

Vegetation Classification and Mapping at Lake Mead National Recreation Area, Mojave National Preserve and Death Valley National Park

Scope of Work

Submitted by the California Native Plant Society (CNPS)

Introduction

This Scope of Work (SOW) addresses work to be completed by the California Native Plant Society in conjunction with the Mojave Desert Inventory and Monitoring Network (MOJN) to prepare a vegetation classification as part of vegetation mapping projects at Lake Mead National Recreation Area, Mojave National Preserve and Death Valley National Park; assist with field sampling strategy; train field crews in classification and accuracy assessment data collection; work with the mapping contractor to develop map classes based on the final vegetation classification; provide input on the results of the accuracy assessment; prepare a final classification, vegetation descriptions, a field key to vegetation types and a report describing the methods used and the results obtained during the development of the classification.

Background

CNPS was originally formed in 1965 and is a statewide non-profit organization of amateurs and professionals with a common interest in California's native plants. The Society, working through its local chapters and statewide programs, seeks to increase understanding of California's native flora and to preserve this rich resource for future generations. The mission of CNPS is “to increase understanding and appreciation of California's native plants and to conserve them and their natural habitats through education, science, advocacy, horticulture and land stewardship.” Members have diverse interests including natural history, botany, ecology, conservation, photography, drawing, hiking, plant uses, land use, horticulture and gardening, and a love of California's natural landscapes.

Vegetation Mapping is an inventory process that documents the composition, distribution and abundance of plant communities across a landscape. It is one of the 12 baseline inventories to be completed for all 270 national parks within the NPS Inventory and Monitoring Program. The National Park Service (NPS) and U.S. Geological Survey (USGS) are cooperating to produce detailed vegetation classifications and digital databases, including vegetation maps, as part of the nationwide NPS Inventory and Monitoring Program. The NPS Vegetation Mapping Program (NVMP) is a strong component of the NPS Inventory and Monitoring Program and is based on a repeatable set of standards and flexible protocols. The Mojave Desert Inventory & Monitoring Network (MOJN) is coordinating the development of vegetation maps for Lake Mead National Recreation Area (LAME), Mojave National Preserve (MOJA) and Death Valley National Park (DEVA).

Vegetation mapping is a multi-step and multi-year process that involves the skills and interactions of several parties, including NPS staff, an ecology team and a mapping team. The ecology team develops the vegetation classification, vegetation descriptions and field key to vegetation types. The mapping team coordinates all aspects of the mapping including photo

interpretation, image segmentation, creating the GIS layers, and typically completes the accuracy assessment analysis and prepares the final project deliverables. The two teams work together to develop map classes based on the vegetation classification and identify appropriate mapping units for those vegetation types which cannot be mapped at the alliance or association level and must be aggregated into vegetation complexes or mosaics. Following the guidelines provided by the national program, MOJN proposes to create vegetation classifications to the association level of the National Vegetation Classification (NVC) and spatial databases (i.e. maps) to approximately the alliance level.

Since 1995, the California Native Plant Society (CNPS) has contributed to numerous vegetation classification and mapping projects in California, including NPS Inventory and Monitoring Program projects. CNPS has contributed to the development and use of the State and National Vegetation Classification systems and sampling protocols, collected thousands of vegetation surveys, developed hundreds of written vegetation descriptions, and reviewed mapping data results across millions of acres. CNPS has been a collaborator on various NPS projects in the Western Region, including at Pinnacles NM, Point Reyes NS and Golden Gate NRA, Santa Monica Mountains NRA, and Yosemite NP. In these projects, CNPS has contributed to sampling protocols and trainings, classification analyses, written descriptions, and/or accuracy assessment analyses.

