Vegetation Mapping of the Santa Susana Mountains – a portion of the Simi-Valley-Santa Susana Mountains Ecological Subsection of the Southern California Coast Ecological Section

Final Performance Report – Phase I

Submitted to U.S. Fish and Wildlife Service – Carlsbad Office

December 31, 2019

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U.S. Fish and Wildlife Service (USFWS) Cooperative Funding Agreement: F17AC00950

Funding Title: Map the remainder of the Simi Valley-Santa Susana Mountains ecological subsection

Phase I Funding Total: $98,000

Project Proponent: USFWS CFDA Program 15.657

Period of Performance for entire project: October 1, 2017 through September 30, 2022

Funding Period Phase I: October 1, 2017 through September 30, 2019

Cover Photo Credit: Edward Reyes

Acknowledgements:

USFWS

Carlsbad: Will Miller

Ventura: Chris Dellith, Mark Elvin, and Chris Diel

Vegetation Classification and Field Reconnaissance

California Department of Fish and Wildlife (CDFW): Todd Keeler-Wolf

Vegetation Classification, Classification Surveys

California Native Plant Society (CNPS): Julie Evens, Kendra Sikes, Jennifer Buck-Diaz, William "Syd" Magner, and Jay Sullivan

Land Permissions, Accessibility, and Road Conditions

Mountains Conservation and Recreation Authority (MCRA): Paul Edelman, Marc Shores, James Latham, and Fernando Gomez

City of Santa Clarita: Dan Duncan

Rancho Simi Recreation and Park District: Paul Friedeborn

US Forest Service, Angeles National Forest: Nathan Sill and Jamie Uyehara

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Introduction

AIS was contacted by the US Fish and Wildlife Service (USFWS) to provide a cost estimate to map the remainder of the Simi Valley-Santa Susana Mountains Ecological Subsection of the Southern California Coast Ecological Section. A large portion of the subsection was completed as part of AIS's mapping effort for the National Park Service (NPS) covering the Santa Monica Mountains Recreation Area (SAMO). However, only limited funding was available, so the project was divided into a Phase I (allocated funding) and Phase II, which is the remainder of the tasks not covered in Phase I (future funding).

Although the vegetation is similar to SAMO, it was anticipated that there was a need for additional field data collection and analysis to cover types not previously encountered and to refine and update the existing vegetation classification. AIS subcontracted the California Native Plant Society (CNPS) for this vegetation classification effort. CNPS was tasked with classification development and associated field data collection, as well as classification analysis, floristic key development, and classification descriptions.

The study area (Figure 1) of the total overall project is approximately 155,519 acres, consisting of the Santa Susana Mountains proper (approximately 110,000 acres), the Simi Valley (approximately 14,000 acres), the Moorpark Area (23,158 acres), and a northeast extension (8,361 acres). The Phase I portion of the study area is composed of approximately 28,900 acres covering the regional southern slope of the Santa Susana Mountains proper from just west of Happy Camp Canyon in the west to the Angeles National Forest boundary in the east.

This Final Performance Report is a summary of the work completed in Phase I and not a final project report, as the tasks needed to complete the mapping, accuracy assessment, and final report were not funded as part of Phase I. This report will describe each task, including the methodology and work completed for the Phase I effort.

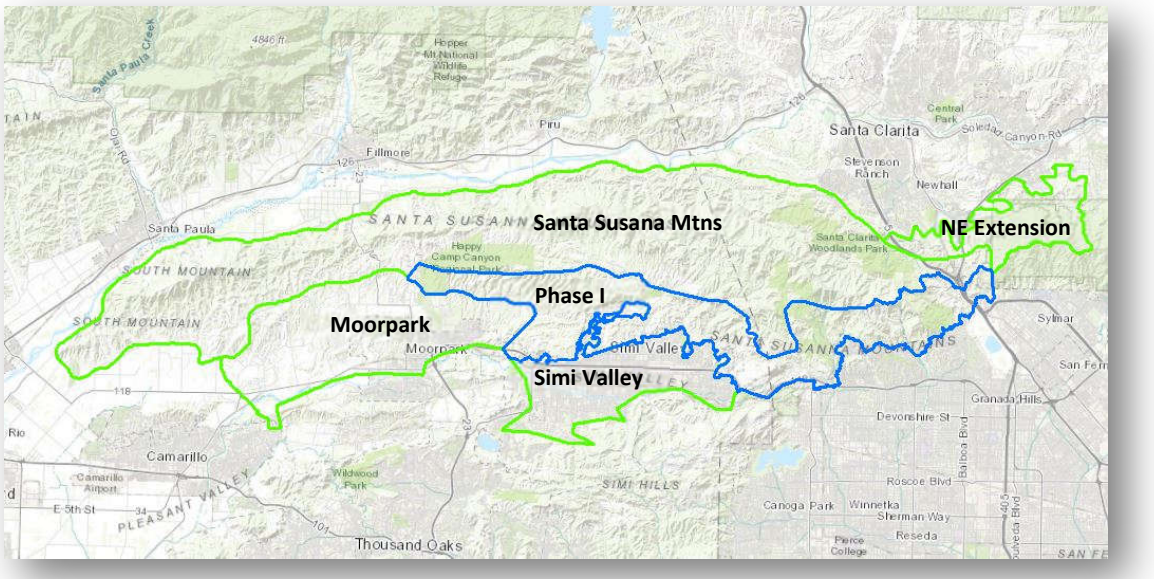


Figure 1: Phase I Study Area and Phase II Study Subareas (Santa Susana Mountains, Moorpark, Simi Valley, NE Extension)

Phase I – Task 1: Data Collection for Classification

Objectives and Methods

The Simi Valley-Santa Susana Mountains Ecological Subsection of the Southern California Coast Ecological Section includes SAMO, which had been previously mapped for vegetation and encompasses a large portion of this ecological subsection. Although the vegetation for SAMO is similar to the remainder of the subsection, it was anticipated that there was a need for additional field data collection and analysis to cover types not previously encountered and to refine and update the existing vegetation classification.

For the data collection effort vegetation is surveyed using a stratified random sampling scheme and includes directed and opportunistic sampling. Existing GIS layers such as CalVEG, elevation, and geology are used to generate sample allocations to ensure multiple samples of each vegetation type are collected throughout the project area. Sample allocation fulfills three goals: samples are well-spread across the study area; samples are distributed among the vegetation types to represent rare and common types; and access to sites are facilitated according to proximity to roads or access trails to maximize efficiency in the field. Timing of data collection for the study area should coincide with peak phenology to obtain appropriate cover values and reliable plant taxa identification.

Field staff are proficient in plant identification and vegetation classification concepts and highly experienced in the use of the CNPS-CDFW Protocol for Combined Vegetation Rapid Assessment and Relevé Field Form, and the CNPS Reconnaissance form. Protocols comply with state and national standards as defined by the Survey of California Vegetation (SCV) and the US National Vegetation Classification (USNVC).

Each survey location is digitally photographed and marked using a GPS device to produce a GIS map of the surveyed data points. Recorded data include plant species composition, species abundance, structure, site impacts, and environmental setting. Percent cover of plant species are visually estimated using percent cover individually and by vegetation strata (herbaceous, shrub, tree). Unknown species are identified to the finest taxonomic level possible in the field and then collected for further identification in the office. Nomenclature and species codes conform to the USDA NRCS PLANTS Database (USDA, NRCS, 2015) when possible. Specimens of plants are collected for identification or for other reasons of interest (e.g. range extension, newly invasive, or unusual occurrences) and vouchers may be deposited in a recognized herbarium.

All survey data are reviewed for quality and accuracy, then entered and archived into a standardized database. Paper field forms are scanned/filed and archived into binders while digital photos are organized and archived into folders labeled by a survey's unique identifier.

Quality control is performed on the data entry including sorting of data tables to check for outlier values, checking for correctness in plant species identified across the region, reviewing taxa with similar names and/or USDA codes, and checking for correctness of plants' % cover values. Data can be publicly available upon project completion through CDFW's Biogeographic Information and Observation System (BIOS) and other data-sharing utilities upon project completion. Approximately 70 surveys were anticipated for collection.

Work Completed

The Data Collection task was conducted by CNPS. CNPS collected 80 surveys in the data collection process. 79 of the surveys were Rapid Assessments, while one was a Relevé survey. The surveys were conducted in mid and late March, and early April of 2018. The survey data and classification was provided to USFWS in the form of a Microsoft Access database named Standalone_Database_SASU_201900422.mdb, and a personal geodatabase named VegetationSurveys_SASU_final_20190422.mdb.

Phase I – Task 2: Data Analysis for Classification & Vegetation Key, Descriptions, and Crosswalks

Objectives and Methods

Plant species data collected are used to classify vegetation, and data from adjacent/similar areas in related projects are co-analyzed for broader analysis. Percent cover estimates for each taxon are relativized by plot, such that each estimate is relative to other species in the plot, and the sum of the cover values is 1.

Data is imported into PC-ORD and converted into plot-by-species matrices. Taxa that occur in a small number of plots (i.e., less than 2 to 5 plots) are removed to generate additional plot-by-species matrices. Summary statistics including alpha and beta diversity and the coefficient of variation (CV) are calculated and outlier analyses are run on all matrices. The plot-by-species matrices with lowest alpha and beta diversity and lower CV for species (typically <200%) are selected. Outliers for species and plots are removed from the matrices and reported.

Hierarchical cluster analyses group similar surveys based on species composition and abundance. These groups, along with indicator species analyses, are interpreted to develop a hierarchical classification that defines the vegetation types for a project area. The distance measure and linkage method used (typically Sørensen and Flexible data, respectively) are to be reported in the final report document. The grouping level with the lowest average p-values and highest number of significant indicators are used to drive the vegetation classification process. Ecologists assign each survey to an Alliance and an Association (if possible) as based on the analyses results along with information from existing classifications and related data. A draft classification is provided to CDFW VegCAMP for review, to ensure compliance with the Manual of California Vegetation (Sawyer et al., 2009) and the USNVC.

During classification, a vegetation key is developed and organized by various characteristics such as layer (e.g., tree, shrub, herb), NVC name (e.g., Group, Alliance, and Association), and habit (e.g., riparian/wetland, upland). A key guides users to determine the vegetation type of a stand in the field or while delineating polygons.

Field testing of the vegetation classification key is performed during the map field reconnaissance in the mapping stage of the project. Detailed vegetation descriptions are written for each **new** alliance encountered including criteria such as: sample size, distribution in the study area, summarized environmental data and species composition, cover by stratum, stand tables summarizing percent constancy and abundance values for species in the type, and rarity status. Concept summaries are

written for **new** associations. The vegetation descriptions and key are included in a report, along with a definition of terms and a table showing final classification names for each field survey. Crosswalks will be provided in the final report document showing the relationship of the vegetation types in the classification to the USNVC and others (e.g. CWHR, CalVEG).

Work Completed

CNPS conducted an iterative data analysis for the classification, which utilized the new plot data collected for the project as well as existing plot data for southern California. A cluster analysis was performed on 6,851 surveys throughout Southern California, most of which had an initial classification provided by a recent region-wide co-analysis undertaken by CDFW's VegCAMP. The pre-existing surveys provided a context with which to assign existing types to the surveys for this project. Final classification names were assigned to a total of 503 surveys that were within 5 km of the study area. As a result of the data analysis CNPS created the vegetation key, and provided a description of one new alliance and its corresponding association. All other vegetation types were already known from the ecoregion (refer to the Vegetation Classification of the Santa Monica Mountains National Recreation Area, available from NPS). The new surveys collected for the project, as well as existing surveys from the SAMO vegetation mapping project collected in 2003 through 2007, and two plots from the Santa Clara River were included in the final data analysis. CDFW's VegCAMP reviewed the draft classification. Testing of the draft vegetation key was conducted by AIS and Todd Keeler-Wolf, the CDFW state ecologist, during the photo interpretation reconnaissance trip in late March-early April of 2019. The draft vegetation classification hierarchy and vegetation key, as well as the classification surveys were provided to AIS in late January 2019 for the photo interpretation field reconnaissance and vegetation mapping process. Updates and revisions to the classification and vegetation key were applied from feedback resulting from the field reconnaissance as well as from the photo interpretation mapping process. Additional updates and revisions are possible as a result of additional data collection and classification analysis, field reconnaissance, and mapping of the Phase II study area. Final versions of all documents will be provided in the project final report and updated databases will also be provided at the conclusion of the Phase II effort.

The following draft digital files were delivered as a result of this task:

- HierarchyTable3_SASUrev.doc (Appendix F)
- ClassifTable2_SASUrev.docx (Appendix G)
- SASU key draft_20190422.docx (Appendix H)
- DescriptionsSSU_rev.docx (Appendix I)
- Changes to Classification-KS-3-18-2019.xlsx
- tbl_StandTable_Association.xlsx

Phase I – Task 3: Vegetation Mapping

Objectives and Methods

A portion of the overall study area was selected as an example of the vegetation mapping process to be included in the Phase I effort. Because of the funding limitation the vegetation mapping process was not

to be considered a “final” product. Field checking/ground truthing, mapping quality control, accuracy assessment, and data revisions were not funded in Phase I.

During the project initiation and set up, the team of photo interpreters and GIS staff inventory and organize the project materials and prepare those materials into a format suitable for production mapping. GIS staff also create project workspaces, modify existing ArcGIS tool sets, create project specific coding menus to facilitate the photo interpretation effort, and divide the study area into working production modules. Having individual production modules allow multiple people to work on the data simultaneously and arranges the project materials into smaller, more manageable pieces to expedite the production mapping process.

The mapping classification for the project is based on the vegetation classification already developed as part of Task 2. Map units are classified to the Alliance-level. In addition to the vegetation type, polygons mapped are based on their percent cover by vegetation life form, hardwood, conifer, shrub and herbaceous components. Other attributes such as disturbance impact level, exotic impact level, and land use are attributed to the delineated polygons but are not themselves line formers. Upon completion of the Phase II mapping, the vegetation map units will be crosswalked to populate other attributes such as the California Wildlife Habitat Relations (CWHR) types, tree height, etc., in the final geodatabase.

Because of the complexity of the overall study area there is a need for four field reconnaissance visits to the total study area. Two of the reconnaissance visits occur prior the mapping process, and the other two, ground truth reconnaissance, occur after the mapping process is completed. Field reconnaissance serves various functions. Field visits enable the photo interpreters to relate the vegetation on the ground at each observation site to the signatures on the aerial imagery. They provide an opportunity for the ecologists and photo interpreters to spend time together in the field to become familiar with the flora, vegetation assemblages, and local ecology of the study area. This interchange also gives the ecologists a better understanding, from the photo interpreters’ perspective, of vegetation assessment through the framework of map creation. Field visits are also used to help answer photo interpretation questions that may arise during the mapping effort (ground truth reconnaissance). Site visits are documented with geographic locations, field notes, and ground photos, further enhancing the photo interpreters’ ability to accurately map the vegetation. Due to funding constraints only the first field reconnaissance was included as part of Phase I.

Mapping done by experienced photo interpreters with knowledge of vegetation communities, good reference sources, as well as the use of appropriate GIS tools, are all essential in creating a quality vegetation map. Equally important is the development of the set of decision making rules, or mapping criteria, to ensure the accuracy and consistency of map delineations and attributes. The mapping criteria contains the project guidelines and rules regarding exceptions, special situations, and minimum feature size and are documented in the final project report.

For this project, established statewide standard guidelines are used. Statewide standard for minimum mapping unit (MMU) size is 1 acre for upland types and ¼ acre for wetland and riparian types. Any changes or additions to criteria are discussed and agreed upon by the project team, and disseminated to all staff members, as needed, during the photo interpretation effort.

Photo interpreters delineate and attribute vegetation unit polygons using heads-up digitizing techniques, while viewing project base imagery on-screen. The mapping consists of two distinct aspects, the “photo interpretation process” and the “mapping process.” During the photo interpretation process

the interpreters apply their understanding of photo signature (defined by the color, texture, tone, size, and pattern exhibited on the aerial imagery) and knowledge of the geographic characteristics of ground features to formulate a reasoned decision about how to represent a feature and what to call it. The "mapping process" involves the creation of the digital geodatabase through the use of computer hardware and software. In other words, the mapping process captures for subsequent users a permanent record of the results of the photo interpretation process. Both aspects happen simultaneously as a map is created.

Just as the use of mental models by experienced photo interpreters contributes to the production of a high-quality vegetation map, the use of established mapping procedures allow for the map to be produced in a highly efficient manner. Photo interpreters have at their disposal a suite of standard and custom ArcMap tools to facilitate the creation of polygons. They also reference supplemental imagery from various years and seasonality, vegetation field data, and other data, such as elevation contours and fire history, to help in their polygon delineations and attribution.

To ensure the accuracy and completeness of the interpretations, a comprehensive quality control (QC) review is performed to ensure delineations and codes adhere to the project criteria and classification. QC is an iterative process, conducted at many phases of the mapping effort.

A senior staff member reviews the completed map datasets to verify accuracy and consistency among interpreters, looking for completeness, uncoded polygons, unnecessary boundaries, and how well the delineations match the imagery. In addition, the modules will be subjected to a series of automated GIS checks, which flags any instances of invalid codes, uncoded polygons, unnecessary boundaries, illogical code combinations, or topology problems. All errors found are corrected.

When the completed modules are joined, they are edge-matched, with any discrepancies at the edges between modules corrected, and any changes applied throughout the modules. This edge matching is also done in the areas previously mapped for other projects, such as the existing vegetation data for the SAMO. With all the individual production modules joined together, one last quality control review is conducted on the geodatabase prior to final delivery for seamless and completeness of map processing.

Work Completed

During the project initiation phase AIS in collaboration with USFWS determined the Phase I study area for mapping. The study area was divided into three working modules. All pertinent materials and data files were acquired. The base for mapping was the 2018 NAIP natural color and color infrared imagery. The 2016 NAIP imagery, as well as Google Earth, was also available for reference. Fire perimeter files, the classification survey data, land access files, road files, and geology were also obtained.

The AIS mapping classification was based on the vegetation classification developed by CNPS. Other miscellaneous non-vegetation map classes not accounted for by the vegetation classification were added. Mapping criteria is based on the CDFW state standard for vegetation mapping. The mapping class criteria for mapping is based on the vegetation key developed by CNPS during the classification analysis process. The vegetation key becomes the basis for photo interpretation criteria and map class descriptions. As a result of observations during the field reconnaissance and use of the key during the mapping process, collaboration between the AIS mapping staff and the CNPS ecologists, updates and revisions to the key were incorporated to reflect new information or clarifications.

One five-day field reconnaissance trip was conducted for the Phase I study area. Two AIS staff and one CDFW staff member traveled throughout accessible portions of the study area. One USFWS staff was present for one day. AIS was in contact with personnel from the Mountains Recreation and Conservation Authority, Rancho Simi Recreation and Parks District, City of Santa Clarita, and Angeles National Forest in assessing accessibility, road conditions, and permission to access their properties. Private lands otherwise was not accessible. The field reconnaissance trip was conducted in early April of 2019. The reconnaissance report is found in Appendix E. Note that the ground truth field reconnaissance for the Phase I mapped study area will be conducted as part of the Phase II portion of the project.

The vegetation photo interpretation and mapping was conducted by AIS. Two photo interpreters, including one senior staff conducted the mapping of the three Phase I modules. Both staff had been present on the field reconnaissance trip. Communication and collaboration between the two mappers. Any vegetation classification or criteria issues were discussed and resolved through communication with CNPS staff. Since only one field reconnaissance trip was conducted as part of Phase I on only a portion of the entire study area, there remain some issues of trends of certain types across the study area that can be further observed with the additional field reconnaissance trips that remain as part of Phase II. In addition, as mapping progresses, other problematic signatures or questions come up that are flagged for visit during the ground truth reconnaissance. The ground truth trip is also a part of the Phase II part of the project.

Although not part of the Phase I effort, AIS completed the GIS processing for the Phase I study area in order to provide USFWS with a "useable" GIS geodatabase. After the 3 separate modules were joined and module boundaries dissolved, diagnostic GIS checks were conducted. A visual overview of the attribute table was done to find any obvious inconsistencies between attribute field value correlations. A type by type onscreen review was conducted in a search for anomalies. Any incongruities found were either reassessed and recoded as appropriate or flagged for potential future field visits. Consistency between mappers was also checked, and that consistent correlations were applied. There are a number of field verification sites flagged for questionable PI signatures that will need to be addressed in the PHASE II ground truth reconnaissance.

The mapping classification is composed of 68 alliances. For the Phase I mapping study area, 1 macrogroup level, 3 group level, 39 alliance level, and 13 Mapping Unit types were mapped. Table 1 below summarizes the types mapped, as well as acres for each type.

The schema for the interim Phase I vegetation geodatabase is provide in Appendix A. Note that the final geodatabase (resulting from the mapping of both Phase I and II) will include the additional attributes for MethodID, Tree Height, and CWJR Tree Size, which will be attributed as part of Phase II when all mapping for the entire study area is complete. The preliminary version of the mapping classification hierarchy, as well as an alphabetical and numeric classification short list by life form is provided in Appendices B, C, and D. A final version of the mapping classification, map class descriptions, and the vegetation key will be provided in the final report documentation after the completion of Phase II.

The interim Phase I vegetation map geodatabase (SASU_Phase1_Preliminary_20190730.gdb) is provided as part of this task.

Table 1: Summary of Phase I Mapped Classes by Type (listed by Acres high to low)

Map Unit	Description	Area (ac.)	% of Total Area (ac.)	# of Polygons	Average Polygon Size (ac.)
2232	Adenostoma fasciculatum - Salvia spp. Alliance	5,815.8	20.1%	341	17.1
2410	Californian Ruderal Grassland, Meadow & Scrub Group	4,953.2	17.1%	628	7.9
2334	Salvia mellifera - Artemisia californica Alliance	3,908.1	13.5%	528	7.4
9300	Urban MU	2,440.6	8.4%	134	18.2
2331	Artemisa californica - Salvia leucophylla Alliance	2,298.1	7.9%	389	5.9
2332	Encelia californica - Eriogonum cinereum Alliance	2,202.6	7.6%	268	8.2
1111	Juglans californica Alliance	1,269.0	4.4%	242	5.2
2231	Adenostoma fasciculatum Alliance	874.0	3.0%	82	10.7
2211	Malosma laurina Alliance	873.6	3.0%	184	4.7
1112	Quercus agrifolia Alliance	824.2	2.8%	226	3.6
2224	Prunus ilicifolia - Heteromeles arbutifolia - Ceanothus spinosus Alliance	568.8	2.0%	123	4.6
1411	Platanus racemosa - Quercus agrifolia Alliance	421.2	1.5%	75	5.6
2333	Eriogonum fasciculatum - Salvia apiana Alliance	411.0	1.4%	154	2.7
2315	Malacothamnus fasciculatus - Malacothamnus spp. Alliance	404.3	1.4%	105	3.9
2234	Ceanothus megacarpus Alliance	310.6	1.1%	55	5.6
3511	Baccharis salicifolia Alliance	153.9	0.5%	68	2.3
1412	Salix gooddingii - Salix laevigata Alliance	132.4	0.5%	57	2.3
9531	Artificial Cuts/Embankments - Coastal Sage Scrub Mapping Unit	98.9	0.3%	24	4.1
1113	Quercus lobata Alliance	88.3	0.3%	35	2.5
9110	Cleared Land Mapping Unit	79.6	0.3%	19	4.2
9540	Artificial Cuts/Embankments - Herbaceous to Sparsely Vegetated Mapping Unit	75.2	0.3%	19	4.0
9200	Agriculture Mapping Unit	65.8	0.2%	3	21.9
1311	Pseutotsuga macrocarpa Alliance	65.2	0.2%	15	4.3
2223	Cercocarpus montanus Alliance	61.4	0.2%	9	6.8
2233	Ceanothus crassifolius Alliance	61.0	0.2%	15	4.1
2212	Rhus integrifolia Alliance	59.6	0.2%	11	5.4
9530	Artificial Cuts/Embankments - Shrubs Mapping Unit	47.2	0.2%	11	4.3
3513	Salix lasiolepis Alliance	42.4	0.1%	31	1.4
6111	Selaginella bigelovii Alliance	42.3	0.1%	10	4.2
1413	Populus fremontii - Fraxinus velutina - Salix gooddingii Alliance	38.3	0.1%	7	5.5
4311	Lepidospartum squamatum Alliance	38.2	0.1%	10	3.8
9400	Exotic or Planted Trees and Shrubs Mapping Unit	36.1	0.1%	9	4.0
1211	Eucalyptus spp. - Ailanthus altissima - Robinia pseudoacacia Alliance	32.8	0.1%	16	2.0
9520	Artificial Cuts/Embankments - Trees Mapping Unit	27.7	0.1%	7	4.0
3514	Sambucus nigra Alliance	25.6	0.1%	23	1.1
2314	Lotus scoparius - Lupinus albifrons - Eriodictyon spp. Alliance	23.1	0.1%	13	1.8
2225	Quercus berberidifolia Alliance	22.8	0.1%	11	2.1
2511	Rhus ovata Allilance	20.9	0.1%	9	2.3
6110	Californian Cliff, Scree & Rock Vegetation Group	18.5	0.1%	13	1.4
9801	Small Earthen Dammed Ponds	16.4	0.1%	8	2.0
3622	Atriplex lentiformis Alliance	7.5	0.0%	7	1.1
9500	Artificial Cuts/Embankments Mapping Unit	5.2	0.0%	2	2.6
4111	Opuntia littoralis - Opuntia oricola - Cylindropuntia prolifera Alliance	3.7	0.0%	5	0.7
2711	Isocoma menziesii	2.8	0.0%	3	0.9
3311	Phragmites australis - Arundo donax Alliance	2.6	0.0%	8	0.3
1511	Tamarix spp. Alliance	2.2	0.0%	3	0.7
9700	Post-Fire Mapping Unit	1.7	0.0%	1	1.7
3212	Typha (angustifolia, domingensis, latifolia) Alliance	1.5	0.0%	1	1.5
2322	Toxicodendron diversilobum Alliance	1.3	0.0%	3	0.4
9100	Sparsely Vegetated to Non-vegetated Mapping Unit	1.2	0.0%	1	1.2
2330	Central & Southern Californian Coastal Sage Scrub Group	1.0	0.0%	1	1.0
1212	Schinus (molle, terebinthifolius) - Myoporum laetum Alliance	1.0	0.0%	1	1.0
9800	Water Mapping Unit	0.3	0.0%	1	0.3
3512	Salix exigua Alliance	0.3	0.0%	1	0.3
2112	Leymus condensatus Alliance	0.3	0.0%	1	0.3
3400	Western North American Vernal Pool Macrogroup	0.2	0.0%	1	0.2
	Total Area	28,981.4	100.0%	4027	7.2

Deliverables

1. Preliminary Mapping Classification Hierarchy_4-19-2019 (AIS) (Appendices B, C, and D, and delivered as separate digital files)

   Outline of the final Phase I version of the alliance level hierarchical mapping classification for the project, with associations and Mapping Units also listed. It was derived from the Vegetation Classification provided by CNPS (ClassifTable2_SASUrev.docx, HierarchyTable3_SASUrev.doc, and SASU key draft_20190422.docx). The classification contains potential alliance types that may be found and mapped in the study area and is based on the alliances/associations assigned to survey plots used in the classification analysis and plots outside, but near the study area (5 kilometer buffer). The document is updated as mapping progresses if types not listed are encountered, after discussion with CNPS and/or CDFW. Upon completion of Phase II of the project, a final report with mapping class type descriptions will be provided (currently not funded for Phase I).

2. HierarchyTable3_SASUrev.doc (CNPS) (Appendix F and delivered as separate digital file)

   List of vegetation alliances and associations documented in the Santa Susana Mountains project area, or within a 5km buffer (noted by *). The types are nested within the NVC hierarchy. The NVC code is identified for the upper levels of the hierarchy to the Group level. This list will be updated where the inclusion of additional survey data collected as part of Phase II of the project results in new types.

3. ClassifTable2_SASUrev.docx (CNPS) (Appendix G and delivered as separate digital file)

   List of vegetation types (alliance and association by life form) sampled within the Santa Susana Mountains and a 5km buffer surrounding the project area. The list includes a column showing the number of surveys classified that are located within the study area, as well as within the buffer area. This list will be updated with the inclusion of additional survey data collected as part of Phase II of the project. As mapping progresses, the photo interpreters may have questions for CNPS/CDFW regarding some survey plots which may result in a change of alliance or association assignment of the plot.

4. SASU key draft_20190422.docx (CNPS) (Appendix H and delivered as separate digital file)

   A dichotomous field key written to assist users in identifying the vegetation alliances and associations of the Santa Susana Mountains. It is based on the classification of data collected in 2018 by CNPS, as well as additional supporting data collected for the Santa Monica Mountains NRA between 2003 and 2009, and two additional data points collected in 2015 by Rancho Santa Ana Botanic Garden. Types collected outside of the Simi Valley - Santa Susana Mountains project area may potentially occur in the study area. The key will be updated where the inclusion of additional survey data, collected as part of Phase II of the project, results in new types. As mapping progresses, the photo interpreters may have questions for CNPS/CDFW regarding some survey plots or key descriptions, which may result in a change of alliance or association assignment of the plot, and potentially a modification of the key description.

