MSHCP Species Status Database User Guide

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Version 1.1

Version 1.0 created by Shawn MacCabe, Desert Research Institute, for the Clark County Desert Conservation Program, March 2009

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Introduction:

- The Clark County Multiple Species Habitat Conservation Plan (MSHCP) is administered and implemented by the Desert Conservation Program on behalf of seven Permittees (Cities of Boulder City, Henderson, Las Vegas, Mesquite and North Las Vegas; Clark County and Nevada Department of Transportation) in order to maintain a Section 10(a)(1)(B) Incidental Take Permit under the federal Endangered Species Act.
- The MSHCP includes a requirement that species trend tracking be implemented by the Desert Conservation Program.

Purpose:

- This database is designed to track available species population status related data for covered, evaluation and watch list species addressed by the Clark County MSHCP.
- MSHCP species trend tracking will be accomplished periodically using the data in this database.
- This database is maintained in Microsoft Access ® 2000 file format.

Users viewing the data or generating queries and reports should take great care not to mistakenly overwrite existing data.

Main Menu:

When the Microsoft Access ® file is opened, the *Main Menu* window will display. This menu displays the functions of this database. (Figure 1)
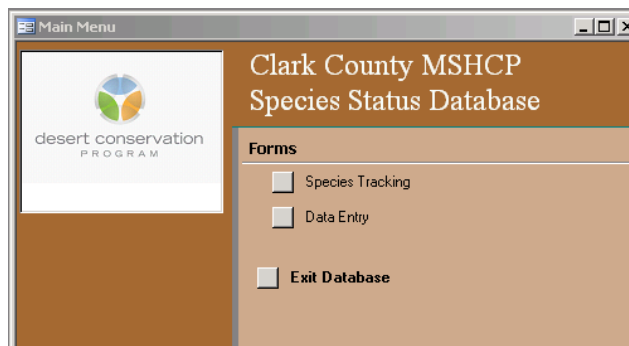
- Species Tracking
- Data Entry
- Exit Database

Figure 1

Main Database window:

In addition, at all times the *Main Database* window (Figure 2) will be open. The *Main Database* window is automatically launched when the database is opened and may be minimized during database use, but closing this window will exit the

database. The *Main Database* window also allows the user to navigate to all *Objects* in the database, including all tables, queries, forms and reports.
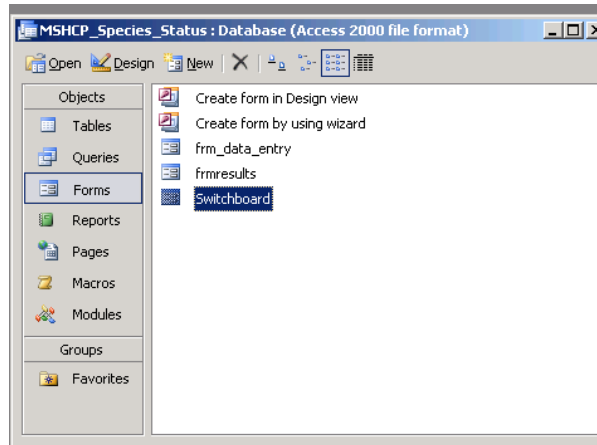

Figure 2

Species Tracking form:

To display the *Species Tracking* form, select it from the *Main Menu* window (Figure 1). The *Species Tracking* form window (Figure 3) displays the available data for each species in the upper portion of the window, as well as the species status summary statistics for the selected population and dataset in the lower half of the window. Each field is described in greater detail below. The *Species Tracking* form window has three basic functions: (1) data viewing form, (2) a report tool, and (3) a data entry form. Users viewing the data or generating queries and reports should take great care not to mistakenly overwrite existing data.

Figure 3

Species Tracking form Data Viewing function:
The *Species Tracking* form window displays the available species population and environmental datasets and summary population status data for each species. The top portion of the form displays selection boxes for *Species*, *Population Name*, *Year*, and *Method*. The *Species* selection box will display the scientific names of all species with data currently entered in the database. The *Population Name* selection box will provide a list of the populations or occurrence-clusters for which data are available. Determination of population boundaries is described in greater detail in the data entry section of this user guide. The *Year* selection box will display the years for which data have been entered for each species and population. The *Method* selection box will display the type of data collection method used by those who collected the species and environmental data in the field. After a species has been selected from the *Species* selection box drop down list, the selection can be filtered and narrowed by selecting *Population Name*, *Year*, and/or *Method*.

The available *Sample Data* dataset information will display in the middle third of the *Species Tracking* form window for the selected species, population, year and/or method. The *Sample Date* field will display the dates of data collection for the available datasets. The *Sample Methods* field will display the type of data collection methods used. The *Sample Years* field will display the years for which datasets are available. The *Surveyor* field will display the identity of the person(s) or organization who collected the data. The available datasets will display in the tabbed window in the center of the form. The *Species Data* tab will display the file names of the available *Population Sample Data Files* and *Population Sample Data Method Files*. Similarly, the *Environmental Data* tab will display the file names of the available *Environmental Sample Data Files* and *Environmental Sample Data Method Files*.

The lower third of the *Species Tracking* form window displays the *Summary Population Data* which consists of species summary statistics that have been reported by the data collector or generated by an expert using the datasets. The summary statistics are displayed after a selection has been made in the top three selection boxes: *Sample Date*, *Population Sample Data File*, and *UTM's*. The *Sample Date* selection box will display the dates on which available data were collected. The *Population Sample Data File* selection box will display the datafiles that correspond to that data collection effort. The *UTM's* selection box will display the X and Y coordinates of available population groupings in Universal Transverse Mercator (UTM) meter coordinates, Zone 11 projection, North American Datum (NAD) 83 datum.

The possible summary population statistics that may be available are:

- *Est. Abundance*
- *Est. Area of Occupied Habitat*
- *Est. Area of Breeding Habitat*
- *Area of Occupied Habitat (m^2)*
- *Est. Population Size*
- *Est. Population Size Standard Error*
- *Mean Density*
- *Standard Error Density*
- *Median Density*
- *No. Breeding Pairs*
- *No. Active Nests*
- *No. Fledglings*

In addition, if available, file names for *Pdf Sketch of Occupied Habitat* and *Shapefile of Occupied Habitat Perimeter* will display.

Species Tracking form Report function:

From the *Species Tracking* form, users can query the database and generate reports that list the names of all relevant datasets for species (population data files) or environmental (habitat data files) data for a particular species. Note that a report will only contain species datasets or environmental datasets. To query the datasets a species must be selected in the *Species Tracking* form window. After a species has been selected from the *Species* drop down list, the selection can be filtered and narrowed by selecting *Population Name*, *Year*, and/or *Method*. The query can also be further narrowed by selecting and highlighting either desired *Species Data* or *Environmental Data*. After all desired datasets are highlighted, click on the *Generate Report* button.

Reports are named in the following manner:
<species name>_<pop OR env>_<MM/DD/YYYY>.
Prior reports from the same day for same species and data type will be overwritten by the more recent report. The *Reports* window should appear and display the newly created report (Figure 4). If the *Reports* window does not appear automatically, navigate to the *Main Database* window (Figure 2), and select *Reports* from the *Objects* list.   If you do not see your report please try again. To view, export or print this report go to the *Main Database* window (Figure 4) and in the *Objects* list select *Reports* and locate the report.
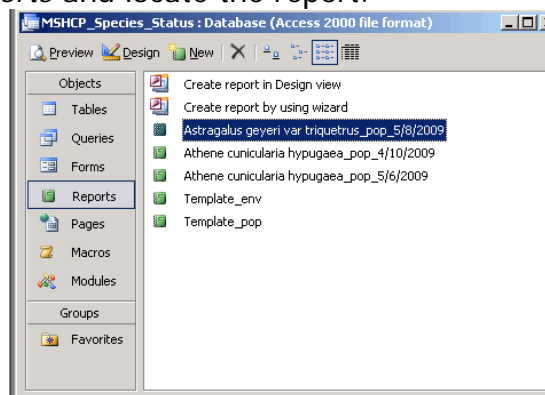

Figure 4

Export/Print Report:

To export or print a selected report make sure the report is open.

To print:

Select File> Print or click which is located on the toolbar on the top of the page (Figure 5)

To export:

Select the little drop down arrow next the to Microsoft Word ® symbol . In this drop down list a user can select options to create an Microsoft Excel ® or Microsoft Word ® file. Follow the wizard steps to name and save your report file to the desired location.

Figure 5

Data Entry Form:

To display the *Data Entry* form, select it from the *Main Menu* window (Figure 1). The *Data Entry* form window allows a user to update the database with new dataset information when it becomes available. The *Data Entry* form window (Figure 6) contains the data fields that are found on the upper part of the *Species Tracking* form, as well as a field to enter the *Species Scientific Name*, *Species Common Name* and *Comments*. This data should only be entered by an expert. See the Entering New Data section of this user manual for more information.

Figure 6

Summary Population Data must be entered separately, using the fields in the *Species Tracking* form window. The lower third of this form is the *Summary Population Data* section which contains fields for entry of qualitative and quan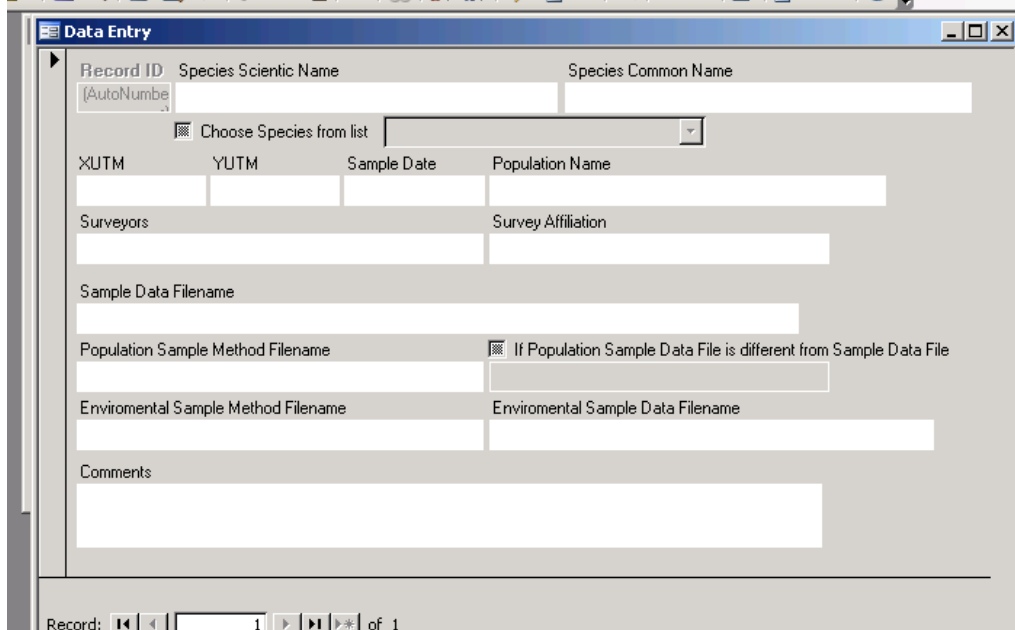titative species population status data (Figure 7). This data should only be calculated and entered by an expert. See the Entering New Data section of this user manual for more information.

Figure 7

Entering New Data:

New data should only be entered by an expert who is sufficiently familiar with the life history of the species to evaluate the datasets. The type and quality of the available data will vary greatly. In most cases, population summary statistics will not be provided with the dataset and must be calculated by a biologist sufficiently familiar with the life history of the species to evaluate the methods used to collect the data and generate species-appropriate population summary statistics that are reasonable to calculate from the data provided. Data should be evaluated, prepared and entered using the process described below.

Preparing available species data for entry into the database:
Provision of available data: Available species data in their native format will be provided by the Clark County Desert Conservation Program. Generally these data are in ArcGIS ESRI ®, Microsoft Access ® or Microsoft Excel ® format. Documentation of data collection methods may be provided in an Adobe Acrobat document or a Federal Geographic Data Committee compliant metadata file format such as XML or TXT.

Locate and evaluate species records within available data: Examine each provided dataset and determine which location and other species or environmental data records are within each dataset. Identify any files that document the methods used to collect the data. Evaluate the appropriateness of entering these data in the database, and note any data deemed inappropriate to include in the database due to questionable quality, lack of metadata, etc.

<u>Create species specific data tables:</u> For those data appropriate to include in the database, extract data from each dataset for each species to be included in the MSHCP Species Status Database, and create new species specific data tables with unique file names. Do the same for any associated environmental data. To the extent practicable, the new file names should include the original dataset file name.

