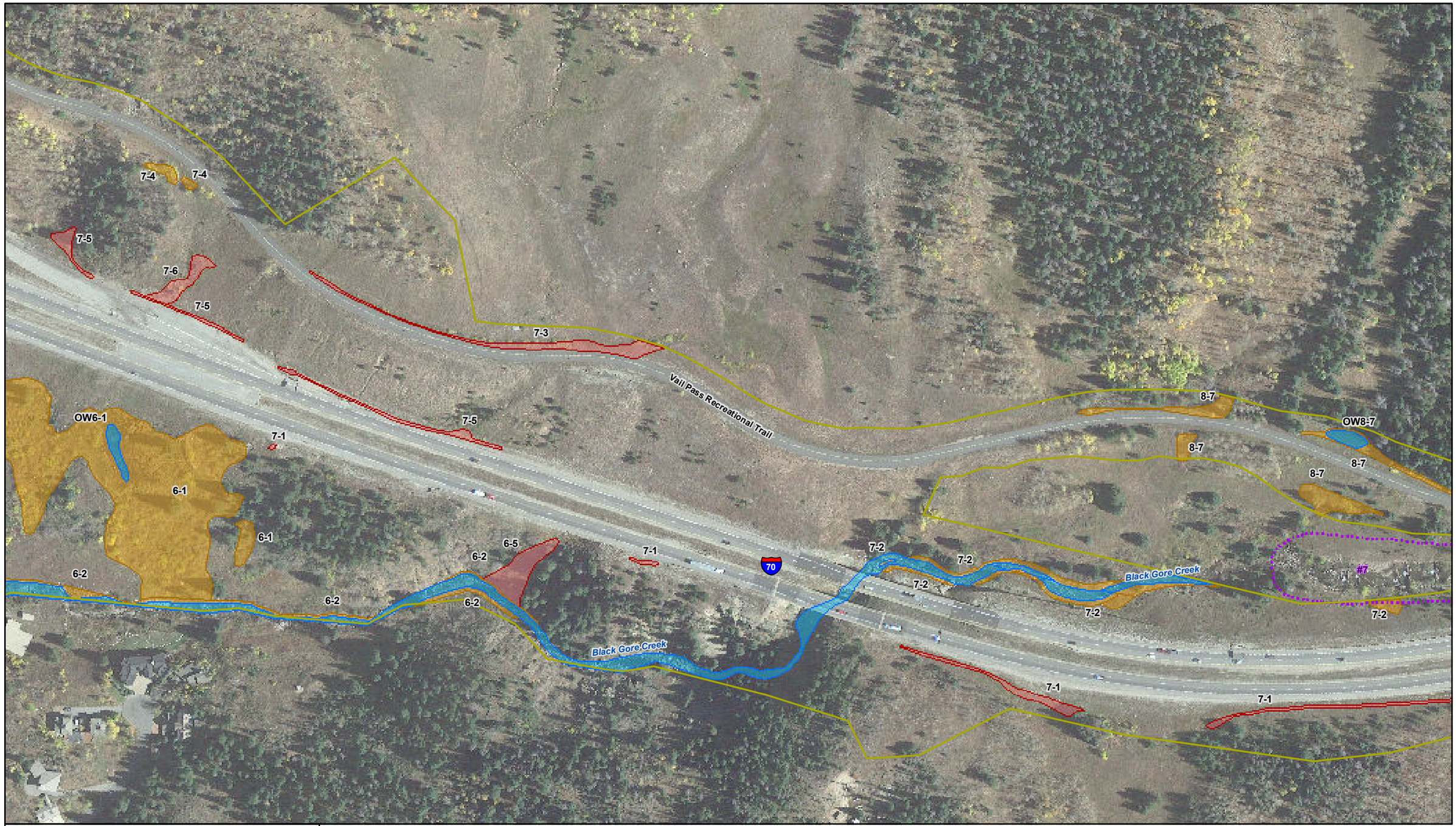
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 6 of 24
March 18, 2020



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- Milepost

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Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

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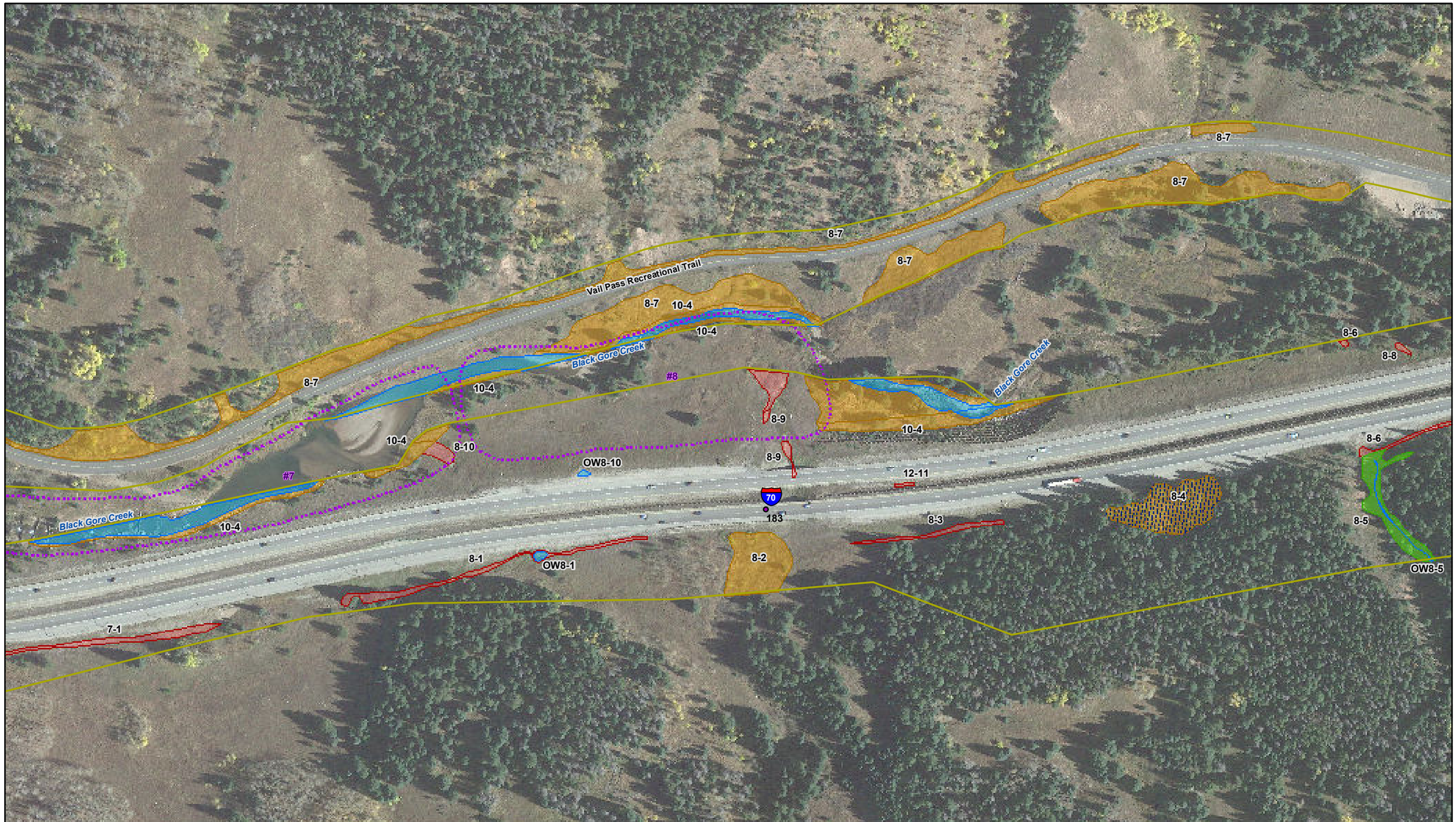
West Vail Pass
Wetlands
Map 7 of 24
March 18, 2020



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- Milepost

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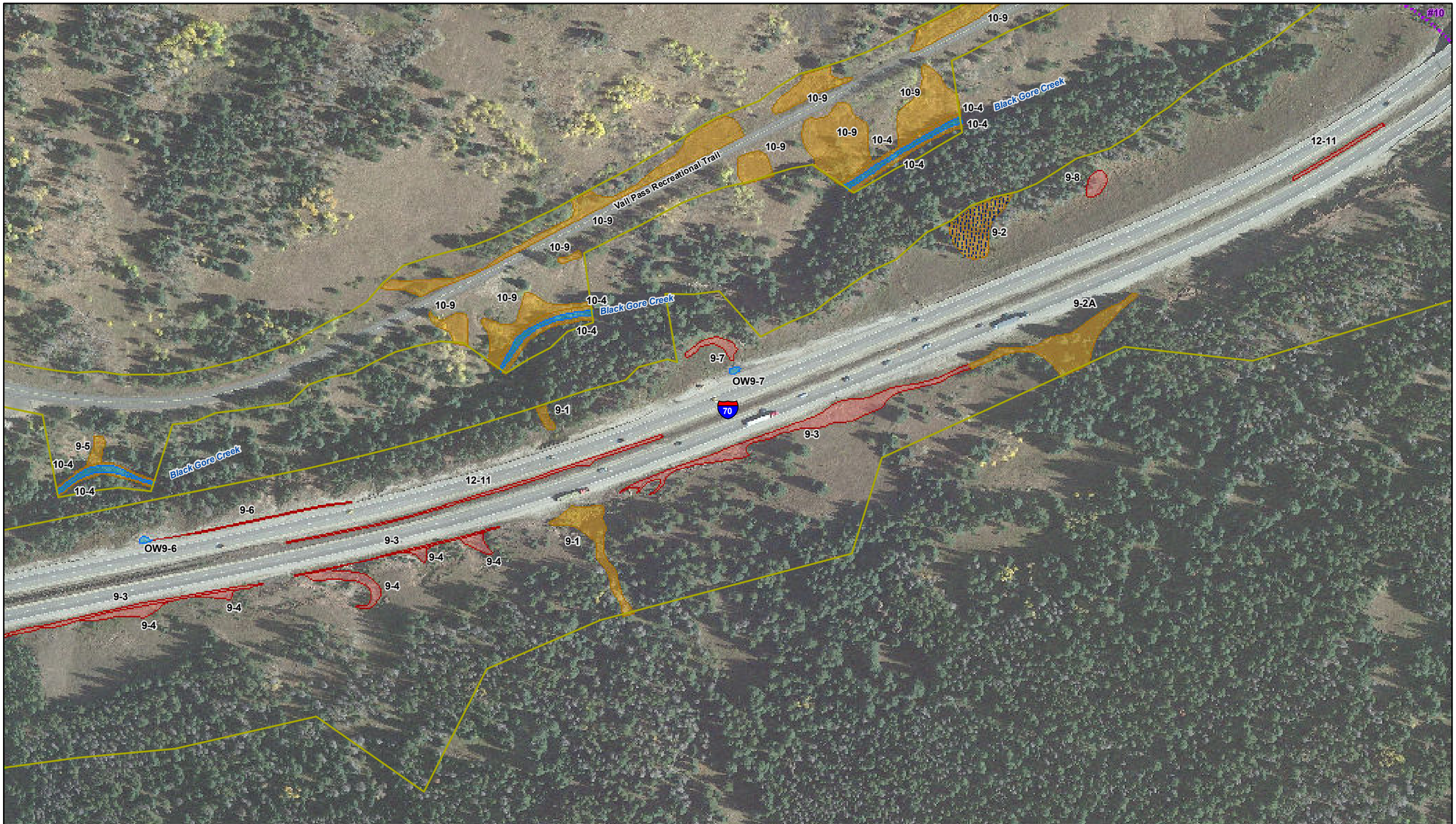
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 8 of 24
March 18, 2020



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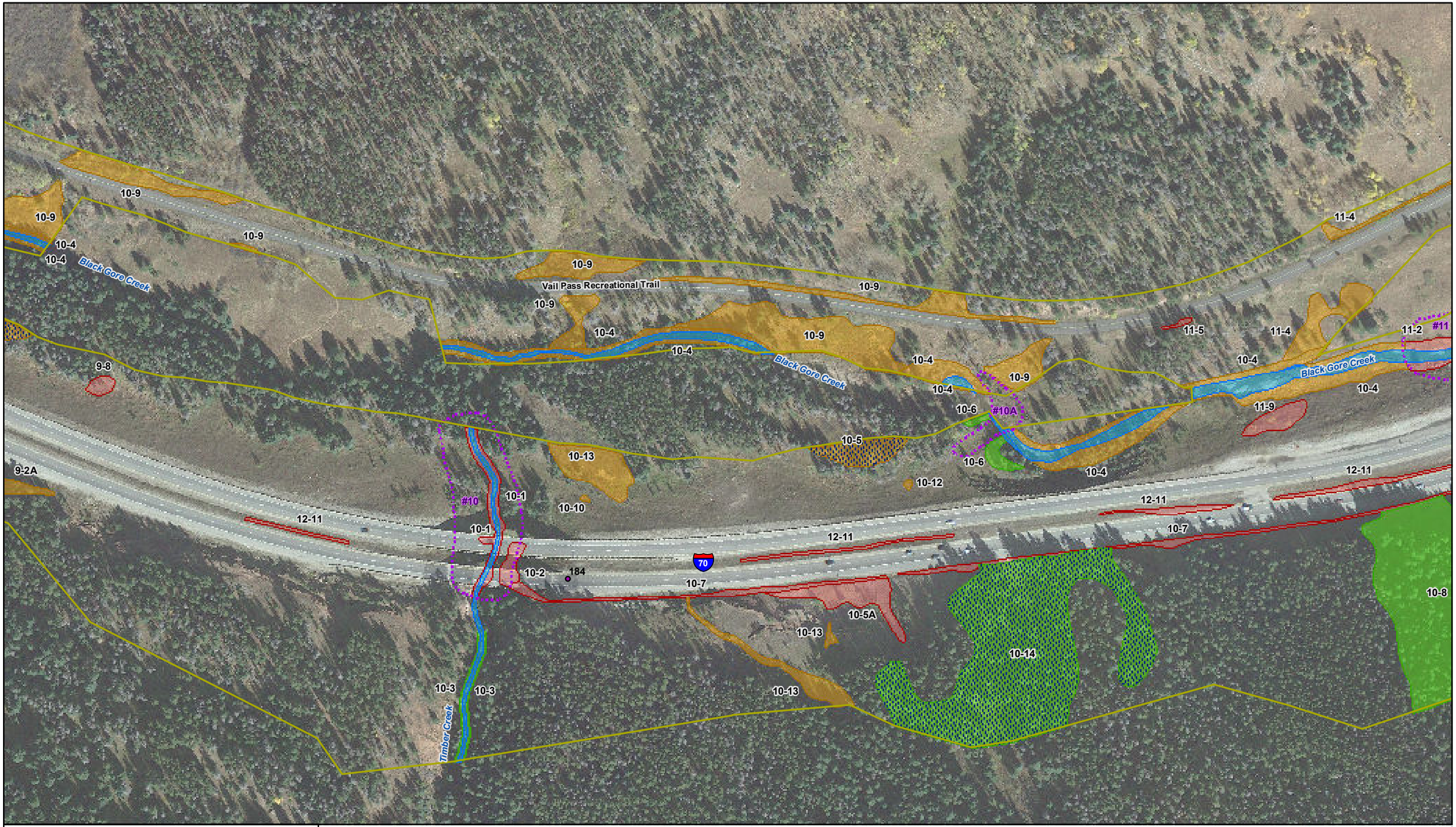
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 9 of 24
March 18, 2020



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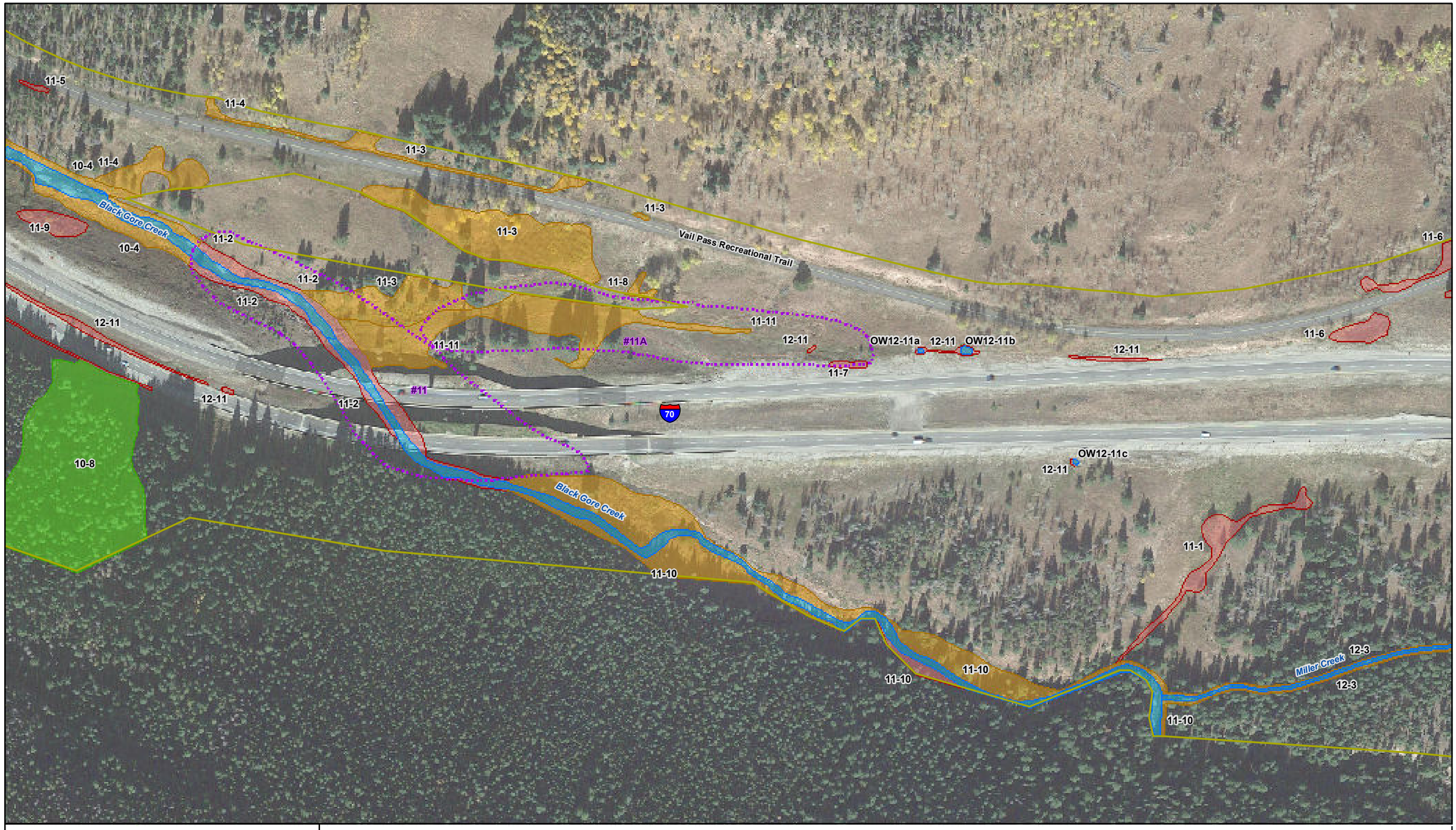
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 10 of 24
March 18, 2020



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Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 11 of 24
March 18, 2020

12-2
12-2
12-12
12-12
12-2
12-2
11-6
11-6
12-7
12-13
Miller Creek
12-13
12-2b
12-2b
#12
12-1
12-13
185
OW12-11d
12-2
12-2
12-11
12-11
12-11
OW12-7
OW12-7
12-4
OW12-4
12-3
12-7
12-7
Vail Pass Recreational Trail
70
12-5
12-7
OW13-8
12-8
12-9
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Black Gore Creek
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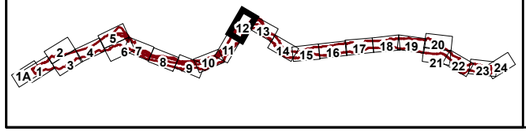
13-8



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Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 12 of 24
March 18, 2020

Legend

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Aerial Photo Source: Google Earth, 2015

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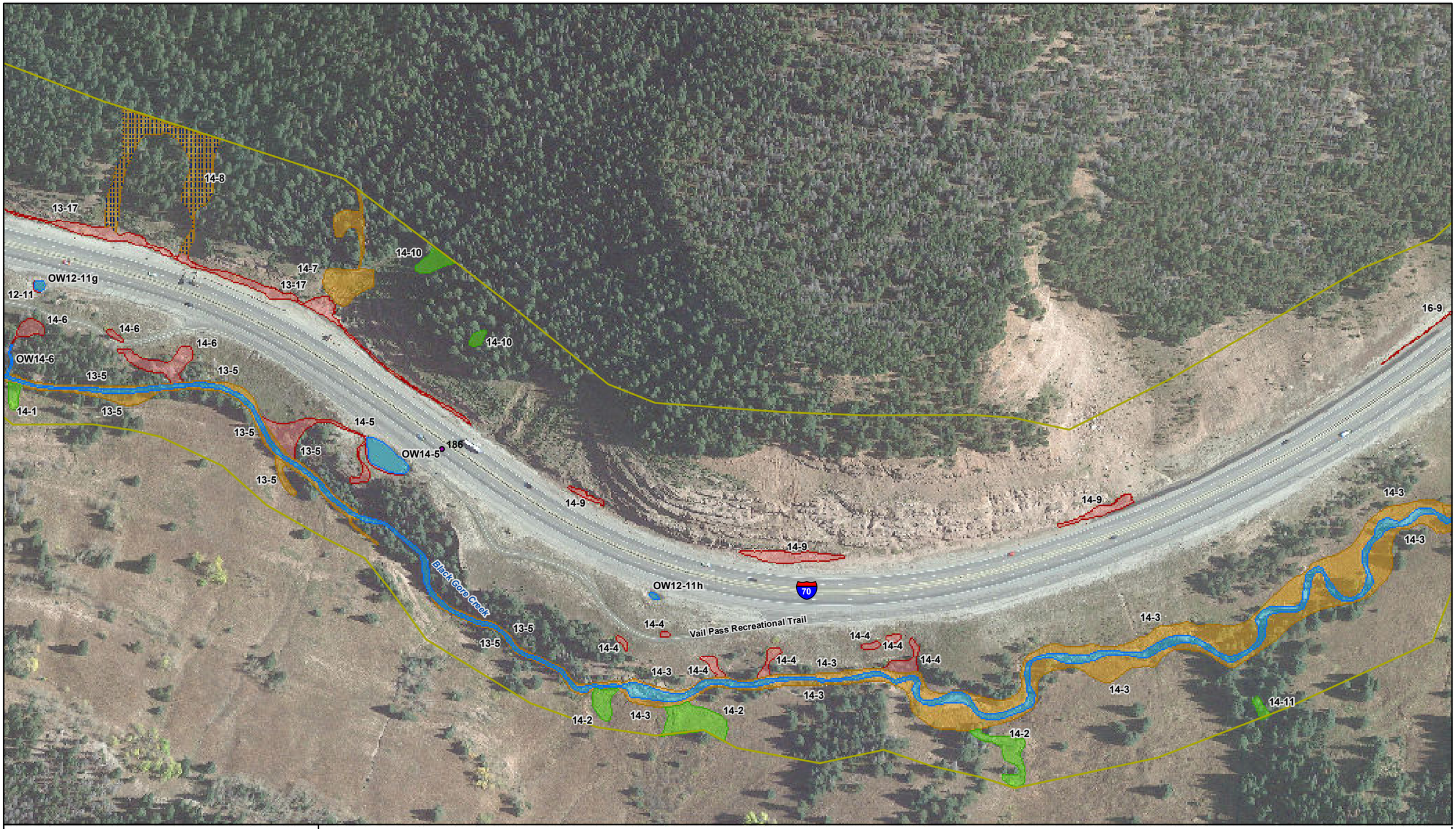
West Vail Pass
Wetlands
Map 13 of 24
March 18, 2020