5. Changes to Classification-KS-3-18-2019.xlsx (CNPS) (Delivered as separate digital file)

   A spreadsheet indicating the correlation of vegetation alliance and/or association types to old scientific nomenclature of the adjacent Santa Monica Mountains NRA and/or other areas in Southern California. Highlighting in the spreadsheet is used to group records of the same current vegetation type. Former associations or alliances may have been lumped, merged, renamed, or moved within the classification hierarchy as a result of the classification analysis for the project as well as the global southern California and statewide vegetation classification review currently underway by CDFW. Since the review is still in progress, the correlations are subject to modification as the analyses progress. If and when Phase II of the project becomes funded, the status of the southern California vegetation classification review would likely result in a revised correlation spreadsheet. This list will be updated where the inclusion of additional survey data collected as part of Phase II of the project results in new types.

6. Tbl_StandTable_Association.xlsx (CNPS) (Delivered as separate digital file)

   A species table for each association of the alliance showing lifeform, overall constancy value, and average minimum, and maximum cover values of each species listed in the table for that association. Number of plots for a given association and alliance are also indicated. The table will be updated where the inclusion of additional survey data collected as part of Phase II of the project results in new types and/or additional plots for a given type. As mapping progresses, the photo interpreters may have questions for CNPS/CDFW regarding some survey plots or key descriptions, which may result in a change of alliance or association assignment of the plot, and potentially a modification of the table. Changes resulting from the global regional review of southern California vegetation plot data may also result in classification changes for given plots, and therefore changes to the table.

7. DescriptionsSASU_rev.docx (CNPS) (Appendix I and delivered as separate digital file)

   Descriptions for **new** types Ericameria linearifolia - Cleome isomeris Shrubland Alliance and its corresponding Ericameria linearifolia Association are the only vegetation classification descriptions provided at this time. The other type descriptions can be found in the SAMO classification that was completed in 2006 for SAMO NRA. Item #5 above will help in determining the correct alliance/association nomenclature previously used for a given alliance/association.

   It should be noted that CDFW is currently undergoing a comprehensive regional southern California classification analysis and review. This effort will result in the merging, lumping, renaming, and/or change within the classification hierarchy of associations and/or alliances. While this regional analysis is in progress, vegetation classification descriptions will use the existing SAMO and/or MVC online descriptions. When Phase II of the project becomes funded, the status of the southern California vegetation classification review would need to be assessed. The status of the types and their corresponding vegetation classification descriptions would need to be addressed with CDFW and CNPS at that time.

8. Vegetation Classification of the Santa Monica Mountains National Recreation Area and Environs 3-30-2006.doc (SAMO/NPS) (Delivered as separate digital file)

   This document from 2006 is available from CDFW and the Santa Monica Mountains National Recreation Area (SAMO). It provides Vegetation Classification descriptions for the types found at the Santa Monica Mountains National Recreation Area. Many types from SAMO are also found in the Santa Susana Mountains. Refer to Changes to Classification-KS-3-18-2019.xlsx (item #5) for some type correlations involving merging, lumping, or nomenclature changes.

9. Standalone_Database_SASU_20190422.mdb (CNPS)(Delivered as separate digital file)

   Access database for Classification of the Santa Susana Mountains project.

10. VegetationSurveys_SASU_final_20190422.mdb (CNPS) (Delivered as separate digital file)

    Geodatabase of surveys classified for the Santa Susana Mountains project.

11. Classification Survey Plots Geodatabase – SASU_Classification2.gdb (AIS generated from CNPS data) (Delivered as separate digital file)

    Geodatabase based on Access database Standalone_Database_SASU_20190315.mdb (All Reports) and VegetationSurveys_SASU_final_20190315.mdb (Survey Points, Survey Plants)

12. Vegetation Database Phase 1 (SASU_Phase1_Preliminary_20190730.gdb) (AIS) (Delivered as separate digital file)

    Vegetation geodatabase for Phase 1 portion of the study area compiled by AIS through photo interpretation and mapping using ArcMap.

Although not a deliverable, the Manual of California Vegetation Online (CNPS) (Available online at http://vegetation.cnps.org/) contains useful information to supplement the information provided in the other documents. It should be noted that the online Manual may not reflect current classification parameters since it is not updated on a frequent basis.

Appendix A: Schema for Phase I and II (AIS)

ObjectID – Phase I and II

Shape – Phase I and II

MapUnit – Phase I and II

ConiferCover – Phase I and II

HardwoodCover – Phase I and II

TotalTreeCover – Phase I and II

ShrubCover – Phase I and II

HerbaceousCover – Phase I and II

Exotics – Phase I and II

Roadedness – Phase I and II

Development – Phase I and II

AnthropogenicAlteration – Phase I and II

Notes – Phase I and II

LandUse – Phase I and II

MethodID – Attributized as part of Phase II

TreeHeight – Attributized as part of Phase II

CWJRTreeSize – Attributized as part of Phase II

Shape_Length – Phase I and II

Shape_Area – Phase I and II

Database Status – Phase I interim delivery only

Appendix B: Preliminary Mapping Classification Hierarchy – 4-19-2019 (AIS)

Class
Subclass
Formation
Division
Macrogroup
Group
Alliance
Association

MMU = 1 acre upland; ½ acre wetlands and riparian

Forest & Woodland Class (1.) (1000)
Temperate & Boreal Forest & Woodland Subclass (1.B)
Warm Temperate Forest & Woodland Formation (1.B.1.)
Californian Forest & Woodland Division (1.B.1.Nc.)
Californian Forest & Woodland Macrogroup (M009) (1100)
Californian Broadleaf Forest & Woodland Group (G195) (1110)
Juglans californica Alliance (1111)
Juglans californica – Quercus agrifolia Association
Juglans californica / annual herbaceous Association
Juglans californica / Artemisia californica / Leymus condensatus Association
Juglans californica / Heteromeles arbutifolia Association*
Juglans californica / Malosma laurina Association
Quercus agrifolia Alliance (1112)
Quercus agrifolia Association
Quercus agrifolia – Umbellularia californica Association*
Quercus agrifolia / Ceanothus (oliganthus, spinosus) Association*
Quercus agrifolia / Heteromeles arbutifolia Association*
Quercus agrifolia / Salvia leucophylla – Artemisia californica Association*
Quercus lobata Alliance (1113)
Quercus lobata – Quercus agrifolia / grass Association
Umbellularia californica Alliance (1114)
Umbellularia californica / Ceanothus oliganthus Association*

Californian Ruderal Forest Macrogroup (M513) (1200)
Californian Ruderal Forest Group (G678) (1210)
Eucalyptus spp. – Ailanthus altissima – Robinia pseudoacacia Semi-natural Alliance* (1211)
Eucalyptus (globulus, camaldulensis) Provisional Semi-natural Association*
Schinus (molle, terebinthifolius) – Myoporum laetum Semi-natural Alliance* (1212)
Schinus molle Association*

Cool Temperate Forest & Woodland Formation (1.B.1.)
Vancouverian Forest & Woodland Division (1.B.1.Nd.)
Southern Vancouverian Montane-Foothill Forest Macrogroup (M023) (1300)
Californian Montane Conifer Forest & Woodland Group (G344) (1310)
Pseudotsuga macrocarpa Alliance (1311)
Pseudotsuga macrocarpa – Quercus agrifolia Association

Temperate Flooded & Swamp Forest Formation (1.B.3.)
Western North American Interior Flooded Forest Division (1.B.3.Nd.)
Interior Warm & Cool Desert Riparian Forest Macrogroup (M036) (1400)
Western Interior Riparian Forest & Woodland Group (G797) (1410)
Platanus racemosa – Quercus agrifolia Alliance (1411)
Platanus racemosa – Quercus agrifolia Association
Platanus racemosa / Toxicodendron diversilobum Association*
Quercus agrifolia / Salix lasiolepis Association
Salix gooddingii – Salix laevigata Alliance* (1412)
Salix laevigata Association*
Salix laevigata / Salix lasiolepis Association*
Populus fremontii – Fraxinus velutina – Salix gooddingii* Alliance (1413)
Populus fremontii – Salix laevigata Association*

Interior West Ruderal Riparian Forest & Scrub Macrogroup (M298) (1500)
Interior West Ruderal Riparian Forest & Scrub Group (G510) (1510)
Tamarix spp. Semi-natural Alliance* (1511)
Tamarix spp. Association*
Nicotiana glauca Semi-natural Stands* (1512)

Vancouverian Flooded & Swamp Forest Division (1.B.3.Ng.)
Vancouverian Flooded & Swamp Forest Macrogroup (M035) (1600)
North Pacific Lowland Riparian Forest & Woodland Group (G254) (1610)
Populus trichocarpa Alliance* (1611)

Shrub & Herb Vegetation Class (2.) (2000)
Temperate & Boreal Grassland & Shrubland Subclass (2.B.)
Mediterranean Scrub & Grassland Formation (2.B.1.)
Californian Scrub & Grassland Division (2.B.1.Na.) (2005)
Californian Annual & Perennial Grassland Macrogroup (M045) (2100)
Californian Perennial Grassland Group (G496) (2110)
Corethrogyne filaginifolia – Eriogonum (elongatum, nudum) Alliance † (2111)
Calystegia macrostegia – Eucrypta chrysanthemifolia Association*
Corethrogyne filaginifolia Association
Leymus condensatus Alliance (2112)
Leymus condensatus Association
Californian Annual Grassland & Forb Meadow Group (G766) (2120)
Eschscholzia (californica) – Lupinus (nanus) Alliance* (2121)
Lasthenia californica – Plantago erecta – Vulpia microstachys Alliance* (2122)
Amsinckia (menziesii, tessellata) – Phacelia spp. Alliance* (2123)

Californian Chaparral Macrogroup (M043) (2200)
Californian Maritime Chaparral Group (G258) (2210)
Malosma laurina Alliance (2211)
Malosma laurina Association*
Malosma laurina – Artemisia californica – Eriogonum fasciculatum Association
Malosma laurina – Artemisia californica – Salvia leucophylla Association*
Malosma laurina – Rhus ovata Association*
Malosma laurina – Salvia mellifera Association

Rhus integrifolia Alliance (2212)
Rhus integrifolia Association*
Rhus integrifolia – Artemisia californica – Eriogonum cinereum Association
Rhus integrifolia – Artemisia californica – Salvia mellifera Association*
Rhus integrifolia – Heteromeles arbutifolia Association*
Rhus integrifolia – Malosma laurina Association*
Californian Mesic & Pre-montane Chaparral Group (G261) (2220)
Arctostaphylos glandulosa Alliance* (2221)
Arctostaphylos glandulosa – Adenostoma fasciculatum Association*
Ceanothus oliganthus – Ceanothus leucodermis – Ceanothus tomentosus Alliance (2222)
Ceanothus oliganthus Association
Ceanothus oliganthus – Adenostoma fasciculatum Association*
Cercocarpus montanus Alliance (2223)
Cercocarpus montanus – Adenostoma fasciculatum Association*
Cercocarpus montanus var. glaber Association
Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus Alliance (2224)
Heteromeles arbutifolia Provisional Association
Heteromeles arbutifolia – Artemisia californica Association*
Heteromeles arbutifolia – Fraxinus dipetala Provisional Association
Prunus ilicifolia ssp. ilicifolia Association
Prunus ilicifolia ssp. ilicifolia – Heteromeles arbutifolia Association*
Quercus berberidifolia Alliance* (2225)
Quercus berberidifolia Association*
Quercus berberidifolia – Adenostoma fasciculatum Association*
Californian Xeric Chaparral Group (G257) (2230)
Adenostoma fasciculatum Alliance (2231)
Adenostoma fasciculatum Association
Adenostoma fasciculatum – (Eriogonum fasciculatum – Salvia mellifera) Association*
Adenostoma fasciculatum – (Lotus scoparius – Eriodictyon spp.) Association*
Adenostoma fasciculatum – Diplacus aurantiacus Association*
Adenostoma fasciculatum – Eriogonum fasciculatum Association
Adenostoma fasciculatum – Malosma laurina Association*
Adenostoma fasciculatum – Salvia spp. Alliance (2232)
Adenostoma fasciculatum – Salvia mellifera Association
Ceanothus crassifolius Alliance (2233)
Ceanothus crassifolius Association*
Ceanothus crassifolius – Adenostoma fasciculatum Association
Ceanothus crassifolius – Cercocarpus montanus Association*
Ceanothus megacarpus Alliance (2234)
Ceanothus megacarpus Association
Ceanothus megacarpus – Salvia mellifera Association*

Californian Coastal Scrub Macrogroup (M044) (2300)
Californian Coastal-Foothill Seral Scrub Group (G782) (2310)
Diplacus aurantiacus Alliance* (2311)
Ericameria linearifolia – Cleome isomeris Alliance (2312)
Ericameria linearifolia Association
Hazardia squarrosa – Ericameria palmeri Alliance* (2313)
Ericameria palmeri Provisional Association*

Lotus scoparius – Lupinus albifrons – Eriodictyon spp. Alliance (2314)
Dendromecon rigida Association
Eriodictyon crassifolium Provisional Association
Lotus scoparius Association*
Malacothamnus fasciculatus – Malacothamnus spp. Alliance (2315)
Malacothamnus fasciculatus Association
Malacothamnus fasciculatus – Salvia leucophylla Association*

Californian North Coastal & Mesic Scrub Group (G662) (2320)
Baccharis pilularis Alliance* (2321)
Baccharis pilularis – Artemisia californica Association*
Toxicodendron diversilobum Alliance* (2322)
Toxicodendron diversilobum – Artemisia californica / Leymus condensatus Association*
Central & Southern Californian Coastal Sage Scrub Group (G264) (2330)
Artemisia californica – Salvia leucophylla Alliance (2331)
Artemisia californica Association
Artemisia californica – (Salvia leucophylla) / Leymus condensatus Association
Artemisia californica – Eriogonum cinereum Association*
Artemisia californica – Eriogonum fasciculatum Association
Artemisia californica – Eriogonum fasciculatum – Opuntia littoralis / Dudleya (edulis) Association*
Artemisia californica – Eriogonum fasciculatum – Salvia leucophylla Association*
Artemisia californica – Eriogonum fasciculatum – Salvia mellifera Association
Artemisia californica – Salvia leucophylla Association
Artemisia californica – Salvia leucophylla – Eriogonum cinereum / Nassella spp. Assoc.*
Artemisia californica / Nassella (pulchra) Association
Salvia leucophylla Association
Encelia californica – Eriogonum cinereum Alliance (2332)
Encelia californica Association
Encelia californica – Artemisia californica Association*
Encelia californica – Eriogonum cinereum Association*
Encelia californica – Malosma laurina – Salvia mellifera Association*
Eriogonum cinereum Association*
Eriogonum fasciculatum – Salvia apiana Alliance (2333)
Eriogonum fasciculatum Association
Eriogonum fasciculatum – Salvia apiana Association
Eriogonum fasciculatum – Salvia mellifera – Malosma laurina Association*
Eriogonum fasciculatum var. foliolosum – Hesperoyucca whipplei Association
Salvia apiana Provisional Association
Salvia apiana – Artemisia californica – Ericameria spp. Association
Salvia mellifera – Artemisia californica Alliance (2334)
Salvia mellifera Association
Salvia mellifera – Artemisia californica – Malosma laurina Association
Salvia mellifera – Eriogonum cinereum Association*
Salvia mellifera – Eriogonum fasciculatum Association*
Salvia mellifera – Lotus scoparius Association
Salvia mellifera – Malacothamnus fasciculatus Association
Salvia mellifera – Rhus ovata Association*

Californian Ruderal Grassland, Meadow & Scrub Macrogroup (M046) (2400)
Californian Ruderal Grassland, Meadow & Scrub Group (G497) (2410)
Avena spp. – Bromus spp. Semi-natural Alliance* (2411)
Avena barbata – Avena fatua Semi-natural Association*
Bromus diandrus – Avena spp. Semi-natural Association*
Bromus diandrus Semi-natural Association*
Bromus hordeaceus – Erodium botrys Semi-natural Association*
Brachypodium distachyon Semi-natural Association*
Brassica nigra – Centaurea (solstitialis, melitensis) Semi-natural Alliance* (2412)
Brassica nigra Semi-natural Association*
Centaurea melitensis Semi-natural Association*
Hirschfeldia incana Semi-natural Association*
Conium maculatum – Foeniculum vulgare Semi-natural Alliance* (2413)
Foeniculum vulgare Semi-natural Association*
Lolium perenne Semi-natural Alliance* (2414)
Lolium perenne Semi-natural Association*

Temperate Grassland & Shrubland Formation (2.B.2.)
Western North American Interior Chaparral Division (2.B.2.Nd.)
Warm Interior Chaparral Macrogroup (M091) (2500)
Western Madrean Chaparral Group (G281) (2510)
Rhus ovata Alliance (2511)
Rhus ovata Association
Rhus ovata – Salvia leucophylla – Artemisia californica Association

Western North American Grassland & Shrubland Division (2.B.2.Na.)
Southern Vancouverian Lowland Grassland & Shrubland Macrogroup (M050) (2600)
Southern Vancouverian Shrub & Herbaceous Bald, Bluff & Prairie Group (G488) (2610)
Bromus carinatus – Elymus glaucus Alliance* (2611)
Pteridium aquilinum – Grass Association*

Temperate to Polar Scrub & Herb Coastal Vegetation Formation (2.B.4.)
Pacific North American Coastal Scrub & Herb Vegetation Division (2.B.4.Nb.)
Pacific Coastal Beach & Dune Macrogroup (M059) (2700)
Californian Coastal Beach & Dune Group (G663) (2710)
Isocoma menziesii Alliance (2711)
Isocoma menziesii Association
Isocoma menziesii – Artemisia californica Association*

Shrub & Herb Wetland Subclass (2.C.) (3000)
Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland Formation (2.C.4.)
Western North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland Division (2.C.4.Nb.)
Vancouverian Lowland Marsh, Wet Meadow & Shrubland Macrogroup (M073) (3100)
Temperate Pacific Freshwater Wet Mudflat Group (G525) (3110)
Heterotheca (oregona, sessiliflora) Alliance* (3111)
Heterotheca sessiliflora Provisional Association*
Grindelia (camporum, stricta) Alliance* (3112)
Ambrosia psilostachya – Grindelia hirsutula var. hallii Association*

Arid West Interior Freshwater Marsh Macrogroup (M888) (3200)
Arid West Interior Freshwater Marsh Group (G531) (3210)
Schoenoplectus acutus – Schoenoplectus californicus Alliance* (3211)
Typha (angustifolia, domingensis, latifolia) Alliance* (3212)

Western North American Ruderal Marsh, Wet Meadow & Shrubland Macrogroup (M301) (3300)
Western North American Ruderal Marsh, Wet Meadow & Shrubland Group (G524) (3310)
Phragmites australis ssp. australis – Arundo donax Semi-natural Alliance *(3311)
Phalaris aquatica – Phalaris arundinacea Semi-natural Alliance* (3312)
Phalaris aquatica Semi-natural Association*

Western North American Vernal Pool Macrogroup (M074) (3400)
Californian Vernal Pool Group (G530) (3410)

Southwestern North American Warm Desert Freshwater Marsh & Bosque Division (2.C.4.Nc.)
Warm Desert Lowland Freshwater Marsh, Wet Meadow & Shrubland Macrogroup (M076) (3500)
North American Warm Desert Riparian Low Bosque & Shrubland Group (G533) (3510)
Baccharis salicifolia Alliance (3511)
Baccharis salicifolia Association
Salix exigua Alliance* (3512)
Salix exigua – Arundo donax Association*
Salix exigua Association*
Salix lasiolepis Alliance (3513)
Salix lasiolepis Association
Salix lasiolepis – Baccharis salicifolia Association*
Sambucus nigra Alliance (3514)
Sambucus nigra Association

Salt Marsh Formation (2.C.5.)
North American Western Interior Brackish Marsh, Playa. & Shrubland Division (2.C.5.Nd.)
Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland Macrogroup (M082) (3600)
North American Desert Alkaline-Saline Marsh & Playa Group (G538) (3610)
Distichlis spicata Alliance* (3611)
Distichlis spicata – annual grasses Association*
Distichlis spicata Association*
Leymus cinereus – Leymus triticoides Alliance* (3612)
North American Desert Alkaline-Saline Wet Scrub Group (G537) (3620)
Pluchea sericea Alliance* (3621)
Pluchea sericea Association*
Atriplex lentiformis Alliance* (3622)
Atriplex lentiformis Association*

Desert & Semi-Desert Class (3.) (4000)
Warm Desert & Semi-Desert Woodland, Scrub & Grassland Subclass (3.A.)
Warm Desert & Semi-Desert Scrub & Grassland Formation (3.A.2.)
North American Warm Desert Scrub & Grassland Division (3.A.2.Na.)
Mojave-Sonoran Semi-Desert Scrub (M088) Macrogroup (4100)
Baja Semi-Desert Coastal Succulent Scrub Group (G298) (4110)
Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera Alliance (4111)
Cylindropuntia prolifera – Mixed Coastal Scrub Provisional Association
Opuntia littoralis Association
Opuntia oricola Provisional Association*

North American Warm Desert Ruderal Scrub & Grassland Macrogroup (M512) (4200)
North American Warm Desert Ruderal Grassland Group (G677) (4210)
Pennisetum setaceum – Pennisetum ciliare Semi-natural Alliance* (4211)
Pennisetum setaceum Semi-natural Association*

North American Warm-Desert Xeric-Riparian Scrub Macrogroup (M092) (4300)
Warm Semi-Desert Shrub & Herb Dry Wash & Colluvial Slope Group (G541) (4310)
Lepidospartum squamatum Alliance (4311)
Lepidospartum squamatum – Baccharis salicifolia Association
Lepidospartum squamatum – Eriogonum fasciculatum Association*
Lepidospartum squamatum / ephemeral annuals Association

Cool Semi-Desert Scrub & Grassland Subclass (3.B.) (5000)
Cool Semi-Desert Scrub & Grassland Formation (3.B.1)
Western North American Cool Semi-Desert Scrub & Grassland Division (3.B.1.Ne.)
Great Basin-Intermountain Tall Sagebrush Steppe & Shrubland Macrogroup (M169) (5100)
Intermountain Mesic Tall Sagebrush Steppe & Shrubland Group (G302)
Intermountain Dry Tall Sagebrush Steppe & Shrubland Group (G303) (5110)
Artemisia tridentata Alliance* (5111)

Open Rock Vegetation Class (6.) (6000)
Temperate & Boreal Open Rock Vegetation Subclass (6.B.)
Temperate & Boreal Cliff, Scree & Other Rock Vegetation Formation (6.B.1.)
Western North American Temperate & Boreal Cliff, Scree & Rock Vegetation Division (6.B.1.Nb.)
Western North American Cliff, Scree & Rock Vegetation Macrogroup (M887) (6100)
Californian Cliff, Scree & Rock Vegetation Group (G563) (6110)
Selaginella bigelovii Alliance (6111)
Selaginella bigelovii / Eriogonum fasciculatum Association
Dudleya cymosa – Dudley lanceolata – Lichen/Moss Sparse Alliance* (6112)
Lichen Gravel – Bedrock Nonvascular Sparse Association*
Sparsely Vegetated/Barren* (6113)

Miscellaneous Classes (9000)
Sparsely Vegetated to Non-vegetated (9100)
Cleared Land (9110)
Sand/Gravel Bar (9120)
Rocky Streambed (9130)
Landslide (9140)
Firebreak (9150)

Agriculture (9200)
Urban (9300)
    Urban Window (9310)
Exotic or Planted Trees and Shrubs (9400)
Artificial Cuts/Embankments (9500)
    Exotic (9510)
    Trees (9520)
    Shrubs (9530)
        Coastal Sage Scrub (9531)
    Herbaceous to Sparsely Vegetated (9540)
Post-Fire (9700)
Water (9800)
    Small Earthen Dammed Ponds (9801)

Percent Cover - Woody (Conifer, Hardwood, Total Tree, Shrub)
Absolute Cover 1% increment
nnn = Absolute Cover
000 = None or None Observable
999 = Not Applicable, Not Assessed

photo interpreted based on the following ranges:
0-2%
>2-10%
>10-25%
>25-40%
>40-60%
>60%

Percent Cover – Herbaceous
1 = 0-2%
2 = >2-10%
3 = >10-40%
4 = >40%
9 = Not Applicable, Not Assessed

Roadedness Disturbance
0 = No observed roads or trails.
1 = Minimal Roadedness: Less than one-third of the polygon is crossed by roads or trails. Polygons adjacent to paved roads are also placed into this category.
2 = Moderate Roadedness: Between one-third and two-thirds of the polygon is crossed by roads or trails.
3 = High Roadedness: Over two-thirds of the polygon is crossed by roads or trails.
9 = Not Applicable/Not Assigned

Anthropogenically Altered Disturbance (Clearing)
0 = No observed clearing
1 = Minimal Anthropogenic Clearing: Less than one-third of the polygon has been cleared of at least the understory vegetation.
2 = Moderate Anthropogenic Clearing: Between one-third and two-thirds of the polygon has been cleared of at least the understory vegetation.

3 = High Anthropogenic Clearing: Over two-thirds of the polygon has been cleared of at least the understory vegetation.
9 = Not Applicable/Not Assigned

Exotics (Invasives)
0 = Little or No Observable Invasive Plant Cover: Less than 5%
1 = Low Invasive Plant Cover: Less than 33% of the polygon but over 5% is covered with invasive plants.
2 = Moderate Invasive Plant Cover: Between 33% and 66% of the polygon is covered with invasive plants.
3 = High Invasive Plant Cover: Over 66% of the polygon's area is covered with invasive plants.
9 = Not Applicable/Not Assigned

Land Use
0000 = Not Assessed
1000 = Urban
1436 = Water Transfer
1850 = Wildlife Preserves and Sanctuaries
2000 = Agriculture (includes nurseries)
2100 = Non-woody row and field crops
2200 = Orchards & Vineyards
2300 = Improved Pastureland (irrigated)
3500 = Vacant Land – Restoration
9800 = Undifferentiated Water
9810 = Water Impoundment Feature

Tree Height
01 = <.5m
02 = >.5-1m
03 = >1-2m
04 = >2-5m
05 = >5-10m
06 = >10-15m
07 = >15-20m
08 = >20-35m
09 = >35-50m
10 = >50m
99 = Not Applicable/Not Assessed

California Wildlife Habitat Relations (CWHR) Tree Size Class
1 = Seedlings (<1'dbh)
2 = Saplings (>1"-6" dbh)
3 = Pole (>6"-11" dbh)
4 = Small (>11"-24" dbh)
5 = Medium-large (>24" dbh)
6 = Multi-layered medium-large trees over smaller trees in densities >60%
9 = Not Applicable/Not Assessed

Method ID
01 = Rapid Assessment (current project)
02 = Releve
03 = Field Verification
04 = Photo Interpretation
05 = Adjacent stand information or photo
06 = Reconnaissance (current project)
07 = Other information
08 = Older plot data
09 = Older recon data
10 = Accuracy Assessment

Note
A Comment Field in the database used to add any pertinent additional information, such as significant additional species present not accounted for in the alliance or association name.