<u>Add UTM coordinates to records in species specific data tables:</u> For each location record, insert a single X, Y coordinate for each record. The X, Y coordinates entered into the database must be in UTM meter coordinate system, Zone 11 projection and NAD83 datum. The original location records may describe individuals or clusters of the species, nests or sample transect locations, and should be described in the metadata accompanying the original dataset.

For locations defining a sampling transect, use the point location of the transect start point. Single point feature coordinates should be determined using ArcGIS function 'Add XY coordinates (ArcToolBox – Data Management Tools – Features – Add XY Coordinates)' to generate two fields, POINT_X and POINT_Y. If a centroid point for polygons must be created use the following method. Polygon feature coordinates should be determined using the ArcGIS function, 'Feature To Point (ArcToolBox – Data Management Tools – Features – Feature To Point)' to site the centroid of a polygon with associated attribute data. Following identification of the centroid, the function 'Add XY Coordinates' should be used to determine X and Y coordinates, POINT_X and POINT_Y.

Please note, that any future rigorous spatial data analyses will be preformed on the original datasets, and the X, Y coordinates in this database are illustrative only, and should only be used to identify potential population groupings within and immediately surrounding Clark County, NV.

<u>Transcribe feature class data to template table:</u> Using the template table provided in Table 1, transcribe the data from the previous steps. Each field is also described below.

- OBJECTID = a unique identification number for each record that is automatically generated by the database;
- src_OID = a unique identification number for each record from the original source data table;
- src_Filename = the source data table containing population information, the original data records can be traced with fields src_OID and src_Filename;
- SciName = scientific name of species;
- ComName = common name;
- PopName = the name assigned to each population (these names are commonly used by surveyors);
- xUTM and
- yUTM = specific location of population;

- SampleDate = the time period when sampling occurred;
- Surveyors = name of the person responsible for conducting the survey;
- SurveyAffiliation = agency or professional affiliation of surveyor;
- PopSampleMethod = file name containing population sample methods;
- PopSampleData, = file name containing population data;
- EnvSampleMethod, = file name containing environmental/habitat sample methods;
- EnvSampleData = file name containing envirnonmental/habitat data;
- SiteSketch = file name of any drawing of population site;
- Area = the are covered by the population as determined from GPS polygon;
- DataType = type of population data compiled during survey (it is important to know population and environmental sampling methods in order to compare data from different time periods with data using the same or similar methods);
- Note = notes regarding sample; and
- SampleYear = the year of population data collected. Population size and area estimates can be used to calculate density estimates for qualitative data.

Please see Appendix A for examples of previous data transcription methods.

Table 1. Template Table Field names, data type, field length, and a general description of fields used in the database. Type and Length are based on Microsoft Access ® field descriptions.

Field name	Type	Length	Description
OBJECTID	Number	Long integer	Unique ID
src_OID	Number	Integer	ObjectID in source table
src_Filename	Text	55	Source file with population data
SciName	Text	55	Scientific name
ComName	Text	55	Common name
PopName	Text	55	Population name
xUTM	Number	Single precision	X-coordinate, UTM11 NAD83
yUTM	Number	Single precision	Y-coordinate, UTM11 NAD83
SampleDate	Text	10	Year-month-day of sampling
Surveyors	Text	55	
SurveyAffiliation	Text	55	
PopSampleMethod	Text	55	Population sampling method
PopSampleData	Text	55	Document describe sampling method
EnvSampleMethod	Text	55	Environmental data sampling method
EnvSampleData	Text	55	File contains environmental data

Field name	Type	Length	Description
SiteSketch	Text	55	Site description
Area	Number	Single precision	
DataType	Text	10	count, present, qualitative describe
Note_	Text	255	Note
SampleYear	Number	Integer	Year of sampling

Check for duplicate records: Determine if duplicate records are present within the datasets you are preparing for database entry. Also compare the new datasets you are preparing with those data already in the *MSHCP Species Status Database.* Determine which of the duplicate records contains the most complete information and set aside the less complete records. Only proceed with the datasets containing the more complete records.

Assign population names: Assign existing or create new population names to the records within each dataset. Population assignment or name creation should be done in the following manner. Population names should be assigned to represent associations with geographical features or conventions used by past surveyors, as described below.

> 1— For those species that occur in well defined demes that are readily known to management agencies, use population names that have been assigned by agencies, past surveys, or surveyors. For instance, desert tortoise population names were assigned following the Desert Tortoise Recovery Plan (U.S. Fish and Wildlife Service 2008) convention. Spatial records of these species that occur outside a subgroup were assigned "Clark County" as the population name.

> 2— Species with discrete distributions, such as springsnails, that occupy a named geographical feature, such as a spring, should have population names assigned in reference to named habitats. For instance, each springsnail population was named by the spring it occupied.

> 3—Highly localized species should have one population name that is descriptive of their location. For instance, the Mt. Charleston blue butterfly occurs only on Mt. Charleston and this population name (Mt. Charleston) was assigned to all location records of this species.

> 4—Species with distributional clusters of demes that do not have populations or demes named in the original dataset, proximate congregations within the broad distribution of several sample sites should be grouped into clusters and assigned names. For instance, populations of the Las Vegas Valley

buckwheat, relict leopard frog, and Southwestern Willow Flycatcher were named following this method.

5—Species that are highly mobile and do not occupy discrete habitat patches that can be easily named have only one population in Clark County, and all records in the database should be combined in a population named "Clark County".

Compile data tables into database: Because these data are point-feature classes that use the same template for attribute structure (Table 1), they can be merged into a single table for each species using the ArcGIS function 'ArcToolBox – Data Management Tools – General – Merge'. These merged species tables, or each individual table, can then be appended to the existing data tables within the database. Data may also be entered by keying each field value through the *Data Entry* form as described below, but additional quality assurance steps should be followed to ensure the accuracy of the entered information.

Calculating species population summary statistics: An expert with sufficient knowledge of the species' life history should examine the available datasets and makes a determination regarding which (if any) species population summary statistics can be calculated from the data and entered in the database. Any qualitative summary information regarding species status from the original dataset may also be entered. These data should be keyed into the appropriate field through the *Species Tracking* form as described below, and reviewed for accuracy.

Keying data into the MSHCP Species Status Database
Entering dataset information: From the *Main Menu* window open the *Data Entry* form window (Figures 1 and 6 respectively).

The *Data Entry* form (Figure 8) contains the data fields that are found on the upper part of the *Species Tracking* form.
- Determine if the species already has data within the database by checking the *Choose Species from list* option. If the species name appears, select it and proceed with data entry. if the species name is not available in the list, clear the *Choose Species from list* checkbox and enter data within the *Species Scientific Name* and *Species Common Name* fields. Always use the *Choose Species from list* option if possible to avoid duplicate species name entry.
- Continue entering data in the appropriate fields until all fields are filled out or all available information has been added.
- If there is more than one file associated with Population Sample data check the check box next to *Population Sample Method* field and enter the file name.

Figure 8

Entering summary population data:
Summary statistics for each species population and sampling effort are entered using the *Species Tracking* form window. The lower section of the Species Tracking form (*Summary Population Data*) contains qualitative and quantitative species population status data (Figure 9).

To enter data in this section:
- In the upper third of the *Species Tracking* form window, select the *Species*, *Population Name*, *Year* and *Method*
- In the lower third of the *Species Tracking* form window, select from the drop down lists for each of the following fields: *Sample Date*, *Population Sample Data File*, and *UTM's*.
- After finding and selecting the correct population and data collection effort, enter the appropriate *Summary Population Data* (Figure 9).

Figure 9

Troubleshooting:

Data Entry form will not load

If the *Data Entry* form doesn't open by clicking on the button on the *Main Menu*, then open the *Main Database* window (Figure 2). In the *Objects* list select *Forms*. In the list, locate *frm_data_entry*. Highlight by clicking once then click the design button on the top left of the *Main Database* window. The small window shown in the left side of Figure 10 should display.
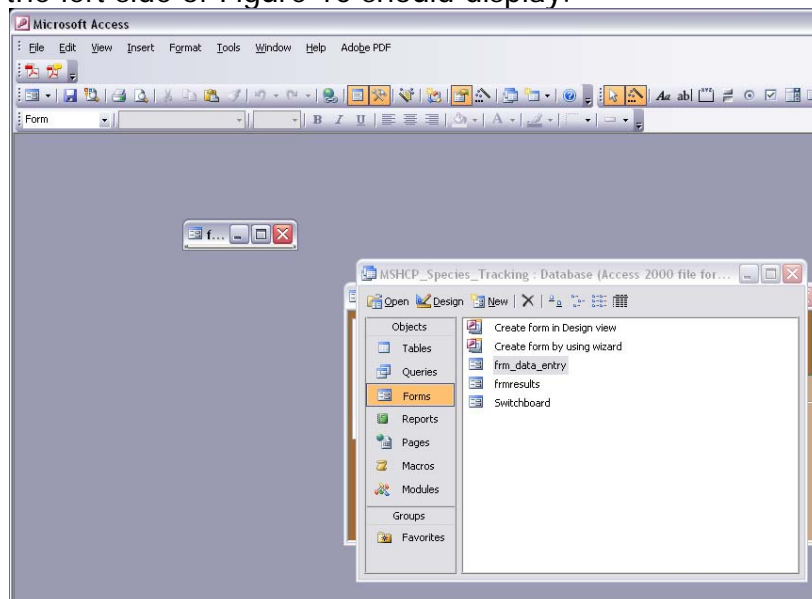
Figure 10

Resize the form by clicking and dragging the lower right corner of this small window [f... _ □ ✕]. The end result should look similar to Figure 11. Save the changes by selecting the save icon [💾] in the upper left of the database window. Now this form should load.
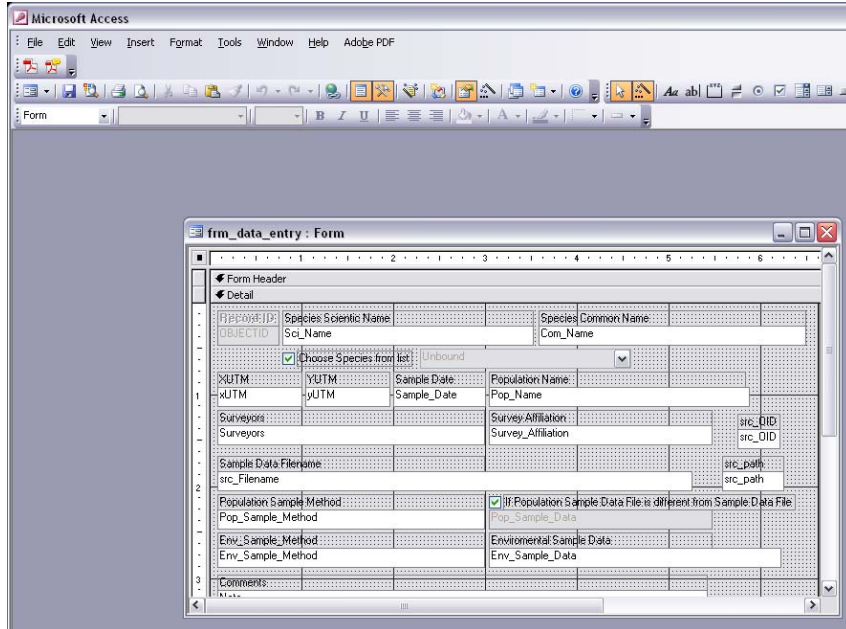
Figure 11

Appendix A

Methods Used to Populate Species Database March 31, 2009

Clark County Covered Species Population Trends Tracking System: Methods Used to Compile Data

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Introduction

A number of programs have been implemented to monitor the abundance and distribution of covered species identified in the Clark County Multiple Species Habitat Conservation Plan (MSHCP). In its capacity as MSHCP Science Advisor, the Desert Research Institute (DRI) was asked to develop a functional prototype of a spatially explicit database template (herein after called the database) where past and future monitoring data for covered species can be compiled. The database was to include only 12 covered species (Table 1), but it must be amenable to modification so that data for additional species can be added. In addition, the scope of the Interlocal Agreement between DRI and the County was modified to include 10 covered species and two not covered species within the prototype database. This database is to be used by researchers and managers to assess temporal and spatial changes in the abundance and distribution of these species, which may provide information to refine MSHCP biological goals and objectives, as appropriate.

A database for the 12 species was created from data provided to DRI by Clark County in ArcGIS file geodatabase format. This database contained sensitive data and there was agreement that it would not be externally circulated or made available to any other organization or person other than DRI staff working on the project. These data were accumulated or compiled by a number of agencies and individuals and include a variety of estimates. This report summarizes the process used to create the database and compile data for the 12 species. It includes a brief discussion of monitoring programs, eight steps followed to create the database, and maps showing the location of populations of the 12 species.

