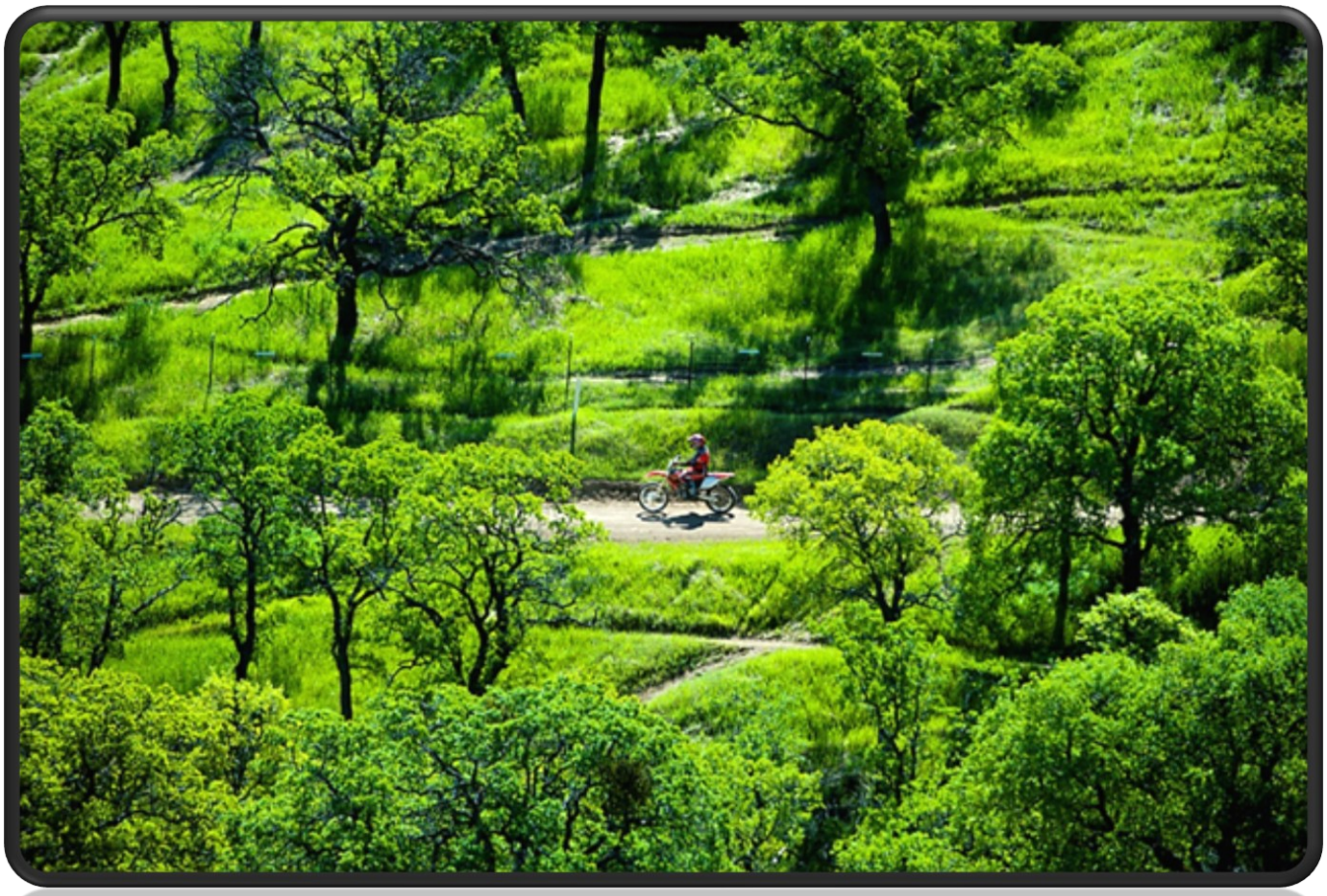

DRAFT 2025 CARNEGIE STATE VEHICULAR RECREATION AREA SOIL CONSERVATION PLAN

November 2025

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List of Abbreviations

4WD	Four-wheel drive
4x4	Four-by-four
ATV	All-Terrain Vehicle
BAS	Best Available Science
Basin Plan	Water Quality Control Plan
BEPA	The Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BP	Before Present
CAT	Carnegie Advisory Team
CCR	California Code of Regulations
CDFG	California Department of Fish and Game (now CDFW)
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CGP	Construction General Permit
CHC	Corral Hollow Creek
CHWA	Corral Hollow Watershed Assessment
CO	Carbon monoxide
CSVRA	Carnegie State Vehicular Recreation Area
CTR	California Toxics Rule
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
DOM	Department Operational Manual
DPR	California Department of Parks and Recreation
EIR	Environmental Impact Report
FWCA	Fish and Wildlife Coordination Act
GIS	Geographic Information System
GPS	Global Positioning System
Guidelines	Soil Standard and Guidelines

G-Y-R	Green, Yellow, Red
LSAA	Lake and Streambed Alteration Agreement
LLNL	Lawrence Livermore National Laboratory
MBTA	(Federal) Migratory Bird Treaty Act
MS4	Multiple Storm Sewer System
MU	Management Unit
MX	Motocross
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Services
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NRD	Natural Resources Division
NRHP	National Register of Historic Places
OHMVA	Off-highway Motor Vehicle Act
OHMVR Division	Off-Highway Motor Vehicle Recreation Division
OHV	Off-Highway Vehicle
OTR	Off-trail riding
PEF	Project Evaluation Form
PM10	Particular Matter, aerodynamic diameter of 10 micrometers or less
PRC	Public Resources Code
RMA	Resource Management Area
ROV	Recreational Off-highway Vehicle
RTMP	Road and Trail Management Plan
RWQCB	Regional Water Quality Control Board
SCP	Soil Conservation Plan
SFBAAB	San Francisco Bay Area Air Basin
SJVAB	San Joaquin Valley Air Basin
S.M.A.R.T.	Specific, Measurable, Achievable, Realistic, Timely

SPPO	State Parks Peace Officer
SRI	Standford Research Institute
Standard	Soil Standard and Guidelines
SWMM	Storm Water Management Model
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SVRA	State Vehicular Recreation Area
TRM	Trail Rating Matrix
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VegCAMP	Vegetation Classification and Mapping Program
WDR	Waste Discharge Requirements
WHPP	Wildlife Habitat Protection Plan

1.0 Introduction

The Soil Conservation Plan (SCP) for Carnegie State Vehicular Recreation Area (Carnegie SVRA/CSVRA/the Park) describes in detail the Best Management Practices (BMPs), measures, and strategies using the best available science to ensure compliance with the 2020 Soil Conservation Standard (the Standard). The Plan also defines protocols for assessment, maintenance, and monitoring efforts implemented at CSVRA. The Plan is intended to meet the requirements of Senate Bill 249 (Allen).

The overarching goal of the CSVRA SCP and associated programs is to ensure that the SVRA is managed for sustainable, long-term prescribed use in accordance with the 2020 Soil Conservation Standard. The Plan details management actions implemented to reduce erosion from trails and roads associated with off-highway vehicle (OHV) use and minimize sedimentation impacts beyond the boundary of the park, beyond naturally occurring conditions, while providing high-quality recreational opportunities for multiple OHV user groups and non-motorized user groups as well.

The Plan provides a comprehensive overview of adaptive soil management practices at CSVRA. Details regarding protocols for maintenance, monitoring, and assessment are discussed at length.

1.1 Purpose and Scope of the Soil Conservation Plan

In 2017, Senate Bill 249 (Allen) directed the Off-Highway Motor Vehicle Recreation (OHMVR) Division to review and update the 2008 Soil Conservation Standard and Guidelines (Guidelines) by 2020. The updated 2020 Guidelines defines the Standard, which is the standard to which OHV facilities are managed with respect to soil loss. While the Standard did not change during the 2020 update, substantial revisions were made to the Guidelines. The 2020 Guidelines require SCPs for State Vehicular Recreation Areas (SVRAs).

Public Resources Code (PRC) §5090.35 (et seq.) describes environmental requirements for the SVRAs. Specifically, PRC §5090.35(d) requires SVRA staff to monitor OHV facilities annually to ensure compliance with the Standard. The SCP is the document used by SVRA staff to outline a monitoring program that describes how the park unit will meet the Standard.

The Standard emphasizes soil retention through sustainable management practices that prevent unnatural, accelerated erosion from OHV facilities. The SCP is tailored to site-specific conditions at the SVRA. This SCP comprises three main components: 1) an assessment of existing road and/or trail conditions, 2) a description of the routine road

and/or trail maintenance that occurs throughout the SVRA, and 3) a monitoring plan. To ensure compliance with the Standard, SCPs utilize best available science (BAS) to facilitate the adaptive management framework through setting goals and objectives, monitoring the progress towards achieving those goals, and adjusting management as necessary to make improvements.

Implementation of this SCP may result in identifying potential future projects and/or management recommendations. Annual compliance reporting to assess compliance with the Standard through SCP monitoring activities includes a Compliance Action Plan, which can identify potential projects to improve soil retention and conditions. Any identified new project(s) and/or management actions resulting from this SCP implementation will be analyzed using the Department's Project Evaluation Form (PEF) and subject to California Environmental Quality Act (CEQA) review.

1.2 State and Regional Conservation Objectives

CSVRA is operated by the State of California. PRC §5090.32(g) requires that SVRA management and wildlife habitat protection plans be developed considering statutorily required state and regional conservation objectives. As a result, the below referenced state and regional conservation objectives were reviewed and considered while developing the CSVRA SCP objectives (Table 1). These state and regional conservation objectives are only for reference purposes for developing the SCP, and CSVRA and the SCP are not necessarily subject to complying with all of the referenced plans. This consideration has led to well-defined SCP objectives that will ensure the SVRA is managed in a manner compatible with the values expressed by the surrounding community.

Table 1. State and Regional Conservation Objectives

	Geographical Overlap with SVRA	*Contains Relevant Target Resources*	*Contributes to Conservation Objectives*
State-wide Documents with Conservation Objectives			
State Wildlife Action Plan			
California Water Resilience Portfolio	X	X	X
California Water Plan	X	X	X
Safeguarding California Plan	X	X	
California Healthy Soils Action Plan	X	X	X
California Toxics Plan	X	X	
Carbon Forest Plan	X	X	

	Geographical Overlap with SVRA	*Contains Relevant Target Resources*	*Contributes to Conservation Objectives*
Regional Conservation Documents with Conservation Objectives			
Central Valley Region Basin Plan	X	X	X
Weed Management Area Plans			

State Wildlife Action Plan

The State Wildlife Action Plan, developed by the California Department of Fish and Wildlife in 2015 in concert with a number of partners statewide, provides a blueprint for conservation of wildlife and their habitats in the context of a growing human population and a changing climate. The Plan complies with the requirements of the Federal, State, and Tribal Wildlife Grants Program. One of the priority goals of the plan is to "maintain and improve soil and sediment quality vital for sustaining ecosystems (including soil moisture, chemistry, and pollutant/nutrient concentrations and dynamics." Another major goal is to "maintain or improve sediment deposition regimes vital for sustaining ecosystems (including hydrogeomorphic processes, wind-driven processes, and soil stability)". The SCP supports these goals by seeking to maintain and retain soil over time within Hungry Valley SVRA.

California Water Resilience Portfolio

In 2020, state agencies developed the California Water Resilience Portfolio in response to Executive Order N-10-19 to improve California's capacity to prepare for disruptions, withstand and recover from climate-related shocks, and adapt into the future. The Portfolio embraces a broad, diversified approach shaped to provide important tools to local and regional entities building resilience and to encourage collaboration within and across these regions. Four broad approaches are identified: 1) maintain and diversify water supplies; 2) protect and enhance natural systems; 3) build connections; and 4) be prepared. While most of the document is focused on water resources on the scales of large rivers, there are a few conservation goals that directly align with those in the SCP, such as promoting soil conservation and water quality.

2018 Safeguarding California Plan

Developed by the California Natural Resources Agency, the updated 2018 Safeguarding California Plan purpose is to lay out guidelines for how agencies can incorporate strategies necessary to address climate change into their future planning efforts. The 2018 update included a chapter specific to parks, which included the recommendation (PC-5) to incorporate climate change in all California State Parks and conservancy planning and decision-making. To meet Recommendation PC-5, the plan identifies a step (PC-5.6) to "prioritize conservation, protection, and restoration of natural resources in climate change adaptation projects and planning to ensure sustainable recreational opportunities for the public." The SCP can contribute to this plan by conserving and retaining soils while evaluating whether recreational opportunities are sustainably managed.

Central Valley Region Basin Plan

Basin Plans are mandated by both the federal CWA and the Porter-Cologne Act. The Basin Plan for the Central Valley Region (CVRWQCB, 2019) sets forth water quality standards for the surface and ground waters of the region, which include both designated beneficial uses of the water and the narrative and numeric objectives that must be maintained or attained to protect those uses. Generally, narrative criteria require that degradation of water quality does not occur due to increases in pollutant loads that will adversely impact the designated beneficial uses of a water body.

The Central Valley Basin Plan does not specify beneficial uses or specific water quality objectives for Corral Hollow Creek. According to the tributary rule, the beneficial uses assigned to any downstream water body would also apply to the creek. However, the flows in the creek completely infiltrate in the Central Valley before discharging to any other surface water bodies. Thus, no downstream water bodies are directly impacted by Corral Hollow Creek.

The Basin Plan does specify general water quality objectives for all water bodies within the Sacramento and San Joaquin River Basins and should be consulted when assessing the potential impacts of a proposed project within Carnegie SVRA.

The Basin Plan issued by the Central Valley Regional Water Quality Control Board sets forth water quality standards for the surface waters and groundwater of the region. Those standards include both designated beneficial uses of the water, and the narrative and numeric objectives that must be maintained or attained to protect those uses. Generally, narrative criteria require that water quality not be degraded because of increases in pollutant loads that adversely affect a water body's designated beneficial uses. The Basin Plan provides allowable limits for water turbidity leaving the site compared to entering the site. The water quality monitoring conducted as a component of the Carnegie SVRA Stormwater Management Plan (SWMP) implements these limits.

California Toxics Rule

The CTR is a federal regulation (codified in 40 CFR section 131.38) issued by the USEPA, which established numeric criteria for toxic priority pollutants for California's inland surface waters, enclosed bays, and estuaries. CTR criteria for certain metals must be calculated based upon the probable hardness values of the receiving waters for evaluation of acute (and chronic) toxicity. At higher hardness values for the receiving water, toxins are more likely to be complexed (bound with) other components in the water column, which reduces the bioavailability and resulting toxicity to aquatic organisms. Acute criteria represent the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time without deleterious effects. Chronic criteria represent the highest concentration to which aquatic life can be exposed for an extended period of time (four days) without deleterious effects.

The CTR criteria shall be used to assess potential water quality impacts to Corral Hollow Creek.

1.3 Relationship with Other SVRA Plans

Since Carnegie SVRA became a unit of the State Park system in July 1980, a number of management plans and planning documents have been established to guide the management of CSVRA. The 2025 Carnegie SVRA Soil Conservation Plan has been developed in coordination with these existing management plans and planning documents.

Carnegie SVRA General Plan

The General Plan is a policy document that establishes a long-range vision for the SVRA. It provides goals and guidelines to direct future improvements, services, program development, ongoing management, and public use of Carnegie SVRA. The framework is intended to guide day-to-day decision making and serve as the basis for developing focused feasibility and management plans, project plans, and other management actions necessary to implement General Plan goals. This plan helps to direct the goals and objectives for the SCP's management actions. The Carnegie SVRA General Plan was initially adopted in 1981. A Preliminary General Plan Update and draft Environmental Impact Report (EIR) were released for public review in January 2024 and were approved and certified on October 24, 2024, at the OHMVR Commission hearing.

Carnegie SVRA Declaration of Purpose

The Declaration of Purpose is the broadest statement of management goals designed to fulfill the vision for a State Park unit and provides direction for the development of management plans for that park. It is required by PRC Section 5002.2(b) and describes a unit's primary resource values, significance, opportunities, and value to the State Parks System.

Carnegie SVRA's Declaration of Purpose was approved in December 1981 (DPR, 1981):

> The primary purpose of Carnegie State Vehicular Recreation Area is to make available to the public opportunities for recreation use of off-highway vehicles, to manage this use in the interest of visitor safety and long-term use of the site for off-highway vehicle recreation, to provide appropriate related facilities to serve the needs of present and future off-highway vehicle users; and to protect, perpetuate, and interpret special natural, scenic, and cultural values in the unit.
>
> The prime resource of Carnegie SVRA is the recreational value of the Corral Hollow Creek floodplain and the adjacent hillside slopes. Certain natural and cultural

values in the unit are also prime resources, and can provide recreational and interpretive opportunities, as well as opportunities for scientific study.

Carnegie SVRA Stormwater Management Plan

A Stormwater Management Plan (SWMP) was developed and implemented for Carnegie SVRA in 2011. The SWMP aims to reduce or eliminate pollutant discharges originating from the SVRA by utilizing various site specific structural and non-structural BMPs to protect and improve water quality. The Carnegie SWMP was designed to meet the requirements set forth in SWRCB Water Quality Order No. 2003-0005-DWQ, General Permit No. CAS000004, water discharge requirements (WDRs) for Storm Water Discharges from Small MS4s. The SWMP was last updated in 2012 (DPR, 2012) and will be revised following the adoption of a new SWRCB Phase II Small MS4 Permit, should requirements change. Carnegie SVRA operates under the 2013 Phase II Small MS4 permit as a non-traditional permittee.

Elements of the Carnegie SVRA SWMP include public education and outreach, public involvement and participation, detection and elimination of illicit discharges, stormwater management at construction sites, post-construction stormwater management, and pollution prevention/good housekeeping. The SWMP also includes monitoring components that relate to OHV road and trail management, road and trail evaluations, and sediment and erosion control evaluations in accordance with the OHMVR Division's Soil Conservation Standard and Guidelines (DPR, 2008; 2020), in addition to use of the DPR OHV BMP manual (DPR, 2007b) for selecting, implementing, and maintaining appropriate BMPs. The results of these monitoring components are documented in the SWMP Annual Report.

It is important to understand that while Carnegie SVRA staff have historically performed various monitoring and management activities to achieve SWMP compliance, some of these actions can also help ensure compliance with the Soil Standard. To avoid redundancy, sections of CSVRA's SWMP that relate to OHV road and trail monitoring and sediment and erosion control will continue to be carried out annually but reported through the CSVRA's Soil Conservation Plan's Annual Compliance Report and Action Plan, instead of the SWMP Annual Report. The CSVRA SWMP will continue to be implemented, and compliance objectives will, in part, be carried out in this CSVRA Soil Conservation Plan.

Carnegie SVRA Resource Management Area (RMA) Environmental Impact Report

Beginning in 2022, Parks staff began the process of preparing an EIR to continue implementation of the Resource Management Areas (RMAs) that were first constructed at Carnegie SVRA beginning in 2009. RMAs are a vital component of the Carnegie SVRA's Roads and Trails Management program and enable CSVRA to achieve compliance with

water quality and soil conservation standards. More detail about RMAs can be found in Section 2.6 of this document, but the main purpose of the RMA program is to support responsible stewardship of the land by managing OHV use while maintaining quality OHV recreational opportunities for visitors of Carnegie SVRA. The public draft of the RMA EIR is anticipated to be released in late 2025.

Carnegie SVRA Wildlife Habitat Protection Plan

Along with this SCP, Parks staff are drafting the Wildlife Habitat Protection Plan (WHPP). The SCP and WHPP are interconnected and topics in one plan may cross-over into topics of another.

The WHPP presents the full picture of the Park's wildlife and habitat management effort and acts as a dynamic working document that provides land managers with guidance for the management of habitat, along with short- and long-term habitat goals and the methods to achieve these goals (DPR 2021b). While similarities and overlaps potentially exist between the two documents, the WHPP emphasizes conservation and improvement of habitat, whereas the SCP focuses on sustainable soil resource management.

1.4 California Environmental Quality Act (CEQA) Compliance

The SCP identifies resource objectives along with general types of projects and/or actions that can or will be taken to ensure progress in meeting the SCP objectives. If discretionary projects or actions are subsequently carried out, State Parks will follow Department procedure for meeting CEQA compliance. Once a project or action has been selected for implementation, it will undergo CEQA review at that time using the State Park's project evaluation process.

1.5 Update Cycle and Approval Process

To ensure the document remains consistent with the BAS, Department procedure aims to update the SCP every 5 years. Each revision will encompass soil conservation planning, management, and monitoring efforts in the SVRA over the next five years. Updates will include a summary of conservation efforts at the SVRA since the previous SCP revision and a description of goals and objectives for the next five years. The update will reflect changes to land cover, land use, erosion control, and disturbance, as well as land acquisitions, and updates to monitoring protocols or technology. SCP updates will undergo a review by Natural Resource Division (NRD) to ensure BAS was applied, then subsequently approved by the OHMVRD.

1.6 Adaptive Management Strategy and Best Available Science

Adaptive management provides a scientific framework to address uncertainty or disagreement in resource planning and management. Adaptive management is a

fundamental component of implementing the BAS in natural resource management (DPR 2021b). Adaptive management includes assessing existing conditions, developing objectives based on those conditions, identifying management actions, and monitoring these actions, which allows evaluation and adjustment of practices. The steps of the adaptive management process are interdependent, with a clear connection between the management questions, operations goals, scientific hypotheses, and findings/inference. The process relies on comprehensive and transparent treatment of scientific information.

Each SVRA SCP clearly and transparently documents the steps of adaptive management, including the use of an initial assessment, documentation of management actions via the maintenance plan, and monitoring. Sections 3 through 7 provide information on natural resource planning for each step of the adaptive management process.

2.0 Carnegie SVRA Setting and Existing Conditions Assessment

2.1 Location

CSVRA is located in unincorporated Alameda and San Joaquin Counties, approximately 60 miles southeast of San Francisco, 15 miles east of Livermore, and 12 miles southwest of Tracy (Figure 1). Access to CSVRA is via a paved, two-lane county road named Corral Hollow Rd (County Road J2) in San Joaquin County and Tesla Road in Alameda County; visitors may access this roadway from Interstate 580 in either county. The location of CSVRA primarily attracts visitors from the Bay Area and Central Valley regions, although OHV-user attendance is not limited to those areas.

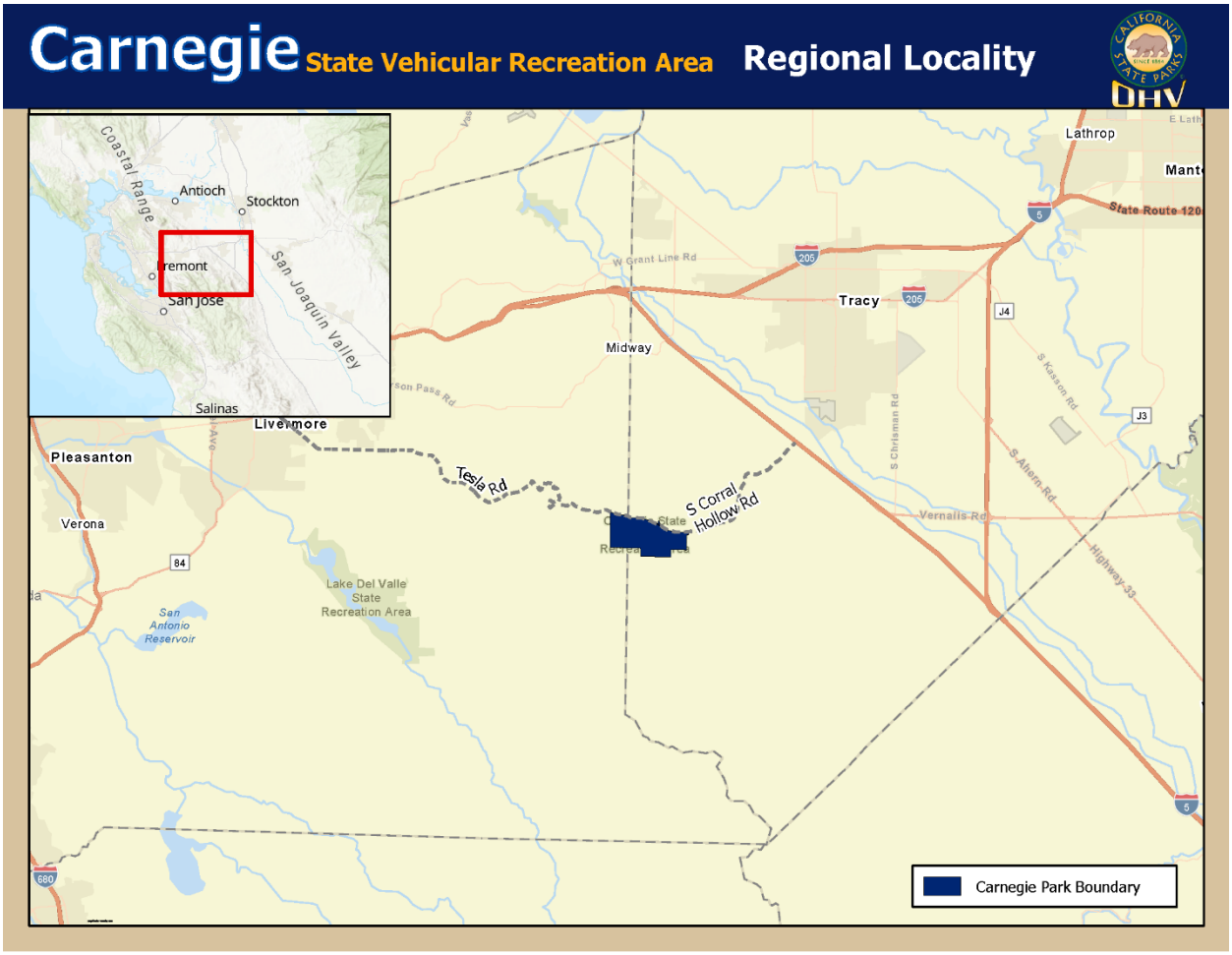

Figure 1. Regional Locality Map of Carnegie SVRA

2.2 History and Land Use

Carnegie SVRA and the land immediately surrounding it has seen a variety of land uses over the years. The Corral Hollow Canyon, where Carnegie resides, has a rich history. A detailed narrative of the history and variety of land uses in the canyon can be found in the Carnegie General Plan (DPR, 2024). An overview of these details is discussed below in context of historical land use and management.

Carnegie SVRA is located within the Diablo Range, which is considered the approximate boundary between the Native American people of the Northern Valley Yokuts and the Ohlone/Costanoan peoples from the East Bay (Levy, 1978; Wallace, 1978). Evidence of Native American occupation has been documented in Corral Hollow Canyon. The oldest north-south trail in the interior of Spanish colonial Las Californias (1769-1822) passed through Corral Hollow Canyon, used by Spanish and Mexican vaqueros and later by miners during the California Gold Rush (1848-1855) (Williams, 1970). Ranching endeavors have been recorded as early as 1846 in the canyon and continue to be an economic pursuit on privately owned lands surrounding much of CSVRA. California's first coal mining operation began in the nearby DPR-owned Tesla mine parcel when a coal seam was discovered in 1855, four miles to the west of the present-day SVRA (Mosier and Williams, 2002). The development of the Tesla mine and its operations led to the creation of several townsites and businesses in Corral Hollow Canyon prior to the existence of CSVRA, including clay, coal, sand, and manganese mines, industrial brick and pottery operations, lime kilns, gravel quarries, and transportation networks such as the Alameda and San Joaquin Railroad Company. The Graner Hotel, the bakery, and the Carnegie Brick and Pottery Works operations were all located within present-day CSVRA, where remnants have been preserved and can still be viewed today. A series of floods, fires and bank failures led to the eventual failure of business ventures and townsites in the canyon by 1911. Mining efforts were attempted and failed throughout the decades until the final efforts ceased in the 1960s, but the Carnegie Brick and Pottery Works would be the inspiration for the eventual namesake of present-day CSVRA.

Figure 2. Photo of informal OHV use at what is now Carnegie SVRA, circa 1940s.

2.2.1. OHV Recreation Prior to State Ownership:

The area was first informally used by OHV motorcyclists as early as the 1920s (Figure 2). In 1970, John Brillisour, Lee Peterson, and others purchased the property and established the Carnegie Cycle Park (Figure 3). Carnegie Cycle Park was well known among the motorcycle community and was the sanctioned site for the Northern California Trans-AMA International Motocross by the American Motorcycle Association

Figure 3. Historic photo of Carnegie Cycle Park, prior to DPR ownership.

from 1970 to 1976, when the owners of the Cycle Park decided to withdraw from hosting the event. The State of California purchased the present-day SVRA using OHV Trust Funds in 1979, and it continues to be used as an OHV recreation area today (ASC, 2010).

2.3 SVRA Setting

2.3.1. Surrounding and Regional Land Use

Carnegie SVRA is managed by the Diablo Range District of California State Parks. Lawrence Livermore National Laboratory (LLNL) Experimental Test Site (Site 300) property lies directly north of Carnegie SVRA. The Alameda-Tesla Property, an unclassified State Parks unit that is not currently open to the public, is located to the west of the SVRA. A few additional DPR properties are also located to the west of the SVRA, on both the northern and southern sides of the road. Open spaces, ranches and rural residences are located to the east and south. Large, private ranches reside to the northwest and southeast of the SVRA. The land use surrounding CSVRA is depicted in (Figure 4).

Northeast of Carnegie SVRA, the 99.2-acre Corral Hollow Ecological Reserve borders Site 300, west of Corral Hollow Rd. This CDFW-operated reserve provides key habitat for an array of reptile and amphibian species and preserves riparian habitat for wildlife.

SRI International (SRI), which was originally part of the Stanford Research Institute, once operated as an explosive testing facility, southwest of the SVRA. This facility is no longer in operation and now belongs to a private landowner. The SRI property is accessed through an easement gate off Corral Hollow Road in Tracy. The Waterfall Canyon area of Carnegie SVRA, which is not open to OHV recreation, lies southeast of SRI Road. SRI Road is also known as Carnegie Ridge Road, appearing on maps as early as 1909 under this name.

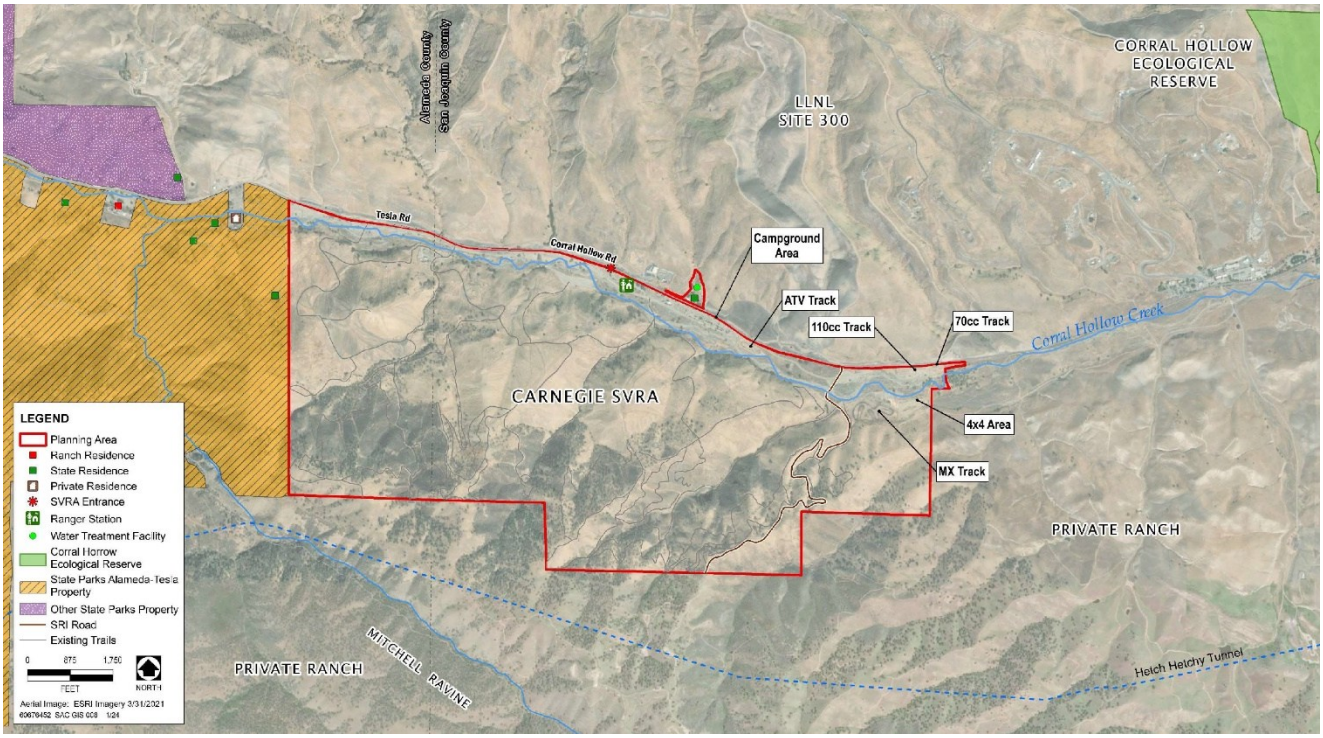

Figure 4. Map depicting surrounding land use in the vicinity of CSVRA.

A tunnel used by the Hetch Hetchy Project passes beneath the upper reaches of Mitchell Ravine, a southern tributary to Corral Hollow Creek. The Hetch Hetchy Project was undertaken to provide water to a growing San Francisco and the surrounding Bay Area. The project involved damming Hetch Hetchy Valley near Yosemite, building a canal to convey the water across the San Joaquin Valley, and constructing the Coast Range Tunnel. The Mitchell Shaft, located south of Carnegie SVRA in Mitchell Ravine, serves as an access point for the primary tunnel. Hetch Hetchy Water and Power, a department of the San

Francisco Public Utilities Commission, owns and manages the shaft and properties within Mitchell Ravine.

2.3.2. SVRA Site Description

Carnegie SVRA comprises 1,533 acres. More than 1,400 acres are open to the public for various recreational opportunities but primarily focuses on off-road vehicle recreation. The park is located on the south side of Tesla Road/Corral Hollow Road and is typically accessed using the main entrance, where fees are collected at the kiosk. A maintenance entrance, operated by a remote-operated mechanical gate, is located to the west of the main entrance and leads to the Carnegie SVRA maintenance yard. Staff utilize the maintenance entrance daily, but this entrance is occasionally used by the public during special events. Within Carnegie SVRA, there are approximately 50 miles of roads and trails open to various types of motorized recreation. OHV trails are available for a range of skill levels; main trails are marked with trail name signs and indicate the level of difficulty. Off-highway motorcycles, also known as dirt bikes, are allowed on all trails. Most trails are multi-use and can accommodate both dirt bikes and all-terrain vehicles (ATVs), but some trails are not wide enough for ATVs and are only accessible by dirt bikes. Trails at Carnegie SVRA are open to two-way traffic, unless indicated on the trail head. The busy season at Carnegie SVRA has typically coincided with red-sticker season, which operated from October 1st to April 30th each year, until regulations changed in January of 2025. An OHV is issued either a red sticker or green sticker by the DMV in accordance with California Air Resource Board emission standards.

Carnegie SVRA also houses several tracks as well as a 4x4 Play Area and a trials motorcycle area. The motocross (MX) track is open to off-highway motorcycles only. Although rare, formalized competitive events are held on some weekends, resulting in periodic track closures to the public. The ATV track is open to both ATVs and dirt bikes. There are two tracks open only to dirt bikes with small engines known as the "Kids' Tracks". The 70cc kids' track is available for dirt bikes and ATVs with small engines up to 70cc displacement and offers young riders (under 14) an opportunity to practice and improve their riding skills. The 110cc kids' track, sometimes called the "beginners' track" is available for off-highway motorcycles and ATVs with small engines up to 110cc displacement. A 4x4 play area is open only to four-wheel-drive (4WD) vehicles such as trucks, jeeps and side-by-sides. This area is not open to motorcycles or ATVs. There is a small area near the 4x4 play area that is dedicated to trials bikes and gives riders an opportunity to practice their skills and control techniques on a variety of obstacles. The trials area is accessed through the additional parking area located north of the MX track.