CNPS also has completed several vegetation classifications for a variety of other agencies in California including the federal and state agencies such as Bureau of Land Management, Bureau of Reclamation, California Department of Fish & Game (CDFG), USDA Forest Service, US Geological Survey (USGS), The Nature Conservancy, and local agencies such as the Marin Municipal Water District, western Riverside County, central San Diego County, and Tehama County Resource Conservation District. CNPS recently analyzed and classified data from the Northern and Eastern Colorado Desert and adjacent desert regions (Evens and Hartman 2007). CNPS also is the publisher of the first and second editions of *A Manual of California Vegetation* (Sawyer, Keeler-Wolf, and Evens 2009), the state's standard for alliance-level vegetation classification and description. CNPS staff to contribute to this project includes the Vegetation Program Director, Vegetation Ecologist, and Assistant Ecologist. CDFG staff will also contribute in-kind time to the project, including their Senior Ecologist—T. Keeler-Wolf, with experience from past involvement in the central Mojave vegetation mapping project (Thomas et al 2004).

Objectives and Purpose

The objective of this project is to create a single vegetation classification for LAME, MOJA and DEVA at the alliance and association levels per the National Vegetation Classification Standard (NVCS). The objective of the NVCS is to support the development and use of a consistent national vegetation classification (hereafter referred to as the NVC) in order to produce uniform statistics about vegetation resources across the nation, based on vegetation data gathered at local, regional or national levels (FGDC National Vegetation Classification Standard, ver. 2, Feb 2008). Vegetation data collected includes floristic composition, vegetation structure and plant species cover.

Creating a single classification for the three parks insures uniform definitions of vegetation types common to each park and the development of uniform map classes. Pooling the data collected from each park will provide a more robust sample on which to define vegetation types common to each park, allow for a greater land area over which to examine the distribution of vegetation types and allow for a comparison of species composition within vegetation types between the eastern and central Mojave Desert. The final classification is used to define the vegetation types to be mapped. Final map classes will be developed from the final classification and fine scale digital vegetation maps created.

Project Description

The project will be conducted in a series of phases starting with the development of a preliminary classification and a sampling strategy for the collection of vegetation classification data within LAME, MOJA and DEVA. Additional tasks to be conducted will include field crew trainings, development of map classes in conjunction with the mapping contractors, review of map accuracy assessment results and creation of vegetation descriptions, a field key to vegetation types and a report of the methods used to produce the classification.

Preliminary classification, interim and final classification

Classification work will begin with creating a preliminary classification using legacy datasets, literature searches and park staff knowledge of the plant communities within each park. The preliminary classification will identify those vegetation types that have been well-sampled and those that have been under-sampled within the parks. The preliminary classification will be used to direct field sampling efforts by identifying vegetation types to be targeted and an estimate of the number of plots to sample per vegetation type and areas under-sampled within each park. MOJN will collect and compile legacy datasets and provide them to the California Native Plant Society (CNPS).

Following the first season of field data collection (2010), CNPS will prepare an interim classification. This classification will be used to further refine the list of vegetation types to be sampled in 2011 and to develop map classes as the mapping of LAME begins. A finalized classification will be completed once all vegetation classification data has been collected within LAME, MOJA and DEVA.

NatureServe will be subcontracted by CNPS to provide a review of the interim and final classifications, assist with field tests of the field key to vegetation types, assist with field crew training on accuracy assessment data collection and incorporate the vegetation descriptions produced as part of this project into the National Vegetation Classification (NVC).

Field crew training\field data collection

New vegetation plot data and observation points will be collected for the under-sampled areas within each park, with a focus on rare and unique vegetation types not included in the existing dataset. MOJN will contract field crews to conduct the field data collection. CNPS will provide field crew training and MOJN will provide logistical support to CNPS during the training. Field crew personnel will be responsible for entering all field data. MOJN will insure that the

databases have undergone a thorough quality assurance (QA) and quality checking (QC) process before providing them to CNPS.

Accuracy Assessment training\Map class development\Map accuracy assessment results review
CNPS will provide training for field crews in accuracy assessment data collection protocols, work with the mapping contractor to develop map classes based on the classification of vegetation alliances and associations and participate in a review of the accuracy assessment results. NatureServe will assist with the accuracy assessment sampling protocol training and MOJN will provide logistical support during the training. MOJN will also participate in the development of map classes and the review of accuracy assessment results.