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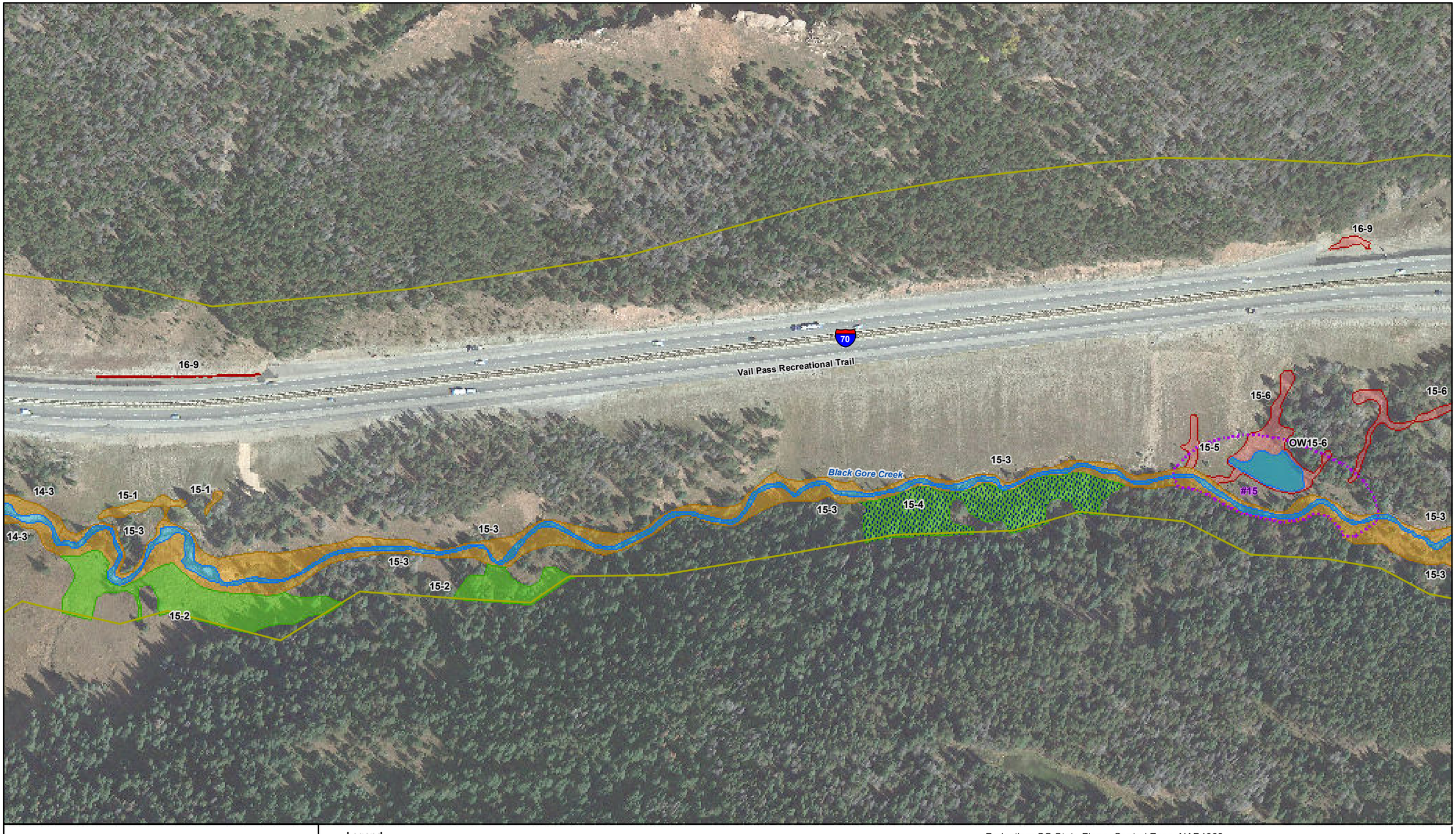
0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 14 of 24
March 18, 2020



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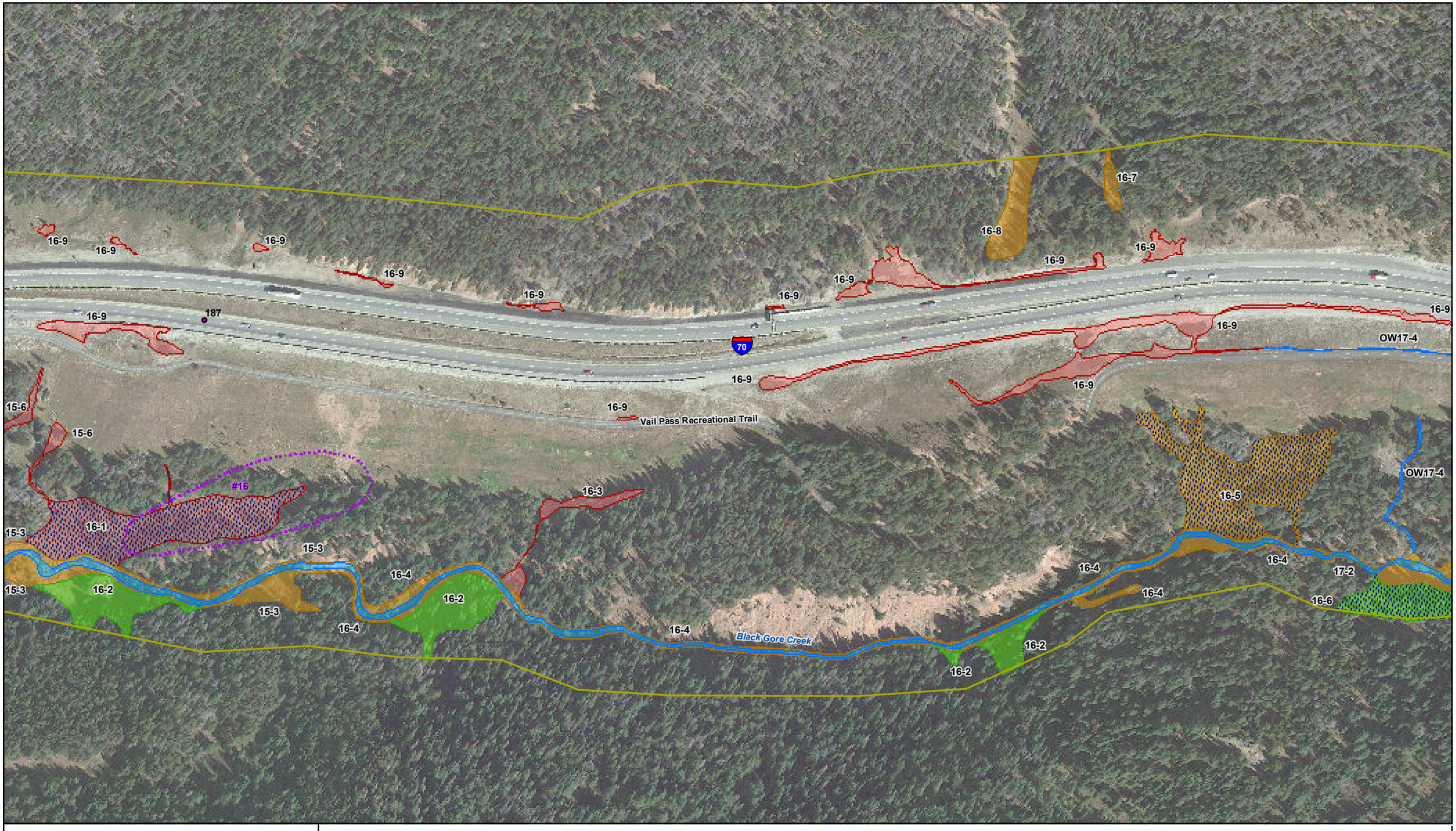
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 15 of 24
March 18, 2020



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- Milepost

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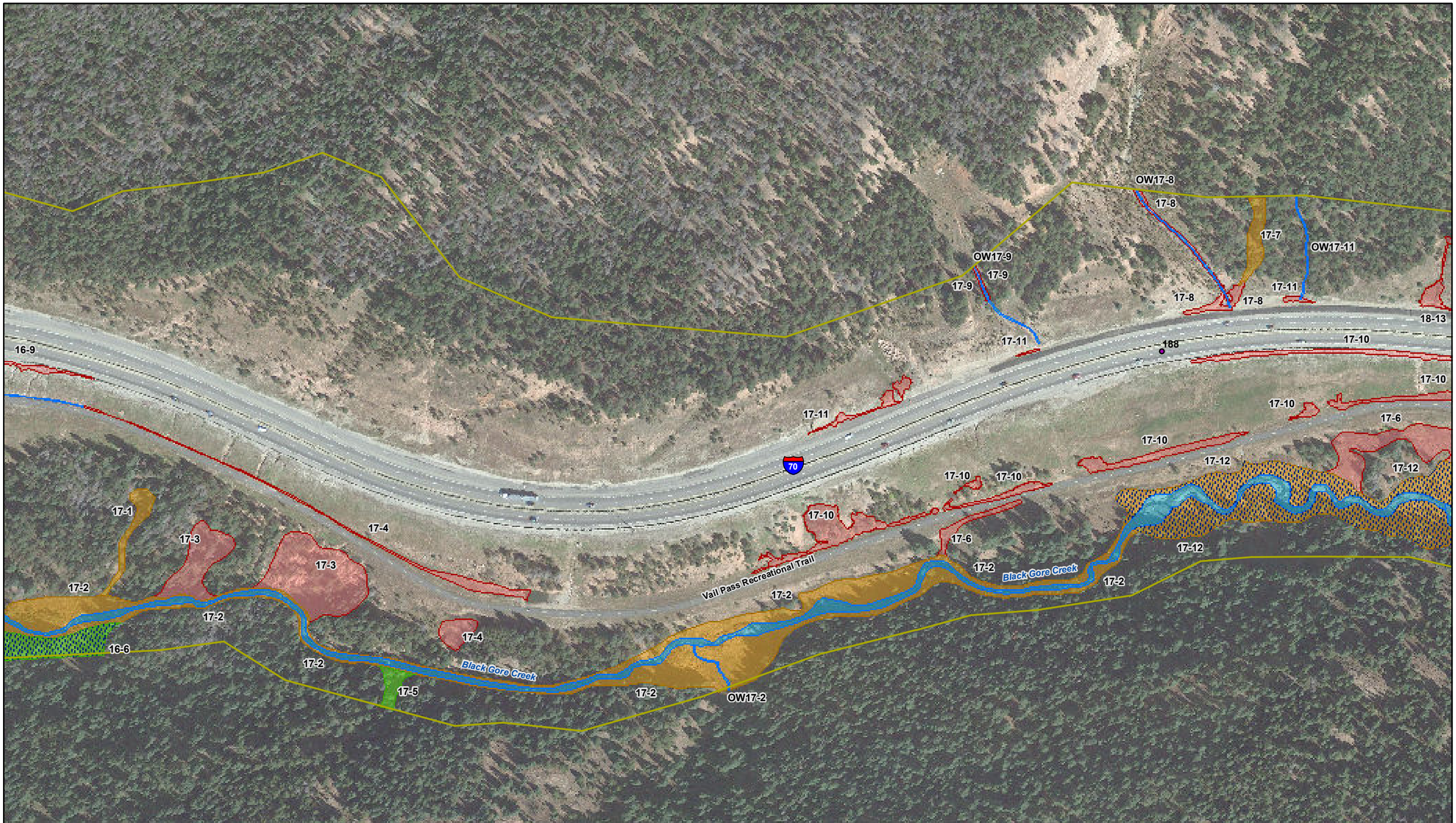
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 16 of 24
March 18, 2020



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0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 17 of 24
March 18, 2020

Legend

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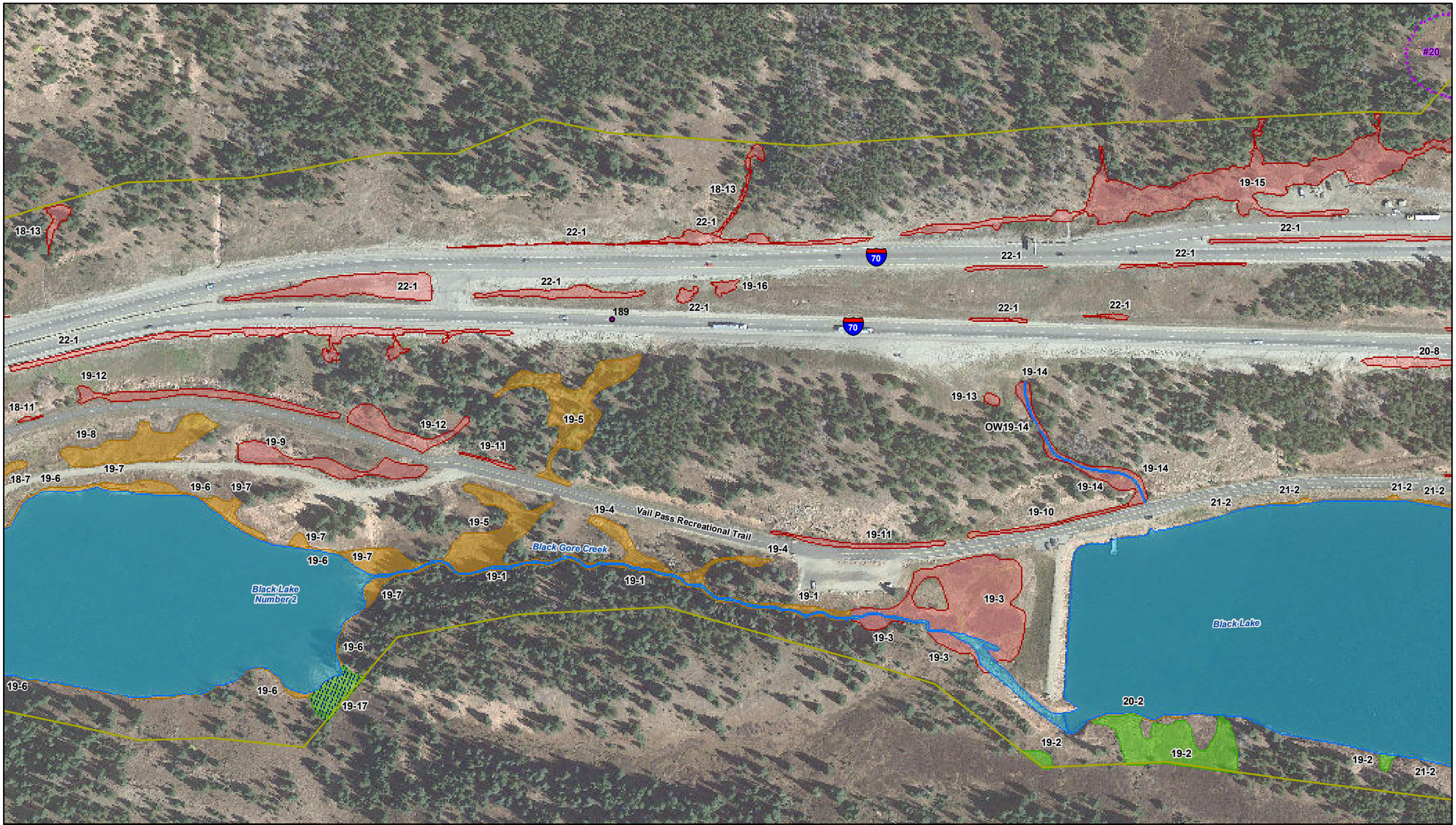
AlpineEco

West Vail Pass
Wetlands
Map 18 of 24
March 18, 2020



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- Fen (20.79 acres)
- Water (59.80 acres)
- Potential Mitigation Area (35.12 acres)
- Milepost

N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 19 of 24
March 18, 2020

Legend

Wetlands (130.10 acres)
- B: Highly Functioning (13.70 acres)
- C: Functioning (67.05 acres)
- D: Functioning Impaired (49.34 acres)
- Approximate Study Area (1,251.13 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Potential Mitigation Area (35.12 acres)
- Milepost
- County Boundary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 20 of 24
March 18, 2020

Legend

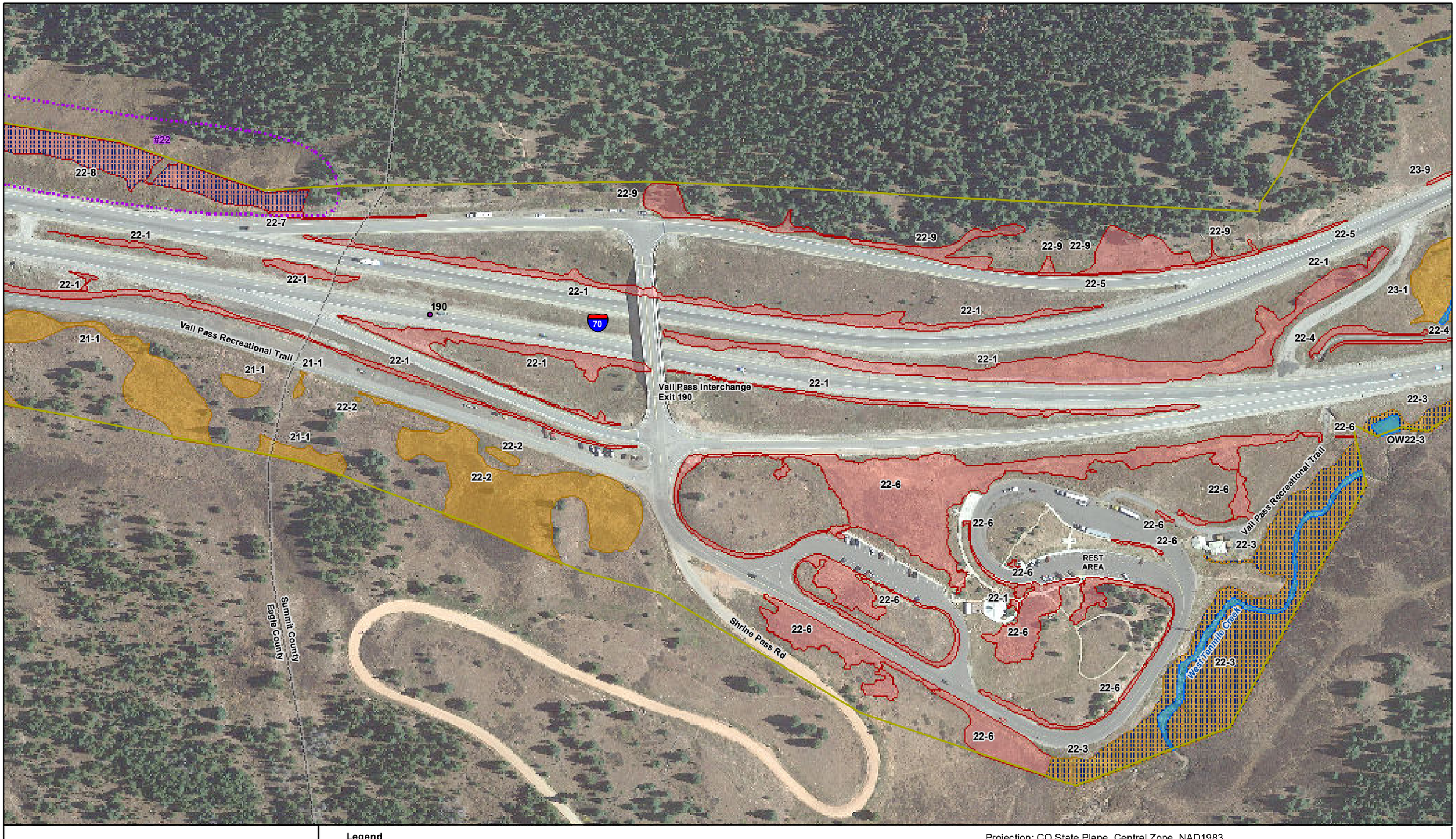
Wetlands (130.10 acres)
- B: Highly Functioning (13.70 acres)
- C: Functioning (67.05 acres)
- D: Functioning Impaired (49.34 acres)
- Approximate Study Area (1,251.13 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Potential Mitigation Area (35.12 acres)
- Milepost
- County Boundary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 21 of 24
March 18, 2020