Appendix C: Preliminary Mapping Classification Alpha Code Sheet – 4-19-2019

TREES

Eucalyptus spp. – Ailanthus altissima – Robinia pseudoacacia Semi-natural Alliance* (1211)
- Eucalyptus (globulus, camaldulensis) Provisional Semi-natural Association*

Juglans californica Alliance (1111)
- Juglans californica – Quercus agrifolia Association
- Juglans californica / annual herbaceous Association
- Juglans californica / Artemisia californica / Leymus condensatus Association
- Juglans californica / Heteromeles arbutifolia Association*
- Juglans californica / Malosma laurina Association

Platanus racemosa – Quercus agrifolia Alliance (1411)
- Platanus racemosa – Quercus agrifolia Association
- Platanus racemosa / Toxicodendron diversilobum Association*
- Quercus agrifolia / Salix lasiolepis Association

Populus fremontii – Fraxinus velutina – Salix gooddingii* Alliance (1413)
- Populus fremontii – Salix laevigata Association*

Populus trichocarpa Alliance* (1611)

Pseudotsuga macrocarpa Alliance (1311)
- Pseudotsuga macrocarpa – Quercus agrifolia Association

Quercus agrifolia Alliance (1112)
- Quercus agrifolia Association
- Quercus agrifolia – Umbellularia californica Association*
- Quercus agrifolia / Ceanothus (oliganthus, spinosus) Association*
- Quercus agrifolia / Heteromeles arbutifolia Association*
- Quercus agrifolia / Salvia leucophylla – Artemisia californica Association*

Quercus lobata Alliance (1113)
- Quercus lobata – Quercus agrifolia / grass Association

Salix gooddingii – Salix laevigata Alliance* (1412)
- Salix laevigata Association*
- Salix laevigata / Salix lasiolepis Association*

Schinus (molle, terebinthifolius) – Myoporum laetum Semi-natural Alliance* (1212)
- Schinus molle Association*

Umbellularia californica Alliance (1114)
- Umbellularia californica / Ceanothus oliganthus Association*

SHRUBS

Adenostoma fasciculatum Alliance (2231)
- Adenostoma fasciculatum Association
- Adenostoma fasciculatum – (Eriogonum fasciculatum – Salvia mellifera) Association*
- Adenostoma fasciculatum – (Lotus scoparius – Eriodictyon spp.) Association*
- Adenostoma fasciculatum – Diplacus aurantiacus Association*
- Adenostoma fasciculatum – Eriogonum fasciculatum Association
- Adenostoma fasciculatum – Malosma laurina Association*

Adenostoma fasciculatum – Salvia spp. Alliance (2232)
- Adenostoma fasciculatum – Salvia mellifera Association

Arctostaphylos glandulosa Alliance* (2221)
- Arctostaphylos glandulosa – Adenostoma fasciculatum Association*

Artemisia californica – Salvia leucophylla Alliance (2331)
- Artemisia californica Association
- Artemisia californica – (Salvia leucophylla) / Leymus condensatus Association
- Artemisia californica – Eriogonum cinereum Association*
- Artemisia californica – Eriogonum fasciculatum Association
- Artemisia californica – Eriogonum fasciculatum – Opuntia littoralis / Dudleya (edulis) Association*
- Artemisia californica – Eriogonum fasciculatum – Salvia leucophylla Association*
- Artemisia californica – Eriogonum fasciculatum – Salvia mellifera Association
- Artemisia californica – Salvia leucophylla Association
- Artemisia californica – Salvia leucophylla – Eriogonum cinereum / Nassella spp. Assoc.*
- Artemisia californica / Nassella (pulchra) Association
- Salvia leucophylla Association

Artemisia tridentata Alliance* (5111)

Atriplex lentiformis Alliance* (3622)
- Atriplex lentiformis Association*

Baccharis pilularis Alliance* (2321)
- Baccharis pilularis – Artemisia californica Association*

Baccharis salicifolia Alliance (3511)
- Baccharis salicifolia Association

Ceanothus crassifolius Alliance
- Ceanothus crassifolius Association*
- Ceanothus crassifolius – Adenostoma fasciculatum Association
- Ceanothus crassifolius – Cercocarpus montanus Association*
- Ceanothus megacarpus Association
- Ceanothus megacarpus – Salvia mellifera Association*

Ceanothus oliganthus – Ceanothus leucodermis – Ceanothus tomentosus Alliance (2222)
- Ceanothus oliganthus Association
- Ceanothus oliganthus – Adenostoma fasciculatum Association*

Cercocarpus montanus Alliance (2223)
- Cercocarpus montanus – Adenostoma fasciculatum Association*
- Cercocarpus montanus var. glaber Association

Diplacus aurantiacus Alliance* (2311)

Encelia californica – Eriogonum cinereum Alliance (2332)
- Encelia californica Association
- Encelia californica – Artemisia californica Association*
- Encelia californica – Eriogonum cinereum Association*
- Encelia californica – Malosma laurina – Salvia mellifera Association*
- Eriogonum cinereum Association*

Ericameria linearifolia – Cleome isomeris Alliance (2312)
- Ericameria linearifolia Association

Eriogonum fasciculatum – Salvia apiana Alliance (2333)
- Eriogonum fasciculatum Association
- Eriogonum fasciculatum – Salvia apiana Association
- Eriogonum fasciculatum – Salvia mellifera – Malosma laurina Association*
- Eriogonum fasciculatum var. foliolosum – Hesperoyucca whipplei Association
- Salvia apiana Provisional Association
- Salvia apiana – Artemisia californica – Ericameria spp. Association

Hazardia squarrosa – Ericameria palmeri Alliance* (2313)
- Ericameria palmeri Provisional Association*

Isocoma menziesii Alliance (2711)
- Isocoma menziesii Association
- Isocoma menziesii – Artemisia californica Association*

Lepidospartum squamatum Alliance (4311)
- Lepidospartum squamatum – Baccharis salicifolia Association
- Lepidospartum squamatum – Eriogonum fasciculatum Association*
- Lepidospartum squamatum / ephemeral annuals Association

Lotus scoparius – Lupinus albifrons – Eriodictyon spp. Alliance (2314)
- Dendromecon rigida Association
- Eriodictyon crassifolium Provisional Association
- Lotus scoparius Association*

Malacothamnus fasciculatus – Malacothamnus spp. Alliance (2315)
- Malacothamnus fasciculatus Association
- Malacothamnus fasciculatus – Salvia leucophylla Association*

Malosma laurina Alliance (2211)
- Malosma laurina Association*
- Malosma laurina – Artemisia californica – Eriogonum fasciculatum Association
- Malosma laurina – Artemisia californica – Salvia leucophylla Association*
- Malosma laurina – Rhus ovata Association*
- Malosma laurina – Salvia mellifera Association

Nicotiana glauca Semi-natural Stands* (1512)

Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera Alliance (4111)
- Cylindropuntia prolifera – Mixed Coastal Scrub Provisional Association
- Opuntia littoralis Association
- Opuntia oricola Provisional Association*

Pluchea sericea Alliance* (3621)
- Pluchea sericea Association*

Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus Alliance (2224)
- Heteromeles arbutifolia Provisional Association
- Heteromeles arbutifolia – Artemisia californica Association*
- Heteromeles arbutifolia – Fraxinus dipetala Provisional Association
- Prunus ilicifolia ssp. ilicifolia Association
- Prunus ilicifolia ssp. ilicifolia – Heteromeles arbutifolia Association*

Quercus berberidifolia Alliance* (2225)
- Quercus berberidifolia Association*
- Quercus berberidifolia – Adenostoma fasciculatum Association*

Rhus integrifolia Alliance (2212)
- Rhus integrifolia Association*
- Rhus integrifolia – Artemisia californica – Eriogonum cinereum Association
- Rhus integrifolia – Artemisia californica – Salvia mellifera Association*
- Rhus integrifolia – Heteromeles arbutifolia Association*
- Rhus integrifolia – Malosma laurina Association*

Rhus ovata Alliance (2511)
- Rhus ovata Association
- Rhus ovata – Salvia leucophylla – Artemisia californica Association

Salix exigua Alliance* (3512)
- Salix exigua – Arundo donax Association*
- Salix exigua Association*

Salix lasiolepis Alliance (3513)
- Salix lasiolepis Association
- Salix lasiolepis – Baccharis salicifolia Association*

Salvia mellifera – Artemisia californica Alliance (2334)
- Salvia mellifera Association
- Salvia mellifera – Artemisia californica – Malosma laurina Association
- Salvia mellifera – Eriogonum cinereum Association*
- Salvia mellifera – Eriogonum fasciculatum Association*
- Salvia mellifera – Lotus scoparius Association
- Salvia mellifera – Malacothamnus fasciculatus Association
- Salvia mellifera – Rhus ovata Association*

Sambucus nigra Alliance (3514)
    Sambucus nigra Association
Tamarix spp. Semi-natural Alliance* (1511)
    Tamarix spp. Association*
Toxicodendron diversilobum Alliance* (2322)
    Toxicodendron diversilobum – Artemisia californica / Leymus condensatus Association*

HERBS

Californian Scrub & Grassland Division (2005)
Californian Annual & Perennial Grassland Macrogroup (Native) (M045) (2100)
Californian Ruderal Grassland, Meadow & Scrub Group (Non-native) (G497) (2410)
Arid West Interior Freshwater Marsh Group (G531) (3210)
Californian Vernal Pool Group (G530) (3410)
Californian Cliff, Scree & Rock Vegetation Group (G563) (6110)

Amsinckia (menziesii, tessellata) – Phacelia spp. Alliance* (2123)
Avena spp. – Bromus spp. Semi-natural Alliance* (2411)
    Avena barbata – Avena fatua Semi-natural Association*
    Bromus diandrus – Avena spp. Semi-natural Association*
    Bromus diandrus Semi-natural Association*
    Bromus hordeaceus – Erodium botrys Semi-natural Association*
    Brachypodium distachyon Semi-natural Association*
Brassica nigra – Centaurea (solstitialis, melitensis) Semi-natural Alliance* (2412)
    Brassica nigra Semi-natural Association*
    Centaurea melitensis Semi-natural Association*
    Hirschfeldia incana Semi-natural Association*
Bromus carinatus – Elymus glaucus Alliance* (2611)
    Pteridium aquilinum – Grass Association*
Conium maculatum – Foeniculum vulgare Semi-natural Alliance* (2413)
    Foeniculum vulgare Semi-natural Association*
Corethrogyne filaginifolia – Eriogonum (elongatum, nudum) Alliance † (2111)
    Calystegia macrostegia – Eucrypta chrysanthemifolia Association*
    Corethrogyne filaginifolia Association
Distichlis spicata Alliance* (3611)
    Distichlis spicata – annual grasses Association*
    Distichlis spicata Association*
Dudleya cymosa – Dudley lanceolata – Lichen/Moss Sparse Alliance* (6112)
    Lichen Gravel – Bedrock Nonvascular Sparse Association*
Eschscholzia (californica) – Lupinus (nanus) Alliance* (2121)
Grindelia (camporum, stricta) Alliance* (3112)
    Ambrosia psilostachya – Grindelia hirsutula var. hallii Association*
Heterotheca (oregona, sessiliflora) Alliance* (3111)
    Heterotheca sessiliflora Provisional Association*
Lasthenia californica – Plantago erecta – Vulpia microstachys Alliance* (2122)
Leymus condensatus Alliance (2112)
    Leymus condensatus Association
Leymus cinereus – Leymus triticoides Alliance* (3612)
Lolium perenne Semi-natural Alliance* (2414)
    Lolium perenne Semi-natural Association*
Pennisetum setaceum – Pennisetum ciliare Semi-natural Alliance* (4211)
    Pennisetum setaceum Semi-natural Association*
Phragmites australis ssp. australis – Arundo donax Semi-natural Alliance *(3311)
Phalaris aquatica – Phalaris arundinacea Semi-natural Alliance* (3312)
    Phalaris aquatica Semi-natural Association*
Schoenoplectus acutus – Schoenoplectus californicus Alliance* (3211)

Appendix D: Preliminary Mapping Classification Numeric Code Sheet – 4-19-2019 (AIS)

1100 = Forest & Woodland Class (1.) (1000)
1100 = Californian Forest & Woodland Macrogroup (M009) (1100)
1110 = Californian Broadleaf Forest & Woodland Group (G195) (1110)
1111 = Juglans californica Alliance (1111)
Juglans californica – Quercus agrifolia Association
Juglans californica / annual herbaceous Association
Juglans californica / Artemisia californica / Leymus condensatus Association
Juglans californica / Heteromeles arbutifolia Association*
Juglans californica / Malosma laurina Association
1112 = Quercus agrifolia Alliance (1112)
Quercus agrifolia Association
Quercus agrifolia – Umbellularia californica Association*
Quercus agrifolia / Ceanothus (oliganthus, spinosus) Association*
Quercus agrifolia / Heteromeles arbutifolia Association*
Quercus agrifolia / Salvia leucophylla – Artemisia californica Association*
1113 = Quercus lobata Alliance (1113)
Quercus lobata – Quercus agrifolia / grass Association
1114 = Umbellularia californica Alliance (1114)
Umbellularia californica / Ceanothus oliganthus Association*
1200 = Californian Ruderal Forest Macrogroup (M513) (1200)
1210 = Californian Ruderal Forest Group (G678) (1210)
1211 = Eucalyptus spp. – Ailanthus altissima – Robinia pseudoacacia Semi-natural Alliance* (1211)
Eucalyptus (globulus, camaldulensis) Provisional Semi-natural Association*
1212 = Schinus (molle, terebinthifolius) – Myoporum laetum Semi-natural Alliance* (1212)
Schinus molle Association*
1300 = Southern Vancouverian Montane-Foothill Forest Macrogroup (M023) (1300)
1310 = Californian Montane Conifer Forest & Woodland Group (G344) (1310)
1311 = Pseudotsuga macrocarpa Alliance (1311)
Pseudotsuga macrocarpa – Quercus agrifolia Association
1400 = Interior Warm & Cool Desert Riparian Forest Macrogroup (M036) (1400)
1410 = Western Interior Riparian Forest & Woodland Group (G797) (1410)
1411 = Platanus racemosa – Quercus agrifolia Alliance (1411)
Platanus racemosa – Quercus agrifolia Association
Platanus racemosa / Toxicodendron diversilobum Association*
Quercus agrifolia / Salix lasiolepis Association
1412 = Salix gooddingii – Salix laevigata Alliance* (1412)
Salix laevigata Association*
Salix laevigata / Salix lasiolepis Association*
1413 = Populus fremontii – Fraxinus velutina – Salix gooddingii* Alliance (1413)
Populus fremontii – Salix laevigata Association*
1500 = Interior West Ruderal Riparian Forest & Scrub Macrogroup (M298) (1500)
1510 = Interior West Ruderal Riparian Forest & Scrub Group (G510) (1510)
1511 = Tamarix spp. Semi-natural Alliance* (1511)
Tamarix spp. Association*
1512 = Nicotiana glauca Semi-natural Stands* (1512)
1600 = Vancouverian Flooded & Swamp Forest Macrogroup (M035) (1600)
1610 = North Pacific Lowland Riparian Forest & Woodland Group (G254) (1610)
1611 = Populus trichocarpa Alliance* (1611)

2000 = Shrub & Herb Vegetation Class (2.) (2000)
2005 = Californian Scrub & Grassland Division (2005)
2100 = Californian Annual & Perennial Grassland Macrogroup (M045) (2100)
2110 = Californian Perennial Grassland Group (G496) (2110)
2111 = Corethrogyne filaginifolia – Eriogonum (elongatum, nudum) Alliance † (2111)
Calystegia macrostegia – Eucrypta chrysanthemifolia Association*
Corethrogyne filaginifolia Association
2112 = Leymus condensatus Alliance (2112)
Leymus condensatus Association
2120 = Californian Annual Grassland & Forb Meadow Group (G766) (2120)
2121 = Eschscholzia (californica) – Lupinus (nanus) Alliance* (2121)
2122 = Lasthenia californica – Plantago erecta – Vulpia microstachys Alliance* (2122)
2123 = Amsinckia (menziesii, tessellata) – Phacelia spp. Alliance* (2123)
2200 = Californian Chaparral Macrogroup (M043) (2200)
2210 = Californian Maritime Chaparral Group (G258) (2210)
2211 = Malosma laurina Alliance (2211)
Malosma laurina Association*
Malosma laurina – Artemisia californica – Eriogonum fasciculatum Association
Malosma laurina – Artemisia californica – Salvia leucophylla Association*
Malosma laurina – Rhus ovata Association*
Malosma laurina – Salvia mellifera Association
2212 = Rhus integrifolia Alliance (2212)
Rhus integrifolia Association*
Rhus integrifolia – Artemisia californica – Eriogonum cinereum Association
Rhus integrifolia – Artemisia californica – Salvia mellifera Association*
Rhus integrifolia – Heteromeles arbutifolia Association*
Rhus integrifolia – Malosma laurina Association*
2220 = Californian Mesic & Pre-montane Chaparral Group (G261) (2220)
2221 = Arctostaphylos glandulosa Alliance* (2221)
Arctostaphylos glandulosa – Adenostoma fasciculatum Association*
2222 = Ceanothus oliganthus – Ceanothus leucodermis – Ceanothus tomentosus Alliance (2222)
Ceanothus oliganthus Association
Ceanothus oliganthus – Adenostoma fasciculatum Association*
2223 = Cercocarpus montanus Alliance (2223)
Cercocarpus montanus – Adenostoma fasciculatum Association*
Cercocarpus montanus var. glaber Association
2224 = Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus Alliance (2224)
Heteromeles arbutifolia Provisional Association
Heteromeles arbutifolia – Artemisia californica Association*
Heteromeles arbutifolia – Fraxinus dipetala Provisional Association
Prunus ilicifolia ssp. ilicifolia Association
Prunus ilicifolia ssp. ilicifolia – Heteromeles arbutifolia Association*
2225 = Quercus berberidifolia Alliance* (2225)
Quercus berberidifolia Association*
Quercus berberidifolia – Adenostoma fasciculatum Association*
2230 = Californian Xeric Chaparral Group (G257) (2230)
2231 = Adenostoma fasciculatum Alliance (2231)
Adenostoma fasciculatum Association
Adenostoma fasciculatum – (Eriogonum fasciculatum – Salvia mellifera) Association*
Adenostoma fasciculatum – (Lotus scoparius – Eriodictyon spp.) Association*
Adenostoma fasciculatum – Diplacus aurantiacus Association*
Adenostoma fasciculatum – Eriogonum fasciculatum Association
Adenostoma fasciculatum – Malosma laurina Association*
2232 = Adenostoma fasciculatum – Salvia spp. Alliance (2232)
Adenostoma fasciculatum – Salvia mellifera Association

2233 = Ceanothus crassifolius Alliance (2233)
Ceanothus crassifolius Association*
Ceanothus crassifolius – Adenostoma fasciculatum Association
Ceanothus crassifolius – Cercocarpus montanus Association*
2234 = Ceanothus megacarpus Alliance (2234)
Ceanothus megacarpus Association
Ceanothus megacarpus – Salvia mellifera Association*
2300 = Californian Coastal Scrub Macrogroup (M044) (2300)
2310 = Californian Coastal-Foothill Seral Scrub Group (G782) (2310)
2311 = Diplacus aurantiacus Alliance* (2311)
2312 = Ericameria linearifolia – Cleome isomeris Alliance (2312)
Ericameria linearifolia Association
2313 = Hazardia squarrosa – Ericameria palmeri Alliance* (2313)
Ericameria palmeri Provisional Association*
2314 = Lotus scoparius – Lupinus albifrons – Eriodictyon spp. Alliance (2314)
Dendromecon rigida Association
Eriodictyon crassifolium Provisional Association
Lotus scoparius Association*
2315 = Malacothamnus fasciculatus – Malacothamnus spp. Alliance (2315)
Malacothamnus fasciculatus Association
Malacothamnus fasciculatus – Salvia leucophylla Association*
2320 = Californian North Coastal & Mesic Scrub Group (G662) (2320)
2321 = Baccharis pilularis Alliance* (2321)
Baccharis pilularis – Artemisia californica Association*
2322 = Toxicodendron diversilobum Alliance* (2322)
Toxicodendron diversilobum – Artemisia californica / Leymus condensatus Association*
2330 = Central & Southern Californian Coastal Sage Scrub Group (G264) (2330)
2331 = Artemisia californica – Salvia leucophylla Alliance (2331)
Artemisia californica Association
Artemisia californica – (Salvia leucophylla) / Leymus condensatus Association
Artemisia californica – Eriogonum cinereum Association*
Artemisia californica – Eriogonum fasciculatum Association
Artemisia californica – Eriogonum fasciculatum – Opuntia littoralis / Dudleya (edulis) Association*
Artemisia californica – Eriogonum fasciculatum – Salvia leucophylla Association*
Artemisia californica – Eriogonum fasciculatum – Salvia mellifera Association
Artemisia californica – Salvia leucophylla Association
Artemisia californica – Salvia leucophylla – Eriogonum cinereum / Nassella spp. Assoc.*
Artemisia californica / Nassella (pulchra) Association
Salvia leucophylla Association
2332 = Encelia californica – Eriogonum cinereum Alliance (2332)
Encelia californica Association
Encelia californica – Artemisia californica Association*
Encelia californica – Eriogonum cinereum Association*
Encelia californica – Malosma laurina – Salvia mellifera Association*
Eriogonum cinereum Association*
2333 = Eriogonum fasciculatum – Salvia apiana Alliance (2333)
Eriogonum fasciculatum Association
Eriogonum fasciculatum – Salvia apiana Association
Eriogonum fasciculatum – Salvia mellifera – Malosma laurina Association*
Eriogonum fasciculatum var. foliolosum – Hesperoyucca whipplei Association
Salvia apiana Provisional Association
Salvia apiana – Artemisia californica – Ericameria spp. Association

2334 = Salvia mellifera – Artemisia californica Alliance (2334)
Salvia mellifera Association
Salvia mellifera – Artemisia californica – Malosma laurina Association
Salvia mellifera – Eriogonum cinereum Association*
Salvia mellifera – Eriogonum fasciculatum Association*
Salvia mellifera – Lotus scoparius Association
Salvia mellifera – Malacothamnus fasciculatus Association
Salvia mellifera – Rhus ovata Association*

2400 = Californian Ruderal Grassland, Meadow & Scrub Macrogroup (M046) (2400)

2410 = Californian Ruderal Grassland, Meadow & Scrub Group (G497) (2410)

2411 = Avena spp. – Bromus spp. Semi-natural Alliance* (2411)
Avena barbata – Avena fatua Semi-natural Association*
Bromus diandrus – Avena spp. Semi-natural Association*
Bromus diandrus Semi-natural Association*
Bromus hordeaceus – Erodium botrys Semi-natural Association*
Brachypodium distachyon Semi-natural Association*

2412 = Brassica nigra – Centaurea (solstitialis, melitensis) Semi-natural Alliance* (2412)
Brassica nigra Semi-natural Association*
Centaurea melitensis Semi-natural Association*
Hirschfeldia incana Semi-natural Association*

2413 = Conium maculatum – Foeniculum vulgare Semi-natural Alliance* (2413)
Foeniculum vulgare Semi-natural Association*

2414 = Lolium perenne Semi-natural Alliance* (2414)
Lolium perenne Semi-natural Association*

2500 = Warm Interior Chaparral Macrogroup (M091) (2500)

2510 = Western Madrean Chaparral Group (G281) (2510)

2511 = Rhus ovata Alliance (2511)
Rhus ovata Association
Rhus ovata – Salvia leucophylla – Artemisia californica Association

2600 = Southern Vancouverian Lowland Grassland & Shrubland Macrogroup (M050) (2600)

2610 = Southern Vancouverian Shrub & Herbaceous Bald, Bluff & Prairie Group (G488) (2610)

2611 = Bromus carinatus – Elymus glaucus Alliance* (2611)
Pteridium aquilinum – Grass Association*

2700 = Pacific Coastal Beach & Dune Macrogroup (M059) (2700)

2710 = Californian Coastal Beach & Dune Group (G663) (2710)

2711 = Isocoma menziesii Alliance (2711)
Isocoma menziesii Association
Isocoma menziesii – Artemisia californica Association*

3000 = Shrub & Herb Wetland Subclass (2.C.) (3000)

3100 = Vancouverian Lowland Marsh, Wet Meadow & Shrubland Macrogroup (M073) (3100)

3110 = Temperate Pacific Freshwater Wet Mudflat Group (G525) (3110)

3111 = Heterotheca (oregona, sessiliflora) Alliance* (3111)
Heterotheca sessiliflora Provisional Association*

3112 = Grindelia (camporum, stricta) Alliance* (3112)
Ambrosia psilostachya – Grindelia hirsutula var. hallii Association*

3200 = Arid West Interior Freshwater Marsh Macrogroup (M888) (3200)

3210 = Arid West Interior Freshwater Marsh Group (G531) (3210)

3211 = Schoenoplectus acutus – Schoenoplectus californicus Alliance* (3211)

3212 = Typha (angustifolia, domingensis, latifolia) Alliance* (3212)

3300 = Western North American Ruderal Marsh, Wet Meadow & Shrubland Macrogroup (M301) (3300)

3310 = Western North American Ruderal Marsh, Wet Meadow & Shrubland Group (G524) (3310)

3311 = Phragmites australis ssp. australis – Arundo donax Semi-natural Alliance *(3311)

3312 = Phalaris aquatica – Phalaris arundinacea Semi-natural Alliance* (3312)
Phalaris aquatica Semi-natural Association*

3400 = Western North American Vernal Pool Macrogroup (M074) (3400)

3410 = Californian Vernal Pool Group (G530) (3410)

3500 = Warm Desert Lowland Freshwater Marsh, Wet Meadow & Shrubland Macrogroup (M076) (3500)
3510 = North American Warm Desert Riparian Low Bosque & Shrubland Group (G533) (3510)
3511 = Baccharis salicifolia Alliance (3511)
Baccharis salicifolia Association
3512 = Salix exigua Alliance* (3512)
Salix exigua – Arundo donax Association*
Salix exigua Association*
3513 = Salix lasiolepis Alliance (3513)
Salix lasiolepis Association
Salix lasiolepis – Baccharis salicifolia Association*
3514 = Sambucus nigra Alliance (3514)
Sambucus nigra Association
3600 = Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland Macrogroup (M082) (3600)
3610 = North American Desert Alkaline-Saline Marsh & Playa Group (G538) (3610)
3611 = Distichlis spicata Alliance* (3611)
Distichlis spicata – annual grasses Association*
Distichlis spicata Association*
3612 = Leymus cinereus – Leymus triticoides Alliance* (3612)
3620 = North American Desert Alkaline-Saline Wet Scrub Group (G537) (3620)
3621 = Pluchea sericea Alliance* (3621)
Pluchea sericea Association*
3622 = Atriplex lentiformis Alliance* (3622)
Atriplex lentiformis Association*
4000 = Desert & Semi-Desert Class (3.) (4000)
4100 = Mojave-Sonoran Semi-Desert Scrub (M088) Macrogroup (4100)
4110 = Baja Semi-Desert Coastal Succulent Scrub Group (G298) (4110)
4111 = Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera Alliance (4111)
Cylindropuntia prolifera – Mixed Coastal Scrub Provisional Association
Opuntia littoralis Association
Opuntia oricola Provisional Association*
4200 = North American Warm Desert Ruderal Scrub & Grassland Macrogroup (M512) (4200)
4210 = North American Warm Desert Ruderal Grassland Group (G677) (4210)
4211 = Pennisetum setaceum – Pennisetum ciliare Semi-natural Alliance* (4211)
Pennisetum setaceum Semi-natural Association*
4300 = North American Warm-Desert Xeric-Riparian Scrub Macrogroup (M092) (4300)
4310 = Warm Semi-Desert Shrub & Herb Dry Wash & Colluvial Slope Group (G541) (4310)
4311 = Lepidospartum squamatum Alliance (4311)
Lepidospartum squamatum – Baccharis salicifolia Association
Lepidospartum squamatum – Eriogonum fasciculatum Association*
Lepidospartum squamatum / ephemeral annuals Association
5000 = Cool Semi-Desert Scrub & Grassland Subclass (3.B.) (5000)
5100 = Great Basin-Intermountain Tall Sagebrush Steppe & Shrubland Macrogroup (M169) (5100)
5110 = Intermountain Mesic & Dry Tall Sagebrush Steppe & Shrubland Group (G303 & 302) (5110)
5111 = Artemisia tridentata Alliance* (5111)
6000 = Open Rock Vegetation Class (6.) (6000)
6100 = Western North American Cliff, Scree & Rock Vegetation Macrogroup (M887) (6100)
6110 = Californian Cliff, Scree & Rock Vegetation Group (G563) (6110)
6111 = Selaginella bigelovii Alliance (6111)
Selaginella bigelovii / Eriogonum fasciculatum Association
6112 = Dudleya cymosa – Dudley lanceolata – Lichen/Moss Sparse Alliance* (6112)
Lichen Gravel – Bedrock Nonvascular Sparse Association*
6113 = Sparsely Vegetated/Barren* (6113)

9000 = Miscellaneous Classes (9000)

- 9100 = Sparsely Vegetated to Non-vegetated (9100)
  - 9110 = Cleared Land (9110)
  - 9120 = Sand/Gravel Bar (9120)
  - 9130 = Rocky Streambed (9130)
  - 9140 = Landslide (9140)
  - 9150 = Firebreak (9150)
- 9200 = Agriculture (9200)
- 9300 = Urban (9300)
  - 9310 = Urban Window (9310)
- 9400 = Exotic or Planted Trees and Shrubs (9400)
- 9500 = Artificial Cuts/Embankments (9500)
  - 9510 = Exotic (9510)
  - 9520 = Trees (9520)
  - 9530 = Shrubs (9530)
    - 9531 = Coastal Sage Scrub (9531)
  - 9540 = Herbaceous to Sparsely Vegetated (9540)
- 9700 = Post-Fire (9700)
- 9800 = Water (9800)
  - 9801 = Small Earthen Dammed Ponds (9801)

<u>Percent Cover - Woody</u> (Conifer, Hardwood, Total Tree, Shrub)
Absolute Cover 1% increment
nnn = Absolute Cover
000 = None or None Observable
999 = Not Applicable, Not Assessed

photo interpreted based on the following ranges:
0-2%
>2-10%
>10-25%
>25-40%
>40-60%
>60%

<u>Percent Cover – Herbaceous</u>
1 = 0-2%
2 = >2-10%
3 = >10-40%
4 = >40%
9 = Not Applicable, Not Assessed

<u>Roadedness Disturbance</u>
0 = No observed roads or trails.
1 = Minimal Roadedness: Less than one-third of the polygon is crossed by roads or trails. Polygons adjacent to paved roads are also placed into this category.
2 = Moderate Roadedness: Between one-third and two-thirds of the polygon is crossed by roads or trails.
3 = High Roadedness: Over two-thirds of the polygon is crossed by roads or trails.
9 = Not Applicable/Not Assigned

Anthropogenically Altered Disturbance (Clearing)
0 = No observed clearing
1 = Minimal Anthropogenic Clearing: Less than one-third of the polygon has been cleared of at least the understory vegetation.
2 = Moderate Anthropogenic Clearing: Between one-third and two-thirds of the polygon has been cleared of at least the understory vegetation.
3 = High Anthropogenic Clearing: Over two-thirds of the polygon has been cleared of at least the understory vegetation.
9 = Not Applicable/Not Assigned

Exotics (Invasives)
0 = Little or No Observable Invasive Plant Cover: Less than 5%
1 = Low Invasive Plant Cover: Less than 33% of the polygon but over 5% is covered with invasive plants.
2 = Moderate Invasive Plant Cover: Between 33% and 66% of the polygon is covered with invasive plants.
3 = High Invasive Plant Cover: Over 66% of the polygon's area is covered with invasive plants.
9 = Not Applicable/Not Assigned

Land Use
0000 = Not Assessed
1000 = Urban
1436 = Water Transfer
1850 = Wildlife Preserves and Sanctuaries
2000 = Agriculture (includes nurseries)
2100 = Non-woody row and field crops
2200 = Orchards & Vineyards
2300 = Improved Pastureland (irrigated)
3500 = Vacant Land – Restoration
9800 = Undifferentiated Water
9810 = Water Impoundment Feature

Tree Height
01 = <.5m
02 = >.5-1m
03 = >1-2m
04 = >2-5m
05 = >5-10m
06 = >10-15m
07 = >15-20m
08 = >20-35m
09 = >35-50m
10 = >50m
99 = Not Applicable/Not Assessed

California Wildlife Habitat Relations (CWHR) Tree Size Class
1 = Seedlings (<1'dbh)
2 = Saplings (>1"-6" dbh)
3 = Pole (>6"-11" dbh)
4 = Small (>11"-24" dbh)
5 = Medium-large (>24" dbh)
6 = Multi-layered medium-large trees over smaller trees in densities >60%
9 = Not Applicable/Not Assessed

Method ID
01 = Rapid Assessment (current project)
02 = Releve
03 = Field Verification
04 = Photo Interpretation
05 = Adjacent stand information or photo
06 = Reconnaissance (current project)
07 = Other information
08 = Older plot data
09 = Older recon data
10 = Accuracy Assessment

Note
A Comment Field in the database used to add any pertinent additional information, such as significant additional species present not accounted for in the alliance or association name.