Final project deliverables

CNPS will be responsible for producing the classification related final project deliverables which will include the final vegetation classification, vegetation descriptions, field key to vegetation types and a report describing the methods used and results obtained in developing the classification. NatureServe and MOJN will review draft final products and provide their comments to CNPS for incorporation into the final products. MOJN will identify either NPS or contracted staff to complete a portion of the vegetation descriptions.

Project Location (see *Attachment A*)

Each of the parks being addressed under this project is extremely large and presents many unique challenges due to their enormous size and remote location. Of particular importance for this project is sampling the rare and unique vegetation types. Many of the rare and unique vegetation types occur in the remote mountain ranges of each park making access difficult.

Lake Mead National Recreation Area

LAME covers approximately 1,194,114 acres surrounding the Reservoirs of Hoover and Davis Dams on the Colorado River along the Arizona-Nevada border. Lake Mead is one of the largest man-made lakes in the world with a surface area of over 153,200 acres at full pool. Lake Mohave is smaller with 28,800 acres of surface area when full. Approximately 87% of LAME is considered terrestrial surrounded by large amounts of public lands including GRCA and PARA to the north and east. LAME is located in a very hot and dry portion of the county where summer temperatures can easily reach 110 °F and average precipitation is just 4.5 inches annually.

LAME contains some small elements of the Sonoran and Great Basin deserts but is primarily comprised of Mojave Desert plant species. The Sonoran Desert is represented only at the southern tip of the park and Great Basin species are scattered in the northern and eastern portions. The geologic diversity and convergence of three desert ecosystems within the park provides habitat for a wide range of plants. Shrub communities are quite common consisting of creosote bush, sagebrush, blackbrush, and saltbush species. At higher elevations these shrubs are also found with pinyon-juniper woodlands and intermix with cottonwood and willow stands along the Colorado River. Unique plant communities at LAME include the gypsophilous, riparian, cliff, desert marsh, ocotillo, and other stem succulent communities. Threats to LAME's natural resources consist of the rapid urbanization of surrounding lands, the introduction of non-

native species (tamarisk), groundwater withdrawals, water quality issues, off-road driving, burros and livestock grazing.

Mojave National Preserve

MOJA was established on October 31, 1994 and is located in the Mojave Desert in Southern California between Interstate 15 and Interstate 40. MOJA is a large NPS unit covering roughly 1,538,386 acres. Elevation ranges from 880 to 7492 ft. MOJA is characterized by isolated mountain ranges and ridges separated by alluvium-filled, irregular large valleys, sand dunes, great mesas and extinct volcanoes. Dividing MOJA in half is the northeast trending Providence-Mid Hills-New York Mountain ranges. The climate varies greatly. Summer temperatures are extreme averaging about 90 °F with highs exceeding 105 °F.

The vegetative resources of Mojave National Preserve reflect three major North American Deserts: the Great Basin, Mojave and Sonoran with some elements of the California Coastal Zone. Common species forming complex plant communities at MOJA include impressive Joshua tree forests, Great Basin sagebrush, Utah juniper, manzanitas, teddy bear cholla, smoke tree, Mojave yucca, Spanish bayonet, blackbrush and pinyon-juniper. The preserve also has some riparian and wetland features dominated by cottonwoods, willows, mulefat and sedges. Significant threats to MOJA's natural resources exist and are related to land use practices such as mining, grazing, hunting, trapping, and utility rights of way. Other threats to park resources include introduction of non-native plant and animal species (i.e. burros, tamarisk), air pollution, hazardous materials related to mining activities, off-road vehicle use, loss of critical habitat due to grazing and recreational activities and increased vehicular traffic along the interstate corridors.