As monitoring programs are implemented or additional monitoring data are compiled, the database may ultimately include data for all covered species. The database will expand in concert with monitoring programs, and database structure is designed to be closely linked to information compiled during monitoring programs for each species. The database is also structured for use in the field so data can be digitally cataloged into field data loggers and downloaded directly into files that can be compiled and accessed through the database.

Species Status Monitoring Basics

Monitoring and research are primary elements that provide information to implement successful adaptive management programs, and to accomplish goals and purposes of the MSHCP. MSHCP adaptive management entails two basic types of monitoring: 1—Species status and trend monitoring to document spatial and temporal changes in the abundance and distribution of covered species, and 2—Effectiveness monitoring to assess the efficacy of management to accomplish goals. Both types are required to provide feedback and assess the effectiveness of management, determine changes in the status of rare species, and accomplish MSHCP goals and purposes.

In response to requirements necessary to assess the conservation status of rare species and implement adaptive management programs, resource managers have recently given substantial attention to designing and implementing monitoring programs (e.g., Peterman 1990, Hayek and Buzas 1997, Noon et al. 1999, Noon 2003). Effective monitoring programs rely on explicit description of goals and objectives to focus data collection and compile information about salient variables and avoid accumulating unnecessary or irrelevant information. A

reasonable goal of species status monitoring programs is to quantitatively document spatial and temporal variation in the abundance and distribution of a species, and an objective would be to determine if abundance and distribution are static, improving, or declining. Similar goals and objectives can be identified for effectiveness monitoring programs, where a goal might be to assess the efficacy of a management program on ecosystem health and determine if health is improving or degrading. Once goals and objectives have been set, each monitoring program must be tailored to address these elements in context of the ecology of the target species or ecosystems in question.

Effective species status monitoring programs should collect relevant biological and environmental data during each sample. Collecting both data sets increases the utility of data to examine ecological links, which can explain relationships between environmental conditions and the biotic response. Determining these links is not possible when only biotic or environmental data are singularly collected and insight into how biotic metrics change in response to environmental circumstances is limited. Conversely, collecting data that are not tied to the hypotheses or objectives of the monitoring program may be an expensive distraction from the overall monitoring program.

The distribution of many covered species and their habitats in Clark County is patchy, and they are often associated with interacting environmental factors such as soils, vegetation communities, elevation, and water regimes. Patch size and demography of many species varies spatially (among patches) and temporally in response to natural factors such as season, climate, precipitation, and land cover (e.g., influences of fire, flooding, etc.). Demography and patch size are also influenced by human activities that affect land cover, vegetation, water availability and quality, air quality, and interactions with non-native and invasive species. Understanding relationships among these factors in all occupied patches is necessary to determine trends in status of each covered species. Also, several categories of information are required. Accurate survey data are needed to locate and delineate the aerial extent of patches and the abundance of each target species. Ecological studies are needed to determine environmental factors that influence spatial and temporal variability in demography. Much of this variability can be determined using demographic and environmental monitoring programs developed for each covered species. The collection of high quality information over long periods of time permits generalization of ecological information over time and space. This can be used to evaluate status in terms of stressors such as climate, fire, flooding, and anthropogenic factors.

Data Compilation Methods

The following criteria were used by the County, in consultation with DRI, to select the 12 species for the database (these criteria were not weighted during the selection process). A list of selected species is shown in Table 1 (there is no priority order).

- The list should include a taxonomic diversity of taxa

- Species for which there is sufficient demographic and distributional knowledge to design an effective monitoring program

- Species whose demography and habitats can be easily sampled

- Species that occupy discrete, readily quantified habitat

- Species that are rarest, most vulnerable to extirpation, and that could be most readily conserved by implementing a rigorous tracking system

- Species that are listed under Federal or State statute and are therefore most important to agency activities.

Table 1. Twelve species selected for the database.

Common Name	Scientific Name	MSHCP Status
Claopodium whippleanum moss	*Claopodium whippleanum*	Covered
Desert tortoise	*Gopherus agassizii*	Covered
Las Vegas bearpoppy	*Arctomecon californica*	Covered
Mt Charleston blue butterfly	*Icaricia shasta charlestonensis*	Covered
Phainopepla	*Phainopepla nitens*	Covered
Relict leopard frog	*Rana onca*	Covered
Southern Nevada springsnail	*Pyrgulopsis turbatrix*	Covered
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Covered
Threecorner milkvetch	*Astragalus geyeri* var. *triquetrus*	Covered
White-margined beardtongue	*Penstemon albomarginatus*	Covered
Las Vegas Valley buckwheat	*Eriogonum corymbosum* var. *nilesii*	Not Covered
Western Burrowing Owl	*Athene cunicularia hypugaea*	Not Covered

Data for 10 of the 12 species compiled in the database were provided by the County in the MSHCP_SPECIES Geodatabase that was last updated November 23, 2007. This is an ArcGIS file geodatabase that contains several feature datasets and each feature dataset contains several feature classes. Additional data for the southern Nevada springsnail (*Pyrgulopsis turbatrix*) was provided by D. Sada from records in the DRI springs database. No data were provided for the Claopodium whippleanum moss. All feature classes are in a UTM meter coordinate system, Zone 11 projection, and NAD83 datum. UTM coordinates may represent several data elements, which can be determined by examining each data set and most are described in the metadata summary compiled for each dataset. These coordinates may locate sites where observations of individual tortoises occurred along a transect, coordinates showing location of Phainopepla nests, sites where point counts were made during bird surveys, or where transects were located during plant surveys. The type and quantity of available data varies widely among species. There are only qualitative data for some species (e.g., the southern Nevada springsnail), bird surveys include point counts and nesting surveys, and some plant surveys were conducted using transects while others counted individuals. The database includes all data provided to DRI by Clark County. The database addresses differences in data by accessing information by querying the

species name, and the sample year, sample method, and population name. For species with isolated demes (e.g., in a single valley, at discrete locations, etc.) population names are those 'standardized' by past surveyors. For widespread species, such as Phainopepla, the county where data were accumulated was recorded as the 'population'.

Geodatabase Template

Twenty-three fields were included in a template designed for the database, whose properties and database structure are shown in Table 2, and can be assessed using the database interface that is shown in Figure 1. Use of the database is described in MacCabe (2009).These fields provide basic information for the database. This database template is a pioneer design by DRI for Clark County that can be modified in the future to add or remove species.

The data table structure of the database template is Microsoft Access®, and it is designed to minimize confusion and increase efficiency. The structure of this table is parsimonious to decrease processing time, save storage space, and facilitate transcribing information from other datasets. It provides a unified template that is critical for merging datasets, minimizing data loss, the presence of redundant fields, and comparing information that may occur when datasets of different structure are merged.

As shown in Table 2, the following fields are included in the database: OBJECTID = a unique identification number for each record that is automatically generated by the database; src_OID = a unique identification number for each record from the original source data table; src_Filename = the source data table from the MSHCP_SPECIES Geodatabase containing population information, the original data records can be traced with fields src_OID and src_Filename; SciName = scientific name of species; ComName = common name; PopName = the name assigned to each population (these names are commonly used by surveyors); xUTM and yUTM = specific location of population; SampleDate = the time period when sampling occurred; Surveyors = name of the person responsible for conducting the survey; SurveyAffiliation = agency or professional affiliation of surveyor; population sample methods and data and environmental sample methods and data (PopSampleMethod, PopSampleData, EnvSampleMethod, EnvSampleData) are files that describe sample methods and contain population data; AbundanceEst = an estimated abundance; AreaEst = an estimate of the area occupied by sampled population; SiteSketch = drawing of population site; Area = the are covered by the population as determined from GPS polygon; PopSize = quantitative estimate of population size; DataType = type of population data compiled during survey (it is important to know population and environmental sampling methods in order to compare data from different time periods with data using the same or similar methods); Note = notes regarding sample; and SampleYear = the year of population data collected. Population size and area estimates can be used to calculate density estimates for qualitative data.

Species Tracking

Species: Population Name: Year: Method

Sample Data:

Sample Date: Sample Methods: Sample Years: Surveyor:

Species Data | Enviromental Data

Population Sample Data Files: Population Sample Data Method Files:

Generate Report

Summary Population Data: Sample Date: Population Sample Data File: UTM's:

Est. Abundance: Area of Occupied Habitat (m2): Mean Density: No. Breeding Pairs

Est. Area of Occupied Habitat: Est. Population Size: Standard Eerror Density: No. Active Nests:

Est. Area of Breeding Habitat: Est. Population Size Standard Error: Median Density: No. Fledglings:

Pdf Sketch of Occupied Habitat: Shapefile of Occupied Habitat Perimeter:

Figure 1. The user interface for the prototype species tracking database. Data compiled using methods described herein can be accessed by entering a species name, population name, sample year, and sample method. With these queries, abundance and environmental data files in the database are shown in the species data and environmental data boxes. The lower portion of the interface is to show summary data that have been calculated from database data sets. At this time, summary data have not been compiled for any species.

Table 2. Field names, data type and length, and a general description of fields used in the database. Type and Length are data type and byte of the field based on Microsoft Access®.

Field name	Type	Length	Description
OBJECTID	Number	Long integer	Unique ID
src_OID	Number	Integer	ObjectID in source table
Src_Filename	Text	55	Source file with population data
SciName	Text	55	Scientific name
ComName	Text	55	Common name
PopName	Text	55	Population name
xUTM	Number	Single precision	X-coordinate, UTM11 NAD83
yUTM	Number	Single precision	Y-coordinate, UTM11 NAD83
SampleDate	Text	10	Year-month-day of sampling
Surveyors	Text	55	
SurveyAffiliation	Text	55	
PopSampleMethod	Text	55	Population sampling method
PopSampleData	Text	55	Document describe sampling method
EnvSampleMethod	Text	55	Environmental data sampling method
EnvSampleData	Text	55	File contains environmental data
AbundanceEst	Text	55	Abundance estimation (qualitative)
AreaEst	Text	55	Area estimation
SiteSketch	Text	55	Site description
Area	Number	Single precision	
PopSize	Number	Single precision	Population size
DataType	Text	10	count, present, qualitative describe
Note_	Text	255	Note
SampleYear	Number	Integer	Year of sampling

Data Synthesis and Organization

Eight steps were followed to create a master data table for the 12 species from files included in the MSHCP_SPECIES Geodatabase. They are diagramed in Figure 2 below.

```
┌─────────────────────────────────────────────┐
│      MSHCP Data Provided by Clark County      │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│    **Step I.** Search for Species Records     │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│   **Step II.** Create Species Specific Databases   │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│   **Step III.** Add UTM Coordinates to Records   │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ **Step IV.** Transcribe Feature Class Data to Template Table │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│    **Step V.** Create a Species Master Table    │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│    **Step VI.** Check for Duplicate Records     │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│     **Step VII.** Assign Population Names      │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│  **Step VIII.** Compile Data Tables into Database  │
└─────────────────────────────────────────────┘
```
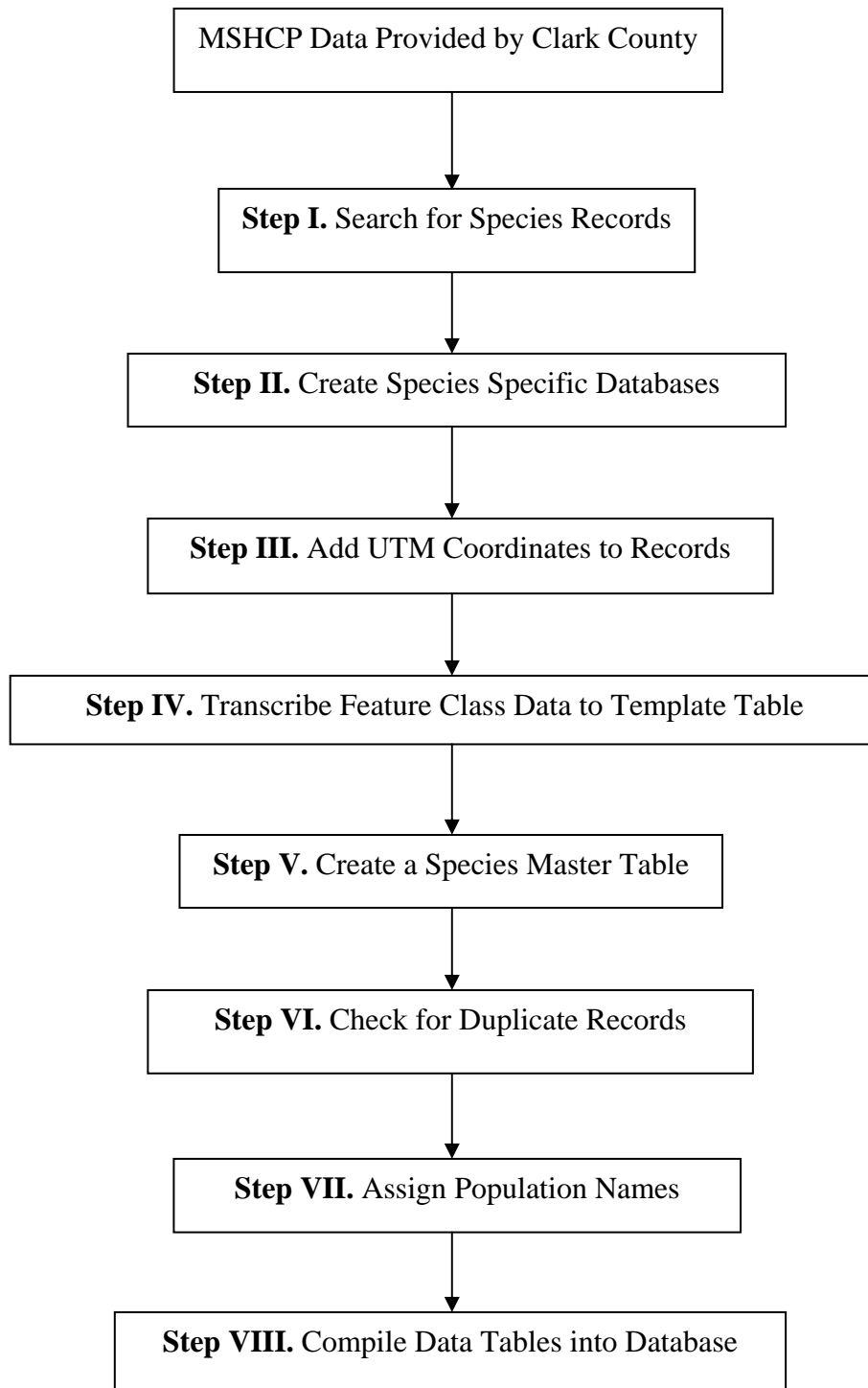
Figure 2. A summary of the eight steps followed to compile species data into the prototype species status tracking database.