Various special events have occurred at Carnegie SVRA historically, but the most regular and notable events are the hillclimb events. The National Championship Hillclimbs are held at CSVRA in the Spring and the State Championship Hillclimbs take place in the fall. Hillclimb events are held in an area of the park known as the Special Event Area that is

closed to the public and is opened during formal hillclimb events. The hillclimb portion of the Special Event Area is only used for professional events and receives rehabilitation after each event season to protect resources. A gate system allows trails in the hillclimb area to be closed off from the remainder of the park during events and allows riders to use the Middle Track trail system to return to the Special Event Area. Trail systems traverse the hillsides adjacent to the hillclimb area; the gate system allows these trails to be open to riders when an event is not being held. Other special events and races, such as hare scrambles, have been held at Carnegie SVRA historically and occur based on public interest.

Carnegie SVRA's main entrance kiosk is adjacent to the ranger station, where visitors can report issues or seek medical attention. A small fenced-off parking area west of the ranger station is located to the west of the kiosk to store law enforcement vehicles and OHVs for Visitor Services staff (Figure 5). An electric vehicle charging station is available for visitor use, located just north of the entrance kiosk. Visitor facilities include multiple restrooms located throughout the SVRA, day-use sites for picnicking and staging, and a campground area. The 26 campground sites each have a shade structure, fire ring, and picnic table and are open to visitors looking to camp with or without a trailer. Approximately 10% of park visitors stay overnight at the campgrounds. A concessionaire provides SVRA visitors access to purchase off-highway motorcycles and ATV parts, safety gear, and OHV accessories. Some food and drink items and minor OHV repair services are also available for purchase. Cell phone service is limited at the park, so pay phones are available at the ranger station and in the campgrounds. There is no dump station, wash rack or air pump available for public use. The park is open 365 days per year and allows OHV operation from 8AM to approximately sunset.

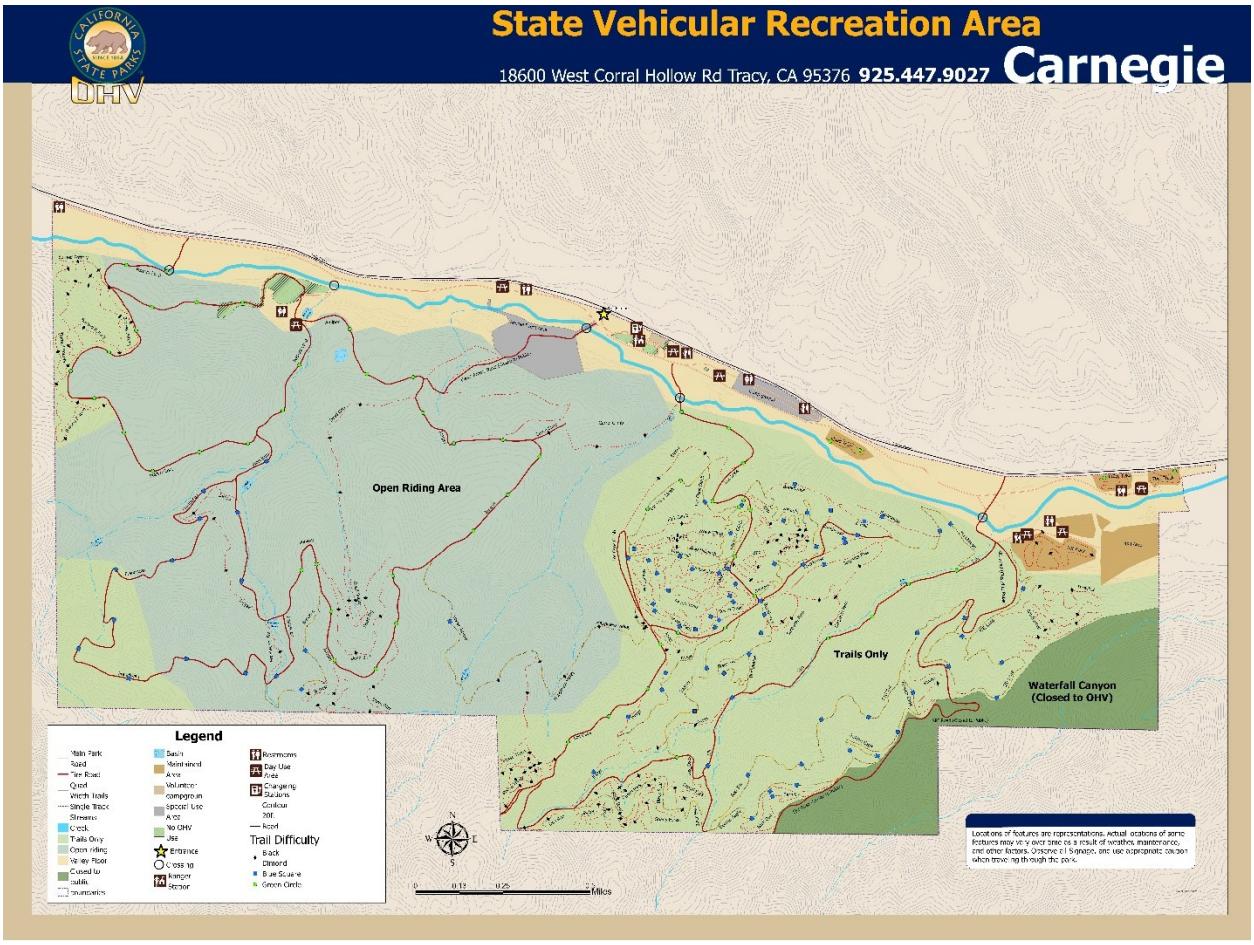

Figure 5. Carnegie SVRA Park Brochure Map, updated in 2025.

The Park straddles the San Joaquin and Alameda County line. Approximately 30% of the SVRA falls within Alameda County; the remainder is in San Joaquin County. Just over 200 of the Park's 1,533 total acreage make up the area known as 'the valley floor': an approximately 4-mile stretch that parallels Corral Hollow/Tesla Road where all the Park's facilities are housed along the native surface main park road. The main park entrance is located approximately halfway through the 4-mile-long stretch of the valley floor and is accessible by all vehicle types and street legal off-highway motorcycles. The tracks, campgrounds, concessionaire store, and various staging areas are located to the east of the main park entrance along the valley floor; additional staging areas, the Special Event Area, and the park's maintenance yard are located to the west.

The valley floor provides an area for beginner skill levels to recreate but is also open to non-OHV users who may visit the Park. The floodplain of Corral Hollow Creek comprises the valley floor and may be affected by creek flow during large storm events. The historic flow path of the creek and riparian buffer area are delineated with fencing to prevent OHV users from recreating in sensitive habitat and to allow the riparian corridor within Carnegie SVRA to revegetate to improve floodplain function.

Figure 6. Photo of steep hills at Carnegie SVRA. This area is now operated as a trails-only riding area.

The remaining acreage of the park, known as the hills, is made up of hilly terrain with elevations up to almost 1,800 ft and slopes ranging from 15-70% (Figure 6). There are five entrances to the hills from the valley floor that are wide enough for vehicle use that serve as access roads and provide emergency and staff vehicle access through approximately 14 miles of trails in the hills. The access roads (Kiln, Los Osos, Juniper, Franciscan, and Pottery) are rated for beginner riders with a few segments of the trails rated for intermediate riders. Beyond the access roads, the trails are mainly intermediate to advanced rider skill level. An approximate breakdown of the skill level of OHV recreation at Carnegie SVRA is

30% beginner, 30% intermediate and 40% advanced. The steep slopes of the hillsides at Carnegie SVRA provide a challenge for OHV users, and the park is historically known for its hilly terrain. Carnegie SVRA is known as “the Home of the Verti-cross” for the hillclimb events that have been hosted at Carnegie SVRA since before it was a designated OHV recreation area. Despite the more advanced skill level that is required to access the entirety of the park, Carnegie SVRA is a popular destination for beginner skillsets.

Various organizations routinely utilize Carnegie SVRA as a location to host classes and workshops. San Joaquin and Alameda County Fire Departments sometimes hold training workshops for emergency personnel to act out rescue scenarios. Federal agencies have contracted companies to host 4x4 off-road driving training for their staff in the 4x4 area at Carnegie SVRA. One of the concessionaires for Carnegie SVRA hosts guided tours on OHV equipment that they rent through Carnegie SVRA in a class setting. The Police Activities League (PALs) has historically hosted dirt bike safety training for local youth at the SVRA.

2.3.3 Carnegie SVRA Visitation

Attendance at Carnegie SVRA was consistent from 2016 to 2021 with an average of 59,183 people a year. Surprisingly, 2019 had the lowest attendance; not 2020 when Carnegie SVRA was closed for a month before visitation restrictions were implemented for COVID-19

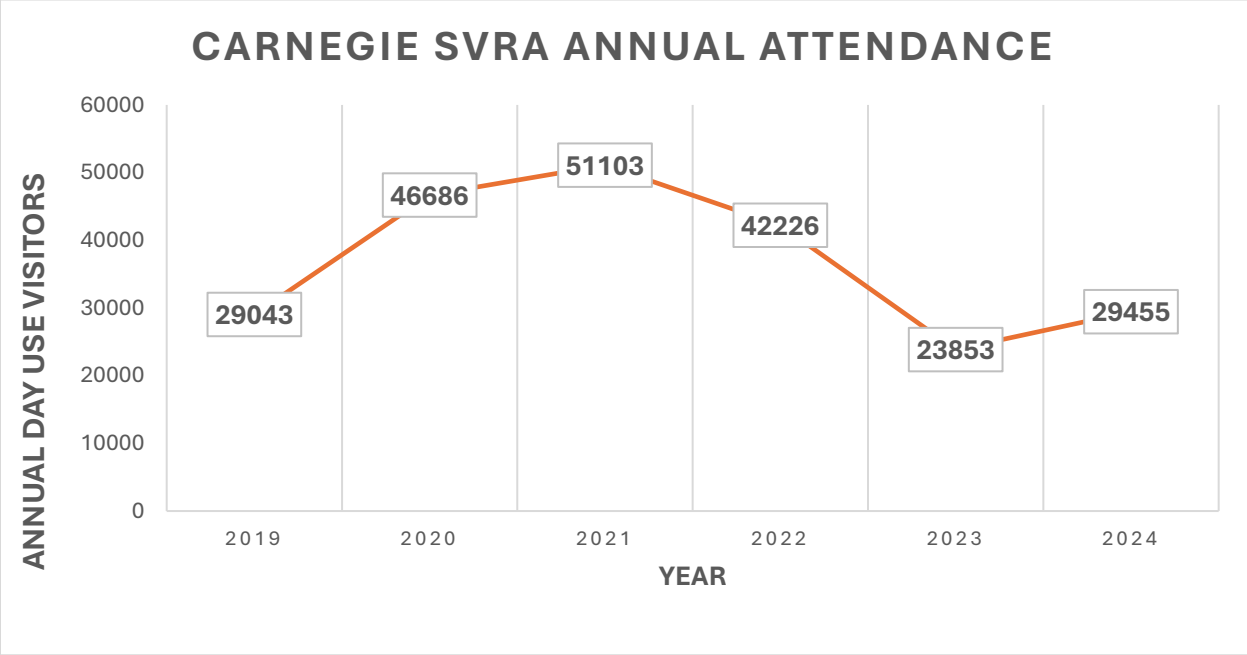

Figure 7. Annual day-use attendance at Carnegie SVRA from 2019 to 2024.

(Figure 7). While many activities and venues remained closed in 2020 and 2021 due to risk of spreading COVID-19, Carnegie SVRA provided a place for social-distanced recreational activity after a brief closure in early 2020.

Carnegie SVRA visitation typically peaks between October and April, corresponding with both the red-sticker season and the cooler months of the year. Visitation declines after April, when green-sticker season, along with an increase in the daily temperature, would begin (Figure 8).

Starting in January of 2025, the regulations around red-sticker and green-sticker seasons for OHV use were retired, and all previously red-stickered OHVs were grandfathered into green-sticker OHVs and permitted to recreate year-round. This state policy change may result in an increase in visitation during what was previously considered the slow season at Carnegie SVRA, although the high temperatures CSVRA experiences in the summer months may deter some visitors from recreating during this time.

2.3.4. Past Soil Conservation Efforts by the SVRA

When DPR acquired Carnegie Cycle Park in the late 1970s, the EIR acknowledged that trail management issues would need to be addressed under the new supervision. Management took immediate action to identify existing soil and water problems of concern to research techniques to correct them. Control methods such as revegetation, erosion control devices, or sediment detention devices were proposed to remedy these issues. In the drafting of the 1981 Carnegie SVRA General Plan (DPR, 1981), DPR recognized that some

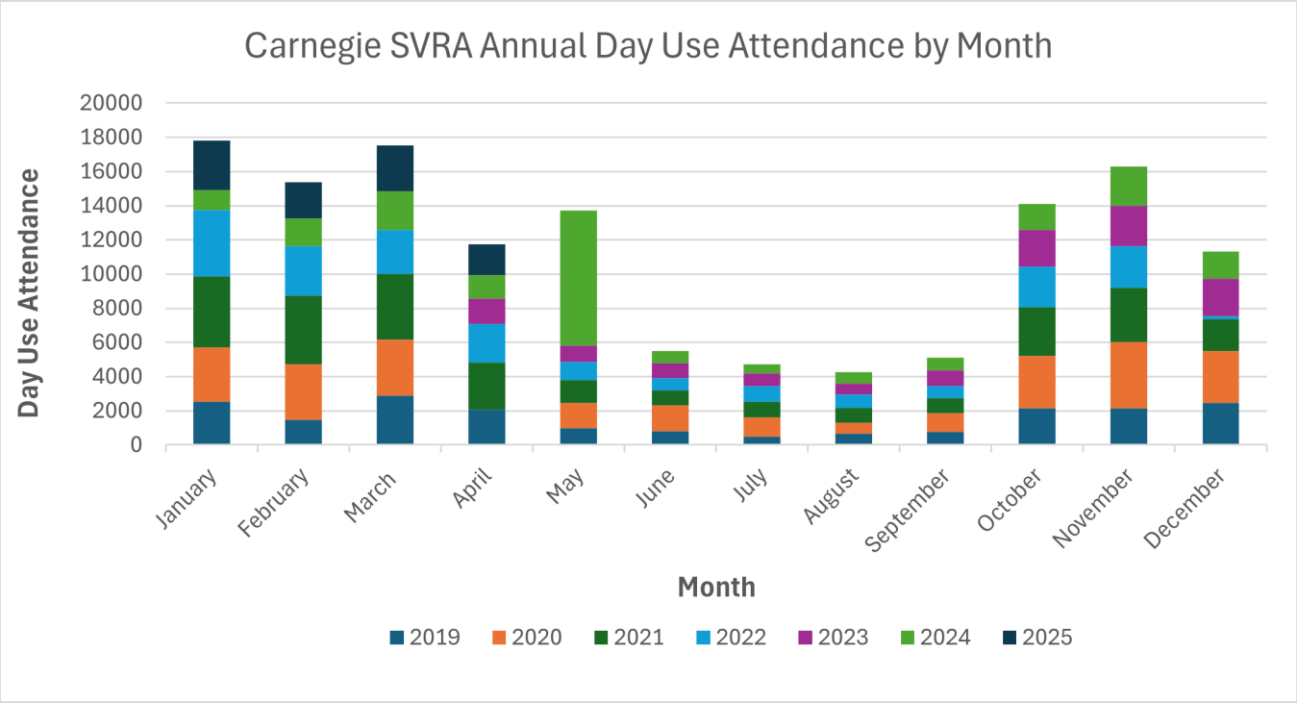

Figure 8. Average attendance at Carnegie SVRA by month from 2016 to 2024. Note: April data is skewed because the park was closed during April 2020 due to COVID-19.

areas of the park needed to be more restrictive to OHV-use. This prompted management to create distinctions between “trails only” areas and areas where users would not be restricted to a trail system. The southern hills of the SVRA were designated as “trails only” riding due to the friable soils and sensitive habitat types present; the northern hills were designated as “open-riding”, where OHV use were free to recreate (Figure 9). A sound resource management program would be required to address the problems that would only worsen if left untreated. An Erosion Control Plan was developed for the newly acquired Carnegie SVRA and was adopted in 1985.

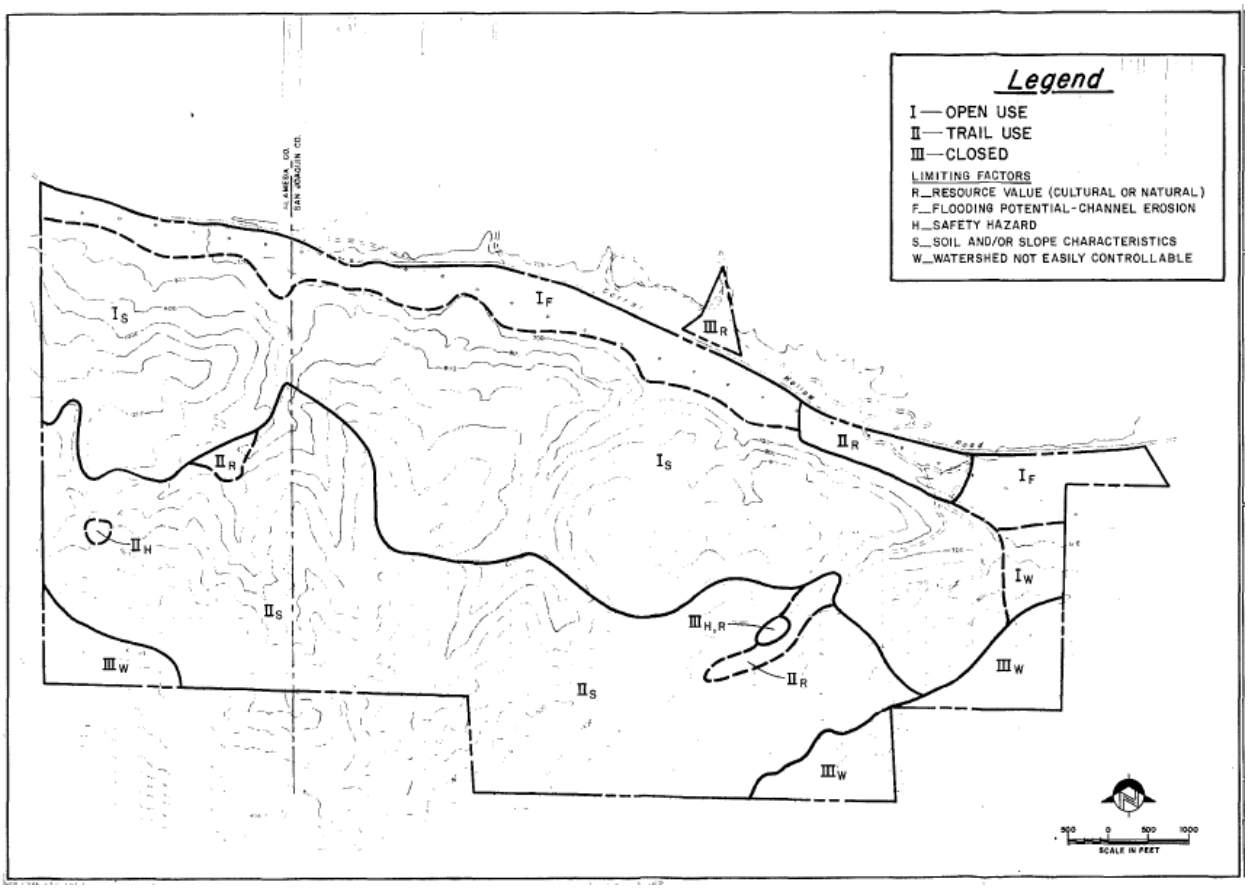

Figure 9. Level of use map from the 1981 Carnegie SVRA General Plan. Northern hills are available for open riding and southern hills are limited to trails only riding; various closure areas are indicated.

In 2004, DPR hired consultants to conduct a 2-year assessment of the Corral Hollow watershed to provide OHMVR Division, Parks staff and community stakeholders with an understanding of the historical occurrences that have shaped the watershed. This study would assist management in developing a plan to proactively assess and improve water quality within the SVRA, while also ensuring compliance with the CWA and the NPDES WDRs for stormwater discharges from Small MS4s, also referred to as the SWRCB Phase II Small MS4 Permit. The findings from the study were used to develop recommendations to reduce future erosion and sediment load into Corral Hollow Creek originating from

Carnegie SVRA, while also maintaining quality OHV recreational opportunities and preserving the historical value of the area. The findings from the Corral Hollow Watershed Assessment (DPR, 2007a) were used to develop the DPR OHV Best Management Practices (BMP) Manual in 2007 (DPR, 2007b), which provided guidance for selecting and implementing BMPs that would reduce potential impacts to water quality from California State Parks facilities but was specially compiled and written to be "SVRA-specific" for use at Carnegie SVRA.

One solution that has proven effective in the short term to combat the off-trail riding problem at Carnegie SVRA over the past 35 years has been the permanent closure of some areas and the rehabilitation of many others, typically based on the severity of the problem. However, this method did not consider the need for a connected trail system and lacked a means to provide proper education to the public, enforcement of the rules, and/or physical barriers used to prevent incidences of off-trail riding from recurring. Over time, Parks staff have come to better understand the local site conditions and effectiveness of various erosion control practices at Carnegie SVRA.

After several successful rehabilitation projects were developed and implemented, it was recognized that there was a need to consolidate the years of experience and outline a strategy to provide more substantial, environmental improvement projects. A new strategy was developed and introduced as the Trail Management Program at Carnegie SVRA, also known as the Trails Program. The Trails Program addressed a variety of trail issues by combining the years of rehabilitation and park management experience, along with components from the OHV BMP Manual, into one cohesive approach aimed at reducing voluntary trails, increasing vegetation cover, improving water quality, and conserving and improving habitat, all while providing a quality recreational experience for the OHV user. The Trails Program was adopted in 2009 with the goal of protecting the health of the soil and developing Carnegie's trail system into a well-managed network of trails. The program derives key principles of the plan from lessons learned from past rehabilitation projects in combination with a three-tiered approach of using physical barriers, visitor education and law enforcement patrols to ensure that off-trail riding in newly rehabilitated areas does not reoccur. The approach to these new rehabilitated riding areas is long term. Areas are generally rehabilitated within one or two seasons, but on-going monitoring and recurring maintenance as needed are mandatory to ensure sustainability. This approach was the method that ultimately led to the formation of RMAs within Carnegie SVRA, which are described in Section 2.6, Management Units and Resource Management Areas. Additional information about the RMAs can be found in the Carnegie SVRA RMA EIR, discussed in Section 1.4.

2.4 Existing Conditions

2.4.1 Topography

Carnegie SVRA is made up of northeast-trending ridges with steep canyons and the Corral Hollow Creek floodplain. Corral Hollow Creek flows from west to east into the San Joaquin Valley. The hills rise abruptly from the floodplain with very steep slopes. A narrow flat floodplain corridor characterized by riparian habitat parallels Corral Hollow Creek on the south side of Corral Hollow Road/Tesla Road; the surrounding hills support grasslands, scrub, and oak woodlands.

The topography at Carnegie SVRA varies widely, ranging from approximately 600 feet above mean sea level along the eastern portion of Corral Hollow Creek (near the eastern boundary of the SVRA) to approximately 1,760 feet above mean sea level on the highest peaks of the park. Generally, hills with moderate to steep slopes trend down into narrow valleys, and slope down to more gently sloping and flat land along Corral Hollow Creek. Rock outcroppings are present in many locations throughout CSVRA.

2.4.2 Climate

The climate of the Corral Hollow watershed consists of mild to hot, dry summers and mild, wet winters. Temperatures are generally coolest in January and warmest in July. Humidity is highest during the winter months and becomes quite low during the hot summer months. Because of the summer's low humidity, the evaporation rate is high during the growing season. Therefore, soil moisture reserves are depleted rapidly during the summer months. Humidity is also highest in the morning and lowest in the afternoon. Most of the annual rainfall the SVRA receives occurs between November and March. The mean annual precipitation received by the SVRA is 12.7 inches/32.3 centimeters.

2.4.3. Air Quality

Carnegie SVRA is located in Alameda and San Joaquin Counties. These counties are part of the San Francisco Bay Area Air Basin (SFBAAB) and San Joaquin Valley Air Basin (SJVAB), respectively. The clear skies and relatively warm conditions that are typical in summer can combine with localized air pollutant emissions to elevate ground-level ozone levels. Air quality standards for ozone generally are exceeded when conditions remain relatively stagnant for periods of several days during the warmer months. Weak wind-flow patterns combined with strong inversions substantially reduce normal atmospheric mixing. Key components of ground-level ozone formation are sunlight and heat; therefore, substantial ozone formation occurs only during the months from late spring through early fall.

The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. Precipitation and fog tend to reduce or limit concentrations of some pollutants. For instance, clouds and fog

block sunlight, which is necessary to fuel photochemical reactions that form ozone. Because carbon monoxide (CO) is partially water soluble, precipitation and fog also tend to reduce CO concentrations in the atmosphere. In addition, respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM10) can be washed from the atmosphere through wet deposition processes, such as rain. Between winter storms, however, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions, which can result in a higher concentration of these air pollutants (e.g., CO, PM10).

PM10 consists of particulate matter emitted directly into the air, such as soot and smoke from mobile and stationary sources, natural windblown dust, as well as dust generated by human activities, such as construction operations, and fires. Many of the trails and riding areas at CSVRA have loose gravel, silt, and clay particles present within them. When OHV use disturbs loose soils during the dry months, fugitive dust (up to PM10) may become airborne. The presence of geographic barriers and inversions that result in a stable atmosphere causes particulate matter to accumulate and achieve elevated concentrations, thus reducing visibility and increasing periods with potentially adverse health effects. Generally, the periods of greatest concern for elevated PM10 concentrations (the summer months) are not the same as the periods of greatest OHV activity at Carnegie SVRA (Section 2.3.3). High average daily temperatures in the summer often result in lower public use at Carnegie SVRA. Attendance at Carnegie SVRA use tends to peak between late fall into late spring, when soil still retains some moisture and loose particles of sediment are less likely to become airborne. CSVRA implements various dust management strategies to reduce fugitive dust generation, which are detailed in Section 4.0.

2.4.4. Hydrology & Watersheds

Carnegie SVRA is located within the Corral Hollow watershed. The watershed is defined as dendritic; small headwater tributaries converge in the upper watershed to form the main stem of Corral Hollow Creek. Additional tributaries contribute to the creek as it flows toward the outlet of the watershed. Corral Hollow Creek is the main drainage for the 28,200 acre (11,420-hectare) watershed; the SVRA accounts for 5.5% of the watershed. The creek infiltrates the soil in the western reaches of the San Joaquin Valley downstream of the Park and has no surface connection to the San Joaquin River. The Corral Hollow watershed is flanked by the Arroyo Seco watershed to the west, Lone Tree watershed to the south, Deep Gulch Creek watershed to the east, and a small unnamed sub-watershed of the San Joaquin River to the north. The Corral Hollow watershed spans the Alameda/San Joaquin County line.

The Corral Hollow watershed exhibits a unique rainfall-runoff relationship that is largely influenced by low intensity rainfall, the steepness of the canyon slopes, and the varied infiltrative nature of the surficial soils. The hydrological characteristics of the site were

simulated using the EPA's Storm Water Management Model (SWMM); detailed results from this simulation are available in the Corral Hollow Watershed Assessment (DPR, 2007a). In general, the model predicted that 1 to 2% of the average annual rainfall converts to runoff, 3 to 4% is lost through evapotranspiration, and the remaining 95% infiltrates.

Numerous anthropogenic activities have played a role in shaping the watershed. One of the most significant anthropogenic impacts can be attributed to the extensive mining activities that were conducted in the canyon. Over 100 years of extensive mining activities have created various impacts to the watershed; one of the most notable is the formation of a number of waste-rock piles located upstream of the SVRA along Corral Hollow Creek, particularly in the neighboring DPR-managed Tesla property (DPR, 2007a). Other human-influenced landscape manipulations include an extensive grazing history, which impacted the banks of Corral Hollow Creek and the vegetation in the riparian corridor. Open grazing on neighboring ranch lands sometimes led to overgrazing, leaving slopes of poor soil exposed and devoid of vegetation.

Corral Hollow Creek is susceptible to strong flows after heavy rains, which may cause flooding during significant storm events. A 2009 update to the FEMA Flood Insurance Rate maps of the 100-year floodplain for Corral Hollow Creek covered the San Joaquin County portion of the SVRA, only accounting for a small portion of the SVRA that falls within the 100-year floodplain for the creek. The remainder of the SVRA is above the 500-year floodplain level (DPR, 2024). The strong flows that are channeled through the valley floor of the SVRA have a long history of damaging infrastructure in the canyon, including the flood of 1911 that played a part in the demise of the Carnegie Brick and Pottery Company.

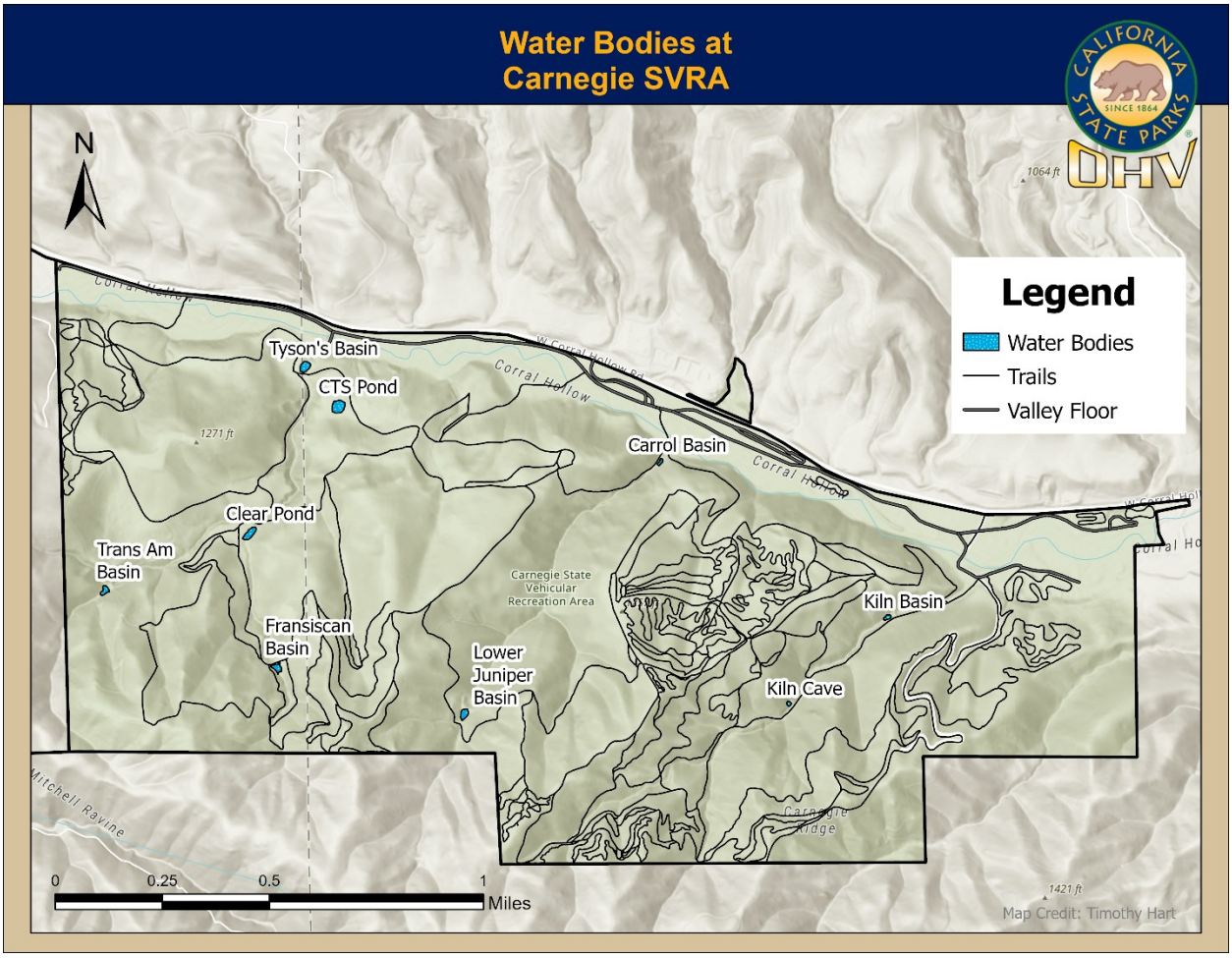

Figure 10. Map of water features within Carnegie SVRA.

CSVRA has seven waterbody features that are implemented to control erosion and sediment transport as needed (Figure 10). The three main drainages in the park empty into sediment basins before discharging stormwater runoff into the creek. Tyson's Pond, Carrol's Pond, and Kiln Pond sediment basins receive annual or as-needed maintenance to ensure they function properly to reduce impacts to water quality. Two waterbodies are naturally occurring and not implemented for sediment control purposes; these disconnected waterbodies support wildlife habitat at CSVRA. These features are discussed below, separated according to sub-watershed (Figure 11).

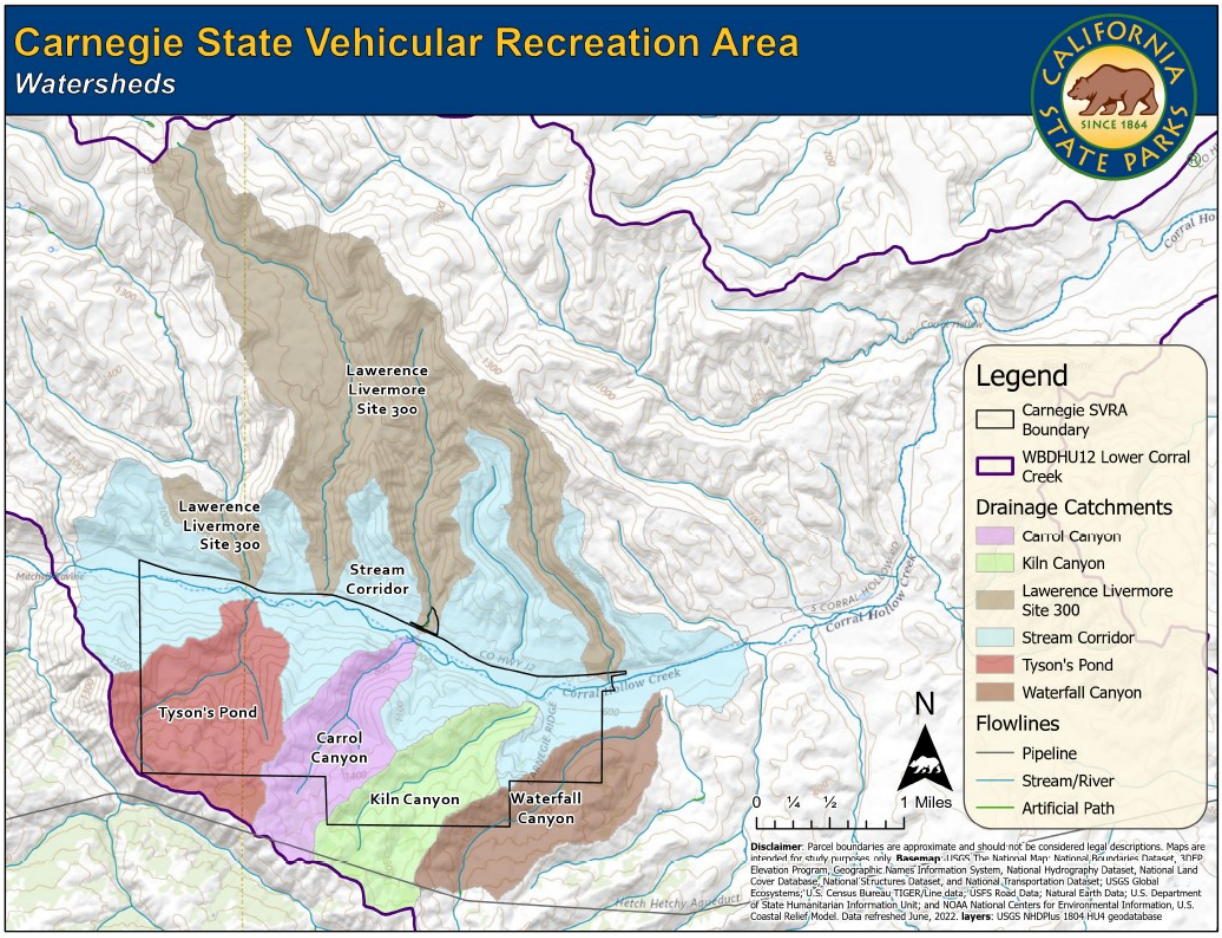

Figure 11. Map depicting sub-watersheds for Carnegie SVRA.