Death Valley National Park

DEVA was created to preserve and protect unique desert features and landscapes, which covers over 3 million acres. DEVA lies in the southeastern portion of California and contains dramatic mountain ranges (11,000 foot peaks) and dry arid valleys (-280 feet below sea level) DEVA is located in a hot desert environment and winter temperatures within the park rarely drop below freezing while daytime summer temperatures routinely reach 110-120 °F (including the nation's highest recorded temperature and the world's second highest). Annual precipitation is approximately 2 inches, and there have been years with no recorded rainfall.

DEVA is renowned for its diverse geology and tectonics, including one of only two active rift faults known in the world. Additionally, the park contains all of the major dune systems and the lowest point in North America. Covering these areas are large salt pans and sand dunes supporting many endemic and specialized plant species such as the Eureka Valley dune grass. Flanking the desert areas are large mountain ranges and hills dominated by bristlecone pine, limber pine, and pinyon pine/juniper woodlands. Mid and lower elevations of the park contain many scrublands. Scattered throughout are various wetland habitats associated with springs and drainages containing willows, cottonwoods, mesquite and cattails. Past land-use activities such as mining has introduced many non-native plants to the area including salt cedar, palm trees, and Russian thistle.

Recipient's Involvement (Responsibilities)

CNPS will head the team of ecologists completing the vegetation classification for LAME, MOJA and DEVA.

CNPS will produce a preliminary classification identifying vegetation types and number of plots per type to be targeted during field data collection efforts.

CNPS will provide assistance with developing the field sampling strategy identifying under-sampled areas and under-sampled vegetation types within each park to direct field data collection efforts.

CNPS will provide field crew training on classification plot and accuracy assessment data collection.

CNPS will attend planning/scoping meeting(s) to meet with other project cooperators to discuss the classification and its relationship to mapping.

CNPS will complete an interim classification and final vegetation classification including vegetation descriptions (up to 70), field key to vegetation types, and a written report detailing the methods used and results obtained during the data analysis.

CNPS will coordinate with NatureServe to analyze and describe the vegetation data collected in the Mojave Desert portion of Parashant National Monument as part of the Grand Canyon vegetation mapping project.

CNPS will subcontract to NatureServe to provide review of the interim and final classification, vegetation descriptions and field key to vegetation types.

CNPS will subcontract to NatureServe to assist with a field test of the field key to vegetation types.

CNPS will subcontract to NatureServe to assist with the training of field crews in accuracy assessment sampling protocols.

CNPS will subcontract to NatureServe to provide guidance insuring that the final classification and vegetation descriptions conform to the National Vegetation Classification Standard (NVCS).

CNPS will subcontract to NatureServe to provide data management support for incorporating the vegetation descriptions produced in conjunction with this project into the NVC.

CNPS will work with the mapping contractor and MOJN to develop map classes based on the interim and final classifications of plant alliances and associations and upper levels of the NVCS hierarchy.

NPS's Involvement (Responsibilities) (If a cooperative agreement or CESU, must identify NPS's substantial involvement)

MOJN will provide financial assistance to CNPS for work performed.

MOJN will provide to CNPS legacy datasets in a standard format ready for classification analysis.

MOJN will provide to CNPS any available and needed spatial data layers.

MOJN will communicate with park staff to identify vegetation types of concern at each park and of particular interest for sampling.

MOJN will identify a GIS specialist(s) who will assist with the field sampling design including identifying ecological zones, biophysical units and completing the gradsect (gradient oriented transect) analysis.

MOJN will review and participate in discussions of the preliminary classification and sampling strategy and provide input on modifications needed.

MOJN will contract field crews to complete collection of field classification and accuracy assessment data.

MOJN will provide logistical support to CNPS when conducting field crew trainings. The MOJN VMC may participate as an instructor during the trainings.

MOJN will identify NPS or contracted staff to write the vegetation descriptions beyond those written by CNPS.

MOJN staff will review and participate in discussions of all draft project product deliverables.

MOJN will be responsible for performing quality assurance and quality checking of the databases provided to CNPS for classification analysis.

MOJN will coordinate contacts between CNPS, park staff and the mapping contractor(s).

