desert conservation
PROGRAM

Data Management Guidelines

Introduction

The Multiple Species Habitat Conservation Plan (MSHCP) and the U.S. Fish and Wildlife Service Biological and Conference Opinion on Clark County's Section 10(a)1(B) incidental take permit application set the standard that all projects funded by the MSHCP must be responsive to adaptive management. Therefore, projects that provide conservation benefits (*implementation projects*) should be demonstrated to be effective, and be documented well enough to support assessment. Projects that provide information to determine the effectiveness of implementation projects or to provide information on species or ecosystem status (*information gathering projects*) must be documented well enough so that the project can be repeated and the information produced can be used or combined with other datasets to perform the analyses that assess progress toward MSHCP objectives.

All projects will follow this data management plan format unless otherwise directed or prior written approval is granted by the County. The County may prescribe the data management plan and/or project proponents may be required to develop additional components of the data management plan for their project and submit it as a first quarter deliverable. Certain standards and guidelines have been established to ensure the quality of data. The County may require more detailed data management plans and more stringent data quality and assurance methods for long-term monitoring or risky projects.

Each project's data management plan describes data collection procedures, data management methods, processes to be used to ensure the accuracy and quality of the data, and the storage of data. The data management plan also identifies key project team members and their data management responsibilities. The data management plan should be clearly dated and include the minimum components described below.

Section 1: Project Description

Briefly describe the project in executive summary style including the MSHCP project number, contract title(s) and number(s), and all funding sources. Also include the following:

***Project Location*:** Describe the project location using UTM, NAD 83 coordinates representing the outline of your project area. These coordinates need not be exact but they should represent the project area and not be outlines of the county, state, or Mojave Desert.

Goals and or objectives: Describe the project's purpose and include any goal or objective statements that are in the project contract or protocols.

Section 2: Data Collection

The metadata for all project data will describe in detail the data that will be collected and the methods that will be used for collection, field crew training or certification, and equipment calibration. The following must be included:

Methods: Within the body of the metadata file or as a standalone document in either .doc or .pdf format, provide a methods report. This report should include at a minimum; 1) final methods used for collecting, processing, and analyzing field data, 2) final methods used for collection and processing/analyzing of spatial data (including software/hardware products used), and 3) final methods used in processing/analyzing of data delivered in spreadsheet format (this should include formulas used in the spreadsheet). Cite literature references for standard data collection methods where appropriate, noting any deviations from those standard methods. This report should document any changes in data collection, processing methods, and software enhancements made throughout the project term. Note also the storage location and fate of samples collected and where voucher specimens have been deposited. The methods report files are a required component of the final data deliverable.

***Spatial Data*:** Almost all MSHCP projects will involve the collection of spatial data. Spatial data should be collected with Global Positioning System (GPS) receivers whenever possible. Resource or mapping grade GPS units are recommended although recreational grade units can be used for data with lower accuracy requirements, such as wildlife locations or generalized habitat. See *Appendix A* for GPS unit parameters.

The metadata must include the make and model of each GPS unit used for the project, and record the error for each location or feature collected. Error should be recorded as Probability Dilution of Precision (PDOP) on mapping grade units and Estimated Positional Error (EPE) on recreational grade units. If your GPS data is corrected, record the type of correction used (e.g. WAAS, post-processing, or beacon).

Point locations or features should be recorded by averaging positions to increase accuracy. For high accuracy features, such as section corners, a minimum of 180 positions should be averaged at 1 position per second. A minimum of 30 positions should be averaged for all other features. Positions for lines and polygons should typically be collected at a rate of 1 position per second or at a minimum of 10-foot intervals.

When using mapping grade GPS units, a data dictionary should be used on the unit to provide consistency in data collection and reduce data collection errors (see *Data Dictionary* below).

***Aspatial Data*:** Data that are not spatially linked are also gathered by MSHCP projects. These are often tabular but may also include voucher specimens, photographs or samples of soil, etc. Examples of a spatial tabular data include data collected in laboratories for research projects, data regarding individual observer's error rates to calibrate monitoring project results, data regarding the results of an educational outreach effort, and data regarding seed fates are all examples of data that may not include spatial location attributes. All data should also include metadata.

***Existing Data*:** List existing data that you will be using in your project, including appropriate citations and metadata files. For example, existing data may include spatial data representing stream reaches from the US Geological Survey or soils data from the Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database.

***Data Dictionary*:** A data dictionary defines the fields and domains in a database, spatial data file, or GPS data collection file. Data dictionaries may be prescribed and provided by the County, or project proponents may be required to create their own. Information from the data dictionary will be entered into the Entity Attribute section of the metadata for each dataset (see the *Metadata* section below). See *Appendix B* for an example of a data dictionary.

Section 3: Data Management

In this section of your data management plan, describe in detail the methods that you will be using to manage data for this MSHCP project. This section details how your data will be stored during collection, analysis and any archival deposits of the data. The County will maintain their copy of the data deliverables according to County Records Management Policies, which may be time limited. Please be specific and cite references where appropriate. The following guidelines have been established and should be addressed when describing your data management methods:

Roles and Responsibilities: Document the names of all data collection staff, data processing staff, and data management staff. Describe the role and responsibilities of each staff person regarding data collection, quality control, quality assurance, processing, analysis, and management.