Tyson's Pond

Tyson's Pond, also known as Tyson's Basin, was constructed along with the maintenance yard area upon DPR's acquisition of Carnegie Cycle Park to reduce sediment load into Corral Hollow Creek. Tyson's Pond was constructed adjacent to and partially within a historic mine shaft and tailings pile, which are cultural features that are preserved along the southwest edge of the basin. The drainage area that feeds Tyson's Pond is 460 acres from the northeastern boundary of the park to the Carnegie maintenance yard. Runoff flows through a series of sediment ponds before being captured by Tyson's Pond, where stormwater is ponded to allow for sediment to slowly settle out before ultimately discharging into Corral Hollow Creek. Franciscan Pond is located in the upper reaches of the Tyson's Pond drainage area, approximately 3,750 feet upstream of Tyson's Pond. This pond receives a smaller influx of sediment when compared to other ponds in Carnegie SVRA and dense vegetation tends to grow in this feature. TransAm Basin is within the

Tyson's Pond sub-watershed but falls outside of the southwestern boundary of CSVRA and is not operated as a sediment pond. Clear Pond was originally used as a cattle stock pond during the ranching era in the canyon but was implemented as a sediment capture feature upon DPR's purchase of Carnegie Cycle Park that was designed to fill with sediment and top over the northern embankment wall at capacity. Clear Pond is the middle pond of the series that drains into Tyson's Pond, residing downstream of Franciscan Pond and TransAm Basin.

Carrol Canyon

Carrol's Pond is the main sediment basin located at the outlet of the Carrol Canyon drainage area, located approximately 200 feet south of Corral Hollow Creek. The Carrol Canyon drainage area extends 328 acres from the southeastern boundary of the park to the entrance of Carnegie SVRA. The runoff accumulated in this drainage flows into CSVRA and through Lower Juniper Pond and/or Carrol Canyon Pond before discharging into the main stem of the creek. Lower Juniper Pond is located approximately 4,090 feet upstream of Carrol Canyon Pond at the intersection of Happiness Valley and Lower Juniper Trail. Lower Juniper Pond was originally constructed as a livestock pond but now collects runoff from several ephemeral tributaries within the upper 110 acres of the Carrol Canyon drainage area. The pond does not have a corrugated metal pipe riser, outlet structure, or stabilized spillway. Retained flows in Lower Juniper Pond are removed through infiltration and evaporation. Runoff that is collected downstream of Lower Juniper Pond, travels through the drainage of Carrol Canyon, a black diamond rated trail that generally does not receive much maintenance due to the difficulty of access in the canyon. Carrol Canyon trail weaves along the lower parts of the Carrol Canyon drainage area before providing an exit for OHV users shortly before the inlet to Carrol Canyon Pond, which is demarcated to restrict OHV's from entering the basin.

Kiln Canyon

The Kiln Canyon drainage area encompasses 385 acres from the northeast boundary of the park to the intersection of SRI Road and Kiln Canyon trail. Kiln Canyon Pond is located approximately 1,500 feet south of Corral Hollow Creek. About 90% of the runoff generated in the Kiln Canyon drainage area is routed through Kiln Canyon Pond before entering the main stem of the creek (DPR, 2007a). This basin receives significantly less sediment influx than the other two basin features in the park, likely due to the sustainable trail network incorporated into the RMAs within Kiln Canyon.

Waterfall Canyon

Waterfall Canyon, on the eastern boundary of the SVRA, is also a main tributary to the creek but does not have a mechanism to filter sediment from stormwater runoff before discharging into Corral Hollow Creek. This area is not open to motorized recreation.

Disconnected Water Features

Two other small waterbodies exist within the park that are not connected to the drainages or sediment basins. CTS Pond is a small, seasonal pond located near the stockpiles on Juniper Trail. Lime Kiln Cave Pond is a small pond that flows from a spring at the mouth of Lime Kiln Cave, a gypsum cave that was drilled during the period of mining in the canyon.

2.4.5. Geology

Local and Regional Geology

Carnegie SVRA is located within the Diablo Range, which is part of the Coast Ranges that comprise the Coast Range Geomorphic Province. The Coast Ranges are characterized by northwest trending ridges separated by river valleys, subparallel to the San Andreas Fault. The Coast Ranges were created by folds and faults that resulted from the collision of the Pacific and North American Plates and subsequent strike-slip faulting along the San Andreas Fault zone. Rocks throughout the Diablo Range consist of unique sedimentary, metamorphic and igneous rocks associated with the Franciscan Complex, interpreted as remnants of an accretionary complex related to the active subduction that occurred off the western margin of North America in the Mesozoic and early Paleogene. In the vicinity of Carnegie SVRA, Franciscan Complex rocks contact the Great Valley sequence along the Tesla Fault, which resides a few miles south of the SVRA and is classified as semi-active (Meltzer et al, 1987). Within CSVRA, the rock assemblages include marine sedimentary and

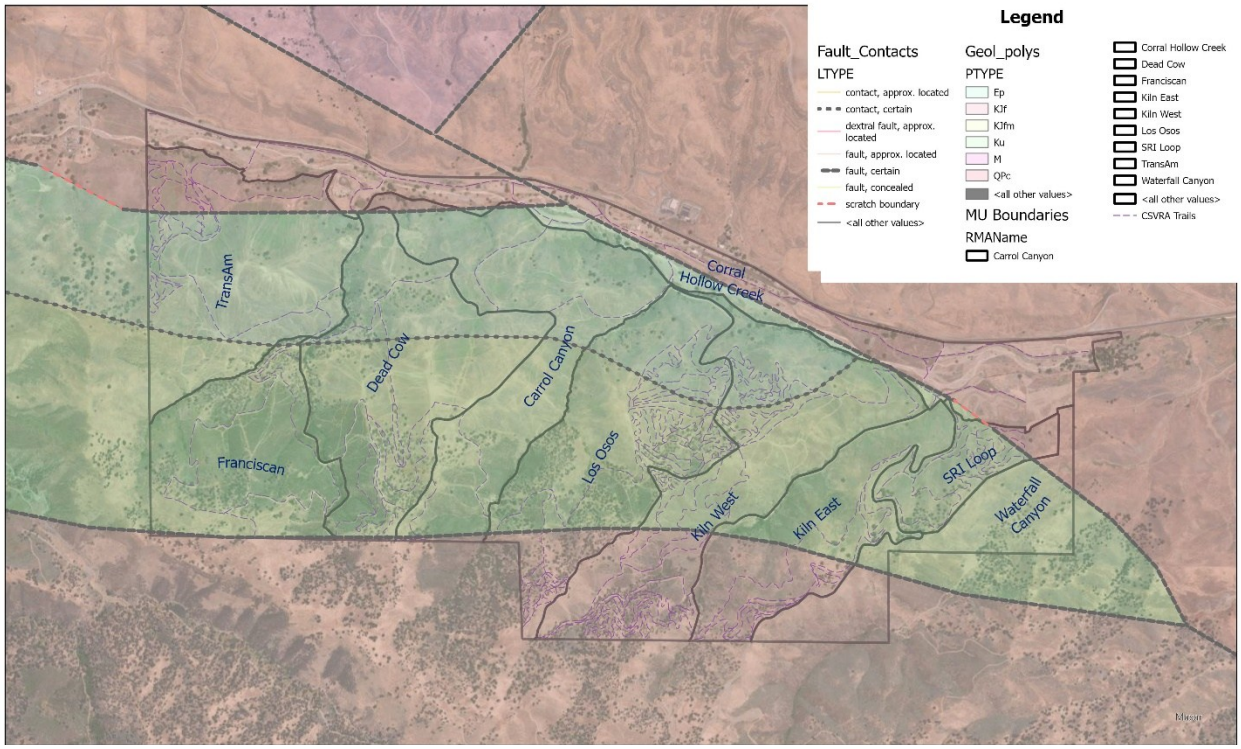

Figure 12. Local geology map for Carnegie SVRA.

metasedimentary rocks from the Upper Cretaceous (Ep) overlain by marine sedimentary rocks from the Paleocene (Ku), illustrated in Figure 12. The oldest rock assemblage present in CSVRA is Cretaceous-Jurassic age Franciscan Complex (KJf), composing the southernmost portion of the park beneath the Paleocene marine sedimentary rocks. The northern portion of the park is composed of Pliocene to Pleistocene age continental sedimentary deposits (QPc), mostly loosely consolidated, that lie unconformably over Ep. Outside of Carnegie SVRA to the north, Miocene age marine sedimentary rocks lie uncomformably over the younger QPc deposits. Approximately 4,000 meters south of CSVRA, Franciscan Complex blocks form a chaotic mélange in a matrix composed of fragmented and sheared sedimentary and metamorphic rock, likely influenced by activity on the Tesla fault, which truncates older fault surfaces of the Coast Range thrust-fault system (Raymond, 2019). Local and regional geology and tectonics is discussed in more detail in Appendix 2.4.5 – Geologic and Seismic Assessment.

2.4.6. Soils

Soil forms the basis for ecosystems, performing vital functions such as sustaining plant and animal life, regulating and partitioning water and solute flow; filtering, immobilizing, detoxifying, buffering, storing and cycling nutrients; and providing physical support. Soil properties, determined by the properties of the underlying rock, climate, living organisms, topography, and time, influence the living systems that occur above and below ground surface.

This Section describes soil characteristics in Carnegie SVRA with respect to the following:

- Soil units
- Soil Properties
    - Texture
    - Drainage Class
    - Depth to restrictive layer
    - Flooding/ponding frequency
- Soil chemical and physical characteristics
- Soil suitability and limitations for use
- Wind and water erosion hazards

Seventeen different soil types are found within Carnegie SVRA; descriptions of each from the Soil Survey Geographic (SSURGO) database (USDA, 2024) can be found in Figure 13 of Appendix 2.4.6. Soil Types and Properties Table, corresponding to Figure 13. On the western end of the SVRA, soils are classified using the Alameda County SSURGO database descriptions up until the San Joaquin County line. From the Alameda County line to the eastern boundary of the SVRA, soils are classified using the San Joaquin County SSURGO database. The soil properties differ considerably between the two counties in the SSURGO database. The mapped soil units on Figure 13 represent areas within Carnegie SVRA

dominated by one or more major kinds of soil, which may be a phase of a soil series, or a complex composed of two or more soil types combined in an intricate pattern or small scale that they cannot be shown separately on the map.

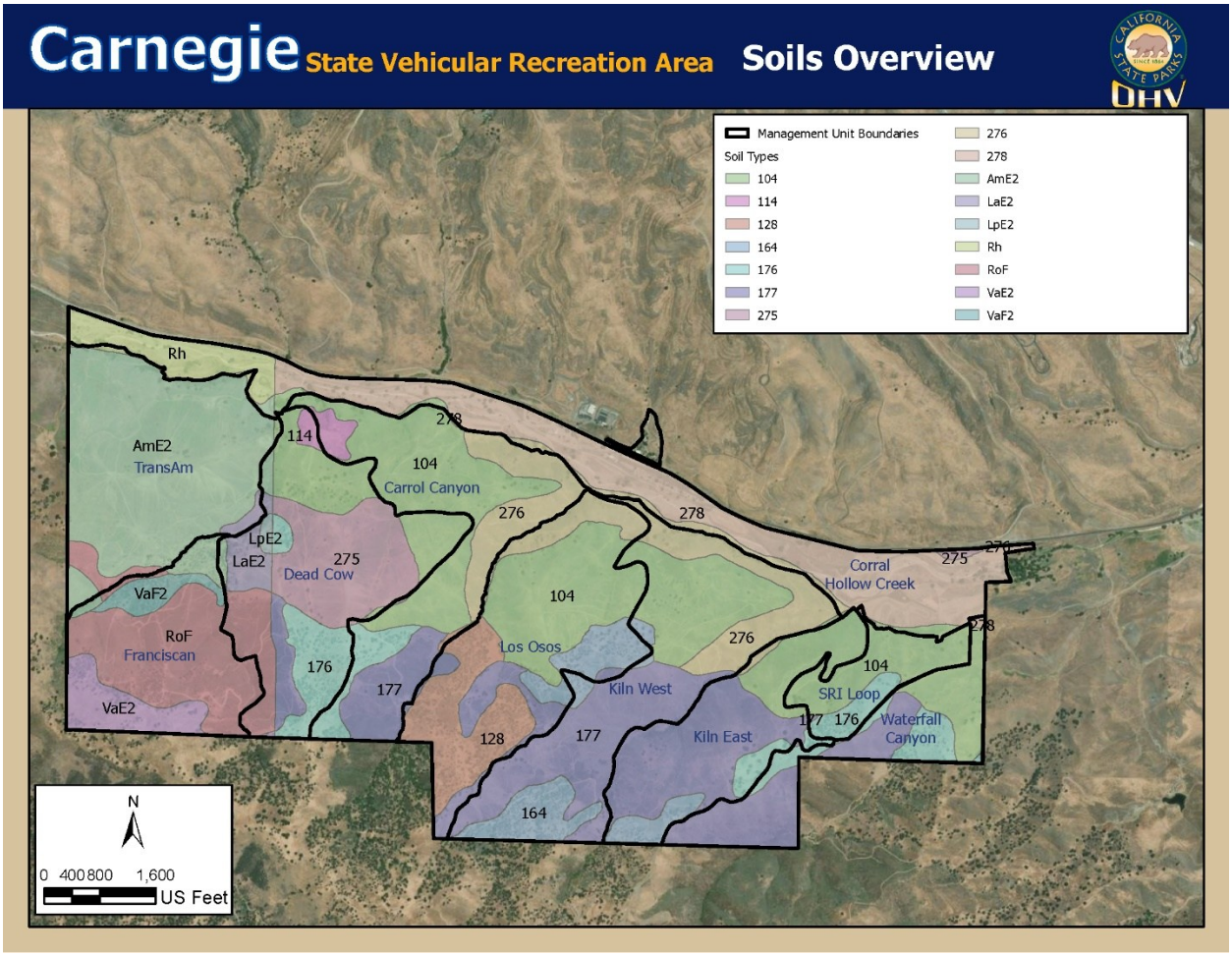

Figure 13. Soils map for Carnegie SVRA.

Physical and chemical properties of soil affect soil behavior and can have implications for different land uses. Soil suitability and limitation ratings, derived from Natural Resources Conservation Service (NRCS) soil survey mapping of the upper 5 feet of soil, for various engineering uses are identified in Table 6. Table 6 includes more detailed information about each soil type found within Carnegie SVRA, providing a description of each unit with respect to slope, surface texture, and various other properties. A short description of each soil type is detailed later in this Section.

The soil texture types within the SVRA are predominantly loam, or a variety of clay-, sandy-, or gravelly-loam. There is one class of rock texture and one class of sand soil texture. Soil texture influences nutrient retention in soils and plays an important role in nutrient management. Finer textured soils like clay soils tend to have a greater ability to store water

and nutrients, while sandy soils have a coarser texture and do not hold nutrients as well. This ability to store nutrients is due to the significantly increased surface area of a clay particle compared to a sand particle. The increased surface area in particles of clay provides many places for soil particles to retain and supply water and nutrients.

The clay, clay loam, and loam soils in CSVRA are highly cohesive and can withstand the erosive forces of wind and water when left in a natural state; however, steep slopes, removal of vegetation, and increased compaction of the soil can create an increased hazard of erosion from physical forces such as rainfall impact or high velocity surface flows from runoff. These silt and clay particles, once dislodged, are much more easily suspended and transported in water when compared to sand particles.

Most of the soil types in the park have a moderate to high shrink-swell potential due to the high clay content in the soils which greatly increase in volume when saturated with water and shrink when dried. High clay content in soils, especially in smectite mineral group clays, indicates the soil is likely to undergo substantial volume changes as soil moisture content increases or decreases. This effect is known to cause structural foundations to rise during the rainy season and subside during the dry season to the extent that it can crack the foundations of housing; this can pose various challenges when it comes to the management of OHV-recreation on these soil types. Subsidence in trail structures may occur as the rainy season trends into the dry season and desiccation cracks can form in trail systems that may convey water, increasing the hydrologic connectivity and leading to potential erosion from stormwater runoff. Additional management actions must be considered in areas of the SVRA with high clay content in the soil. Clay soil can have a reduced hydraulic conductivity due to the relatively small pore spaces in the soil texture which do not allow water to travel through the pore spaces under saturated conditions. Clay soils are more resistant to detachment from rain drops because of their low hydraulic conductivity, but the amount of water content present in clay soils at the time of compaction controls the soils engineering properties once compacted (Lambe, 1958). Reduced hydraulic conductivity in soils under saturated conditions can lead to shearing and kneading of the soil from the compaction process by wheels, increasing erosion potential due to the reduction of permeability (Van den Akker and Soane, 2005). The clay content in soils can also indicate the erodibility of the soil because the clay particles combine with organic material to form soil aggregates or clods, the stability of which determines the soil's resistance; Evans (1980) indicates that soils with a clay content between 9 and 30 percent are the most susceptible to erosion. Two soil types within Carnegie SVRA are clay dominant: Altamont clay and Alo-Vaquero complex soils. Altamont clay soil series decrease in clay content with depth, with a clay content of nearly 50% at the surface and reducing to near zero percent clay content deeper than approximately 70 cm below surface level. Alo-Vaquero series soils remain at approximately 50% clay content from surface level to over 50 cm below surface. Additionally, both of these soil series have organic matter percentages of 1.5-2%, which decrease in depth to 0% organic matter

content, implying that erodibility for these two series is potentially higher due to the lack of organic material and the high clay content in these soil series.

Of the seventeen soil types, nine are categorized into hydrologic soil group D, indicating that the surface layers of these soil types have a high to moderate runoff potential when saturated. Soils in hydrologic soil group D have very slow infiltration rates when thoroughly wetted, with the group consisting mostly of clayey soils with a high swelling potential or capacity. Soils in hydrologic group C, of which there are four within the SVRA, have slow infiltration rates when thoroughly wetted, usually due to a layer in the soil that impedes the downward movement of water. The two soil groups within the SVRA fall within hydrologic group B, which have a moderate infiltration rate when thoroughly wetted and are moderately well to well drained soils with moderately fine to moderately coarse grain textures, and the remaining two soil groups fall within hydrologic group A, which has a high infiltration rate, even when thoroughly wetted, and consists of deep, well to excessively drained sand and/or gravel that would result in a low runoff potential. Hydrologic soil groups C and D are more dominant throughout the SVRA, which may have implications for natural resource management due to the very slow water transmission rates of these soil types and since runoff rates in these soil types can be quite high and may be increased when the soils are compacted or denuded of vegetation.

With the exception of river wash soils and rock land soils, all the soil types within the SVRA and the surrounding area have a drought vulnerability rating of drought vulnerable or severely drought vulnerable, implying that the site and soil properties have a low to very low water storage capacity, and the climate in the area has either low annual precipitation or high annual temperatures, or both. The drought vulnerability rating of the soils within the SVRA may have implications for vegetation since plants must be very drought tolerant, even in years with normal amounts of rainfall. Since the SVRA relies on vegetation to strengthen the resistance of the soils, any vegetation that is used for rehabilitation activities should consider the drought tolerance of the plant.

In order of approximate percentage, the predominant soil types within Carnegie SVRA include Wisflat-Arburua-San Timoteo complex, Honker-Vallecitos-Gonzaga complex, Honker-Vallecitos-Honker eroded complex, Alo-Vaquero complex, Vallecitos rocky loam, rock land, and Altamont clay. Linne clay loam, Los Gatos-Los Osos complex, river wash, Vallecitos loam, Calla-carbona complex, Carbona clay loam, Cogna loam, and Xerofluvents-Xerothents complex soils make up a smaller percentage of the soil types within Carnegie SVRA but are nonetheless important for management considerations due to the variation in properties or behavioral characteristics that may affect use. A detailed description of each of these soil types is included in Appendix 2.4.6.

2.4.7. Vegetation

Soil formation is a function of five major soil forming factors that account for the variation in soil types across a landscape. The characteristics of a soil greatly influence the vegetation type. Climate and topography are also factors that determine what type of vegetation may be present. Assemblage of wildlife is generally associated with the vegetation type within an area as habitat. For all of the interaction within an ecosystem, the relationships between soils, vegetation, and animals are much more complex than just explained. All the parts of an ecosystem are intricately interrelated and interdependent, with each influencing one another.

The vegetation of the Corral Hollow watershed is diverse, prolific and varies throughout the SVRA based on changing soils and depending on the abundance of water. A vascular plant study conducted by EcoSystems West in 2003 identified 197 native plant species in Carnegie SVRA (CHWA 2007). The vegetation and native plant communities at Carnegie SVRA have been mapped using the VegCAMP vegetation mapping method; initially in 2011-2012, then updated in 2021-2022 (Figure 14). Table 2 details the mapped vegetation types and associated acreages identified in the 2021-2022 mapping efforts. Vegetation communities are distinctive vegetation patterns that reflect environmental conditions such as climate, soil, water, disturbance, and other variables. These vegetation patterns and the resulting plant communities and vegetation types are the predictable results of the plants' interaction with specific environments. The processes of VegCAMP and results will likely be covered in more detail in the Carnegie SVRA WHPP.

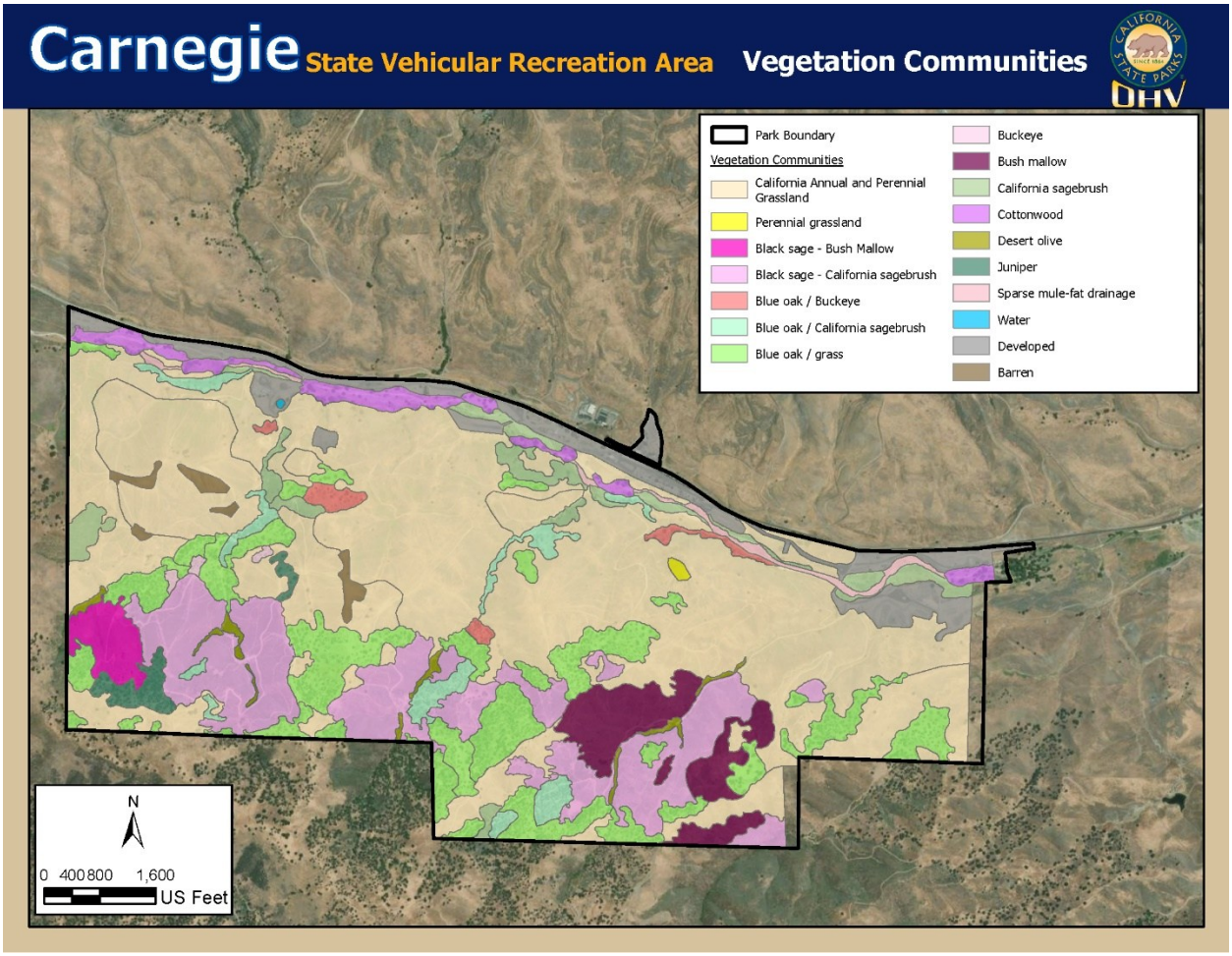

Figure 14. Vegetation communities map for Carnegie SVRA.

Soils and slope can greatly affect vegetation types. Slope definition determines how much sun plants receive in the summer, in turn affecting how fast plants use up water. Especially in semiarid regions, slope aspect can create notable difference in soil properties, microclimate influences, and hydrological processes, which may result in distinct vegetation types occupying opposite slopes within the same general area (Yang et al, 2020). The northeast trending ridges that compose Carnegie SVRA tend to remain cooler and retain more moisture than the southern facing slopes of LLNL Site 300, to the north of the SVRA. Biomass, vegetation coverage, species richness, and average plant height are typically higher on northern facing slopes than southern facing slopes (Yang et al, 2020). In semiarid areas, soil water limitations and nutrient deficiencies are dominant environmental constraints on vegetation distribution, which is greatly determined by topography. Yang et al. found that soil nutrient content is significantly higher on northern facing slopes, potentially explaining why stark differences in vegetation are apparent among slopes throughout the SVRA; for example, blue oak and grassland vegetation is often seen on hillsides across from sage or scrub vegetation types.

Table 2. Carnegie SVRA mapped vegetation types and corresponding acreages.

	NVCS Name	Common name map label	Total Acres
Tree Overstory (Woodland / Forest) Vegetation	***Juniperus californica* woodland alliance**	California juniper	13.9
	***Aesculus californica* forest and woodland alliance**	Buckeye	2.9
	***Populus fremontii - Fraxinus velutina - Salix gooddingii* Forest and woodland alliance**	Fremont cottonwood	35.4
Shrubland Vegetation	***Rhus trilobata - Crataegus rivularis - Forestiera pubescens* shrubland alliance**	Desert olive	9.6
	***Baccharis salicifolia* shrubland alliance**	Mule fat	12.3
	***Malacothanmus fasciculatus - Malacothamnus* spp. shrubland alliance**	Bush mallow	60.9
	***Salvia mellifera* - *Artemisia californica* alliance**	Black sage - California sagebrush	199.54
Herbaceous Vegetation	**California annual and perennial grassland macrogroup**	California annual and perennial grassland	770.7
	***Nassella* spp. - *Melica* spp. alliance**	Purple needlegrass	1.5
Non-Vegetated	**Barren**	Barren	11.1
	Developed	Developed	94.9
	Water	Water	0.3
		SUM	1533

In correlation to Table 2, the vegetation at CSVRA falls within four vegetation types: tree overstory, shrubland, herbaceous, and non-vegetated. Herbaceous vegetation accounts for the highest amount of groundcover at CSVRA with 772.2 acres, while tree overstory vegetation accounts for 300 acres and shrubland vegetation makes up 353.64 acres. Non-vegetated areas, such as developed areas or areas barren of vegetation, account for 101.5 acres of CSVRA. The non-vegetated area is composed of 94.9 acres of developed land, 0.3 acres of water, and 11.1 acres of barren area, where there was less than 2% vegetation cover on native substrate across the minimum mapping unit of 1 acre. The relation of these vegetation types and the species that compose them to the soils at CSVRA are discussed below. Developed non-vegetated areas are not discussed below. The 11.1 acres of barren area are targeted for rehabilitation efforts to encourage vegetation growth and are discussed in Section 3, Goals and Objectives.

Tree Overstory:

Blue oaks (*quercus douglasii*) forest and woodland alliance make up the majority of the tree overstory within CSVRA, composing 247.8 acres of vegetation mapped. The blue oak

alliance forms varied stands throughout California, where it may grow in a scattered pattern across a landscape or form a closed tree canopy with other tree species. The species is highly genetically varied. Environmental factors controlling growth are moisture availability, substrate, fire, and other disturbances (Allen-Diaz and Bartolome 1992, Allen-Diaz et al. 2007, Keeley 2002c), which begins to explain the variance of associations in the species. Blue oaks are a drought and flood tolerant species that develop root systems reaching up to 25 meters to tap into groundwater reserves. Blue oaks grow well in valley bottoms, foothills, and rocky outcrops, and in soils that are shallow, low in fertility, and moderately to excessively drained with extensive rock fragments. (CNPS, 2024)

Juniper (*Juniperus californica*), buckeye (*Aesculus californica*), and Fremont cottonwood (*Populus fremontii*) woodland alliances account for the remaining portion of tree overstory within CSVRA. Fremont cottonwoods are typically found in the riparian corridor and floodplain of Corral Hollow Creek, where they form patchy stands that are not consistently dense enough along the entire creek corridor to meet the membership rules of the Fremont cottonwood alliance. Two distinct parcels of Juniper woodland interspersed with blue oak have been mapped on the southwest portion of CSVRA, but small Juniper stands have established throughout CSVRA in various areas.

Shrubland Vegetation:

Shrubland vegetation is categorized by woody shrubs in the canopy. This vegetation alliance is generally found on moderate-to-steep slopes in lower elevations that have been burned within the last four decades (Gordon and White 1994). Shrublands typically prefer soils that are colluvial derived. The shrubland alliances predominantly found at Carnegie SVRA include Desert olive (*Rhus trilobata - Crataegus rivularis - Forestiera pubescens)*, Mulefat (*Baccharis salicifolia*), and combinations of bush mallow (*Malacothanmus fasciculatus - Malacothamnus spp.*), Black sage (*Salvia mellifera*), and California sagebrush (*Artemisia californica*) alliances. Shrubland type alliances are typically drought tolerant through a suite of characteristics, such as by curling their leaves rather than dropping them (Gill and Hanlon 1998), or by blooming in fall to disperse seeds in winter and spring. Winter and spring blooming shrub types offer nectar for pollinators and allow gravity and other wildlife to disperse seeds, which collect in the soil as a seed bank. Shrub type seeds have low germination rates unless exposed to light or fire components, although fire may reduce germination rates (Keeley and Fotheringham, 1998). Moist soils are needed for seedlings to establish and take two or more growing seasons to mature. Recruitment of this vegetation type is primarily by seed (Montalvo and McMillan 2004b), and establishment is more successful in wet years despite the ability for this vegetation to withstand a variety of climates.

Desert olive is a semi-wetland vegetation type that occurs in draws and drainages, extending up adjacent slopes. Elderberry (*Sambucus nigra* ssp. *caerulea*), coyote brush

(*Baccharis pilularis*), and poison oak (*Toxicodendron diversilobum*) contribute additional cover to this alliance. This vegetation alliance is typically dense with little herbaceous understory. Mule fat is found in Corral Hollow Creek near Fremont Cottonwood stands.

Where bush mallow, black sage, and California sage are dominant, the herbaceous layer is sparse but may include non-native grasses. Most commonly, these shrub types are observed on slopes that had burned previously, sometimes as recent as a year or two prior to surveys. Often, these three species will intermingle in nearly equal cover. California sagebrush prefers steep slopes with coarse texture soils that are rarely flooded and may be moderately saline. California sagebrush can be found in high abundance on protected, north-facing hillsides. California sagebrush may be found within the corridor of Corral Hollow Creek in patches along with mule fat; often, mule fat will dominate these stands and be categorized into the mule fat alliance. California sagebrush often interfaces with annual grasslands or oak woodlands on slopes with deeper soils and transition to xeric chaparral on rockier, higher slopes. On rockier soil in more mesic settings, black sage tends to dominate, and the vegetation alliance shifts to California sagebrush-Black sage alliance, typically in the Coast Ranges (Mooney 1977, Rundel 2007). In the California Central Coast Ranges, stands of California sagebrush that are co-dominated by California buckwheat (*Eriogonum fasciculatum*) in Alameda County are mostly inland and not strongly influenced by the summer maritime temperatures.

Increased fire frequency in wildlands, presence of non-native grasses such as *Bromus rubens*, and air pollution are contributing to decreased stands of California sage and Black sage (Montalvo 2002a, Montalvo and McMillan 2004b). Areas where these plants dominate CSVRA should be targeted for successful restoration efforts to create conditions where these shrubs can establish, mature, and develop seed banks.

Herbaceous Vegetation:

The herbaceous vegetation that makes up CSVRA is dominated by the California annual and perennial grassland macrogroup, which includes all native and non-naive annual forb and grass vegetation as well as native perennial grasslands that grow within the California Mediterranean climate. California annual and perennial grasslands are known to grow in all topographic locations of California, in soils that may be deep with high clay content; loamy, sandy or silty soils that are derived from mudstone or sandstone; or in serpentine substrates. Climate is a controlling factor for California grasslands, which are usually the understory for blue oaks. Soil water deficits characterize the grassland ecosystem annually, typically for 4-8 of the summer months. (Hopkinson et al 2007, Heady 1977)

Purple needlegrass (*Nassella pulchra*) is a bunchgrass alliance that establishes stands in deep, clay-rich soils, as well as occurring in sterile serpentine soils (Evens and San 2004, Gelbard and Harrison 2003, Hamilton 1997, Harrison and Viers 2007, McNaughton 1968) or in shallow soils of coastal hills in central California (Keeler-Wolf et al. 2003a). Purple

needlegrass plants expand when the tussocks fragments and establish best on bare ground. Seedling establishment is typically low and growth varies depending on seasonal weather conditions, favoring a wet growing season (Steinberg 2002c, Stromberg et al. 2007). It occurs in the herbaceous layer at CSVRA along with California melicgrass (*Melica californica*), a tufted native perennial grass that occurs from the Coast Ranges to the Sierra foothills, typically growing on open or rocky hillsides and slopes in Central California. Both of these grass types typically accompany chaparral, grassland, or oak woodland habitats. California melicgrass will form small stands in openings among blue oak woodlands and prefers more mesic slopes compared to purple needlegrass. California melicgrass is tolerant of serpentine soils and can grow in both deep and shallow soils.

Non-native/Invasive Vegetation:

While Carnegie supports a diverse population of native vegetation, non-native plants can also be found throughout the SVRA. These non-native species can be detrimental to the natural ecosystem by outcompeting native species, which can deprive wildlife of food and shelter. Non-native plant species throughout the SVRA have the potential to decrease slope stability and increase sediment mobilization into receiving waters, as non-native species may not be as resistant to erosion as native species.

2.5 Assessment

Erosion is a natural process where soil or rock is displaced by wind, water, ice, or gravity. This process can be accelerated when native vegetation is removed or when soils have been compacted. Soil's susceptibility to erosion is determined by the steepness and length of slope, the soil texture, permeability of soil, and the type of vegetation supported by the soil. The length and slope of land surface can affect the velocity and erosive force of stormwater runoff as a function of gravity. Soil texture is a characteristic of soils that can be used to determine erodibility, since soils with the largest amount of medium-sized particles (silt) are the most susceptible to erosion. Clay and sandy soils are typically less prone to erosion. Soil permeability, also referred to as hydraulic conductivity, is a measure of how quickly water passes through soil. Water saturation impacts the strength and stability of soils because of how water passes through the voids between particles of soils. Permeability of a soil can be affected by the shape and texture of the particles, the relative volume of voids in the soil, the degree of saturation, the effect of transpiration from plant roots, and the presence of a hydraulic head from a difference in water level. Available vegetation can lessen these impacts, with plant species exhibiting higher root and stem densities and greater leaf area proving to be the most effective in reducing erosion (Dahanayake et al, 2024).

A desktop assessment of soil resources at Carnegie SVRA has been provided in Section 2.4, but field surveys and visual inspections of the trails, roads, and open-ride areas have been conducted since the early 1990s at the SVRA in compliance with the previous

iterations of the Soil Conservation Standard. Trail system monitoring via the use of Green-Yellow-Red (G-Y-R) trail evaluations have been conducted annually since 2009; these evaluations are used to provide feedback for maintenance needs in the trail system. Red-rated trail segments are prioritized for repairs. These evaluations also indicate potential problems that could require management actions or further monitoring. G-Y-R trail evaluations are conducted using the methods described in Section 5.1.