MOJN and CNPS, jointly, agree to:

Meet together periodically, and with other project cooperators, to coordinate project activities, track project progress and expenditures, and ensure consistency in attainment of project goals.

Ensure coordination between project cooperators and staff of the University of Las Vegas and NatureServe.

Review and approve the content of materials that will be compiled for presentation at public meetings.

Performance schedule with tasks, timelines and deliverables

Phase I: Planning for Field Work and Mapping; Preliminary Classification

Time Frame: Aug 15, 2009 - Jan 31, 2010

Task 1 – Project Startup – Obtain and Review Datasets. Aug 15 – Oct 1, 2009.

CNPS staff will obtain and review existing Mojave Desert vegetation data compiled by Mojave Network staff in preparation for follow-up vegetation sampling, classification and mapping at LAME, MOJA and DEVA. CNPS and Mojave Network staff will determine which datasets are appropriate for preliminary classification and review existing lists and reports of vegetation types. Data will be provided by NPS staff in MS Access Database and Excel formats with species composition and abundance (% cover), by August 15, 2009 for CNPS to begin this task.

Task 1 Deliverables. Evaluation of existing datasets and project materials obtained from Mojave Network staff, deciding which datasets are applicable for preliminary classification analysis in 2009.

Task 2 – Preliminary Classification Analysis. Sept 1 – Dec 15, 2009.

CNPS staff will classify the statistically analyzable existing data using PC-ORD, a multivariate statistical package, including cluster analysis and indicator species analysis. CNPS will prepare a preliminary classification of alliances and associations in concordance with the NVCS and the California state classification (*Manual of California Vegetation*), and the preliminary classification will be compared and updated with the current California state and national classifications. California Department of Fish and Game (CDFG) and Network staff will act in an advisory role to review and verify results.

Task 2 Deliverables. Preliminary classification of vegetation established with identification of the main types (alliances/associations) in the Mojave Desert in 2009.

Task 3 – Assistance with Field Sampling Strategy. Nov 1, 2009 – Jan 31, 2010.

CNPS staff will assist partners in developing a sampling strategy across the three Parks. Partners will identify gaps in the data within the parks, identify numbers of samples needed for completing the fine-scale classification and mapping and review a GRADSECT analysis (produced by mapping team) via email and phone calls. The Park staff also will advise on rare and important types that need additional survey.

Task 3 Deliverables. Guidance on sampling strategy for 2010-12 field seasons with project partners, identifying data gaps for additional sampling and reviewing of GRADSECT analysis in 2009.

Phase II: Support of First Year's Vegetation Sampling, Classification and Mapping

Time Frame: Jan 1 - Dec 31, 2010

Task 4 – Planning Meeting and Relevé Training for Field Crews. Jan 1 – Jun 1, 2010.

CNPS staff will meet with field crews and partners to begin the first field season of sampling. In January, two CNPS staff will assist in the first training of field crews on relevé data collection in

LAME. In mid-May, CNPS staff will provide a second training with field crews, to calibrate them on sampling in upper elevations of DEVA and MOJA.

Task 4 Deliverables. Two (2) trips to train NPS-UNLV field staff in relevé sampling techniques and interpretation of vegetation stands, with the first trip to include a meeting with project partners in early 2010.

Task 5 – Interim Classification and Field Key. Aug 15 – Dec 31, 2010.

CNPS staff will receive the first year's field data by August 20, 2010, after the data have been entered and quality-controlled and unknown plants have been identified by NPS staff. CNPS will establish an interim classification, particularly for LAME, by November 1. The classification will be reviewed by partners (NatureServe, Network and NPS staff) by December 1. An interim field key for the LAME classification will be produced including alliances (by CNPS) and mapping classes (by BOR mapping team) by December 31.

Task 5 Deliverables. Analysis of 2010 relevé data to create an interim classification; preliminary placement in the NVCS hierarchy; development of a field key based on the interim classification (with key to alliances and associations by CNPS, and mapping classes by mapping team) in late 2010.