Legend

Wetlands (130.10 acres)
- B: Highly Functioning (13.70 acres)
- C: Functioning (67.05 acres)
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- Approximate Study Area (1,251.13 acres)
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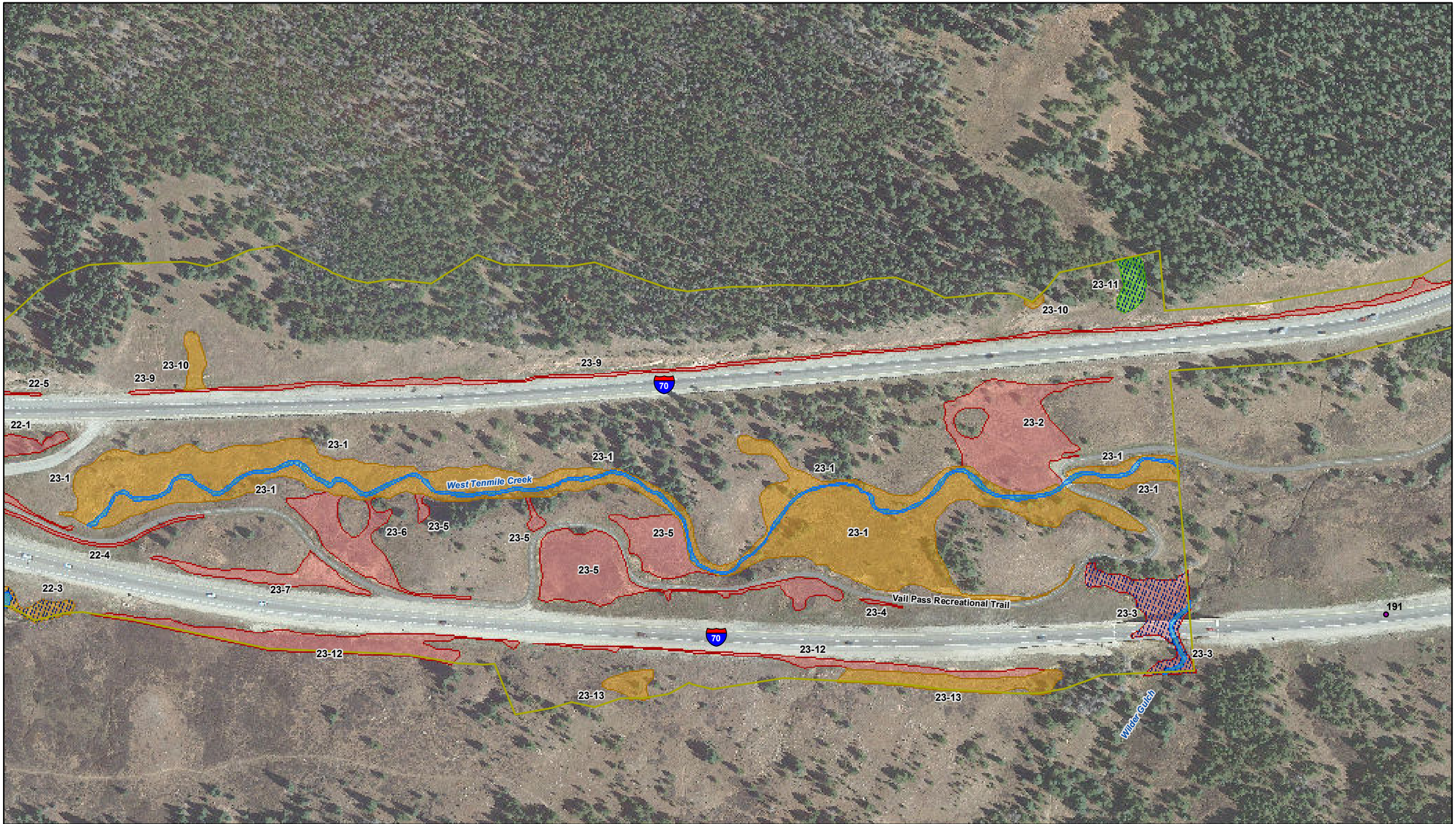
- Water (59.80 acres)
- Potential Mitigation Area (35.12 acres)
- Milepost
- County Boundary

Feet
0 100 200 400

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 22 of 24
March 18, 2020



Legend

Wetlands (130.10 acres)
- B: Highly Functioning (13.70 acres)
- C: Functioning (67.05 acres)
- D: Functioning Impaired (49.34 acres)
- Approximate Study Area (1,251.13 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Potential Mitigation Area (35.12 acres)
- Milepost

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 23 of 24
March 18, 2020

Trail

23-11

23-1

23-1

23-3

Wilder Gulch

23-3

23-9

191

Vail Pass Recreational Trail

Legend

Wetlands (130.10 acres)
- B: Highly Functioning (13.70 acres)
- C: Functioning (67.05 acres)
- D: Functioning Impaired (49.34 acres)
- Approximate Study Area (1,251.13 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Potential Mitigation Area (35.12 acres)
- Milepost

N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands
Map 24 of 24
March 18, 2020

APPENDIX B

WETLAND FIELD DATA SUMMARY TABLE

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Classification		Vegetation			Hydrology		Functional Condition	Notes
		Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source		
Highly Functioning (B)										
10-6	0.08	PSS	Slope	Salix spp.	Caaq	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	B (Highly Functioning)	Likely continuation of Wetland 10-14 (fen above road). Buffer only stressor. Possibly receives some water from retaining wall drain?
10-8	2.53	PEM/PFO	Slope	Pien	Meci	Caco	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	B (Highly Functioning)	Impaired at road and by Road, otherwise no stressors. Hard to map.
10-14	2.96	PSS/PFO	Slope	Alin	Setr	Caaq	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	B (Highly Functioning)	Steep slope Wetland. Fen above road. Some PEM areas. Very wet. Buffer only stressor.
12-12	1.61	PSS/PFO	Slope	Alin	Caca	Hema	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Alluvial Groundwater	B (Highly Functioning)	Buffer only stressor, mostly gw, several small channels, bike path crosses upper end, bedrock dams gw
13-18	0.04	PEM	Slope	Setr	Meci	Caco	Saturation (A3)	Groundwater,Precipitation/Snow melt	B (Highly Functioning)	Small depressions that appear to hold snowmelt
13-19	0.78	PEM	Slope	Setr	Eqar	Caut	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Fen. Outflow impaired by roadcut.
14-1	0.03	PSS	Slope	Sapl	Caca	Eqar	Saturation (A3), Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Very steep seep on hillside
14-2	0.34	PSS	Slope	Sapl	Sadr	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Seep on steep hillside
14-10	0.08	PEM	Slope	Caca	Eqar	Vasc	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Multiple polygons, some impairment to lower areas especially from roadcut altering discharge; some PFO
14-11	0.02	PEM	Slope	Hema	Mior	Meci	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Small seep surrounded by spruce/fir
15-2	1.23	PSS	Slope	Sabr	Caca	Dafr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	B (Highly Functioning)	Across creek at toe of natural Hillside

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
15-4	0.98	PSS	Slope	Sabr	Caut	Sadr	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	B (Highly Functioning)	Fen. On steep slope on south side of creek. Gw wells obs. See photo 14
16-2	1.02	PSS	Slope	Sabr	Caca	Caaq	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	On south side of creek. On steep slope as well as at toe. Multiple polygons. Some PFO.
16-6	0.59	PEM	Slope	Caaq	Caut	Sapl	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Fen above creek
17-5	0.07	PEM	Slope	Acco	Setr	Sapl	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Steep slope. Some s/f cover
18-3	0.24	PEM	Slope	Sapl	Samo	Setr	Saturation (A3)	Groundwater,Precipitation/Snow melt	B (Highly Functioning)	Several seeps on north-facing slope above Creek. Appear to be essentially in reference condition. Some PSS.
19-2	0.55	PSS	Slope	Sawo	Sapl	Meci	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	B (Highly Functioning)	Minor social Trail damage. Some PEM areas.
19-17	0.15	PEM	Slope	Caaq	Caut	Salix spp.	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Fen
23-11	0.13	PSS	Slope	Sapl	Caut	Begl	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater	B (Highly Functioning)	Fen
Subtotal	**13.42**									
Functioning (C)										
4-2	0.03	PEM	Slope	Ptaq	Popr	Epci	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Buffer impairment only. Lots of potr and sasc.
5-2	1.08	PSS	Slope	Samo	Sali	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Outflow significantly altered, some ditches through Wetland also, good restoration site at bottom, lots of potr.

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
6-1	6.27	PSS/PFO	Slope	Sadr	Caut	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	C (Functioning)	Minor sw inputs, recent and historic beaver activity, some pem
7-4	0.05	PSS	Slope	Samo	Rupa	Potr	Saturation (A3)	Groundwater, Precipitation/Snowmelt	C (Functioning)	Lots of Potr and Sasc nearby but not included
8-2	0.37	PSS	Slope	Samo	Alin	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Cut off/altered by Road
8-4	0.42	PSS	Slope	Samo	Setr	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Cut off by Road, some sw enters Wetland near road, fen
8-7	3.39	PSS	Slope	Sadr	Samo	Caaq	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Many polygons, maybe fens higher up
9-1	0.22	PSS	Slope	Alin	Samo	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Steep drainage, intercepted by road
9-2	0.22	PSS	Slope	Samo	Caaq	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Small fen area below road
9-2A	0.31	PSS	Slope	Samo	Caaq	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Flow modified by road. Old ditches cross wetland to redirect snow melt. .Some PFO
9-5	0.03	PSS	Slope	Samo	Sadr	-	Saturation (A3)	Groundwater	C (Functioning)	Very steep
10-5	0.19	PSS	Slope	Sabr	Caaq	Juen	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Fen. GW exposed by road cut on south side of road and fen filled on north side. Multiple polygons
10-9	3.44	PSS	Slope	Samo	Caut	Caaq	Saturation (A3)	Groundwater	C (Functioning)	Multiple polygons, bisected by road

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
10-10	0.00	PEM	Slope	Juba	Caaq	-	Saturation (A3)	Groundwater	C (Functioning)	On roadway embankment, very small, likely associated with 10-6 and/or 10-5
10-12	0.01	PEM	Slope	Juba	Caaq	-	Saturation (A3)	Groundwatet	C (Functioning)	On roadway embankment, very small, likely associated with 10-5.
10-13	0.50	PSS	Slope	Sabr	Caaq	Juen	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Gw exposed by Road cut.
11-3	1.64	PSS	Slope	Sadr	Samo	Caca	Saturation (A3)	Groundwater	C (Functioning)	Multiple polygons
11-4	0.27	PSS	Slope	Samo	Sadr	-	Saturation (A3)	Groundwater	C (Functioning)	On slope above Black Gore Creek
11-8	0.03	PEM	Slope	Potr	Hema	Caca	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	C (Functioning)	Border line wetland. Starts at toe of path embankment. Some PFO.
11-11	1.03	PEM	Slope	Alpr	Aggi	Elre	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	C (Functioning)	In bottom of swale; lots of Elre; connects to 11-3 and 11-2 at BGC; both GW and SW
12-8	0.28	PSS	Slope	Sadr	Alin	Eqar	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Small channel but functions like slope wetland; bisected by path; likely fen up higher
12-9	0.39	PSS	Slope	Sadr	Sala	Alin	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Flow interupted by path; likely fen up higher
13-3	0.13	PSS	Slope	Riwo	Samo	Alpr	Saturation (A3),Drainage Patterns (B10) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	C (Functioning)	Very steep slope
13-11	0.01	PSS	Slope	Sadr	Popr	Alpr	Saturation (A3), Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Rock outcrop; may seep seasonally

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
14-7	0.23	PEM	Slope	Caca	Eqar	Vasc	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Multiple polygons, impairment from roadcut altering discharge, some PFO
14-8	0.48	PEM	Slope	Eqar	Setr	Caut	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Outflow, buffer stressors and roadcut altering discharge. Fen. Some PFO
15-1	0.10	PEM	Slope	Caaq	Alpr	Juen	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Near toe of road embankment but still above floodplain
16-5	1.30	PSS	Slope	Sapl	Caca	Caut	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	C (Functioning)	Fen. Impaired by Road fill and run off
16-7	0.06	PEM	Slope	Caca	Setr	Judr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	C (Functioning)	Lots of dead Willow, mostly snow melt, buffer only stressor
16-8	0.29	PSS	Slope	Sapl	Caut	Gema	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Outflow and buffer stressors, lots of dead Willow at top
17-1	0.10	PEM	Slope	Setr	Meci	Caco	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	C (Functioning)	Road likely filled across original seep
17-7	0.11	PSS	Slope	Samo	Setr	Eqar	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Buffer and outflow stressors
18-4	0.21	PEM	Slope	Caaq	Alpr	Meci	Saturation (A3)	Groundwater	C (Functioning)	Seep on embankment slope of bike path.
18-7	0.45	PSS	Slope	Samo	Sapl	Caaq	Saturation (A3)	Groundwater	C (Functioning)	Same impairment as 19-12
19-4	0.18	PSS	Slope	Sapl	Samo	Caaq	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Some runoff from path

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
19-5	0.87	PSS	Slope	Sapl	Samo	Caaq	Saturation (A3)	Groundwater	C (Functioning)	Some possible minor impairment from bike path and the interstate above.
19-7	0.37	PSS	Slope	Sapl	Sabr	Caca	Saturation (A3)	Groundwater	C (Functioning)	Small sloped Wetlands feeding Lake. Some social Trail impacts
19-8	0.39	PSS	Slope	Sawo	Deca	Juen	Saturation (A3),Surface Water (A1)	Groundwater	C (Functioning)	Slope Wetland on bike path embankment. Surface water present and flowing
21-1	3.93	PSS	Slope	Sapl	Sabr	Caaq	Saturation (A3),Surface Water (A1),Inundation on Imagery (B7),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	C (Functioning)	Lots of runoff from the highway and Frontage Road. Some areas of drier Willow included on north-facing Hillside. Old Beaver activity.
21-3	0.52	PEM	Slope	Caaq	Juba	Cami	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater	C (Functioning)	Fen abutting Reservoir. At toe of slope. Some minor social Trail impacts along Lake Shore. Overall impairment by inundation from lake.
22-2	1.56	PSS	Slope	Sapl	Sawo	Meci	Saturation (A3),Drainage Patterns (B10) - Secondary	Groundwater,Precipitation/Snow melt	C (Functioning)	May contain small areas of peat. Maybe drier than natural because of road cut.
23-10	0.11	PEM	Slope	Caaq	Juba	Alpr	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	C (Functioning)	On road cut
23-13	0.46	PSS	Slope	Sapl	Begl	Sabr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	C (Functioning)	Slope Wetland supported by snow melt. Outflow disrupted by Road cut
Subtotal	**32.03**									
Functioning Impaired (D)										
4-1	0.31	PSS	Slope	Poan	Potr	Sali	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	Outflow and buffer impaired, retaining wall at bottom. Some of channel put in open pipe. Lots of popa, caca. putting channel in pipe has dried out the lower portion enough to make it perfect for Aspen and Cottonwood. Some PFO.
4-5	1.10	PSS	Slope	Sadr	Caut	Caca	Saturation (A3),Surface Water (A1)	Groundwater	D (Functioning Impaired)	Includes Ditch at toe of bighorn road and adjacent to condo complex. Orange algae. Likely same hydro as 5-4. Some stormwater supplement.
5-4	2.11	PEM	Slope	Juba	Aggi	Cane	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	Outflow and buffer impaired, on road cut. Pockets of willow and Potr, lots of rock in gullies (placed), minor stormwater input at bottom only

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
5-5	0.02	PEM	Slope	Alpr	Aggi	Juba	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Precipitation/Snowmelt	D (Functioning Impaired)	On edge of pavement where swale enters; likely some SW inputs but minor; some Salix in lower area
6-5	0.19	PSS	Slope	Sali	Eqar	Setr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	Very steep, sw and gw, road above with retaining wall, obvious sw flow entering from next to wall, lots road sand
7-3	0.19	PSS	Slope	Sali	Saex	Juba	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Precipitation/Snowmelt	D (Functioning Impaired)	Lots of oxeye daisy; flow/discharge modified by road
7-6	0.10	PSS	Slope	Sabr	Eqar	Juen	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	On road cut, outflow impaired too
8-10	0.04	PSS	Slope	Sage	Alpr	Ciar	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	Mostly sw, lots of road sand, just above floodplain at toe of embankment
9-4	0.22	PSS	Slope	Samo	Caaq	Juba	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt	D (Functioning Impaired)	Road cut. Gw daylights. Several polygons.
9-8	0.04	PEM	Slope	Alpr	Caca	Eqar	Saturation (A3)	Groundwater	D (Functioning Impaired)	Appears to be groundwater; associated with 9-2??
10-5A	0.26	PEM	Slope	Caaq	Caut	Juen	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	GW exposed by road cut on south side of road. Lots of natural sediment inputs from above road cut.
11-1	0.27	PSS	Slope	Sadr	Alpr	Caca	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt	D (Functioning Impaired)	Upper part filled by Road. Receives some sw but mostly gw. Lots of ciar at top.
11-6	0.35	PSS	Slope	Sadr	Hema	Eqar	Saturation (A3)	Groundwater	D (Functioning Impaired)	Flow diverted by bike path; wetland bisected
11-9	0.12	PSS	Slope	Sapl	Alpr	Potr	Saturation (A3)	Groundwater	D (Functioning Impaired)	Some minor stormwater input, steep, on embankment, lots of sand; part of 10-8?

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
12-5	0.04	PSS	Slope	Sapl	Juba	Alpr	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	VERY steep slope. Wetland originates at Culvert on road embankment. Connects to floodplain. Location taken just above.
12-6	0.02	PSS	Slope	Salix spp.	-	-	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	D (Functioning Impaired)	Very steep; originiates at culvert on road embankment
12-7	0.43	PSS	Slope	Sadr	Sali	Eqar	Saturation (A3),Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	D (Functioning Impaired)	Lots of stormwater from path; includes long roadside ditch and other polygons; some PEM areas
12-13	0.15	PEM	Slope	Juba	Alpr	Eqar	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Precipitation/Snowmelt	D (Functioning Impaired)	In previously disturbed open area; multiple polygons
13-1	0.03	PSS	Slope	Alin	Eqar	Sapl	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	Combination sw and gw. Very steep channel below
13-6	0.09	PEM	Slope	Alpr	Caca	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Steep gully with sw Culvert outlet. Flowing.. Likely gw too.
13-13	0.64	PSS	Slope	Sadr	Juen	Alin	Saturation (A3), Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	In ditch along truck ramp but mostly groundwater; includes wetlands on cliffs above.
13-16	0.05	PEM	Slope	Caaq	Eqar	Sapl	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	On road cut above small cliff
13-20	0.03	PSS	Slope	Sadr	Caaq	Eqar	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	Groundwater exposed by bike path. Wetland in ditch along path.
13-21	0.21	PSS	Slope	Alin	Caut	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	Goundwater flow cut off by roadway. Receives stormwater overflow from small pond by road.
16-1	1.17	PSS	Slope	Sapl	Caaq	Caut	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	C (Functioning)	Fen. Receives stormwater. Severely impaired by road sand accumulation. Substantial surface flow.

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
16-3	0.15	PEM	Slope	Hema	Eqar	Meci	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater, Groundwater?	D (Functioning Impaired)	At toe of road embankment at edge of Forest.
17-3	0.93	PSS	Slope	Samo	Setr	Caco	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Lots of old road sand and/or other sediment
17-6	0.98	PSS	Slope	Sapl	Caca	Caaq	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Includes old sw pond. Revenues gw and sw. Seeps from trail embankment.
17-8	0.08	PSS	Slope	Sapl	Judr	Juen	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt	D (Functioning Impaired)	Eroded channel with narrow fringe, very cobbly, portions lined with plastic and gabions,
17-9	0.01	PEM	Slope	Caca	Judr	Sapl	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt	D (Functioning Impaired)	Mostly snow melt, deep and narrow channel, flow spread out by man made ditches.
18-5	0.06	PSS	Slope	Sawo	Samo	Alpr	Saturation (A3)	Groundwater	D (Functioning Impaired)	Slope Wetland on embankment of bike path
18-6	0.58	PEM	Slope	Caaq	Sali	Gema	Saturation (A3),Water Stained Leaves (B9) - Secondary,Drainage Patterns (B10) - Secondary	Lake/Pond	D (Functioning Impaired)	Appears to be a mitigation site. Lack of diversity and perched well above Valley bottom. Some PVC pipes visible.
18-10	0.04	PSS	Slope	Sage	Caut	Sala	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Gw from wetlands on other side of road? Lots of road sand
18-13	1.34	PSS	Slope	Sabr	Sapl	Caaq	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Groundwater	D (Functioning Impaired)	Substantial PEM areas with Caca, Alpr, Juba, Hoju; on roadcut
18-14	0.31	PSS	Slope	Sadr	Samo	Alpr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	D (Functioning Impaired)	Both groundwater and stormwater. On embankment slope below Road.
19-3	1.00	PSS	Slope	Sali	Sadr	Juba	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater,Lake/Pond,Precipitation/Snowmelt	D (Functioning Impaired)	Appears to be a mitigation site some dryer areas included.

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
19-9	0.26	PEM	Slope	Caut	Cape	Sapl	Saturation (A3),Surface Water (A1)	Groundwater	D (Functioning Impaired)	Impaired by Lake access road and bike path
19-11	0.10	PSS	Slope	Sabr	Samo	Juen	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	D (Functioning Impaired)	Slope wetland that is intercepted by Frontage Road. Currently standing water. At toe of Road cut
19-12	0.38	PSS	Slope	Sapl	Samo	Caca	Saturation (A3)	Groundwater,Precipitation/Snow melt	D (Functioning Impaired)	Outflow diverted by bike path which bisects the Wetland with Wetland number 19 - 9.
19-15	1.34	PSS	Slope	Sabr	Sapl	Caca	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	D (Functioning Impaired)	On road cut and in ditch at toe of cut
20-1	0.08	PEM	Slope	Caca	Alpr	Meci	Saturation (A3),Drainage Patterns (B10) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	D (Functioning Impaired)	At Culvert Outlet under Highway. Also includes small area above frontage road
20-3	0.01	PSS	Slope	Samo	Alpr	Meci	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	Actively discharging seep. At toe of slope and in roadside ditch. Outflow impaired by roadway.
20-4	0.26	PSS	Slope	Sapl	Caaq	Caut	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	Flows into Culvert under roadway. Possible fill on east side also. May have originally connected to 22 - 8??? Mainly groundwater, but also receiving stormwater from West.
20-5	0.29	PSS	Slope	Sapl	Caca	Setr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	Intercepted by road
20-6	0.08	PSS	Slope	Sapl	Caaq	Juen	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	D (Functioning Impaired)	Mostly slope Wetland with some areas supported by stormwater / snowmelt along the road. Intercepted by Road. Shallow Swale.
20-7	1.07	PSS	Slope	Sapl	Caaq	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	Ditch above Maintenance building to divert flows to the West. Wetland intercepted by cut for maintenance building area.Fen.
21-4	0.05	PSS	Slope	Sapl	Sabr	Caaq	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt	D (Functioning Impaired)	At toe of roadway embankment.