Appendix E: Phase I Field Reconnaissance Report (AIS)

The US Fish & Wildlife Service
Santa Susana Mountains Vegetation Mapping Project
Photo Interpretation Field Reconnaissance Report
April 2-6, 2019

Introduction

Field reconnaissance visits serve two major functions. First, they enable photo interpreters to relate the vegetation on the ground at each observation site to the signatures on the aerial imagery. Second, with guidance from ecologists in the field, the photo interpreters become familiar with the flora, vegetation assemblages, and local ecology of the study area. At the same time, ecologists gain understanding from the photo interpreter's perspective about assessing vegetation through the framework of map creation. In summary, the field session is a means of acquainting the photo interpreters with the species and vegetation type distribution, ecology and trends within the study area, as well as for answering signature questions. In addition, the photo interpreters can use and test the vegetation classification key and provide feedback for modifications.

This report summarizes the itinerary and observations of the Aerial Information Systems (AIS) photo interpreters during their field trip to the Santa Susana Mountains study area. The field trip was conducted from Tuesday April 2 through Saturday April 6, 2019.

Personnel from AIS, US Fish & Wildlife Service (USFWS), and California Department of Fish & Wildlife (CDFW) involved in the field trip were as follows:

Edward Reyes, AIS Senior Photo interpreter
Arin Glass, AIS Photo interpreter
Todd Keeler-Wolf, State Ecologist, CDFW
Will Miller, USFWS Biomonitor

Prior to the field reconnaissance, AIS staff performed several in-house preparations to facilitate a more organized trip. Field routes were planned to accommodate a variety of factors including: maximizing the number of vegetation types and regional zones visited while addressing time constraint considerations and accessibility.

The imagery was reviewed for representative signatures of different vegetation types, density and abiotic factors such as percent slope, aspect, shape of the slope, elevation, substrate, landform, etc. Locations of field check sites were assigned into a database. Multiple sites were chosen to provide alternatives if one or more sites proved inaccessible.

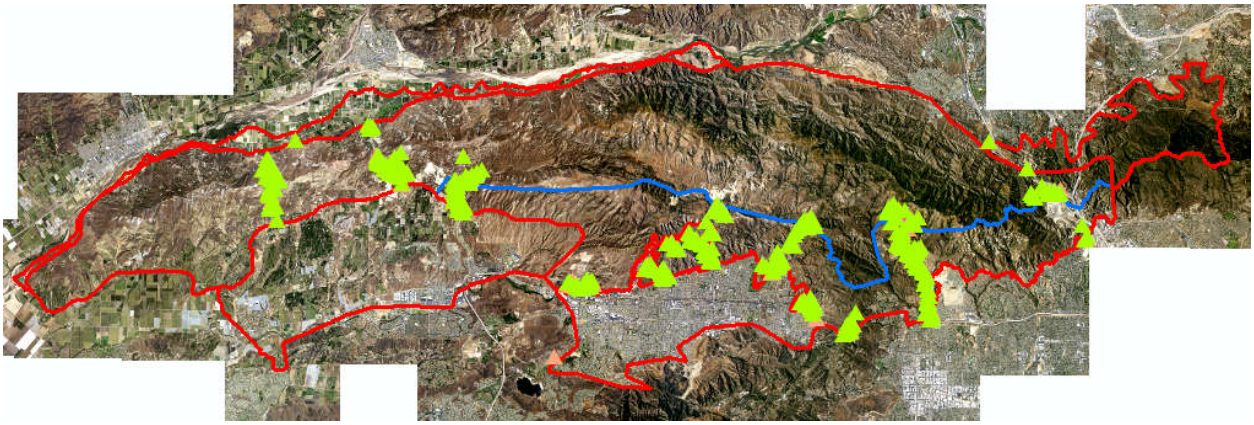
The selected sites and the 2016 base digital imagery were downloaded to an Apple iPad with ArcGIS Collector software. Other ancillary data, such as the 2018 Classification plot locations and data, and roads database were also downloaded for reference.

Public land owners (Parks and Open Space) were contacted in order to assure access to the area through locked gates. The Mountains Recreation and Conservancy Authority, Rancho Simi Parks and Recreation District, the City of Santa Clarita, and the Angeles National Forest were contacted and any necessary gate or road condition information was obtained.

During the trip, the area was traversed by 4WD vehicle and on foot, with stops at selected sites. At each site visited, GPS coordinates were noted along with ground information that was recorded on the tablet. Areas encountered in transit between sites, and areas of noteworthy or unusual significance, were added in the field as reconnaissance points. Also, reconnaissance points were captured to mark the transition between vegetation types, with the intent of helping photo interpreters determine the edges of stands. A single reconnaissance point may have contained information about two or more stands. It was also possible for a given stand to be assessed in multiple places. Some stands of vegetation were remotely observed at a distance with the aid of binoculars. The location of these remote stands was determined using a compass and laser rangefinder, as well as the imagery on the tablet. The ecologist assisted in species identification and ecology, as well as in discussion of trends involving vegetative transition across the landscape, and the floristic vegetation classification.

The crew took digital color ground photos at many reconnaissance points. The frame number, direction the photographer was facing, and other information about the photo were recorded in the field and later input into computer files for easy reference. For the mapping effort, the field data and ground photos were essential for correlating conditions seen on the aerial imagery to conditions on the ground.

Itinerary



<u>Tuesday, April 2, 2019 – Tapo Canyon and Dry Canyon Areas</u>

The field team accessed Tapo Canyon from the CA 118 freeway in Simi Valley, and headed north on Tapo Canyon Road into the canyon. The crew observed the riparian and upland vegetation along the road as far as Tapo Canyon State Park. Further observations were made on Bennett Road, along Lost Canyon Drive, adjacent to the Legends Drive neighborhood, and the southern end of an abandoned golf course in Dry Canyon accessed via Anderson Drive.

<u>Wednesday, April 3, 2019 – Happy Camp Canyon, Las Llajas Canyon</u>

The field crew accessed Happy Camp Canyon Road via the CA 118 freeway to Collins Drive and Campus Park Drive, in the Moorpark area. The team spent the morning observing riparian and upland vegetation along 2 miles of the canyon. On returning to CA 118, the crew proceeded to Las Llajas Canyon Road via Yosemite Avenue and Evening Sky Drive, at the north end of Simi Valley. Approximately two and a half miles of the riparian vegetation in the canyon and upland vegetation were observed and noted before returning to the hotel at the end of the day.

Thursday, April 4, 2019 – Balcom Canyon, Grimes Canyon, and Brea Canyon

The field team accessed Balcom Canyon Road via the CA 118 (freeway and Los Angeles Avenue) in the Moorpark area. The crew noted the vegetation along Balcom Canyon northward until exiting the study area. They then traveled to the north end of Grimes Canyon via Mountain Road, Sespe Street, and Bardsdale Avenue. The team drove southward along Grimes Canyon until leaving the study area. The field team then traveled to Brea Canyon via CA 118 (Los Angeles Avenue and freeway) to the north end of Madera Road, where they made observations of the vegetation. The team ended the day at the adjacent Simi Land Fill.

Friday, April 5, 2019 – Browns Canyon

The field team accessed Browns Canyon Road via the CA 118 freeway and De Soto Avenue in Chatsworth. The crew drove up Browns Canyon Road and Palo Sola Fire Truck Road for approximately five and a quarter miles to the Oat Mountain ridgeline, observing the riparian and upland vegetation along the way. A short hiking excursion was conducted at one upper tributary of Devil Canyon. After continuing to just below the tallest ridgeline, the field crew then backtracked on the same route, returning to the CA 118 freeway at the end of the day.

Saturday, April 6, 2019 – Rancho Simi Open Space at Kuehner Drive, Rocky Peak Park, I5-Weldon Canyon Motorway

The field team began the day at an open space park at the end of Kuehner Drive, just off the CA 118 freeway, at the northeast end of Simi Valley. After observing and noting the vegetation on the hillside slope, the crew continued along the CA 118 freeway to Rocky Peak Road. The crew hiked into the Rocky Peak Park for approximately a half a mile noting the vegetation along the way. In the afternoon, the team continued on the CA 118 to Balboa Blvd. and San Fernando Road to observe the vegetation along the I-5 freeway in the Newhall/Fremont/San Fernando Pass area. The field crew drove up the Weldon Motorway for approximately 1 mile before completing their observations for the day.

The Vegetation

The considerable precipitation in the winter of 2018-19, and moderate weather in early spring has resulted in very good conditions for vegetation vitality in the early April field week. The vegetation had not begun to dry out. Many trees and shrubs were in flush or in flower, or beginning to flower. Non-native grasslands were fairly dense and lush. More detailed information regarding specific areas are provided below. Green point represent locations captured by the tablet and peach/tan points were captured via GPS.

Balcom Canyon

Balcom Canyon is a north-south trending canyon on the regional north-slope toward the western end of the Santa Susana Mountains, where there is some coastal influence. Elevation ranges from 400 feet at the mouth of the canyon to 1150 feet at the ridgeline. The canyon forms the boundary between a 2003 burn to the west and a 2009 burn to the east. The slopes are fairly steep with a substrate of mudstone and sandstone. The bottom is flatter only toward the mouth of the canyon.

In the upper canyon the vegetation on all aspects for the most part is *Artemisia californica*. *Salvia leucophylla* favors north-facing slopes. *Encelia californica* was consistently found on south-facing lower to mid slopes either with grasses/forbs or with *Artemisia* on southwest facing lower slopes. Very steep rocky east-facing slopes contained open stands of *Salvia mellifera, Eriogonum fasciculatum*, and *Hesperoyucca whipplei*. *Baccharis salicifolia* and *Sambucus nigra* were found in the canyon bottom, with a few *Salix laevigata* and *Salix lasiolepis* occurring down the canyon. The lower canyon contained larger areas of herbaceous vegetation. Native grasses and forbs favored the steeper thinner soil and southerly slopes, while non-native species were found primarily in protected moist swales and bottoms, or on slopes with deeper soils. *Rhus integrifolia* and *Heteromeles arbutifolia* were noted as remnant stands on north-facing concavities. On rocky steep slopes *Eriogonum fasciculatum* favored more exposed harsher slopes, *Salvia mellifera* on less steep westerly or easterly slopes, and *Artemisia californica* and *Salvia leucophylla* on more northwest to northeast slopes. Some *Schinus molle, Quercus agrifolia,* and *Juglans californica* were encountered on the lower slopes.

Brea Canyon

Brea Canyon trends northeast-southwest and drains southward within the central part of the Santa Susana Mountains. Only the southern third of the canyon was visited. The canyon bottom where visited is approximately 750 to 825 feet in elevation. The adjacent spur tops are approximately 1150 feet. This area was last burned in 2003.

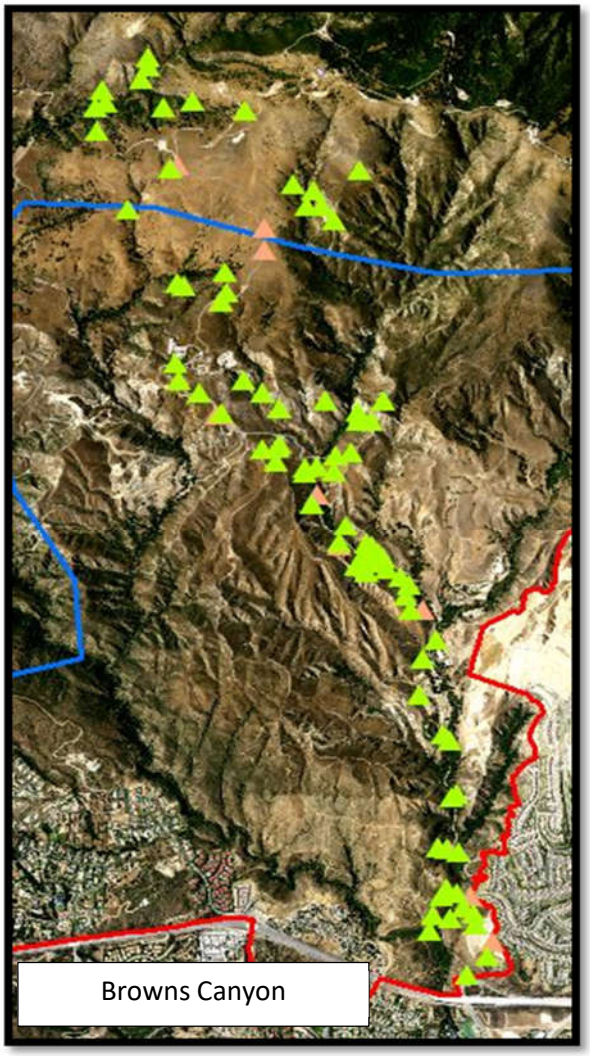
The canyon bottom contained *Salix laevigata, Baccharis salicifolia*, with *Eriogonum fasciculatum*, some *Quercus agrifolia*, and a patch of *Tamarix*. The adjacent slopes to the northwest were composed of *Adenostoma fasciculatum, Ceanothus megacarpus, Rhus integrifolia, Salvia mellifera, Eriogonum fasciculatum*, and *Encelia californica* in various mixtures. At the Simi Landfill to the northwest *Quercus berberidifolia*, old decadent *Ceanothus megacarpus*, and planted exotics were observed.

Browns Canyon

Browns Canyon, in the western Santa Susana Mountains, trends northwest-southeast in the upper canyon, then turns north-south at its lower reaches, as it flows to the northwest San Fernando Valley. The canyon bottom ranges from 1100 feet to upwards of 2000 feet. The adjacent slopes rise up to approximately 1700 feet at the lower part of the canyon, and up to 2400 to 2500 feet at the upper canyon. The upper ridge of Oat Mountain is at about 3400 to 3600 feet. The area burned in 2008.

Lower Browns Canyon has a well-developed riparian zone consisting of *Salix laevigata, Salix lasiolepis*, with some *Populus fremontii, Platanus racemosa,* and *Quercus agrifolia*. Up canyon *Quercus agrifolia* and *Platanus* increase in frequency. Runs of *Baccharis salicifolia* or *Salix lasiolepis* occur where trees open up. *Salix exigua* was also noted. On adjacent slopes at the lower portion of the canyon, *Adenostoma fasciculatum* was observed occurring with *Salvia mellifera* and *Malosma laurina*, or with an additional mix of other coastal sage scrub species such as *Eriogonum fasciculatum* and *Artemisia californica* on drier sites. Some northeast to northwest aspects added *Ceanothus megacarpus* rather than the additional coastal sage scrub species. Up canyon on northeast slopes *Artemisia californica* increased, with some *Salvia leucophylla* and *Malosma laurina. Salvia apiana* was observed on some upper slopes. *Adenostoma fasciculatum* with *Salvia mellifera* was also observed on the northerly and southerly slopes. *Heteromeles arbutifolia* was observed in a protected area. Higher up the canyon

Ceanothus crassifolius began to be observed on the northeast facing slopes. Drier southerly slopes had *Eriogonum fasciculatum, Artemisia californica,* and *Hesperoyucca whipplei.*



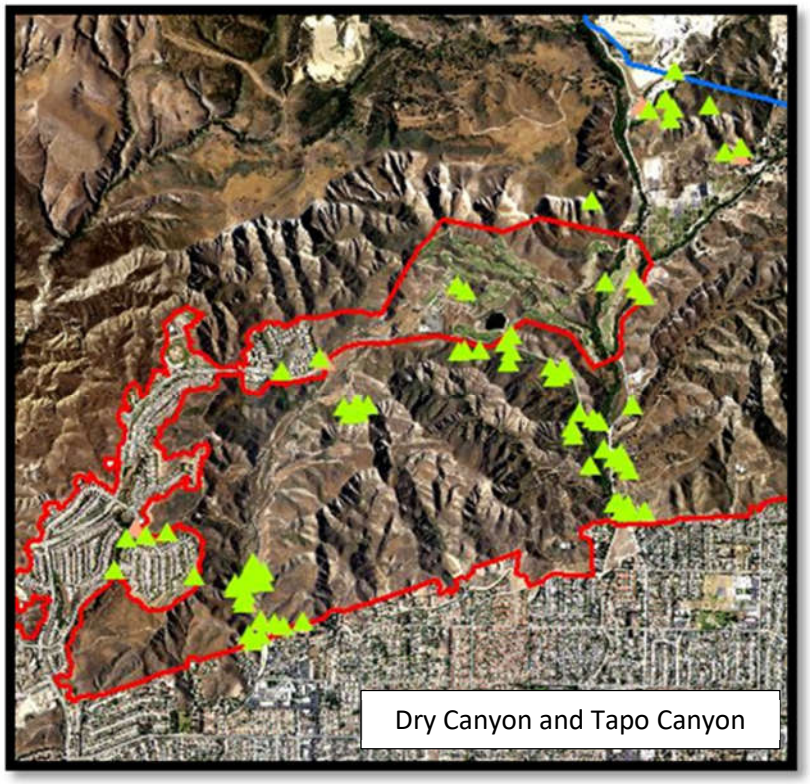
Further up the canyon patches of *Malacothamnus fasciculatus* was observed. *Artemisia californica* with *Salvia mellifera* were noted on northerly slopes. *Adenostoma fasciculatum* with and without *Salvia mellifera* continued up the canyon. *Eriodictyon crassifolius* was noted in several grassy stands. Some exposed rocky areas contained *Eriogonum fasciculatum, Artemisia californica,* and *Salvia apiana.*

Continuing on Palo Sola Road out of Browns Canyon and onto a spur ridge that the road follows, grasslands increase. *Artemisia californica, Salvia mellifera, Malosma laurina, Eriogonum fasciculatum,* and *Salvia apiana* continued to be observed. *Juglans californica, Quercus agrifolia,* and *Quercus lobata* were observed in some of the upper elevation draws. Occurrences of *Quercus chrysolepis* were also noted. Non-native grasses and forbs were more frequently seen in this area, with more non-native species in the swales. *Eriogonum fasciculatum* was found on steep southerly slopes. A large area of *Adenostoma fasciculatum, Ceanothus crassifolius,* with *Rhus ovata* comprised one northeast facet. *Eriodictyon crassifolius* was found in this area with *Salvia mellifera* and *Rhus ovata*, as well as with *Adenostoma fasciculatus* and *Ceanothus crassifolius.*

Dry Canyon

Dry Canyon is a north-south trending drainage in the central Santa Susana Mountains flowing southward to the Simi Valley. Elevation at the mouth of the canyon is approximately 1050 feet. Adjacent slopes rise to approximately 1350 to 1550 feet in the vicinity of the reconnaissance visit. The entire area burned in the 2003 fire. The area visited was an abandoned golf course.

Baccharis salicifolia, Lepidospartum squamatum, and *Sambucus nigra* were found in the riparian zone, with some patches of *Salix lasiolepis, Ericameria pinifolia*, and an occasional *Populus fremontii*. *Encelia californica* was encountered on steep southerly lower slopes as well as on the disturbed terraces with *Lepidospartum. Artemisia californica, Salvia leucophylla,* and *Malacothamnus fasciculatus* were noted on some of the slopes. *Salvia mellifera* was also noted on a few drier slopes. Non-native grasses and forbs were found on the old golf course links. Higher up the canyon *Salvia leucophylla, Malacothamnus fasciculatus,* and *Salvia mellifera* were observed on a northerly slope. *Salix lasiolepis* was seen in a drainage adjacent to a subdivision at a road crossing.


Dry Canyon and Tapo Canyon

<u>Tapo Canyon</u>

Tapo Canyon is a north-south trending drainage in the central Santa Susana Mountains flowing southward to the Simi Valley. Elevation at the mouth of the canyon is approximately 1050 feet. Adjacent slopes rise to approximately 1500 to 1800 feet. The entire area last burned in 2003. The area visited contains some agriculture and an abandoned golf course.

The riparian zone was composed of *Salix lasiolepis, Salix laevigata, Sambucus nigra,* with some *Populus fremontii, Platanus racemosa, Baccharis salicifolia, Toxicodendron diversilobum,* and *Arundo donax*. The adjacent slopes contained *Salvia mellifera* and *Artemisia californica* on east- and west-facing slopes, *Artemisia californica* and *Salvia leucophylla* on northerly slopes, and *Encelia californica* on southerly slopes and terraces. *Adenostoma fasciculatum* and *Ceanothus megacarpus* were noted on higher elevation upper slopes above Tapo Canyon State Park. Other species encountered include *Peritoma arborea, Malacothamnus fasciculatus, Eriogonum fasciculatum, Atriplex lentiformis, Baccharis pilularis, Hesperoyucca whipplei, Lotus scoparius,* and *Isocoma menziesii. Quercus agrifolia* and *Juglans californica* were also found in the area.

Grimes Canyon

Grimes Canyon is a north-south trending canyon on the regional north-slope in the western third of the Santa Susana Mountains. The upper third of the watershed drainage bends to the east. Elevation ranges from approximately 550 feet at the mouth of the canyon to approximately 2100 feet at the ridgeline. The slopes are fairly steep, with the bottom being relatively flat through most of the canyon. The lower reaches of the canyon are very disturbed, with agriculture and oil/gas pumps scattered in the vicinity. The 2003 fire burned at the mouth of the canyon, with the remainder primarily in the 2009 burn area.

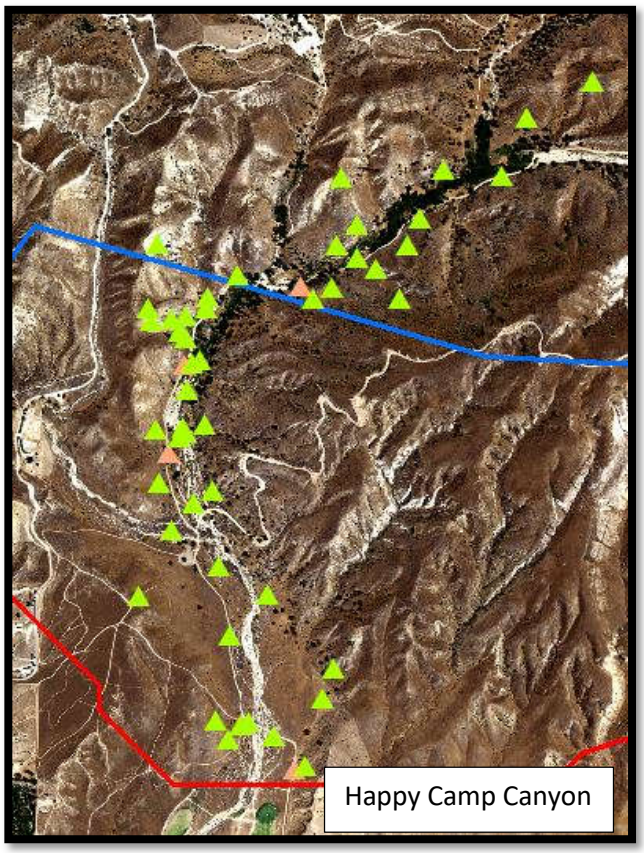
Quercus agrifolia, Juglans californica and exotic *Eucalyptus* and palms were found at the northern mouth of the canyon, with *Baccharis salicifolia, Lepidospartum squamatum, Salix exigua, Sambucus nigra,* and *Malacothamnus fasciculatus* in the drainage area. Incidental *Quercus, Juglans, Eucalyptus,* and *Schinus* continued on the lower slopes of the middle stretch of the canyon. The canyon bottom contained some *Lepidospartum squamatum,* and *Baccharis salicifolia*. Northerly slopes had *Artemisia californica* and *Salvia leucophylla*. Otherwise there were mosaics and mixes of *Encelia californica* favoring southerly exposures, with *Eriogonum fasciculatum, Malacothamnus fasciculatus*, and large areas of native and non-native grassland/forbs.

The upper watershed contained *Quercus* and *Juglans* on lower slopes and draws. *Baccharis salicifolia* and *Lepidospartum* continued on the canyon bottom. Sideslopes were composed of *Artemisia, Salvia leucophylla, Malacothamnus fasciculatus,* and *Encelia californica*. Grimes Road continued up to the southern ridgeline where shrubs included *Eriogonum fasciculatum, Lupinus albifrons, Ericameria pinifolia,* and *Salvia apiana* on drier slopes, *Salvia leucophylla* and *Artemisia californica* on northerly slopes and concavities, and *Toxicodendron diversilobum* and *Selaginella bigelovii* on protected north-facing slopes. Uppermost concavities contained

Quercus agrifolia and *Rhus integrifolia*. Native grass and forb mosaics were located on steeper exposed slopes with thin substrates.

Happy Camp Canyon

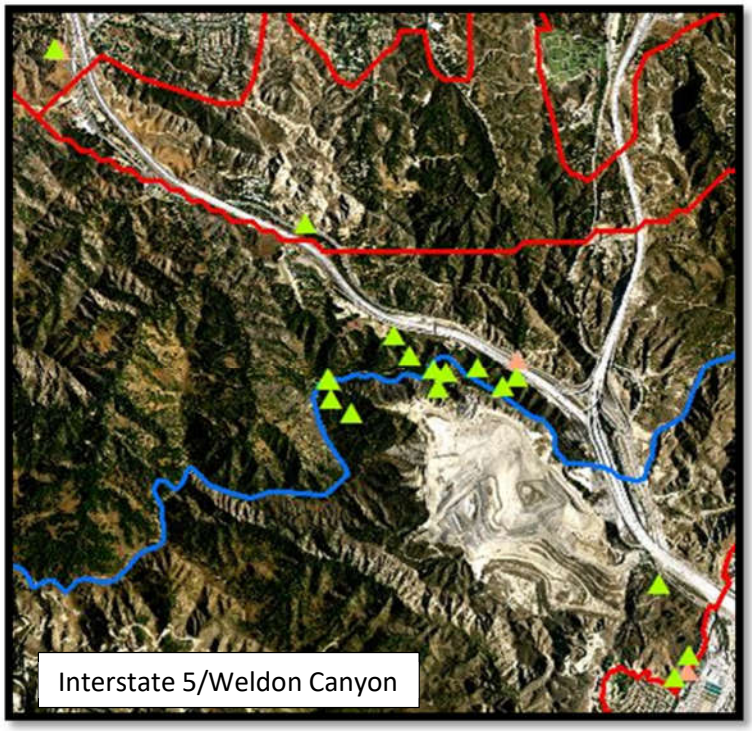
Happy Camp Canyon is a major south-flowing drainage in the central Santa Susana Mountains. It trends east-west in the upper two thirds of the watershed, and flows southward in the lower third. The area where the canyon turns from north-south to east-west was visited, where it has a broader stream terrace. Where visited, the canyon bottom elevation ranges from 950 to 1250 feet. The adjacent ridges above the steep slopes to the south range from 1500 to 2000 feet. The northern slopes are more broken and variable rising to approximately 2050 feet at the ridgeline. The area was last burned in 2009.