2.6 Management Units and Resource Management Areas

The Department Operations Manual (DOM), Chapter 0300 defines management units as follows:

> The structure for organizing and scheduling natural resource maintenance activities is the resource management unit. Resource management units are defined areas of land with distinct boundaries. Each park unit is subdivided into a number of resource management units, each with its own unique identifier. Management units are typically based on permanent features where the boundaries are not likely to change. Management units define manageable-sized areas for organizing and scheduling maintenance work. A management unit often includes lands with similar resources and management objectives. For each management unit, maintenance activities are identified and scheduled accordingly.
>
> By their very nature some management activities, such as prescribed burning and exotic pig control are applied over multiple management units or the entire area of the park. These maintenance activities are organized and scheduled under a unit wide management unit designation.

CSVRA comprises ten Management Units (MUs). MUs are discrete zones established to better plan and implement management activities within areas that share common characteristics. These MUs are generally separated by sub-watershed, access roads and/or type of recreational uses offered. Figure 15 shows the delineation of the ten MUs. These MUs are, for the most part, consistent with how the park has been managed for decades. The delineation of the MUs at CSVRA was initially organized in the 1981 General Plan but was updated after the 2007 CHWA and before the implementation of the 2011 SWMP. The MUs are further divided into smaller areas known as Resource Management Areas (RMAs), which allow staff to make more refined management decisions based on known resources, topography, soil type, and other factors. The management decisions that are implemented in RMAs are an amalgamation of years of experience in park management and restoration paired with recommendations from the OHV BMP manual that have been distilled into one cohesive approach.

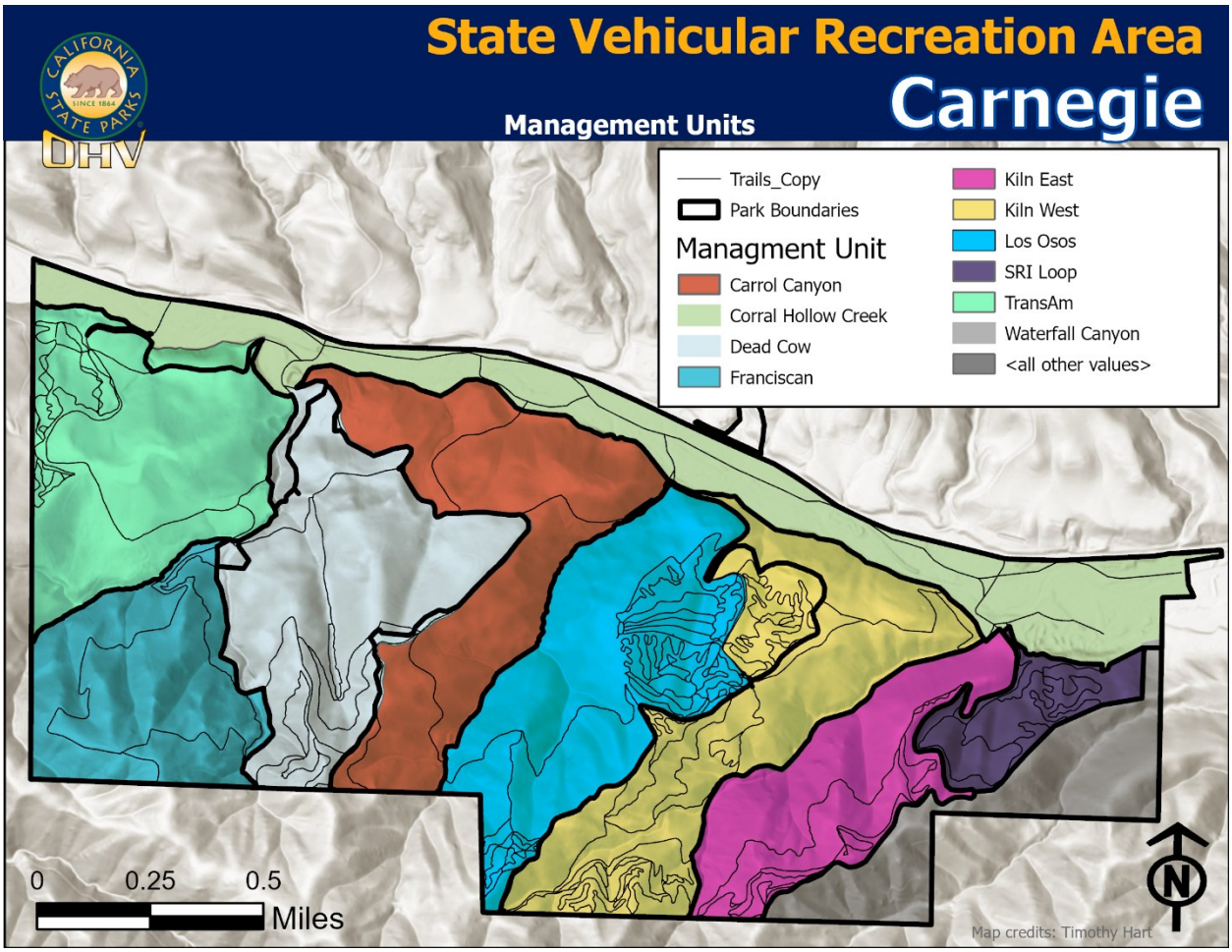

Figure 15. Map depicting the 10 management units within Carnegie SVRA.

RMAs are subdivisions of a MU that focus on operating as a "trails-only" managed riding area, where users are expected to limit OHV activity to the existing trail systems. CSVRA uses this strategy to support responsible stewardship of the land by managing OHV use while providing a high-quality recreational experience for the user. Prior to the establishment of RMAs, much of the road and trail system within CSVRA consisted of inherited roads and trails from when the park was privately owned. The RMA program allows Parks staff to effectively control erosion and sediment loss by focusing on reducing trail density, increasing vegetation cover, building and maintaining sustainable trails that are enjoyable for the user, limiting OHV-recreation to designated trails, and enforcing this policy by issuing citations to visitors who do not obey the rules of remaining on trail while recreating in an RMA. This strategy was first implemented in 2009 and has proved to be effective in reducing sediment loss and erosion in each sub-watershed that houses an RMA. The RMAs also allow Parks staff to create a sustainable park-wide trail network that provides connectivity from one RMA to the next, creating a high-quality recreational experience where users are less tempted to go off-trail. Trail design is typically a

collaborative effort between Parks and OHMVR Division staff, with input from the Carnegie Advisory Team (CAT), a group of public participants and stakeholders who recreate at CSVRA and are familiar with OHV recreation and trail design. This allows CSVRA visitors to have an input on OHV trail design and features they would like to see at the park where they recreate. Less commonly, private companies will be contracted to assist with trail design and creation; if an outside contractor is called in for trail design and creation, this is conducted as a staff training opportunity. Currently, 53% of the SVRA is managed as a complete (or near complete) RMA.

Each RMA is surrounded with perimeter fencing and access gates at entry points that allow each RMA to be managed independently. RMAs are inspected on a weekly to bi-weekly basis to ensure riders are staying on the established trail system within the RMA, discussed in detail in 5.1.3. Off-trail Riding Inspections. When incidences of off-trail riding (OTR) are discovered, the area is closed for at least a week to conduct repairs, and the OTR incident is investigated. OTRs can occur for various reasons; sometimes an OTR can be attributed to a rider's inexperience, while other times OTRs can indicate a lack of flow or connectivity to a trail system, prompting a need for management to reassess the sustainability and recreational experience of a trail segment. In some cases, incidences of OTRs can be due to visitor ignorance of the rules or an inability to see the trail system due to an overgrowth of vegetation. For these reasons, incidences of OTRs are investigated and adaptive management actions may result from insight gathered from each investigation.

State Parks Peace Officer (SPPO) staff may issue citations to offenders if an OTR is observed, and while this has shown to be an effective way to enforce the message for users to "Stay on Trail", Parks staff have found that a conversation with the offender tends to be more effective. Through fostering these conversations with CSVRA visitors about the importance of staying on established trail systems in RMAs, Parks staff have observed self-policing by our visitors to OTR offenders in trails-only areas, since one OTR incidence in an RMA results in a week-long closure of that RMA that affects all visitors. The RMA closures are published on the SVRA website weekly, as well as displayed at the SVRA's entrance kiosk, and the message for the user to "Stay on Trail" is reinforced through signage, social media posts, and various other efforts from the Carnegie SVRA Interpretation staff.

2.6.1. Corral Hollow Creek MU

Also known as "the Valley Floor", the Corral Hollow Creek MU comprises about 10% of the SVRA, encompassing the floodplain of Corral Hollow Creek and forming the northern boundary of the SVRA; all other MUs in the park lie to the south of this MU (Figure 16). The majority of the SVRA's facilities are located within this MU, while the main trail system is located in the steep hills to the south of the creek, accessed by one of five designated low-water crossings. This MU contains the ranger station and main entrance kiosk, the maintenance yard, Tyson's Pond sediment basin, campground area, day use facilities, tracks, trials area, 4x4 play area, and the main stem of Corral Hollow Creek with an

approximately 75-foot OHV-exclusion buffer area on either side of the active channel of the creek. Most of this MU lies to the north of Corral Hollow Creek, although the MX track, trials area, 4x4 play area and some of the day use areas are situated south of the creek, accessed by a hardened low water crossing known as SRI Crossing.

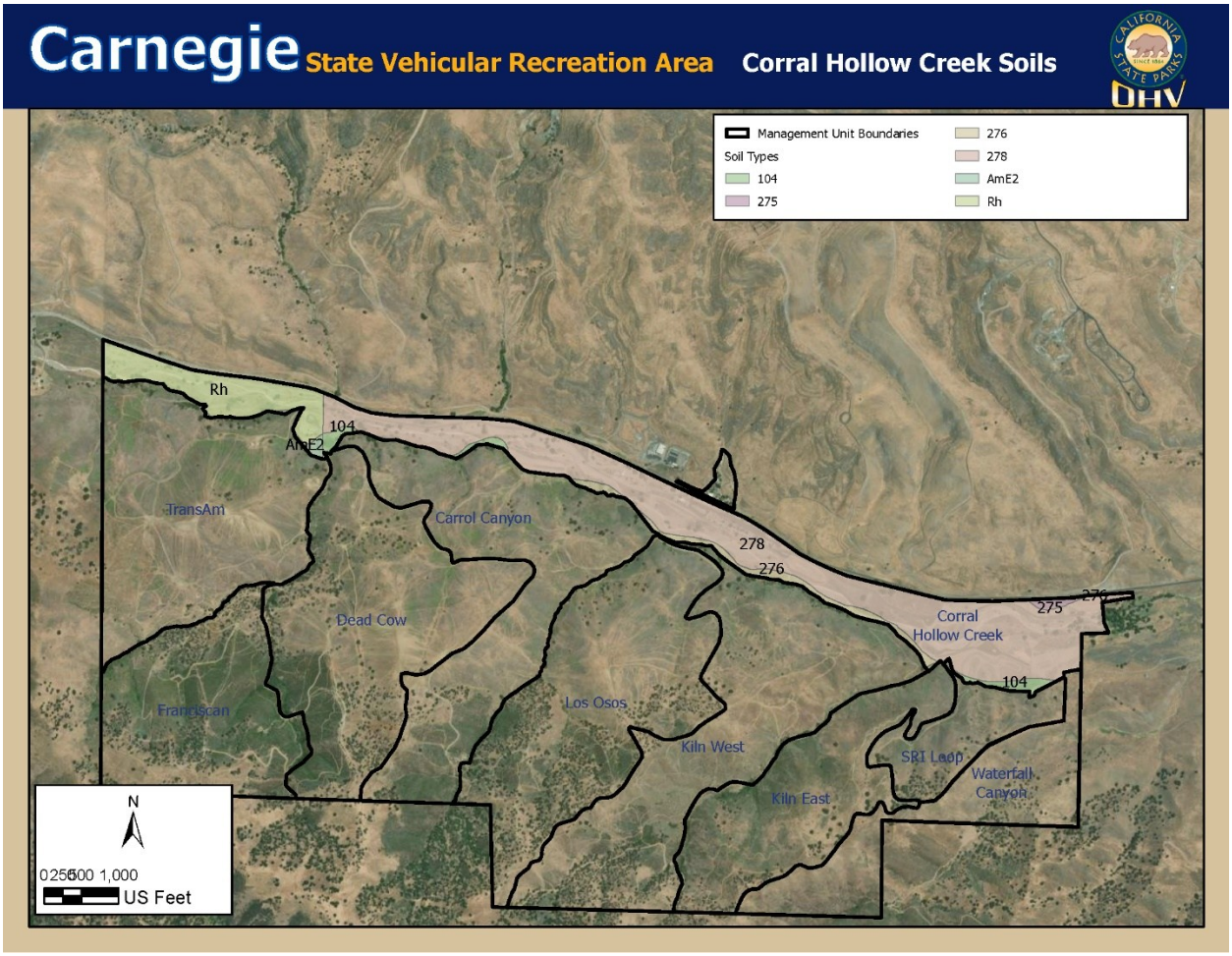

Figure 16. Soil map of Corral Hollow Creek MU.

The OHV-exclusion buffer area was delineated with signage in 2009 and fenced off in 2012 to protect water quality and the habitat within the sensitive riparian corridor of Corral Hollow Creek. This delineation was classified as the first creation of an RMA at CSVRA, but as more RMAs began to be established, park management determined that classifying the area as a Management Unit was more appropriate. The SVRA began supplementing the revegetation of the riparian corridor within the creek as early as 1992 by planting native riparian saplings like mule fat, sycamore, cottonwood and willow, improving methods and success rates over time. Currently, the plantings are watered by Parks staff during the warm summer months to nurture the growth of the young roots for the first 3-5 years until they can tap into the groundwater table. As a component of the CSVRA WHPP, invasive plants such as stinkwort are targeted for removal in this MU as an effort to control their spread

and reduce the impact invasive plants can have on native plants by reducing available resources present, as demonstrated in Figure 17. This effort is an on-going restoration project within the SVRA.

Figure 17. Greater Valley Conservation Corp members removing invasive plants in the riparian corridor of Corral Hollow Creek MU

The soil types present within Corral Hollow Creek MU are classified as riverwash in Alameda County and xerofluvent-xerorthents complex (1-8%, occasionally flooded) in San Joaquin County. Riverwash is considered to be excessively drained, where water is removed rapidly from the soil. Areas with riverwash-dominant soils may require supplemental irrigation, which may have implications for the Corral Hollow Creek riparian restoration project, especially during drought years. Xerofluvent-xerorthents complex soils are typically well-drained, where water is removed readily, but not rapidly.

Since this MU houses the campground and day use areas, as well as most of the SVRA's facilities, this MU sees significantly more use than other MUs in the SVRA. Some of the issues encountered in this MU include seasonal flooding from Corral Hollow Creek, congestion on the valley floor from increased visitation, and various park operations

problems, ranging from trash generated from the public, unauthorized activity (ex. speeding, “donuts”), to broken water lines or hazards generated from day-use or campground facilities.

2.6.2 Kiln East MU

Kiln East MU makes up the southeastern portion of the SVRA, with Waterfall Canyon MU residing just east of Kiln East MU. The MU is accessed via Kiln Canyon Trail on the east side of the SVRA, the main trailhead southeast of SRI Crossing. Kiln Canyon Trail serves as the boundary between Kiln East and Kiln West MUs. Raven and Kiln East RMAs are within this MU.

RMAs in Kiln East

This 119.3-acre MU is operated entirely as a “trails-only” managed riding area, composed of two RMA units: Kiln East RMA and Raven RMA. The trail system in this area was installed in 1995 with the intent of reducing volunteer trails, but lacked a successful strategy to limit the issue of riders creating new trails. In August 2009, a fire started outside of the unit and burned the majority of the Kiln East MU, giving Parks staff the opportunity to implement a large-scale rehabilitation project based on both active and passive techniques. Kiln East RMA was rehabilitated and reopened in October 2011 as the second RMA to adopt the new model of “trails-only” riding (Figure 18). The trail system within Kiln East RMA was designed to complement the trail system within the MU to the north of Kiln East, SRI Loop MU, which predates Kiln East. Kiln East RMA is one of the larger RMAs in the SVRA, 112.4 acres in size, providing approximately 2.98 miles of trails within the RMA. This RMA does not typically experience regular instances of off-trail riding despite the lack of fencing to prevent it, possibly due to the varying topography and complex trail system within the Kiln East RMA.

Figure 18. Photo of Kiln East MU rehabilitation project from 2010 to 2012. BMPs have been installed to rehabilitate unauthorized trails in the photo on the right.

Raven RMA is a smaller RMA within Kiln East MU, 6.9 acres in size, providing approximately 1.5 miles of trails. The area was rehabilitated starting in 2009 after the previously mentioned fire and reopened as part of Kiln East RMA in 2011, but in 2018, park management decided to add additional fencing measures and create a smaller RMA with the Raven trail system. Raven RMA is entirely enclosed within Kiln East RMA, so if Kiln East RMA is closed, Raven RMA is also inaccessible. The Raven trail system connects to Red Tail Trail within the Kiln East trail system, which provides access to the neighboring SRI Loop RMA via a paved crossing along an easement road known as Carnegie Ridge Road that is not open to the public. OHVs are limited to a single crossing along Carnegie Ridge Road between Kiln East RMA and SRI Loop RMA.

The soil types present within this MU are Gonzaga-Honker-Franciscan complex (30-50% slopes), Honker-Vallecitos-Gonzaga complex (30-50% slopes), Honker-Vallecitos-Honker eroded complex (30-50% slopes), and Alo-Vaquero complex (30-50% slopes), corresponding with Figure 19. Honker soils are typically part loam with gravelly clay and are classified as well drained soils with a moderately high saturated hydraulic conductivity, implying that these soils can transmit water flow under saturated soil conditions. Honker soils are well drained with high shrink-swell potential and are low susceptibility to wind erosion. Alo-Vaquero complex soils have a clay texture with low saturated hydraulic conductivity, therefore infiltration rates for this soil type are slower. The potential for increased runoff rates, impacts to plant growth, subsurface water flow and pollutant transport on this soil type is higher.

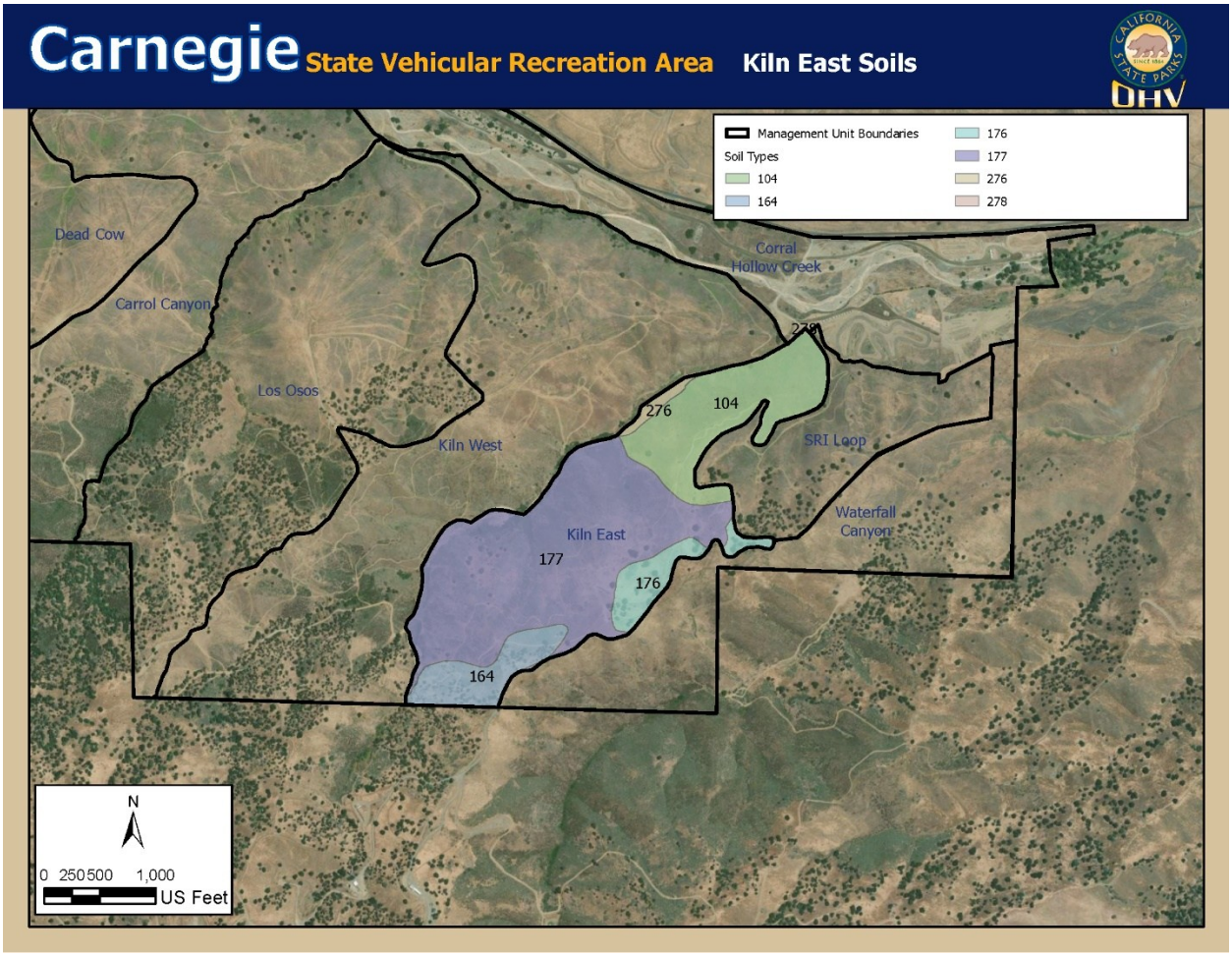

Figure 19. Soils map of Kiln East MU.

The slopes within the MU are 30-50% slope, which requires careful monitoring to ensure OHV trail management remains in compliance with the standard. Ideally, recreational trails should have a slope of 5-10%, so the SVRA's trail design for this area included subtle climbs, erosion control features to shed water from the trail path, and trails that parallel the contour of the slope to promote hydrologic invisibility. This area is inspected regularly as detailed in Section 5.1.3.

2.6.3 SRI MU

This MU is situated between Kiln East MU to the west and Waterfall Canyon MU to the east, with Corral Hollow MU directly to the north (Figure 19). SRI MU contains Roadrunner and SRI Loop RMAs, as well as a 5.41-acre parcel of hillside that is not open for OHV-use located to the south of the 4x4 Play Area. SRI MU is separated from Kiln East MU by way of Carnegie Ridge Road. OHV users may pass between these MUs at a designated crossing along Carnegie Ridge Road.

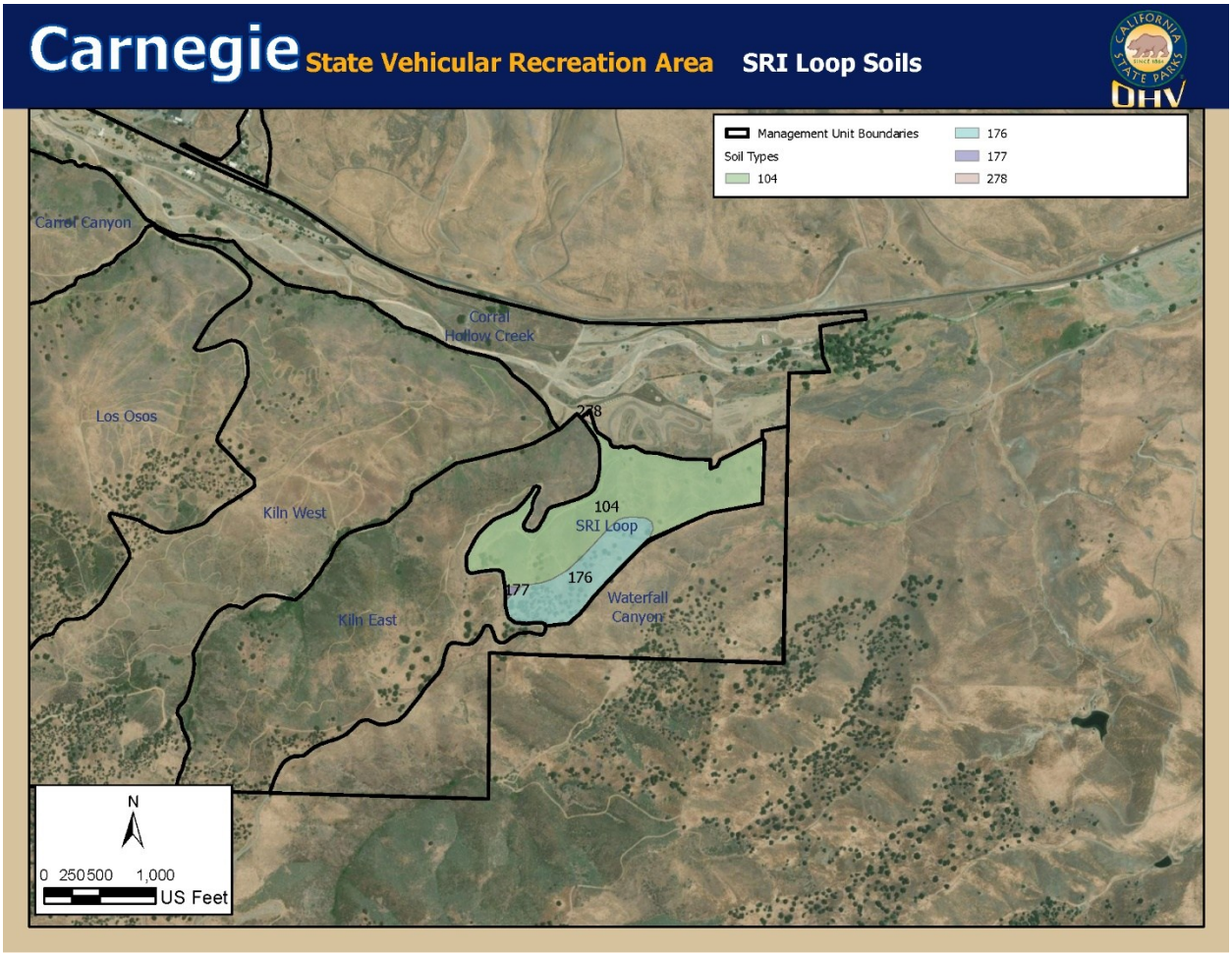

Figure 20. Soil map for SRI Loop MU.

RMAs in SRI MU

SRI Loop RMA was closed for rehabilitation in August 2009 and reopened in January 2011 as the first RMA under the new model, which relied on minimal fencing, frequent monitoring and swift management actions to enforce the "Trails Only" message (Figure 18). In the first two years of implementation of the RMA program, this RMA was closed approximately eight times due to off-trail riding activity and two citations were issued. Vegetation in this area is predominantly California annual and perennial grassland, which grew back quickly post-rehabilitation and provided better natural filtration for sediment that may mobilize in stormwater and increase potential for erosion or soil loss. Blue oaks, junipers, and black sage make up the secondary vegetation types in this RMA. SRI Loop RMA offers 1.08 miles of secondary trails.

Figure 21. Photo of SRI Loop RMA, the first RMA implemented at the SVRA in 2011. Photo taken in April 2018.

Roadrunner RMA is the other RMA in SRI MU, serving as the northeastern boundary of the MU to the south of Corral Hollow MU and east of a small, unused parcel of CSVRA that is incorporated into Waterfall Canyon MU. This area was rehabilitated in 2009 when SRI MU originally underwent rehab efforts but did not open as a separate RMA from SRI Loop RMA until 2018. Roadrunner provides 1.35 miles of secondary width trails within it.

The soils that make up SRI MU are predominantly Alo-Vaquero complex (30-50% slopes) with some Honker-Vallecitos-Gonzaga complex (30-50% slopes) present on the southeastern boundary of the MU along Waterfall Canyon. Alo-Vaquero complex soils, which are classified as clayey hills, are composed of residuum weathered from shale. Alo-Vaquero complex soils have a clay texture with low saturated hydraulic conductivity, therefore infiltration rates for this soil type are slower. The potential for increased runoff rates, impacts to plant growth, subsurface water flow and pollutant transport on this soil type is higher. Honker soils are typically part loam with gravelly clay and are classified as well drained soils with a moderately high saturated hydraulic conductivity, implying that these soils can transmit water flow under saturated soil conditions. Honker soils have a high shrink-swell potential and are low susceptibility to wind erosion.

The 30-50% slopes within this MU require regular monitoring to ensure OHV trail management remains in compliance with the Standard. As previously mentioned, recreational trails should have a slope of 5-10%, so the SVRA's trail design for this area included subtle climbs, erosion control features to shed water from the trail path, and trails

that parallel the contour of the slope to promote hydrologic invisibility. This area is inspected regularly as detailed in Section 5.1.3.

2.6.4. Kiln West MU

This MU is operated almost entirely as a “trails-only” riding area, with Los Osos MU to the west and Kiln East MU to the east. This MU contains Harrison Hill, Bunkhouse, Kiln West, The Knoll, and Black Bear RMAs and provides 11.7 miles of trails open to OHV recreation. There is a section of this MU that is currently closed from rehabilitation activities but will be reopened as a “trails-only” area and incorporated into the trail network. Kiln West MU is, for the most part, accessed via Kiln Canyon trail on the eastern side of the park. Approximately 0.92 miles south from the entrance along Kiln Canyon trail, Los Osos trail starts and splits off to the west and Kiln Canyon trail continues south, providing access to Black Bear RMA one last time before dead-ending at Golden Eagle trail in Kiln East MU. The MU and the RMAs within it can also be accessed by entering the Los Osos trailhead and following the trail for approximately 0.42 miles until the turnoff to Harrison Hill and Bunkhouse RMAs.

Kiln Canyon Pond is a sediment basin in this MU, just east of Bunkhouse RMA along Kiln Canyon trail. This feature is maintained and monitored as detailed in Sections 4.0 and 5.0. A cultural feature along Kiln Canyon trail still remains from the historic Carnegie Brick and Pottery factory days: the lime kiln, where Kiln Canyon’s name is derived from, at one time fired 20,000 bricks per day that were created with clay and lime mined from the canyon. The kiln is surrounded by protective fencing, as well as an excavated gypsum cave that holds water year-round and provides habitat for a variety of wildlife species, despite the high alkaline content in the water. Mountain lions have been captured on game cameras in this area and federally endangered California red-legged frogs have been observed in this cave feature, an atypical habitat for this species (Alvarez et al. 2024).

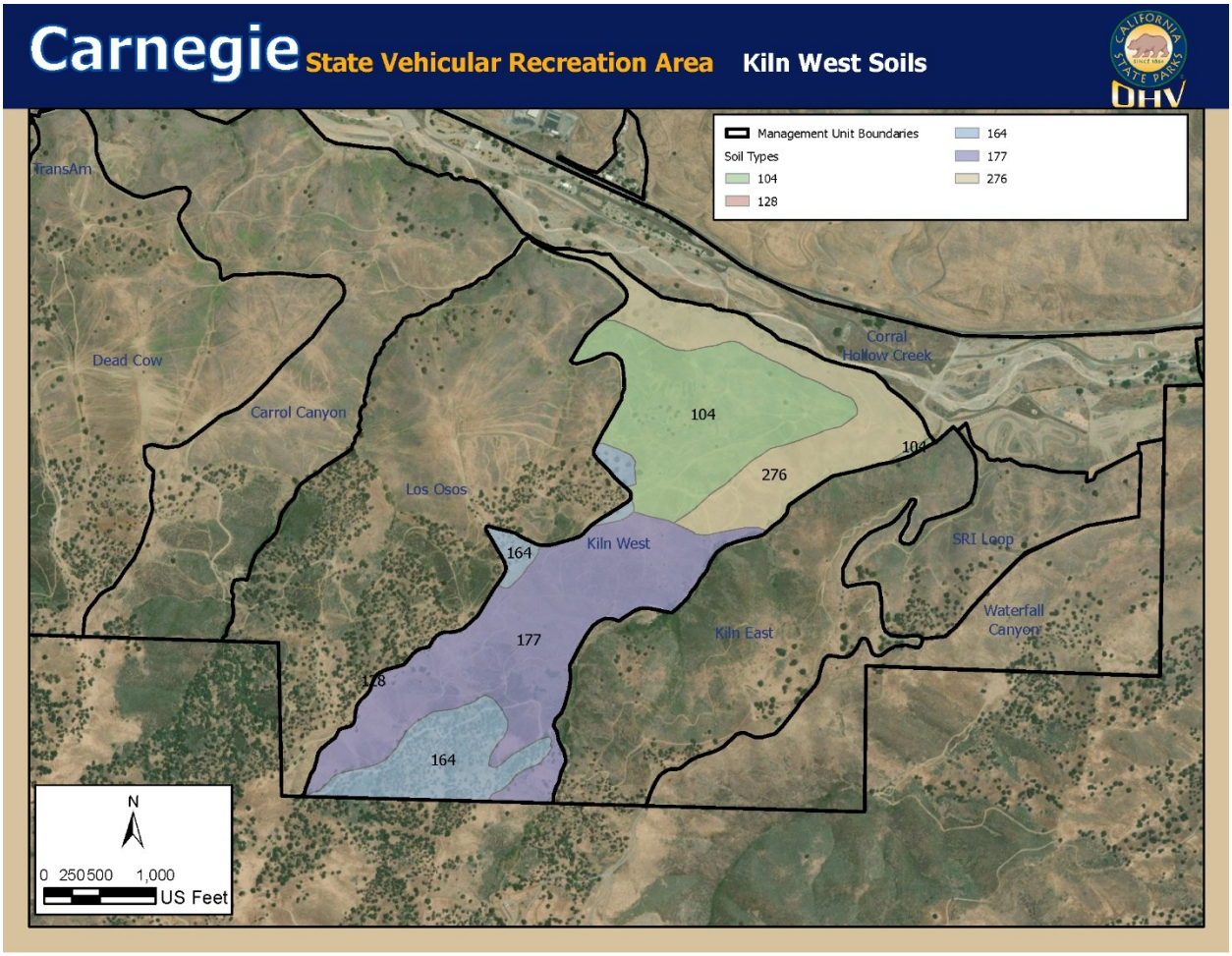

Figure 22. Soils map of Kiln West MU.

RMAs in Kiln West MU

The Los Osos Knoll RMA, or 'The Knoll', was rehabilitated in 2014 and reopened in 2015. This area is 2.46 acres in size and provides approximately 0.27 miles of intermediate skill level trails. This RMA is only open to OHV motorcycles and implements width limiters at the entrances to the RMA to exclude ATVs and three wheelers. This RMA comprises Gonzaga-Honker-Franciscan complex soils, 30-50% slopes (Figure 22). This soil complex is not widespread throughout CSVRA.

Harrison Hill RMA gets its name from the hillclimb events that would occur on its northern face in the 1980s and 1990s. This 21-acre RMA was rehabilitated in 2015 from an open-riding area with several hillclimbs and an erosional feature forming in the drainage. was installed prior to reopening; this RMA was reopened for trails-only riding in May 2016, and new trails composed 2.7% of the 21-acre RMA. Alo-Vaquero complex soils dominate this RMA, with the northern slopes outside the boundary of this RMA composed of Wisflat-Arbuna-San Timoteo complex, 50-75% slopes. Alo-Vaquero complex soils are classified as

clayey hills and are composed of residuum weathered from shale. Increased runoff rates, impacts to plant growth, subsurface water flow, and pollutant transport are potential concerns in Alo-Vaquero soils, which are situated in an area of this RMA that sort of encapsulates this soil type. A very small portion of the southern boundary of this RMA contains amounts of Gonzaga-Honker-Franciscan complex soils, 30-50% slopes. This soil complex is not widespread throughout CSVRA and may host a most robust variety of wildflowers that prefer this soil type, as rare plants have been found in this area previously.

Bunkhouse RMA composes the northern boundary of Kiln West MU where it borders Corral Hollow MU and was rehabilitated and reopened in 2019. This RMA was likely named for the Carnegie Brick and Pottery bunkhouses that used to reside along the valley floor to the north of this RMA. This RMA includes a trail, Z trail, which was created and installed in 1991. CSVRA has undergone many changes in management methods since then, but Z trail still remains today and has been incorporated into the sustainable trail network within this RMA. Soil types within this RMA include Wisflat-Arbuna-San Timoteo complex, 50-75% slopes and Alo-Vaquero complex soils. The Wisflat-Arbuna-Timoteo complex soils compose the northern facing hills of this RMA, where OHV recreation has been limited or completely restricted. Alo-Vaquero complex soils have a clay texture with low saturated hydraulic conductivity, therefore infiltration rates for this soil type are slower. The potential for increased runoff rates, impacts to plant growth, subsurface water flow and pollutant transport on this soil type is higher. In this RMA, these soil types are found along the top of the hillslopes and provide a durable soil surface for OHV hillclimbs and recreation.