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
21-5	0.19	PEM	Slope,Depressional	Sapl	Alpr	Caaq	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	D (Functioning Impaired)	Seep through roadway embankment Gets ponded behind Frontage Road. Some PSS
22-4	0.14	PEM	Slope	Juba	Alpr	Caaq	Saturation (A3)	Groundwater,Precipitation/Snow melt	D (Functioning Impaired)	Seep on road and trail cut
22-6	3.73	PEM	Slope	Sabr	Sapl	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater, Stormwater	D (Functioning Impaired)	Likely natural wetland (rest area built on). GW with runoff from parking lots and roads associated with rest area; numerous culverts, ditches, etc. Some PSS.
22-8	1.22	PEM	Slope	Caaq	Caut	Sapl	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	Mostly pem, but some pockets of pss. Fen. Receiving some storm water, especially from the East End. Heavy elk use. Lots of Canada thistle around perimeter. Impaired by the roadway embankment both directly and indirectly.
22-9	0.73	PEM	Slope	Caca	Judr	Cale	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater	D (Functioning Impaired)	Groundwater intercepted by off-ramp; some PFO; scattered Salix; abuts roadside ditch wetland in some areas (22-5)
23-2	1.03	PSS	Slope	Sawo	Sabr	Caaq	Saturation (A3),Surface Water (A1)	Groundwater	D (Functioning Impaired)	Old road bifurcates Wetland. Storm water inputs. Landscape stressors
23-5	1.21	PSS	Slope	Sapl	Sawo	Caaq	Saturation (A3),Surface Water (A1)	Groundwater	D (Functioning Impaired)	On slope below road and above bike path, water present
23-6	0.46	PSS	Slope	Samo	Sapl	Alpr	Saturation (A3),Drainage Patterns (B10) - Secondary	Groundwater,Precipitation/Snow melt,Stormwater	D (Functioning Impaired)	Bike path cuts through between this and 23-7. Likely received substantial sw runoff
Subtotal	**26.27**									
Total	**71.72**									
Classification from Cowardin, et al. (1979) and Brinson (1993); hydrology indicators from Corps (2010); functional condition variables adapted from Johnson, et al. (2013)										
Plant abbreviations, scientific names and wetland indicator status(Corps 2019):										

West Vail Pass Field Data Summary - Slope Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes

Abbreviation	Common Name	Scientific Name	Wetland Indicator Status
ACCO	Columbian monkshood	*Aconitum columbianum*	FACW
AGGI	Black bent	*Agrostis gigantea*	FAC
ALIN	Speckled alder	*Alnus incana*	FACW
ALPR	Meadow foxtail	*Alopecurus pratensis*	FAC
BEGL	Resin birch	*Betula gladulosa*	OBL
CAAQ	Leafy tussock sedge	*Carex aquatilis*	OBL
CACA	Bluejoint	*Calamagrostis canadensis*	FACW
CACO	Large mountain bittercress	*Cardamine cordifolia*	FACW
CAMI	Small-wing sedge	*Carex microptera*	FACU
CANE	Nebraska sedge	*Carex nebrascensis*	OBL
CAPE	Woolly sedge	*Carex pellita*	OBL
CAPR	Clustered field sedge	*Carex praegracillis*	FACW
CAUT	Northwest Territory sedge	*Carex utriculata*	OBL
CIAR	Canadian thistle	*Cirsium arvense*	FAC
COAL	Red osier	*Cornus alba*	FACW
DAFR	Golden-hardhack	*Dasiphora fruticosa*	FAC
DECA	Tufted hair grass	*Deschampsia caespitosa*	FACW
ELPA	Common spike-rush	*Eleocharis palustris*	OBL
ELRE	Creeping wild rye	*Elymus repens*	FAC
EPCI	Fringed willowherb	*Epilobium ciliatum*	FACW
EQAR	Field horsetail	*Equisetum arvense*	FAC
GEMA	Large-leaf avens	*Geum macrophyllum*	FAC
HEMA	American cow-parsnip	*Heracleum maximum*	FAC
HOJU	Fox-tail barley	*Hordeum jubatum*	FAC
JUBA	Baltic rush	*Juncus balticus*	FACW
JUDR	Drummond's rush	*Juncus drummondii*	FACW
JUEN	Dagger-leaf rush	*Juncus ensifolius*	FACW

Abbreviation	Common Name	Scientific Name	Wetland Indicator Status
MECI	Tall fringe bluebells	*Mertensia ciliata*	FACW
MIGU	Seep monkey-flower	*Mimulus guttatus*	OBL
MIOR	Bog psuedasaxifrage	*Micranthes oregana*	FACW
PHAR	Reed canary grass	*Pharlaris arundinacea*	FACW
PHPR	Common Timothy	*Phleum pratense*	FAC
PIEN	Englemann's spruce	*Picea engelmannii*	FAC
POAN	Narrow-leaf cottonwood	*Populus angustifolia*	FACW
POPR	Kentucky blue grass	*Poa pratensis*	FAC
POTR	Quaking aspen	*Populus tremuloides*	FACU
PTAQ	Northern bracken fern	*Pteridium aquilinum*	FACU
RILA	Bristly black gooseberry	*Ribes lacustre*	FAC
RIWO	Winaha currant	*Ribes wolfii*	FAC
ROWO	Wood's rose	*Rosa woodsii*	FACU
RUPA	Western thimbleberry	*Rubus parviflorus*	FACU
SABR	Short-Fruit willow	*Salix brachycarpa*	FACW
SADR	Drummond's willow	*Salix drummondiana*	FACW
SAEX	Narrow-leaf willow	*Salix exigua*	FACW
SAGE	Geyer's willow	*Salix geyeriana*	FACW
SALA	Whiplash willow	*Salix lasiandra*	FACW
SALI	Strap-Leaf willow	*Salix ligulifolia*	FAC
SAMO	Park willow	*Salix monticola*	OBL
SAPL	Tea-Leaf willow	*Salix planifolia*	OBL
SASC	Scouler's willow	*Salix scouleriana*	FAC
SAWO	Idaho willow	*Salix wolfii*	OBL
SETR	Arrow-leaf ragwort	*Senecio triangularis*	FACW
THFE	Fendler's meadow-rue	*Thalictrum fendleri*	FAC
VASC	Grouseberry	*Vaccinium scoparium*	FACU

West Vail Pass Field Data Summary - Riverine Wetlands

ID	Size (acres)	Classification		Vegetation			Hydrology		Functional Condition	Notes
		Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source		
Highly Functioning (B)										
8-5	0.22	PSS	Riverine	Alin	Setr	Caco	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater	B (Highly Functioning)	Small perennial stream, steep and narrow valley, gw inputs.
10-3	0.07	PEM	Riverine	Setr	Caco	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater	B (Highly Functioning)	Narrow deep valley, only stressors are buffer... Trail and road. Timber Creek
Subtotal	**0.28**									
Functioning (C)										
5-1	4.18	PSS	Riverine	Alin	Samo	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater, Overbank Flow	C (Functioning)	Gore Creek
6-2	1.28	PSS	Riverine	Alin	Caca	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Overbank Flow,Stormwater	C (Functioning)	Black Gore Creek.
7-2	0.34	PSS	Riverine	Alin	Samo	Caca	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	C (Functioning)	Black Gore creek, some sw but little in this reach, floodplain modified by Road and road sand
10-4	2.65	PSS	Riverine	Samo	Caaq	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater, Overbank Flow	C (Functioning)	Black Gore Creek
11-10	1.72	PSS	Riverine	Sadr	Caca	Alin	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	C (Functioning)	Controlled source and some sediment. Black Gore Creek
12-2	0.50	PSS/PFO	Riverine	Alin	Caca	Setr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	C (Functioning)	Miller creek. Downstream of tall bridge. Lots of sediment from road. PFO areas.
12-3	0.25	PEM	Riverine	Setr	Caco	Saor	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	C (Functioning)	Miller Creek just above confluence with BGC. Narrow fringe.

West Vail Pass Field Data Summary - Riverine Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
13-4	0.09	PEM	Riverine	Setr	Gema	Caco	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Precipitation/Snowmelt,Stormwater	C (Functioning)	Controlled source but far away. Black Gore Creek
13-5	1.57	PSS	Riverine	Alin	Sadr	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Precipitation/Snowmelt,Stormwater	C (Functioning)	Pss fringe along flatter portion of channel. Likely receives sw too. Lots of large rock. Black Gore Creek
13-14	0.33	PSS	Riverine	Sadr	Eqar	Juen	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial, Overbank Flow	C (Functioning)	Polk Creek
14-3	1.97	PSS	Riverine	Sapl	Sadr	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	C (Functioning)	Some areas with substantial floodplain. Black Gore Creek
15-3	2.98	PSS	Riverine	Sapl	Sadr	Caaq	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater,Precipitation/Snowmelt	C (Functioning)	Lots of road sand. Gw inputs along floodplain edge. Black Gore Crk
16-4	0.72	PSS	Riverine	Sapl	Samo	Caca	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Overbank Flow	C (Functioning)	Mostly much narrower Canyon and steeper channel. More boulders and large cobble, less gravel and sand than 15-3. Wetland fringe very narrow 5 feet maximum. Black Gore Creek. Impaired by controlled source.
17-2	2.27	PSS	Riverine	Sapl	Caco	Setr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Precipitation/Snowmelt,Stormwater	C (Functioning)	Main impairments are controlled source and excess sediment. Black Gore Creek.
17-12	1.98	PSS	Riverine	Sapl	Caco	Setr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Precipitation/Snowmelt,Stormwater	C (Functioning)	Main impairments are controlled source and excess sediment. Black Gore Creek. Some fen areas
18-1	3.62	PEM	Slope,Riverine	Caaq	Cami	Sapl	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater,Overbank Flow,Precipitation/Snowmelt	C (Functioning)	Relic riverine wetland supplemented by slope Wetland to South. Both dewatering and oversaturation from Dam. Fen.
18-2	0.32	PSS	Riverine	Samo	Sapl	Caaq	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater, Overbank Flow	C (Functioning)	Definitely impaired by dam but Canyon very narrow so wetlands seem to be generally functional and mostly natural.
19-1	0.16	PSS	Riverine	Sadr	Samo	Caaq	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater, Overbank Flow	C (Functioning)	Narrow fringe of Black Gore Creek, impaired by managed water source and buffer

West Vail Pass Field Data Summary - Riverine Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
22-3	2.57	PSS	Slope,Riverine	Sawo	Sabr	Caaq	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater,Overbank Flow,Precipitation/Snowmelt,Stormwater	C (Functioning)	West Ten Mile Creek with abutting slope; Channel an average of 8 ft wide. Fen areas.
23-1	4.80	PSS	Slope,Riverine	Sawo	Sabr	Caaq	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater,Overbank Flow,Precipitation/Snowmelt,Stormwater	C (Functioning)	In median but stressors mainly limited to landscape variables and storm water input. West Ten Mile Creek.
Subtotal	**34.29**									
Functioning Impaired (D)										
1-2	0.12	PSS	Riverine	Salix spp.	-	-	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Overbank Flow	D (Functioning Impaired)	Pitkin Creek; no access
2-1	0.01	PEM	Riverine	Deca	Phpr	Sage	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Overbank Flow	D (Functioning Impaired)	Just above culvert. Altered floodplain. Recent work on banks... Rock walls.Bighorn Creek.
6-3	5.57	PSS	Riverine	Sadr	Alin	Caca	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Overbank Flow,Stormwater	D (Functioning Impaired)	Gore creek though neighborhood. Mostly Willow with some poan over story. Lots of modifications and stressors. Many areas estimated since no access.
10-1	0.13	PSS	Riverine	Sage	Eqar	Caaq	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Overbank Flow	D (Functioning Impaired)	Lots of road sand, other old geomorph impacts from road construction, Timber Creek
11-2	0.61	PSS	Riverine	Sadr	Caca	Alin	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	D (Functioning Impaired)	Major road sand problem, great mitigation site, mostly alluvial but some sw. Black Gore Creek
12-2B	0.06	PSS	Riverine	Alin	Caca	Setr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	D (Functioning Impaired)	Miller creek. Under tall bridge. Lots of sediment from road.
13-8	0.13	PSS	Riverine	Alin	Setr	Caco	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Stormwater	D (Functioning Impaired)	Impaired by sw road sand, and modifications under bridge. Polk Creek
19-14	0.18	PSS	Riverine	Sapl	Samo	Setr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater	D (Functioning Impaired)	Active channel 3'; flows under highway; steep slope; gw inputs; ultimately connected to 19-15

West Vail Pass Field Data Summary - Riverine Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
23-3	0.44	PSS	Slope,Riverine	Sawo	Sabr	Caca	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Alluvial Groundwater,Groundwater,Overbank Flow,Stormwater	D (Functioning Impaired)	Lots of alpr near overpass, active channel 8', lots of road sand in wetland, see p-28; Wilder Gulch; fen areas
Subtotal	**7.25**									
Total	**41.82**									

Classification from Cowardin, et al. (1979) and Brinson (1993); hydrology indicators from Corps (2010); functional condition variables adapted from Johnson, et al. (2013)

Plant abbreviations, scientific names and wetland indicator status(Corps 2019):

Abbreviation	Common Name	Scientific Name	Wetland Indicator Status
ACCO	Columbian monkshood	*Aconitum columbianum*	FACW
AGGI	Black bent	*Agrostis gigantea*	FAC
ALIN	Speckled alder	*Alnus incana*	FACW
ALPR	Meadow foxtail	*Alopecurus pratensis*	FAC
BEGL	Resin birch	*Betula gladulosa*	OBL
CAAQ	Leafy tussock sedge	*Carex aquatilis*	OBL
CACA	Bluejoint	*Calamagrostis canadensis*	FACW
CACO	Large mountain bittercress	*Cardamine cordifolia*	FACW
CAMI	Small-wing sedge	*Carex microptera*	FACU
CANE	Nebraska sedge	*Carex nebrascensis*	OBL
CAPE	Woolly sedge	*Carex pellita*	OBL
CAPR	Clustered field sedge	*Carex praegracillis*	FACW
CAUT	Northwest Territory sedge	*Carex utriculata*	OBL
CIAR	Canadian thistle	*Cirsium arvense*	FAC
COAL	Red osier	*Cornus alba*	FACW
DAFR	Golden-hardhack	*Dasiphora fruticosa*	FAC
DECA	Tufted hair grass	*Deschampsia caespitosa*	FACW
ELPA	Common spike-rush	*Eleocharis palustris*	OBL
ELRE	Creeping wild rye	*Elymus repens*	FAC
EPCI	Fringed willowherb	*Epilobium ciliatum*	FACW
EQAR	Field horsetail	*Equisetum arvense*	FAC
GEMA	Large-leaf avens	*Geum macrophyllum*	FAC
HEMA	American cow-parsnip	*Heracleum maximum*	FAC
HOJU	Fox-tail barley	*Hordeum jubatum*	FAC
JUBA	Baltic rush	*Juncus balticus*	FACW
JUDR	Drummond's rush	*Juncus drummondii*	FACW
JUEN	Dagger-leaf rush	*Juncus ensifolius*	FACW

Abbreviation	Common Name	Scientific Name	Wetland Indicator Status
MECI	Tall fringe bluebells	*Mertensia ciliata*	FACW
MIGU	Seep monkey-flower	*Mimulus guttatus*	OBL
MIOR	Bog psuedasaxifrage	*Micranthes oregana*	FACW
PHAR	Reed canary grass	*Pharlaris arundinacea*	FACW
PHPR	Common Timothy	*Phleum pratense*	FAC
PIEN	Englemann's spruce	*Picea engelmannii*	FAC
POAN	Narrow-leaf cottonwood	*Populus angustifolia*	FACW
POPR	Kentucky blue grass	*Poa pratensis*	FAC
POTR	Quaking aspen	*Populus tremuloides*	FACU
PTAQ	Northern bracken fern	*Pteridium aquilinum*	FACU
RILA	Bristly black gooseberry	*Ribes lacustre*	FAC
RIWO	Winaha currant	*Ribes wolfii*	FAC
ROWO	Wood's rose	*Rosa woodsii*	FACU
RUPA	Western thimbleberry	*Rubus parviflorus*	FACU
SABR	Short-Fruit willow	*Salix brachycarpa*	FACW
SADR	Drummond's willow	*Salix drummondiana*	FACW
SAEX	Narrow-leaf willow	*Salix exigua*	FACW
SAGE	Geyer's willow	*Salix geyeriana*	FACW
SALA	Whiplash willow	*Salix lasiandra*	FACW
SALI	Strap-Leaf willow	*Salix ligulifolia*	FAC
SAMO	Park willow	*Salix monticola*	OBL
SAPL	Tea-Leaf willow	*Salix planifolia*	OBL
SASC	Scouler's willow	*Salix scouleriana*	FAC
SAWO	Idaho willow	*Salix wolfii*	OBL
SETR	Arrow-leaf ragwort	*Senecio triangularis*	FACW
THFE	Fendler's meadow-rue	*Thalictrum fendleri*	FAC
VASC	Grouseberry	*Vaccinium scoparium*	FACU

West Vail Pass Field Data Summary - Stormwater Wetlands

ID	Size (acres)	Classification		Vegetation			Hydrology		Functional Condition	Notes
		Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source		
Functioning Impaired (D)										
1-1	0.15	PEM	Depressional	Alpr	Juba	Aggi	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Within interchange
1-3	0.09	PSS	Depressional	Samo	Phar	Caut	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Ditch along Bighorn Road
3-1	0.11	PSS	Depressional	Alin	Salix spp.	Caca	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Stormwater/Irrigation	D (Functioning Impaired)	Bighorn Diversion channel
4-3	0.02	PEM	Depressional	Alpr	Ciar	-	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Under eastbound bridge.
4-4	0.08	PEM	Depressional	Phar	Cane	Alpr	Saturation (A3),Surface Water (A1)	Stormwater	D (Functioning Impaired)	Connect to Wetland on other side of i70. Mostly sw.
5-3	0.06	PEM	Slope	Alpr	Phar	Caaq	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Next to and under bridge. Lots of road sand
6-4	0.04	PEM	Depressional	?	?	?	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Pond in condo complex; no access
7-1	0.31	PEM	Depressional	Alpr	Aggi	Caaq	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Roadside ditch
7-5	0.15	PEM	Depressional	Alpr	Juba	Aggi	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Ditch
8-1	0.13	PSS	Depressional	Samo	Sadr	Aggi	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater, Groundwater	D (Functioning Impaired)	Ditch but maybe some gw input
8-3	0.05	PSS	Depressional	Samo	Alin	Caaq	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Ditch but may get gw too.

West Vail Pass Field Data Summary - Stormwater Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
8-6	0.03	PEM	Depressional	Alpr	Caaq	Elpa	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Ditch.
8-8	0.01	PEM	Slope	Alpr	Eqar	Juba	Saturation (A3)	Stormwater	D (Functioning Impaired)	Sw mainly but may seep out of embankment. Culvert not obvious.
8-9	0.10	PEM	Slope	Alpr	Cane	Aggi	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Seasonal snow melt input, lots of road sand, part of wetland is sw pond
9-3	0.42	PEM	Depressional	Alpr	Cane	Juba	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Wide ditch, some Willow pockets esp. along rock band.
9-6	0.02	PEM	Depressional	Phar	Hoju	-	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Road side ditch
9-7	0.05	PEM	Depressional	Phar	Alpr	Sage	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Receives water from a culvert outlet and from the small stormwater pond. Man made feature.
10-2	0.07	PEM	Slope	Alpr	Eqar	Aggi	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Under bridge, strictly sw
10-7	0.33	PEM	Depressional	Alpr	Eqar	Juen	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Ditch
11-5	0.01	PSS	Slope	Sali	Thfe	Rila	Saturation (A3)	Stormwater	D (Functioning Impaired)	Stormwater from path
11-7	0.02	PSS	Slope	Saex	Elre	Coal	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	On embankment slope. Lots of road sand.
12-1	0.18	PEM	Slope	Alpr	Juba	Eqar	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Impaired by water source and large amounts of sediment below Bridges

West Vail Pass Field Data Summary - Stormwater Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
12-4	0.05	PEM	Slope	Alpr	Phar	Eqar	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Mostly sw but some gw. Lots of ciar nearby. Deeply gullied.
12-10	0.01	PEM	Depressional	Juen	Alpr	Sadr	Saturation (A3)	Stormwater	D (Functioning Impaired)	Roadside ditch along path
12-11	0.96	PEM	Depressional	Alpr	Hoju	Juba	Saturation (A3),Geomorphic Position (D2) - Secondary,Drainage Patterns (B10) - Secondary	Stormwater	D (Functioning Impaired)	Roadside ditch; pockets of Cane and lots of Aggi
13-2	0.05	PEM	Slope	Alpr	Eqar	Setr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Very steep sw drainage
13-7	0.03	PEM	Depressional	Alpr	Caca	Elpa	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Sw pond with fringe and outlet
13-9	0.01	PEM	Slope	Alpr	Eqar	Rowo	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Lots of road sand, water from bridge above
13-10	0.09	PEM	Slope	Alpr	Cane	Ciar	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Lots of road sand, water from bridge above
13-12	0.00	PEM	Depressional	Juen	Alpr	-	Saturation (A3), Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Ditch along bike bath
13-15	0.06	PEM	Depressional	Juen	Alpr	Sage	Saturation (A3), Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Roadside ditch
13-17	0.62	PEM	Depressional	Alpr	Juen	Migu	Saturation (A3), Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Roadside Ditch
14-4	0.14	PSS	Slope	Sadr	Samo	Caca	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Lots of road sand. Multiple polygons

West Vail Pass Field Data Summary - Stormwater Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
14-5	0.15	PEM	Depressional	Alpr	Eqar	Juen	Saturation (A3),Surface Water (A1),Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Sw pond fringe and spillover. Some Salix in spillover. Chamomile present.
14-6	0.17	PSS	Slope	Salix spp.	Alpr	Eqar	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Break in curb directs sw into wetland, on road cut, lots of Moss, some PEM areas, possible groundwater too
14-9	0.16	PEM	Depressional	Alpr	Juen	Migu	Saturation (A3), Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Roadside ditch
15-5	0.05	PEM	Slope	Juen	Epci	Elpa	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Stormwater	D (Functioning Impaired)	On steep embankment of road. Connects to creek. Wet
15-6	0.50	PEM	Slope	Alpr	Caca	Salix	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Groundwater,Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Flows into man made pond at toe of slope. Multiple seeps. Lots of ciar at top.
16-9	1.21	PEM	Depressional	Alpr	Hoju	Juba		stormwater	D (Functioning Impaired)	Roadside and pathside ditch areas
17-4	0.24	PEM	Depressional	Deca	Juba	Alpr	Saturation (A3),Surface Water (A1),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Storm water channel and pond
17-10	0.79	PSS	Depressional	Caaq	Juen	Alpr	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt, Stormwater, Groundwater	D (Functioning Impaired)	Ditch and small slope areas along bike path; multiple polygon. Some PEM
17-11	0.08	PEM	Depressional	Alpr	Hoju	Caaq	Saturation (A3),Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt, Stormwater	D (Functioning Impaired)	Roadside ditch
18-8	0.10	PEM	Depressional	Hoju	Alpr	Juba	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Lots of road sand, includes fringe of small sw pond.
18-9	0.04	PEM	Depressional	Juba	Sage	Juen	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Mostly stormwater, pem along trail, pss at lowest part of slope where runoff spills over embankment

West Vail Pass Field Data Summary - Stormwater Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
18-11	0.03	PEM	Depressional	Juba	Alpr	Sapl	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Trail side ditch
18-12	0.31	PEM	Slope	Juba	Alpr	Hoju	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Mostly stormwater. On embankment slope below Road. Area adjacent to Road recently colonized. Mostly alpr and hoju
19-10	0.05	PEM	Depressional	Juen	Caaq	Alpr	Saturation (A3),Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Scattered Willow, in roadside ditch.
19-13	0.02	PEM	Depressional	Caaq	Alpr	Sapl	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Small storm water pond, lots of ciar
19-16	0.03	PSS	Depressional	Sabr	Sapl	Caaq	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Roadside ditch
20-2	0.03	PSS	Depressional	Sabr	Samo	Juba	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Roadside ditch at toe of slope
20-8	0.32	PEM	Depressional	Caca	Alpr	Capr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Lots of road sand
20-9	0.11	PSS	Depressional	Samo	Sadr	Alpr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Lots of road sand; edge of road
22-1	4.99	PEM	Depressional	Alpr	Caaq	Juba	Saturation (A3)	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Lots of road sand present. A few Willows scattered throughout. Lots of alpr. Numerous polygons.R160
22-5	0.10	PEM	Depressional	Alpr	Caaq	Juba	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Edge of pavement
22-7	0.04	PEM	Depressional	Caaq	Alpr	Caca	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Stormwater	D (Functioning Impaired)	Abuts wetland 22-8. Primary water source is stormwater.