Step I. Search for records of the 12 species and generate an intermediate geodatabase for each species.

The MSHCP database was searched for data regarding the 12 species. This was accomplished by searching all feature datasets and feature classes by scientific names. Common names were used only when scientific names were unavailable in a data table. Common names were infrequently used during the search because a species may have several common names. For example, Las Vegas buckwheat,
golden buckwheat, and Niles' wild buckwheat are different common names of *Eriogonum corymbosum* var. *nilesii*. To locate all files, the search also considered synonyms. For example, the taxonomical history for Las Vegas buckwheat (*Eriogonum corymbosum* var. *nilesii*) is complicated. It had been named *E. c.* var. *glutinosum* and *E. c.* var. *aureum.* , before Reveal (2004) gave its current nomenclature. We assumed that all *Eriogonum corymbosum* (CODE: ERCO) records refer to *E. c.* var. *nilesii* (CODE: ERCONI), because it is the only *E. corymbosum* in Clark County (James D. Morefield, personal communication). Also, the Western Burrowing Owl was placed in the genus *Speotypo* for a period of time before being described as *Athene cumicularia hypugaea.* Only records containing data for live individuals were included. This excluded records for dead tortoise, etc. These records could be added to the database and were excluded because they could not be used to track population size.

Search results yielded 38 feature classes under five feature datasets that were named Birds, Natural_Heritage_DB, Plant_Gypsum, Plants, and Tortoise. Using this data, a geodatabase containing these five feature datasets and subordinate feature classes was created in the following manner:

Feature Dataset: Birds

There are 11 feature classes containing birds records within the list of 12 species under the feature dataset: Birds (Table 3).

Table 3. Feature classes containing records of species included within the list of 12 species under the feature dataset: Birds.

Feature Classes— Feature Dataset: Birds
BLM_367_Phainopepla_nests
BLM_367_Phainopepla_transects
BRRC_Phainopepla_nests_2001
BRRC_Phainopepla_nests_2002
BRRC_Phainopepla_nests_2003
GBBO_nevada_bird_count
MSHCP_2001_BRRC_1_MuddyRv_birds2
MSHCP_2001_BRRC_1_MuddyRv_birds3
NPS_229_birds_pt_sightings04
NPS_229_birds_pt_sightings05
NPS_229_WIFL_detect05

Feature class BLM_367_Phainopepla_transects was not used because of inadequate information provided to track populations.

Feature Dataset: Natural_Heritage_DB

There are three feature classes containing records of species included within the list of 12 species under the feature dataset: Natural_Heritage_DB (Table 4).

Table 4. Feature classes containing records of species included within the list of 12 species under the feature dataset: Natural_Heritage_DB.

Feature Classes— Feature Dataset:Natural_Heritage_DB
combined_precision_eors_2006_11_20 (polygon)
observed_area_2006_11_20 (polygon)
observed_centroids_2006_11_20 (point)

The feature class 'combined_precision_eors_2006_11_20' includes location precision errors and no population information. Feature classes 'observed_area_2006_11_20' and 'observed_centroids_2006_11_20' contain the same information but in different spatial forms, polygons and points, respectively. We prioritized point features and chose to use feature class 'observed_centroids_2006_11_20' since majority of the spatial data are in point form.

Feature Dataset: Plant_Gypsum

There are three feature classes containing records of plants included within the list of 12 species under the feature dataset: Plant_Gypsum (Table 5).

Table 5. Feature classes containing records of species included within the list of 12 species under the feature dataset: Plant_Gypsum.

Feature Classes— Feature Dataset:Plant_Gypsum
NNHP_erconi_eos_200709
NNHP_observed_centroids
Whitney_sens_plants

Only one feature class NNHP_erconi_eos_200709 was used for the database under this feature dataset. 'NNHP_observed_centroid' is a partial data table from feature class 'observed_centroids_2006_11_20' under feature dataset Natural_Heritage_DB. 'Whitney_sens_plants' is a partial data table from feature class Whitney_sens_plants under feature dataset Plants.

Feature Dataset: Plants

There are ten feature classes containing records of plants included within the list of 12 species under the feature dataset: Plants (Table 6).

Table 6. Feature classes containing records of plants included within the list of 12 species under the feature dataset: Plants.

Feature Classes—Feature Dataset: Plants
BLM_sensitive_plants
BLM_updated_eis
BLM_updated_eis_nnhp1
BLM_updated_eis_ssplants
NDF_ARCAsurvey_2005_pts
NPS_363_ARCA_98to00obs
NPS_363_ASGE_97to06obs
SNEI_Lvbuckwheat (delete)
TNC_rareplants
Whitney_sen_plant

Feature class 'SNEI_Lvbuckwheat' was not used in the database because it included poor quality data.

Feature Dataset: Tortoise

Under the feature dataset Tortoise, there are many feature classes containing records for desert tortoise population indexes, such as burrows, corpse, and live tortoises. We chose to include only records of live tortoise in the database, because burrows and corpses are not population data. These types of data could be compiled in the database in the future. There are 12 feature classes containing records for live tortoises.

Step II. Create a species-specific database for each species.

For this step, each feature class listed in Step I was examined, records for species other than the selected 12 were removed, and species-specific feature classes were created that contained only data for the respective 12 species. These feature classes were compiled in a new set of species-specific geodatabases. Species-specific feature class names in the MSHCP_Species geodatabase were retained for each of these databases to inform the user of the origin of data in the feature class. Many feature classes in the MSHCP_Species geodatabase included data for more than one species. For example; feature class 'TNC_rareplants' included data for three species, the Las Vegas bearpoppy, threecorner milkvetch, and white-margined beardtongue.

Table 7. Feature classes containing records desert tortoise under the feature dataset: Tortoise.

Feature Classes—Feature Dataset: Tortoise
NPS_compliance_tortoise
NPS_CPSU_monitoring_tortoise
NPS_Mormon_Mesa
NPS_NRPP_monitoring_tortoise
NPS_NRPP_triangle_tortoise
NPS_SNWA_tortoise
USFWS_nem_observations_01
USFWS_nem_observations_02
USFWS_nem_observations_03
USFWS_nem_observations_04
USFWS_nem_tranlivobs_05
USFWS_oppliveobs_05

An intermediate geodatabase was generated from these that included at least one record for a species.

Records containing dead individuals or which did not include information for any of the 12 species were excluded because they do not provide information that can be used to assess trends in abundance. The 12 geodatabases and the names of species-specific feature classes (taken from the MSHCP_SPECIES geodatabase) within each one are described below.

Geodatabases

Non-Vascular Plants

Geodatabase: Claopodium whippleanum moss

There were no records for *Claopodium whippleanum* in the MSHCP_SPECIES geodatabase.

Vascular Plants

There were four vascular plants included in the 12 species, including the Las Vegas bearpoppy, threecorner milkvetch, white-margined beardtongue, and Las Vegas buckwheat.

Geodatabase: Las Vegas bearpoppy (Arctomecon californica)

Table 8. Names of eight feature classes in the Las Vegas bearpoppy geodatabase containing its records in the prototype Status Tracking Database.

Feature Class Name
BLM_updated_eis
BLM_updated_eis_nnhp1
BLM_updated_eis_ssplants
NDF_ARCAsurvey_2005_pts
NPS_363_ARCA_98to00obs
TNC_rareplants
Whitney_sen_plant
observed_centroids_2006_11_20

Geodatabase: Threecorner milkvetch (*Astragalus geyeri var. triquetrus*)

Table 9. Three feature classes in the threecorner milkvetch geodatabase containing its records in the prototype Status Tracking Database.

Feature Class Name
NPS_363_ASGE_97to06obs
TNC_rareplants
observed_centroids_2006_11_20

Geodatabase: White-margined beardtongue (Penstemon albomarginatus)

Table 10. Two feature classes in the white-margined beardtongue geodatabase containing its records in the prototype Status Tracking Database.

Feature Class Names
TNC_rareplants
observed_centroids_2006_11_20

Geodatabase: Las Vegas buckwheat (Eriogonum corymbosum var. nilesii)

Table 11. Seven feature classes in the Las Vegas buckwheat geodatabase containing its records in the prototype Status Tracking Database.

Feature Class Names
BLM_sensitive_plants
BLM_updated_eis
BLM_updated_eis_nnhp1
BLM_updated_eis_ssplants
SNEI_Lvbuckwheat
NNHP_erconi_eos_200709
observed_centroids_2006_11_20

The feature class SNEI_Lvbuckwheat was not included in the database because this project was not done adequately.

Invertebrates

There are two invertebrates on the list of 12 species selected for this database. They are southern Nevada springsnail and Mt. Charleston blue butterfly.

Geodatabase: Southeast Nevada springsnail (Pyrgulopsis turbatrix)

Table 12. Name of the only feature class in the southeast Nevada springsnail geodatabase containing records in the database.

Feature Class Name
observed_centroids_2006_11_20

Dr. Sada provided an additional data table from his studies, P.turbatrix.xls.

Geodatabase: Mt. Charleston blue butterfly (Icaricia shasta charlestonensis)

Table 13. Name of the only feature class in the Mt. Charleston blue butterfly geodatabase containing records in the database.

Feature Class Name
observed_centroids_2006_11_20

Vertebrate Animals

There are five vertebrate species included in database. They are the relict leopard frog, desert tortoise, Southwestern Willow Flycatcher, Phainopepla, and Western Burrowing Owl.

Geodatabase: Relict leopard frog (Rana onca)

Table 14. Name of the only feature class in the relict leopard frog geodatabase containing records in the database.

Feature Class Name
observed_centroids_2006_11_20

Geodatabase: Desert tortoise (Gopherus agassizii)

Table 15. Names of 12 feature classes in the desert tortoise geodatabase containing its records in the database.

Feature classes
observed_centroids_1006_11_20
NPS_compliance_tortoise
NPS_CPSU_monitoring_tortoise
NPS_Mormon_Mesa
NPS_NRPP_mornitoring_tortoise
NPS_NRPP_triangle_tortoise
NPS_SNWA_tortoise
USFWS_nem_observations_01
USFWS_nem_observations_02
USFWS_nem_observations_03
USFWS_nem_observations_04
USFWS_nem_tranlivobs_05
USFWS_oppliveobs_05

Geodatabase: Western Burrowing Owl (Athene cumicularia hypugaea)

Table 16. Name of the only feature class in the Western Burrowing Owl geodatabase containing records in the database.

Feature Class Name
GBBO_nevada_bird_count

Geodatabase:Southwestern Willow Flycatcher (Empidonax traillii extimus)

Table 17. Names of five feature classes in the Southwestern Willow Flycatcher geodatabase containing records in the database.

Feature Class Names
GBBO_nevada_bird_count
MSHCP_2001_BRRC_1_MuddyRv_birds3
NPS_229_birds_pt_sightings04
NPS_229_WIFL_detect05
observed_centroids_2006_11_20

Geodatabase: Phainopepla (Phainopepla nitens)

Table 18. Names of ten feature classes in the Phainopepla geodatabase containing its records in the database.