Kiln West RMA was rehabilitated starting in 2020; rehabilitation efforts were completed in 2022. The trail system in the Kiln West RMA can accommodate ATVs, three wheelers and dirt bikes and is primarily rated as intermediate or advanced skill level. There are still small sections of improvements that are being considered to ensure that this area can continue to be managed in compliance with the Standard; once identified, those improvements will be prioritized, implemented, and reported on in future iterations of this report. Kiln West RMA is predominantly Honker-Vallecitos-Honker-Eroded complex soil, 30-50% slopes, which is a gravelly loam with a high shrink-swell potential. This soil type is well drained and has a very high runoff potential.

Black Bear RMA was rehabilitated starting in 2017, then completed and opened for recreation in 2019. Black Bear RMA was originally planned as one RMA but after implementation, Black Bear RMA was split into Black Bear East and Black Bear West, allowing staff to close the RMAs off from one another as needed. Black Bear RMA has one trail within it that can accommodate ATVs or three wheelers; otherwise, this RMA is more suited for dirt bikes. Although Black Bear RMA is relatively small (27.37 acres; 9.57 acres in Black Bear West and 17.8 acres in Black Bear East), the terrain is very steep, and the trail system is challenging. This RMA is predominantly composed of Gonzaga-Honker-Franciscan complex soils, 30-50% slopes, with some deposits of Honker-Vallecitos-

Honkey-Eroded complex soil, 30-50% slopes. Honker soils are typically part loam with gravelly clay and are well drained soils with a moderately high saturated hydraulic conductivity, implying that these soils can transmit water flow under saturated soil conditions. Honker soils are well drained with high shrink-swell potential and are low susceptibility to wind erosion.

2.6.5. Los Osos MU

Los Osos MU makes up one of the main hills of CSVRA and is located between Kiln East MU to the east, Corral Hollow MU to the north, and Carrol Canyon MU to the west. There are three RMAs that operate as trails-only riding areas within Los Osos MU, as well as two other areas that have not been rehabilitated with sustainable trails and currently operate as open-riding areas. Los Osos MU is separated from Kiln East MU by Los Osos trail, one of the main access roads into the hills of the SVRA. The main drainage for Carrol Canyon comprises the western boundary of Los Osos MU and the eastern boundary for Carrol Canyon MU. Carrol Basin sits at the mouth of the Carrol Canyon drainage and serves as the sediment control feature from this drainage and falls within this MU. The southern boundary of Los Osos MU makes up the southern boundary of CSVRA.

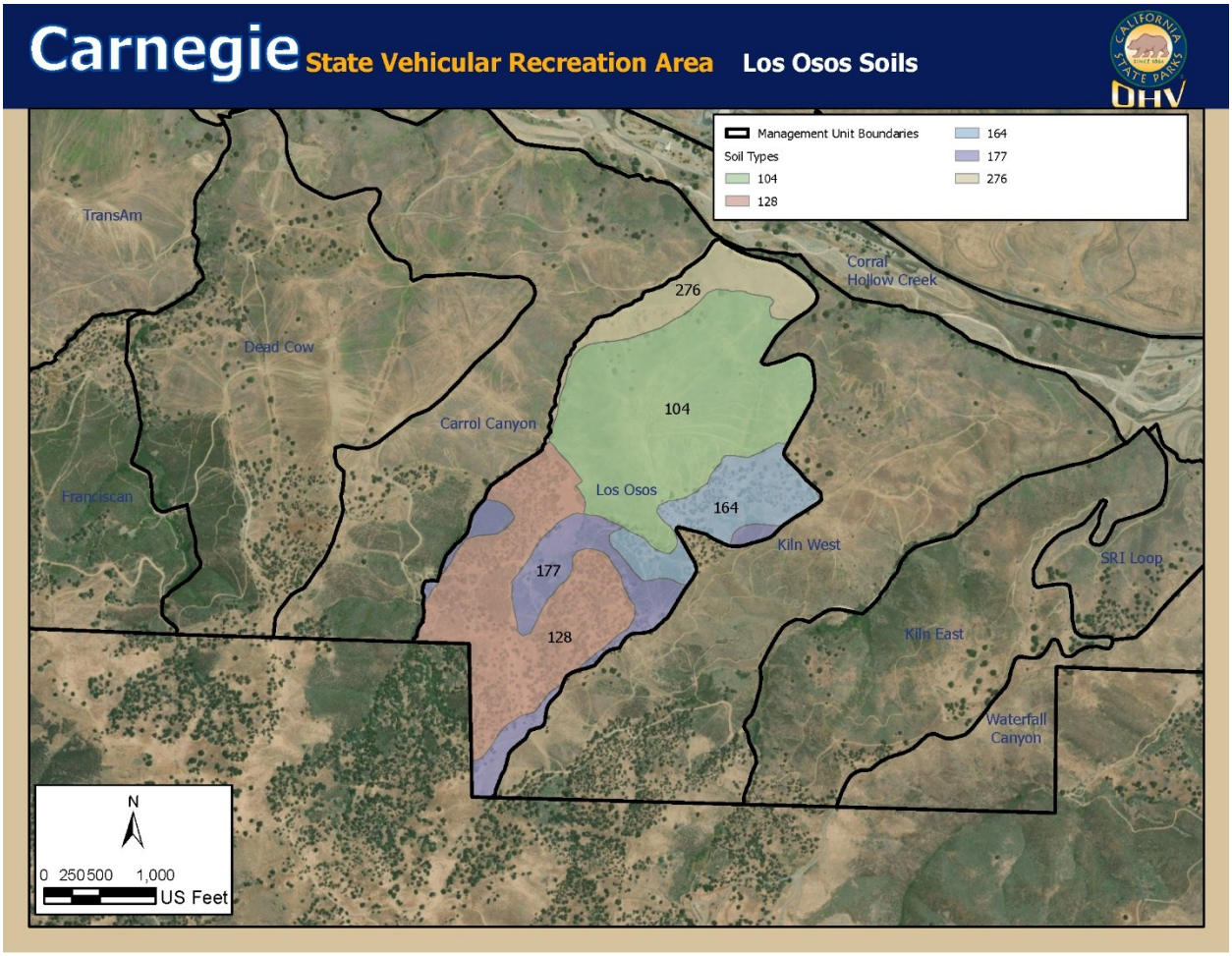

Figure 23. Soils map for Los Osos MU.

RMAs in Los Osos MU

Los Osos Climb RMA contains five runs of managed hillclimbs, increasing in skill level from south to north: the green hillclimb, blue hillclimb, red hillclimb, white hillclimb and pink hillclimb trails were installed and reopened as an RMA in 2017 after rehabilitation efforts began in 2015. To ensure that OHV-users remain on the trail system, hay bales were placed alongside the trail tread of each hillclimb in 2017 after experiencing some off-trail riding along these trails. This RMA is composed almost entirely of Alo-Vaquero complex soils, which are classified as clayey hills, and are preferred for hillclimb activities (Figure 23). The clay texture of Alo-Vaquero complex results in slower infiltration rates for this soil type. The potential for increased runoff rates, impacts to plant growth, subsurface water flow and pollutant transport on this soil type is higher which may require careful monitoring to be able to quick adapt and implement management actions as needed.

Seven Trails RMA is approximately 27 acres in size and was rehabilitated in Fall of 2014 (Figure 24). It reopened in Spring 2015 after fencing was installed around the perimeter of

the RMA and trail layout was designed with assistance from the CAT. This RMA is predominantly composed of Gonzaga-Honker-Franciscan complex soils, 30-50% slopes, with some deposits of Honker-Vallecitos-Honkey-Eroded complex soil, 30-50% slopes. Honker soils are typically part loam with gravelly clay and are classified as well drained soils with a moderately high saturated hydraulic conductivity, implying that these soils can transmit water flow under saturated soil conditions. Honker soils are well drained with a high shrink-swell potential and are low susceptibility to wind erosion.

Figure 24. Photo of Seven Trails rehabilitation project, which reopened as an RMA in 2015.

Happiness Valley is an area on the western side of Los Osos trail and in the southwestern portion of the Los Osos MU. Happiness Valley trail is a black diamond skill-rated trail that provides a connection from Lower Juniper trail in the southeastern portion of Carrol Canyon MU to the top of Los Osos trail near the southern boundary of the SVRA. Happiness Valley proved to be a popular area for riders at Carnegie, but was found to be challenging for beginner riders, prompting management to add a less complex trail system in 1993 that provided a connection between Los Osos trail and Happiness Valley, known as Happiness Valley trail. This area is currently operated as an open-ride area, but it is being considered for rehabilitation activities to transition this area to trails-only riding. ATVs are not recommended for Happiness Valley trail.

The soils in Happiness Valley are somewhat unique in Carnegie SVRA, composed predominantly of Cogna fine sandy loam, which is a well-drained soil with high saturated hydraulic conductivity. It is slightly more easily eroded by wind than the clay-rich soils that are found in the northern hills of the SVRA. Cogna fine sandy loam soil is in hydrologic class B, implying that there is low to moderate runoff potential within this soil group. There is a

slight potential for hazards to result from off-trail activity in this soil type, so this area should be monitored for hazards resulting from off-trail activity and employ management actions as needed. The vegetation type within Happiness Valley is also somewhat unique, where California sage brush and black sage dominate the cover layer in the southern portion of the MU with desert olive establishing in lower portions of the drainage. The Cogna fine sandy loam seems to be preferred by this shrub alliance, which is known to prefer coarse soils and tends to grow on steep slopes in xeric habitats. At the higher elevations of the MU, the vegetation type changes from shrub brush to oak woodlands with annual grasses.

Los Osos MU borders Carrol Canyon MU to the east. The border between the two MUs is the drainage of Carrol Canyon, which ultimately drains into Carrol Pond sediment basin. West of Los Osos Climb RMA, Los Osos MU contains an area referred to as Carrol Canyon East, the northeastern part of Carrol Canyon. Carrol Canyon contains few designated trails and is reserved mostly for highly skilled motorcyclists. This area is currently designated as open-riding, although it is categorized as a double-black diamond rated trail and provides an especially difficult challenge to OHV-users. The steep slopes within Carrol Canyon pose a safety hazard for most ATV, so ATVs are not recommended in Carrol Canyon.

2.6.6 Carrol Canyon MU

Carrol Canyon MU is operated as an entirely open-riding facility, with the exception of the Special Event Area, which is located on the north-facing slopes of the west end of the MU. The Special Event Area is fenced off and used only for Special Events that are hosted at CSVRA. Carrol Canyon MU is located to the south of Corral Hollow Creek MU and between Los Osos and Dead Cow MUs, to the east and to the west, respectively. The southern boundary of Carrol Canyon MU forms the southern boundary of CSVRA. Aside from the Special Event Area, there are no established RMAs in this MU, but future management goals for this area include establishing RMAs to promote hydrologic invisibility and continue to provide a space where OHV recreation can be balanced with natural resource protections. The northwestern corner of Carrol Canyon MU comprises the Stockpile area for CSVRA, where the material from the sediment basins is stored after they are cleaned out to be used for routine maintenance projects throughout the park.

Carrol Canyon MU is a popular area within Carnegie SVRA for hillclimbing and provides an advanced to very advanced skill level challenge with nearly no established trails. Since this area is popularly known for this type of OHV recreation, management has considered keeping parts of Carrol Canyon MU “open-riding” areas, where OHV users are not required to limit their recreation to established trails. This type of use would require additional monitoring and management measures to ensure compliance with the Standard, which may need to be developed since CSVRA is not currently overseeing management of open-ride areas in the same manner as trails-only areas.

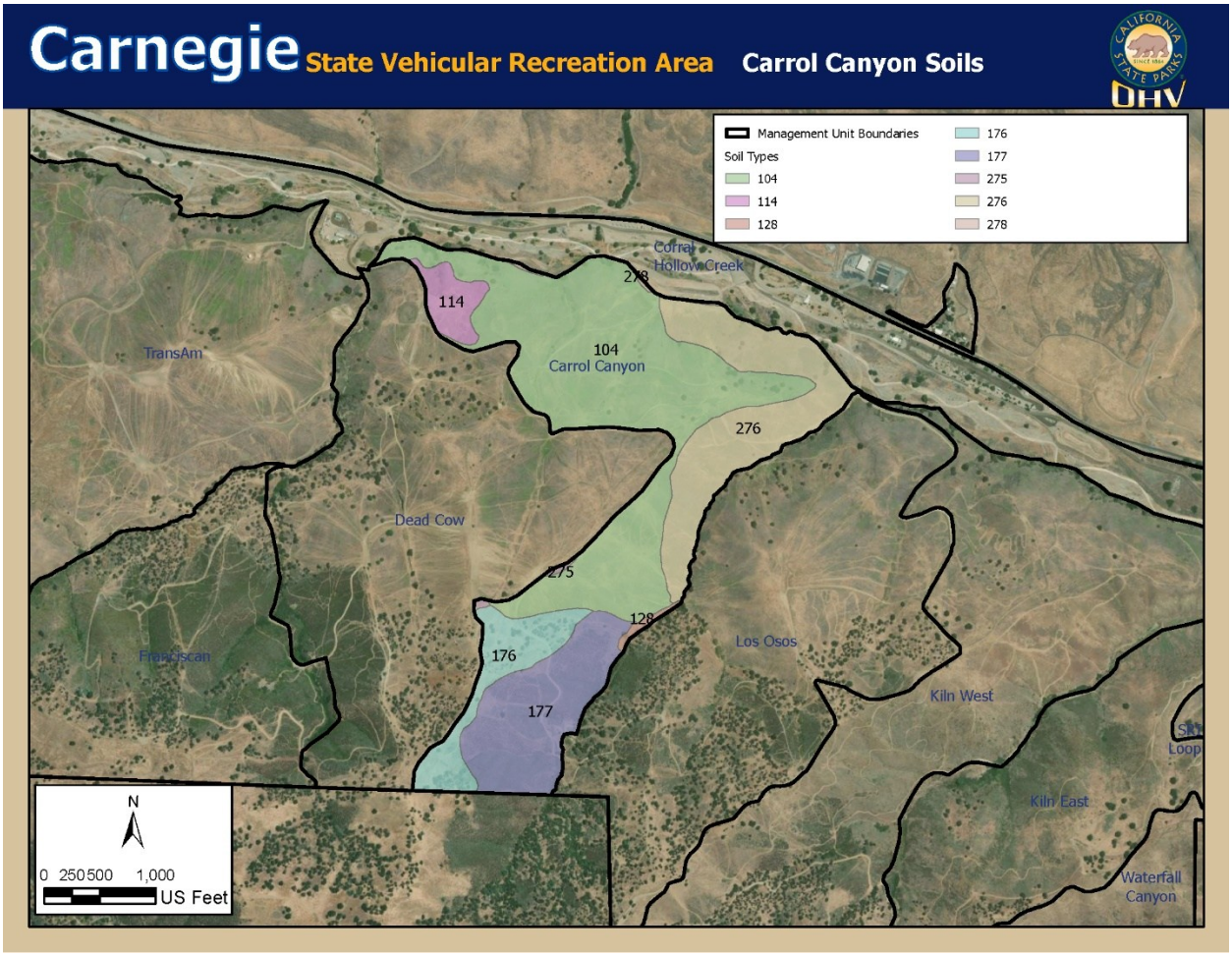

Figure 25. Soils map for Carrol Canyon MU.

Carrol Canyon MU falls entirely within San Joaquin County and is classified using the San Joaquin County SSURGO database descriptions. Soil types within Carrol Canyon MU include Alo-Vaquero complex, Wisflat-Arbuna-San Timoteo Complex, Honker-Vallecitos-Gonzaga Complex, Honker-Vallecitos-Hoker-Eroded Complex, with a small amount of Calla-Carbona complex on the western side of the MU, near the Stockpile area (Figure 25).

Alo-Vaquero complex soils have a clay texture and are classified as clayey hills. This soil type demonstrates a low saturated hydraulic conductivity, so infiltration rates for this soil type are slower. The potential for increased runoff rates, subsurface water flow and pollutant transport on this soil type is higher. The presence of these qualities may pose impacts to plant growth from this soil type.

Wisflat-Arbuna-San Timoteo complex is composed of residuum weathered from sandstone and calcareous sandstone and is classified as well drained sandy loam with a high saturated hydraulic conductivity. These soils are also more susceptible to erosion from the wind than other soils found within CSVRA. Because this soil type exhibits these properties

with a high susceptibility to erosion from wind or water, OHV roads and trails in this soil type will require regular monitoring and adaptive management actions to ensure compliance with the Standard.

Honker soils are typically part loam with gravelly clay and are classified as well drained soils with a moderately high saturated hydraulic conductivity, implying that these soils can transmit water flow under saturated soil conditions. Honker soils have a high shrink-swell potential and are low susceptibility to wind erosion. Honker-Vallecitos-Gonzaga complex soils are composed of residuum weathered from sandstone and shale and are classified as well drained soils with very high runoff rates and a very low to low hydraulic conductivity. Within this soil group, a restrictive layer can be found approximately 4 inches below the surface, with approximately 10-40 inches to lithic bedrock. Honker-Vallecitos-Honker-Eroded complex is composed of residuum weathered from sandstone and is classified as well-drained soils with very high runoff potential, and low to moderately low saturated hydraulic conductivity. This soil group also exhibits a restrictive layer that can be found approximately 4-7 inches below the surface, with approximately 10-40 inches to lithic bedrock.

Calla-Carbona complex soils are composed of alluvium derived from mixed rock sources. This is a clay loam soil type that is well drained with a moderately low saturated hydraulic conductivity. The runoff potential for this soil type is moderately low, and this soil type has a moderate shrink-swell potential. Calla-Carbona complex soils are more susceptible to erosion by water or wind and require proper management actions to ensure compliance with the Standard.

2.6.7 Dead Cow MU

Dead Cow MU is located between Franciscan MU to the west and Carrol Canyon MU to the east; the southern boundary of Dead Cow MU forms the southern boundary of CSVRA. There are currently no established RMAs within Dead Cow MU. There are two resource areas within Dead Cow MU that are not open for OHV recreation. Dead Cow MU contains a popular hillclimb area known as Competition Hill in a small offset canyon on the western side of the MU known as Dead Cow Canyon. Another hillclimb location in the park, the Training hill in TransAm MU, is known as being ‘the hill you train on to be able to climb Competition hill’. Because of the popularity of hillclimbs in this area, managed hillclimbs will be considered when this area is rehabilitated and incorporated into the RMA program.

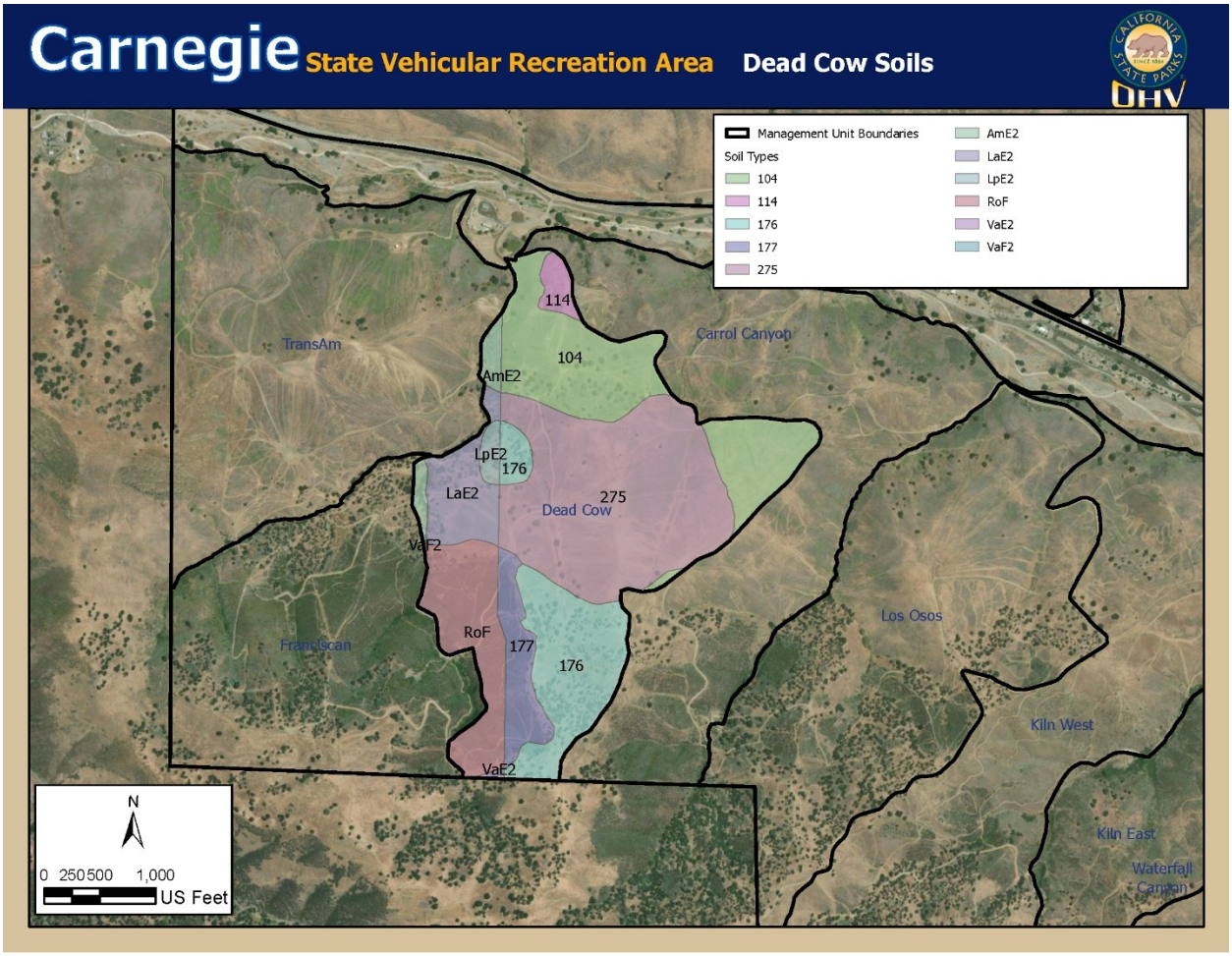

Figure 26. Soils map for Dead Cow MU.

Dead Cow MU is classified using both the Alameda County and San Joaquin County SSURGO database descriptions, since this MU falls in both counties. Soil types within Dead Cow MU include Linne clay loam, Los Gatos-Los Osos complex, rock land, and a very small amount of Vallecitos rocky loam in Alameda County and Alo-Vaquero complex, Calla-Carbona complex, Honker-Vallecitos-Gonzaga Complex, Honker-Vallecitos-Honker-Eroded Complex, Wisflat-Arbuna-San Timoteo Complex in San Joaquin County, as depicted in Figure 26. The 30-50% slopes within this MU require regular monitoring to ensure OHV trail management remains in compliance with the Standard. As previously mentioned, recreational trails should have a slope of 5-10%, so the SVRA's trail design for this area included subtle climbs, erosion control features to shed water from the trail path, and trails that parallel the contour of the slope to promote hydrologic invisibility. This area is inspected regularly as detailed in Chapter 5.

Alo-Vaquero complex soils, which are classified as clayey hills, are composed of residuum weathered from shale. Alo-Vaquero complex soils have a clay texture with low saturated hydraulic conductivity, therefore infiltration rates for this soil type are slower. The potential

for increased runoff rates, impacts to plant growth, subsurface water flow and pollutant transport on this soil type is higher.

Calla-carbona complex soils are composed of alluvium derived from mixed rock sources. This clay loam soil type is well drained with moderately low saturated hydraulic conductivity. The runoff potential for this soil type is moderately low, and this soil type has a moderate shrink-swell potential. Calla-Carbona complex soils are more susceptible to erosion by water or wind and require proper management actions to ensure compliance with the Standard. Honker-Vallecitos-Gonzaga complex soils are composed of residuum weathered from sandstone and shale and are classified as well drained soils with very high runoff rates and a very low to low hydraulic conductivity. Within this soil group, a restrictive layer can be found approximately 4 inches below the surface, with approximately 10-40 inches to lithic bedrock.

Honker-Vallecitos-Honker-Eroded complex is composed of residuum weathered from sandstone and is classified as well-drained soils with very high runoff potential, and low to moderately low saturated hydraulic conductivity. This soil group also exhibits a restrictive layer that can be found approximately 4-7 inches below the surface, with approximately 10-40 inches to lithic bedrock.

Wisflat-Arbuna-San Timoteo complex is composed of residuum weathered from sandstone and calcareous sandstone and is classified as well drained sandy loam with a high saturated hydraulic conductivity. These soils are also more susceptible to erosion from the wind than other soils found within CSVRA. Because this soil type exhibits these properties with a high susceptibility to erosion from wind or water, OHV roads and trails in this soil type will require regular monitoring and adaptive management actions to ensure compliance with the Standard.

In Alameda County, Linne clay loam is classified as a clay loam that is well drained with a very low saturated hydraulic conductivity. The runoff rate for this soil type is very high and the potential for this soil type to be eroded by wind is higher than other soil types found within CSVRA. The shrink-swell potential of this soil type is moderate.

Los Gatos-Los Osos complex is loam texture soil with a very low saturated hydraulic conductivity. The parent material for this soil is residuum weathered from sandstone, shale, and in some places, conglomerate. This soil type has a high runoff potential with a low susceptibility to wind erosion.

The rock land is composed of alluvium derived from sandstone and shale and does not have soil properties or qualities associated with it due to the lack of soils present within that group. Rock land is found within Alameda County; across the county line in San Joaquin County, this unit is mapped as Honker-Vallecitos-Honker-Eroded complex.

Vallecitos rocky loam is found within Alameda County and is composed of residuum weathered from sandstone and shale. The surface texture of this soil is classified as loam and the hydraulic conductivity is very low. This soil type is well drained to excessively well drained and exhibits a high runoff rate with a low susceptibility to wind erosion. The shrink-swell potential of this soil type is low.

The vegetation type present within Dead Cow MU is predominantly annual grassland and oak woodlands, with a denser concentration of shrub brush towards the southern boundary of the SVRA. There is a lack of rocky outcrops throughout the majority of this MU, but the drainage qualities of the soil types present create a suitable habitat for oak species and junipers to grow. Dead Cow Canyon hosts a pocket of oak woodland habitat where multiple species of oaks can be found in moderately dense cover. The shrub land dominates the rock land and Honker-Vallecitos-Honker eroded complex soils, growing more denser towards the southwestern portion of Dead Cow MU where more moisture from the Coast Range climate may be available.

2.6.8. Franciscan MU

Franciscan MU comprises up the southwest boundary of CSVRA and is formed by an access road, Franciscan Loop trail. Franciscan Loop trail connects to Pottery Loop trail east of Training hill and south of the maintenance yard and surrounds Franciscan MU. The existing RMA in this MU, West Franciscan RMA, was created opportunistically in 2015 following a fire closure but was not reopened until 2024. The remaining portions of this MU are still being planned.

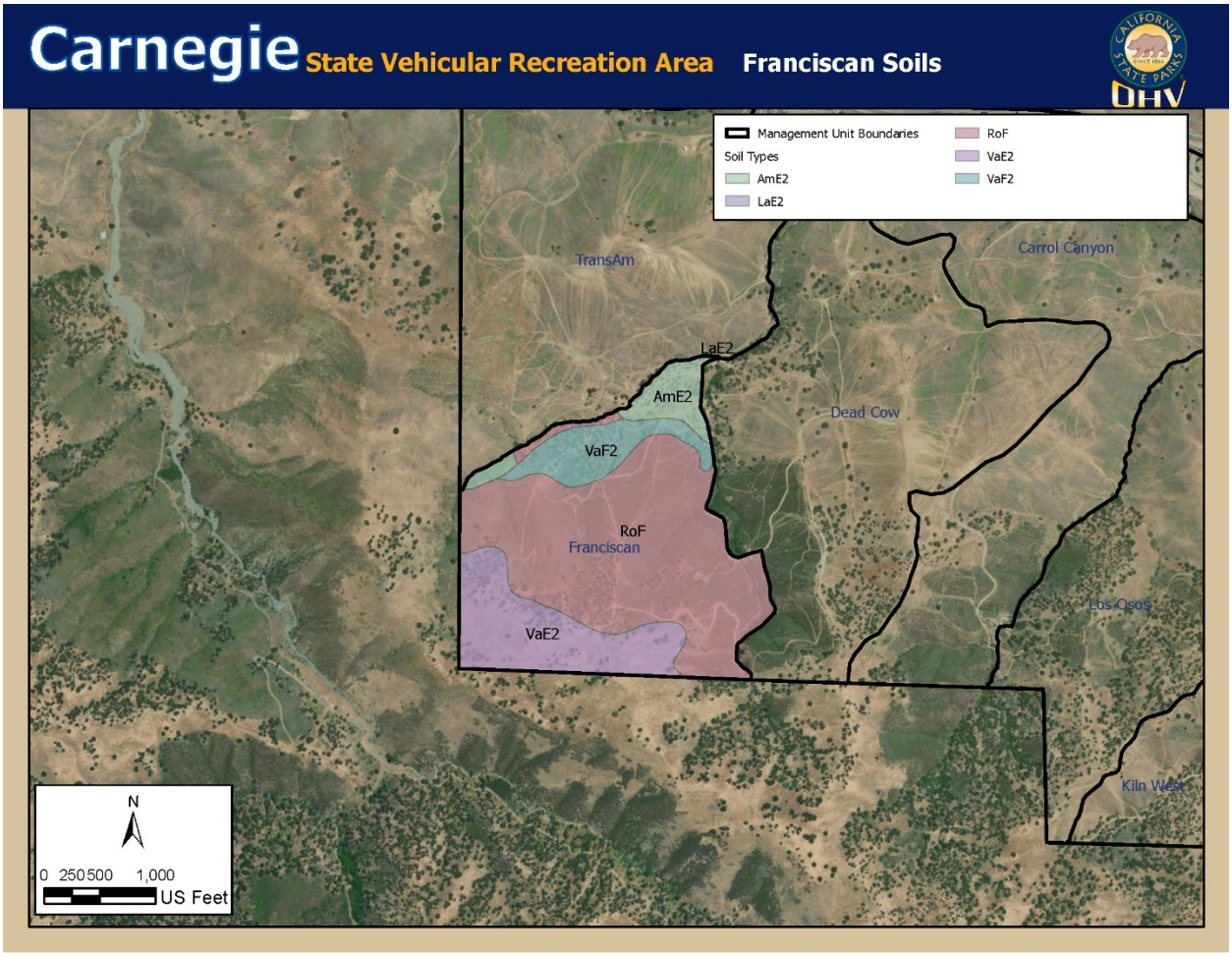

Figure 27. Soils map for Franciscan MU.

RMAs in Franciscan MU:

Franciscan MU is classified using the Alameda County SSURGO database descriptions, since this MU falls entirely within Alameda County. Soil types within this MU include rock land, Vallecitos rocky loam, and a small amount of Altamont clay. The MU is primarily rock land with some Vallecitos rocky loam (30-45% slopes, eroded) along the southwestern boundary of the SVRA and some Vallecitos rocky loam (30-75% slopes, eroded, MRLA 15)

The rock land is composed of alluvium derived from sandstone and shale and does not have soil properties or qualities associated with it due to the lack of soils present within that group. Vallecitos rocky loam is found within Alameda County and is composed of residuum weathered from sandstone and shale. The surface texture of this soil is classified as loam and the hydraulic conductivity is very low. This soil type is well drained to excessively well drained and exhibits a high runoff rate with a low susceptibility to wind erosion. The shrink-swell potential of this soil type is low. The Altamont clay is composed of residuum weathered from sandstone and shale parent materials and is classified as well

drained with a very high runoff potential and very low saturated hydraulic conductivity. This soil type is considered to be more durable due to the shrink-swell potential of the clay; clay particles are less likely to be displaced or detached by rainfall than other surface textures. Within this MU, various shrub types dominate. The majority of the desert olive vegetation found within CSVRA resides within the coarse textured drainages of Franciscan MU.

2.6.9. TransAm MU

TransAm MU composes the western boundary of CSVRA up to the Tyson's Pond drainage area, which serves as the boundary between TransAm MU and Franciscan MU to the south, Dead Cow MU to the southeast and Carrol Canyon MU to the northeast. Corral Hollow Creek MU is located to the north of TransAm MU. TransAm MU is 184.1 acres in size. This MU contains one RMA that is operated as a trails-only riding area, as well as a popular hillclimb area known as Training Hill. The former location of the TransAm track, where the MU's name is derived from, is located on the southwestern portion of the MU where it borders Franciscan MU. Carnegie SVRA management removed the TransAm track feature in 1993, and the area was rehabilitated. This area is currently designated as open-riding.

Figure 28. Photo of the historic TransAm track prior to DPR ownership of CSVRA, circa 1975.

RMAs in TransAm MU

There is currently one established RMA within TransAm MU. Burned Pottery RMA comprises the western boundary of CSVRA and was opportunistically esablished in 2015 following a closure and rehabilitation efforts from a wildfire. Burned Pottery RMA is open only to dirt bikes and offers 1.98 miles of trails within its 32.9 acres. Access into the RMA is limited

using fencing and width limiters at trail entrances, which prevent ATVs or three wheelers from entering the RMA. Trails within Burned Pottery RMA are rated as black diamond skill level trails.

Training Hill is a popular hillclimb area on one of the north facing hills on the west end of Carnegie SVRA, located behind Water Tank trail. Training Hill is not currently a designated RMA, but Parks staff is interested in developing this area as an open-riding RMA, where visitors are not required to remain on designated trail systems. Training Hill is known as being a practice area for motorcycle hillclimbing at CSVRA; once riders master Training Hill, they are ready to move up to Competition Hill, another challenging hillclimb area in Dead Cow MU. Parks staff is currently devising a maintenance and monitoring program for areas of the park where hillclimbing is the primary recreational attraction, since this type of activity is difficult to restrict users to trail systems. Future decisions about open-riding management and monitoring will be reported on in the SCP Annual Compliance reports.

TransAm MU is composed of primarily Altamont clay soil with a small amount of rock land along the southwestern boundary of the MU and a small amount of Linne clay loam at the boundary between TransAm and Dead Cow MUs (Figure 29). In accordance with the Carnegie General Plan, clay soil types are preferred for locating hillclimb activities on due to the durability of the soils. TransAm MU is classified using the Alameda County SSURGO database descriptions, since this MU falls nearly entirely within Alameda County.