The lower canyon riparian zone contained *Baccharis salicifolia* and *Lepidospartum squamatum* with adjacent occasional *Quercus agrifolia, Juglans californica,* or *Sambucus nigra*. Further up the canyon occasional *Salix laevigata, Salix lasiolepis, Platanus racemosa,* and *Populus fremontii* were encountered. Frequency of *Quercus* and *Salix* increased as the crew moved up the canyon. *Salix lasiandra* and *Juglans* were also encountered in a few locations up canyon. The lower slopes had a frequent incidence of *Malacothamnus fasciculatus* along the corridor. One small stand of *Isocoma menziesii* was observed. *Adenostoma fasciculatum* was noted on some spur tops on the north side of the drainage. *Encelia californica* occurred on south-facing exposures on mid to lower slopes, with *Artemisia californica* and some *Opuntia littoralis* noted in the area. *Eriogonum fasciculatum, Salvia apiana,* and *Hesperoyucca whipplei* were noted on some mid to upper slope southerly thin soil steep exposures. *Quercus agrifolia* and *Juglans californica* were observed on northerly slopes and in draws. In general, native grasses/forbs were seen on more exposed, steeper thin soil slopes, while non-native grasses/forbs were on gentler deeper soil slopes, bottoms, and swales.

I-5/Weldon Motorway

The I-5 freeway corridor lies within Weldon Canyon and is located in the Newhall Pass/Fremont Pass/San Fernando Pass area. The corridor runs northwest to southeast. Weldon Motorway rises up the north face to an east-west ridge that overlooks the Sunshine Landfill to the south, and the San Fernando Valley afar. The canyon bottom where the freeway runs, ranges from 1300 feet to 2000 feet in elevation. The adjacent ridges top out at approximately 2200 to 2400 feet. Most of the immediate area has not burned. The lower elevations toward the San Fernando Valley last burned in 2008. East of the freeway the last burn was in 2003, with several smaller burn areas of 2015, 2016, and 2017. The area visited was not burned.

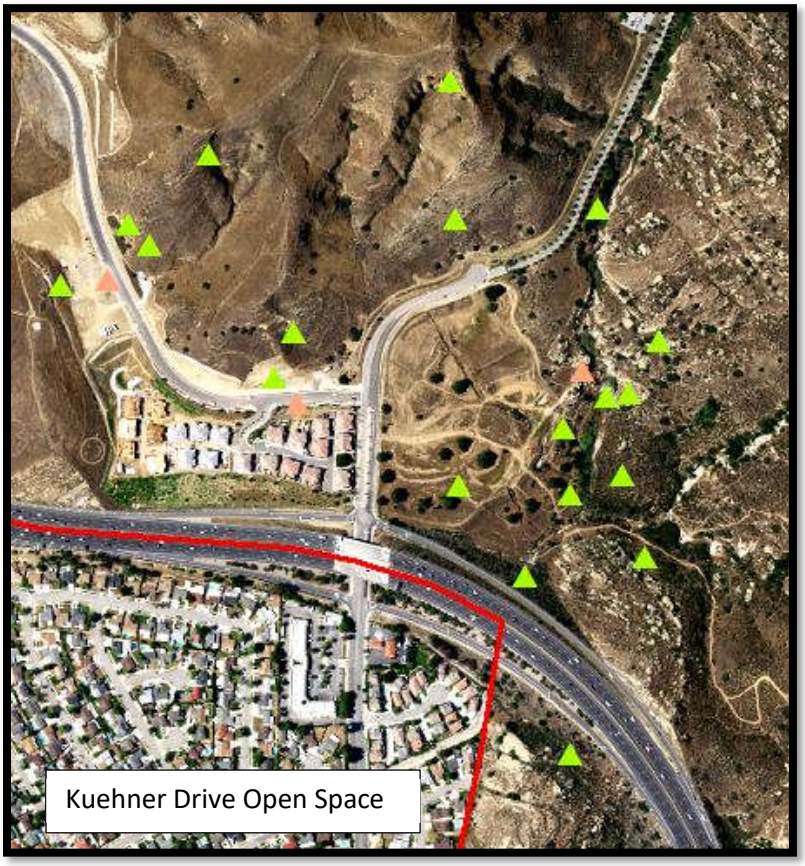

Interstate 5/Weldon Canyon

The general north- to northeast-facing undulating slopes were composed of *Quercus agrifolia, Juglans californica, Pseudotsuga macrocarpa, Heteromeles arbutifolia,* and *Fraxinus dipetala*. The ridgetop where the motorway runs contained a homogeneous uniform dense stand of planted *Quercus agrifolia* of even height. The south-facing slope above the landfill contained coastal sage scrub with scattered *Quercus agrifolia*. The scrub observed was primarily *Artemisia californica,* with *Eriogonum fasciculatum* and some *Salvia apiana* at the upper more exposed slope.

Kuehner Drive Open Space

The Open Space area at the end of Kuehner Drive adjacent to the Hummingbird Nest Ranch is under the jurisdiction of Rancho Simi Recreation and Park District and is located at the northeast corner of Simi Valley. The area to the east of Kuehner Drive is bouldery in nature, while to the west it is not. Elevations in the immediate area range from 1100 feet to 1500 feet, with a short canyon draining southward. Fire last consumed the area in 2003.

The west side of the road consists of a grass and coastal sage scrub matrix. Southerly slopes consist of *Encelia californica*. Some upper drier slopes have *Eriogonum fasciculatum* and *Salvia apiana. Selaginella bigelovii* with *Eriogonum fasciculatum* and *Hesperoyucca whipplei* were noted in a rocky area.

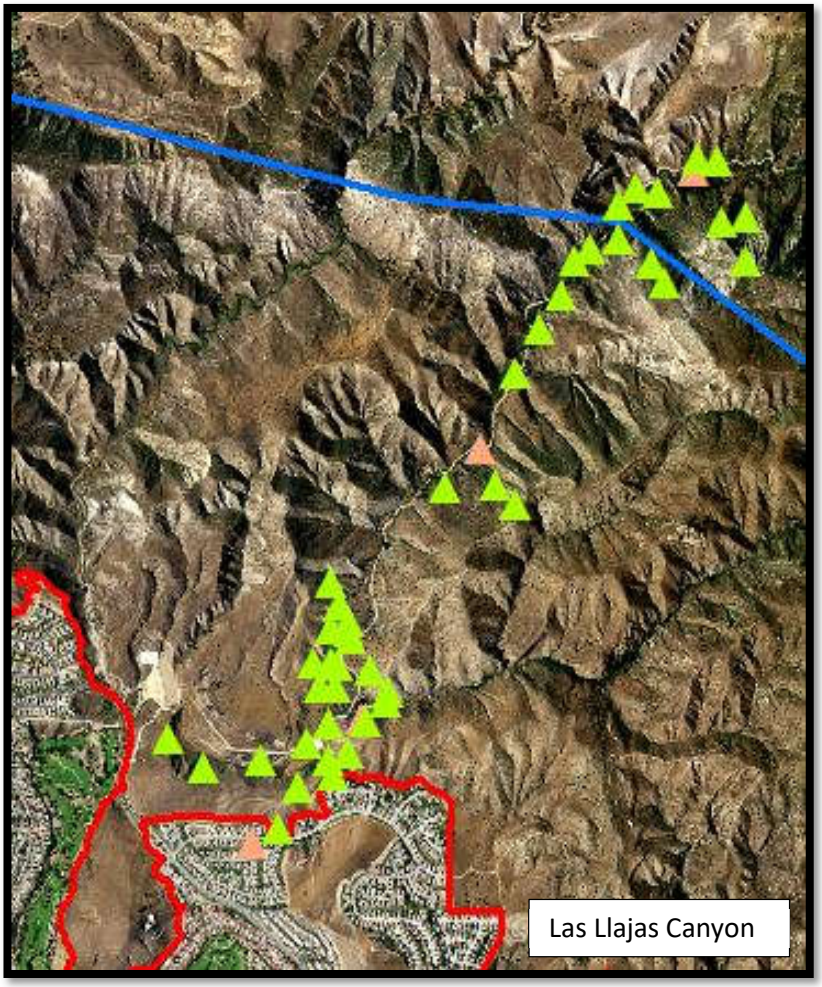


To the east of the road in the bouldery area, there was a mix of *Malosma laurina* and coastal sage scrub. The scrub mix included *Encelia californica, Eriogonum fasciculatum,* and *Artemisia californica.* Small patches of *Malacothamnus fasciculatus* were noted in several areas. *Adenostoma fasciculatum* with a limited amount of *Salvia mellifera* was also observed. Flat rocky exposures contained *Selaginella bigelovii* and non-native grasses. *Quercus lobata* and *Quercus agrifolia* were noted at the toe slope and in the main stream bottom. The CA 118 freeway embankment had been restored with *Eriogonum fasciculatum* and *Artemisia californica*, as well as *Salvia apiana*.

<u>Las Llajas Canyon</u>

Las Llajas Canyon is a northeast-southwest trending canyon in the central Santa Susana Mountains that flows southwestward to Simi Valley. Elevation ranges from approximately 1150 feet at the mouth of the canyon to approximately 1700 feet halfway up the canyon bottom about 3 miles, where the crew ended their visit. The adjacent slope spurs and ridges where the visit occurred range from approximately 1730 feet to 2500 feet. Most of the lower canyon and slopes burned in 2003, while the interior canyon area burned last in 2009.

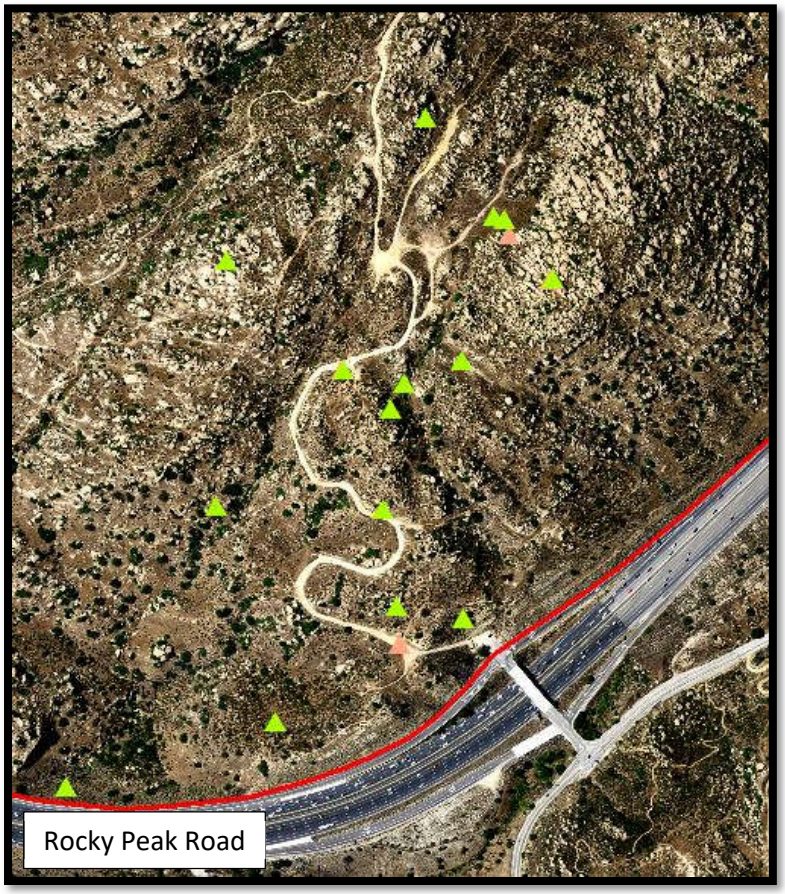
The lower end of the canyon is fairly disturbed, with *Populus fremontii, Salix laevigata, Sambucus nigra, Baccharis salicifolia,* and a few *Tamarix* in the riparian area. Coastal sage scrub on the north-facing slopes at this lower end of the canyon were composed of *Artemisia californica, Salvia leucophylla,* with some *Malosma laurina*, or mixes of *Artemisia californica, Salvia leucophylla, Fraxinus dipetala, Heteromeles arbutifolia, Keckiella sp., Lonicera subspicata,* and *Leymus condensatus*. Southerly slopes here had *Malosma laurina, Encelia californica, Salvia mellifera, Eriogonum fasciculatum,* and/or some *Salvia apiana*.



Progressing up the canyon, the drier mid to upper slopes *Adenostoma fasciculatum* with *Salvia mellifera* began to be encountered. The northerly slopes increased in chaparral, with *Adenostoma fasciculatum, Fraxinus dipetala,* and *Ceanothus megacarpus*. The riparian zone increased in *Salix lasiolepis*, with *Baccharis pilularis*, and some *Populus fremontii* and *Quercus agrifolia. Malacothamnus fasciculatus* was found on some of the lower slopes. Further up the canyon *Quercus agrifolia* increased, with *Platanus racemosa. Salix lasiolepis, Toxicodendron diversilobum,* and some *Populus trichocarpa* was also encountered. On the steep north-facing slopes *Ceanothus oliganthus* and *Cercocarpus montanus* were noted. Southerly slopes in this area contained *Adenostoma fasciculatum* and *Salvia mellifera,* with some *Malosma laurina* on lower slopes.

Rocky Peak Park

The portion of Rocky Peak Park that was visited centers at a draw and fire road north of the Rocky Peak Road exit of the CA 118 freeway at Santa Susana Pass, the saddle area between the Simi and San Fernando Valleys. It is a very bouldery area with elevations ranging between 1575 to 2000 feet. The area last burned in a 2005 fire.



The freeway embankments in the area contain *Artemisia californica, Salvia leucophylla, Eriogonum fasciculatum,* and *Pennisetum setaceum*. The bouldery terrain contains a mix of *Adenostoma fasciculatum, Prunus ilicifolia, Malosma laurina,* and *Salvia mellifera. Cercocarpus betuloides* was noted in a protected north-facing upper slope tucked in between the boulders. Other species noted include *Quercus agrifolia, Toxicodendron diversilobum, Diplacus aurantiacus, Eriodictyon crassifolius, Deinandra minthornii,* and *Heteromeles arbutifolia.*

Other Issues

Will Miller noted the importance of cactus stands as habitat for Cactus Wren. There is *Opuntia littoralis-Opuntia oricola-Cylindropuntia prolifera* Alliance in the classification and we will map this alliance where possible. However, there may be situations where cactus is present in patches within stands that will be classified as something other than *Opuntia littoralis-Opuntia oricola-Cylindropuntia prolifera* Alliance, such as the *Artemisia californica-Salvia leucophylla* Alliance, which can contain cactus within the stand. In these cases AIS will identify in the "Notes" field for the polygon, "cactus patches within other alliance."

Appendix F: Hierarchy Table (CNPS) [Hierarchy Table3_SASUrev.doc]

List of vegetation alliances and associations documented in the Santa Susana Mountains Project Area, or within a 5 km buffer (*), nested within the NVC hierarchy. The table is organized alphabetically by NVC code for the upper levels of hierarchy to division level, and alphabetically by name for the macrogroup to association levels.

Class	Subclass	Formation	Division	Macrogroup	Group	Alliance	Association
1. Forest & Woodland Class							
	1.B. Temperate & Boreal Forest & Woodland Subclass						
		1.B.1. Warm Temperate Forest & Woodland Formation					
			1.B.1.Nc. Californian Forest & Woodland Division				
				M009 Californian Forest & Woodland			
					G195 Californian Broadleaf Forest & Woodland		
						Juglans californica Alliance	
							Juglans californica – Quercus agrifolia Association
							Juglans californica / annual herbaceous Association
							Juglans californica / Artemisia californica / Leymus condensatus Association
							Juglans californica / Heteromeles arbutifolia Association*
							Juglans californica / Malosma laurina Association
						Quercus agrifolia Alliance	
							Quercus agrifolia Association
							Quercus agrifolia – Umbellularia californica Association*
							Quercus agrifolia / Ceanothus (oliganthus, spinosus) Association*
							Quercus agrifolia / Heteromeles arbutifolia Association*
							Quercus agrifolia / Salvia leucophylla – Artemisia californica Association*
						Quercus lobata Alliance	
							Quercus lobata – Quercus agrifolia / grass Association
						Umbellularia californica Alliance	
							Umbellularia californica / Ceanothus oliganthus Association*

Class	Subclass	Formation	Division	Macrogroup	Group	Alliance	Association
				M513 Californian Ruderal Forest			
					G678 Californian Ruderal Forest		
						Eucalyptus spp. – *Ailanthus altissima* – *Robinia pseudoacacia* Semi-natural Alliance*	
							Eucalyptus (globulus, camaldulensis) Provisional Semi-natural Association*
						Schinus (molle, terebinthifolius) – *Myoporum laetum* Semi-natural Alliance*	
							Schinus molle Association*
		1.B.2. Cool Temperate Forest & Woodland Formation					
			1.B.2.Nd. Vancouverian Forest & Woodland Division				
				M023 Southern Vancouverian Montane-Foothill Forest			
					G344 Californian Montane Conifer Forest & Woodland		
						Pseudotsuga macrocarpa Alliance	
							Pseudotsuga macrocarpa – *Quercus agrifolia* Association
		1.B.3. Temperate Flooded & Swamp Forest Formation					
			1.B.3.Nd. Western North American Interior Flooded Forest Division				
				M036 Interior Warm & Cool Desert Riparian Forest			
					G797 Western Interior Riparian Forest & Woodland		
						Platanus racemosa – *Quercus agrifolia* Alliance	
							Platanus racemosa – *Quercus agrifolia* Association
							Platanus racemosa / Toxicodendron diversilobum Association*
							Quercus agrifolia / Salix lasiolepis Association
						Salix gooddingii – *Salix laevigata* Alliance*	
							Salix laevigata Association*
							Salix laevigata / Salix lasiolepis Association*

Class Subclass Formation Division Macrogroup Group Alliance Association

2. Shrub & Herb Vegetation Class

2.B. Temperate & Boreal Grassland & Shrubland Subclass

2.B.1. Mediterranean Scrub & Grassland Formation

2.B.1.Na. Californian Scrub & Grassland Division

M045 Californian Annual & Perennial Grassland

G496 Californian Perennial Grassland

Corethrogyne filaginifolia – Eriogonum (elongatum, nudum) Alliance †

Calystegia macrostegia – Eucrypta chrysanthemifolia Association*

Corethrogyne filaginifolia Association

Leymus condensatus Alliance

Leymus condensatus Association

M043 Californian Chaparral

G258 Californian Maritime Chaparral

Malosma laurina Alliance

Malosma laurina Association*

Malosma laurina – Artemisia californica – Eriogonum fasciculatum Association

Malosma laurina – Artemisia californica – Salvia leucophylla Association*

Malosma laurina – Rhus ovata Association*

Malosma laurina – Salvia mellifera Association

Rhus integrifolia Alliance

Rhus integrifolia Association*

Rhus integrifolia – Artemisia californica – Eriogonum cinereum Association

Rhus integrifolia – Artemisia californica – Salvia mellifera Association*

Rhus integrifolia – Heteromeles arbutifolia Association*

Rhus integrifolia – Malosma laurina Association*

Class Subclass Formation Division Macrogroup Group Alliance Association

G261 Californian Mesic & Pre-montane Chaparral

Arctostaphylos glandulosa Alliance*

Arctostaphylos glandulosa – Adenostoma fasciculatum Association*

Ceanothus oliganthus – Ceanothus leucodermis – Ceanothus tomentosus Alliance

Ceanothus oliganthus Association

Ceanothus oliganthus – Adenostoma fasciculatum Association*

Cercocarpus montanus Alliance

Cercocarpus montanus – Adenostoma fasciculatum Association*

Cercocarpus montanus var. glaber Association

Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus Alliance

Heteromeles arbutifolia Provisional Association

Heteromeles arbutifolia – Artemisia californica Association*

Heteromeles arbutifolia – Fraxinus dipetala Provisional Association

Prunus ilicifolia ssp. *ilicifolia* Association

Prunus ilicifolia ssp. *ilicifolia – Heteromeles arbutifolia* Association*

G257 Californian Xeric Chaparral

Adenostoma fasciculatum Alliance

Adenostoma fasciculatum Association

Adenostoma fasciculatum – (Eriogonum fasciculatum – Salvia mellifera) Association*

Adenostoma fasciculatum – (Lotus scoparius – Eriodictyon spp.*)* Association*

Adenostoma fasciculatum – Diplacus aurantiacus Association*

Adenostoma fasciculatum – Eriogonum fasciculatum Association

Adenostoma fasciculatum – Malosma laurina Association*

Adenostoma fasciculatum – Salvia spp. Alliance

Adenostoma fasciculatum – Salvia mellifera Association

Class	Subclass	Formation	Division	Macrogroup	Group	Alliance	Association

G257 Californian Xeric Chaparral (continued)

Ceanothus crassifolius Alliance

Ceanothus crassifolius Association*

Ceanothus crassifolius – Adenostoma fasciculatum Association

Ceanothus crassifolius – Cercocarpus montanus Association*

Ceanothus megacarpus Alliance

Ceanothus megacarpus Association

Ceanothus megacarpus – Salvia mellifera Association*

M044 Californian Coastal Scrub

G782 Californian Coastal-Foothill Seral Scrub

Ericameria linearifolia – Cleome isomeris Alliance

Ericameria linearifolia Association

Hazardia squarrosa – Ericameria palmeri Alliance*

Ericameria palmeri Provisional Association*

Lotus scoparius – Lupinus albifrons – Eriodictyon spp. Alliance

Dendromecon rigida Association

Eriodictyon crassifolium Provisional Association

Lotus scoparius Association*

Malacothamnus fasciculatus – Malacothamnus spp. Alliance

Malacothamnus fasciculatus Association

Malacothamnus fasciculatus – Salvia leucophylla Association*

G662 Californian North Coastal & Mesic Scrub

Baccharis pilularis Alliance*

Baccharis pilularis – Artemisia californica Association*

Toxicodendron diversilobum Alliance*

Toxicodendron diversilobum – Artemisia californica / Leymus condensatus Association*

Class Subclass Formation Division Macrogroup Group Alliance Association

G264 Central & Southern Californian Coastal Sage Scrub

Artemisia californica – Salvia leucophylla Alliance

Artemisia californica Association

Artemisia californica – (Salvia leucophylla) / Leymus condensatus Association

Artemisia californica – Eriogonum cinereum Association*

Artemisia californica – Eriogonum fasciculatum Association

Artemisia californica – Eriogonum fasciculatum – Opuntia littoralis / Dudleya (edulis) Association*

Artemisia californica – Eriogonum fasciculatum – Salvia leucophylla Association*

Artemisia californica – Eriogonum fasciculatum – Salvia mellifera Association

Artemisia californica – Salvia leucophylla Association

Artemisia californica – Salvia leucophylla – Eriogonum cinereum / Nassella spp. Assoc.*

Artemisia californica / Nassella (pulchra) Association

Salvia leucophylla Association

Encelia californica – Eriogonum cinereum Alliance

Encelia californica Association

Encelia californica – Artemisia californica Association*

Encelia californica – Eriogonum cinereum Association*

Encelia californica – Malosma laurina – Salvia mellifera Association*

Eriogonum cinereum Association*

Eriogonum fasciculatum – Salvia apiana Alliance

Eriogonum fasciculatum Association

Eriogonum fasciculatum – Salvia apiana Association

Eriogonum fasciculatum – Salvia mellifera – Malosma laurina Association*

Eriogonum fasciculatum var. foliolosum – Hesperoyucca whipplei Association

Salvia apiana Provisional Association

Class	Subclass	Formation	Division	Macrogroup	Group	Alliance	Association
							Salvia apiana – Artemisia californica – Ericameria spp. Association
					G264	Central & Southern Californian Coastal Sage Scrub (continued)	
						Salvia mellifera – Artemisia californica Alliance	
							Salvia mellifera Association
							Salvia mellifera – Artemisia californica – Malosma laurina Association
							Salvia mellifera – Eriogonum cinereum Association*
							Salvia mellifera – Eriogonum fasciculatum Association*
							Salvia mellifera – Lotus scoparius Association
							Salvia mellifera – Malacothamnus fasciculatus Association
							Salvia mellifera – Rhus ovata Association*
				M046	Californian Ruderal Grassland, Meadow & Scrub		
					G497	Californian Ruderal Grassland, Meadow & Scrub	
						Avena spp. – *Bromus* spp. Semi-natural Alliance*	
							Avena barbata – Avena fatua Semi-natural Association*
							Bromus diandrus – Avena spp. Semi-natural Association*
						Brassica nigra – Centaurea (solstitialis, melitensis) Semi-natural Alliance*	
							Brassica nigra Semi-natural Association*
							Centaurea melitensis Semi-natural Association*
						Conium maculatum – Foeniculum vulgare Semi-natural Alliance*	
							Foeniculum vulgare Semi-natural Association*
		2.B.2. Temperate Grassland & Shrubland Formation					
			2.B.2.Nd. Western North American Interior Chaparral Division				
				M091	Warm Interior Chaparral		
					G281	Western Madrean Chaparral	
						Rhus ovata Alliance	
							Rhus ovata Association
							Rhus ovata – Salvia leucophylla – Artemisia californica Association

Class Subclass Formation Division Macrogroup Group Alliance Association

2.B.4. Temperate to Polar Scrub & Herb Coastal Vegetation Formation

2.B.4.Nb. Pacific North American Coastal Scrub & Herb Vegetation Division

M059 Pacific Coastal Beach & Dune

G663 Californian Coastal Beach & Dune

Isocoma menziesii Alliance

Isocoma menziesii Association

2.C. Shrub & Herb Wetland Subclass

2.C.4. Temperate to Polar Freshwater Marsh, Wet Meadow & Shrubland Formation

2.C.4.Nb. Western North American Temperate & Boreal Freshwater Marsh, Wet Meadow & Shrubland Division

M073 Vancouverian Lowland Marsh, Wet Meadow & Shrubland

G525 Temperate Pacific Freshwater Wet Mudflat

Heterotheca (oregona, sessiliflora) Alliance*

Heterotheca sessiliflora Provisional Association*

2.C.4.Nc. Southwestern North American Warm Desert Freshwater Marsh & Bosque Division

M076 Warm Desert Lowland Freshwater Marsh, Wet Meadow & Shrubland

G533 North American Warm Desert Riparian Low Bosque & Shrubland

Baccharis salicifolia Alliance

Baccharis salicifolia Association

Salix exigua Alliance*

Salix exigua – Arundo donax Association*

Salix lasiolepis Alliance

Salix lasiolepis Association

Sambucus nigra Alliance

Sambucus nigra Association

Class Subclass Formation Division Macrogroup Group Alliance Association

2.C.5. Salt Marsh Formation

2.C.5.Nd. North American Western Interior Brackish Marsh, Playa. & Shrubland Division

M082 Warm & Cool Desert Alkali-Saline Marsh, Playa & Shrubland

G538 North American Desert Alkaline-Saline Marsh & Playa

Distichlis spicata Alliance*

Distichlis spicata – annual grasses Association*

3. Desert & Semi-Desert Class

3.A. Warm Desert & Semi-Desert Woodland, Scrub & Grassland Subclass

3.A.2. Warm Desert & Semi-Desert Scrub & Grassland Formation

3.A.2.Na. North American Warm Desert Scrub & Grassland Division

M088 Mojave-Sonoran Semi-Desert Scrub

G298 Baja Semi-Desert Coastal Succulent Scrub

Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera Alliance

Cylindropuntia prolifera – Mixed Coastal Scrub Provisional Association

Opuntia littoralis Association

Opuntia oricola Provisional Association*

M512 North American Warm Desert Ruderal Scrub & Grassland

G677 North American Warm Desert Ruderal Grassland

Pennisetum setaceum – Pennisetum ciliare Semi-natural Alliance*

Pennisetum setaceum Semi-natural Association*

M092 North American Warm-Desert Xeric-Riparian Scrub

G541 Warm Semi-Desert Shrub & Herb Dry Wash & Colluvial Slope

Lepidospartum squamatum Alliance

Lepidospartum squamatum – Baccharis salicifolia Association

Lepidospartum squamatum – Eriogonum fasciculatum Association*

Class	Subclass	Formation	Division	Macrogroup	Group	Alliance	Association
							Lepidospartum squamatum / ephemeral annuals Association
6. Open Rock Vegetation Class							
	6.B. Temperate & Boreal Open Rock Vegetation Subclass						
		6.B.1. Temperate & Boreal Cliff, Scree & Other Rock Vegetation Formation					
			6.B.1.Nb. Western North American Temperate & Boreal Cliff, Scree & Rock Vegetation Division				
				M887 Western North American Cliff, Scree & Rock Vegetation			
					G563 Californian Cliff, Scree & Rock Vegetation		
						Selaginella bigelovii Alliance	
							Selaginella bigelovii / Eriogonum fasciculatum Association

Appendix G: Classification Table (CNPS) [ClassifTable2_SASUrev.docx]

List of vegetation types sampled within the Santa Susana Mountains (SASU) and a 5 km buffer surrounding the project area, including the number of surveys (n) classified. Types confirmed within the project area are listed in bold font. Note that some types are considered provisional.