Paper Datasheets: If paper data forms are used during the project, provide digital copies to the County. Digital copies may be provided in Adobe Acrobat (.pdf) format digital scanned at 300 dpi or greater resolution. Document all scanning settings in the data management plan.

Photos, Sound, and Video Recordings: Describe the settings used on the camera or other recording device and the file format(s) used for short term and archival storage.

Spatial Data: Spatial data should be stored electronically in a spatial data file format (e.g. ESRI shapefile or geodatabase) or as coordinates in a relational database. The accuracy of the collected data will be reported in the metadata. If spatial datasets include related tables (i.e. Access .mdb with associated .tbl tables), document all table relationships between tables and spatial data. For all attribute data associated with spatial coordinates see the Tabular Data section below.

Tabular Data: Tabular data should be stored in electronic format in a relational database or spreadsheet. Use of a database is preferred and allows for data validation as data is entered into the database and for exploratory data analysis (see Data Accuracy and Quality section below).

If multiple related tabular datasets are delivered provide key fields and describe all linkages of fields in relational tables in the data dictionary and metadata files. Pay particular attention to the use of zero (0) values in tabular datasets; zero's can be interpreted as either no data or zero value. In the data dictionary and metadata sections provide your definition of the use of zero (0) in the tabular data. Do not deliver tabular datasets with embedded password protection.

Version Control and File Names: Describe a standard digital file naming protocol and a version numbering system for datasets to assist in identifying the various data files during the project and at completion.

Metadata: All data must include metadata. Spatial data and databases must be documented with Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM), version 2.0, FGCC-001-1998 compliant metadata. This metadata contains information such as who created the data, data accuracy, what the data are useful for, and how to read the data. Computer programs such as ArcCatalog or other applicable software programs can create ESRI-compatible metadata for spatial data sets.

Tabular data should include much of the same metadata information required for spatial data. Metadata for voucher specimens, photos, or other samples should include descriptions such as the rules for selection of the sample, camera settings, care during transportation, and the ultimate fate of samples, such as deposit in a repository or a herbarium. Whichever program is used to document metadata, all metadata should be exported in .xml or .txt format for submission with final data deliverables.

Data Storage: Describe short term storage, backup cycles, long term data storage and any repositories or archives where data will be deposited for permanent storage. The County will maintain their copy of the data deliverables according to County Records Management Policies, which may be time limited.

Data Sharing: Document any portion of the data that are "confidential" as defined by law, regulation, or policy. All other data provided to the County will be subject to disclosure upon request as per Nevada Public Records Law.

Section 4: Data Accuracy and Quality

This section of the data management plan describes the processes to be used in ensuring the accuracy and quality of your project data, commonly referred to as Quality Assurance and Quality Control (QA/QC). Detail the specific QA/QC procedures to be used for the project -- don't just refer to another document. Organizations and agencies with internal guidance can develop QA/QC for their project using their own procedures as a starting point. Individuals and entities without internal guidance can refer to the EPA's Quality System website (http://www.epa.gov/quality/index.html) for example guidance on developing quality standards for projects.

At a minimum, QA/QC procedures for your project must address:

- Methods to ensure that field data forms and tables are complete. Standardization of data collection procedures may include development and use of data dictionaries, including those for databases and mapping-grade GPS units that require data be entered in all fields before the form can be closed.
- Standardization of data management including development and use of a spatial data files and electronic databases with data validation procedures.
- Methods for post-collection data verification using display of spatial data to detect location errors, detection of outliers or biologically-nonsensical values for tabular data, statistical reports and graphs, or other procedures.

Appendix A GPS Settings

Refer to your owner's manual for specific instructions on how to change the settings on your particular GPS unit:

GPS Equipment Setup Parameters

Mapping Grade GPS (e.g. Trimble)		Recreational Grade GPS (e.g. Garmin)
WGS84 or NAD83	**Horizontal Datum**	WGS84 or NAD83
Height Above Ellipsoid (HAE)	**Vertical Datum**	Height Above Ellipsoid (HAE)
UTM	**Coordinate System**	UTM
3D (minimum 4 satellites)	**Accuracy Mode**	3D (minimum 4 satellites)
maximum PDOP of 6.0	**Error**	minimize EPE
5 degrees or higher	**Elevation Mask**	n/a
post-process or WAAS	**Correction**	WAAS if available
meters	**Units**	meters

Appendix B Data Dictionary

The following is a basic example of a data dictionary used for inventorying roads:

Field	Domain	Field Description	Field Type
Name	255 characters of text	Official name of road	Text
Number	0..n	Official road number	Number/Integer
Maintenance Responsibility	County NPS BLM USFS USFWS Private Other	Agency or individual responsible for maintaining the road	Text
Maintenance Frequency	Annually Semi-annually Monthly As needed Not maintained	Frequency with which road is maintained	Text
Width	0.00..N.nn	Width of road in meters	Number/Float
Length	0.00..N.nn	Length of road in meters	Number/Float
Surface Type	Paved Gravel Dirt 4x4 Other	Surface condition of road	Text
Class of Use	Motorized Equestrian Hiking Other	Class of road use	Text