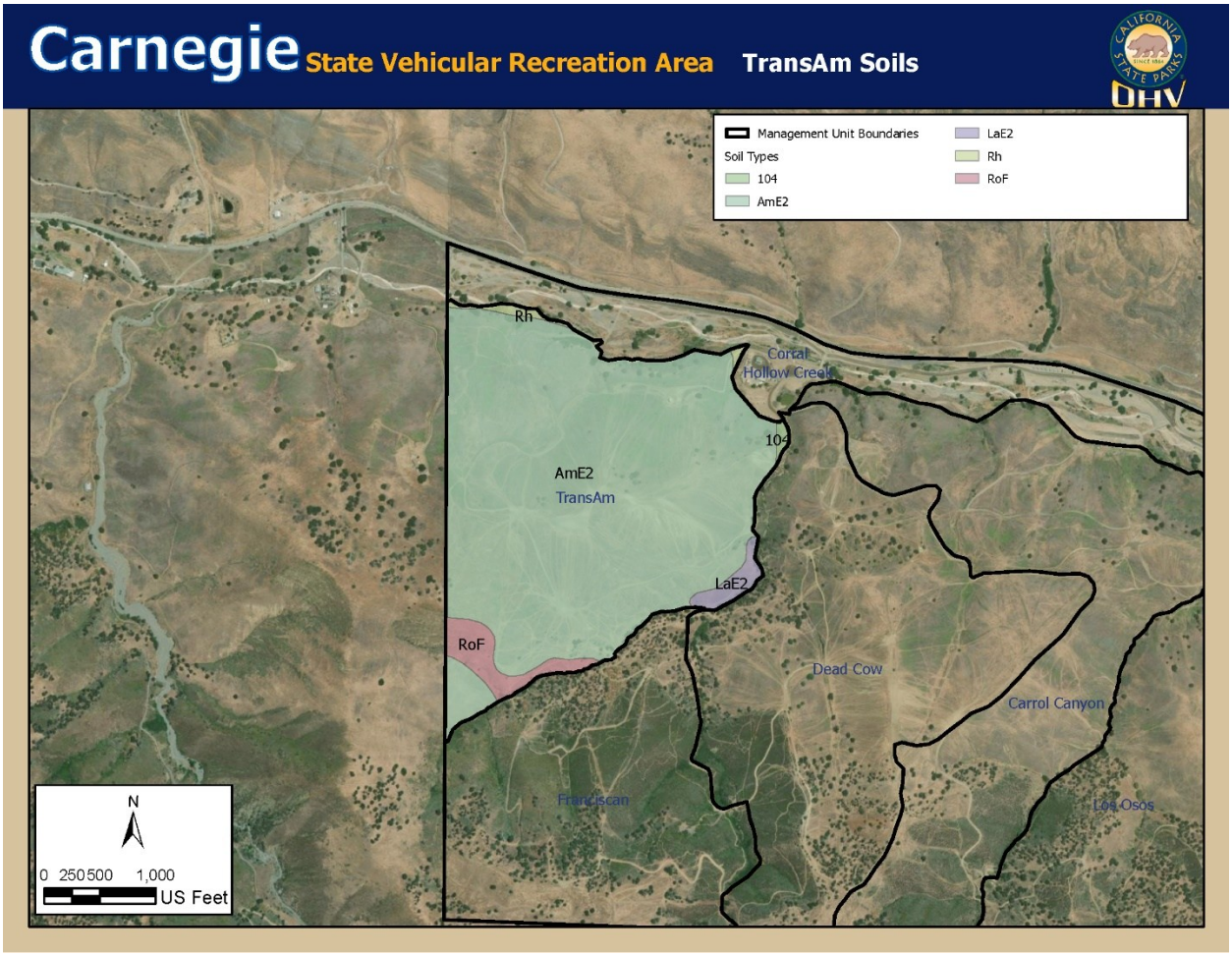

Figure 29. Soil map of TransAm MU.

Altamont clay and rock land soil types are in hydrologic group D and Linne clay loam soil is within hydrologic group C, indicating that runoff rates for these soil types can be high when saturated due to very slow water transmission rates. Compaction and lack of vegetation can increase the erosion potential of soils within this hydrologic class; otherwise, these soil types are considered very cohesive and able to withstand the erosive forces of wind and water in their natural state. Altamont clay is composed of residuum weathered from sandstone and shale parent materials. The rock land is composed of alluvium derived from sandstone and shale and does not have soil properties or qualities associated with it due to the lack of soils present within that group.

2.6.10 Waterfall Canyon MU

This MU is not open to motorized recreation and is currently not open to the public. There are no facilities or established trails in this MU. Due to the lack of recreational activities in this MU, it is not discussed in this document. This section will be developed in future

iterations of this document should future planning efforts include opening this area to public recreation.

3.0 Goals and Objectives

Setting goals and objectives provides clarity around the outcomes to be achieved through implementation of annual management activities related to soils as well as protection, conservation, and improvement of other natural resources as required by law (DPR, 2021b). In addition, well-crafted goals and objectives can identify targeted resource conditions while also allowing for flexibility to apply innovative techniques to achieve desired conditions. This section provides a description of the goals and objectives developed for adaptative soil management at Carnegie SVRA.

3.1 Goals as Defined by the Standard

Public Resources Code 5090.35.(b)(1) requires that the Standard be "generic and measurable". The Standard provides criteria required to demonstrate successful compliance. This section of the Guidelines is intended to provide specific definitions which allow interpretation of the 2020 Standard.

There are two main components to consider when assessing compliance with the Standard. Therefore, the goal for the CSVRA SCP is to create a framework that ensures the SVRA is managed for (DPR 2020):

1. "Sustainable long-term prescribed use" - Successful compliance with the Standard requires that OHV facilities be managed for sustainable and long-term use. Sustainability refers to soil management practices that do not degrade or impair environmental quality onsite or offsite, and do not reduce site productivity as a result of management practices over time. Sustainable prescribed use would be minimum service life of 25 years (DPR 2008).
2. To meet the criteria of sustainable long-term use, soil loss must not exceed restorability (i.e. the ability to be restored). PRC 5090.02 (c)(4) requires that when OHV recreation areas or trails or portions thereof cannot be maintained to appropriate established standards for sustained long-term use, they shall be closed to use and be repaired to prevent accelerated erosion. Those areas shall remain closed until they can be managed within the soil loss standard or shall be closed and restored. Restoration of these areas means that upon closure of the unit or any portion thereof, the return of land to the contours, the plant communities, and the plant covers comparable to those on surrounding lands or at least those which existed prior to OHV use, as defined in PRC 5090.11 and 14 CCR 4970.01.

3.2 SCP Objectives

The Carnegie SVRA objectives tier directly from the goal as defined in the Standard, considering objectives from relevant state and regional conservation documents and incorporating BAS. In addition, the SCP objectives are consistent with the 2024 Carnegie General Plan and the EIR (DPR, 2024). The objectives follow S.M.A.R.T. format principles and inherently conform to BAS and adaptive management. S.M.A.R.T. refers to objectives which are "specific", "measurable", "achievable/attainable", "realistic" and "timely". The objectives are based on information gathered from the natural resource assessment of erosion potential and previous studies, assessments, and surveys. These objectives are intended to span the next five years.

Objective 1: Minimize impacts from erosion and sedimentation into Corral Hollow Creek originating from OHV roads and trails, and other OHV Facilities.		
S.M.A.R.T. Target to achieve this objective:	Targets can be tied to these monitoring efforts to measure success:	Management Actions that accomplish this objective:
Maintain 50% of mapped OHV roads and trails to a yellow rating condition or better.	• Annual G-Y-R Trail Evals	• Road and trail maintenance • Annual MgCl application
Prioritize red-rated trails and BMPs to receive maintenance within 9 months of identifying deficiency and yellow-rated trails and BMPs to receive maintenance within 18 months of identifying deficiency.	• Annual BMP Evaluations • Annual G-Y-R Trail Evals	• Road and trail maintenance
Annually maintain at minimum two sediment basins to within 75% of their holding capacity (if needed).	• Sediment Basin Yield Calculations after maintenance	• Sediment basin maintenance

Objective 2: Eliminate/reduce/prevent erosion associated with volunteer trail creation in previously rehabilitated RMAs		
S.M.A.R.T. Target to achieve this objective:	Targets can be tied to these monitoring efforts to measure success:	Management Actions that accomplish this objective:
Ensure no new volunteer trails persist in rehabilitated areas (RMAs). Maintain RMAs as they are established. RMA closures due to off-trail riding (OTR) incidents are reported on in SWMP Annual Report.	• Weekly/bi-weekly OTR inspections	• RMA closures • Signage • Outreach • Enforcement

Objective 3: Reduce denuded areas within active riding portions of the SVRA.		
S.M.A.R.T. Target to achieve this objective:	Targets can be tied to these monitoring efforts to measure success:	Management Actions that accomplish this objective:
Ensure no more than 11 acres of barren area within the SVRA (baseline from 2022 VegCAMP surveys), excluding developed areas such as campgrounds/staging areas.	• VegCAMP - reassessed every 5 years to assess for overall reduction in bare areas • Photo point monitoring via drone (protocol currently in development; progress will be included in SCP Annual Report)	Perform revegetation efforts in areas of the SVRA where vegetation is denuded throughout the SVRA's active riding area.

Objective 4: Reduce storm related damage and erosion to OHV roads and trails during wet weather.		
S.M.A.R.T. Target to achieve this objective:	Targets can be tied to these monitoring efforts to measure success:	Management Actions that accomplish this objective:
Close access to trail systems in the hills once soils are saturated.	• Monitoring of field conditions during storm events • Monitoring of rainfall amounts received by the weather station at the Carnegie entrance kiosk	Implement Wet Weather Closure Policy: • Closure of trail-access into the hills if conditions are met • Trail-access into the hills is restricted for at least 12 hours after a wet weather closure

Objective 5: Reduce erosion potential from special events at the SVRA by confining activities to public-use areas, eliminating or minimizing new ground disturbance.		
S.M.A.R.T. Target to achieve this objective:	Targets can be tied to these monitoring efforts to measure success:	Management Actions that accomplish this objective:
Develop protocol for special event monitoring; determine when pre-, post- and during event monitoring is needed	• Special Event Monitoring (protocol in development; progress will be included in SCP Annual Report)	• Special Event Permitting Requirements prior to the event • CEQA analysis for Special Events
Complete pre- and post-event monitoring inspections within 14 days of each event; prioritize needed repairs and conduct within 60 days post-event.	• Special Event Monitoring (protocol in development; progress will be included in SCP Annual Report)	• Conduct repairs needed post-event within 60 days

4.0 Management Plan and Maintenance Schedule

The management plan and maintenance schedule described in this section has been developed from the existing conditions assessments and ongoing park maintenance work to ensure consistent, appropriate maintenance is conducted at Carnegie SVRA in accordance with the Carnegie SVRA General Plan, the Standard (DPR 2020) and the 2007 OHV BMP Manual for Erosion and Sediment Control (DPR 2007b). The maintenance plan may be modified in the future to address areas requiring excessive chronic maintenance, or to accommodate changes in maintenance protocol in direct response to monitoring from the previous year. Maintenance activities will be documented in the Compliance Report and Action Plan portions of the SCP (See Section 6 for more details).

Some management actions are long-term and will occur in perpetuity, while others are discrete and are often adaptive management actions that are employed to deter unauthorized activity or as the result of an unplanned incident.

4.1 Management Plan

The Management Plan for Carnegie SVRA was developed to describe the management actions and maintenance activities that Parks staff may undertake at any given time to maintain facilities and ensure compliance with the Standard. Currently, many of the MUs and RMAs are managed the same way in the context of the SCP, and many management actions and activities occur on a park-wide scale, rather than an MU scale. As such, maintenance activities are described by type rather than separated by MU or RMA. Some management actions are limited to only portions of the park, while others occur on a park-wide scale. Some management actions are discrete or responsive and are employed as a result of unwanted activity (e.g. RMA closures), while others are long-term and will be carried out in perpetuity (e.g. wet weather closures, banning night riding).

Best Management Practices (BMPs) are measures that minimize or eliminate the effects of soil erosion, sedimentation mobilization in stormwater, or non-stormwater discharges of possible pollutants. BMPs are intended to imitate and protect the natural functions of a landscape by allowing water to flow while still maintaining the integrity of the soil in the trail network. BMPs must be carefully and appropriately chosen, properly implemented, and regularly maintained to ensure effectiveness. Carnegie SVRA utilizes the OHMVR Division Best Management Practice Manual (DPR 2007b) to provide guidance for selecting and implementing BMPs; this manual was specifically compiled and written to be for use by Carnegie SVRA staff but is used state-wide by Parks staff. The use and implementation of BMPs within the SVRA is often in response to feedback provided by monitoring efforts undertaken by CSVRA. Not all maintenance activities occur annually, but often as a result of feedback from monitoring efforts. Monitoring efforts undertaken by CSVRA are discussed in Section 5.0.

BMPs help DPR and CSVRA meet environmental compliance standards and goals by providing responsible management, maintenance and construction guidelines that offer ecosystem protection while offering quality recreation to the public. BMPs ultimately provide erosion and sediment controls, but may be categorized into parks operations and maintenance, erosion prevention, sediment control, surface stabilization, runoff control, road and trail drainage, or rehabilitation activities.

4.1.1 Park Operations Management Actions:

Night Riding Ban

Carnegie SVRA operates daily from 8am until approximately sunset each day. Upon the daily closure of the SVRA, the gates from the SVRA into the campground are locked to prevent visitors from entering the rest of the SVRA after closure and all entrances into the SVRA are locked. Other SVRAs may allow recreation after hours, but Carnegie SVRA does not allow OHV operation by the public after hours. This management action protects park assets, as well as nocturnal wildlife species that inhabit the park.

Valley Floor Speed Limit

The main park road that runs along the valley floor limits the speed of all vehicles to 15 miles-per-hour. This speed limit is enforced as a public safety measure by CVC §38310, which states that "no motor vehicle shall exceed 15 mph within 50 feet of any campground, campsite, or concentration of people or animals". Since staging areas for visitors are located throughout the valley floor, enforcing the 15-mph speed limit on the main park road ensures public safety while also minimizing fugitive dust generation from OHV recreation.

Vehicle Restriction in Hills

During the SVRA's private ownership, Carnegie Cycle Park recognized that full-size off-road vehicles such as 4x4 Jeeps and trucks posed a safety risk to smaller OHVs like ATVs and dirt bikes when allowed to access the same trail system in the steep hills to the south of the creek and banned full-size off-road vehicles from the trail system in the hills. As time progressed, the popularity of recreational off-road vehicles (ROVs) increased, creating another OHV user group that was interested in accessing Carnegie's trail system in the hills. The steepness of the canyons in the park poses a risk to the safety of users that may try to access the trail systems in the hills in ROVs, along with the hazard of ROVs sharing trails with dirt bikes and ATVs. Because of this, only ATVs, three-wheel motorcycles, and motorcycles may access the trail system in the hills. This restriction of larger ROVs also streamlines compliance with the Standard, since smaller routes minimize the footprint of exposed soil along an OHV trail. Recreation for ROVs and 4x4s are limited to the 4x4 Challenge Area and the valley floor.

Traction Enhancing Device Ban

Per the Diablo Range District's Superintendent Posted Order, motorcycles or ATVs with traction enhancing devices are prohibited at Carnegie SVRA. Traction enhancing devices such as paddle tires, tires with metal paddles, studs or chains, or any sort of metal paddle that attaches to a tire, are often used by competitive hillclimb riders to increase the traction between the vehicle tire and the surface they are riding on. Paddle tires are common in sandy areas where OHV recreation is allowed, since the paddles on the tires allow the vehicle to dig itself up out of the sand, where a normal tire would just dig in and bury itself. As a resource protection measure, as well as to protect public safety and property, traction enhancing devices may not be used within Carnegie SVRA.

Resource Protection Closures

Throughout the SVRA, various areas permanently restrict OHV-activity to protect resources. Culturally significant and environmentally sensitive sites are protected using fencing and gates (Figure 30). For example, over 70 acres of the floodplain of Corral Hollow Creek are fenced off to OHV-activity, limiting park visitors to a set of five designated creek

Figure 30. Photo showing resource closure area in Franciscan MU. Resources are protected using fencing, signage, education and enforcement.

crossings to allow access from parking and staging facilities to the trail system south of the creek while limiting the potential impact to receiving water. This closure has been an important protection measure for the riparian habitat within the Corral Hollow Creek watershed, which supports federal- and state-endangered wildlife such as the California red-legged frog and California tiger salamander. Sediment basins and ponds within CSVRA have been permanently fenced off to exclude OHV-activity and protect water quality, as well as breeding habitat for sensitive species. Drainages that are not already fenced off are targeted for improvements to promote hydrologic invisibility. Portions of the park may be closed temporarily to repair or rehabilitate trails or habitat. These closures allow for vegetation to be reestablished, reducing the potential for erosion that may result from high velocity surface flows that can occur on slopes barren of vegetation. Various forms of barriers are used to exclude OHV-use from these areas, including fencing, vegetation, signage, and enforcement.

Gates, Signs, and Fences

Signs, gates and fences are a key management strategy implemented at Carnegie SVRA. Signs are used to indicate rules and legal mandates, road and trail names, and to identify features at CSVRA such as the MX track or the 4x4 play area. Gates provide access throughout the park and may be closed at various times for various reasons. For example, the gates that serve as an entrance into the hills and trails are closed during wet weather closures to limit impacts to soils in the hills, as well as to ensure public safety. This policy is detailed in Section 4.1.2. A gate system is the primary method to manage RMAs as trails-only riding areas within CSVRA, where the gate system to enter an RMA's trail network will be closed off after OTRs are identified or if the RMA is deemed to require maintenance work to ensure compliance with the Standard. Gates also serve as the main entrance and exit points for CSVRA, like the main entrance kiosk, the maintenance gate on the west end of CSVRA, and the after-hours entrance and exit to the campgrounds. Fencing is a vital component to management at CSVRA. Fencing has been installed throughout the park and signifies a physical barrier to prevent unauthorized use. One example of barrier fencing as a management strategy is, as mentioned in Section 2.6.1, the fencing that was installed in 2009 to prevent OHV-users from recreating in the active channel of Corral Hollow Creek. Fencing is used to prevent visitors from entering restricted areas, such as the Carnegie ranger's station or the maintenance yard. Fencing is also used to prevent unauthorized OHV use in RMAs, and work with the gates as a system to restrict a closed area from visitor use until repairs can be made.

4.1.2 Erosion Prevention Management Actions:

Erosion prevention methods are a collection of preventative techniques that work to reduce erosion by preventing it from occurring in the first place. Erosion prevention methods are the top priority for controlling erosion. Erosion prevention methods require

careful and considerate planning and design, factoring scheduling and sensitive resources into planning considerations to reduce potential erosion and sedimentation.

Wet Weather Closure

Carnegie SVRA implements a wet weather closure policy to protect public safety and soil composition. This policy has been implemented since 2011. Wet weather closures are implemented based on a quantitative, cumulative precipitation measurement determined to be representative of when the soils at the SVRA become so saturated that sheet flow may occur. Using hydrological models and historic conditions, the following thresholds were determined to be representative of when the soil becomes saturated enough for sheet flow to occur:

- More than 0.30 inches within 12 hours
- More than 0.50 inches within 24 hours
- More than 0.65 inches within 48 hours

If any of these rainfall thresholds are met, measured by the weather station at the Carnegie entrance kiosk, the SVRA's trails are closed for a minimum of 12 hours until the trails are determined dry enough to support OHV recreation and facilitate visitor services as determined by SPPO staff.

Wet weather closures protect soil in the SVRA by preventing damage to OHV roads, trails and facilities from accelerated unnatural erosion, which also aids in protecting water quality by minimizing the material available to mobilize in stormwater. As discussed in Section 2.6, the abundance of clay soils in Carnegie SVRA presents a management challenge in wet weather, when the clay soils can become very slick and nearly impassable. The high clay content in the soil at CSVRA necessitates the closure of the park's main trail system during wet weather. When clay soil is saturated, OHV recreation can lead to erosion and water quality issues, as well as cause severe damage to the trail tread if traversed with motorized equipment. This policy also serves to maintain visitor and staff safety, since the hills become untraversable in wet weather, increasing the potential for accidents or injuries due to unsafe conditions and compromising the ability for emergency vehicles to assist, or even access an individual, in the event of an emergency.

During wet weather closures, the SVRA is split into three distinct designations: the Valley Floor, the West Hills and the East Hills. The Valley Floor is the Corral Hollow MU and remains open during wet weather closures, unless the entire SVRA closes due to conditions. The East and West Hills are divided at Carrol Canyon and the SVRA's gate system allows management to open or close visitor access to either or both sides of the Hill's trail system in the event of wet weather. Due to soil type variations, conditions in the East Hills typically dry out sooner than conditions in the West Hills, allowing management to reopen the East Hills earlier than the West Hills in most circumstances.

Wet weather closures and updates on conditions are posted on the SVRA's social media, the website, and updates are sent to visitors and staff via text message alert, which is maintained by visitor services staff. More about monitoring for wet weather closures is detailed in Section 5.2.

Scheduling

Scheduling special events and trail maintenance is another method employed by the SVRA to minimize dust emissions. Special events typically take place from October through May, when soil moisture is more prevalent, and may require cancellation or rescheduling due to inclement weather and/or soil conditions. Trail maintenance is performed in the late winter to early spring, depending on rainfall conditions; if the winter receives heavy rainfall, trail maintenance is put off until later in the season to allow time for soils to dry out enough that equipment work won't damage the soils. Alternately, trail maintenance is less effective once the moisture content in the soil has diminished, as the soils within the trail system tend to harden as the weather gets warmer. Within Carnegie SVRA, timing for trail maintenance is imperative to ensure that there is enough soil moisture to ensure compaction, reduce dust emissions and the potential for soil to mobilize after mechanical manipulation from equipment.

4.1.3 Erosion and Sediment Control Measures:

Sediment Basin Management

Sediment basins are a part of the critical stormwater infrastructure, and an integral sediment control feature implemented at CSVRA. There are eight waterbodies within the CSVRA, five of which operate as sediment basins (Figure 32). Sediment basins are designed to slow and retain sediment-laden water long enough for deposition of coarse material and settlement of fine particles before being discharged into connecting tributaries. In general, a sediment basin consists of an inlet (either natural or piped with a culvert), a retention area, an earthen berm or gabion basket structure to impound water, and an outlet pipe. Most outlet structures have been reinforced with rock to prevent scour. Sediment basins provide good control of coarse sediment and can effectively trap medium-size sediment particles; however, suspended clay and fine silt particles in runoff require longer settling times in the basin without the additional of chemical flocculants to bind to and remove these finer-textured sediments.

Figure 31. Photo of Tyson's Pond sediment basin.

Regular maintenance is integral to sediment basin efficiency. Maintenance for sediment basins heavily relies on a mechanical removal of the accumulated sediment from the basin; typically, the clean out level is identified as 50-75% of the wet storage depth. During these cleanings, the inlets, outlets and spillway for the basin should be inspected to ensure that no debris has collected and that there are no signs of erosion or displacement of materials that may be integral to the structure of the basin. If any evidence of erosion or other conditions that may indicate weakness or potential failure are detected, they must be addressed immediately. During sediment basin maintenance, the set of culverts underneath the bridge to the maintenance yard are also cleaned of built-up sediment to allow sufficient clearance for creek flows to pass under the bridge.

At Carnegie SVRA, basins are typically cleaned out annually in the late summer to early fall when the basins have been dried for at least four weeks. The timing of sediment basin maintenance is pertinent due to the sensitivity of the breeding habitat for amphibians that the sediment basins provide. The federally and/or state listed wildlife like the California red-legged frog and California tiger salamander have the potential to exist or breed in waterbodies within Corral Hollow Canyon, so complete desiccation of the basins is

necessary to minimize impacts to these species. Intensive surveys are conducted prior to maintenance to ensure the basins are not inhabited by wildlife and biological monitors are present while sediment basin maintenance is occurring. This regular maintenance is subject to various regulatory permits and conditions, and compliance with all state and federal laws that pertain to this type of work is mandatory. In some cases, vegetation may have become established in the basins that may need clearing prior to heavy equipment entering the site. Near the end of the clean out process, an environmental scientist will assess the vegetation cover and stability of the basins sidewalls to prevent erosion of the structure that may contribute to sediment yield.

The sediment extracted from the basins is typically removed and stockpiled at Juniper Trail, east of Tyson's Pond sediment basin and is used for regular maintenance and rehabilitation projects inside the park.

Figure 32 shows a map of the sediment ponds within the SVRA. Of these, Tyson's Pond, Carrol Pond, and Kiln Pond are considered the main three sediment basins and receive maintenance more regularly due to the location of the basins in the sub-watershed and the proximity to receiving waters. Franciscan Pond and Juniper Pond are sediment ponds that reside higher up in the sub-watersheds but still provide important stormwater runoff control that can affect the sediment load entering the basins lower in the watershed. Proper maintenance and regular monitoring of these upper sediment ponds at the start and at the end of the wet season should be conducted to ensure that wet storage capacity has not been exceeded.

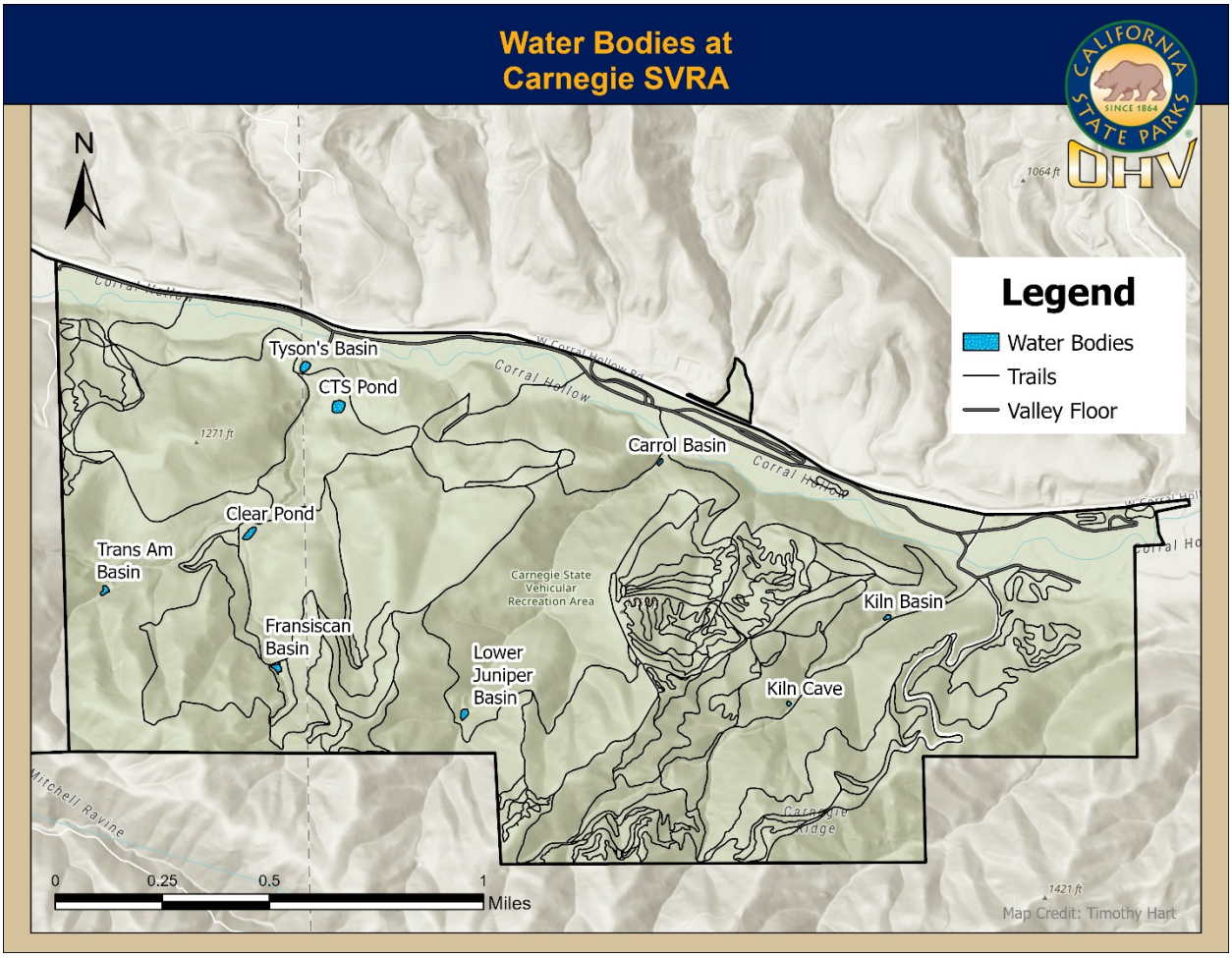

Figure 32. Figure showing locations of the sediment basins and ponds throughout CSVRA.

Culvert Maintenance

Culverts are widely used throughout Carnegie SVRA and are important components of the road and trail system that allow water to pass under at natural drainages or stream crossings. As of Spring 2025, there are 26 culverts that are implemented throughout CSVRA and identified as BMPs. These BMPs are inspected annually each spring; the methods for monitoring are covered in Section 5, Monitoring. Culverts that are 50% or more plugged with sediment are identified as BMPs that will require maintenance within the next year. Identifying culverts for maintenance in the spring typically allows SVRA staff the appropriate amount of time to seek regulatory permits where needed for culvert cleaning.

Culverts are typically cleaned using dry-clean methods, where the culvert has been dried for at least 4 weeks. Depending on the size of the culvert, hand tools, a mini excavator, or a backhoe is used to remove accumulated sediment. The sediment removed from the culvert is stockpiled and used within CSVRA for projects.

Low Water Crossing Maintenance

Carnegie SVRA has five designated low-water crossings that provide access from the north side of Corral Hollow Creek to the trail system and facilities on the south side of the creek. Two of these crossings are hardened; the remaining three low-water crossings are native surface crossings that are sometimes inundated by flow in Corral Hollow Creek.

The crossing at the maintenance bridge is composed of two six-foot culverts underneath a concrete bridge structure (Figure 33). This crossing and the sediment that accumulates underneath it receive annual or as-needed maintenance to allow flow from the creek to pass through the culverts without impingement. A skid-steer is used in combination with an excavator to remove sediment from these culverts. Maintenance of this crossing is subject to regulatory permitting along with the maintenance of the sediment basins.

Figure 33. Photo of maintenance bridge crossing and culverts shortly after annual maintenance.

SRI Crossing is the other hardened low water crossing in CSVRA, located east of the entrance kiosk near Kiln Canyon Trail. The crossing consists of a small concrete pad that encases six small culverts that were intended to allow flow from the creek to pass through; however, the culverts were undersized for the creek's hydraulics, and the culverts have

been buried from material channeled by the flow of the creek. The hardened crossing was installed long prior to DPR's ownership, and the crossing needs updating. Carnegie SVRA and OHMVRD are investigating solutions to redesign the crossing, which is expected to be a lengthy process.

The three native surfaced low-water crossings receive annual or as-needed maintenance to re-establish the path to the trailhead and ensure that the crossing is passable to maintain access for emergency vehicles. While remaining outside of the active channel, a loader or grader is used to back drag the trailhead and ensure clearance. Low water crossings are monitored as needed, as detailed in Section 5.3.

Road and Trail Drainage

Rolling dips are shallow, outward-sloping dips that collect and convey surface runoff from roads and trails to ensure hydrological disconnection and minimize erosion. Rolling dips are preferred at CSVRA over water bars because they are more appropriate for winter use and less likely to get damaged in wet weather. Rolling dips are recommended when the road gradient exceeds the outslope gradient of the road and are effective on long inclines to keep stormwater runoff from creating erosional features along the road. Rolling dips are built by excavation and are created based on specifications identified in the OHV BMP Manual (DPR, 2007b). Spacing of rolling dips depends on the road grade. Rolling dips are inspected as described in Section 5.1.3. Maintenance is performed before the rainy season, depending on the moisture content available in the soil. Maintenance is performed by grading uphill to pull berm material inboard, and rolling dips are graded with caution to prevent damage to the structure.

Check dams are BMPs which are intended to reduce runoff velocity and the potential for sediment transport. Ideally, check dams are used as a temporary measure while a channel is establishing permanent vegetation; however, check dams are sometimes used during gully rehabilitation and repair as permanent grade control structures. Check dams require regular inspections to ensure that flow anomalies or hydraulic jumps are not occurring, which would exacerbate erosional issues. Channel gradient must be taken into consideration when check dams are proposed, since check dams may exhibit a tremendous erosive energy at any opening available that can create damage to the structure.

Outsloping and insloping of roads and trails is used to prevent stormwater from becoming trapped within the road prism. Outsloping refers to when the outside or downhill side of a trail bench is lower than the inside or bank side of the road. This allows runoff to flow naturally as uniform sheet flow off the trail. Insloped roads allows surface runoff to collect in an inboard ditch system along the inside of the road. Insloped roads may require a ditch and cross-drainage structure to move water to the other side of the road. Insloped roads are safer when roads or trails are built along steep slopes with slippery soils or in steep

terrain, but there are drawbacks to insloped roads. Limitations for insloped roads include increased erosion prevention measures, possible reinforcement or increased stabilization of side slopes, and maintenance and treatment of drainage ditches to prevent excess sedimentation. Improper slope of a road of trail will concentrate drainage and may create conditions that are impassable during the rainy season. Roads are outsloped or insloped based on considerations provided in the DPR OHV BMP Manual (DPR, 2007b). Well-designed roads and trails will probably integrate both inslope and outslope sections in combination with rolling dips. Outsloped roads are maintained at least annually, where they are graded in an uphill direction to allow berm material to be pulled inboard. Multiple passes from the grader are usually required. Insloped roads require inspection of drainage ditches and maintenance to be performed to ensure these ditches are operating as intended. Routine grading and shaping are used to maintain insloped roads. Rolling dips are approached with caution to avoid impacts to these features.

4.1.4. Rehabilitation and Surface Stabilization

Hydromulching is a soil stabilization method where fiber mulch is applied to exposed or disturbed areas of soil to prevent raindrop impact erosion. The fiber is hydraulically applied in a slurry, produced by mixing fiber, water and a binding agent together in a mechanical hydroseeder. Effectiveness of hydromulching is dependent on the application rate, which may vary. Hydromulching is also used as a tackifier to anchor straw mulch and apply seed. Hydromulch is sometimes the only acceptable treatment for soil stabilization on steep or rocky slopes that cannot be treated by other means. Effectiveness of hydromulching on this type of terrain may be supplemented using erosion control blankets or hydraulic planting techniques. The conditions present at CSVRA often require hydromulch application for temporary and permanent erosion control (Figure 34).

Figure 34. Photo of rehabilitation efforts on Kiln West MU after earthwork is conducted.

Adaptive Dust Management Program

The purpose of the Adaptive Dust Management Program is to manage and ultimately reduce fugitive dust emissions throughout the park utilizing various resource management practices and/or operational management practices.

Various methods are used to reduce dust at the SVRA. The most frequently used method of dust management is by watering via a water truck. The water truck is used as needed as dust suppressant on the main park road, large open areas, special event areas, tracks, and access trails in some cases. The effect of watering to control fugitive dust is short lived, especially in the warmer summer months.

To reduce watering demands for dust control, a soil surfactant is applied annually. The SVRA hires a contractor to treat the main park road and large open areas along the valley floor with a magnesium chloride (MgCl) solution that drastically reduces dust emissions for longer periods of time when compared to watering alone (Elsholz, 2012). This treatment is typically done in late May or early June, after the rainy season is presumed to have

ended, and greatly reduces the amount of water required for dust suppression during the summer months.

Sections of the SVRA may be closed temporarily due to excess dust generation, such as trails, portions of trails, or large barren areas that are denude of vegetation. Barren areas within the active riding portion of the SVRA are often targeted for revegetation efforts, since these areas can greatly increase dust production. Fences are used where appropriate to prevent the creation of barren areas and are used to keep riders on trail while protecting newly planted areas of vegetation. Trail design to avoid sensitive soils and steep slopes is also utilized as a method to minimize dust emissions and typically involves rerouting "inherited trails" from the SVRA's historic riding use.

Ongoing Maintenance of Existing Roads and Trails

There are approximately 46 miles of roads and trails throughout Carnegie SVRA. Regular maintenance of existing roads and trails is performed to maintain a stable surface and ensure proper operation of drainage features. Road surface maintenance is performed as necessary to minimize erosion of the surface and subgrade. Ruts and potholes are repaired by grading or patching areas with additional material to return surface to grade. Damage along roads and trails is identified by monitoring efforts and prioritized for maintenance. Adequate soil moisture is essential when maintaining trails in the park. Although the soil types in the park are prone to swelling when saturated after rain events, the roads and trails drain rapidly and dry quickly following a rain event. Maintenance efforts are performed when soils still contain adequate moisture to manipulate the soil without having to break apart the clay soil after it has dried and compacted. Rill or gully erosion is more prevalent in soils derived from sedimentary rocks (O'geen et al, 2006) and can result from only a small amount of concentrated flow.

Heavy equipment, such as a bulldozer or a grader, is used to maintain the access roads in the park. The heavy equipment operator will clean sweep areas targeted for maintenance to ensure roads and trails drain property. A trail crew will often follow the maintenance done by the heavy equipment to perform small spot repairs of areas that require fine detail repairs to ensure they do not lead to future erosion issues. A compactor is used as needed to follow behind road and trail maintenance. This equipment is used to increase soil compaction and reduce the amount of future maintenance that may be needed along a specific section of a road or trail that was maintained. Some soil types may require compactor use each time they are maintained.