Task 6 – Field Reconnaissance and Map Classification Meetings. Dates TBD (Oct 1 – Dec 31, 2010).

Two meetings during the fall-winter of 2010 will occur with the partners (NPS, CNPS and BOR staff), and CNPS staff will work with the partners to develop/review map classes related to the floristic classification for LAME. These meetings will include field review of the interim classification and field key and reconnaissance to review vegetation signatures and map classes.

Task 6 Deliverables. Two (2) meetings including one (1) trip of reconnaissance with partners (e.g., mapping team) and one (1) additional meeting to review development of mapping classification; and periodic check-in with partners in the fall-early winter 2010.

Phase III: Accuracy Assessment Sampling Training (for LAME), Relevé Training (for DEVA, MOJA), AA Analysis Interpretation

Time Frame: Jan 1, 2011 – Dec 31, 2011

Task 7 – Accuracy Assessment Sampling Training for Field Crews (at LAME). Dates TBD (Jan 1 – June 30, 2011).

CNPS staff will confirm Accuracy Assessment (AA) sampling methods with project partners and then meet with partners to train field crews on AA sampling for LAME. Both CNPS and NatureServe will provide standards for AA field methods with at least four field staff trained on the use of the field key and the sampling methods to verify mapped vegetation units in early 2011.

Task 7 Deliverables. Participate in one (1) field training for accuracy assessment sampling (at LAME) with partners (including NPS, UNLV and NatureServe) in early 2011.

Task 8 – Relevé Training for Field Crews (at DEVA, MOJA). Dates TBD (Jan 1 – June 30, 2011).

CNPS staff will provide one relevé training for data collection in DEVA and MOJA in early 2011. The training will focus upon calibrating at least six field staff on relevé sampling methods.

Task 8 Deliverables. Participate in one (1) field training for relevé sampling (at DEVA or MOJA) with partners (including NPS, UNLV) in early 2011.

Task 9 – Review of Accuracy Assessment Analysis (at LAME). Sept 1 – Dec 31, 2011.

Partners will reconvene after the BOR mapping team completes vegetation mapping and runs accuracy assessment analysis (AA) at LAME. Through a series of emails and conference calls, CNPS will review and interpret the AA analysis results provided digitally by the partners, and provide recommendations for mapping classes to meet at least 80% accuracy by late 2011.

Task 9 Deliverables. Review of digital records for AA analysis of the mapped vegetation units (for LAME) through conference calls, and periodic check-in with partners by late 2011.

Phase IV: Final Classification, Wrap-up of LAME Vegetation Mapping, Reporting and Start-up of MOJA (or DEVA) Mapping

Time Frame: Jan 1, 2012 – May 31, 2013 (Tasks 10-15); Aug 15, 2013 – Aug 14, 2014 (Tasks 16-17)

Task 10 – Data Analysis Preparation. Aug 20 – Sep 30, 2012.

CNPS staff will review and prepare existing Park data for final classification analysis, including quality control and standardization of the relevé data from 2010-2012 and the existing Park data from 1997 to 2009. Data will be provided by NPS staff in MS Access Database format with species composition and abundance (% cover) by August 20, 2012 for CNPS to begin this task.

Task 10 Deliverables. Preparation of data for final analysis, including relevé data from 2010-2012 and other existing Park data, in the fall 2012.

Task 11 – Final Draft NVCS Classification and Field Key. Oct 1 – Dec 15, 2012.

CNPS staff will produce a final draft classification of alliances and associations for all statistically analyzable vegetation samples, using PC-ORD cluster analysis, indicator species analysis and ordination. A field key will be produced with this floristic classification by Nov 20, 2012, and this classification will be placed within upper levels of the NCVS hierarchy. This classification will be compared and updated into the California state and National classifications, and the results will be reviewed by CDFG, NPS and NatureServe ecologists by Dec 20, 2012.

Task 11 Deliverables. Final Draft NVCS classification and field key of alliances and associations for all statistically analyzable vegetation plots in late 2012.