Feature classes
BLM_367_Phainopepla_nests
BRRC_Phainopepla_nests_2001
BRRC_Phainopepla_nests_2002
BRRC_Phainopepla_nests_2003
GBBO_nevada_bird_count
MSHCP_2001_BRRC_1_MuddyRv_birds2
NPS_229_birds_pt_sightings04
NPS_229_birds_pt_sightings05
observed_centroids_2006_11_20

Step III. Add UTM coordinates for all records in each feature class.

For this step, projections and coordinates for every feature class were checked to insure that UTMs were meter coordinates, zone 11 projection, and NAD 83 datum. Next, two new fields were created to include X and Y coordinates for each record. The point feature coordinates were determined using the function 'Add XY Coordinates (ArcToolBox – Data Management Tools – Features – Add XY Coordinates)' to generate two fields, POINT_X and POINT_Y. Polygon feature coordinates were determined using the function, 'Feature To Point (ArcToolBox – Data Management Tools – Features – Feature To Point)' to site the centroid of a polygon with associated attribute data. Following identification of the centroid, the function 'Add XY Coordinates' was used to determine X and Y coordinates, POINT_X and POINT_Y. The X and Y coordinates were then assigned to the template table.

Step IV. Transcribe data in feature classes for each species onto a template table.

For this step, 49 template tables were created by transcribing records from each feature class for each species (Table 19). Original feature class tables were examined for accuracy and information was assigned to template fields after carefully examining the metadata, attribute data, and spatial data, and some surveyors were interviewed. During transcription, all feature class fields were removed and data were retained in template fields. Template tables were created for each species in each feature class, and template table structure was constant for each species within a feature class. Each template table was named by its feature class and the species whose data it includes. For instance, two template tables with identical structure were created under BLM_updated_eis for *Arctomecon californica* and *Eriogonum corymbosum* var. *nilesii*. Figure 1 illustrates how information was transcribed from feature classes created during Step II into template tables. Template fields are described in Table 2, and Tables 20 – 48 show feature class fields that are associated with fields in each template table.

Table 19. Feature classes and species included in the database. Template tables were created from each feature class for each species, and the structure of data fields in tables created from each feature class was constant. Template tables were named following the feature class and the species it includes (e.g., Template table 'BLM_367_Phainopepla nests, *Phainopepla nitens*'). Template fields and information assigned in each template are shown in Tables 20 – 48.

Feature Class	Scientific Name
BLM_367_Phainopepla_nests	*Phainopepla nitens*
BLM_sensitive_plants	*Eriogonum corymbosum* var. *nilesii*
BLM_updated_eis	*Arctomecon californica*
	Eriogonum corymbosum var. *nilesii*
BLM_updated_eis_nnhp1	*Arctomecon californica*
	Eriogonum corymbosum var. *nilesii*
BLM_updated_eis_ssplants	*Arctomecon californica*
	Eriogonum corymbosum var. *nilesii*
BRRC_Phainopepla_nests_2001	*Phainopepla nitens*
BRRC_Phainopepla_nests_2002	*Phainopepla nitens*
BRRC_Phainopepla_nests_2003	*Phainopepla nitens*
GBBO_nevada_bird_count	*Athene cunicularia hypugaea*
	Empidonax traillii extimus
	Phainopepla nitens
MSHCP_2001_BRRC_1_MuddyRv_birds2	*Phainopepla nitens*
MSHCP_2001_BRRC_1_MuddyRv_birds3	*Empidonax traillii extimus*
observed_centroids_2006_11_20	*Gopherus agassizii*
	Arctomecon californica
	Astragalus geyeri var. *triquetrus*
	Empidonax traillii extimus
	Eriogonum corymbosum var. *nilesii*
	Icaricia shasta charlestonensis

	Penstemon albomarginatus
	Phainopepla nitens
	Pyrgulopsis turbatrix
	Rana onca
NDF_ARCAsurvey_2005_pts	*Arctomecon californica*
NNHP_erconi_eos_200709	*Eriogonum corymbosum* var. *nilesii*
NPS_229_birds_pt_sightings04	*Empidonax traillii extimus*
	Phainopepla nitens
NPS_229_birds_pt_sightings05	*Phainopepla nitens*
NPS_229_WIFL_detect05	*Empidonax traillii extimus*
NPS_363_ARCA_98to00obs	*Arctomecon californica*
NPS_363_ASGE_97to06obs	*Astragalus geyeri* var. *triquetrus*
NPS_compliance_tortoise	*Gopherus agassizii*
NPS_CPSU_monitoring_tortoise	*Gopherus agassizii*
NPS_Mormon_Mesa	*Gopherus agassizii*
NPS_NRPP_triangle_tortoise	*Gopherus agassizii*
NPS_SNWA_tortoise	*Gopherus agassizii*
TNC_rareplants	*Arctomecon californica*
	Astragalus geyeri var. *triquetrus*
	Penstemon albomarginatus
USFWS_nem_observations_01	*Gopherus agassizii*
USFWS_nem_observations_02	*Gopherus agassizii*
USFWS_nem_observations_03	*Gopherus agassizii*
USFWS_nem_observations_04	*Gopherus agassizii*
USFWS_nem_tranlivobs_05	*Gopherus agassizii*
USFWS_oppliveobs_05	*Gopherus agassizii*
Whitney_sen_plant	*Arctomecon californica*

Text with brackets in Tables 20 – 48 are field names of the original feature class tables. Information was copied or extracted from those fields and assigned into the template fields. For examples, [OBJECTID] is a field in the feature class table 'BLM_367_Phainopepla_nests', the containing data are 1, 2, 3, and etc. We copied and pasted these data into the template field 'src_OID' directly (Figure 1). In the same way, data were assigned into template fields 'xUTM' and 'yUTM' from original table fields 'POINT_X' and 'POINT_Y' respectively. However, the template field 'SurveyDate' and the original table field 'SURVEY_DAT' contain the same information but in different format. Data cannot be copied and pasted directly but need to be re-entered.

Text without brackets in Tables 20 – 48 are information assigned into template fields directly. For examples, every record of the template fields 'src_Filename' was assigned with 'BLM_367_Phainopepla_nests', 'SciName' was assigned with '*Phainopepla nitens*', and 'ComName' was assigned with 'Phainopepla'.

Missing information, if possible, was filled after interpretation. For examples, blank dates were assigned with "2003" and blank surveyors were assigned with "Cali" after consulting with the

project leader, Dr. Crampton, at University of Nevada, Reno (C. Crampton, pers. comm., January 31, 2008).

An illustration of information transcription (Figure 3) shows fields and data for both original and template tables. Bold font indicates information from an original table while regular font indicates information assigned after interpretation. Comparing data between original fields and template fields in this illustration indicates that information was assigned into template fields based on the description of Table 20.

Original fields | Template fields

OBJECTID	CREATE_DAT	OBS	POINT_X	POINT_Y	GARMIN_ID	...	src_OID
1	4/18/2003	allison	715243	3885856	BBS3NT		1
2		noel	676657	3951560	HIL3NA		2
3	4/16/2003		599988	3995864	KEL3N1		3
4		cali	662984	4004836	LVS3NA		4

src_Filename	SciName	ComName	PopName	xUTM	yUTM
BLM_367_phainopepla_nests	Phainopepla nitens	Phainopepla		715243	3885856
BLM_367_phainopepla_nests	Phainopepla nitens	Phainopepla		676657	3951560
BLM_367_phainopepla_nests	Phainopepla nitens	Phainopepla		599988	3995864
BLM_367_phainopepla_nests	Phainopepla nitens	Phainopepla		662984	4004836

SampleDate	Surveyors	SurveyAffiliation	PopSampleMethod	PopSampleData	EnvSampleMethod
2003-04-18	allison	UNR	Nest search	Crampton 2004	Crampton 2004
2003	noel	UNR	Nest search	Crampton 2004	Crampton 2004
2003-04-16	Cali	UNR	Nest search	Crampton 2004	Crampton 2004
2003	cali	UNR	Nest search	Crampton 2004	Crampton 2004

EnvSampleData	AbundanceEst	AreaEst	SiteSketch	Area	PopSize	DataType	Note_	SampleYear
Crampton 2004					1	Quantitative		2003
Crampton 2004					1	Quantitative		2003
Crampton 2004					1	Quantitative		2003
Crampton 2004					1	Quantitative		2003

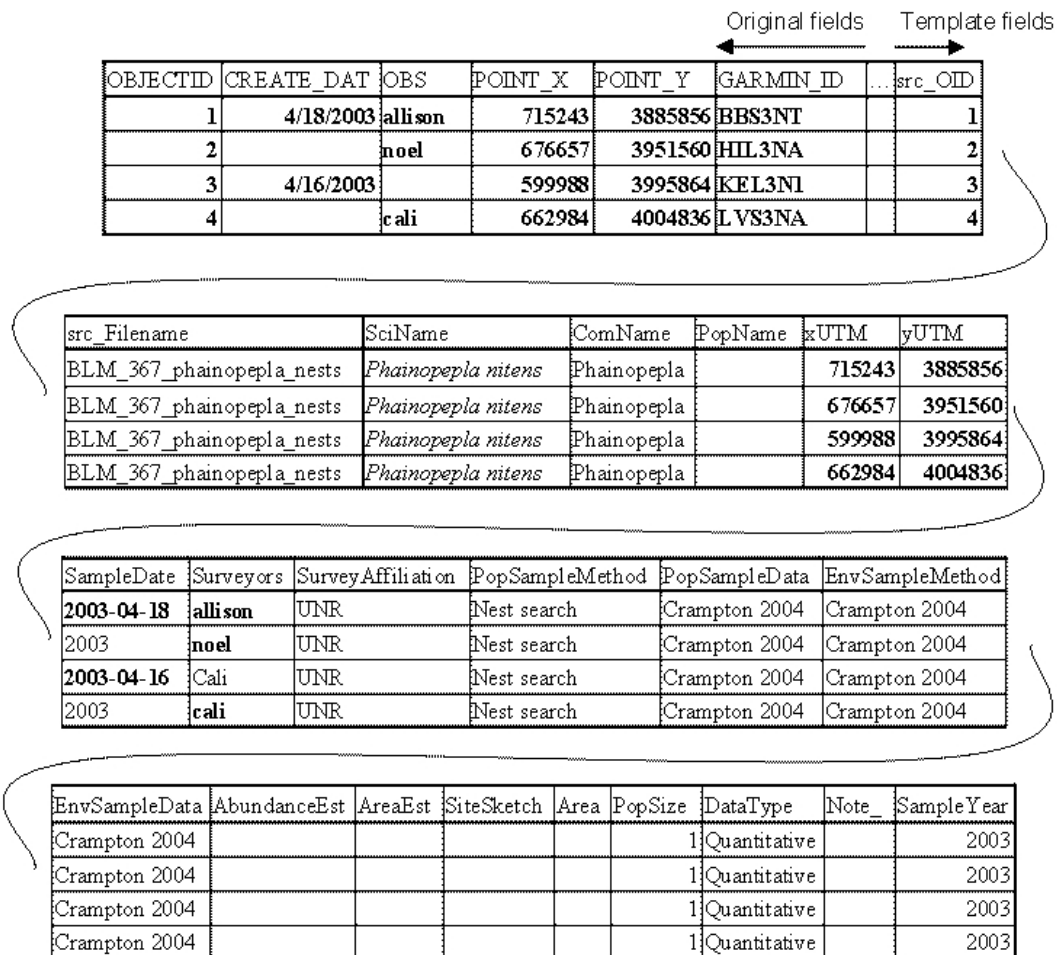Figure 3. A tabular illustration showing how data from the MSHCP_SPECIES geodatabase were transcribed to template tables from feature classes. Bold font indicates information from MSHCP_SPECIES geodatabase feature classes and normal font denotes labels assigned during transcription. Information assigned to template tables is shown in Tables 20 – 48.
Template Table: BLM_367_Phainopepla_nests, only for Phainopepla

Table 20. This template table includes point locations for Phainopepla nests collected under contract 2003-BLM-367, which was a component of the contract to prepare the Mesquite-Acacia Conservation Management Strategies (Crampton et al. 2006. Phainopepla is the only target species contained in this feature class.