Access roads provide important emergency services throughout the park and are maintained to allow a fire truck to pass on them. Access roads are graded at least annually but may be graded after rain events, as needed. There are 13.58 miles of access roads in the park. ATV-width trails are maintained with a SWECO trail dozer (4 ft wide blade) when it

is determined that the trail needs maintenance as indicated by the annual G-Y-R trail evaluations, described in Section 5.1.1. The trail evaluations will dictate the schedule of maintenance work to follow. Maintenance on single-track trails can only be performed by hand crews using hand tools. Repair sites on these trails are accessed via dirt bike or on foot. Hand tools such as McCloud's, shovels, rakes, or rogue hoes are used to perform this type of maintenance. In general, berms are pulled in, ruts are filled, stutter bump features created by OHV use are repaired, and water control features are established and repaired. The trail crews walk the trail system with brushing equipment and hand tools to clear vegetation from the trail path in the final step to complete the maintenance. Maintenance on single-track trails occurs less frequently, as they are intended to be difficult trails for technical riding. Trails are closed from time to time for routine maintenance; OTR inspections provide a weekly to bi-weekly update of damaged areas on trails and allow staff to regularly inspect some of the areas of the park that may be more prone to erosion.

4.1.5. Decommissioning and Restoring Trails and Landscapes

CSVRA routinely decommissions and rehabilitates trails and landscapes. Trail quality and BMPs have been assessed annually since the formal process was established in 2011. Areas and trails chosen for rehabilitation projects are selected based upon data derived from the results of the annual trail assessment, detailed in Section 5.0, Monitoring. Landscapes, areas, trails, and/or roads can be decommissioned and restored when they are deemed non-compliant, or as risk of non-compliance, with the Standard, or when wildlife and habitat monitoring data suggest that the WHPP is not being met. Restoration is defined in the 2020 Soil Conservation Standard and Guidelines as follows:

> "Upon closure of an OHV unit or any portion thereof, the restoration of land to the contours, the plant communities, and plant covers comparable to those on surrounding lands, or at least those that existed prior to off-highway motor vehicle use" (PRC Section 5090.11).

Carnegie has one on-going restoration project to reestablish the riparian corridor in Corral Hollow Creek, as discussed in Section 2.6.1. Historically, OHV-use was permitted within the channels of Corral Hollow Creek. As a component of the Carnegie SWMP, the active bank and channel of the creek were fenced off in 2009 to prevent OHV-users from recreating within the creek, allowing a 75-foot buffer on either side of the channel where possible. There are some areas within Carnegie where pre-existing facilities fall within the 75-foot buffer zone for the creek but meeting that distance requirement would drastically impact operations at the SVRA. For these areas within the park, specifically targeted BMPs are implemented to prevent discharges into Corral Hollow Creek.

The Corral Hollow Creek restoration project is monitored and maintained to ensure that OHV recreation is excluded from both the channel and the buffer area around the channel. Additionally, Carnegie natural resources staff work year-round to bolster the regrowth of native riparian vegetation in Corral Hollow Creek to repair the riparian zone of the creek that was damaged from historic OHV-use in the active channel. Vegetation has been

supplemented in the creek channel by park staff dating back to the 1990s, but the process has been improved and refined over the decades.

4.2 Trail and Road Rehabilitation

Rehabilitation, as defined by the 2020 Soil Conservation Standard and Guidelines, is a project that seeks to improve the long-term sustainability of a road/trail. Road and trail rehabilitation projects are typically much smaller in scale. Commonly, trail rehabilitation projects involve adding material sourced from the sediment basins within the SVRA and applying it to the tread of a trail or road. Adding native fill material allows for the trail tread to be built back to match the existing contour of the landscape and for BMPs to be installed to improve drainage features thereby preventing erosion.

Trails and roads targeted for rehabilitation work are generally incised, and do not shed water as intended. Incised trails are identified during annual trail evaluations, which are detailed in Section 5, Monitoring. Occasionally, roads or trails will be targeted for rehabilitation to make improvements to the sustainability of the trail or the recreational experience provided for the user. For example, if monitoring identifies that off-trail riding offences are recurring along a specific segment of a trail in an RMA, management may be prompted to evaluate that segment of trail and may recommend altering the trail in some way. Once a road or trail is rehabilitated, it must be regularly monitored to ensure repairs are functioning as intended and maintained to ensure long-term sustainability. Regular monitoring can identify problem areas on roads or trails at an early stage and provide feedback to staff about management actions and maintenance activities that can rectify the issue.

4.3 Open-riding Area Rehabilitation

As previously discussed, Carnegie Cycle Park operated as entirely open-riding, where visitors were not limited to any designated trail system. Upon DPR purchase of the property, many of the trails were incorporated into the main trail network despite not being built to modern trail standards. As discussed in Section 2.6, the 2009 initiation of the Carnegie Trails Program and the implementation of the RMA Program allowed CSVRA staff to shift management of CSVRA towards trail-only riding by rehabilitating small sections of MUs and reopening them as managed riding areas known as RMAs. Areas for RMA rehabilitation projects are first identified by assessing open-ride areas for density of trails, hydrological connections, the potential for trails in an area to contribute to erosion or convey stormwater flow, and vegetation cover. The planning process considers trail layout, connectivity, emergency access, user interest, enforcement strategy, education methods, buffer zones, and develops a project timeline. Sustainable trails that exist within an open-riding area are incorporated into the trail network. Sustainable trails are those which are not considered erosive per the Standard, promote hydrologic invisibility, and do not

channel stormwater along the trail, which can increase the potential for erosion. For example, many of the trails inherited from Carnegie Cycle Park were stacked, where trails are laid out above or below one another. This layout can be problematic because drainage from one trail can negatively impact another below it. Consistent maintenance of drainage features on these types of inherited roads and trails are required to ensure that stormwater runoff does not concentrate, where it can lead to gully erosion. Trails that have been identified as erosive per the Standard or have a high potential to convey stormwater are eliminated from the trail network, typically via the use of heavy equipment like a backhoe, excavator, and/or dozer.

4.4 Hillclimb Event Area Rehabilitation

Hillclimb events occur several weekends per year at Carnegie SVRA and draw thousands of visitors to the SVRA to observe the races (Figure 35). Prior to each event, the event coordinator completes a Special Event Permit to host the hillclimbs. The Special Event Permit includes conditions for resource protection and restoration measures, which are employed by event staff and overseen by Carnegie's supervising State Parks peace officer (SPPO) and the environmental scientist. One condition of the event permit involves getting SPPO and environmental scientist approval over race routes to prevent hydrologic connections that could channel stormwater and minimize the footprint of disturbance for the event. Another condition of the event permit includes repairing race routes via the use of spreading seed, hydroseeding, or spreading straw. Depending on the condition of the hillside, the environmental scientist may suggest that event staff use hand tools to knock down edges of race lines and encourage the spread of the seed bank in existing soil. Racetracks are to be covered within four weeks of the final special event for the season. This maintenance is overseen by natural resources staff with input from the environmental scientist. The event coordinator works closely with the environmental scientist, supervising State Parks peace officer, and natural resources staff to ensure that the special event facility is operated sustainably so that this recreational opportunity will be available to future generations. The special event area is evaluated annually as a condition of Carnegie's MS4 permit; more details about these inspections can be found in the Altamont Sector SWMP Annual Reports (https://ohv.parks.ca.gov/?page_id=31610).

Figure 35. Photo of the kids' hill within the hillclimb event area during an event. These large swaths of exposed soil are targeted for rehabilitation efforts after the last event of each season.

4.5 Track Maintenance

Carnegie SVRA operates and maintains four tracks (Figure 36). Each track is managed differently and for different use types.

Motocross (MX) Track

The MX track is maintained once per week, year-round, although frequency may vary depending on track conditions, use, and operator availability. The MX track is maintained by

using a dozer with a ripper attachment, a tractor, loader, and grader. Amendments like rice hauls or sand are sometimes added to aid in moisture retention for the track. The water truck is used as needed for dust control, after grooming, and during periods of heavy use. The watering needs for the MX track vary depending on season, conditions, and level of use. The MX track remains open during wet weather closures of the hills, but no track maintenance can occur if the track is too wet from rain.

ATV Track

The ATV track is maintained one to four times per year, depending on use and operator availability. The ATV track is maintained by use of a grader, dozer, and skid steer. The water truck has been used for dust control at the ATV track in the past, but in 2023 SVRA staff undertook a project to install a sprinkler system at the ATV track. A water tank was installed at the west end of the ATV track for the sprinkler system that is connected to the non-potable water distribution system for the park. The motor for the sprinkler system receives maintenance for approximately every 100 hours of use.

Kids' Tracks

The 70cc Children's Track and 110cc Beginner Track, known as the Kids' Tracks, receive maintenance approximately annually. Maintenance involves dragging with a harrow to fill in small imperfections in the tread surface, and hand tooling or use of a grader, SWECO, or mini excavator to rebuild or reface the tread surface. The 70cc track is large enough to accommodate a grader for maintenance; the 110cc track is maintained by mini-excavator, SWECO, and hand tooling. Straw bales are used to line the tracks and need replacing approximately every few years.

Carnegie also maintains a 4x4 play area and a trials bike area.

Trials Area

The trials area receives weed management to keep vegetation in the area low and usable for trials bikes. Since the trials area is designed to provide a challenge to trials bike users, this area does not receive or require much maintenance. Occasionally, trials bike users will manipulate the existing logs, rocks or culverts in the area to test their skills. To move or manipulate larger obstacles, trials bike users will request assistance from the SVRA's equipment operators at the ranger station. The equipment operator utilizes a loader and/or a backhoe to maintain the trials area.

4x4 Play Area

The 4x4 play area is maintained by the use of the loader, grader, dozer, water truck, dump truck, and backhoe. The roads, trails and obstacles are groomed and graded approximately once per month depending on conditions, use, and State Parks equipment operator

availability. Weed management activities are performed as-needed dependent on conditions and staff availability. The 4x4 play area sometimes receives seasonal closures due to resource concerns.

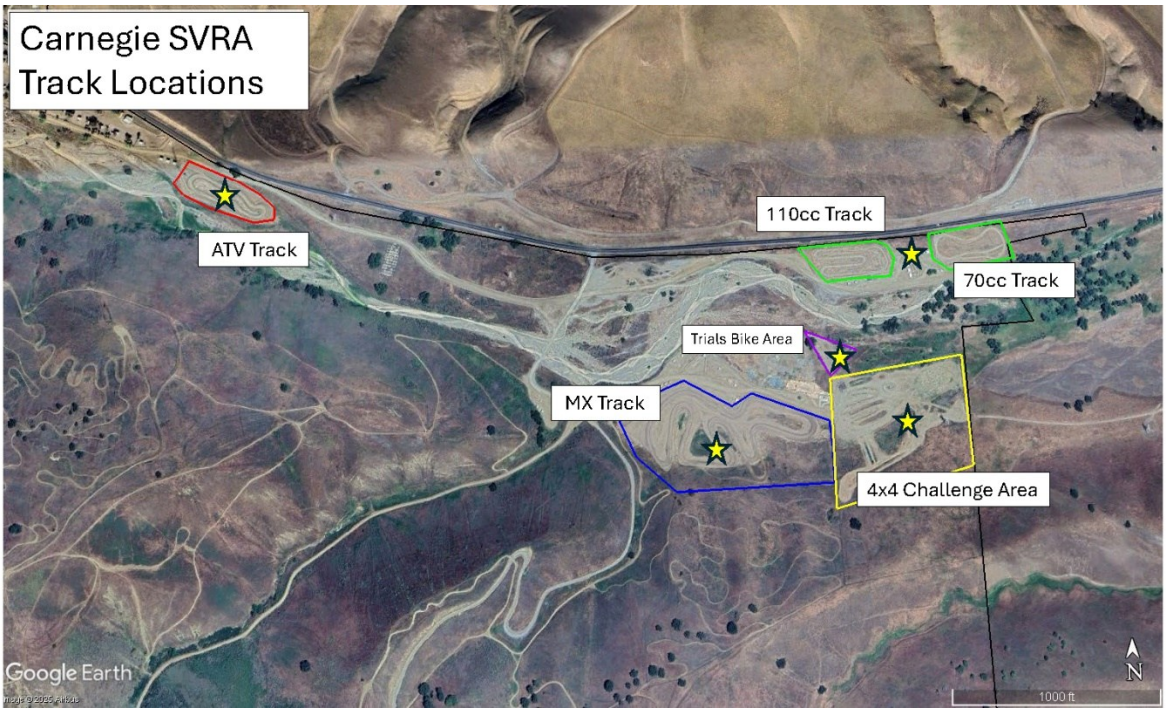

Figure 36. Map of track locations at Carnegie SVRA.

4.6 Maintenance Schedule

Maintenance activities at CSVRA are on-going year-round, but some maintenance activities or management actions are employed seasonally or on a routine calendar basis. For example, Magnesium Chloride is applied as a management action to minimize dust creation at CSVRA during the dry months but is typically not applied until late May or early June in anticipation of late spring rains that CSVRA usually receives.

Service road and trail maintenance at Carnegie SVRA is best achieved when timed after rain events, where the hills are dry enough to access but the trails are still holding enough moisture to allow for the trails and their soils to be manipulated and adequately compacted. Since the soils at Carnegie are clay-dominated, a sufficient level of moisture is required to allow the trails to be maintained. In the late summer months, when the trails have had enough time without rain to dry completely, the soils will be hard and more compacted and do not allow for manipulation of the trails. Disturbing a compacted trail in the summer months can lead to excessively dusty conditions, as well as potentially creating unstable clods within the clay soils that can lead to erosion in wet conditions.

Table 3. Table showing approximate scheduling of maintenance activities. Scheduling is weather dependent and may change based on conditions and staffing.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Quad Track Maintenance												
Kids Track Maintenance												
Single Track Trail Maintenance - Majority in spring								Update BMP maps	Update BMP maps			
SWECO Maintenance (weather dependent)												
SWECO Follow Up (quad width trails)												
Fire Roads (also as needed, weather dependent)											As-needed	As-needed
4x4 Area (Depending on conditions)												
Dust Off				Prep								
BMP Maintenance									Stormwater BMP Maintenance			

4.7 Equipment Used for Maintenance

Carnegie SVRA relies on various tools, equipment, and vehicles to maintain park operations. CSVRA maintains an inventory of OHVs, vehicles, heavy equipment, and tools that are used for various types of regular maintenance activities. A description of some of the more common uses for these pieces of equipment is discussed below but the use of these items is not limited to the activities described below. The versatility of use for each of these tools is imperative to be able to maintain park operations throughout any situation that may occur at the SVRA.

Figure 37. Photo of a trail dozer being used to remove an ATV that got stuck in a ravine in Carrol Canyon.

The SVRA's heavy equipment is housed in the maintenance yard and maintained per Department of General Service standards by the park's heavy equipment mechanic. The water truck is typically used daily during the dry season for dust control but is also an important vehicle in emergency situations such as fires. The dump truck is used regularly to move materials from one site to another and is vital to operations at the park. A transport unit is used to mobilize heavy equipment, rentals, or large vehicles, either from one end of the park to another, or outside of the park to be serviced or assist another park unit. The tractor is an important tool that is used typically weekly for track maintenance and approximately monthly in the wetter winter months to maintain the main park road but also is used as a large mower in the spring seasons to mow fire breaks to protect facilities and

resources. The grader is used regularly for road and trail maintenance and occasionally for track maintenance. The grader is important for maintenance of the main park road and the emergency access roads. A large dozer is used weekly for track maintenance, regularly for road and trail maintenance, and occasionally for projects such as hillside rehabilitation or trail reroutes. Smaller trail dozers (ex.SWECO, Sutter) are used to maintain the ATV-width trails as needed, as well as for various tasks like fence installation or removal, to lift or mobilize large or heavy items for trail maintenance, or to clear debris after natural events like fires or floods. The SWECO is the only piece of equipment in CSVRA's inventory with a winch, which can be useful for removing OHVs that may crash and become stuck in areas where recovery is difficult (Figure 37). A backhoe is used for small excavation projects, moving, loading and unloading materials, compacting, and BMP maintenance. The loader is used for material handling, loading and unloading, and backfilling. The mini excavator serves a multitude of uses, but is regularly used for trail and BMP maintenance, small excavation projects like pipeline work or repairing leaks, and can be used to compact ATV-width trails by tracking. The Bobcat skidsteer can be used to accomplish a variety of tasks at the SVRA with the addition of various attachments, like a post-hole digger, bucket, forks, various grappler attachments, smooth drum roller, mower, or trencher. It is also regularly used for trail maintenance activities.

On a regular basis, the SVRA undertakes a project that requires a piece of equipment that the SVRA does not already have on hand. When the necessary piece of equipment is not available to borrow from another park unit, the SVRA will rent the equipment from a vendor. The Dust-Off application each spring requires rental of a large smooth drum roller to compact the main park road after it is graded and prior to the application. The SVRA does not own an excavator, which is used for gully rehabilitation, sediment basin maintenance, and occasionally road and trail maintenance. During annual sediment basin maintenance, it is preferred to rent a heavy-haul dump truck that can move a larger amount of material than the SVRA's dump truck.

Some of the most important pieces of equipment to conduct maintenance activities at the SVRA are the inventory of staff vehicles and OHVs. Staff vehicles such as 4x4 trucks or ROVs like Kubotas or John Deere Gators are used daily to access work sites, carry materials, and observe park conditions. OHVs like side-by-sides, ATVs or dirt bikes are used for monitoring efforts, which provide feedback as to where management actions may need to be employed or repairs be made. In some circumstances, these OHVs may be used to access a work site for repairs; for example, single track trails can only be accessed by dirt bikes, so hand crews may use a dirt bike to access and carry tools to the work area.

Other pieces of equipment that are regularly used for maintenance activities at Carnegie SVRA are smaller powered tools, such as canny-coms, vibraplates, mowers, jumping jacks, or generators. Canny-coms are used to haul materials out to work sites, usually along a

trail system that is inaccessible to a larger vehicle. Vibraplates and jumping jacks are used to compact materials used for maintenance activities, such as when native soil is added to an entrenched trail tread to repair the trail. Mowers, weed whips or weed-whackers, and brush hogs are used to manage the vegetation at the SVRA, which can overgrow on trails and increase the potential for OTRs to occur because riders cannot see the trail. Generators are used occasionally to provide power to remote work areas throughout CSVRA. Trail construction and maintenance at CSVRA is dependent on several pieces of equipment, such as automatic t-post pounders, which are used to install and maintain the miles of fencing that surround RMA and other facility perimeters. Augers are imperative for the Corral Hollow Creek restoration project, creating holes for native tree plantings. Pull behind mower attachments are used to cut down excess vegetation along trails, usually pulled by an ATV or a John Deere Gator UTV.

4.8 Procedures for Documenting Maintenance Activities

Documentation of trail maintenance activities is tracked and entered into Maximo, a spreadsheet program, as an electronic work order. Each work order details the equipment used, equipment use hours, and location of work site. Tools, vehicles and equipment used for projects are specified in each work order. Maximo hours are tracked for each natural resource staff member on paper, which is kept by the trails supervisor for two years after being entered into Maximo. Maximo files are kept in the sector office. Trail maintenance work orders are also entered into an Excel spreadsheet as a supplemental record. General field observation notes are documented during the trail maintenance process. This information is kept as a hard copy in a field notebook, which is kept and stored in the Altamont Sector Office and/or natural resources offices at the Diablo Range District. Geographic Information System (GIS) data is maintained in the State Parks GIS database and GIS maps are updated after maintenance is performed to BMPs and trail segments to reflect the most accurate field conditions, which helps natural resource managers direct maintenance efforts. It is anticipated that with the implementation of this SCP, natural resources staff at CSVRA will develop and implement new and alternative methods to track maintenance activities performed throughout the year, which will be included in the SCP Annual Report.

5.0 Monitoring Plan

The section below discusses current and future planned monitoring as it relates to soils at Carnegie SVRA. The CSVRA monitoring plan provides evaluations of resource conditions and is used to inform adaptive management decisions within CSVRA to evaluate compliance with the Standard. The monitoring discussed in this section established baselines and provided input for selecting specific objectives to achieve in this compliance period. A summary of monitoring activities at Carnegie SVRA can be found in Table 4.

Table 4. Summary of Monitoring Activities at Carnegie SVRA

Monitoring Activity	Frequency	Timeframe/Due Date	Protocol Used
Road and Trail Evaluations	Annually	Completed every year by June 30	DPR Road and Trail Evaluations Protocol
BMP Evaluations	Annually to twice annually, depending on staffing	Following a water year, it may start as early as July. Completed each year by June 30; completed before and after wet season if done twice annually	DPR Road and Trail Evaluations Protocol, OHV BMP Manual
Off-trail riding Inspections	Weekly to every other week, year-round	Weekly from approximately October to May, Every other week from approximately May to October	Carnegie SVRA Off-trail Riding Inspections Protocol
Informal/Incidental Observations	Daily or as observed, year-round	During staff working hours	N/A
Monitoring for Erosion or Sediment Discharges	As observed, year-round	At all times	Carnegie SVRA SWMP
Monitoring for Reopening after a Wet Weather Closure	As needed	Trails are checked at 8AM and 12PM after a wet weather closure to determine if conditions are safe enough to reopen	Carnegie SVRA Wet Weather Closure Policy
Photo points monitoring	At least once per year, more than once per year as staffing permits	Completed by May 30 each year	Photo point monitoring via drone (protocol currently in development)

Monitoring Activity	Frequency	Timeframe/Due Date	Protocol Used
Special Event Monitoring	As needed	Pre-event inspection within two weeks before the event; post-event inspection within two weeks after the event	Carnegie SVRA Special Event Monitoring (protocol currently in development)
VegCAMP	Every 3-5 years	Conducted in Spring, as needed and as available from NRD staff	CDFW VegCAMP Protocol

To ensure that data is collected in a consistent manner, monitoring staff must be selected and trained appropriately. Each year, prior to collection of monitoring data, monitoring staff will undergo an annual refresher training course to ensure that staff are qualified and prepared to collect monitoring data. In the event that staff are not qualified for specific monitoring, outside sources such as consultants, OHMVRD or NRD staff, may be asked to provide training or conduct the monitoring directly.

Monitoring data will be collected through ESRI GIS applications such as *Field Maps* and *Survey123*, as well as notes and photos taken in the field, Excel forms that can be integrated into GIS applications, and inspection reports that are compiled upon returning to the office from the field. Data is managed in a GIS database or Microsoft OneDrive Sharepoint for future access.

5.1 Road, Trail, and BMP Assessments

The purpose of road and trail assessments is to capture the existing general condition of each trail within CSVRA's trail network, while identifying segments of trails that may require more focused maintenance, or to evaluate past maintenance activities for success. Formal trail assessments produce a current field-validated trail system map with a GIS map layer showing color-coded trail condition ratings for trail segments. Assessment results provide feedback for management by identifying problem areas where trail sustainability could be improved. Along with the road and trail network, BMPs and other features that function to ensure compliance with the Standard are assessed at least annually, as discussed below.

5.1.1. Formal Trail Assessment

Due to the potential for trail systems to alter drainage patterns which can lead to increased erosion within a landscape, careful consideration must be given to trail system layout and design. Regular monitoring is warranted to ensure that erosion potential is minimized and the trail is maintained. Monitoring provides feedback for maintenance activities that need to be conducted or management actions that need to be employed if deficiencies are

detected. One of the most common ways to achieve this type of monitoring is via the use of Green-Yellow-Red (G-Y-R) trail evaluations.

Formal trail assessments are completed once annually and are usually performed in the late winter or early spring. In general, an assessor traverses all system trails in the park and fills out the appropriate assessment forms on ArcGIS Field Maps. CSVRA staff utilize a rating matrix (Table 5. Table of the Carnegie SVRA trail condition evaluation code key, used to determine the G-Y-R rating for trail segments per the monitoring guidelines.Table 5) where the trail's current condition is rated based on five categories: water control, erosion on the shoulder of the trail, tread wear, trail widening, and evidence of off-trail riding. The condition is assigned a rating of green, yellow, or red and a corresponding value. A green rating indicates the trail is in good condition and the water features, used to control erosion, are functioning properly. A yellow rating is assigned when the water features or trail tread is beginning to show signs of deterioration. A red rating indicates the trail has a higher level of deterioration and repairs must be prioritized. This trail rating information is then used to schedule and prioritize trail work.

Trail assessments can be performed using an OHV such as a dirtbike, ATV or ROV, by walking, or by a combination of these. Conducting trail assessments on an OHV has its benefits because it reflects the experience a trail provides for a park visitor; however, the speed at which some trails require may not be appropriate to properly assess the conditions of the trail. Walking allows for a more detailed review of each trail segment and has been the method historically used for most of the park's trail evaluations but may not be feasible every year depending on staffing constraints. Walking also does not provide feedback to the assessor about how the trail is contributing to the user's experience.

Table 5. Table of the Carnegie SVRA trail condition evaluation code key, used to determine the G-Y-R rating for trail segments per the monitoring guidelines.

Carnegie SVRA Trail Condition Evaluation Code Key			
Category	**Green**	**Yellow**	**Red**
Water Control Is there rilling and/or gullying on the trail? (Rill is 1" to 6" depth, Gully is >6" depth and 12" wide)	No rilling or gullying present Water control is sufficient to divert runoff	Rilling is present but no gullying Rilling is not prevented by existing BMPs because they've been degraded and are in need of maintenance, e.g. existing rolling dip is worn down.	Gully is present and/or rilling is present Rilling is occurring because existing BMPs are inadequate and BMPs need to be added, e.g. additional rolling dips need to be added.
Erosion on the Shoulder of Trails Is there accelerated erosion occurring on the shoulder of the trail?	No accelerated erosion is occurring on the shoulder of the trail.	Rill erosion is occurring on the shoulder of the trail.	Gully erosion is occurring on the shoulder of the trail.
Tread Wear Is the tread showing signs of wear?	Tread wear is minimal. Tread is compacted and easy to transverse.	Tread wear is evident. Tread is loose and challenging to transverse for over 1/3 of the trail or trail segment.	Tread wear is severe. Tread is loose and challenging to transverse for over 2/3 of the trail or trail segment.
Tread Widening Is the trail wider than designed?	Trail is not wider than designed or trail is wider but not more than 1.5 times wider.	Trail is 2 times wider but not greater than 3 times wider than designed for over 1/3 of the trail or trail segment.	Trail is 3 times or more wider than designed for over 1/3 of the trail or trail segment.
Off-trail Travel Are there unauthorized trails or routes that intercept this trail? *Mark as green if in an open riding area	No unauthorized trails or routes are occurring along this trail.	Unauthorized trails or routes are occurring off trail. Unauthorized trails or routes are **not** effecting the trail design.	Unauthorized trails or routes are occurring off trail. Unauthorized trails or routes are effecting the trail design.

Cause Codes			
C1	Water breaks/rolling dips not constructed to design standards	**C11**	Rocks or roots exposed in tread
C2	Water breaks/rolling dips spacing too wide for conditions	**C12**	Barriers (natural or constructed) to control traffic is lacking
C3	Cascading runoff from a trail or road upslope	**C13**	Mechanical erosion makes maintenance ineffective
C4	Cascading runoff from an impervious surface upslope	**C14**	Excessive tread width
C5	Wet area caused by a seep or spring	**C15**	Design/layout/construction prevents effective drainage
C6	Excess soil moisture at time of use	**C16**	Uncompact side cast on outboard slope
C7	Trail section is poorly located	**C17**	Berms, whoops, and stutter bumps
C8	Trail gradient is too steep for the type and/or amount of use	**C18**	Crossing alters channel dimensions and/or stream gradient
C9	Segment is not designed for the type or amount of use occurring	**C19**	Rutting or vegetation damage to sensitive habitat
C10	Trail blockage, e.g. brush, logs, rock fall, landslide	**C20**	Excessive tread wear

Trail condition is an important metric for evaluating sediment management because poor trail condition could be a source of erosion in the SVRA. The overall goal is to have a rigorous system to evaluate and inform maintenance priorities. Ideally, green trail ratings would be high and yellow and red ratings low or non-existent. While the trail ratings are not solely a representation of soil loss because there are other factors that are measured simultaneously, they provide a useful general overview of trail conditions that can be used to measure progress over time. Figure 38 depicts the results from the trail conditions evaluation for the 2024-2025 season.

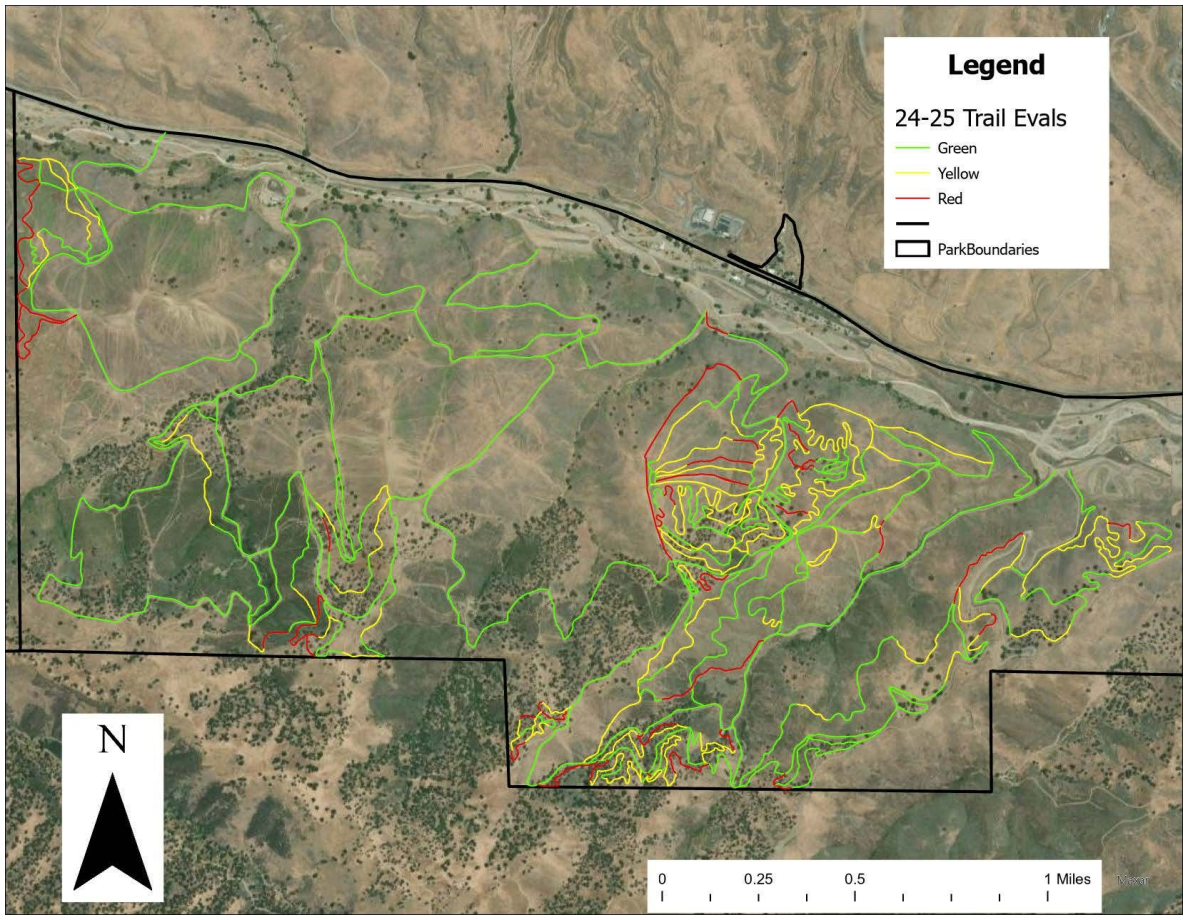

Figure 38. Carnegie trail assessment rating map from 2024-2025.

5.1.2. BMP Assessments

In addition to annual G-Y-R trail evaluations, BMP points are monitored annually to twice annually depending on staffing constraints to ensure that erosion and water control features are functioning properly. As of 2024, there is an inventory of 750 BMPs that are employed throughout the SVRA, including erosion control features such as rolling dips, water quality control features like the sediment basins and culverts, and enforcement features such as signs and gates. The miles of fence throughout CSVRA are also assessed with the BMPs, as well as inspected regularly during off-trail riding inspections and by incidental observations from park employees during day-to-day operations.

Critical stormwater infrastructure is monitored throughout the year on an informal basis, and many BMPs monitored throughout CSVRA function in part as stormwater infrastructure and are assessed as a component of annual BMP evaluations. Monitoring larger components of CSVRA's stormwater infrastructure, such as sediment basins and the culverts that drain in and out of the basins, is completed annually in late Spring or early

Summer as a component of MS4 permit compliance. Critical stormwater infrastructure refers to features along the main drainages that are likely to be subject to higher flow velocities, such as culverts, sediment basins, hardened crossings and roadside ditches. The methods for monitoring critical stormwater infrastructure were taken in part from the 2007 OHV BMP Manual (DPR 2007).

Culverts

Culverts are informally monitored throughout the year, but culverts throughout the trail system in the hills are assessed annually as a BMP and rated Green, Yellow or Red, based on its condition and capacity to channel stormwater through it. As of Spring 2025, there are 26 culverts located throughout the trail system in the hills that operate and are monitored as BMPs. Culverts are inspected for sedimentation, undercutting, slope destabilization, or any damages.

Larger culverts that feed into the sediment basins are subject to regulatory permitting when maintenance needs to be performed and are assessed as a component of the MS4 program each year, usually in early Spring so that permits can be obtained if these culverts require maintenance. The MS4 permit that CSVRA operates under includes several DPR-owned properties within the Corral Hollow watershed covering a total of 35 culverts spread throughout CSVRA and the surrounding State-owned parcels within the Altamont Sector. Some of these culverts are maintained by DPR staff; some of these culverts are maintained by County staff.

Sediment Basins

The three main sediment basins located at the end of the three main drainages out of CSVRA are monitored and maintained as integral components of the MS4 permit. These basins and the remaining sediment basins and pond features throughout the park are monitored most frequently through quarterly compliance inspections and informal staff or visitor observations. The other sediment detention basins throughout CSVRA are inspected annually in late Spring to assess for erosion: rilling or gullies, excess sedimentation, or evidence of flooding from storm events which may indicate that the basin is receiving more flow than it can detain, reducing the potential for sediment to settle out from stormwater. Monitoring efforts of sediment basins will prioritize basin maintenance.

Hardened Crossings

Hardened crossings, also known as articulated concrete block mats (ACB mats), are monitored as a component of the BMP inspections. ACB mats are used as permanent erosion control features in low-water crossings. ACB mats are inspected annually during BMP inspections for sedimentation, scouring around the edges, and damage.

Roadside Ditches and Check Dams

Roadside ditches and check dams should be inspected after storms to ensure that no damage has formed; if damage is observed, it should be prioritized for repairs immediately. Monitoring of roadside ditches and check dams should include an assessment of sediment buildup, and if buildup is observed, sediment should be removed to ensure these features function as intended. Ditches and check dams should be inspected for scouring, bank destabilization, evidence of dislodged rocks, or vegetation growth. Vegetation may be overgrown, which would require maintenance since large vegetation may cause plugging. If no vegetation growth is observed, management actions may be required to encourage vegetation growth to settle sediment out from the feature.

Roadside ditches and check dams are inspected as a component of annual BMP monitoring and given a Green-Yellow-Red rating depending on their condition. Check dam monitoring consists of inspecting the check dam system for evidence of siltation or erosion. As of Spring 2025, there are 57 ditches and check dams implemented as BMPs throughout CSVRA.

5.1.3. Off-trail Riding Inspections

As previously stated, RMAs are managed as trails-only riding facilities at CSVRA. These areas of the park are monitored weekly to every other week, originally in coordination with red-sticker and green-sticker season and following the same schedule of weekly during the busier riding season and every other week during the warmer summer months when OHV recreation is decreased at Carnegie SVRA.

Off-trail riding (OTR) inspections involve natural resource staff accessing the trails in RMAs to evaluate if OHV-users in an area ventured off the established sustainable trail system in the previous week or two prior to the inspection. OTR inspections are critical to ensuring the success of the RMA program, since the process of establishing RMAs involves rehabilitating areas of the park, and OTR inspections regularly evaluate these trails-only riding areas to monitor for unauthorized trail creation and conduct repairs before unauthorized trails become integrated by users into the trail system. Unauthorized trail creation jeopardizes the sustainability of a trail system, since the process of establishing an RMA involves eliminating established trails from the landscape and designing a sustainable trail system that limits erosion potential and the mobilization of sediment in stormwater. OTR inspections are documented via a weekly to bi-weekly report put together by natural resource staff; a summary of OTR reports will be included in the annual Compliance Report and Action Plan.

5.1.4. Informal/Incidental Observations during Day-to-Day Operations

One of the most common ways that CSVRA is monitored is the on-going informal and incidental observations provided by CSVRA staff and visitors. CSVRA staff typically observe

issues incidental to performing other management activities within the Park. As problems are identified, they are documented and addressed. These problems and the solutions implemented will be included in the Annual Compliance Report and Action Plan.