West Vail Pass Field Data Summary - Stormwater Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
23-4	0.01	PEM	Depressional	Alpr	Aggi	Cami	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Roadside ditch fed by Culvert
23-7	0.27	PEM	Depressional	Alpr	Juba	Caaq	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Roadside ditch
23-9	0.53	PEM	Depressional	Juba	Deca	Alpr	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Ditch
23-12	0.84	PEM	Depressional	Caaq	Alpr	Juba	Drainage Patterns (B10) - Secondary,Geomorphic Position (D2) - Secondary	Precipitation/Snowmelt,Stormwater	D (Functioning Impaired)	Roadside ditch. Adjacent Wetland is dominated by Willow but ditch area is herbaceous. Receives substantial stormwater from roadway and Road sand. Scattered low Willows, mainly sapl.
Subtotal	**15.61**									
Total	**15.61**									

Classification from Cowardin, et al. (1979) and Brinson (1993); hydrology indicators from Corps (2010); functional condition variables adapted from Johnson, et al. (2013)

Plant abbreviations, scientific names and wetland indicator status(Corps 2019):

Abbreviation	Common Name	Scientific Name	Wetland Indicator Status	Abbreviation	Common Name	Scientific Name	Wetland Indicator Status
ACCO	Columbian monkshood	*Aconitum columbianum*	FACW	MECI	Tall fringe bluebells	*Mertensia ciliata*	FACW
AGGI	Black bent	*Agrostis gigantea*	FAC	MIGU	Seep monkey-flower	*Mimulus guttatus*	OBL
ALIN	Speckled alder	*Alnus incana*	FACW	MIOR	Bog psuedasaxifrage	*Micranthes oregana*	FACW
ALPR	Meadow foxtail	*Alopecurus pratensis*	FAC	PHAR	Reed canary grass	*Pharlaris arundinacea*	FACW
BEGL	Resin birch	*Betula gladulosa*	OBL	PHPR	Common Timothy	*Phleum pratense*	FAC
CAAQ	Leafy tussock sedge	*Carex aquatilis*	OBL	PIEN	Englemann's spruce	*Picea engelmannii*	FAC
CACA	Bluejoint	*Calamagrostis canadensis*	FACW	POAN	Narrow-leaf cottonwood	*Populus angustifolia*	FACW
CACO	Large mountain bittercress	*Cardamine cordifolia*	FACW	POPR	Kentucky blue grass	*Poa pratensis*	FAC
CAMI	Small-wing sedge	*Carex microptera*	FACU	POTR	Quaking aspen	*Populus tremuloides*	FACU
CANE	Nebraska sedge	*Carex nebrascensis*	OBL	PTAQ	Northern bracken fern	*Pteridium aquilinum*	FACU
CAPE	Woolly sedge	*Carex pellita*	OBL	RILA	Bristly black gooseberry	*Ribes lacustre*	FAC
CAPR	Clustered field sedge	*Carex praegracillis*	FACW	RIWO	Winaha currant	*Ribes wolfii*	FAC
CAUT	Northwest Territory sedge	*Carex utriculata*	OBL	ROWO	Wood's rose	*Rosa woodsii*	FACU
CIAR	Canadian thistle	*Cirsium arvense*	FAC	RUPA	Western thimbleberry	*Rubus parviflorus*	FACU
COAL	Red osier	*Cornus alba*	FACW	SABR	Short-Fruit willow	*Salix brachycarpa*	FACW
DAFR	Golden-hardhack	*Dasiphora fruticosa*	FAC	SADR	Drummond's willow	*Salix drummondiana*	FACW
DECA	Tufted hair grass	*Deschampsia caespitosa*	FACW	SAEX	Narrow-leaf willow	*Salix exigua*	FACW
ELPA	Common spike-rush	*Eleocharis palustris*	OBL	SAGE	Geyer's willow	*Salix geyeriana*	FACW
ELRE	Creeping wild rye	*Elymus repens*	FAC	SALA	Whiplash willow	*Salix lasiandra*	FACW
EPCI	Fringed willowherb	*Epilobium ciliatum*	FACW	SALI	Strap-Leaf willow	*Salix ligulifolia*	FAC
EQAR	Field horsetail	*Equisetum arvense*	FAC	SAMO	Park willow	*Salix monticola*	OBL

West Vail Pass Field Data Summary - Stormwater Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
GEMA	Large-leaf avens	*Geum macrophyllum*	FAC	SAPL	Tea-Leaf willow	*Salix planifolia*	OBL			
HEMA	American cow-parsnip	*Heracleum maximum*	FAC	SASC	Scouler's willow	*Salix scouleriana*	FAC			
HOJU	Fox-tail barley	*Hordeum jubatum*	FAC	SAWO	Idaho willow	*Salix wolfii*	OBL			
JUBA	Baltic rush	*Juncus balticus*	FACW	SETR	Arrow-leaf ragwort	*Senecio triangularis*	FACW			
JUDR	Drummond's rush	*Juncus drummondii*	FACW	THFE	Fendler's meadow-rue	*Thalictrum fendleri*	FAC			
JUEN	Dagger-leaf rush	*Juncus ensifolius*	FACW	VASC	Grouseberry	*Vaccinium scoparium*	FACU			

West Vail Pass Field Data Summary - Reservoir Fringe Wetlands

ID	Size (acres)	Classification		Vegetation			Hydrology		Functional Condition	Notes
		Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source		
Functioning (C)										
19-6	0.31	PEM	Depressional	Caaq	Caut	Caca	Saturation (A3),Surface Water (A1),Inundation on Imagery (B7)Geomorphic Position (D2) - Secondary	Lake/Pond	C (Functioning)	Generally narrow Fringe. Black Lake No. 2 fringe.
21-2	0.43	PEM	Lacustrine Fringe	Caut	Caaq	Sapl	Saturation (A3),Surface Water (A1),Inundation on Imagery (B7),Geomorphic Position (D2) - Secondary	Groundwater,Lake/Pond,Precipitation/Snowmelt	C (Functioning)	Narrow Fringe varies from 5 to 15 ft generally. Adjacent wetlands with other water sources are considered other polygons.Black Lake.
Subtotal	**0.73**									
Functioning Impaired (D)										
3-2	0.21	PSS	Depressional	Samo	Caut	Aggi	Saturation (A3),Surface Water (A1),Inundation on Imagery (B7)Geomorphic Position (D2) - Secondary	Stormwater/Irrigation	D (Functioning Impaired)	Pond on Bighorn Diversion
Subtotal	**0.21**									
Total	**0.95**									

Classification from Cowardin, et al. (1979) and Brinson (1993); hydrology indicators from Corps (2010); functional condition variables adapted from Johnson, et al. (2013)

Plant abbreviations, scientific names and wetland indicator status(Corps 2019):

Abbreviation	Common Name	Scientific Name	Wetland Indicator Status
ACCO	Columbian monkshood	*Aconitum columbianum*	FACW
AGGI	Black bent	*Agrostis gigantea*	FAC
ALIN	Speckled alder	*Alnus incana*	FACW
ALPR	Meadow foxtail	*Alopecurus pratensis*	FAC
BEGL	Resin birch	*Betula gladulosa*	OBL
CAAQ	Leafy tussock sedge	*Carex aquatilis*	OBL
CACA	Bluejoint	*Calamagrostis canadensis*	FACW
CACO	Large mountain bittercress	*Cardamine cordifolia*	FACW
CAMI	Small-wing sedge	*Carex microptera*	FACU
CANE	Nebraska sedge	*Carex nebrascensis*	OBL
CAPE	Woolly sedge	*Carex pellita*	OBL
CAPR	Clustered field sedge	*Carex praegracillis*	FACW
CAUT	Northwest Territory sedge	*Carex utriculata*	OBL
CIAR	Canadian thistle	*Cirsium arvense*	FAC
COAL	Red osier	*Cornus alba*	FACW
DAFR	Golden-hardhack	*Dasiphora fruticosa*	FAC
DECA	Tufted hair grass	*Deschampsia caespitosa*	FACW
ELPA	Common spike-rush	*Eleocharis palustris*	OBL

Abbreviation	Common Name	Scientific Name	Wetland Indicator Status
MECI	Tall fringe bluebells	*Mertensia ciliata*	FACW
MIGU	Seep monkey-flower	*Mimulus guttatus*	OBL
MIOR	Bog psuedasaxifrage	*Micranthes oregana*	FACW
PHAR	Reed canary grass	*Pharlaris arundinacea*	FACW
PHPR	Common Timothy	*Phleum pratense*	FAC
PIEN	Englemann's spruce	*Picea engelmannii*	FAC
POAN	Narrow-leaf cottonwood	*Populus angustifolia*	FACW
POPR	Kentucky blue grass	*Poa pratensis*	FAC
POTR	Quaking aspen	*Populus tremuloides*	FACU
PTAQ	Northern bracken fern	*Pteridium aquilinum*	FACU
RILA	Bristly black gooseberry	*Ribes lacustre*	FAC
RIWO	Winaha currant	*Ribes wolfii*	FAC
ROWO	Wood's rose	*Rosa woodsii*	FACU
RUPA	Western thimbleberry	*Rubus parviflorus*	FACU
SABR	Short-Fruit willow	*Salix brachycarpa*	FACW
SADR	Drummond's willow	*Salix drummondiana*	FACW
SAEX	Narrow-leaf willow	*Salix exigua*	FACW
SAGE	Geyer's willow	*Salix geyeriana*	FACW

West Vail Pass Field Data Summary - Reservoir Fringe Wetlands

ID	Size (acres)	Cowardin Type	HGM Type	Dominant Vegetation	Dominant Vegetation 2	Dominant Vegetation 3	Hydrology Indicators	Water Source	Functional Condition	Notes
ELRE	Creeping wild rye	*Elymus repens*	FAC	SALA	Whiplash willow	*Salix lasiandra*	FACW			
EPCI	Fringed willowherb	*Epilobium ciliatum*	FACW	SALI	Strap-Leaf willow	*Salix ligulifolia*	FAC			
EQAR	Field horsetail	*Equisetum arvense*	FAC	SAMO	Park willow	*Salix monticola*	OBL			
GEMA	Large-leaf avens	*Geum macrophyllum*	FAC	SAPL	Tea-Leaf willow	*Salix planifolia*	OBL			
HEMA	American cow-parsnip	*Heracleum maximum*	FAC	SASC	Scouler's willow	*Salix scouleriana*	FAC			
HOJU	Fox-tail barley	*Hordeum jubatum*	FAC	SAWO	Idaho willow	*Salix wolfii*	OBL			
JUBA	Baltic rush	*Juncus balticus*	FACW	SETR	Arrow-leaf ragwort	*Senecio triangularis*	FACW			
JUDR	Drummond's rush	*Juncus drummondii*	FACW	THFE	Fendler's meadow-rue	*Thalictrum fendleri*	FAC			
JUEN	Dagger-leaf rush	*Juncus ensifolius*	FACW	VASC	Grouseberry	*Vaccinium scoparium*	FACU			

APPENDIX C

PHOTOGRAPHS

West Vail Pass - Slope Wetlands

Wetland 6-1 (upper beaver pond near road)

Wetland 6-1 (lower portion, above Black Gore Creek)

Wetland 8-7

Wetland 9-4

Wetland 10-5 (fen)

Wetland 10-9

West Vail Pass - Slope Wetlands

Wetland 10-13

Wetland 10-14 (fen)

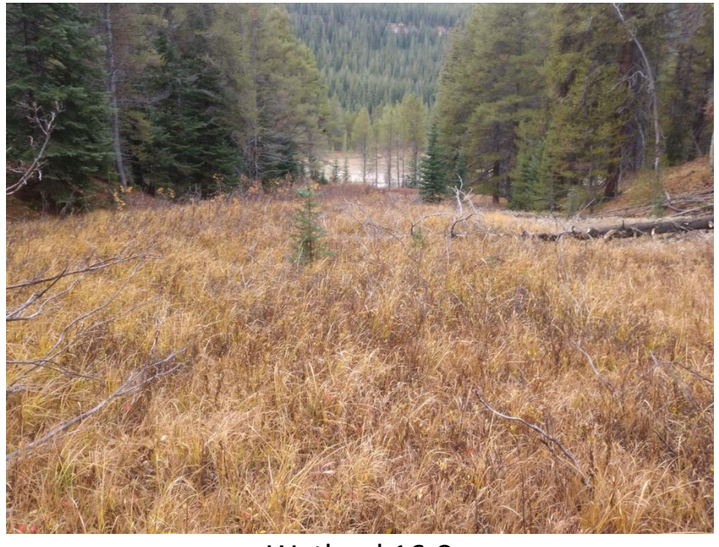
Wetland 11-4

Wetland 14-7

Wetland 15-2

Wetland 16-1 (fen)

West Vail Pass - Slope Wetlands



Wetland 16-8

Wetland 18-3

Wetland 20-5

Wetland 22-6

Wetland 22-8 (fen)

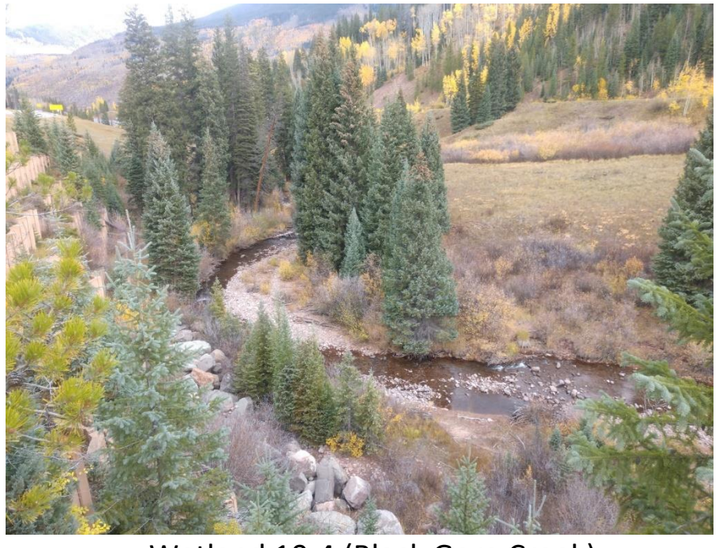
Wetland 23-10

West Vail Pass - Riverine Wetlands

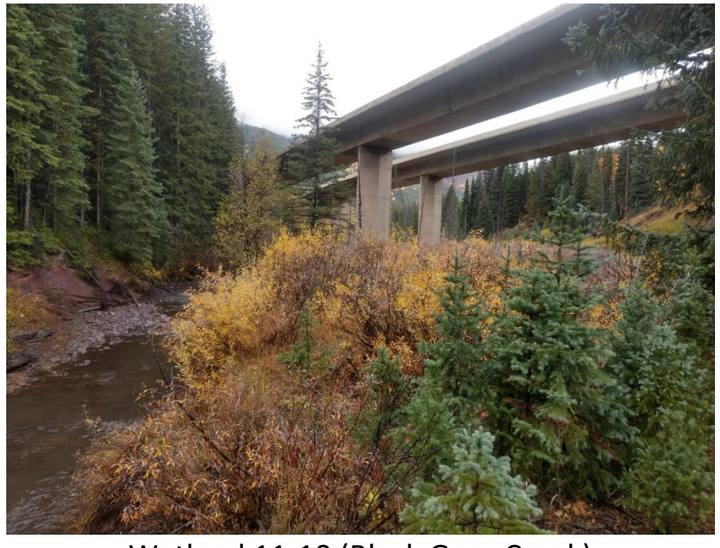
Wetland 5-1 (Gore Creek)

Wetland 8-5 (unnamed tributary to Black Gore Creek)

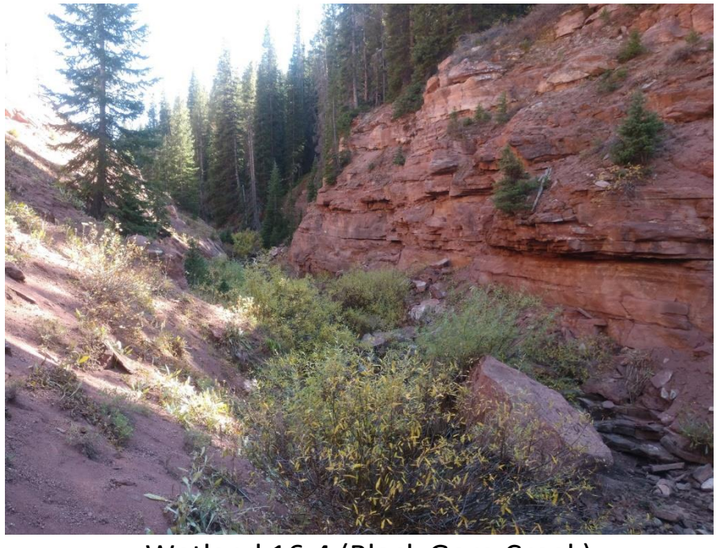
Wetland 10-1 (Timber Creek)



Wetland 10-4 (Black Gore Creek)



Wetland 11-10 (Black Gore Creek)



Wetland 16-4 (Black Gore Creek)

West Vail Pass - Riverine Wetlands

Wetland 17-2 (Black Gore Creek)

Wetland 18-1 (Black Gore Creek – fen)

Wetland 18-2 (Black Gore Creek)

Wetland 22-3 (West Tenmile Creek – fen)

Wetland 23-1 (West Tenmile Creek)

Wetland 23-3 (Wilder Gulch – fen)

West Vail Pass - Stormwater Wetlands

Wetland 9-3

Wetland 11-7

Wetland 12-11 (pond)

Wetland 12-11 (ditch)

Wetland 13-10

Wetland 23-9

West Vail Pass – Reservoir Fringe Wetlands

Wetland 3-2 (Bighorn Diversion Pond)

Wetland 19-6 (Black Lake No. 2)

Wetland 21-2 (Black Lake)

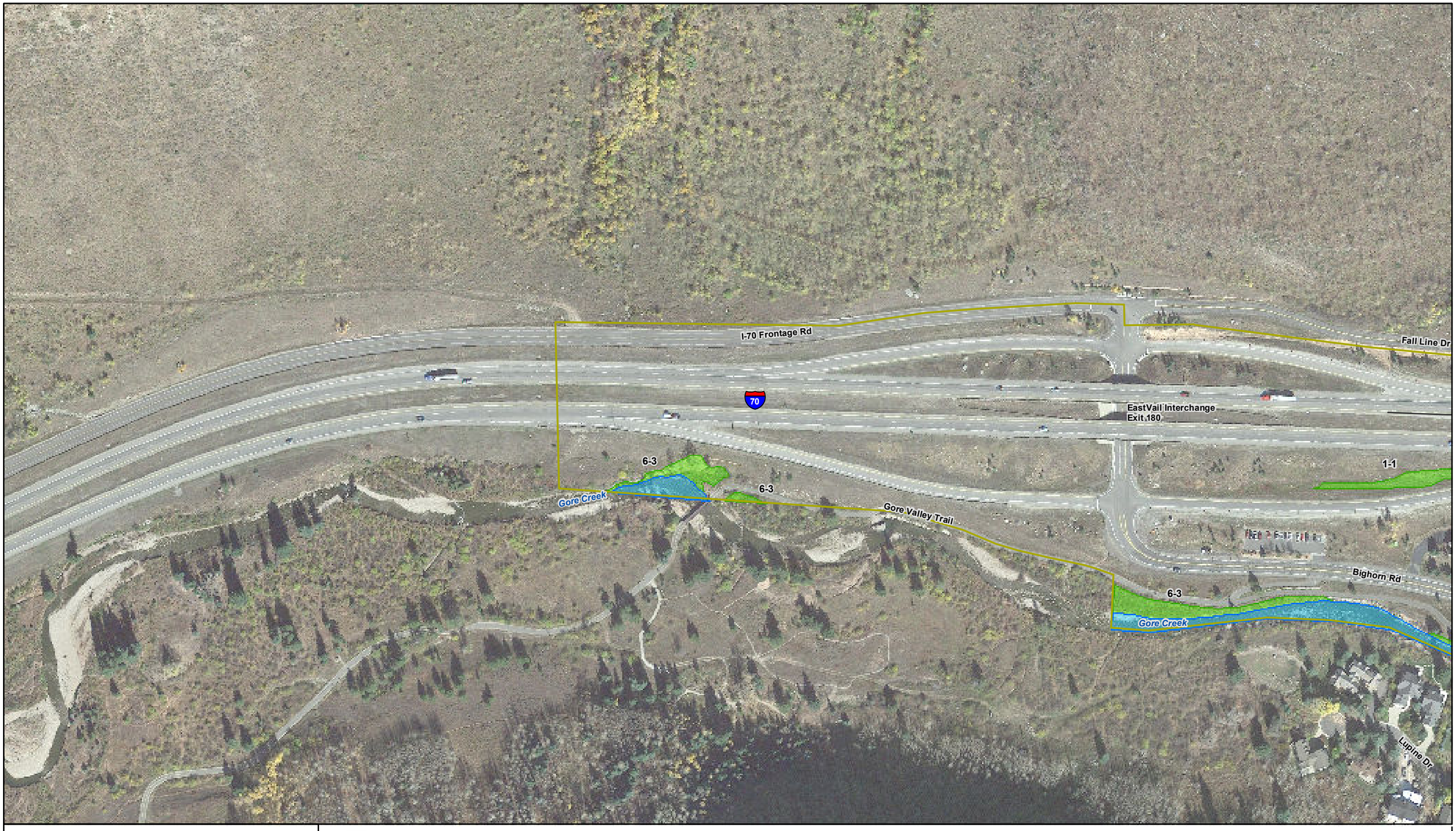
Wetland 21-2 (Black Lake)