Life form	Alliance	Association	Total	Buffer	SASU
Tree	*Eucalyptus* spp. – *Ailanthus altissima – Robinia pseudoacacia*	*Eucalyptus* (*globulus, camaldulensis*)	1	1	
	Juglans californica	***Juglans californica – Quercus agrifolia***	7	1	6
	Juglans californica	***Juglans californica* / annual herbaceous**	6	3	3
	Juglans californica	***Juglans californica / Artemisia californica / Leymus condensatus***	3	2	1
	Juglans californica	*Juglans californica / Heteromeles arbutifolia*	1	1	
	Juglans californica	***Juglans californica / Malosma laurina***	2		2
	Juglans californica	***Juglans californica* Alliance**	1		1
	Platanus racemosa – Quercus agrifolia	***Platanus racemosa – Quercus agrifolia***	4	1	3
	Platanus racemosa – Quercus agrifolia	*Platanus racemosa / Toxicodendron diversilobum*	2	2	
	Platanus racemosa – Quercus agrifolia	***Quercus agrifolia / Salix lasiolepis***	2		2
	Pseudotsuga macrocarpa	***Pseudotsuga macrocarpa – Quercus agrifolia***	2		2
	Quercus agrifolia	***Quercus agrifolia***	6	5	1
	Quercus agrifolia	*Quercus agrifolia – Umbellularia californica*	1	1	
	Quercus agrifolia	*Quercus agrifolia / Ceanothus* (*oliganthus, spinosus*)	1	1	
	Quercus agrifolia	*Quercus agrifolia / Heteromeles arbutifolia*	4	4	
	Quercus agrifolia	*Quercus agrifolia / Salvia leucophylla – Artemisia californica*	1	1	
	Quercus lobata	***Quercus lobata – Quercus agrifolia* / grass**	3	2	1
	Salix gooddingii – Salix laevigata	*Salix laevigata*	6	6	
	Salix gooddingii – Salix laevigata	*Salix laevigata / Salix lasiolepis*	3	3	
	Schinus (molle, terebinthifolius) – Myoporum laetum	*Schinus molle*	4	4	
	Umbellularia californica	*Umbellularia californica / Ceanothus oliganthus*	1	1	
Shrub	***Adenostoma fasciculatum***	***Adenostoma fasciculatum***	3		3
	Adenostoma fasciculatum	*Adenostoma fasciculatum* – (*Eriogonum fasciculatum – Salvia mellifera*)	5	5	
	Adenostoma fasciculatum	*Adenostoma fasciculatum* – (*Lotus scoparius – Eriodictyon* spp.)	9	9	
	Adenostoma fasciculatum	*Adenostoma fasciculatum – Diplacus aurantiacus*	2	2	
	Adenostoma fasciculatum	***Adenostoma fasciculatum – Eriogonum fasciculatum***	1		1
	Adenostoma fasciculatum	*Adenostoma fasciculatum – Malosma laurina*	2	2	
	Adenostoma fasciculatum	*Adenostoma fasciculatum* Alliance	1	1	

Life form	Alliance	Association	Total	Buffer	SASU
Shrub	***Adenostoma fasciculatum – Salvia* spp.**	***Adenostoma fasciculatum – Salvia mellifera***	6	1	5
	Arctostaphylos glandulosa	*Arctostaphylos glandulosa – Adenostoma fasciculatum*	1	1	
	Artemisia californica – Salvia leucophylla	***Artemisia californica***	5	3	2
	Artemisia californica – Salvia leucophylla	***Artemisia californica – (Salvia leucophylla) / Leymus condensatus***	11	10	1
	Artemisia californica – Salvia leucophylla	*Artemisia californica – Eriogonum cinereum*	2	2	
	Artemisia californica – Salvia leucophylla	***Artemisia californica – Eriogonum fasciculatum***	2	1	1
	Artemisia californica – Salvia leucophylla	*Artemisia californica – Eriogonum fasciculatum – Opuntia littoralis / Dudleya* (*edulis*)	2	2	
	Artemisia californica – Salvia leucophylla	*Artemisia californica – Eriogonum fasciculatum – Salvia leucophylla*	1	1	
	Artemisia californica – Salvia leucophylla	***Artemisia californica – Eriogonum fasciculatum – Salvia mellifera***	1		1
	Artemisia californica – Salvia leucophylla	***Artemisia californica – Salvia leucophylla***	25	21	4
	Artemisia californica – Salvia leucophylla	*Artemisia californica – Salvia leucophylla – Eriogonum cinereum / Nassella* spp.	2	2	
	Artemisia californica – Salvia leucophylla	***Artemisia californica / Nassella (pulchra)***	1		1
	Artemisia californica – Salvia leucophylla	***Salvia leucophylla***	9	7	2
	Baccharis pilularis	*Baccharis pilularis – Artemisia californica*	1	1	
	Baccharis pilularis	*Baccharis pilularis* Alliance	1	1	
	Baccharis salicifolia	***Baccharis salicifolia***	2		2
	Ceanothus crassifolius	*Ceanothus crassifolius*	9	9	
	Ceanothus crassifolius	***Ceanothus crassifolius – Adenostoma fasciculatum***	18	17	1
	Ceanothus crassifolius	*Ceanothus crassifolius – Cercocarpus montanus*	1	1	
	Ceanothus crassifolius	*Ceanothus crassifolius* Alliance	1	1	
	Ceanothus megacarpus	***Ceanothus megacarpus***	3	1	2
	Ceanothus megacarpus	*Ceanothus megacarpus – Salvia mellifera*	1	1	
	Ceanothus oliganthus – Ceanothus leucodermis – Ceanothus tomentosus	***Ceanothus oliganthus***	8	6	2
	Ceanothus oliganthus – Ceanothus leucodermis – Ceanothus tomentosus	*Ceanothus oliganthus – Adenostoma fasciculatum*	5	5	
	Cercocarpus montanus	*Cercocarpus montanus – Adenostoma fasciculatum*	1	1	
	Cercocarpus montanus	***Cercocarpus montanus* var. *glaber***	1		1
	Encelia californica – Eriogonum cinereum	***Encelia californica***	6	4	2
	Encelia californica – Eriogonum cinereum	*Encelia californica – Artemisia californica*	3	3	
	Encelia californica – Eriogonum cinereum	*Encelia californica – Eriogonum cinereum*	8	8	
	Encelia californica – Eriogonum cinereum	*Encelia californica – Eriogonum cinereum* Alliance	1	1	
	Encelia californica – Eriogonum cinereum	*Encelia californica – Malosma laurina – Salvia mellifera*	10	10	

Life form	Alliance	Association	Total	Buffer	SASU
Shrub	*Encelia californica – Eriogonum cinereum*	*Eriogonum cinereum*	3	3	
	Ericameria linearifolia – Cleome isomeris	***Ericameria linearifolia***	1		1
	Eriogonum fasciculatum – Salvia apiana	***Eriogonum fasciculatum***	2		2
	Eriogonum fasciculatum – Salvia apiana	***Eriogonum fasciculatum – Salvia apiana***	2		2
	Eriogonum fasciculatum – Salvia apiana	*Eriogonum fasciculatum – Salvia mellifera – Malosma laurina*	1	1	
	Eriogonum fasciculatum – Salvia apiana	***Eriogonum fasciculatum* var. *foliolosum* – *Hesperoyucca whipplei***	1		1
	Eriogonum fasciculatum – Salvia apiana	***Salvia apiana***	2		2
	Eriogonum fasciculatum – Salvia apiana	***Salvia apiana – Artemisia californica – Ericameria* spp.**	1		1
	Hazardia squarrosa – Ericameria palmeri	*Ericameria palmeri*	1	1	
	Isocoma menziesii	***Isocoma menziesii***	1		1
	Lepidospartum squamatum	*Lepidospartum squamatum – Baccharis salicifolia*	1	1	
	Lepidospartum squamatum	*Lepidospartum squamatum – Eriogonum fasciculatum*	1	1	
	Lepidospartum squamatum	***Lepidospartum squamatum* / ephemeral annuals**	1		1
	Lotus scoparius – Lupinus albifrons – Eriodictyon spp.	***Dendromecon rigida***	2		2
	Lotus scoparius – Lupinus albifrons – Eriodictyon spp.	***Eriodictyon crassifolium***	5	3	2
	Lotus scoparius – Lupinus albifrons – Eriodictyon spp.	*Lotus scoparius*	4	4	
	***Malacothamnus fasciculatus – Malacothamnus* spp.**	***Malacothamnus fasciculatus***	16	9	7
	Malacothamnus fasciculatus – Malacothamnus spp.	*Malacothamnus fasciculatus – Salvia leucophylla*	3	3	
	Malosma laurina	*Malosma laurina*	2	2	
	Malosma laurina	***Malosma laurina – Artemisia californica – Eriogonum fasciculatum***	2	1	1
	Malosma laurina	*Malosma laurina – Artemisia californica – Salvia leucophylla*	2	2	
	Malosma laurina	*Malosma laurina – Rhus ovata*	1	1	
	Malosma laurina	***Malosma laurina – Salvia mellifera***	4	3	1
	Malosma laurina	*Malosma laurina* Alliance	2	2	
	Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera	*Cylindropuntia prolifera* – Mixed Coastal Scrub	1	1	
	Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera	***Opuntia littoralis***	14	12	2
	Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera	*Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera* Alliance	1	1	
	Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera	*Opuntia oricola*	2	2	

Life form	Alliance	Association	Total	Buffer	SASU
Shrub	***Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus***	***Heteromeles arbutifolia***	2	1	1
	Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus	*Heteromeles arbutifolia – Artemisia californica*	3	3	
	Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus	***Heteromeles arbutifolia – Fraxinus dipetala***	2		2
	Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus	***Prunus ilicifolia* ssp. *ilicifolia***	1		1
	Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus	*Prunus ilicifolia* ssp. *ilicifolia – Heteromeles arbutifolia*	5	5	
	Rhus integrifolia	*Rhus integrifolia*	6	6	
	Rhus integrifolia	***Rhus integrifolia – Artemisia californica – Eriogonum cinereum***	9	8	1
	Rhus integrifolia	*Rhus integrifolia – Artemisia californica – Salvia mellifera*	2	2	
	Rhus integrifolia	*Rhus integrifolia – Heteromeles arbutifolia*	6	6	
	Rhus integrifolia	*Rhus integrifolia – Malosma laurina*	4	4	
	Rhus ovata	***Rhus ovata***	1		1
	Rhus ovata	***Rhus ovata – Salvia leucophylla – Artemisia californica***	2	1	1
	Salvia mellifera – Artemisia californica	***Salvia mellifera***	23	22	1
	Salvia mellifera – Artemisia californica	***Salvia mellifera – Artemisia californica – Malosma laurina***	12	9	3
	Salvia mellifera – Artemisia californica	*Salvia mellifera – Artemisia californica* Alliance	1	1	
	Salvia mellifera – Artemisia californica	*Salvia mellifera – Eriogonum cinereum*	5	5	
	Salvia mellifera – Artemisia californica	*Salvia mellifera – Eriogonum fasciculatum*	1	1	
	Salvia mellifera – Artemisia californica	***Salvia mellifera – Lotus scoparius***	2	1	1
	Salvia mellifera – Artemisia californica	***Salvia mellifera – Malacothamnus fasciculatus***	2	1	1
	Salvia mellifera – Artemisia californica	*Salvia mellifera – Rhus ovata*	8	8	
	Sambucus nigra	***Sambucus nigra***	3	2	1
	Toxicodendron diversilobum	*Toxicodendron diversilobum – Artemisia californica / Leymus condensatus*	10	10	
	Toxicodendron diversilobum	*Toxicodendron diversilobum* Alliance	3	3	
Herb	*Avena* spp. *– Bromus* spp.	*Avena barbata – Avena fatua*	1	1	
	Avena spp. *– Bromus* spp.	*Bromus diandrus – Avena* spp.	1	1	
	Brassica nigra – Centaurea (*solstitialis, melitensis*)	*Brassica nigra*	3	3	
	Brassica nigra – Centaurea (*solstitialis, melitensis*)	*Brassica nigra – Centaurea* (*solstitialis, melitensis*) Alliance	1	1	
	Brassica nigra – Centaurea (*solstitialis, melitensis*)	*Centaurea melitensis*	5	5	
	Conium maculatum – Foeniculum vulgare	*Foeniculum vulgare*	2	2	
	Corethrogyne filaginifolia – Eriogonum (*elongatum, nudum*)	*Calystegia macrostegia – Eucrypta chrysanthemifolia*	58	58	

Life form	Alliance	Association	Total	Buffer	SASU
Herb	***Corethrogyne filaginifolia – Eriogonum* (*elongatum, nudum*)**	***Corethrogyne filaginifolia***	1		1
	Distichlis spicata	*Distichlis spicata* – annual grasses	1	1	
	Leymus condensatus	***Leymus condensatus***	2	1	1
	Pennisetum setaceum – Pennisetum ciliare	*Pennisetum setaceum*	1	1	
	Selaginella bigelovii	***Selaginella bigelovii / Eriogonum fasciculatum***	3	2	1

Appendix H

DRAFT

Field key to the vegetation associations of the Santa Susana Mountains

By

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In partnership with the

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Redlands, CA

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Vegetation with an overstory of trees, which are typically at least 5 m tall. Absolute tree canopy cover is generally at least 10% or greater, but occasionally may be less than 10% over a denser understory of shrub and/or herbaceous species. If the latter, trees are evenly distributed across the stand and are ecologically significant members of the stand (stand is thus “characterized” by trees, even if not “dominated” by them).

Key B. Shrub-Overstory Vegetation 10

Vegetation characterized by woody shrubs in the canopy, typically less then 5 m tall and usually multi-trunked/branched. Shrubs are usually at least 8% cover, but may be less, especially in more sparsely vegetated areas (Key C includes these cases). Tree species, if present, generally total < 8% absolute cover. Herbaceous species may total higher cover than shrubs. However, if total shrub cover is greater than total herb cover, it will be a shrub type unless total vegetation is < 9% absolute cover.

Key C. Herbaceous or Sparse Vegetation 27

Vegetation characterized by non-woody, herbaceous species in the canopy including grass, graminoid, and broad-leaved herbaceous species. Shrubs, if present, usually comprise < 9% absolute cover. Trees, if present, generally compose < 8% absolute cover. Also included within this key are sparsely vegetated situations, where total vegetation cover is < 9% total cover of plants and may be as low as 1% cover. Sparsely vegetated stands may be dominated by shrubs rather than herbs.

Key D. Unvegetated, Developed Areas, or Planted Stands..... 35

Sites characterized by planted stands of vegetation, built-up sites, and/or other anthropogenic features. Unvegetated is defined as having zero cover or up to less than 1% absolute cover of vascular plant vegetation.

Glossary of Terms Used in the Key 37

Introduction

This field key has been written to assist users in identifying the vegetation alliances and associations of the Santa Susana Mountains. The key is dichotomous and based on the classification of data collected by California Native Plant Society in 2018 and Rancho Santa Ana Botanic Garden staff in 2015, as well as additional supporting data, collected between 2003 and 2009, in the Santa Monica Mountains by National Park Service staff. Some vegetation types not identified from data collected in the Santa Susana Mtns. are included in this key because of their potential to occur in the area. Types not documented from within the project area are designated with an asterisk (*).

While this key attempts to reflect the complexity of species interactions in the landscape, unusual or site-specific assemblages of plants may exist and may not be easily keyed. The key may not denote all vegetation types that occur in the study area, nor explain the full range of variation of vegetation types as they appear on the ground since it was based on the data available and the field surveys done at the time of the classification and mapping.

Alliances and associations are the primary units of vegetation identified in the key. The term "provisional" is used to indicate new types that are under-represented (i.e., <10 surveys) and would need additional sampling to describe fully. Some vegetation types are indicated at higher levels in the National Vegetation Classification hierarchy, including Group and Division. Mapping units are also included; these are landscape units to be mapped that are based more on substrate and landform characteristics than on classifiable vegetation.

While the key uses scientific plant and community names based on USDA Plants database nomenclature (USDA-NRCS 2019), alternate plant names based on the Jepson Manual (Baldwin et al. 2012, Jepson Flora Project 2019), are provided when discrepancies exist.

Thanks to the reviewer of the key, Raphaela Floreani Buzbee.

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Key A. Tree-Overstory Vegetation

1a. The overstory is dominated by conifers alone or in co-dominance with broadleaf evergreen trees or shrubs. **(2)**

1b. Woodlands and forests characterized mainly by broad-leaved evergreen and deciduous tree species such as oaks (*Quercus* spp.), willows (*Salix* spp.), cottonwoods (*Populus* spp.). **(5)**

2a. A stand of pine or other conifer has been planted for landscaping purposes and is not naturally occurring.

Planted trees and shrubs Mapping Unit [93000]

2b. Conifers are naturally occurring or are a restoration planting. **(3)**

3a. Bigcone Douglas-fir *(Pseudotsuga macrocarpa*) occurs as a dominant or co-dominant conifer in the overstory as a canopy tree, usually with at least 20% relative cover, and there may be an abundant (co-dominant or dominant) sub-canopy of oaks *(Quercus).* **(4)**

Californian montane conifer forest & woodland Group (G344)
***Pseudotsuga macrocarpa* Alliance**

3b. Stand not as above. **(5)**

4a. Coast live oak occurs as a dominant or co-dominant sub-canopy tree to bigcone Douglas-fir and *Quercus chrysolepis* may be present at similar or less cover. Understory is variable in composition and often contains shrubs *(*e.g.*, Heteromeles arbutifolia, Toxicodendron diversilobum).*

***Pseudotsuga macrocarpa – Quercus agrifolia* Association**

4b. Canyon live oak occurs as a dominant sub-canopy tree and sometimes as an understory shrub and is co-dominant or sub-dominant to bigcone Douglas-fir. Not sampled within the project area but may occur there.

Pseudotsuga macrocarpa – Quercus chrysolepis* Association

5a. Woodlands characterized by riparian habitat. Trees are mostly deciduous, though *Quercus agrifolia* may also be dominant. **(6)**

5b. Oaks, walnut (*Juglans californica*), or other broadleaf trees dominate in an upland setting **(14)**

6a. *Salix laevigata* is the sole dominant in the tree canopy. *Salix lasiolepis* may be present in the shrub layer. While not sampled within the project area, this alliance has been sampled nearby. **(7)**

Western Interior Riparian Forest & Woodland Group (G797)
Salix laevigata* Alliance

6b. Stand not as above. **(8)**

7a. *Salix lasiolepis* and/or *Baccharis salicifolia* dominate or co-dominate in the shrub layer sharing the stand with *Salix laevigata*.

Salix laevigata / Salix lasiolepis* Association

7b. *Salix laevigata* strongly dominates the canopy. Other trees and shrubs, including *Salix lasiolepis* or *Baccharis salicifolia,* may be present but at much less cover than red willow.

Salix laevigata* Association

8a. *Populus fremontii, Platanus racemosa,* and/or *Quercus agrifolia* dominate or co-dominate the tree canopy. *Salix lasiolepis* or other riparian shrubs may occur at greater cover in the shrub layer. **(9)**

Western Interior Riparian Forest & Woodland Group (G797)

8b. Stand not as above, OR California walnut and coast live oak share the canopy. **(14)**

9a. *Platanus racemosa,* and/or *Quercus agrifolia* dominate or co-dominate the tree canopy. **(10)**

***Platanus racemosa – Quercus agrifolia* Alliance**

9b. A *Populus* species dominates or co-dominates the tree canopy, including with *Salix* spp. **(12)**

10a. *Quercus agrifolia* is dominant in the tree canopy, without much *Platanus. Salix lasiolepis* and/or other riparian shrubs are in the understory.

***Quercus agrifolia / Salix lasiolepis* Association**

10b. *Platanus racemosa* has a significant presence in the stand. **(11)**

11a. *Platanus racemosa* is dominant in the tree canopy, without any *Quercus agrifolia*. The shrubby understory consists of riparian shrubs, with *Toxicodendron* usually high in cover.

Platanus racemosa / Toxicodendron diversilobum* Association

11b. *Platanus racemosa* and *Quercus agrifolia* co-dominate, OR one of these species dominates the tree canopy, and the other is subdominant. There is a significant riparian shrub understory that is often dominated by *Salix lasiolepis*. Other trees such as California walnut and red willow may be present as well.

***Platanus racemosa – Quercus agrifolia* Association**

12a. *Populus trichocarpa (= P. balsamifera* ssp. *tricocarpha*) is dominant or co-dominant with willows.

Populus trichocarpa* Alliance

12b. *Populus fremontii* is dominant or co-dominant with willow. **(13)**

Populus fremontii – Fraxinus velutina – Salix gooddingii* Alliance

13a. *Salix lasiolepis* is the dominant or co-dominant with other shrubs such as *Baccharis salicifolia* in the subcanopy to understory.

Populus fremontii – Salix laevigata **Association***

13b. *Salix laevigata* is subdominant to co-dominant with *Populus fremontii* and the subcanopy may be variable with other species including *S. lasiolepis.*

Populus fremontii – Salix laevigata **Association***

14a. *Juglans californica* and *Quercus agrifolia* are both present in the tree canopy at 1% or more absolute cover. One or the other tree may be dominant, and no other tree species is dominant. Shrub understory may be open to intermittent. If *Quercus* is low in cover and not co-dominant, review other associations in the alliance below for a better fit.

Californian Broadleaf Forest & Woodland Group (G195)

Juglans californica **Alliance**

Juglans californica – Quercus agrifolia **Association**

14b. Stand not as above. **(15)**

15a. *Quercus agrifolia* is dominant to co-dominant in the tree canopy in upland stands. **(16)**

Californian Broadleaf Forest & Woodland Group (G195)

Quercus agrifolia **Alliance**

15b. Stand not as above. *Juglans californica* or other tree dominant. (If *Platanus, Juglans, or Salix* is present with *Quercus agrifolia*, review key steps 8 to 14.) **(20)**

16a. *Umbellularia californica* co-dominates with coast live oak.

Quercus agrifolia – Umbellularia californica **Association***

16b. Coast live oak is usually the sole dominant tree species in the overstory in upland settings over a variety of understory layers from grassy to scrubby. **(17)**

17a. While the overstory is dominated solely by coast live oak, the shrub understory is sparse to low in cover.

Quercus agrifolia **Association**

17b. The shrub understory has significant cover. **(18)**

18a. Coastal scrub species like California sagebrush and purple sage characterize the shrub layer.

Quercus agrifolia / Salvia leucophylla – Artemisia californica **Association***

18b. Other shrubs characterize the understory. **(19)**

19a. A ceanothus species occurs as a tall understory shrub associated with an open to intermittent canopy of coast live oak.

Quercus agrifolia / Ceanothus (oliganthus, spinosus) **Association***

19b. While the overstory is dominated solely by coast live oak, the understory is dominated or characterized by toyon (*Hetermeles arbutifolia*). Laurel sumac, poison oak, and other shrubs may be present at similar cover.

Quercus agrifolia* / *Heteromeles arbutifolia* Association

20a. *Juglans californica* is dominant in the tree canopy or co-dominates with *Fraxinus dipetala, Schinus molle,* or other tree. If sycamore or coast live oak are present, they are not co-dominant with walnut. **(21)**

Californian Broadleaf Forest & Woodland Group (G195)
***Juglans californica* Alliance**

20b. Stand not as above. **(24)**

21a. A shrub understory is sparse or lacking and annual grasses and herbs dominate the understory.

***Juglans californica* / annual herbaceous Association**

21b. Shrubs form an understory below the canopy of California walnut. **(22)**

22a. California sagebrush is codominant to dominant often with purple sage in the shrub understory. Giant wild rye is usually present in significant cover in the herb layer. California walnut is dominant in the overstory.

***Juglans californica / Artemisia californica / Leymus condensatus* Association**

22b. Different shrubs dominate the understory. **(23)**

23a. *Malosma laurina* is a significant part of the shrub understory with other shrubs (some often early seral such as *Malacothamnus fasciculatus*) often present at low cover.

***Juglans californica / Malosma laurina* Association**

23b. *Heteromeles arbutifolia* is present at greater than 5% absolute cover and dominates the understory. Sugar bush and several other typically chaparral shrubs are usually present along with toyon in the shrub layer. Though not sampled within the project area, this type was found nearby.

Juglans californica / Heteromeles arbutifolia* Association

24a. *Quercus lobata* dominates or co-dominates with *Quercus agrifolia* in the tree canopy. Shrubs have at most half the cover of the tree canopy.

Californian Broadleaf Forest & Woodland (G195)
***Quercus lobata* Alliance**
***Quercus lobata – Quercus agrifolia* / grass Association**

24b. Oaks do not dominate the canopy. **(25)**

25a. *Umbellularia californica* dominates the tree canopy. The understory is dominated by *Ceanothus oliganthus.* This type was not sampled in the study area, but found nearby.

Umbellularia californica* Alliance
Umbellularia californica / Ceanothus oliganthus* Association

25b. Non-native trees dominate the overstory. **(26)**

Californian Ruderal Forest Group (G678)

26a. *Schinus molle* has naturalized, expanding beyond an original planting, and dominates the stand.

Schinus molle – Schinus terebinthifolius – Myoporum laetum* Semi-natural Alliance
Schinus molle* Semi-natural Association

26b. Other trees are the dominant tree in the canopy. **(27)**

27a. *Eucalyptus* spp. are naturalized, expanding beyond an original planting, and dominate the stand.

Eucalyptus* spp. – *Ailanthus altissima – Robinia pseudoacacia* Semi-natural Alliance
Eucalyptus (globulus, camaldulensis)* Semi-natural Association

27b. *Eucalyptus* spp. or other planted trees are the dominant tree in the canopy, and have not expanded beyond the original planting.

Planted trees and shrubs Mapping Unit

Key B. Shrub-Overstory Vegetation

1a. Shrublands dominated or co-dominated by sclerophyllous temperate broad-leaved shrubs (with leaves hardened by a waxy cuticle). Stands dominated by typical chaparral shrub genera; including chamise (*Adenostoma fasciculatum*), manzanita (*Arctostaphylos* spp.), *Ceanothus* spp*.,* mountain-mahogany *(Cercocarpus montanus [=C. betuloides]),* toyon *(Heteromeles arbutifolia), Malosma laurina, Rhus* spp*.,* holly-leaf cherry (*Prunus ilicifolia)* and *Quercus berberidifolia* **(2)**

1b. Shrublands dominated mainly by soft-leaved or succulent shrubs that are microphyllous or broad-leaved, and they include cactus, drought-deciduous, summer-deciduous and/or cold-deciduous species. Microphyllous evergreen shrubs such as coyotebrush (*Baccharis pilularis*), *Isocoma menziesii,* and sawtooth goldenbush (*Hazardia squarrosa*) are generally considered to be part of coastal sage scrub or seral scrub, and are also included. Chaparral species may be present but not dominant. Includes shrub willow *(Salix* spp*.),* mule-fat (*Baccharis salicifolia),* quailbush (*Atriplex lentiformis*), arrowweed (*Pluchea sericea*), buckwheat *(Eriogonum* spp*.),* yerba santa (*Eriodictyon* spp.)*,* California sagebrush (*Artemisia californica*), sage (*Salvia* spp.), poison oak (*Toxicodendron diversilobum),* bush lupine (*Lupinus* spp*.), Lycium californicum,* and bush monkeyflower (*Diplacus aurantiacus).* **(39)**

2a. *Prunus ilicifolia* is dominant or co-dominates with other shrubs. **(3)**

Californian Mesic & Pre-montane Chaparral Group (G261)
***Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus* Alliance**

2b. Other shrubs are dominant, and *Prunus ilicifolia* is not co-dominant. **(4)**

3a. *Prunus ilicifolia* is strongly dominant.

***Prunus ilicifolia* ssp*. ilicifolia* Association**

3b. *Prunus ilicifolia* shares the canopy with other shrubs. Toyon occurs as a sub-dominant to co-dominant. Other shrubs may also be co-dominant.

Prunus ilicifolia* ssp*. ilicifolia – Heteromeles arbutifolia* Association

4a. *Heteromeles arbutifolia* and/or *Fraxinus dipetala* is dominant or co-dominant with *Artemisia californica,* or *Malosma laurina.* **(5)**

Californian Mesic & Pre-montane Chaparral Group (G261)
***Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus* Alliance**

4b. Stand not as above. If toyon is co-dominant with *Rhus integrifolia* (and *Artemisia californica* is NOT co-dominant) go to key step 18. **(7)**

5a. *Fraxinus dipetala* is dominant or co-dominant in the stand, and *Heteromeles arbutifolia* is also present to co-dominant.

***Heteromeles arbutifolia – Fraxinus dipetala* Association (Provisional)**

5b. *Fraxinus dipetala* does not characterize the stand, though it may be present at low cover. **(6)**

6a. *Heteromeles arbutifolia* occurs with *Artemisia californica,* which may be sub-dominant to co-dominant.

Heteromeles arbutifolia – Artemisia californica* Association

6b. *Heteromeles arbutifolia* strongly dominates the stand, with the highest absolute cover of any shrub, and *Artemisia californica* is a minor component, less than 10% relative cover.

***Heteromeles arbutifolia* Association**

7a. *Cercocarpus betuloides* or *Quercus berberidifolia* is dominant or co-dominant with chamise. **(8)**

Californian Mesic & Pre-montane Chaparral Group (G261)

7b. Other shrubs are dominant or co-dominant. **(9)**

8a. *Cercocarpus montanus [=C. betuloides]* is dominant or co-dominant with chamise.

***Cercocarpus montanus var. glaber* Alliance**
***Cercocarpus montanus var. glaber* Association** OR
Cercocarpus montanus – Adenostoma fasciculatum* Association

8b *Quercus berberidifolia* is dominant or co-dominant with chamise.

Quercus berberidifolia* Alliance
Quercus berberidifolia* Association OR
Quercus berberidifolia – Adenostoma fasciculatum* Association

9a. *Arctostaphylos glandulosa* is dominant to co-dominant with *Adenostoma fasciculatum*, with manzanita at least 30% relative cover or the highest cover species in the shrub layer.