5.1.5. Monitoring for Erosion

As a condition of CSVRA's SWMP, monitoring for sediment and pollutant discharges is on-going and reported on as it is identified or observed. Staff may observe sediment or pollutant discharges resulting from daily maintenance activities, such as cleaning restrooms or conducting trail maintenance, or from visitor activities, such as leaving trash, tires, or riding off-trail. When sediment or pollutant discharges are discovered or observed, it is managed as an illicit discharge and staff are required to report and investigate the source of the discharge within 72 hours. In the event that a staff member is not comfortable investigating the illicit discharge, they must immediately report the violation to the environmental scientist to report and investigate within 72 hours. Reporting and resolving illicit discharges is a component of SWMP and MS4 compliance for CSVRA, but since sediment is the pollutant of concern, evidence of sediment discharges is investigated to evaluate if the source of the sediment is part of a larger issue that could lead to erosion at CSVRA.

5.2 Monitoring of Open-Ride Areas

Some of the RMAs included in future planning efforts at Carnegie SVRA have been designated as distributed riding areas; these areas will receive different monitoring than the trails-only RMAs but monitoring for these areas will occur on the same schedule as the trails-only riding areas. Currently, approximately 23% of CSVRA operates as distributed riding (approximately 54.6 acres) where OHV use is not limited to specific routes. A formal monitoring method for distributed riding areas had not been previously developed for CSVRA; instead, hazards in distributed riding areas had been identified by visitors or incidentally by CSVRA staff, which are brought to management's attention to be prioritized for repairs. With the development of this SCP, a monitoring method for the inspection of distributed riding areas has also been established, and the progress of that monitoring program will be reported on in the Annual Report.

The newly developed monitoring protocol for CSVRA is designed to allow staff to identify portions of open-ride areas and adjacent areas that may become impacted by heavy OHV traffic. The monitoring protocol will be based off the following approach:

- Staff will monitor the interaction between the distributed riding area and surrounding trails-only riding areas. Monitoring efforts should focus on boundaries between open-ride areas and other adjacent areas to assess for environmental problems originating from an area or beyond its boundaries.

- Areas that may experience concentrated OHV use will be inspected to ensure that erosion or soil loss is not occurring, such as OHV recreation features like hillclimbs.
- Specific common riding sections with potential erosion problems, such as watercourse crossings or environmentally sensitive areas, such as special status species habitats or sensitive natural communities, should be inspected regularly to ensure that no impacts to these areas are occurring.

5.3 Monitoring After a Wet Weather Closure

Following a rain event, SPPO staff may close or restrict access to the trail system in the hills through a series of gates on the valley floor. Although a measurement of cumulative precipitation is used to model soil saturation in the hills to prompt closure, SPPOs may determine that the trail system should be closed at any time depending on field conditions. For example, if less than the threshold amount of rainfall is received but cloudy conditions are keeping the soils saturated, SPPO staff may decide to close access to the trails to protect public safety and allow for the soils to dry out. Closing portions of the park after significant rainstorms has proven to be a very successful means of alleviating and preventing soil loss from rain events (Figure 39).

Figure 39. Photo showing muddy conditions at Carnegie SVRA. The high shrink-swell potential of the clay soil present can compromise emergency response after a storm.

It is the responsibility of the SPPOs to determine when conditions at CSVRA are safe enough to recreate after a rain event. North aspects of hillsides and shaded portions of riding areas are inspected after a rain event to monitor conditions; these areas inherently receive the least amount of sunlight and take longer to dry. Large amounts of standing water on trails, slick conditions, or mud packs on the wheels of vehicles used to inspect an area indicate that soil conditions are too wet to reopen the trails for OHV-use. Fallen trees, sink holes, plugged or malfunctioning culverts, or other erosional features that present an immediate concern are noted during this monitoring so that scheduling repairs can be prioritized. In order for a SPPO to reopen the hills after a rain event, all of the following conditions must be met:

- Site conditions are safe
- No resource concerns exist
- BMPs such as culverts and basins are functioning and in good condition
- The trails have been closed for at least 12 hours
- The trail slopes and soils have dried sufficiently and are stable enough to support OHV use

5.4 Special Event Monitoring

Special events and races can be a strain on the environment and infrastructure of a SVRA because of the concentrated numbers of people who congregate for events and the repetitive runs on event courses by competitors. Special events and races held at Carnegie SVRA may include cross-country races, enduros, hare scrambles, trials riding, rock or hillclimbs, obstacle course contests for 4WD vehicles, and motocross races on closed-loop courses. Monitoring following these special events or races may vary, but are likely to include an assessment of the following:

- Runoff drainage areas will be monitored for sediment and fill volume; if evidence of sediment or runoff discharge is detected, the area will be assessed for the need for a runoff drainage holding facility.
- Weather should be monitored for the weeks prior to the event. If precipitation events are predicted for the event, it may be necessary to postpone or cancel an event due to rain, in accordance with the wet weather policy identified in the Carnegie SVRA SWMP.
- Depending on the type of event, watercourse crossings should be monitored prior to and after an event. Randomly selected segments of the racecourse may be selected for monitoring as well. Monitoring efforts may vary, but one example

of monitoring efforts that may occur are photos taken before and after the event, as well as photos of any repairs or reconditioning that occurred post-event.

Carnegie SVRA hillclimb special event area has a berm around the base of the hill to prevent potential erosion or stormwater discharges from entering Corral Hollow Creek. This berm needs to be monitored prior to any hillclimb special events and repaired prior to events or as soon as maintenance is determined to be needed for this feature.

The main event trail, "Middle Track Trail", needs to be monitored prior to and after events. The trail should be checked approximately 1-2 months prior to events to ensure the road is not entrenched or showing signs of erosion, such as rutting or the formation of rills. The surrounding drainage features in the hills should be monitored for signs of erosion that may undermine any part of the hillclimb trail system or main event area hillside. At all times, Middle Track Trail needs to be able to support the width and weight of an emergency vehicle like an ambulance or a fire truck and a maintenance vehicle like the water truck or hydroseeder.

5.5 VegCAMP

VegCAMP monitoring is used to monitor the vegetation communities present throughout Carnegie SVRA. VegCAMP monitoring is tied to Objective 3, which seeks to reduce the acreage of barren landscape present throughout CSVRA. Monitoring for VegCAMP will occur on 3-5 year cycles and changes in vegetation cover will be assessed then and reported on in the annual Compliance Report and Action Plan.

6.0 Compliance Report and Action Plan

A Compliance Report and Action Plan will be prepared annually at Carnegie SVRA. The Compliance Report will include a summary of monitoring efforts and ground disturbing activities that were completed in that year and how they demonstrated compliance with the Standard. Within each Compliance Report, an Action Plan will be developed which represents a "to-do" list of upcoming activities which may be undertaken in the following year to ensure compliance with the Standard. Any incomplete aspects of previously undertaken projects will be reported on here.

Aspects of the Compliance Report and Action Plan portions of a SCP are detailed below, excerpted from CCR Title 14, Division 3, Chapter 15 of the CCR, subsection 4970.06.3 (h):

> (1) Change analysis, such as quantifying trail condition improvements by contrasting initial and subsequent trail assessments.
>
> (2) Documentation of maintenance activities within the Project Area/Management Unit.
>
> (3) Documentation of Project Area/Management Unit(s) infrastructure improvements, such as the repair of a trail watercourse crossing proposed in the initial Grant Application for grant recipients or proposed by SVRAs.

(4) A Compliance Action Plan, which includes:

> (A) A list of planned actions to be taken at an OHV Facility to guarantee continued adherence to the Soil Conservation Standard, and
>
> (B) A description of an area or areas within an OHV Facility where future Projects are likely, including a brief description of the planned work.

After evaluating the year's maintenance and monitoring programs, CSVRA may need to respond by adjusting the SCP program in the following year as part of the adaptive management process. This section outlines the adaptive management decision process, chain of command, and the required Compliance Report to document the decisions and maintenance conducted by the CSVRA Natural Resource Program in the previous year.

6.1 Adaptive Management Actions

Adaptive management is a process of structured decision-making that emphasizes accountability and explicitness. Specific to SVRAs, PRC 5090.13 stipulates that monitoring programs provide periodic evaluations of the condition of resources and informs adaptive management. Adaptive management is a framework for decision-making and resource management that emphasizes continuous learning and adaptation, where monitoring the outcomes of management actions and evaluating their effectiveness informs adjustments

made to future strategies. Carnegie SVRA Natural Resource Program will use adaptive management strategies to make management decisions which work to fulfill the management goals and objectives identified in this SCP. Each goal and objective will go through key operational steps to ensure implementation is consistent and understand the resource issues and dedication to stay abreast of new information.

Standard Chain of Command

Diablo Range District is divided into Northern and Southern Regions and Carnegie SVRA is within the Northern Region. The standard chain of command for decisions and approval at Carnegie SVRA is depicted in Figure 40 based on the DOM section 202. With resource-related issues, including decisions involving the SCP, the District Natural Resource program manager, Supervisory Environmental Scientist and the OHMVR Division/NRD may have an increased role in the decision-making process depending upon the scope of the issue.

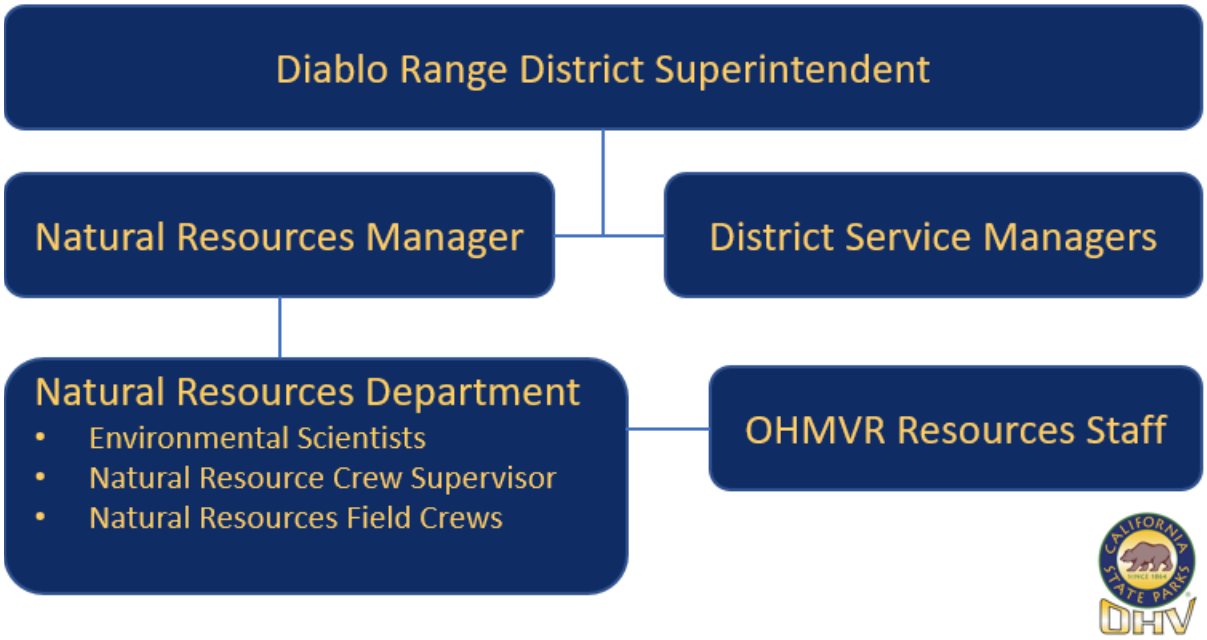

Figure 40. Carnegie SVRA Standard Chain of Command.

OHMVR Division & Carnegie SVRA Natural Resources Program: The Carnegie SVRA Environmental Scientist(s), in collaboration with OHMVRD staff, are responsible for conducting and implementing the monitoring and management actions identified in the SCP. They are also responsible for drafting the District's various resource reports, including SCP and WHPP annual reports.

Natural Resources Crew Supervisor: The Natural Resource Crew Supervisor is responsible for coordinating day-to-day activities of the field crews such as trail maintenance and

native plants nursery operations, invasive plant and animal controls, and any natural resource-related work.

District Natural Resources Manager: The District Natural Resources Manager is responsible for overseeing the entire District's resources management programs which are comprised of all natural resources staff. In addition, the District Natural Resources Manager is responsible for carrying out and leading the district's natural resource ongoing maintenance, natural resource management, and stewardship programs. The District Natural Resources Manager also performs environmental review and other duties as required. The District Natural Resources Manager is the front-line supervisor for resources staff at Carnegie SVRA and ensures the administration of the SCP is completed at the park. This position reports directly to the District Superintendent.

District Service Managers: The Diablo Range District office consists of Administrative Service, Facilities Development, Interpretation & Education, Cultural Resources, and Public Safety. These managers will be informed if the Natural Resource Program requires their involvement in completing projects.

District Superintendent: The District Superintendent is the ultimate district-level authority through departmental delegation and is the district point-of-contact for the department's Executive Staff. The District Superintendent determines where responsibility for projects, programs, mandates, issues, or processes will be assigned within their district.

6.2 Annual Reporting

Annual SCP Reports are to be reviewed at many different levels within State Parks' Chain of Command. These levels include Department, Division, District, and Program. After iterative review at the Department and Division levels, Annual SCP Reports are to be sent to the OHMVR Division and NRD technical team staff for review to determine if the goals and objectives established by Carnegie SVRA's 2025 SCP are being met. Report generation, Program review, and District review should be completed annually with final reports covering activities undertaken during each calendar year and submitted to OHMVR Division and NRD by March 31st following the year to which the annual report applies.

7.0 Constraints

While Carnegie SVRA staff actively work to meet the objective and goals identified in this SCP, constraints such as staffing, equipment, stochastic events, variance in the annual weather cycle, and lawsuits may interrupt planned activities. These constraints are described below.

7.1 Equipment

Although CSVRA staff work diligently to maintain and repair the equipment used for routine maintenance throughout the park, equipment may routinely be unavailable due to requiring maintenance or repair. Additionally, the large equipment used for road and trail maintenance is limited at CSVRA, and there are times or projects which require staff to borrow equipment from another park unit or rent equipment from a vendor. More information about equipment can be found in Section 4.7.

7.2 Stochastic Events

Stochastic (random) events are unpredictable events which may impact the land or draw resources which would otherwise be directed towards management. Examples of stochastic events which may occur within, or nearby Carnegie SVRA include wildfires and flooding.

7.3 Variance in Annual Weather Cycle

Carnegie SVRA is known to have variable weather cycles. Summers at Carnegie SVRA are typically very hot and dry, with high fire potential. Winters at CSVRA are most typically wet and mild, but severe winter storms can result in strong, heavy flows from Corral Hollow Creek which has caused severe damage to CSVRA on several occasions. Maintenance activities and management actions may be impacted by weather events. For example, long periods of wet weather or strong flows in the creek may result in extended closures of the trail system in the hills; or red flag weather may prompt CSVRA to close to reduce fire potential.

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9.0 Appendices

Appendix 2.4.5 – Geologic and Seismic Assessment

Local and Regional Geology

Carnegie SVRA is located within the Diablo Range, a prominent mountain range extending approximately 180 miles from Mt. Diablo in the north to the Cholame Hills in the south. The Diablo Range is part of the Coast Ranges, which make up the Coast Range Geomorphic Province. Average elevations in the Diablo Range are 2,000–3,000 feet above mean sea level. The Diablo Range generally consists of rolling grassland and plateaus, with occasional peaks. Boundaries between ridges and valleys are often defined by faults, which separate rocks that are more resistant to weathering and landslides from weaker rocks.

Rocks throughout the Diablo Range consist of unique sedimentary, metamorphic and igneous rocks associated with the Franciscan Complex. In the vicinity of the SVRA, the Franciscan Complex occurs as a chaotic mélange, of Franciscan blocks in a matrix of Coast Range sedimentary and metamorphic rock and sediments from the Great Valley Sequence. where blocks of graywacke, greenstone, chert, serpentinite, and isolated knockers of high-grade blueschist and eclogite are set in a matrix of sheared and quartz-veined mudstone and minor sandstone (Blake Jr and Jones, 1974). The matrix of these mélanges represents the distal portion of sediments from the Great Valley Sequence and the tectonic blocks of chert, greenstone and serpentinite were derived from the underlying oceanic crust and upper mantle that make up the Coast Range. This chaotic mélange indicates millions of years of tectonic mixing, evident today at the discrete structural horizons that mark the boundaries of imbricate thrust sheets (Blake Jr and Jones, 1974). These rocks are adjacent to, and locally overlain tectonically by, sequences of oceanic crustal and marine sedimentary rocks of late Mesozoic through Tertiary ages. Regional geology is controlled by faults and folds from older inactive and more recent active fault zones.

Based on descriptions provided by Throckmorton (1988) and Carpenter et al. (1984), rock formations in the vicinity of the SVRA range in age from Jurassic to upper Miocene and are found within a complex structure of faults and folds. The structure of the rock formations is as follows, from bottom to top:

- The oldest rocks, which make up the Jurassic- and Cretaceous-age Franciscan Complex, consist primarily of graywackes, shales, and cherts that have been faulted against mudstones and shales of the upper Jurassic Knoxville and Cretaceous Panoche Formations.
- Overlying the Knoxville Formation are marine shales, sandstones, and siltstones of the upper Cretaceous Moreno Formation.
- Overlying the Moreno Formation are sandstones of the middle Eocene/upper Paleocene Tesla Formation.

- The Miocene Cierbo Sandstone (part of the San Pablo Group) unconformably overlies the Tesla Formation.
- Nonmarine sandstones and siltstones of the Neroly Formation (part of the San Pablo Group) overlie the Cierbo Sandstone.

A review of the Geologic Map of the San Francisco–San Jose Quadrangle (Wagner et al. 1991) indicates that the Park is composed of a variety of geologic formations as described below:

- Quaternary alluvium—Holocene-age deposits composed of unconsolidated stream and basin deposits from clay to boulder size. In the SVRA, these deposits are located only along Corral Hollow Creek.
- Contra Costa Group—late Miocene–age nonmarine deposits composed of sandstone, conglomerate, shale, and minor amounts of claystone, limestone, and tuff. The Contra Costa Group includes the Orinda and Moraga Formations.
- San Pablo Group—late Miocene–age marine deposits composed of sandstone, mudstone, siltstone, and shale with minor amounts of tuff. The San Pablo Group includes the Neroly Sandstone, Cierbo Sandstone, and Briones Sandstone Formations.
- Tesla Formation—late Eocene– and early Paleocene–age deposits composed of quartzose sandstone interbedded with siltstone, mudstone, and carbonaceous shales. The Tesla Formation includes the Laguna Seca Formation.
- Moreno Formation—Cretaceous-age marine deposits composed of shale and sandstone.
- Panoche Formation—Cretaceous-age marine deposits composed of shale, siltstone, and sandstone.
- Franciscan Complex Mélange Terrane—a chaotic mixture of Jurassic- and Cretaceous-age fragmented rock masses in a sheared matrix. Coherent masses large enough to be shown on geologic maps consist of sandstone, shale, limestone, chert, greenstone, serpentinized ultramafic rocks, and metagraywacke.
- Franciscan Complex Chert—the Jurassic- to Cretaceous-age chert member of the Franciscan Complex. Most of the chert in the Franciscan Complex consists of fine-grained, hard, highly siliceous rocks. Most have high iron oxide or hydroxide content and thus are red, reddish, brown, or green. Many of the Franciscan chert outcrops are interbedded with shale. About 10 percent of the chert in the Franciscan Complex consists of the skeletons of tiny marine organisms called radiolaria (Bailey et al. 1964:55–65).

Local and Regional Tectonics

Seven major active faults extend through the San Francisco Bay region in a northwesterly direction and have produced at least 12 large-magnitude (greater than 6.0) earthquakes in the last 200 years. The faults on which these earthquakes occurred are part of the San Andreas fault system located along the boundary of the Pacific oceanic plate and the North American continental plate. The two plates are sliding past one another, forming a transform boundary. The Greenville Fault, which is active and is considered to be one of the seven major faults in the San Francisco Bay Area (Working Group on California Earthquake Probabilities, 2003), is the closest fault to Carnegie SVRA and touches the western portion of the nearby State Parks owned Tesla parcel. A discussion of these nearby faults is relevant due to the potential for fault segments to transfer rupture energy from one segment to another, increasing the overall magnitude of an earthquake (Dorsett et al, 2019).

Numerous studies of the Greenville Fault and other smaller faults have been conducted over the last 30 years. The report, “Geology of the Lawrence Livermore National Laboratory Site and Adjacent Areas” (Carpenter et al. 1984) is particularly relevant because of its detailed examination of the geology in the vicinity of the SVRA. Figure 40 shows the locations of the Greenville Fault and the smaller Las Positas, Corral Hollow, Tesla,

Carnegie, and Patterson Pass Faults. The following brief descriptions of these faults are based on investigations either conducted by or summarized in Carpenter et al.:

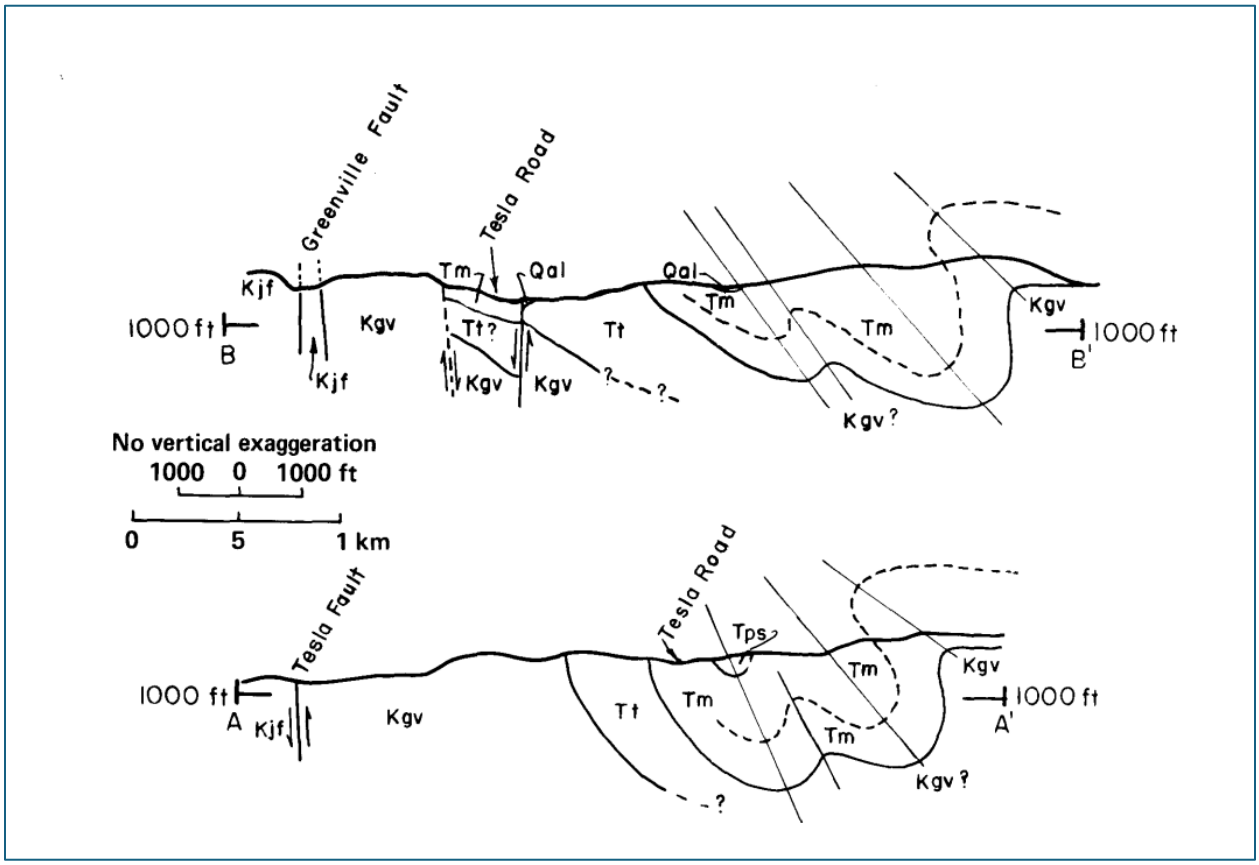

Figure 41. Fault Map for Regional Faults to Carnegie SVRA (Carpenter et al.)

- Las Positas Fault—Evidence of displacement of geologic formations along the Las Positas Fault trace indicates that movement occurred along this strike-slip fault as recently as 3,000–80,000 years Before Present (B.P.). The Las Positas Fault, located approximately 3.6 miles northwest of the CSVRA, consists of two branches that intersect the Greenville Fault. Both branches appear to exist as shear zones that are several hundred feet wide. Geologic evidence suggests that the 1980 earthquakes along the Greenville Fault may have initiated seismic slip along both branches of the Las Positas Fault. Further geologic evidence indicates that the Las Positas Fault has ruptured to the surface during historic time (i.e., within the last 200 years). Microearthquakes (2.0 or less in magnitude) and one magnitude 3.2 event have been recorded along the south branch of this fault zone. Therefore, the Las Positas Fault is considered active, and its northern branch is included in an Alquist-Priolo Earthquake Fault Zone. The Las Positas Fault has an estimated slip rate of 0.4 millimeter per year and maximum magnitude of 6.0.

- Corral Hollow Fault—A portion of the Corral Hollow Fault is located near the northwest boundary of CSVRA, along the bed of Corral Hollow Creek. The Corral Hollow Fault is a northwest-trending strike-slip fault that is oriented subparallel to segments of the Tesla and Greenville Fault zones. The Corral Hollow Fault is located northeast of the Greenville Fault zone and trends southeast toward Corral Hollow, and then easterly beneath alluvium in Corral Hollow to an inferred junction with the Carnegie Fault. Although this fault has not been classified as "active" by the California Geological Survey and is not zoned under the Alquist-Priolo Act, evidence has been presented to State Parks that trenching conducted in 1990 in northeast Section 33, Township 3 South, Range 3 East showed that Holocene gravel deposits overlying the Tesla Formation had been offset downward on the south side of the fault. This evidence indicates that the Corral Hollow Fault may be active.
- Tesla Fault—A portion of the Tesla Fault is located south of CSVRA. The Tesla Fault is the northernmost segment of a complex of faults of varying ages along the eastern flank of the Diablo Range. These faults are likely remnants of the older Coast Range Thrust Fault System, a regional system that originally separated the subducted oceanic crust and sedimentary rock of the Franciscan Complex from the structurally overlying ophiolite and sedimentary rock of the Great Valley sequence. Geologic studies have confirmed that the southern segment of the Tesla Fault is truncated by the Greenville Fault just west of the park; the western portion of the Tesla Fault has been displaced approximately 4.6 miles northwest as a result of movement along the Greenville Fault. Earthquake epicenters have been reported near the Tesla Fault in the vicinity of the State-owned properties in the canyon, but geologic studies have not encountered evidence of surface faulting.
- Carnegie Fault—The Carnegie Fault trends northwest to southeast in the vicinity of the park. The southeastern portion of the Carnegie Fault is located within a portion of Carnegie SVRA, north of Corral Hollow Creek. This is a local fault related to a complex zone of folding and faulting northwest of the Tesla Fault. Geologic evidence suggests that fault activity along the northwestern portion of the fault (outside of the park boundary) has not occurred since the Pliocene epoch. Therefore, this portion of the Carnegie Fault is not considered active. However, Jennings (1994) indicates that the southeastern portion of the Carnegie Fault shows evidence of activity during the Holocene based on an updated geologic study prepared in 1991 for the adjacent Lawrence Livermore Laboratory Site 300. Therefore, this portion of the Carnegie Fault (within the park boundary) is considered active.
- Patterson Pass Fault—The Patterson Pass Fault branches from the Carnegie Fault in an area just north of the nearby State-owned Tesla parcel and may extend northwest for approximately 8 miles to an inferred convergence with the Greenville Fault. Both the Patterson Pass and Greenville Faults show pronounced horizontal components of movement and steep dips but are upthrown on opposite sides. Because of its possible

linkage with the Greenville Fault and reported seismic activity along its trace, the Patterson Pass Fault has been considered active by some researchers. However, other investigations of this fault have shown it to be only approximately 4.6 miles long, with no definitive connection to the Greenville Fault.

Appendix 2.4.6. Soil Types and Properties Table

Table 6. Table of soil types and their associated properties within Carnegie SVRA.

	Soil Unit Name	Texture Surface	Drainage Class	Saturated Hydraulic Conductivity (Ksat)	Hydrologic Soil Group	Runoff Rate	Shrink-Swell Potential	Wind Erodibility Group	Off-Trial Erosion Hazard
AME2	Altamont Clay, moderately deep, 30-40% slopes, eroded	Clay	Well drained	Very Low	D	Very high	High	7	Severe
104	Alo-Vaquero Complex, 30-50% slopes	Clay	Well drained	Moderately low	D	Moderate	High	7	Severe
114	Calla-Carbona Complex, 8-30% slopes	Clay loam	Well drained	Moderately low	B	Moderate	Moderate	4L	Moderate
123	Carbona clay loam, 2-8% slopes	Clay loam	Well drained	Moderately low	D	Moderate	High	4	Slight
128	Cogna fine sandy loam, 0-2% slopes, overwashed	Loam	Well drained	High	B	Moderate	Low	3	Slight
164	Gonzaga-Honker-Franciscan Complex, 30-50% slopes	Loam	Well drained	Moderately high	D	Moderate	Moderate	6	Severe
176	Honker-Vallecitos-Gonzaga Complex, 30-50% slopes	Loam	Well drained	Moderately high	D	Moderate	High	6	Severe
177	Honker-Vallecitos-Honker-Eroded Complex, 30-50% slopes	Gravelly loam	Well drained	Moderately high	D	Moderate	High	7	Severe
LaE2	Linne clay loam, 30–45% slopes, eroded	Clay loam	Well drained	Very low	C	High	Moderate	4L	Severe
LpE2	Los Gatos–Los Osos Complex, 30-45% slopes, eroded	Loam	Well drained	Very low	C	High	Moderate	7	Severe
Rh	Riverwash	Sand	Excessively drained	Very high	A	Very low	NA	3	Very severe
R0F	Rock land	Rock	NA	Very low	D	Very high	NA	8	Slight

	Soil Map Unit Name	Surface Texture	Drainage Class	Saturated Hydraulic Conductivity (Ksat)	Hydrologic Soil Group	Runoff Rate	Shrink-Swell Potential	Wind Erodi-bility Group	Off-Trail Erosion Hazard
VaE2	Vallecitos rocky loam, 30–45% slopes, eroded	Loam	Well drained	Very low	C	High	Low	7	Severe
VaF2	Vallecitos rocky loam, 45–75% slopes, eroded	Loam	Somewhat excessively drained	Very low	C	High	Low	7	Very severe
275	Wisflat-Arbuna-San Timoteo Complex, 30-50% slopes	Sandy loam	Well drained	High	D	Moderate	Low	3	Severe
276	Wisflat-Arbuna-San Timoteo Complex, 50-75% slopes	Sandy loam	Well drained	High	D	Moderate	Low	3	Very severe
278	Xerofluvents-Xerorthents Complex, 1-8% slopes occasionally flooded	Gravelly sandy loam	Well drained	NR	B	NR	NR	NR	Slight

Notes: NA = Not Available; NR = Not Rated
Ksat is a meaure of soil permeability; it refers to the ease with which water travels through the soil pores under saturated conditions
Hydrologic soil groups are based on runoff characteristics: Group A = low runoff potential, Group B = low to moderate runoff potential, Group C = moderate to high runoff potential, Group D = high runoff potential
Shrink-Swell Potential: Based on linear extensibility. Rating moderate to very high can result in damage to buildings, roads and other structures
Wind Erodibility: The soils assigned to Group 1 are the most susceptible to wind erosion, and those assigned to Group 8 are the least susceptible.
Runoff rate classes are not available for Alameda County soils; K Factor is a measure of soil susceptibility to sheet and rill erosion

Sources: State Parks 2007a, based on Natural Resources Conservation Service soil survey data; NRCS 2013-2014; data compiled by AECOM in 2014.

Wisflat-Arbuna-San Timoteo complex is composed of residuum weathered from sandstone and calcareous sandstone and is classified as well drained sandy loam with a high saturated hydraulic conductivity. These soils are also more susceptible to erosion from the wind than other soils found within CSVRA. Because this soil type exhibits these properties with a high susceptibility to erosion from wind or water, OHV roads and trails in this soil type will require regular monitoring and adaptive management actions to ensure compliance with the Standard.

Honker-Vallecitos-Gonzaga complex soils are composed of residuum weathered from sandstone and shale and are classified as well drained soils with very high runoff rates and a very low to low hydraulic conductivity. Within this soil group, a restrictive layer can be found approximately 4 inches below the surface, with approximately 10-40 inches to lithic bedrock.

The rock land is composed of alluvium derived from sandstone and shale and does not have soil properties or qualities associated with it due to the lack of soils present within that group. Rock land is found within Alameda County; across the county line in San Joaquin County, this unit is mapped as Honker-Vallecitos-Honker-Eroded complex.

Honker-Vallecitos-Honker-Eroded complex is composed of residuum weathered from sandstone and is classified as well-drained soils with very high runoff potential, and low to moderately low saturated hydraulic conductivity. This soil group also exhibits a restrictive layer that can be found approximately 4-7 inches below the surface, with approximately 10-40 inches to lithic bedrock.

The Alo-Vaquero complex is composed of residuum weathered from shale and sandstone and is classified as well drained with a very high runoff potential and a variable hydraulic conductivity, ranging from moderately low to moderately high.

Vallecitos rocky loam is found within Alameda County and is composed of residuum weathered from sandstone and shale. The surface texture of this soil is classified as loam and the hydraulic conductivity is very low. This soil type is well drained to excessively well drained and exhibits a high runoff rate with a low susceptibility to wind erosion. The shrink-swell potential of this soil type is low.

The Altamont clay is composed of residuum weathered from sandstone and shale parent materials and is classified as well drained with a very high runoff potential and very low saturated hydraulic conductivity. This soil type is considered to be more durable due to the shrink-swell potential of the clay; clay particles are less likely to be displaced or detached by rainfall than other surface textures.

Linne clay loam is classified as a clay loam that is well drained with a very low saturated hydraulic conductivity. The runoff rate for this soil type is very high and the potential for this soil type to be eroded by wind is higher than other soil types found within CSVRA. The shrink-swell potential of this soil type is moderate.

Los Gatos-Los Osos complex is loam texture soil with a very low saturated hydraulic conductivity. The parent material for this soil is residuum weathered from sandstone, shale, and in some places, conglomerate. This soil type has a high runoff potential with a low susceptibility to wind erosion.

Calla-carbona complex soils are composed of alluvium derived from mixed rock sources. This is a clay loam soil type that is well drained with a moderately low saturated hydraulic conductivity. The runoff potential for this soil type is moderately low, and this soil type has a moderate shrink-swell potential. Calla-Carbona complex soils are more susceptible to erosion by water or wind and require proper management actions to ensure compliance with the Standard.

Carbona clay loam is composed of alluvium derived from mixed rock sources. It is a clay loam texture soil with a moderately low saturated hydraulic conductivity. The runoff potential for this soil type is moderate. Wind erosion and shrink-well potential for this soil type is high to very high. There is almost none of this soil type within CSVRA; if Carbona clay loam exists within Carnegie SVRA, very small deposits would be found in the northeastern most parts of the SVRA and along the administrative area that resides to the north of Corral Hollow Road and houses the Altamont Sector office.

Cogna loam is a fine, sandy loam with a high saturated hydraulic conductivity. This soil group is more susceptible to wind erosion and exhibits a moderate runoff rate. The shrink-swell potential of this soil type is low, implying that there is very little clay present within this soil unit. Cogna loam is derived from mixed alluvium. This soil type is only found within one area of CSVRA. This soil type does not demonstrate severe erosional hazards from off-trail OHV recreation.

Xerofluvents-xerothents complex is found within the stream corridor in San Joaquin County; in Alameda County, the soil is identified as river wash. The surface texture of xerofluvents-xerothents is gravelly sandy loam; The surface texture of river wash is sand. These two soil types are well drained and exhibit a very high hydraulic conductivity, especially in areas where sand is more predominant. River wash is typically composed of alluvium derived from sandstone, whereas xerofluvents-xerothents complex is composed of alluvium derived from mixed rock sources.