Task 12 – Field Review of Classification and Field Key. Dec 1, 2012 – Jan 31, 2013.

CNPS and other partners will perform two (2) field trips in the fall/winter of 2012. Two CNPS

staff will work with the partners to develop/review map classes related to the floristic classification. We will review the final draft NVCS/mapping classification, test the field key and may perform reconnaissance with the mapping team to review vegetation signatures and mapping classes (especially for MOJA and/or DEVA). Based on reviews in the field and with the existing state classification records, CNPS staff will update and finalize the classification and field key in databases and word documents.

Task 12 Deliverables. - Two (2) field trips for reviewing the final draft NVCS/mapping classification and field key, and for reconnaissance with mapping team in late 2012-early 2013.

Task 13 – *Digital Report of Draft Vegetation Descriptions.* Jan 16 – Mar 31, 2013.

CNPS will provide a draft template for vegetation descriptions of alliances and associations in MS Word format for both NPS and CNPS for writing local park descriptions. CNPS also will provide a digital report of 70 draft vegetation association descriptions by CNPS in early 2013. Both NPS and NatureServe will review the descriptions.

Task 13 Deliverables. – Draft template for local vegetation descriptions (for NPS and CNPS to write descriptions); Digital report of 70 draft vegetation descriptions by CNPS in early 2013.

Task 14 – *Compiled Digital Report of Methods, Classification and Descriptions.* Mar 1 – Apr 30, 2013.

CNPS will produce contents of a digital report to document the sampling and classification methods, the final draft classification, field keys and written descriptions. Other report contents will be compiled by the mapping team, including project overview, map classification and mapping results and accuracy assessment analysis results by April 30, 2013. NatureServe will arrange data management assistance with oversight by a NatureServe ecologist to update the NVC with the vegetation descriptions.

Task 14 Deliverables. - Compiled digital report including field sampling and classification methods, final NVCS classification, key to vegetation types and vegetation descriptions in early 2013.

Task 15 – *Finalized Vegetation Report and Project Presentation.* May 1 – May 31, 2013.

CNPS and partners will review and finalize the report, after obtaining input from NPS staff. One (1) trip for a project presentation will occur to discuss the resulting report, database of surveys and map of LAME with the BOR mapping team, CNPS and NPS staff by May 31, 2013.

Task 15 Deliverables. - Finalized vegetation report, survey database and LAME map, with one (1) trip for presentation meeting with partners in early 2013.

Task 16 - *Accuracy Assessment Sampling Training for Field Crews (at MOJA).* Dates TBD (Sept 1, 2013 – Apr 1, 2014).

CNPS staff will meet with project partners to train field crews on AA sampling for MOJA. CNPS will provide standards for AA field methods with at least four field staff trained on the use of the field key and the sampling methods to verify mapped vegetation units by late 2013 or

early 2014.

Task 16 Deliverables. - One (1) field training for accuracy assessment sampling (at MOJA) with partners by late 2013 or early 2014 (depending on map results being available).

Task 17 – *Review of Accuracy Assessment Analysis (at MOJA)*. Dates TBD (May 1 – Aug 14, 2014).

Partners will reconvene after the mapping team completes the second-phase of vegetation mapping and accuracy assessment analysis (AA). Through a series of emails and conference calls, CNPS will review and interpret the AA analysis results provided digitally by the partners, and provide recommendations for mapping classes to meet at least 80% accuracy. CNPS will also update the field key and classification base upon post-AA review of the AA sampling and mapping results.

Task 17 Deliverables. – Review of digital records for accuracy assessment analysis of the mapped vegetation through conference calls, and post-AA revision of field key and classification in early 2014.

Terms of the Agreement (If multiple year agreement, each year must also address performance schedule with tasks and timelines)

The term of this agreement will be between August 15, 2009 and August 14, 2014.