Template Field	Assigned information
src_OID	[OBJECTID]
Src_Filename	BLM_367_Phainopepla_nests
SciName	*Phainopepla nitens*
ComName	Phainopepla
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[CREATE_DAT] or '2003'
Surveyors	[OBS] or 'Cali'
SurveyAffiliation	UNR
PopSampleMethod	Nest search
PopSampleData	Crampton 2004
EnvSampleMethod	Crampton 2004
EnvSampleData	Crampton 2004
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	1
DataType	Quantitative
Note_	
SampleYear	

Template Table: BLM_sensitive_plants, only for *Eriogonum corymbossum* var. *nilesii*

Table 21. This template table includes point locations and attribute information for the Las Vegas buckwheat. It contains qualitative information collected by unknown sample methods.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	BLM_sensitive_plants
SciName	[SPECIES_NA]
ComName	[COMMNAME]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[SURVEY_DAT]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	BLM_sensitive_plants
AbundanceEst	[RELABUND]
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Qualitative
Note_	
SampleYear	

Template Tables: BLM_updated_eis, for *Arctomecon californica* and *Eriogonum corymbossum* var. *nilesii*

Table 22. These template tables include locations and contains attribute information for for *Arctomecon californica* and *Eriogonum corymbossum* var. *nilesii*. It includes quantitative and qualitative data, and sample methods are unknown. The type of data (DataType) varies with each record.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	BLM_updated_eis
SciName	[SNAME]
ComName	[COMMNAME]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[LASTOBS]
Surveyors	
SurveyAffiliation	BLM
PopSampleMethod	Environmental impact statement assessment
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	[POPCOUNT]
AreaEst	
SiteSketch	
Area	
PopSize	[POPCOUNT]
DataType	Quantitative/qualitative
Note_	
SampleYear	

Template Tables: BLM_updated_eis_nnhp1, for *Arctomecon californica* and *Eriogonum corymbosum* var. *nilesii*

Table 23. These template tables contain locations and contains attribute information for *Arctomecon californica* and *Eriogonum corymbosum* var. *nilesii*. They include quantitative and qualitative data (some records are quantitative and describe the population as 'extant' or 'present' and there is one record with POPCOUNT = 10,000-20,000!). Sample methods are unknown and the type of data (DataType) varies with each record.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	BLM_updated_eis_nnhp1
SciName	[SNAME]
ComName	[COMMNAME]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[LASTOBS]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	[POPCOUNT]
AreaEst	
SiteSketch	
Area	
PopSize	[POPCOUNT]
DataType	Quantitative/qualitative
Note_	
SampleYear	

Template Tables: BLM_updated_eis_ssplants, *for Arctomecon californica and Eriogonum corymbossum* var. *nilesii*

Table 24. These template tables include point locations and attribute information for *Arctomecon californica* and *Eriogonum corymbossum* var. *nilesii*. Records are quantitative and describe the population as 'extant' or 'present'. In these template tables, species code for SNAME: ARCA = *A. californica,* and ERCO and ERCOAU = *E. c*. var. *nilesii*.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	BLM_updated_eis_ssplants
SciName	[SNAME]
ComName	
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[SURVEY_DAT]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	BLM_updated_eis_ssplants
AbundanceEst	[RELABUND]
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Qualitative
Note_	
SampleYear	

Template Table: BRRC_Phainopepla_nests_2001, for *Phainopepla nitens*

Table 25. This template table contains point locations of Phainopepla nests in 2001 under contract 2001_BRRC_1_H. Phainopepla is the only species contained in this template table.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	BRRC_Phainopepla_nests_2001
SciName	*Phainopepla nitens*
ComName	Phainopepla
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	2001
Surveyors	Crampton
SurveyAffiliation	UNR
PopSampleMethod	Nest search
PopSampleData	Crampton 2004
EnvSampleMethod	Crampton 2004
EnvSampleData	Crampton 2004
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	1
DataType	Quantitative
Note_	
SampleYear	2001

Template Table: BRRC_Phainopepla_nests_2002, for *Phainopepla nitens*

Table 26. This template table contains point locations for Phainopepla nests in 2002 under contract 2001_BRRC_1_H. Phainopepla is the only species in this template table.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	BRRC_Phainopepla_nests_2002
SciName	*Phainopepla nitens*
ComName	Phainopepla
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[Description] contains date
Surveyors	Crampton
SurveyAffiliation	UNR
PopSampleMethod	Nest search
PopSampleData	Crampton 2004
EnvSampleMethod	Crampton 2004
EnvSampleData	Crampton 2004
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	1
DataType	Quantitative
Note_	
SampleYear	2002

Template Table: BRRC_Phainopepla_nests_2003, for *Phainopepla nitens*

Table 27. This template table contains point locations of Phainopepla nests in 2003 under contract 2001_BRRC_1_H. Phainopepla is the only species in this table.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	BRRC_Phainopepla_nests_2003
SciName	*Phainopepla nitens*
ComName	Phainopepla
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[CREAT_DAT], [GPS_COMMEN]
Surveyors	Crampton
SurveyAffiliation	UNR
PopSampleMethod	Nest search
PopSampleData	Crampton 2004
EnvSampleMethod	Crampton 2004
EnvSampleData	Crampton 2004
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	1
DataType	Quantitative
Note_	
SampleYear	2003

Template Tables: GBBO_nevada_bird_count, for *Athene cunicularia hypugaea*, *Empidonax trailli extimus*, and *Phainopepla nitens*

Table 28. These template tables contains draft point count data for *Athene cunicularia hypugaea*, *Empidonax trailli extimus*, and *Phainopepla nitens* from the Nevada Bird Count program collected from 2001-2006 along more than 400 point count transects within or in close proximity to Nevada. The long-term objective of this program is to provide a scientifically sound data base for evaluating status and trends in bird populations for each of Nevada's major habitats. The program will provide data for analyses at different spatial scales, including state-wide assessments, habitat-wide assessments, as well as comparisons of specific project sites with similar sites in the rest of the state.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	GBBO_nevada_bird_count
SciName	
ComName	[Species]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[Date_]
Surveyors	
SurveyAffiliation	GBBO
PopSampleMethod	Point count
PopSampleData	
EnvSampleMethod	Habitat type
EnvSampleData	GBBO_nevada_bird_count
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	[Number_]
DataType	Quantitative
Note_	
SampleYear	

Template Table: MSHCP_2001_BRRC_1_MuddyRv_birds2, for *Phainopepla nitens*
Template Table: MSHCP_2001_BRRC_1_MuddyRv_birds3, for *Empidonax traillii extimus*

Table 29. These template tables contain quantitative point count locations of *Empidonax traillii extimus* and *Phainopepla nitens*, respectively, from May to June 2001 surveys along the Muddy River. These surveys were conducted at several locations along the Muddy River to compare riparian bird diversity and its relationship with salt cedar. The work was conducted under MSHCP contract 2001_BRRC_1_F. Data are qualitative and noted as presence (1) or absence (0) of the species.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	MSHCP_2001_BRRC_1_MuddyRv_birds2 (3)
SciName	
ComName	
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	2001
Surveyors	
SurveyAffiliation	
PopSampleMethod	Point count
PopSampleData	
EnvSampleMethod	Plant survey
EnvSampleData	MSHCP_2001_BRRC_1_MuddyRiver_plants
AbundanceEst	Present/Absent
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Qualitative
Note_	
SampleYear	2001

Template Table: NDF_ARCAsurvey_2005_pts, for *Arctomecon californica*

Table 30. This template table contains locations of Las Vegas bearpoppy on private lands surveyed by Nevada Division of Forestry in 2005. These surveys were conducted as part of a program to track loss of populations due to development. Original table field [COMMENT] contains survey date information.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NDF_ARCAsurvey_2005_pts
SciName	*Arctomecon californica*
ComName	Las Vegas bearpoppy
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[COMMENT]
Surveyors	
SurveyAffiliation	NDF
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	

Template Table: NNHP_erconi_eos_200709, for *Eriogonum corymbossum* var. *nilesii*

Table 31. This template table contains information compiled by the Nevada Natural Heritage Program for the Las Vegas buckwheat. It includes qualitative and quantitative data that was collected by a number of surveyors using a variety of methods. The Heritage database does not include metadata that describes either data type or methods.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NNHP_erconi_eos_200709
SciName	[SNAME]
ComName	Las Vegas buckwheat
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[LAST_OBS]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	[ACREAGE]
PopSize	[POP_COUNT]
DataType	
Note_	
SampleYear	

Template Table: NPS_229_birds_pt_sightings04, for *Phainopepla nitens* and *Empidonax traillii extimus*

Table 32. These template tables contain the approximate location of *Phainopepla nitens* and *Empidonax traillii extimus* individuals and nests observed during 2004 surveys in Lake Mead National Recreation Area. Each point represents a breeding territory and the number of individuals is shown in [comments].

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_229_birds_pt_sightings04
SciName	[scientific_name]
ComName	[common_name]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[Survey_date]
Surveyors	
SurveyAffiliation	GBBO
PopSampleMethod	Territory plot mapping
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	

Template Table: NPS_229_birds_pt_sightings05, for *Phainopepla nitens*

Table 33. This template table contains the approximate location of *Phainopepla nitens* individuals and nests observed during 2005 surveys in Lake Mead National Recreation Area. Each point represents a breeding territory and the number of individuals is shown in [comments].

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_229_birds_pt_sightings05
SciName	
ComName	[common_name]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[Date_MDY]
Surveyors	
SurveyAffiliation	GBBO
PopSampleMethod	Territory plot mapping
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	

Template Table: NPS_229_WIFL_detect05, for *Empidonax traillii extimus*

Table 34. This template table contains GPS coordinates of *Empidonax traillii extimus* sightings. Locations were collected during shoreline surveys conducted by Lake Mead National Recreation Area wildlife personnel in 2005.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_229_WIFL_detect05
SciName	*Empidonax traillii extimus*
ComName	Southwestern Willow Flycatcher
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[Date_]
Surveyors	[Observers]
SurveyAffiliation	
PopSampleMethod	Transect
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	[Year_]

Template Table: NPS_363_ARCA_98to00obs, for *Arctomecon californica*

Table 35. This template table includes data collected during *Arctomecon californica* monitoring on Lake Mead National Recreation Area. Some points locate the presence of this species and some note its absence. All but about a dozen of these locations were collected during 1998 as a preliminary assessment of bearpoppy range and density. [COMMENT] contains information stating the species' status at a location as yes, no, or dead.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_363_ARCA_98to00obs
SciName	*Arctomecon californica*
ComName	Las Vegas bearpoppy
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[GPS_DATE]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Line transect
PopSampleData	NPS_363_ARCA_Transect_locs
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Presence
Note_	
SampleYear	[YEAR]

Template Table: NPS_363_ASGE_97to06obs, for *Astragalus geyeri* var. *triquetrus*

Table 36. This template table contains records showing the location of threecorner milkvetch at Lake Mead National Recreation Area. These records were collected over a number of years by different people using different methods. Documentation describing these elements is incomplete and it is not possible to determine the quality or source of these data points. A summary of *Astragalus geyeri* var. *triquetrus* inventory and monitoring is in the 2005 MSHCP Biennial report.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_363_ASGE_97to06obs
SciName	*Astrogalus geyeri* var. *triquetrus*
ComName	Threecorner milkvetch
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	[NUM_PLANTS]
DataType	Quantitative
Note_	
SampleYear	[Year_]

Template Table: NPS_compliance_tortoise, for *Gopherus agassizii*

Table 37. This template table contains the location of live tortoises from compliance surveys conducted in Lake Mead National Recreation Area, Arizona and Nevada.
Data from the following surveys are in this database:
--2001 Resurvey of the 1990 Lakeshore Road project area.
--1990 Lakeshore Road survey preceding the road realignment.
--1992 Survey of the proposed Northshore Road construction corridor.
--1999 April 7 and 8, 1999 survey of the Overton powerline project proposed construction area.
--2003 Survey of Northshore Road reconstruction project conducted by SNEI.

Detailed information of these projects and surveys are shown in metadata for feature class NPS_compliance_tortoise in the MSHCP_SPECIES geodatabase. These metadata do not describe sample methods.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_compliance_tortoise
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_SURVEY]
Surveyors	[OBSERVERS]
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	NPS_compliance_tortoise
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	[YEAR_SURVEY]

Template Table: NPS_CPSU_monitoring_tortoise, for *Gopherus agassizii*

Table 38. This template table contains *Gopherus agassizii* locations and sighting information from the Cottonwood and Grapevine study plots in Lake Mead National Recreation Area, Nevada, between 1992 and 2001. This was a long term telemetry study to assess tortoise survivorship in these plots and data include multiple sightings of individual tortoises. We took the geometric means of these multiple sighting coordinates as point representations of populations each year. Population sizes are count of tortoises. Areas are estimations of sighting ranges from ArcMap. Documentation for this information is summarized in Longshore K.M., J.R. Jaeger, J.M. Sappington. 2003. Desert tortoise (*Gopherus agassizii*) survival at two eastern Mojave Desert sites: Death by short-term drought? Journal of Herpetology 37(1):169-177.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_CPSU_monitoring_tortoise
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Radio telemetry
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	
Note_	
SampleYear	[YEAR_]

This dataset is for radio telemetry study for survivorship in two confined areas. There are multiple records for the same individuals. For each individual, we only selected one record at each year to represent its spatial location.