Californian Mesic & Pre-montane Chaparral Group (G261)
Arctostaphylos glandulosa* Alliance
Arctostaphylos glandulosa – Adenostoma fasciculatum* Association

9b. Another shrub dominates or co-dominates the stand. *Arctostaphylos*, if present, is less than 30% relative cover **(10)**.

10a. The stand is dominated or co-dominated by a species of *Ceanothus* **(11)**

10b. Another shrub dominates or co-dominates the stand. **(18)**

11a. *Ceanothus oliganthus* or *Ceanothus leucodermis* occurs as a dominant or co-dominates with chamise, typically in higher elevations or moister, cooler conditions. **(12)**

Californian Mesic & Pre-montane Chaparral Group (G261)
***Ceanothus oliganthus – Ceanothus leucodermis – Ceanothus tomentosus* Alliance**

11b. *Ceanothus megacarpus* or *C. crassifolius* dominates or co-dominates the stand, typically in more xeric conditions. **(13)**

Californian Xeric Chaparral Group (G257)

12a. Hairy leaf ceanothus is the dominant shrub. No other species provides high cover in the shrub layer.

***Ceanothus oliganthus* Association**

12b. Hairy leaf ceanothus co-dominates with chamise and other chaparral shrubs may have significant cover.

Ceanothus oliganthus – Adenostoma fasciculatum* Association

13a. *Ceanothus megacarpus* occurs as a dominant or co-dominates with *Salvia mellifera,* while neither *Artemisia californica* nor *Eriogonum cinereum* have higher cover than *Ceanothus*. **(14)**

***Ceanothus megacarpus* Alliance**

13b. Another species of *Ceanothus* dominates or co-dominates in stands. **(15)**

14a. *Ceanothus megacarpus* co-dominates with *Salvia mellifera.*

Ceanothus megacarpus – Salvia mellifera* Association

14b. *Ceanothus megacarpus* is strongly dominant.

***Ceanothus megacarpus* Association**

15a. *Ceanothus crassifolius* occurs as a dominant or co-dominates with other chaparral shrubs. **(16)**

***Ceanothus crassifolius* Alliance**

15b. Stands not as above. **(18)**

16a. Hoary leaf ceanothus occurs as the sole dominant species, and other chaparral shrubs, if present, are relatively low in cover.

Ceanothus crassifolius* Association

16b. Hoary leaf ceanothus co-dominates with one or more other shrubs **(17)**

17a. Hoary leaf ceanothus co-dominates with chamise.

***Ceanothus crassifolius – Adenostoma fasciculatum* Association**

17b. Hoary leaf ceanothus co-dominates with mountain mahogany

Ceanothus crassifolius – Cercocarpus montanus* Association

18a. *Rhus integrifolia* is dominant or co-dominant with *Artemisia californica, Eriogonum cinereum, Heteromeles arbutifolia, Malosma laurina,* or *Salvia mellifera*. **(19)**

Californian Maritime Chaparral Group (G258)

Rhus integrifolia* Alliance

18b. *Rhus integrifolia* is not dominant. It may be co-dominant with *Encelia californica, Opuntia* spp., *Salvia leucophylla,* or some other shrub. **(23)**

19a. *Rhus integrifolia* is strongly dominant with a significantly lower cover of other shrubs.

Rhus integrifolia* Association

19b. Stand not as above. **(20)**

20a. *Rhus integrifolia* is co-dominant with *Malosma laurina*.

Rhus integrifolia – Malosma laurina* Association

20b. Stand not as above. **(21)**

21a. *Rhus integrifolia* is co-dominant with either *Salvia mellifera* and/or *Artemisia californica*.

Rhus integrifolia – Artemisia californica – Salvia mellifera* Association

21b. Stand not as above. **(22)**

22a. *Rhus integrifolia* is dominant or co-dominant with coastal sage scrub species. Either *Eriogonum cinereum, Encelia californica,* or *Salvia leucophylla* are diagnostically present. *Artemisia californica* is also usually present.

***Rhus integrifolia – Artemisia californica – Eriogonum cinereum* Association**

22b. *Rhus integrifolia* is dominant or co-dominant with chaparral shrubs and toyon is co-dominant or sub-dominant. One or more of the following species are also commonly present, *Cercocarpus, Malosma, Toxicodendron,* and *Artemisia californica*.

Rhus integrifolia – Heteromeles arbutifolia* Association

23a. *Malosma laurina* is dominant or co-dominant in the shrub layer. Coastal scrub species such as *Rhus ovata* and *Salvia mellifera* may be co-dominants. **(24)**

Californian Maritime Chaparral Group (G258)
***Malosma laurina* Alliance**

23b. Another species has more cover than *Malosma laurina,* OR the co-dominant is *Encelia californica* or another chaparral shrub such as chamise. **(29)**

24a. *Malosma laurina* is co-dominant with *Rhus ovata. Salvia mellifera* may also be co-dominant or sub-dominant.

Malosma laurina – Rhus ovata* Association

24b. *Rhus ovata* is not co-dominant. **(25)**

25a. *Malosma laurina* and *Salvia leucophylla* are co-dominant. *Artemisia californica* is present as a subdominant along with other coastal scrub species.

Malosma laurina – Artemisia californica – Salvia leucophylla* Association

25b. *Salvia leucophylla* is not co-dominant. **(26)**

26a. *Malosma laurina* is dominant to co-dominant with *Artemisia californica* and/or *Eriogonum fasciculatum.* Buckwheat and/or sagebrush may also be sub-dominant.

***Malosma laurina – Artemisia californica – Eriogonum fasciculatum* Association**

26b. Stand not as above. **(27)**

27a. *Malosma laurina* is strongly dominant, greater than 60% relative cover of the shrub layer.

Malosma laurina* Association

27b. Stand not as above. **(28)**

28a. *Salvia mellifera* is co-dominant to sub-dominant with *Malosma laurina*. If *Salvia mellifera* is co-dominant, *Artemisia californica* is not present. *Malosma laurina* is less than 60% relative cover of the shrub layer. Other coastal scrub species, including *Malacothamnus fasciculatus*, may have greater cover than *Salvia mellifera.*

***Malosma laurina – Salvia mellifera* Association**

28. *Salvia mellifera* is co-dominant and *Artemisia californica* is present. **(54)**

29a. *Rhus ovata* is dominant or co-dominant with *Artemisia californica* or *Salvia leucophylla*. **(30)**

Western Madrean Chaparral Group (G281)
***Rhus ovata* Alliance**

29b. *Rhus ovata* is not dominant, or is co-dominant with *Adenostoma fasciculatum.* **(31)**

30a. *Rhus ovata* is co-dominant with *Artemisia californica* and/or *Salvia leucophylla*.

***Rhus ovata – Salvia leucophylla – Artemisia californica* Association**

30b. *Rhus ovata* is dominant.

***Rhus ovata* Association**

31a. *Adenostoma fasciculatum* is dominant or co-dominant in stands that include various shrubs such as laurel sumac or sage. **(32)**

Californian Xeric Chaparral Group (G257)

31b. Chamise is NOT co-dominant, or is co-dominant with *Fraxinus dipetala*. **(39)**

32a. *Adenostoma fasciculatum* is co-dominant with *Salvia mellifera,* OR *Salvia mellifera* is the shrub next highest in cover and is not followed by *Artemisia californica, Eriogonum fasciculatum,* or *Malosma laurina*.

***Adenostoma fasciculatum – Salvia* spp. Alliance**
***Adenostoma fasciculatum – Salvia mellifera* Association**

32b. *Salvia mellifera* is not co-dominant or other coastal scrub species are of similar importance. **(33)**

***Adenostoma fasciculatum* Alliance**

33a. *Adenostoma fasciculatum* is dominant or co-dominant with disturbance indicators including *Eriodictyon crassifolium, Lotus scoparius [=Acmispon glaber], Malacothamnus fasciculatus, Dendromecon rigida,* or *Helianthemum scoparium.* Stands may be post-burn, with low overall cover and fire-following herbs.

Adenostoma fasciculatum – (Lotus scoparius – Eriodictyon spp.)* Association

33b. Stand not as above. **(34)**

34a. *Adenostoma fasciculatum* is co-dominant with more than one species. The co-dominant species do not include the disturbance indicators listed in the previous key step. At least one of the co-dominants is *Artemisia californica, Eriogonum fasciculatum, Malosma laurina,* or *Salvia mellifera.*

***Adenostoma fasciculatum – (Eriogonum fasciculatum – Salvia mellifera)**
Association***

34b. Stand not as above. **(35)**

35a. *Adenostoma fasciculatum* is co-dominant with *Diplacus aurantiacus*. *Rhus ovata* may also co-dominate.

Adenostoma fasciculatum – Diplacus aurantiacus* Association

35b. Stand not as above. **(36)**

36a. *Adenostoma fasciculatum* is co-dominant with *Malosma laurina*. Neither *Eriogonum fasciculatum* or *Salvia mellifera* are next highest in cover.

Adenostoma fasciculatum – Malosma laurina* Association

36b. Stand not as above. **(37)**

37a. *Eriogonum fasciculatum* is co-dominant to sub-dominant with chamise. If *Eriogonum* is sub-dominant, chaparral shrub species have similar or more cover than buckwheat AND more cover than *Salvia mellifera* and/or *Malosma laurina,* if present.

***Adenostoma fasciculatum – Eriogonum fasciculatum* Association**

37b. Stand not as above. **(38)**

38a. *Adenostoma fasciculatum* is dominant to co-dominant with at least two of the following species being sub-dominants (to co-dominant), *Artemisia californica, Eriogonum fasciculatum, Malosma laurina, Salvia leucophylla,* or *Salvia mellifera.*

Adenostoma fasciculatum – (Eriogonum fasciculatum – Salvia mellifera) **Association***

38b. *Adenostoma fasciculatum* is strongly dominant.

Adenostoma fasciculatum **Association**

39a. *Fraxinus dipetala* has the highest cover in the overstory or is co-dominant with *Heteromeles arbutifolia*.

Californian Mesic & Pre-montane Chaparral Group (G261)

Prunus ilicifolia – Heteromeles arbutifolia – Ceanothus spinosus **Alliance**

Heteromeles arbutifolia – Fraxinus dipetala **Association (Provisional)**

39b. *Fraxinus dipetala* is less than 30% relative cover in the shrub canopy. Other shrubs are present and dominant, including coastal scrub, bluff scrub, and seral scrub species. (If a tree species such as *Juglans californica* has 10% absolute cover or more, see key B.) **(40)**

40a. Shrublands characterized by the presence of *Lepidospartum squamatum* where *L. squamatum* is dominant, co-dominant, or characteristically present with other shrubs. Stands are generally found in rocky, flooded washes or alluvial plains, and shrubs vary from 1 to over 30% absolute cover. **(41)**

Warm Semi-Desert Shrub & Herb Dry Wash & Colluvial Slope Group (G541)

Lepidospartum squamatum **Alliance**

40b. Stands not as above. If *Lepidospartum squamatum* is present, it is less than 1% absolute cover and less than 10% relative cover in the shrub layer. **(43)**

41a. *Lepidospartum squamatum* is present, at 1% absolute cover or more, with *Baccharis salicifolia.*

Lepidospartum squamatum – Baccharis salicifolia **Association***

41b. Stand not as above. **(42)**

42a. *Lepidospartum squamatum* is present, at 1% absolute cover or more, with *Eriogonum fasciculatum.*

Lepidospartum squamatum – Eriogonum fasciculatum **Association**

42b. *Lepidospartum squamatum*, at 1% absolute cover or more, is the dominant shrub over an understory of annual herbaceous species. The herb layer may be much higher in cover than the shrub layer.

Lepidospartum squamatum / **ephemeral annuals Association**

43a. Riparian or moist shrubs are dominant or co-dominant including *Baccharis salicifolia, Salix, Pluchea sericea, Tamarix* spp., etc. **(44)**

43b. Upland scrubs or shrubs are dominant or co-dominant including *Artemisia californica, Eriogonum, Salvia, Opuntia,* etc. **(53)**

44a. *Baccharis salicifolia* is dominant in the shrub canopy, or co-dominant with other shrubs except *Salix* spp. An emergent and sparse tree layer of *Salix* spp. or other species may also be present.

North American Warm Desert Riparian Low Bosque & Shrubland Group (G533)
***Baccharis salicifolia* Alliance**
***Baccharis salicifolia* Association**

44b. *Baccharis salicifolia* cover is insignificant or it co-dominates with *Salix* spp. **(45)**

45a. *Salix lasiolepis* or *Salix exigua* is dominant or co-dominant. It may be accompanied by mulefat (*Baccharis salicifolia*) or other riparian and/or coastal shrubs. **(46)**

45b. If *Salix lasiolepis* or *S. exigua* is present, it is not an important part of the canopy. Other shrubs dominant or co-dominant. **(49)**

46a. *Salix lasiolepis* is dominant or co-dominant. **(47)**

***Salix lasiolepis* Alliance**

46b. *Salix exigua* is dominant or co-dominant. **(48)**

Salix exigua* Alliance

47a. *Baccharis salicifolia* is a characteristic sub-dominant or co-dominant with *Salix lasiolepis*.

Salix lasiolepis – Baccharis salicifolia* Association

47b. *Salix lasiolepis* is the sole dominant in the stand.

***Salix lasiolepis* Association**

48a. *Arundo donax* is a characteristic sub-dominant or co-dominant with *Salix exigua.*

Salix exigua – Arundo donax* Association

48b. *Salix exigua* is the sole dominant in the stand.

Salix exigua* Association

49a. *Sambucus nigra* is dominant in the shrub canopy.

***Sambucus nigra* Alliance**
***Sambucus nigra* Association**

49b. *Sambucus nigra* is NOT dominant. **(50)**

50a. Other riparian native shrubs dominant, namely *Pluchea sericea* or *Atriplex lentiformis*. **(51)**

North American Desert Alkaline-Saline Wet Scrub Group (G537)

50b. Other non-native riparian shrubs dominant, including *Nicotiana* or *Tamarix* strongly dominant (>66%) **(52)**

Interior West Ruderal Riparian Forest & Scrub Group (G510)

51a. *Pluchea sericea* is dominant or sometimes co-dominant with others in the shrub canopy.

Pluchea sericea* Alliance
Pluchea sericea* Association

51b. *Atriplex lentiformis* is dominant in the shrub canopy.

Atriplex lentiformis* Alliance
Atriplex lentiformis* Association

52a. *Tamarix* spp. dominant in the shrub canopy.

Tamarix spp.* Semi-natural Alliance
Tamarix* spp. Association

52b. *Nicotiana glauca* dominant in the shrub canopy.

Interior West Ruderal Riparian Forest & Scrub Group (G510)
Nicotiana glauca Semi-natural Stands (no current alliance defined)*

53a. The overstory is characterized by cactus. Cactus is more than 30% relative cover in the shrub layer, or may be as low as 20% relative cover if the absolute cover is more than one-third that of the dominant coastal scrub species. **(54)**

Baja Semi-Desert Coastal Succulent Scrub Group (G298)
Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera* Alliance

53b. Cactus may occur but is less than 20% relative cover. **(56)**

54a. *Cylindropuntia prolifera* is the dominant shrub or has the highest cover.

***Cylindropuntia prolifera* – Mixed Coastal Scrub Association* (Provisional)**

54b. Another *Opuntia* is present as a co-dominant **(55)**

55a. *Opuntia littoralis* is present and co-dominant with either *Artemisia californica* or *Eriogonum fasciculatum,* and these 3 species have the highest cover in the shrub layer.

***Opuntia littoralis* Association**

55b. *Opuntia oricola* is the co-dominant cactus or has the highest cover.

Opuntia oricola* Association (Provisional)

56a. *Salvia mellifera* is dominant or co-dominates with something other than *Encelia californica*. *Artemisia californica* is often present. **(58)**

Central & Southern Californian Coastal Sage Scrub Group (G264)
***Salvia mellifera – Artemisia californica* Alliance**

56b. *Salvia mellifera* is NOT dominant, OR co-dominates with *Encelia* californica, OR co-dominates with both *Artemisia californica* and *Eriogonum fasciculatum*. **(64)**

58a. *Salvia mellifera* is co-dominant with *Eriogonum cinereum. Eriogonum cinereum* may also be sub-dominant, but will be the species with the next highest cover.

Salvia mellifera – Eriogonum cinereum* Association

58b. If *Eriogonum cinereum* is present, it has lower cover than *Salvia mellifera* AND other shrubs. **(59)**

59a. *Salvia mellifera* is co-dominant with *Eriogonum fasciculatum. Eriogonum fasciculatum* may also be sub-dominant, but will be the species with the next highest cover.

Salvia mellifera – Eriogonum fasciculatum* Association

59b. *Eriogonum fasciculatum* has less cover than *Salvia mellifera* and other shrubs. **(60)**

60a. *Salvia mellifera* is co-dominant with *Rhus ovata. Rhus ovata* may also be sub-dominant, but will be the species with the next highest cover OR shares the canopy with *Ceanothus* spp. or other chaparral shrubs.

Salvia mellifera – Rhus ovata* Association

60b. Stand not as above. **(61)**

61a. *Salvia mellifera* is co-dominant with *Malosma laurina* and/or *Artemisia californica,* or both *Malosma* and *Artemisia* are sub-dominant. In addition, only one of these species may be subdominant, if there are no other sub-dominants. *Eriogonum fasciculatum* is NOT co-dominant.

***Salvia mellifera – Artemisia californica – Malosma laurina* Association**

61b. Stand not as above. If *Eriogonum fasciculatum* is co-dominant in addition to *Salvia mellifera* and *Malosma laurina,* see also the *Eriogonum fasciculatum – Salvia apiana* Alliance*,* key step 69. **(62)**

62a. *Salvia mellifera* is co-dominant with *Malacothamnus fasciculatus,* or the combination of the covers of *Artemisia californica* and *Salvia mellifera* approach that of *Malacothamnus. Malacothamnus fasciculatus* may also be sub-dominant, but will be the species with the next highest cover to *Salvia mellifera*.

***Salvia mellifera – Malacothamnus fasciculatus* Association**

62b. *Malacothamnus fasciculatus* has less cover than *Salvia mellifera* and other shrubs. **(63)**

63a. *Salvia mellifera* is co-dominant with disturbance indicators *Lotus scoparius [=Acmispon glaber], Eriodictyon crassifolium, Dendromecon rigida,* and/or *Helianthemum scoparium,* alone or in combination.
***Salvia mellifera – Lotus scoparius* Association**

63b. *Salvia mellifera* is dominant.
***Salvia mellifera* Association**

64a. Shrubland characterized by the dominance or co-dominance of *Encelia californica* and/or *Eriogonum cinereum*. Co-dominant shrubs may include *Malosma laurina,* or *Salvia mellifera. Artemisia californica* may co-dominate with *Encelia californica.* **(65)**
***Encelia californica – Eriogonum cinereum* Alliance**

64b. *Encelia californica* is not an important component of the canopy, OR *Eriogonum cinereum* is co-dominant with *Artemisia californica* or *Salvia leucophylla*. Instead *Eriogonum fasciculatum, Artemisia californica*, or various other scrub is present and co-dominant. **(69)**

65a. *Eriogonum cinereum* is dominant without or less than 1% *Encelia californica* present. This type is found on steep slopes.
Eriogonum cinereum* Association

65b. Stand not as above. **(66)**

66a. *Encelia californica* and *Eriogonum cinereum* co-dominate, OR both are present at greater than 1% absolute cover. Neither is greater than 60% relative cover, such that other coastal scrub species may share the canopy.
Encelia californica – Eriogonum cinereum* Association

66b. Stand not as above. **(67)**

67a. *Encelia californica* is co-dominant with *Malosma laurina* and/or *Salvia mellifera.*
Encelia californica – Malosma laurina – Salvia mellifera* Association

67b. Stand not as above. **(68)**

68a. *Encelia californica* is dominant or co-dominant with *Artemisia californica,* which is co-dominant or sub-dominant.
Encelia californica – Artemisia californica* Association

68b. *Encelia californica* is dominant.
***Encelia californica* Association**

69a. *Eriogonum fasciculatum, Hesperoyucca whipplei,* or *Salvia apiana* occurs as a dominant or co-dominant with one another. In addition, *Eriogonum fasciculatum* may co-dominate with *Salvia mellifera* and/or *Malosma laurina*, OR *Salvia apiana* may co-dominate with *Artemisia californica*. **(70)**

***Eriogonum fasciculatum – Salvia apiana* Alliance**

69b. Stand not as above, OR *Eriogonum fasciculatum* is co-dominant with *Artemisia californica*. **(75)**

70a. *Salvia apiana* is strongly dominant. *Artemisia californica* may be present, but is a minor constituent and less important than other shrub species.

***Salvia apiana* Association (Provisional)**

70b. Stand not as above. **(71)**

71a. *Salvia apiana* and *Eriogonum fasciculatum* occur together, with or without *Artemisia californica,* as the most important shrub species in the stand.

***Eriogonum fasciculatum – Salvia apiana* Association**

71b. Stand not as above. **(72)**

72a. *Salvia apiana* is usually dominant or co-dominant with *Artemisia californica* and *Ericameria linearifolia* and/or *E. pinifolia,* though other shrub species such as *Lotus scoparius [=Acmispon glaber]* may have high cover. Stands found in broad alluvial fan washes with recent history of burns.

***Salvia apiana – Artemisia californica – Ericameria spp.* Association**

72b. Stand not as above. **(73)**

73a. *Hesperoyucca whipplei* occurs at >2% cover and is dominant or co-dominates with *Eriogonum fasciculatum* in the shrub canopy. Often found on southern exposures.

***Eriogonum fasciculatum var. foliolosum – Hesperoyucca whipplei* Association**

73b. Stand not as above. **(74)**

74a. *Eriogonum fasciculatum* occurs together with *Salvia mellifera* and *Malosma laurina.* Buckwheat may be dominant or co-dominant. *Salvia mellifera* and *Malosma laurina* may be co-dominant to merely present, but at least one of them is sub-dominant.

Eriogonum fasciculatum – Salvia mellifera – Malosma laurina* **Association**

74b. *Eriogonum fasciculatum* is strongly dominant.

Eriogonum fasciculatum **Association**

75a. *Artemisia californica* or *Salvia leucophylla* is dominant or co-dominant in the shrub canopy. **(76)**

Artemisia californica – Salvia leucophylla **Alliance**

75b. Stand not as above, and *Artemisia californica* is not co-dominant with *Baccharis pilularis*. Other scrub species are present and dominant including coastal bluff scrub, *Isocoma menziesii,* moist coastal scrub like *Baccharis pilularis,* or seral scrub *Lotus scoparius* [=*Acmispon glaber], Ericameria palmeri, Hazardia squarrosa, Malacothamnus* spp., etc. **(87)**

76a. *Salvia leucophylla* is strongly dominant.

Salvia leucophylla **Association**

76b. Stand not as above. **(77)**

77a. *Artemisia californica* or *Salvia leucophylla* is dominant, or co-dominant with one another, while *Leymus condensatus* is characteristic in the understory (usually at 5% or greater absolute cover, or greater than 20% of the herbaceous layer).

Artemisia californica – (Salvia leucophylla) / Leymus condensatus **Association**

77b. Stand not as above. **(78)**

78a. *Salvia leucophylla* and *Artemisia californica* are co-dominant, or one may be sub-dominant to the other that is less than 60% relative cover.

Artemisia californica – Salvia leucophylla **Association**

78b. Stand not as above. **(79)**

79a. California sagebrush and purple sage codominate, while ashy buckwheat is usually subdominant and *Nassella* sp. [=*Stipa* sp.] is characteristic of the herb layer.

Artemisia californica – Salvia leucophylla – Eriogonum cinereum / Nassella **spp. Association***

79b. Stand not as above. **(80)**

80a. California buckwheat and purple sage occur as subdominants to codominants with California sagebrush.

Artemisia californica – Eriogonum fasciculatum – Salvia leucophylla **Association***

81b. Stand not as above. **(82)**

82a. California buckwheat and black sage occur as subdominants to codominants with California sagebrush.

Artemisia californica – Eriogonum fasciculatum – Salvia mellifera **Association**

82b. Stand not as above. **(83)**

83a. California buckwheat and *Opuntia littoralis* occur as subdominants to codominants with California sagebrush.

Artemisia californica – Eriogonum fasciculatum – Opuntia littoralis / Dudleya (edulis) **Association***

83b. Stand not as above. **(84)**

84a. California buckwheat is subdominant to codominant with California sagebrush.

Artemisia californica – Eriogonum fasciculatum **Association**

84b. Stand not as above. **(85)**

85a. *Eriogonum cinereum* is subdominant to codominant with California sagebrush.

Artemisia californica – Eriogonum cinereum **Association***

85b. Stand not as above. **(86)**

86a. *Artemisia californica* is dominant, or may be co-dominant with another shrub such as *Eriodictyon crassifolium* not already listed as a co-dominant in this alliance, with *Nassella* spp. [=*Stipa* spp.] or *Bromus carinatus* as a significant presence in the understory, 10% relative cover or more.

Artemisia californica / Nassella (pulchra) **Association**

86b. *Artemisia californica* is greater than 50% of the shrub canopy. Other coastal sage shrubs are sub-dominant *Encelia californica* or *Lupinus albifrons.* Stands may be open to dense with a sparse to dense herbaceous layer. If the herbaceous layer is dense, there is not a significant complement of perennial grasses.

Artemisia californica **Association**

87a. *Isocoma menziesii* (Menzies' goldenbush) is dominant or co-dominant in the stand. **(88)**

Californian Coastal Beach & Dune Group (G663)
***Isocoma menziesii* Alliance**

87b. Other shrubs are dominant or co-dominant. **(89)**

88a. *Isocoma* is co-dominant with *Artemisia californica*.
Isocoma menziesii – Artemisia californica* Association

88b. *Isocoma menziesii* (Menzies' goldenbush) is dominant or co-dominant in a stand and the herbaceous layer is either sparse or grassy. Shrubs that may be co-dominant include *Baccharis pilularis.*
***Isocoma menziesii* Association**

89a. *Baccharis pilularis* is dominant or co-dominant with *Artemisia californica*. **(90)**
Californian North Coastal & Mesic Scrub Group (G662)
***Baccharis pilularis* Alliance**

89b. *Baccharis pilularis* is not as above. **(91)**

90a. *Baccharis pilularis* is co-dominant with *Artemisia californica*, both species will have between 30 and 60% relative cover.
Baccharis pilularis – Artemisia californica* Association

90b. *Baccharis pilularis* is not as above.
Baccharis pilularis* Alliance

91a. *Toxicodendron diversilobum* is strongly dominant in the shrub canopy or co-dominant with *Artemisia californica*. **(92)**
Californian North Coastal & Mesic Scrub Group (G662)
***Toxicodendron diversilobum* Alliance**

91b. Another shrub is dominant. **(93)**

92a. *Toxicodendron diversilobum* is found with either *Artemisia californica* and/or *Leymus condensatus*.
Toxicodendron diversilobum – Artemisia californica / Leymus condensatus* Association

92b. Stand not as above.
Toxicodendron diversilobum* Alliance

93a. Big sagebrush (*Artemisia tridentata*) is dominant or co-dominant with other montane shrubs.
Intermountain Mesic Tall Sagebrush Steppe & Shrubland Group (G302)
Intermountain Dry Tall Sagebrush Steppe & Shrubland Group (G303)
Artemisia tridentata* Alliance

93b. Another shrub is dominant or co-dominant, typically in seral scrub conditions. **(94)**

94a. *Dendromecon rigida, Eriodictyon crassifolium, or Lotus scoparius [=Acmispon glaber]* is dominant. **(95)**

Californian Coastal-Foothill Seral Scrub (G782)
***Lotus scoparius – Lupinus albifrons – Eriodictyon* spp. *crassifolium* Alliance**

94b. Stand not as above. **(97)**

95a. *Lotus scoparius [=Acmispon glaber]* is strongly dominant in the stand
Lotus scoparius* Association

95b. Stand not as above. **(96)**

96a. *Eriodictyon crassifolium* is dominant.
***Eriodictyon crassifolium* Association (Provisional)**

96b. *Dendromecon rigida* is the shrub with the highest cover. This is usually a post-burn seral condition.
***Dendromecon rigida* Association**

97a. *Malacothamnus fasciculatus* is dominant in the shrub layer, at greater than 60% relative cover, or is co-dominant with *Salvia leucophylla*. This is usually a post-burn seral condition. **(98)**

Californian Coastal-Foothill Seral Scrub (G782)
***Malacothamnus fasciculatus – Malacothamnus* spp. Alliance**

97b. Stand not as above. Other seral scrub species are dominant. **(99)**

98a. *Salvia leucophylla* is sub-dominant to co-dominant with *Malacothamnus fasciculatus.*
Malacothamnus fasciculatus – Salvia leucophylla* Association

98b. *Malacothamnus fasciculatus* is greater than 60% relative cover and *Salvia leucophylla* is not present or very low in cover.
***Malacothamnus fasciculatus* Association**

99b. Stand not as above. **(100)**

100a. *Ericameria palmeri* or *Hazardia squarrosa* is dominant in the shrub canopy. Sometimes herbaceous layer may be higher in cover than the shrub layer. **(101)**
Hazardia squarrosa – Ericameria palmeri* Alliance

100b. Stand not as above **(102)**

101a. *Ericameria palmeri* dominant in stands.
Ericameria palmeri* Association

101b. *Hazardia squarrosa* dominant in stands.