Phase I, Aug 15, 2009 – Jan 31, 2010

1. Project Startup – Obtain and Review Datasets
2. Preliminary Classification Analysis
3. Assistance with Field Sampling Strategy

Phase II, Jan 1 – Dec 31, 2010

4. Planning Meeting and Relevé Training for Field Crews (Attend one planning meeting; Assist with training of field crews)
5. Interim Classification and Field Key (of alliances and associations)
6. Field Reconnaissance and Map Classification Meetings

Phase III, Jan 1, 2011 – Dec 31, 2011

7. Accuracy Assessment Sampling Training for field crews (at LAME)
8. Relevé Training for field crews (at DEVA, MOJA)
9. Review of Map Accuracy Assessment Analysis (at LAME)

Phase IV, Jan 1, 2012 – May 31, 2013

10. Data Analysis Preparation
11. Final Draft NVCS Classification and Field Key
12. Field Review of Classification and Field Key
13. Digital Report of Draft Vegetation Descriptions
14. Compiled Digital Report of Methods, Classification and Descriptions
15. Finalized Vegetation Report and Project Presentation

Phase IV, Aug 15, 2013 – Aug 14, 2014 (Exact Dates to be Determined)

16. Accuracy Assessment Sampling Training for Field Crews (at MOJA)
17. Review of Map Accuracy Assessment Analysis (at MOJA)

Based on calendar year-end reviews, modifications may be needed for the task timeline dates and deliverables with the availability of federal funding.

Table 3. Preliminary Project Timeline and Task Estimated Completion Schedule			
Phase I, Aug 15, 2009 – Jan 31, 2010		Estimated start date	Estimated completion date
Task 1	Project Startup – Obtain and Review Datasets	August 15, 2009	October 1, 2009
Task 2	Preliminary classification analysis	September 1, 2009	December 15, 2009
Task 3	Assistance with field sampling strategy	November 1, 2009	January 31, 2010
Phase II, Jan 1 – Dec 31, 2010			
Task 4	Planning Meeting and Relevé Training for Field Crews	January 1, 2010	To be determined (June 1, 2010)
Task 5	Interim classification and Field Key (to alliances and associations)	August 15, 2010 November 1, 2010	December 1, 2010 December 31, 2010
Task 6	Field Reconnaissance and Map Classification Meetings	To be determined (October 1, 2010)	To be determined (December 31, 2010)
Phase III, Jan 1, 2011 – Dec 31, 2011			
Task 7	Accuracy Assessment Sampling Training for field crews (at LAME)	To be determined (January 1, 2011)	To be determined (June 30, 2011)
Task 8	Releve Training for field crews (at DEVA, MOJA)	To be determined (January 1, 2011)	To be determined (June 30, 2011)
Task 9	Review of Map Accuracy Assessment Analysis (at LAME)	September 1, 2011	December 31, 2011
Phase IV, Jan 1, 2012 – May 31, 2013			
Task 10	Data Analysis Preparation	August 20, 2012	September 30, 2012
Task 11	Final Draft NVCS Classification and Field Key	October 1, 2012 November 1, 2012	December 15, 2012 November 30, 2012
Task 12	Field Review of Classification and Field Key	December 1, 2012	January 31, 2013
Task 13	Digital Report of Draft Vegetation Descriptions	January 16, 2013	March 31, 2013
Task 14	Compile Digital Report of Methods, Classification and Descriptions	March 1, 2013	April 30, 2013
Task 15	Finalized Vegetation Report and Project Presentation	May 1, 2013	May 31, 2013
Phase IV, Aug 15, 2013 – Aug 14, 2014 (Exact Dates to be Determined)			
Task 16	Accuracy Assessment Sampling Training for Field Crews (at MOJA)	To be determined (September 1, 2013)	To be determined (April 1, 2014)
Task 17	Review of Map Accuracy Assessment Analysis (at MOJA)	To be determined (May 1, 2014)	To be determined (Aug 14, 2014)

Attachment A. Project Location

Mojave Network
Inventory and Monitoring Program

National Park Service
U.S. Department of the Interior