Template Table: NPS_Mormon_Mesa, for *Gopherus agassizii*

Table 39. This template table contains desert tortoise locations in marked burrows on Mormon Mesa, Clark County, Nevada. The shapefile was derived from a text file provided by Kenneth E. Nussear with the U.S. Geological Survey. Tortoise locations were calculated as averaged coordinates listed in this text file.

This was a telemetry study for tortoise monitoring. There are multiple sightings for individual tortoises during 1998 and 1999. Location of the population was calculated as the geometric mean of multiple tortoise sighting coordinates. Population sizes are counts of individual tortoises. The aerial extent of this population is an estimate of sighting ranges calculated from ArcMap. Further information can be found in: Nussear, K.E.. 2004. Mechanistic investigation of the distributional limits of the desert tortoise (*Gopherus agassizii*). University of Nevada, Reno. PhD Dissertation.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_Mormon_Mesa
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Radio telemetry
PopSampleData	Naussaer, 2004
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	1998 & 1999

Template Table: NPS_NRPP_monitoring_plots, for *Gopherus agassizii*

Table 40. This template table contains data showing the location of five tortoises in 14, 1 km^2 study plots that were created for long-term desert tortoise monitoring in Lake Mead National Recreation Area, Arizona and Nevada. The project was funded from 1995 through 1997 by the National Park Service Natural Resource Protection Program.

Details of this monitoring are summarized in, 'Lake Mead National Recreation Area. NRPP Final Report, Report of Activities 1995-1997. Protecting the Threatened Desert Tortoise: A Multi-Park Plan for Primary Survey, Management, and Monitoring'.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_NRPP_monitoring_tortoise
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	[OBSERVERS]
SurveyAffiliation	
PopSampleMethod	1 square-km plot
PopSampleData	
EnvSampleMethod	
EnvSampleData	NPS_NRPP_monitoring_tortoise
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	

Template Table: NPS_NRPP_triangle_tortoise, for *Gopherus agassizii*

Table 41. This template table contains tortoise locations along triangular transects created to determine tortoise distribution, relative density, and potential habitat in Lake Mead National Recreation Area, Arizona and Nevada. The project was funded from 1995 through 1997 by the National Park Service Natural Resource Protection Program. Data were collected by following a compass bearing, counting the number of tortoises, and estimating the distance traveled by the time spent walking along 1.5 mile triangular transects. Each transect was approximately one-half mile on a side. Details of this monitoring are summarized in a report titled, 'Lake Mead National Recreation Area. NRPP Final Report, Report of Activities 1995-1997. Protecting the Threatened Desert Tortoise: A Multi-Park Plan for Primary Survey, Management, and Monitoring'.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_NRPP_triangle_tortoise
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	[OBSERVERS]
SurveyAffiliation	
PopSampleMethod	Triangular transect
PopSampleData	
EnvSampleMethod	
EnvSampleData	NPS_NRPP_triangle_tortoise
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	

Template Table: NPS_SNWA_tortoise, for *Gopherus agassizii*

Table 42. This template table contains desert tortoise locations in the River Mountains, Lake Mead National Recreation Area (LAME), Nevada. This was a tortoise telemetry study that involved animals that were relocated to this site from a Southern Nevada Water Authority project in LAME during 1998. One tortoise, #4484, was injured and after rehabilitation had a telemeter affixed to monitor its health. The population size in this data set is the number of animals relocated. Location of the population was calculated as the geometric mean of multiple tortoise sighting coordinates. The aerial extent of this population is an estimate of sighting ranges calculated from ArcMap.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	NPS_SNWA_tortoise
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	[OBSERVERS]
SurveyAffiliation	
PopSampleMethod	Radio telemetry, relocation
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	1998

Template Tables: observed_centroids_1006_11_20, for *Phainopepla nitens*, *Arctomecon californica*, *Pyrgulopsis turbatrix*, *Astragalus geyeri* var. *triquetrus*, *Penstemon albomarginatus*, *Icaricia shasta charlestonensis*, *Gopherus agassizii*, *Empidonax traillii extimus*, *Eriogonum corymbosum* var. *nilesii*, and *Rana onca*.

Table 43. Theses template tables contain information collected for *Phainopepla nitens*, *Arctomecon californica*, *Pyrgulopsis turbatrix*, *Astragalus geyeri* var. *triquetrus*, *Penstemon albomarginatus*, *Icaricia shasta charlestonensis*, *Gopherus agassizii*, *Empidonax traillii extimus*, *Eriogonum corymbosum* var. *nilesii*, and *Rana onca* by a number of individuals and agencies, and compiled by the Nevada Natural Heritage Program. These records are the centroid points corresponding to each polygon in the observed_area_2006_11_20 feature class, and they carry the exact same set of attributes. Centroid Points represent the best attempt to locate the observation by Nevada Natural Heritage Program. Records vary depending on source information and data entry backlog. This compiled table contains ten target species: Las Vegas bearpoppy, threecorner milkvetch, white-margined beardtongue, Las Vegas buckwheat, southern Nevada springsnail, Mt. Charleston blue butterfly, relict leopard frog, desert tortoise, Phainopepla, and Southwestern Willow Flycatcher.

Template field	Assigned Information
src_OID	[OBJECTID]
Src_Filename	observed_centroids_1006_11_20
SciName	[SNAME]
ComName	[SCOMNAME]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[OBS_DATE]
Surveyors	[OBSERVER]
SurveyAffiliation	
PopSampleMethod	
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	[OBS_AREA], [OBS_DATA]
PopSize	[OBS_DATA]
DataType	Quantitative
Note_	
SampleYear	

Template Table: TNC_rareplants, for *Arctomecon californica*, *Astragalus geyeri* var. *triquetrus*, and *Penstemon albomarginatus*

Table 44. These template tables contain information compiled by The Natural Conservancy to develop a comprehensive dataset showing the distribution of species for plant/habitat conservation planning. They include locations for nine, rare, low-elevation plant species found in Arizona, California and Nevada, and data for three of the 12 species (*Arctomecon californica*, *Astragalus geyeri* var. *triquetrus*, and *Penstemon albomarginatus*). The dataset includes occurrences compiled from Nevada, Arizona, and California Natural Heritage Programs, as well as point locations of individuals/populations from various sources, which are not identified in documentation accompanying the compiled dataset.

Natural Heritage data are redundant to data in other template tables were removed from this table. Also, most Heritage Program data are weak because coordinates are off position.

Template field	Feature Class Field
src_OID	[OBJECTID]
Src_Filename	TNC_rareplants
SciName	[SNAME]
ComName	[COMMNAME]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[LASTOBS], [FIRSTOBS]
Surveyors	
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	TNC_rareplants
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	
Note_	
SampleYear	

Template Table: USFWS_nem_observations_01, for *Gopherus agassizii*
Template Table: USFWS_nem_observations_02, for *Gopherus agassizii*
Template Table: USFWS_nem_observations_03, for *Gopherus agassizii*
Template Table: USFWS_nem_observations_04, for *Gopherus agassizii*

Table 45. These template tables consist of points locating live tortoises or tortoise carcasses found by field crews while walking Line Distance Sampling (LDS) transects from 2001 to 2004 (the data in these MSHCP_SPECIES feature classes include live and dead tortoises; only records of live tortoises are included in these template files, as determined by selecting Tort_state = live). LDS is the current method used to estimate tortoise density in support of the range-wide monitoring program that is outlined in the Desert Tortoise Recovery Plan (U.S. Fish and Wildlife Service 2008). These data are intended for use by scientific and resource management communities for ongoing research, modeling, monitoring, mapping, and visualization applications.

Template field	Feature Class Field
src_OID	[OBJECTID]
Src_Filename	USFWS_nem_observations_01 (2, 3, 4)
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	[OBSERVER1]
SurveyAffiliation	UNR
PopSampleMethod	Line distance sampling
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	USFWS_nem_transects_01 (2, 3, 4)
Area	
PopSize	
DataType	Quantitative
Note_	
SampleYear	

Template Table: USFWS_nem_tranlivobs_05, for *Gopherus agassizii*
Template Table: USFWS_oppliveobs_05, for *Gopherus agassizii*

Table 46. Template table USFWS_oppliveobs_05, for *Gopherus agassizii* consists of point data locating live tortoises during opportunistic observations by surveyors walking to or from the start or end of any transect in 2005. Template table 'USFWS_nem_tranlivobs_05, for *Gopherus agassizii* consists of point locations of live tortoises found while walking Line Distance Transects (LDS) in 2005. LDS is the current method used to estimate tortoise density in support of the range-wide monitoring program that is outlined in the Desert Tortoise Recovery Plan (U.S. Fish and Wildlife Service 2008). These data are intended for use by scientific and resource management communities for ongoing research, modeling, monitoring, mapping, and visualization applications.

Template field	Feature Class Field
src_OID	[OBJECTID]
Src_Filename	USFWS_nem_observations_01 (2, 3, 4)
SciName	*Gopherus agassizii*
ComName	Desert tortoise
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[DATE_]
Surveyors	[OBSERVER1]
SurveyAffiliation	UNR
PopSampleMethod	Line distance sampling
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	USFWS_nem_transects_01 (2, 3, 4)
Area	
PopSize	1
DataType	Quantitative
Note_	
SampleYear	2005

Template Table: Whitney_sen_plant, for *Arctomecon californica*

Table 47. This template table includes points locating the Las Vegas bearpoppy in an unspecified area of Clark County. These data are a part of a larger dataset of rare plant locations compiled for Clark County. Data of species other than *Arctomecon californica* were removed to create this template table. Data collection methods are unknown.

Template field	Feature Class Field
src_OID	[OBJECTID]
Src_Filename	Whitney_sen_plant
SciName	*Arctomecon californica*
ComName	[Species]
PopName	
xUTM	[POINT_X]
yUTM	[POINT_Y]
SampleDate	[Date_]
Surveyors	[Observer]
SurveyAffiliation	
PopSampleMethod	Unknown
PopSampleData	
EnvSampleMethod	
EnvSampleData	
AbundanceEst	
AreaEst	
SiteSketch	
Area	
PopSize	[Live_ind]
DataType	Quantitative
Note_	
SampleYear	

Table 48. This template table contains point locations and qualitative data for southeast Nevada springsnail surveys in a number of southern Nevada springs from Dr. Donald Sada.

Template field	Assigned Information
src_OID	[ID No.]
src_Filename	P.turbatrix.xls
SciName	[Springsnail]
ComName	
PopName	[Spring Name]
xUTM	[Easting]
yUTM	[Northing]
SampleDate	[Sample Date]
Surveyors	[Surveyor]
SurveyAffiliation	DRI
PopSampleMethod	Spring survey
PopSampleData	SpringDBMetadata.pdf
EnvSampleMethod	Spring survey
EnvSampleData	P.turbatrix.xls
AbundanceEst	[NOTES]
AreaEst	
SiteSketch	
Area	
PopSize	
DataType	Qualitative
Note_	
SampleYear	

Step V. Create a species master table by combining species-specific template tables.

For this step, template tables were combined for each species to make species-specific master tables. Since data had been transcribed into template tables with standard structure (see Table 2), this was accomplished by combining tables using the ArcGIS function 'Merge' (ArcToolBox – Data Management Tools – General – Merge).

Step VI. Check for and delete duplicate records.

Template tables were checked for duplicate (e.g., the occurrence of more than a single record for a species at a location during a survey) records. Duplicate records were deleted. This was required because data were often duplicated because many MSHCP_SPECIES feature classes contained common information. Duplicate records were found by rounding X and Y coordinates into an integer in each species' master table and applying the 'Find Duplicates Query' function in Microsoft Access® to locate duplicate coordinates during a year. Records that shared the same year and X and Y coordinates were considered duplicates. Duplicate records were compared for their information, clarity, accuracy, and originality. Records with superior information, greater accuracy, and from original surveys were retained and records with less and unclear information, lower accuracy, and compiled from another feature class were removed.

Step VII. Assign population names.

Population names were added to master template tables for each species. Names were assigned to represent associations with geographical features or conventions used by past surveyors, and they are described below. Locations of populations for the 11 species for which data were available are mapped in Figures 3 – 14. Naming conventions for populations were:

1—Using names that have been assigned by agencies, past surveys, or surveyors. These species occur in well defined demes that are readily known to management agencies and include populations of the Las Vegas bearpoppy, threecorner milkvetch, white-margined beardtongue, and desert tortoise (Figures 4 - 7). Desert tortoise population names were assigned following the Desert Tortoise Recovery Plan (U.S. Fish and Wildlife Service 2008) convention. Spatial records of these species that occur outside a subgroup were assigned "Clark County" as the population name.