Hazardia squarrosa – Ericameria palmeri **Alliance***

102a. *Diplacus aurantiacus* [=*Mimulus aurantiacus]* is dominant or co-dominant with other seral scrub.

Diplacus aurantiacus **Alliance***

102b. *Ericameria linearifolia* and/or *Cleome isomeris [=Peritoma isomeris]* is dominant in the shrub canopy.

Ericameria linearifolia – Cleome isomeris **Alliance**

Ericameria linearifolia **Association**

Key C. Herbaceous or Sparse Vegetation

1a. Vegetation is dominated by mainly wetland or mesic herbaceous species, including cattail (*Typha*), bulrush (*Schoenoplectus*), giant reed (*Arundo donax*), common reed (*Phragmites australis*), rush (*Juncus*), sedge (*Carex*), and pickleweed (*Sarcocornia [=Salicornia])*. Weedy annuals of wet areas are included. **(2)**

1b. Vegetation is dominated by grasses or upland, more xeric, herbaceous plants. **(10)**

2a. Stands dominated or co-dominated by cattails *(Typha* spp.*),* bulrush (*Schoenoplectus* spp.), or native common reed (*Phragmites australis* ssp. *americanus*). **(3)**

Arid West Interior Freshwater Marsh Group (G531)

2b. Cattails, bulrush, and/or native common reed NOT dominant or co-dominant. **(4)**

3a. Hardstem bulrush (*Schoenoplectus acutus)* or California tule (*S. californicus*) is dominant or co-dominant with taxa including cattail species.

Schoenoplectus acutus – Schoenoplectus californicus* Marsh Alliance

3b. Cattail and/or native common reed dominates stands, or co-dominant with taxa other than bulrush. Other, shorter graminoids may have equal or somewhat greater cover. Shrubs such as coyotebrush (*Baccharis pilularis)* may be present but are at less than 10% absolute cover. Marsh baccharis (*Baccharis douglasii [=Baccharis glutinosa])* and saltgrass (*Distichlis spicata)* are common associates.

Typha (angustifolia, domingensis, latifolia)* Alliance

4a. Non-native tall herbs giant reed (*Arundo donax*) or canary-grass (*Phalaris* spp.) are strongly dominant (>60% relative cover). **(5)**

Western North American Ruderal Marsh, Wet Meadow & Shrubland Group (G524)

4b. There are native species or other perennial non-natives that have higher cover than *Arundo* or *Phalaris.* **(6)**

5a. *Arundo donax* or non-native common reed (*Phragmites australis* spp. *berlandieri,* or other hybrid) is strongly dominant, and typically at least 60% relative cover with low cover of shrubs and other herbs.

Phragmites australis ssp. australis – Arundo donax* Semi-natural Alliance

5b. *Phalaris aquatica* is dominant, OR is the perennial species with highest cover, and it may be codominant or subdominant though at least 25% relative cover along with other non-natives such as *Bromus diandrus*. Native species cover is < 30% relative cover.

Phalaris aquatica – Phalaris arundinacea* Semi-natural Alliance

Phalaris aquatica* Semi-natural Association

6a. Mesic perennial grasses are dominant. Grass species of mesic habitats are *Distichlis spicata, Juncus acutus, Elymus triticoides (Leymus triticoides), Cynodon dactylon* or *Phalaris aquatica.* **(7)**

6b. Upland grasses or forbs dominate the stand. **(10)**

7a. Stands of the lowland/valley bottom species, creeping wild rye (*Leymus triticoides [=Elymus triticoides]*), may be dominant to co-dominant.

North American Desert Alkaline-Saline Marsh & Playa Group (G538)
Leymus cinereus – Leymus triticoides* Alliance

7b. *Leymus triticoides* is co-dominant with *Distichlis spicata*, or *Leymus triticoides* is neither co-dominant nor dominant. **(8)**

8a. *Distichlis spicata* is dominant or co-dominant in the stand. Rarely, *Juncus acutus* may be co-dominant or dominant with low cover of *Distichlis spicata* **(9)**

North American Desert Alkaline-Saline Marsh & Playa Group (G538)
Distichlis spicata* Alliance

8b. Stand not as above. **(10)**

9a. *Distichlis spicata* is co-dominant with annual grasses, most often with *Bromus diandrus*. May occur in sandy, sparsely vegetated situations.

Distichlis spicata* – annual grasses Association

9b. *Distichlis spicata* is dominant, or sometimes co-dominant with ice plant (*Carpobrotus chilensis),* sea rocket (*Cakile maritima), Bromus maritimus,* Bermuda grass *(Cynodon dactylon),* or *Phacelia distans*.

Distichlis spicata* Association

10a. Grasses are strongly dominant in the stand OR native perennial grasses are co-dominant. **(11)**

10b. Forbs dominate or co-dominate the stand, though grasses are often present at significant cover. **(18)**

11a. *Leymus condensatus [=Elymus condensatus]* dominates or co-dominates the stand. Smaller stature grasses may have equal or somewhat greater cover. Sparse shrubs often present. Usually on slopes.

***Leymus condensatus* Alliance**
***Leymus condensatus* Association**

11b. Stand not as above. **(12)**

12a. A *Nassella* species [=*Stipa* sp.], usually *Nassella pulchra,* has a clear presence in the stand. It varies from dominant to sub-dominant, usually with an absolute cover of 5% or more, but may be lower if the relative cover of *Nassella* and *Dichelostemma capitatum* combined is greater than 10%.

Californian Perennial Grassland Group (G496)
Nassella* spp. – *Melica* spp. Alliance

12b. If a *Nassella* species [=*Stipa* sp.] is sub-dominant, another native perennial grass has greater cover than *Nassella* and *Dichelostemma capitatum* combined, OR *Baccharis pilularis* has a cover of 6% or more and is well distributed throughout the stand. Otherwise, *Nassella* is less than 5% cover and less than 10% of the herbaceous layer. **(13)**

13a. *Bromus carinatus* or *Elymus glaucus* is the dominant perennial grass while annual grasses may be present at up to 3 times the cover. Native cover is greater than 25% of the herbaceous layer.

Bromus carinatus – Elymus glaucus* Alliance

13b. Stand not as above. **(14)**

14a. Stand is dominated by another native perennial grass not listed above.

Californian Perennial Grassland Group (G496)

14b. Stand not as above. **(15)**

15a. Grassland co-dominated by *Lolium perenne* [=*Festuca perennis]*, with other grasses such as *Bromus diandrus* and *Avena* spp. also common. May also be dominated by annual fescues (*Vulpia [=Festuca]).*

Californian Ruderal Grassland, Meadow & Scrub Group (G497)
Lolium perenne* Semi-natural Alliance
Lolium perenne* Semi-natural Association

15b. Other grasses or forbs co-dominant or dominant. **(16)**

16a. *Phalaris aquatica* is dominant, OR is the perennial species with highest cover and at least 25% relative cover with no native species of higher cover. It may be subdominant to non-native annual grasses such as *Bromus diandrus.*

Western North American Ruderal Marsh, Wet Meadow & Shrubland Group (G524)
***Phalaris aquatica – Phalaris arundinacea* Semi-natural Alliance**
***Phalaris aquatica* Semi-natural Association (Provisional)**

16b. There are native species or other perennial non-natives that have higher cover than *Phalaris aquatica.* **(17)**

17a. *Pennisetum setaceum* is strongly dominant, OR is the perennial species with highest cover and at least 25% relative cover with non-native species of higher cover. It may be co- to subdominant with somewhat higher cover other non-native annual grasses such as *Bromus diandrus*.

North American Warm Desert Ruderal Grassland Group (G677)
Pennisetum setaceum – Pennisetum ciliare* Semi-natural Alliance
Pennisetum setaceum* Semi-natural Association

17b. There are native species or other non-natives that have higher cover than *Pennisetum setaceum.* **(18)**

18a. *Heterotheca sessiliflora* or *Ambrosia psilostachya* is dominant in the herbaceous layer with varied cover. **(19)**

Temperate Pacific Freshwater Wet Mudflat (G525)

18b. Stand not as above. **(20)**

19a. No other perennial forb has more cover than *Heterotheca* spp. Found on sandy and cobbled gravel bars in floodplains, along riparian terraces and stream banks, flats or slopes adjacent to riparian areas, and other seasonally disturbed areas.

Heterotheca (oregona, sessiliflora)* Alliance
Heterotheca sessiliflora* Association (Provisional)

19b. *Ambrosia psilostachya* is dominant or co-dominant in the herbaceous layer. Found in moist meadows.

Grindelia (camporum, stricta)* Alliance
Ambrosia psilostachya – Grindelia hirsutula var. hallii* Association (Provisional)

20a. *Pteridium aquilinum* var. *pubescens* dominates the stand.

Southern Vancouverian Shrub & Herbaceous Bald, Bluff & Prairie Group (G488)
Bromus carinatus – Elymus glaucus* Alliance
Pteridium aquilinum* – Grass Association (Provisional)

20b. Stand not as above. **(21)**

21a. Sand-aster (*Corethrogyne filaginifolia)* is the primary forb and may be co-dominant (> 30% relative cover) with annual grasses, or there is a mix of native forbs with greater cover than either the exotic forbs or the exotic grasses, and sand-aster (*Corethrogyne filaginifolia)* is at least 10% relative cover. *Nassella* spp. [=*Stipa* spp.] may or may not be present at less than 10% relative cover.

Californian Perennial Grassland Group (G496)
***Corethrogyne filaginifolia – Eriogonum (elongatum, nudum)* Alliance**
***Corethrogyne filaginifolia* Association**

21b. Stand not as above. **(22)**

22a. *Emmenanthe penduliflora, Eucrypta chrysanthemifolia,* and/or *Calystegia macrostachya,* along with many other forbs, are subdominant to codominant (especially in good rain years). Often in post-fire chamise chaparral.

***Corethrogyne filaginifolia – Eriogonum (elongatum, nudum)* Alliance**
Calystegia macrostegia – Eucrypta chrysanthemifolia* Association

22b. Stand not as above. **(23)**

23a. *Selaginella bigelovii* is dominant in the herbaceous layer. Sparse shrubs may occur including *Eriogonum fasciculatum*.

Californian Cliff, Scree & Rock Vegetation Group (G563)
***Selaginella bigelovii* Alliance**
***Selaginella bigelovii / Eriogonum fasciculatum* Association**

23b. Stand not as above. **(24)**

24a. Annual forbs are co-dominant or sub-dominant with non-native annual herbs with at least 10% relative cover. **(25)**

24b. Annual non-native forbs and grasses are strongly dominant with at least 90% relative cover. **(29)**

25a. Annual vernally moist herbs are present in pools and playas, and sometimes perennial herbs are present but at low cover. *Spergularia macrotheca* var. *macrotheca* and/or *Polygonum* spp. can often occur in drying basins.

Californian Vernal Pool Group (G530)

25b. Annual upland herbs are present, including a variety of species such as poppy, lupines. **(26)**

Californian Annual Grassland & Forb Meadow Group (G766)

26a. California poppy (*Eschscholzia californica*) and/or an annual lupines (e.g., *Lupinus succulentus*) is co-dominant or co-dominant in the herbaceous layer. Depending on the timing of sampling and amount of rainfall, sometimes these annuals may be characteristically present at lower cover (e.g., 10-20% relative cover).

Eschscholzia (californica) – Lupinus (nanus)* Alliance

26b. If *Eschscholzia californica* and/or annual *Lupinus* spp. are present, neither species is dominant or co-dominant. *Eschscholzia* has less cover than at least one other forb species. **(27)**

27a. *Lasthenia* spp., *Plantago erecta,* and/or *Vulpia microstachys [=Festuca microstachys]* is dominant to co-dominant with other native and/or non-native species.

Lasthenia californica – Plantago erecta – Vulpia microstachys* Alliance

27b. Stand not as above. **(28)**

28a. *Amsinckia intermedia (A. menziesii* var. *intermedia), A. menziesii,* and/or *Phacelia* spp is dominant or seasonally characteristic in the herbaceous layer at > 10% relative cover. Annual grasses may dominate but one or more of these annual forbs is seasonally characteristic in the herbaceous layer at > 10% relative cover. **(29)**

Californian Annual Grassland & Forb Meadow Group (G766)
Amsinckia (menziesii, tessellata) – Phacelia* spp. Alliance

28b. Stand not as above. **(29)**

29a. Non-native annual grasses are strongly dominant, including *Avena* spp., *Hordeum* spp., *Bromus* spp., *Brachypodium* spp., and *Festuca* spp. **(30)**

Californian Ruderal Grassland, Meadow & Scrub Group (G497)
Avena* spp. – *Bromus* spp. Semi-natural Alliance

29b. Other annual grasses or non-native forbs are dominant, and not as above. **(34)**

30a. If *Avena* spp. is high in cover, *Bromus diandrus* or Australian saltbush (*Atriplex semibaccata)* is co-dominant. Otherwise *Avena* spp. is a moderate to minor portion of the herbaceous layer. **(31)**

30b. *Avena* spp., either *Avena barbata* or A. *fatua*, is strongly dominant or is co-dominant with an *Erodium* sp. While *Bromus diandrus* is often present, it is less than 30% relative cover.

Avena barbata – Avena fatua* Semi-natural Association

31a. *Bromus hordeaceus* is present and may be dominant. If not dominant, it or another annual grass is co-dominant with *Erodium* spp.

Bromus hordeaceus – Erodium botrys* Semi-natural Association

31b. Stand not as above. **(32)**

32a. *Brachypodium distachyon* is dominant or co-dominant in the stand.

Brachypodium distachyon* Semi-natural Association

32b. If *Brachypodium distachyon* is present, another annual grass has higher cover. **(33)**

33a. *Avena* spp. and *Bromus diandrus* co-dominate and combined are higher cover than any other species.

Bromus diandrus – Avena* spp. Semi-natural Association

33b. If *Avena* spp. is present, it is less than 20% of the herbaceous layer or *Bromus diandrus* is more than 50% relative cover.

Bromus diandrus* Semi-natural Association

34a. *Foeniculum vulgare* is important within a grassy matrix, at least 25% relative cover of the herbaceous layer. Non-native annual grasses may have higher cover.

Californian Ruderal Grassland, Meadow & Scrub Group (G497)
Conium maculatum – Foeniculum vulgare* Semi-natural Alliance
Foeniculum vulgare* Semi-natural Association

34b. If *Foeniculum vulgare* is present, it is less than 25% of the herbaceous layer or another perennial species co-dominates. **(35)**

35a. Non-native annual forbs dominate the stand. **(36)**

Californian Ruderal Grassland, Meadow & Scrub Group (G497)
Brassica nigra – Centaurea (solstitialis, melitensis)* Semi-natural Alliance

35b. Other forbs dominate or co-dominate. **(38)**

36a. *Centaurea melitensis* dominates the stand.

Centaurea melitensis* Semi-natural Association

36b. Non-native mustards dominate the stand. **(37)**

37a. *Brassica nigra* dominates the stand.

Brassica nigra* Semi-natural Association

37b. *Hirschfeldia incana* dominates the stand.

Hirschfeldia incana* Semi-natural Association

38a. An *Erodium* sp. co-dominates with *Bromus hordeaceus*.

***Avena* spp. – *Bromus* spp. Semi-natural Alliance**
Bromus hordeaceus – Erodium botrys* Semi-natural Association

38b. Neither *Bromus hordeaceus* nor *Erodium* spp. is co-dominant. **(39)**

39a. Total cover of herbaceous plants is sparse, less than 15% absolute cover, and there is a shrub canopy of 5% or more. Go to **Key B.**

39b. Stand not as above. **(40)**

40a. Total cover is less than 10%, and the cover of the herbaceous layer is greater than total cover of the shrub layer. **(41)**

Californian Cliff, Scree & Rock Vegetation Group (G563)

40b. Total cover is greater than 10%. **(43)**

41a. The substrate is rocky or gravelly and lichen, moss and/or *Dudleya* have significant cover. **(42)**

Dudleya cymosa – Dudleya lanceolata* – Lichen/Moss Sparse Alliance

41b. Stand not as above.

Sparsely Vegetated / Barren

42a. *Dudleya* is not present, while lichen has greater cover than vascular plants.
Lichen Gravel – Bedrock Nonvascular Sparse Association*

42b. Other vascular plant species have cover equal to or greater than lichen.
Californian Cliff, Scree & Rock Vegetation Group (G563)

43a. Stand has a significant native component and is primarily composed of herbaceous species that are not noted above.
California Annual & Perennial Grassland Macrogroup

43b. Nativity of species is unknown and/or shrub cover is in transition after a fire event and may become a shrub stand with recovery.
Californian Scrub & Grassland Division

Key D. Unvegetated, Developed Areas, or Planted Stands

1a. Area of water impoundments and other water bodies and their margins. **(2)**

1b. Area not of water or adjoining water. **(6)**

2a. Riparian and/or wetland area that is sparsely vegetated (at least 1% absolute cover of vascular plants, but less than 10% absolute cover, and only 2% or less of any one species).

Sparsely vegetated drainage channels & seeps

2b. Not as above. **(3)**

3a. Standing water areas. **(4)**

3b. Land along the margins of water, including the ocean. Littoral. **(5)**

4a. Constructed ponds, sometimes drying out seasonally, can be sparsely or well vegetated.

Dammed Pond Mapping Unit

4b. Not as above.

Water body

5a. Unvegetated littoral area covered by sand.

Beach sand Mapping Unit

5b. Unvegetated littoral area dominated by rock.

Littoral Mapping Unit

6a. Natural landforms that are mostly unvegetated. **(7)**

6b. Sites that are planted stands of vegetation, developed or built-upon areas, or otherwise anthropogenically disturbed. **(9)**

7a. Sandy area, not adjacent to water, unvegetated.

Sand Mapping Unit

7b. Substrate is not sand. **(8)**

8a. Sparsely vegetated or unvegetated area of fine sediments, often caused by previous water inundation.

Mudflat Mapping Unit

8b. Sparsely vegetated or unvegetated area of rocky outcrops, cliffs, or other substrate, including caliche. Less than 8% absolute cover of vascular plants.

California Cliff, Scree & Rock Vegetation Group
Sparsely Vegetated / Barren

9a. Urban areas that are unvegetated or a matrix of development and small patches of natural and/or human-planted vegetation.

Urban / Disturbed Mapping Unit

9b. Human-planted vegetation for landscaping or other purposes.

Planted trees and shrubs Mapping Unit

Glossary of Terms Used in the Key

- **Absolute cover** – Refers to the actual percentage of the ground (surface of the plot or stand) that is covered by a species or group of species. For example, *Pinus muricata* covers between 5% and 10% of the stand. Absolute cover of all species or groups if added in a stand or plot may total greater or less than 100% because it is not a proportional number.
- **Characteristic** – Present in at least 75% of the samples for that vegetation type, with no restriction on cover.
- **Co-dominant** – Two or more abundant species with high cover in relation to other species in the layer with the highest canopy cover. We typically define co-dominant species as those with at least 30% relative cover.
- **Cover** – The primary metric used to quantify the abundance of a particular species or a particular vegetation layer within a plot. It was measured by estimating the aerial extent of the living plants, or the "bird's-eye view" looking from above for each category.
- **Dense/Continuous cover** – Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where there is greater than 66 percent absolute cover.
- **Dominant** – An abundant species with high cover in relation to other species in the layer with highest canopy cover. We typically define dominant species as those with at least 50% relative cover within a particular layer.
- **Dune –** a mound, ridge or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.
- **Emergent** – A plant (or vegetation layer) is considered emergent if it includes plants that rises above a predominant vegetation layer, but that are sparse in cover. It is considered as a member of the next tallest layer, but typically has an absolute cover < 10%.
- **Herb** – Is any vascular plant species that has no main woody stem-development, and includes grasses, forbs, and perennial species that die-back seasonally.
- **Open** – Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the cover is less than 33 percent absolute cover.
- **Relative cover** – Refers to the amount of the surface of the plot or stand sampled that is covered by one species (or physiognomic group) as compared to (relative to) the amount of surface of the plot or stand covered by all species (in that group). Thus, 50% relative cover means that half of the total cover of all species or physiognomic groups is composed of the single species or group in question. Standardized layers of herb, shrub, and tree (see Tables 1 and 2 for taxa assignments to these groups) are used to determine relative cover. Relative cover values are proportional numbers and, if added, total 100% for each stand (sample).

- **Semi-natural vegetation** – Stands characterized by naturalized non-native species. Examples include *Bromus diandrus* Semi-natural Association. Note that NVC vegetation types use "ruderal" to describe these plant communities.

- **Shrub** – Is normally a multi-stemmed woody plant that generally has several erect, spreading, or prostrate stems and that is usually between 0.2 meters and 5 meters tall, giving it a bushy appearance. Definitions are blurred at the low and the high ends of the height scales. At the tall end, shrubs may approach trees in size (*Heteromeles arbutifolia,* often appears tree-sized on Santa Rosa Island. At the low end, woody perennial herbs or sub-shrubs of various species are often difficult to categorize into a single life-form; usually sub-shrubs (per USDA-NRCS 2014) were categorized in the "shrub" category.

- **Sometimes** – Present in 25 to 50% of the samples with no restriction on cover.

- **Sparse** – Used to describe individual layers of vegetation (tree, shrub, herb, or subdivisions of them) where the *average* cover value is <2% absolute cover (though the range in cover could be <1-9% cover).

- **Stand** – The basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small such as wetland seeps, and some may be several square kilometers in size such as desert or forest types. A stand is defined by two main unifying characteristics:

    - It has *compositional* integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or gradual.

    - It has *structural* integrity. It has a similar history or environmental setting, affording relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest formerly dominated by the same species, but that has burned on the upper part of the slope and not the lower is divided into two stands. Likewise, a sparse woodland occupying a slope with shallow rocky soils is considered a different stand from an adjacent slope of a denser woodland/forest with deep moister soil and the same species.

- **Sub-dominant –** Used to describe an important species in the stand that is less than 30% relative cover.

- **Trace –** Present at less than 1% absolute cover.

- **Tree** – Is a one-stemmed woody plant that normally grows to be greater than 5 meters tall. In some cases trees may be multiple-stemmed (ramifying) after fire or other disturbance, but size of mature plants is typically greater than 5 m and undisturbed individuals of these species are usually single stemmed.

Usually/Often – Present in 50 to 75% of the samples, with no restriction on cover.

Appendix I: New Vegetation Classification Descriptions (CNPS) [DescriptionsSASU_rev.doc]

Ericameria linearifolia – Cleome isomeris Shrubland Alliance

Common Name: Narrowleaf goldenbush – bladderpod scrub

NVC Alliance Code: A4101. *Ericameria linearifolia – Cleome isomeris* Scrub Alliance

Alliance Concept

The Narrowleaf goldenbush – bladderpod scrub Alliance forms an open to intermittent shrub layer. The emergent tree layer is absent to open, and the herbaceous layer is open to dense. The alliance is found on all positions on the slope, but is most commonly found on the middle to upper slope with a northern aspect. Soils are shallow and can be alkaline. Elevations range from approximately 100 to 1500 meters. Dominant and characteristic shrubs include *Cleome isomeris, Eastwoodia elegans,* and/or *Ericameria linearifolia.* Herbs that are often present include *Amsinckia tessellata, Bromus rubens, Erodium* spp*.,* and *Poa secunda.* The alliance is found in the Central Coast Ranges (Carrizo Plains National Monument, Ciervo-Panoche Natural Area) and Great Valley (Lokern Preserve, Tejon Ranch, Wind Wolves Preserve), as well as in the Santa Susana Mountains.

Diagnostic Criteria: This alliance is characterized by an open to intermittent shrub layer of *Cleome isomeris, Eastwoodia elegans,* and/or *Ericameria linearifolia*. One of these species is greater than 30% relative cover. The overall shrub cover ranges from 3 to 57 percent cover.

Associations by Ecoregion Subsection	Total	261B	262A	M262A
Cleome isomeris	27		9	18
Eastwoodia elegans	42		2	40
Eastwoodia elegans – Krascheninnikovia lanata	19			19
Ericameria linearifolia	50	1	1	48

Plot/Sample Data Summary (N = 145):

Elevation: Mean 759 m, Range 122 – 1488 m
Slope: Mean 24°, Range 0 – 44°
Aspect: Primarily north-facing

Fines Cover: Mean 64%, Range 2 – 99%
Litter Cover: Mean 15%, Range 0 – 92%

Large Rock: Mean 0.6%, Range 0 – 20%
Small Rock: Mean 17%, Range 0 – 63%

Tree Cover: Mean 0.3%, Range 0 – 6%
Shrub Cover: Mean 19%, Range 3 – 57%
Herb Cover: Mean 27%, Range 3 – 90%

Local Alliance Distribution

A single sample was recorded from Tapo Canyon Park within the Santa Susana Mountains on a NW-facing upper slope of 25 degrees. The dominant species was *Ericameria linearifolia* with *Adenostema fasciculatum* and *Lotus scoparius.* The understory was co-dominated by *Selaginella bigelovii* and *Bromus rubens.*

Classification Comments

Conservation Status Rank

Global: G4

State: S4

References

Buck-Diaz et al. 2011, Buck-Diaz and Evens 2012, VegCAMP and AIS 2013

Alliance Stand Table

Layer	Taxon	Con	RelCov	Avg	Min	Max	Char	Dom	cD	Oft
Tree										
	Juniperus californica	28	28	0.2	0.11	3				
Shrub										
	Ericameria linearifolia	**70**	**36**	**7.3**	**0.11**	**43**				**x**
	Eastwoodia elegans	**54**	**26**	**5.7**	**0.2**	**50**				**x**
	Eriogonum fasciculatum	50	5.7	1.2	0.2	22				**x**
	Gutierrezia californica	34	2.5	0.4	0.2	10				
	Krascheninnikovia lanata	30	3.9	0.8	0.2	20				
	Ephedra californica	30	2.7	0.5	0.11	12				
	Cleome isomeris	**25**	**16**	**2.2**	**0.2**	**25**				
Herb										
	Bromus rubens	97	22	6.6	0.2	60	**x**			**x**
	Erodium spp.	90	14	3.8	0.2	40	**x**			**x**
	Poa secunda	78	18	4.5	0.2	25	**x**			**x**
	Amsinckia tessellata	73	10	3.3	0.2	30				**x**
	Microseris lindleyi	33	0.4	0.1	0.2	1				
	Castilleja exserta	31	0.9	0.3	0.11	20				
	Monolopia lanceolata	30	2.8	1	0.2	20				
	Bromus hordeaceus	30	1.3	0.6	0.2	20				

Delphinium gypsophilum	27	0.7	0.2	0.2	4
Schismus spp.	25	3.5	0.8	0.2	22
Phacelia tanacetifolia	24	1.3	0.4	0.11	12
Vulpia microstachys	21	0.5	0.1	0.2	5
Non-vasc					
Moss	27	24	1.9	0.2	30

Ericameria linearifolia Association

Common Name: Narrowleaf goldenbush scrub

Plot/Sample Data Summary (N = 50):

Elevation: Mean 742 m, Range 203 – 1488 m
Slope: Mean 22°, Range 1 – 40°
Aspects: Primarily north-facing

Fines Cover: Mean 65%, Range 5 – 95%
Litter Cover: Mean 18%, Range 0.2 – 81%
Large Rock: Mean 0.6%, Range 0 – 20%
Small Rock: Mean 14%, Range 0 – 63%

Tree Cover: Mean 0.4%, Range 0 – 3%
Shrub Cover: Mean 19%, Range 4 – 44%
Herb Cover: Mean 25%, Range 7 – 63%

Association Stand Table

Layer Taxon	Con	RelCov	Avg	Min	Max	Char	Dom	cD	Oft
Tree									
Juniperus californica	40	40	0.34	0.20	3				
Shrub									
Ericameria linearifolia	**100**	**84**	**16.48**	**4**	**43**	**X**	**X**		**X**
Eriogonum fasciculatum	40	1.8	0.36	0.20	3				
Gutierrezia californica	34	1.7	0.24	0.20	4				
Ephedra californica	30	3.2	0.54	0.20	7				
Eastwoodia elegans	28	2.3	0.53	0.20	5				
Herb									
Bromus rubens	92	24.	6.49	0.20	45	X			X
Erodium	84	12.	3.22	0.20	30	X			X
Poa secunda	80	20.	5.09	0.20	25	X			X
Amsinckia tessellata	68	5.5	1.78	0.20	13				X
Microseris lindleyi	48	0.4	0.11	0.20	1				
Bromus hordeaceus	42	1.3	0.44	0.20	10				
Castilleja exserta	36	1.1	0.45	0.10	11				
Vulpia microstachys	30	0.8	0.28	0.20	5				
Phacelia tanacetifolia	24	1.0	0.23	0.20	7				
Monolopia lanceolata	22	1.5	0.42	0.20	10				
Lasthenia gracilis	22	1.3	0.37	0.20	15				
Marah	22	0.5	9.60	0.20	2				
Dichelostemma capitatum	22	0.2	4.40	0.20	0.20				
Non-vasc									
Moss	38	32.	2.97	0.20	30				