Wetland 21-2 (Black Lake – fringe only)

Wetland 21-2 (Black Lake – fringe only)

APPENDIX D

WETLAND IMPACT MAPS



- Wetland (109.31 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Study Area Boundary (1,251.13 acres)
- Proposed Action
- Milepost
- Potential Wetland Impacts - Permanent
- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
- Potential Water Impacts - Temporary

N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 1A of 24
March 18, 2020

- Wetland (109.31 acres)
- Fen (20.79 acres)
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- Proposed Action
- Milepost
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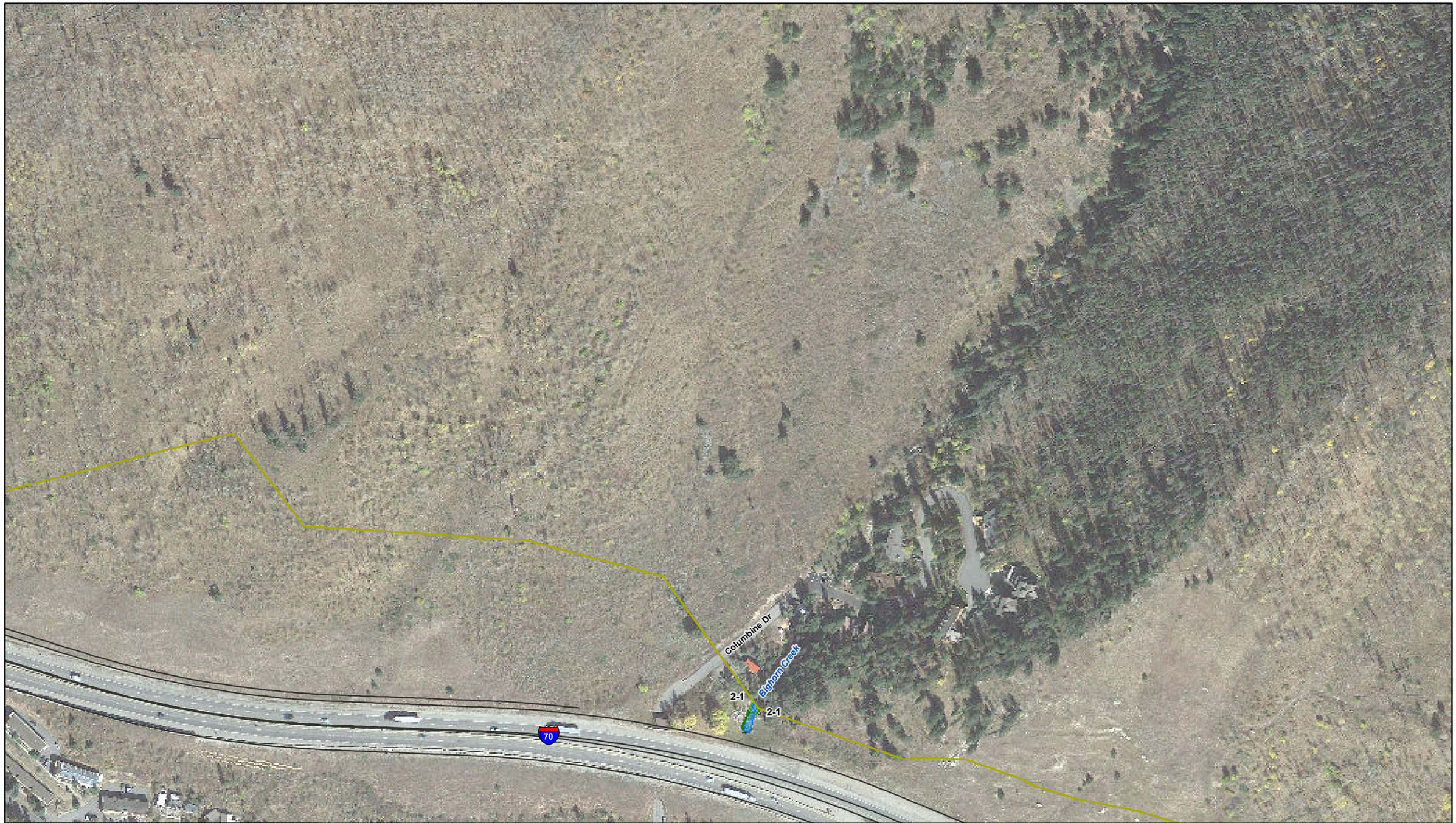
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 1 of 24
March 18, 2020



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N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 2 of 24
March 18, 2020

Wetland (109.31 acres)
Fen (20.79 acres)
Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action

Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 3 of 24
March 18, 2020

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- Milepost
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- Potential Wetland Impacts - Temporary
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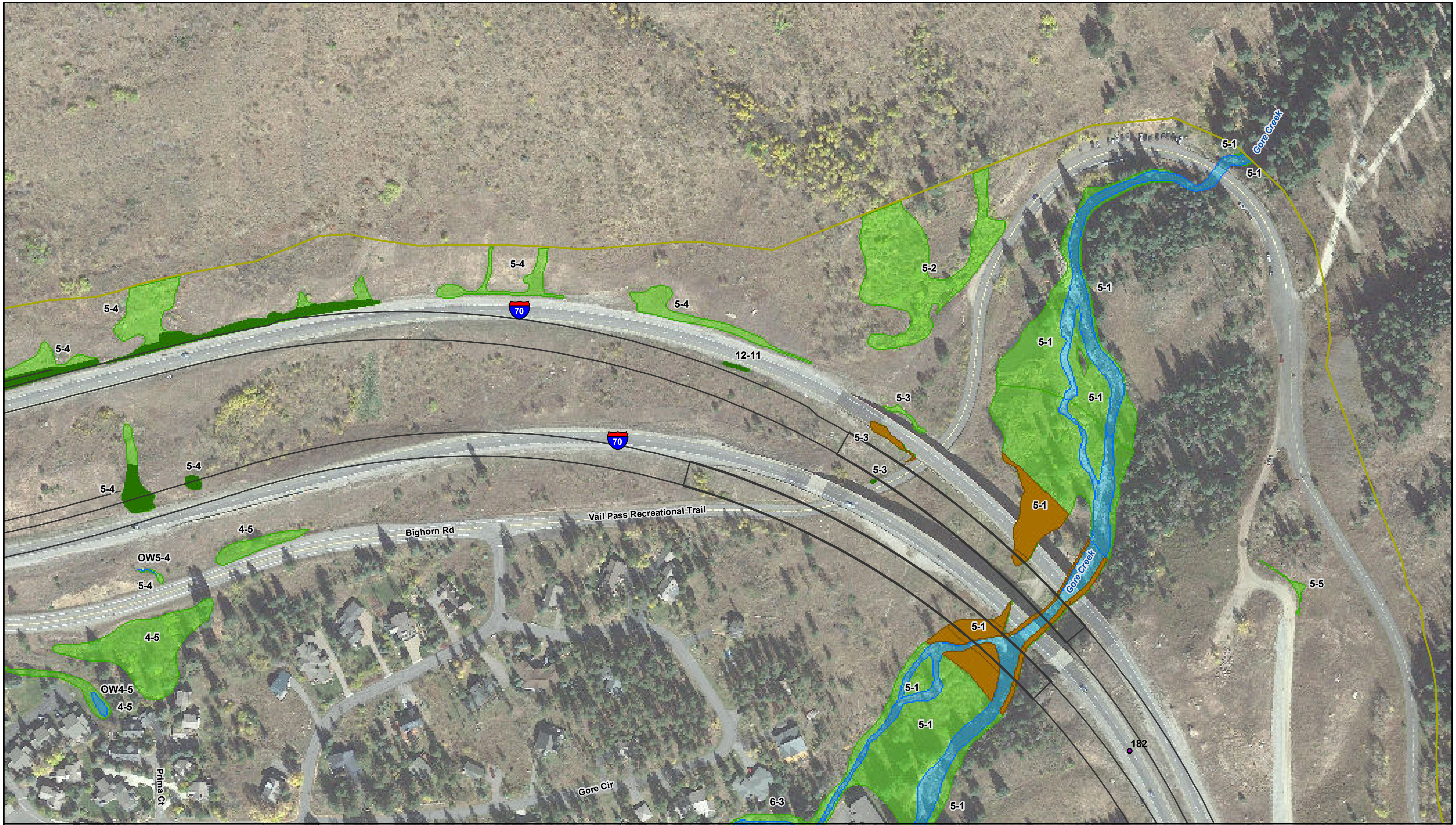
N

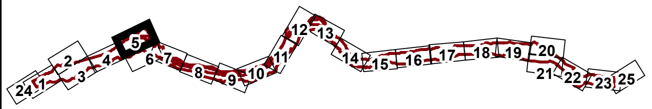
0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 4 of 24
March 18, 2020





Wetland (109.31 acres)
Fen (20.79 acres)
Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action

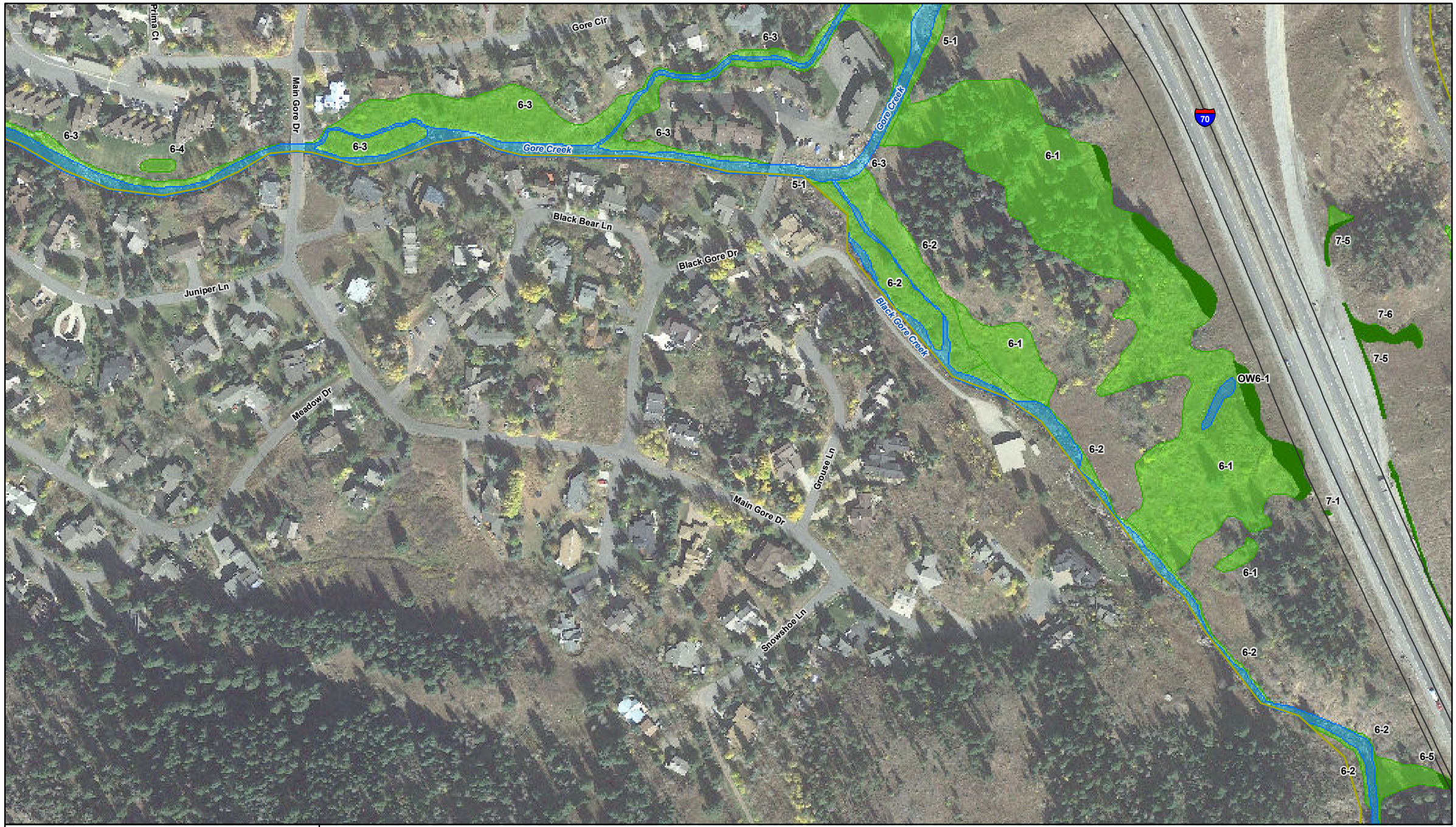
Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 5 of 24
March 18, 2020



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Fen (20.79 acres)
Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action

Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

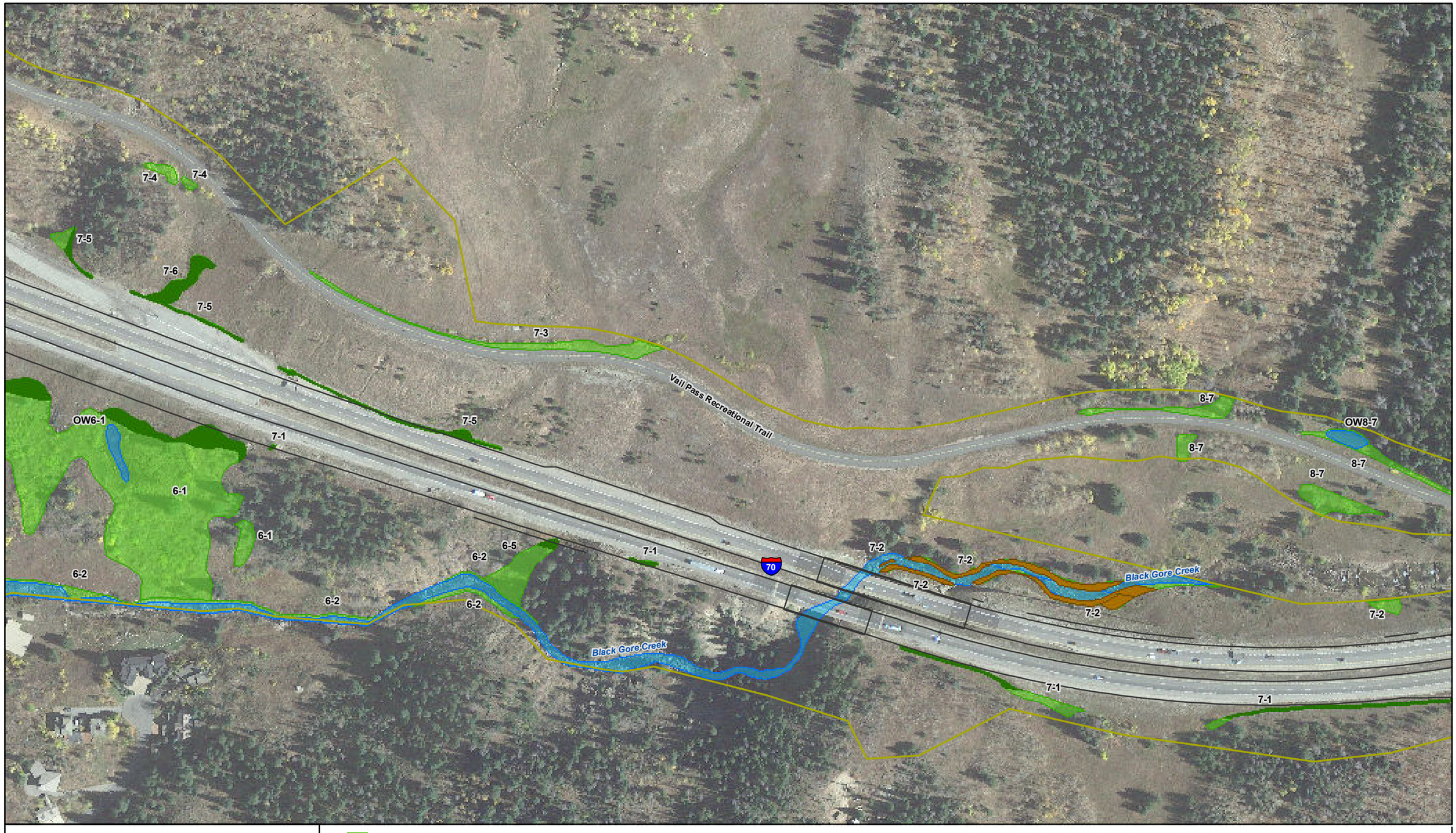
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 6 of 24
March 18, 2020



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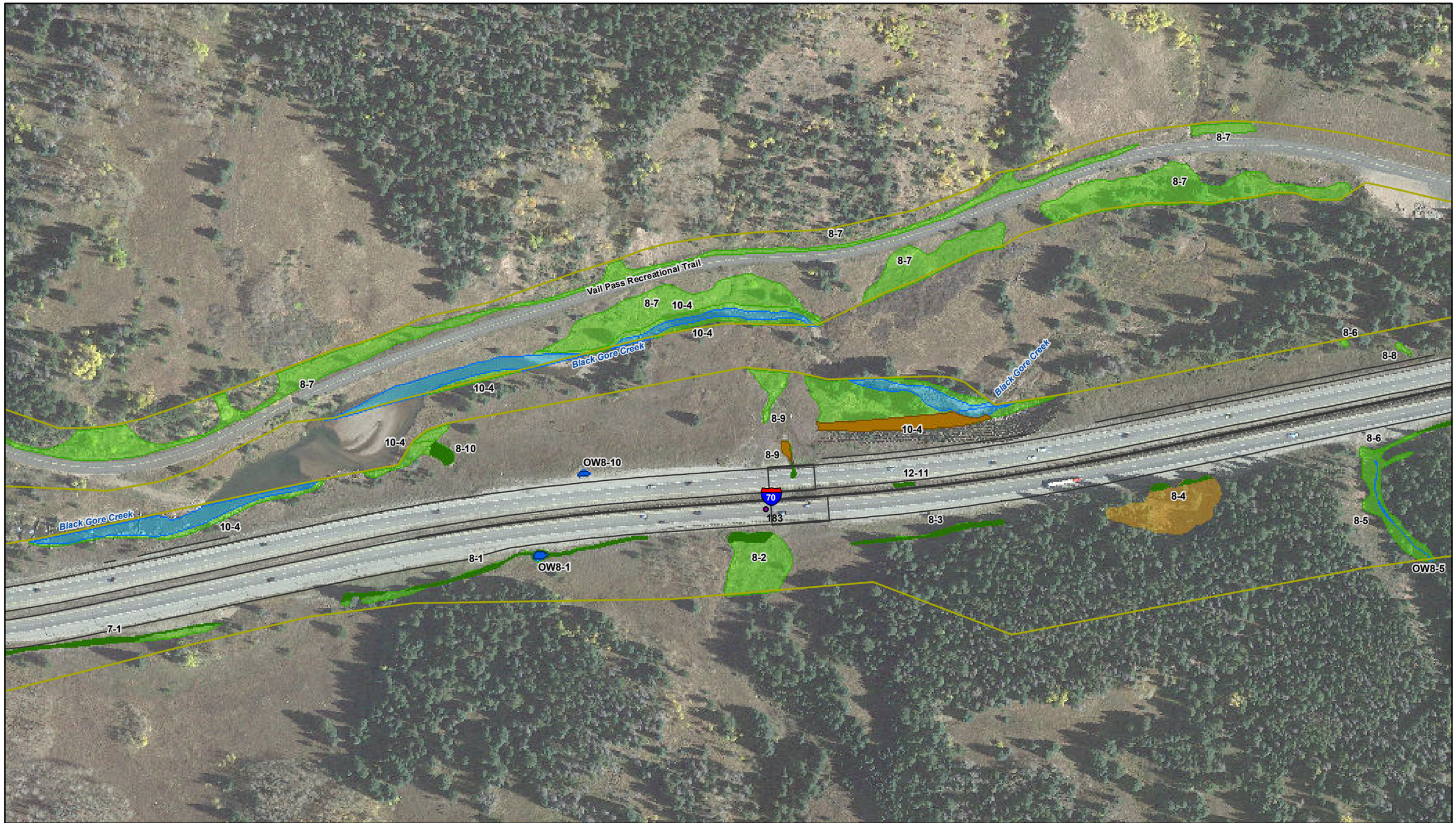
N

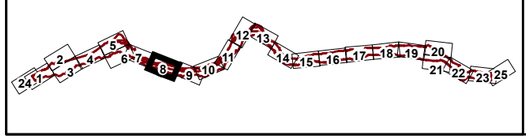
0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 7 of 24
March 18, 2020





Wetland (109.31 acres)
Fen (20.79 acres)
Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action

Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

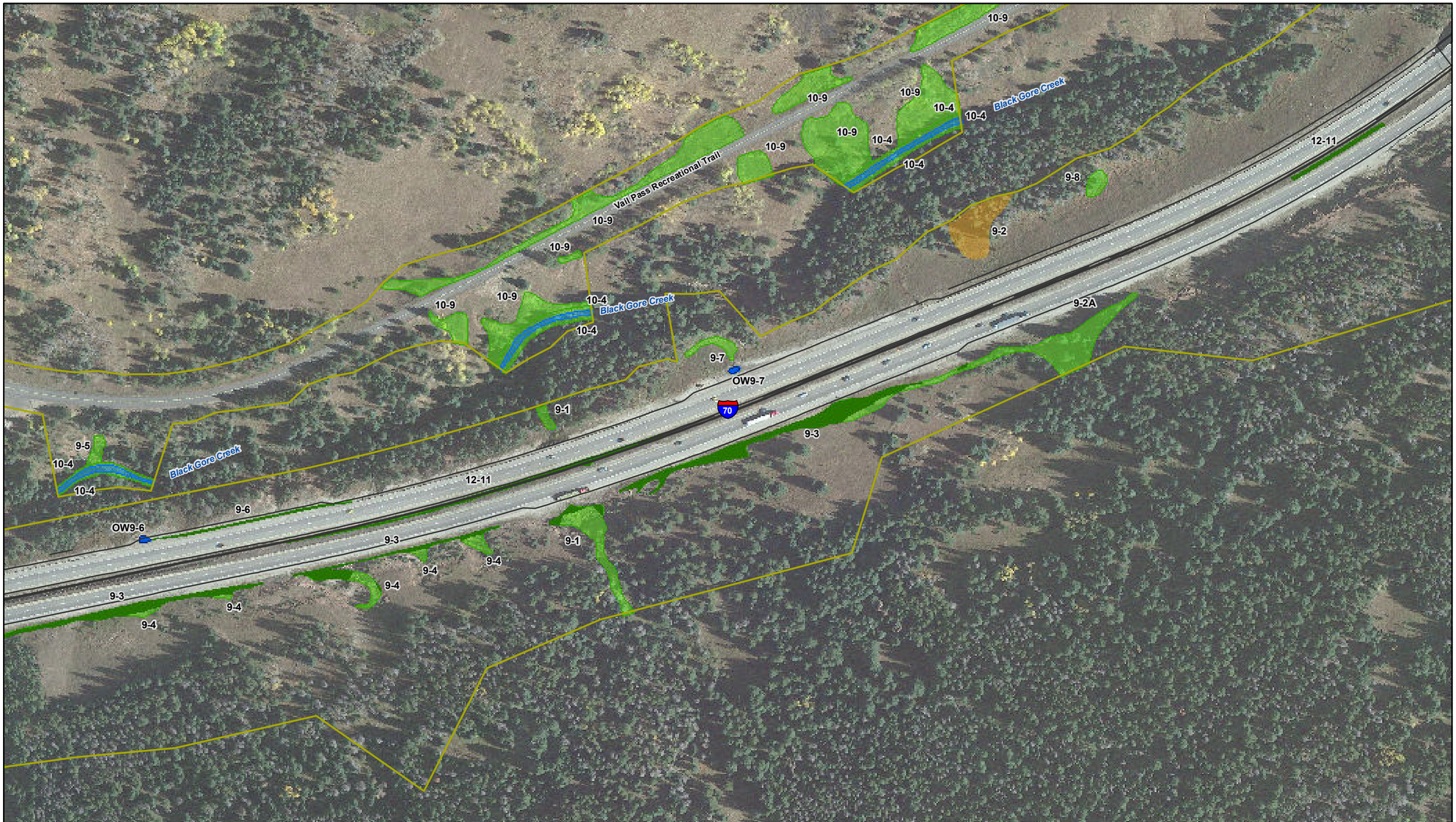
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 8 of 24
March 18, 2020



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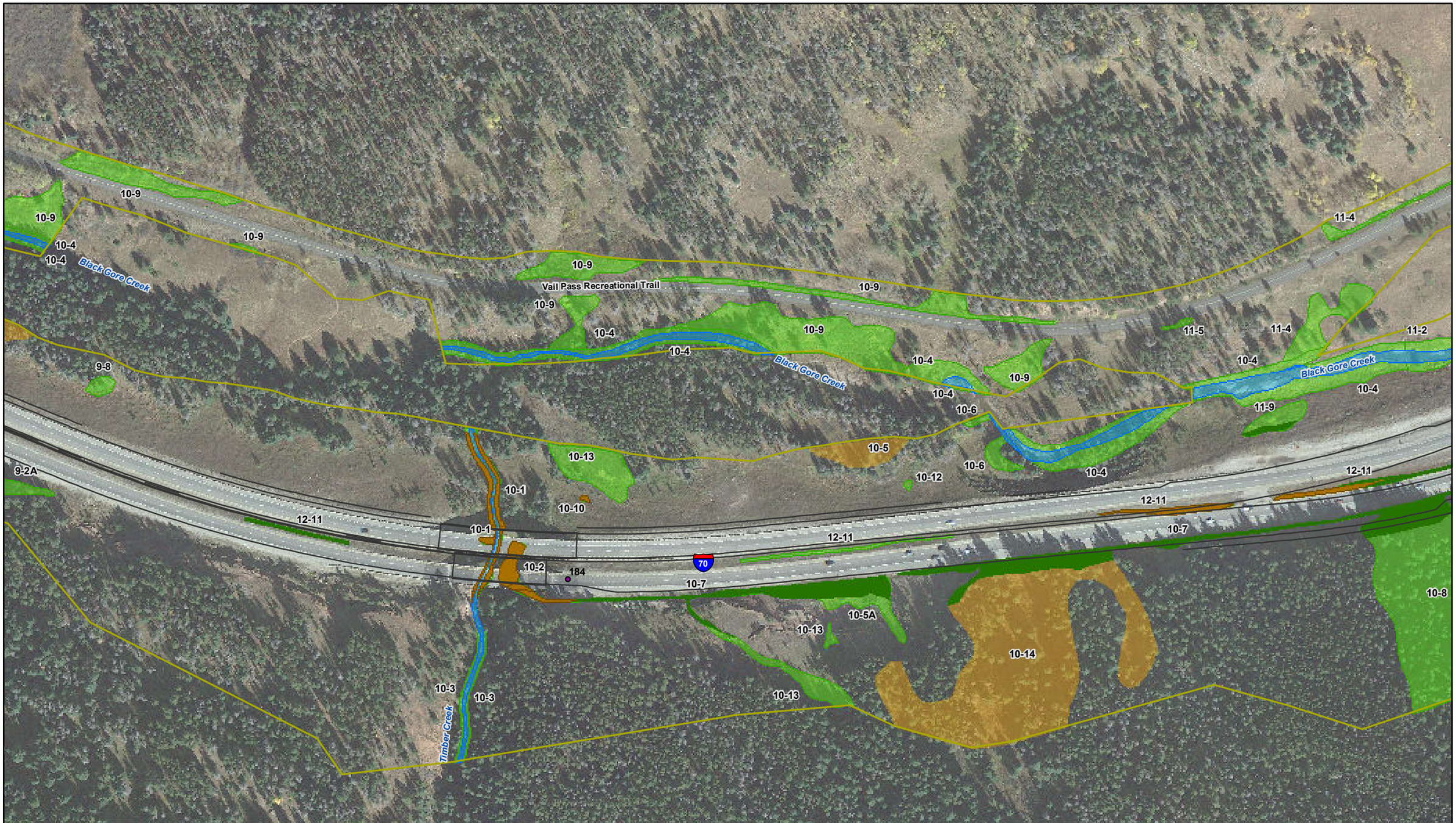
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 9 of 24
March 18, 2020



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Proposed Action
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Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

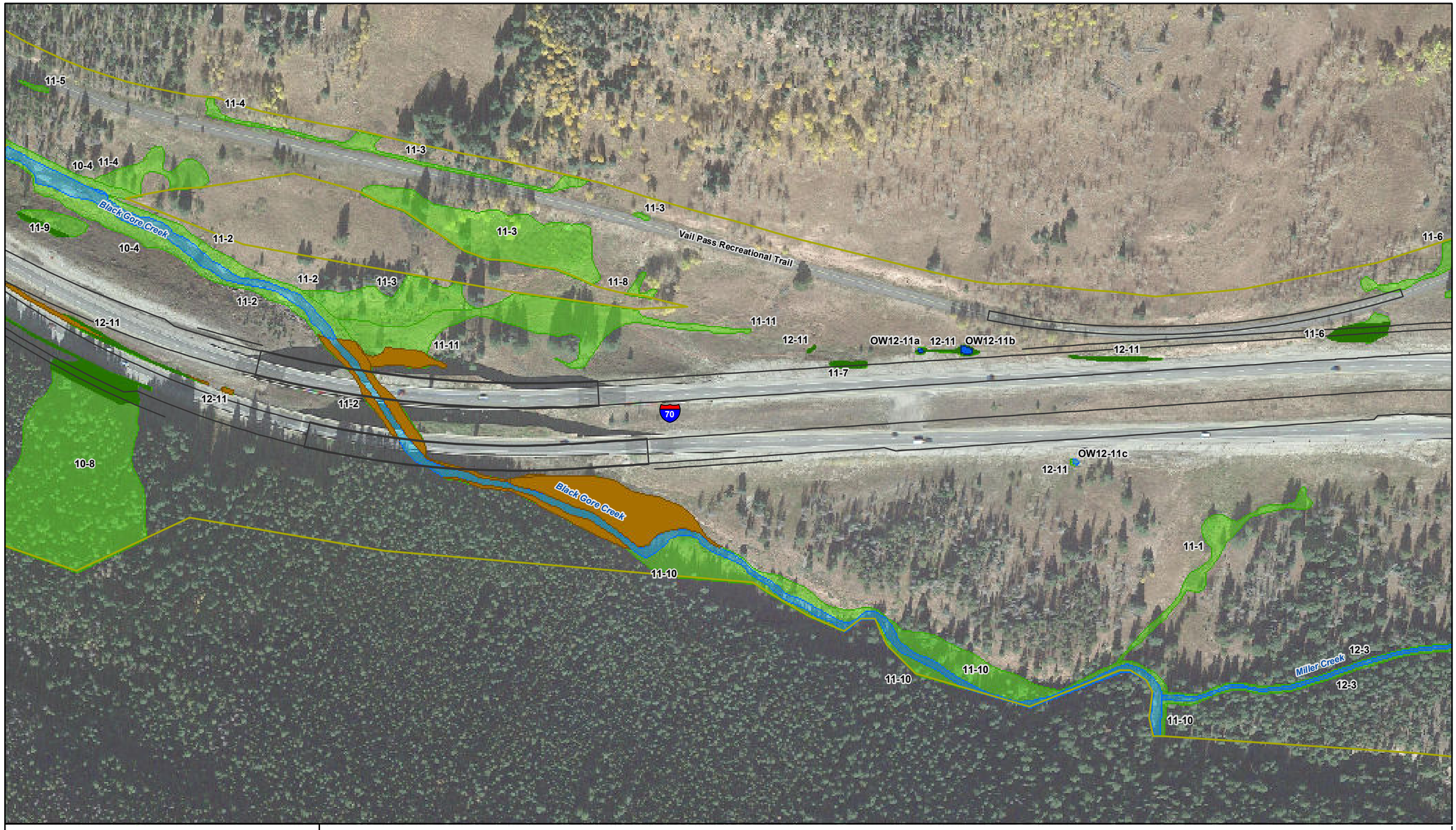
N

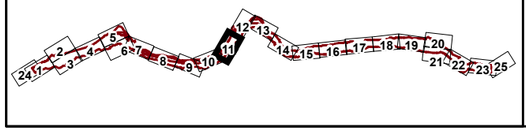
0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 10 of 24
March 18, 2020





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Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action

Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 11 of 24
March 18, 2020

- Wetland (109.31 acres)
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- Potential Wetland Impacts - Temporary
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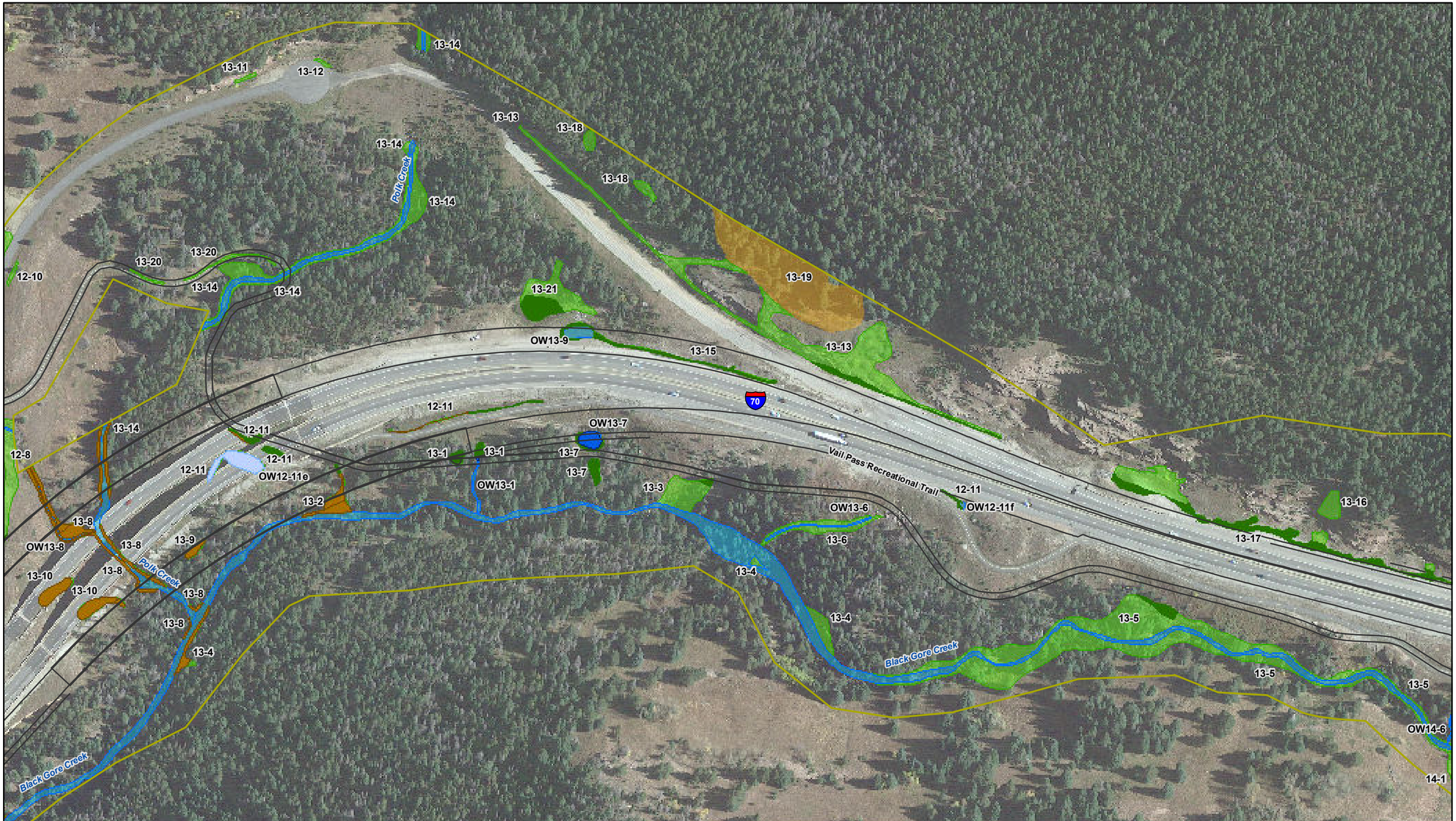
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 12 of 24
March 18, 2020



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- Proposed Action
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- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
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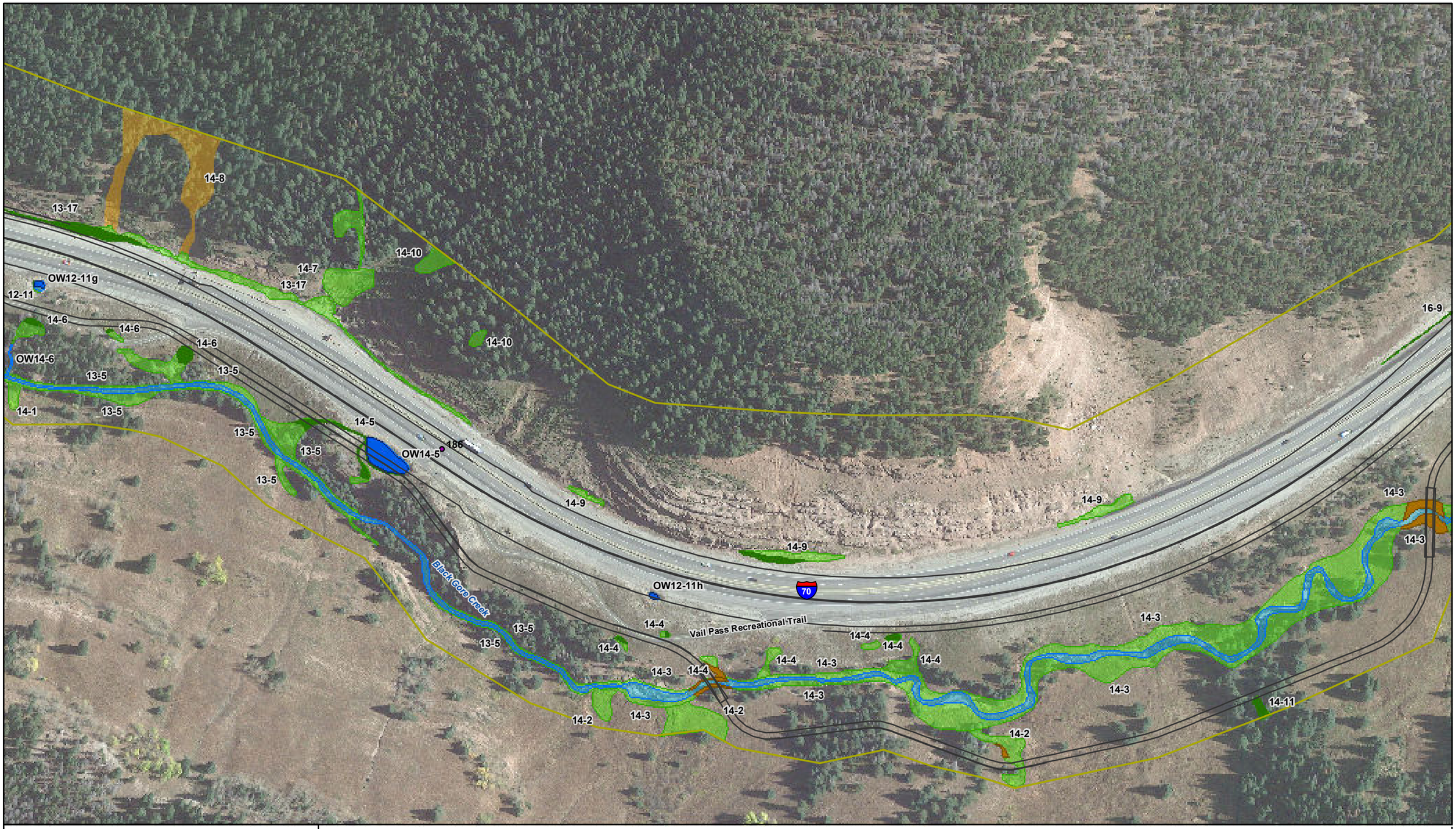
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 13 of 24
March 18, 2020



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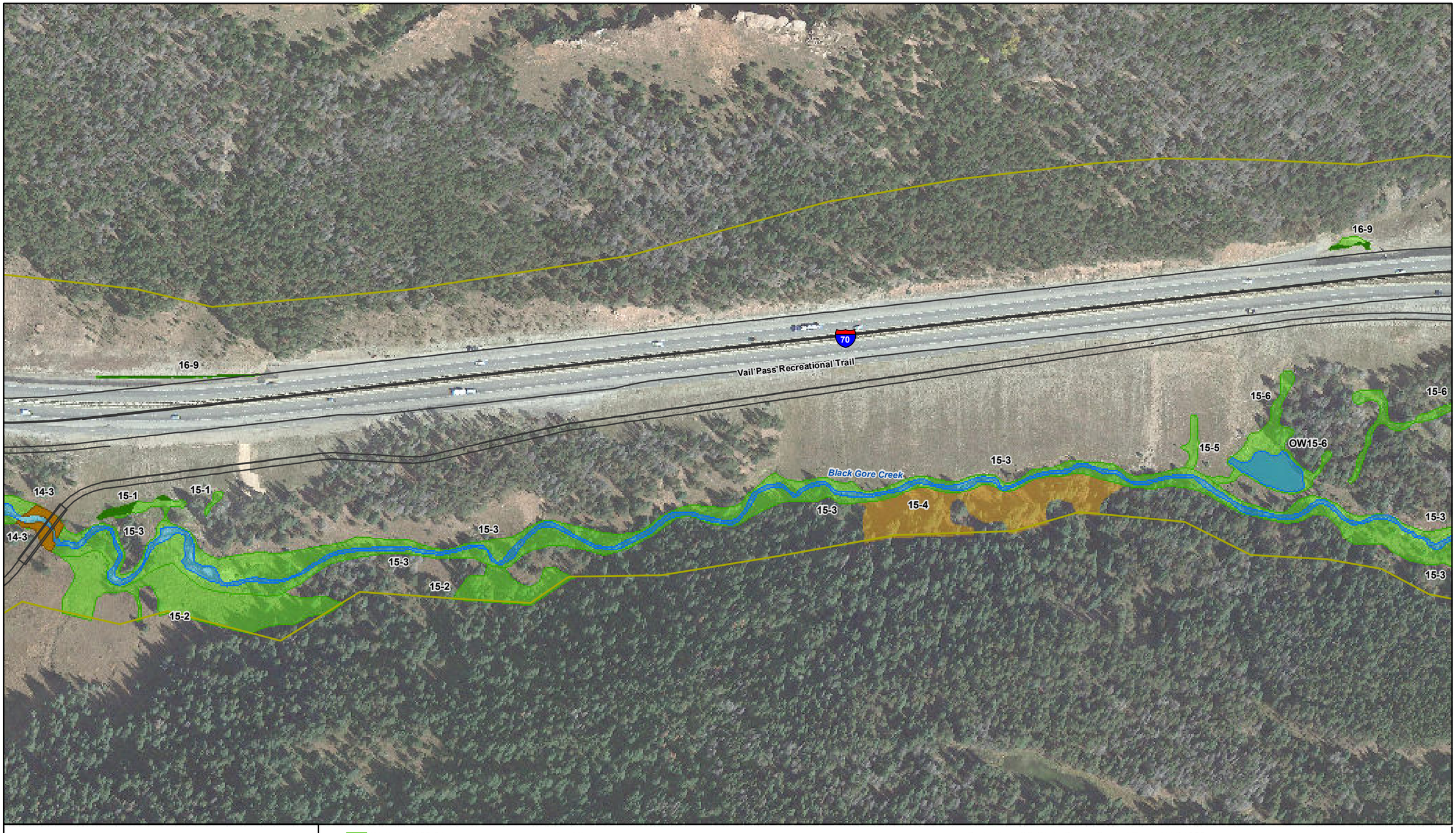
N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 14 of 24
March 18, 2020



Wetland (109.31 acres)
Fen (20.79 acres)
Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action

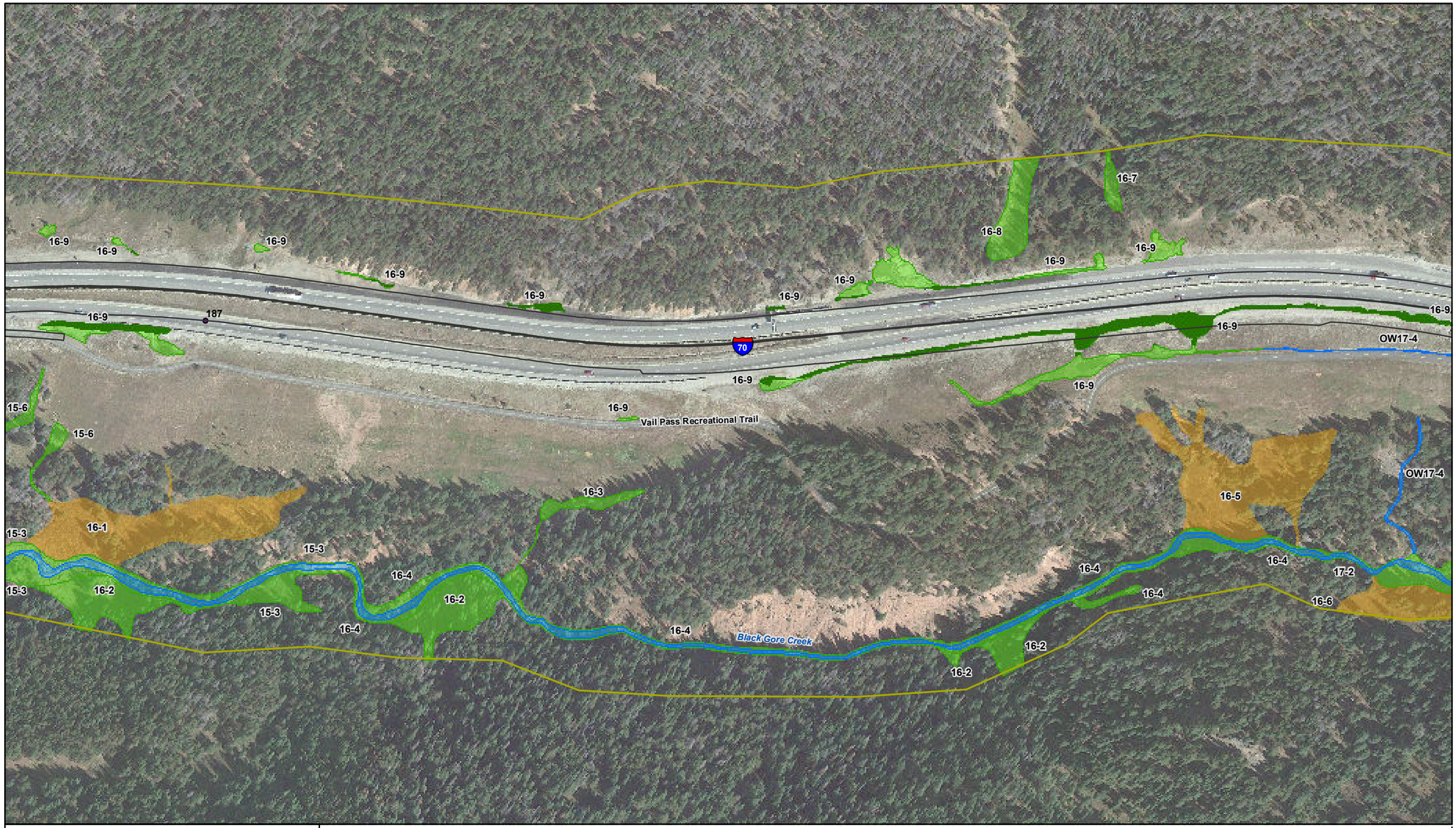
Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 15 of 24
March 18, 2020



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- Water (59.80 acres)
- Study Area Boundary (1,251.13 acres)
- Proposed Action
- Milepost
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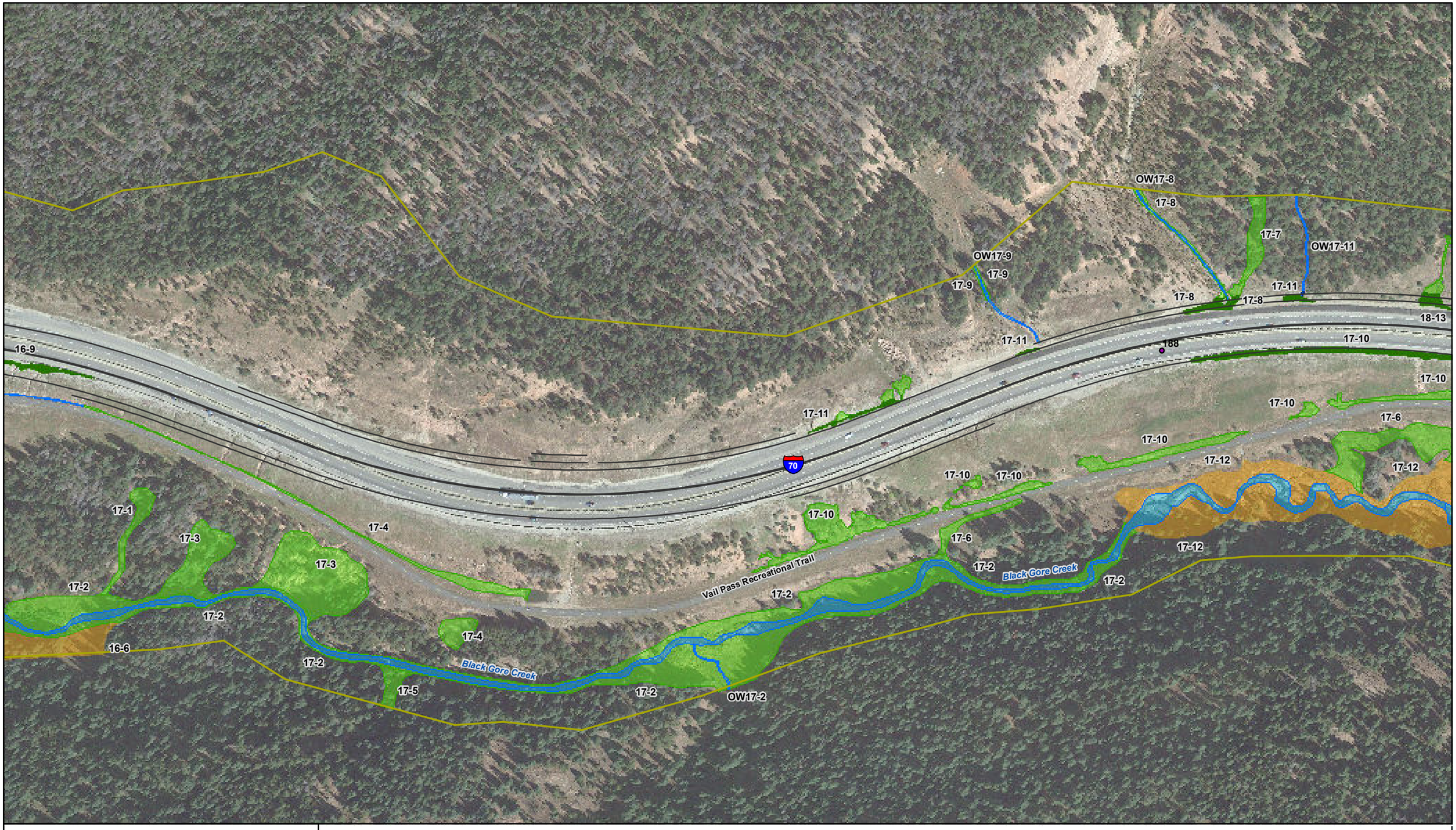
- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
- Potential Water Impacts - Temporary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 16 of 24
March 18, 2020



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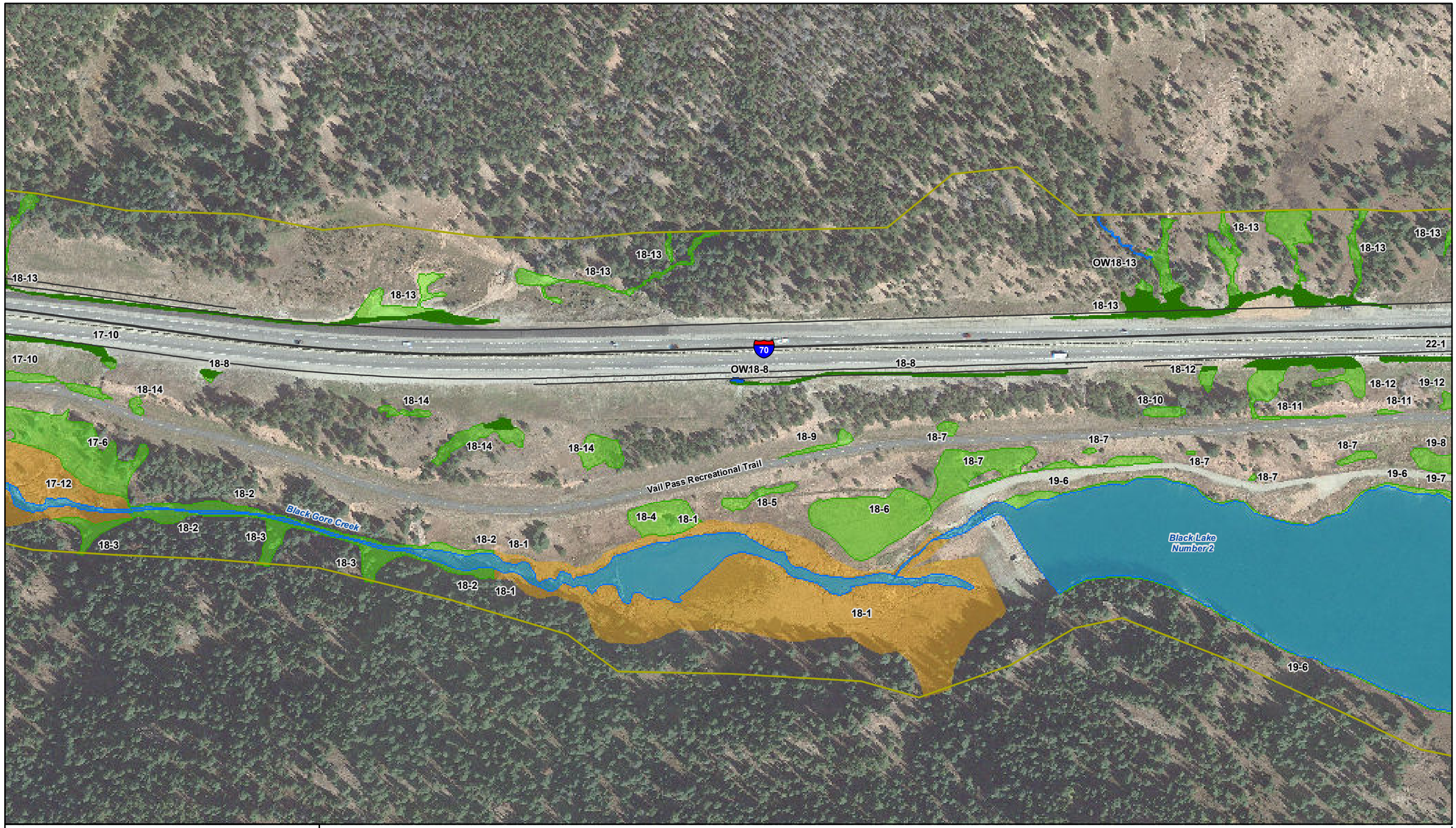
0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 17 of 24
March 18, 2020


18-13
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18-14
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18-7
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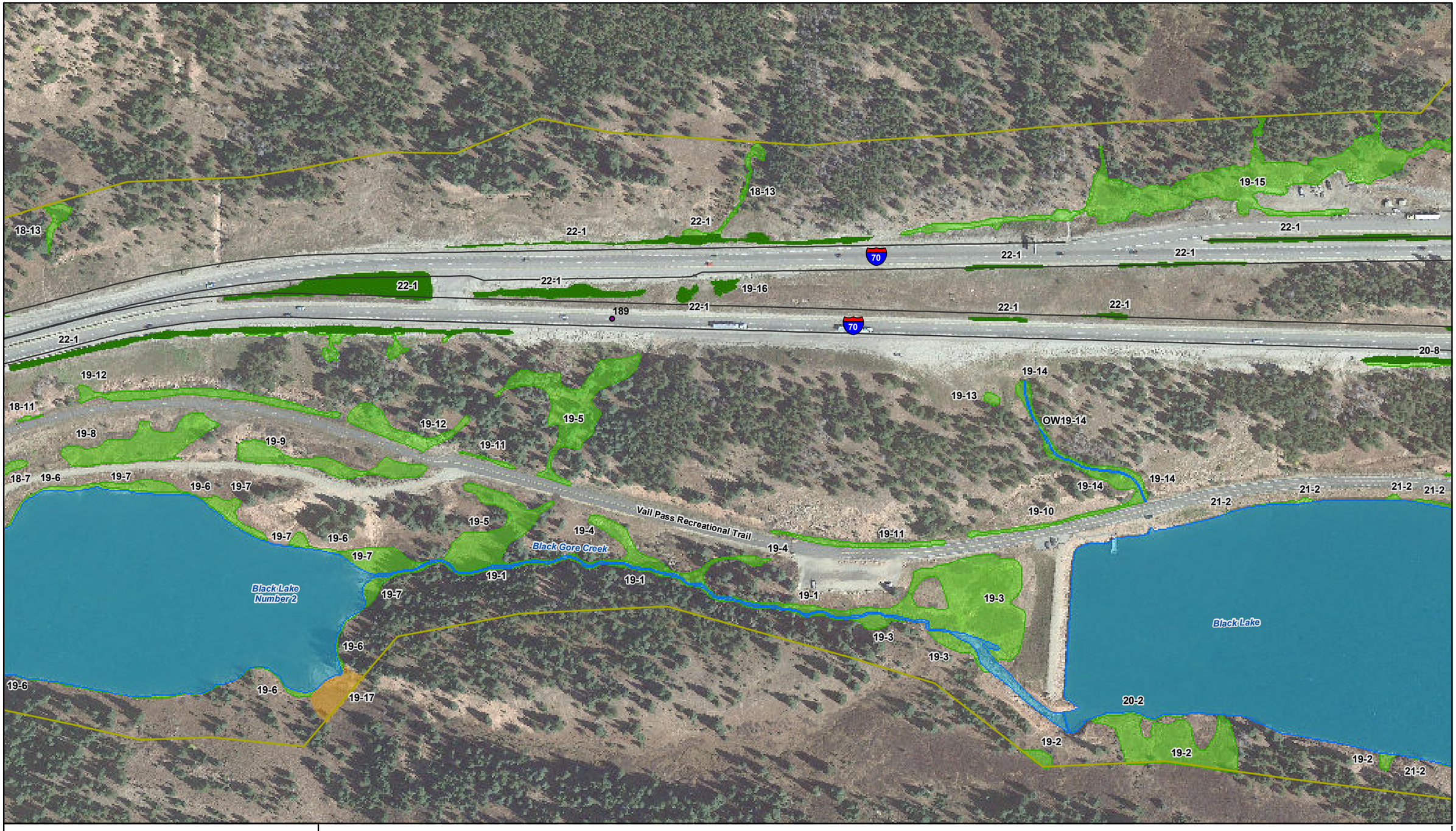
18-7
18-7
19-8
17-12
Vail Pass Recreational Trail
18-7
19-6
18-7
19-6
19-7
18-2
18-5
18-6
Black Gore Creek
18-4
18-1
18-2
18-3
18-2
18-3
18-2
18-1
18-3
18-2
18-1
Black Lake
Number 2
18-1
19-6
Wetland (109.31 acres)
Fen (20.79 acres)
Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action
Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary
0
100
200
400
Feet
Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015
AlpineEco
West Vail Pass
Wetlands Impacts
Map 18 of 24
March 18, 2020



- Wetland (109.31 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Study Area Boundary (1,251.13 acres)
- Proposed Action
- Milepost
- Potential Wetland Impacts - Permanent
- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
- Potential Water Impacts - Temporary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 19 of 24
March 18, 2020

- Wetland (109.31 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Study Area Boundary (1,251.13 acres)
- County Boundary
- Proposed Action
- Milepost
- Potential Wetland Impacts - Permanent
- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
- Potential Water Impacts - Temporary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 20 of 24
March 18, 2020

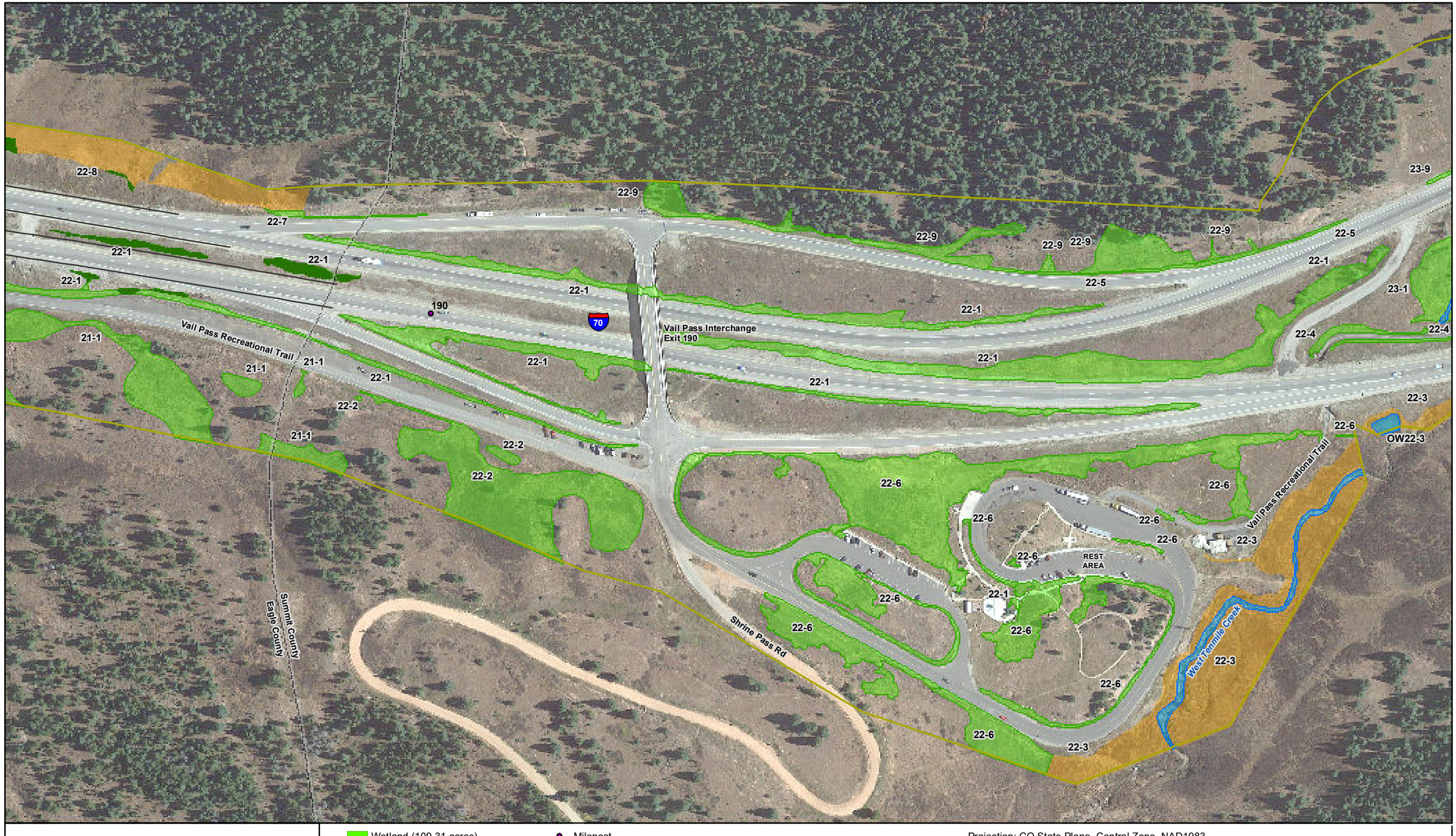
- Wetland (109.31 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Study Area Boundary (1,251.13 acres)
- County Boundary
- Proposed Action
- Milepost
- Potential Wetland Impacts - Permanent
- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
- Potential Water Impacts - Temporary

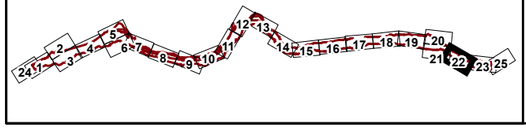
0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 21 of 24
March 18, 2020





- Wetland (109.31 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Study Area Boundary (1,251.13 acres)
- County Boundary
- Proposed Action
- Milepost
- Potential Wetland Impacts - Permanent
- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
- Potential Water Impacts - Temporary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 22 of 24
March 18, 2020

- Wetland (109.31 acres)
- Fen (20.79 acres)
- Water (59.80 acres)
- Study Area Boundary (1,251.13 acres)
- Proposed Action
- Milepost
- Potential Wetland Impacts - Permanent
- Potential Wetland Impacts - Temporary
- Potential Water Impacts - Permanent
- Potential Water Impacts - Temporary

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

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West Vail Pass
Wetlands Impacts
Map 23 of 24
March 18, 2020

Wetland (109.31 acres)
Fen (20.79 acres)
Water (59.80 acres)
Study Area Boundary (1,251.13 acres)
Proposed Action

Milepost
Potential Wetland Impacts - Permanent
Potential Wetland Impacts - Temporary
Potential Water Impacts - Permanent
Potential Water Impacts - Temporary

N

0 100 200 400 Feet

Projection: CO State Plane, Central Zone, NAD1983
Aerial Photo Source: Google Earth, 2015

AlpineEco

West Vail Pass
Wetlands Impacts
Map 24 of 24
March 18, 2020