2— Using names assigned in reference to named habitats. This method was used for species with discrete distributions, such as springsnails, that occupy a named geographical feature, such as a spring. In these cases, each population was named by the spring it occupied (Figure 8).

3—Species such as Phainopepla and Western Burrowing Owl are highly mobile and they do not occupy discrete habitat patches that can be easily named. Therefore, there is only one population of these species in Clark County, and all records in the database were combined in a population named "Clark County". In a similar manner, data in the MSHCP_SPECIES geodatabase did not name individual Mt. Charleston blue butterfly populations. Since this species occurs only on Mt. Charleston this name was assigned to all of its populations (Figures 9 - 11).

4—Names were assigned as distributional clusters of demes that did not have populations or demes named in the MSHCP_SPECIES geodatabase. For these, proximate congregations

within the broad distribution of several sample sites were grouped into clusters and assigned names. Populations of the Las Vegas Valley buckwheat, relict leopard frog, and Southwestern Willow Flycatcher were named following this method (Figures 12 - 14).
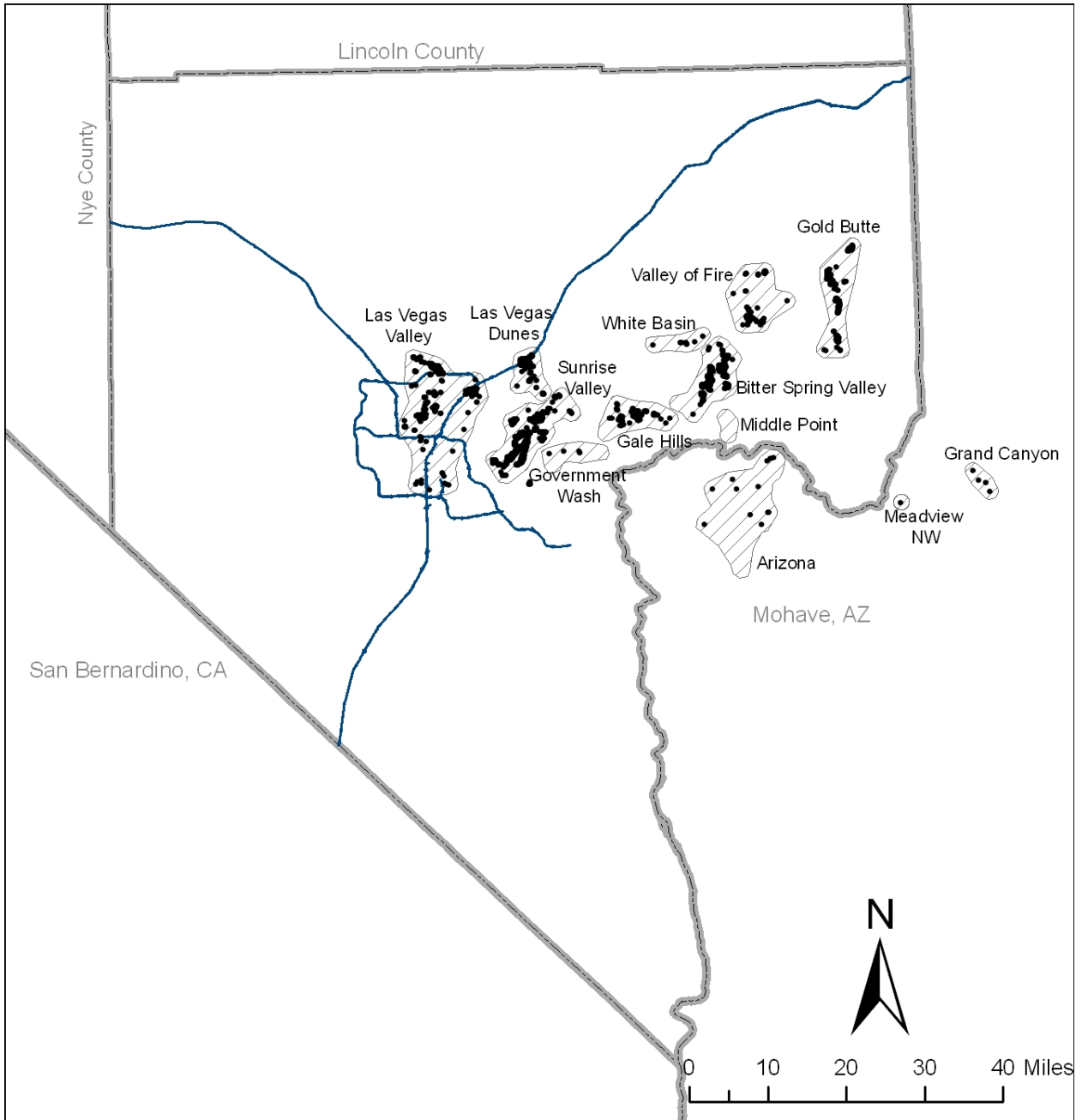
Figure 4. Las Vegas bearpoppy distribution and population units in Clark County and outlying areas. These points include all XY coordinates for location of this species as compiled in its master template table.
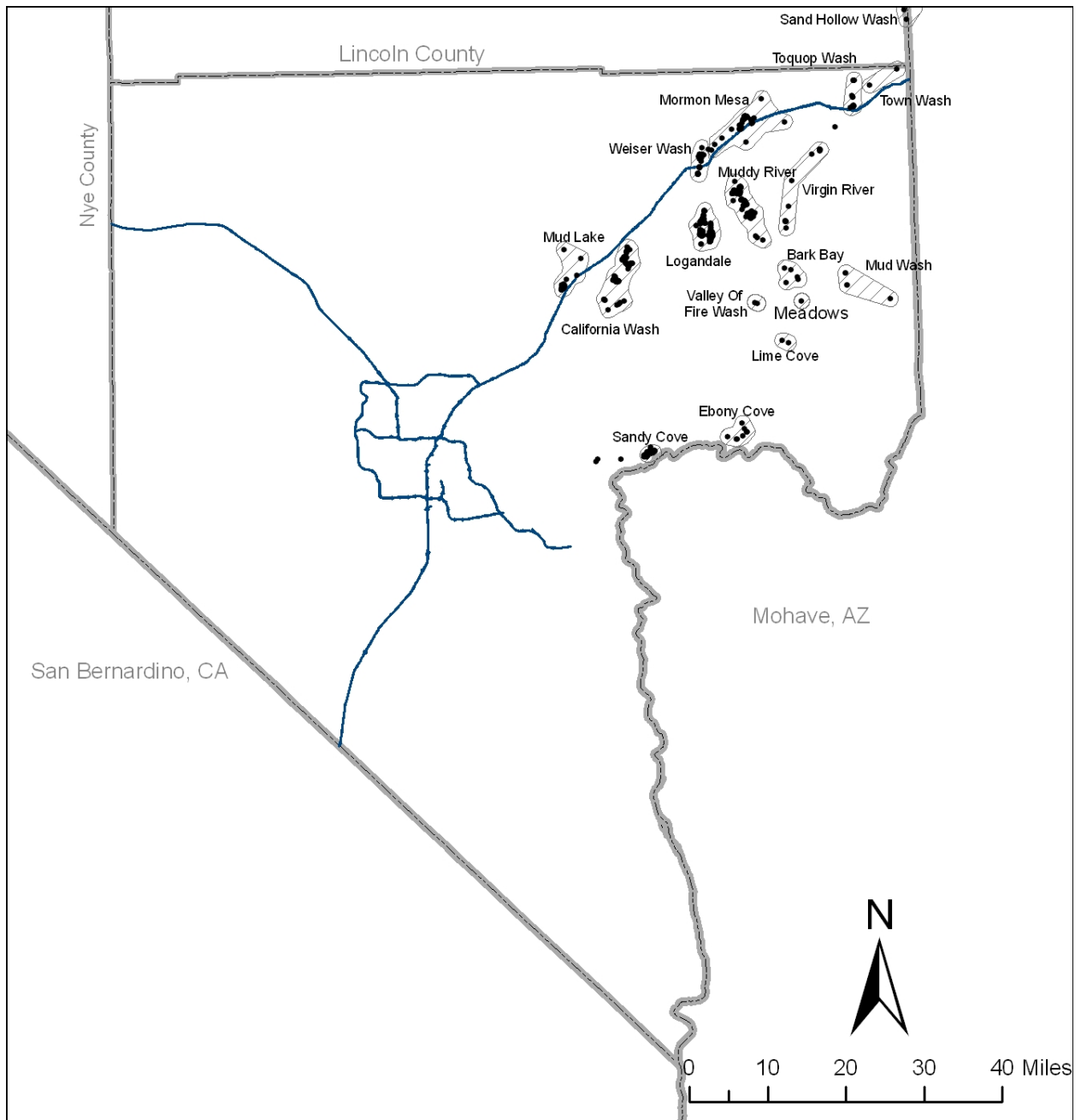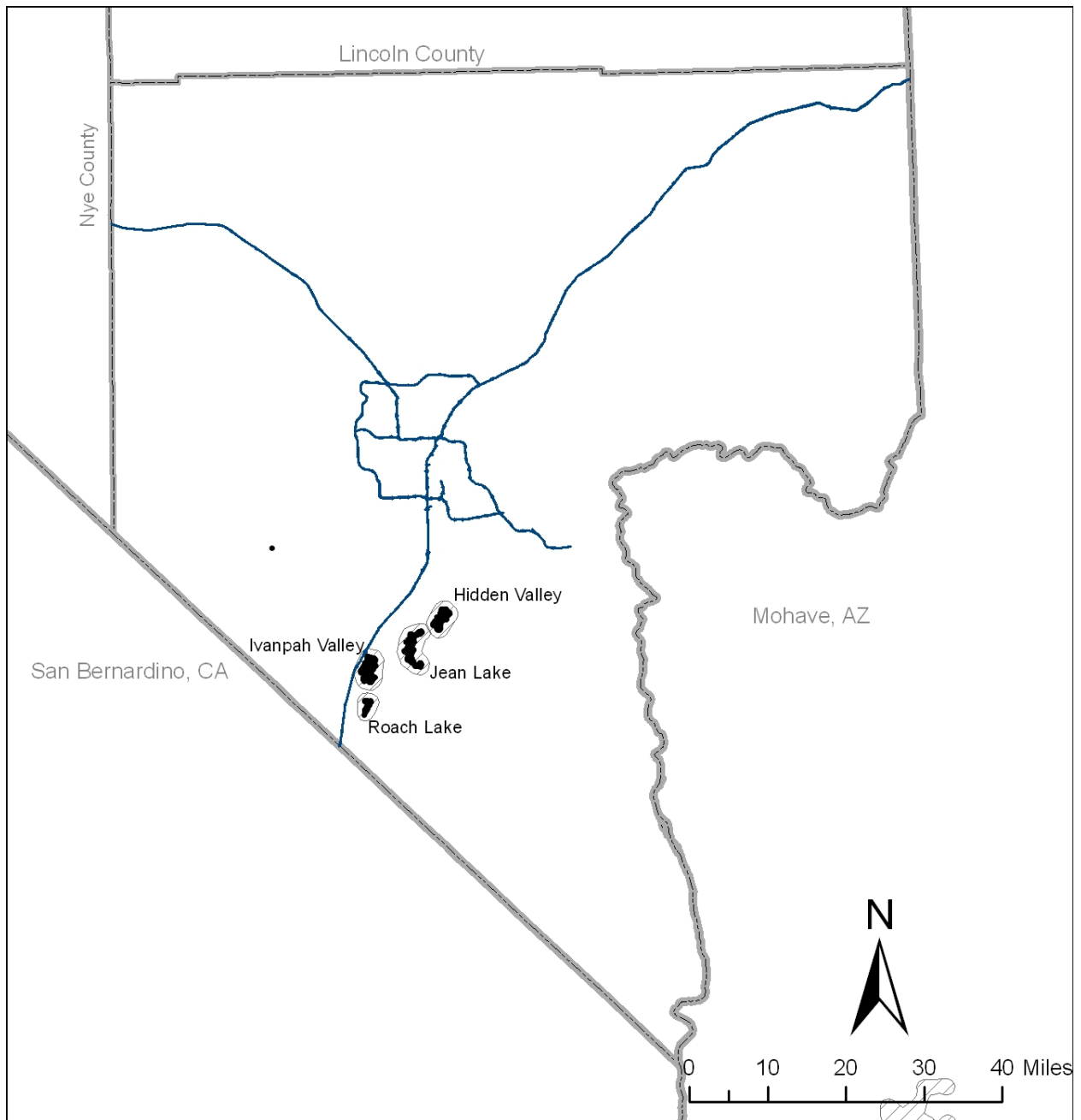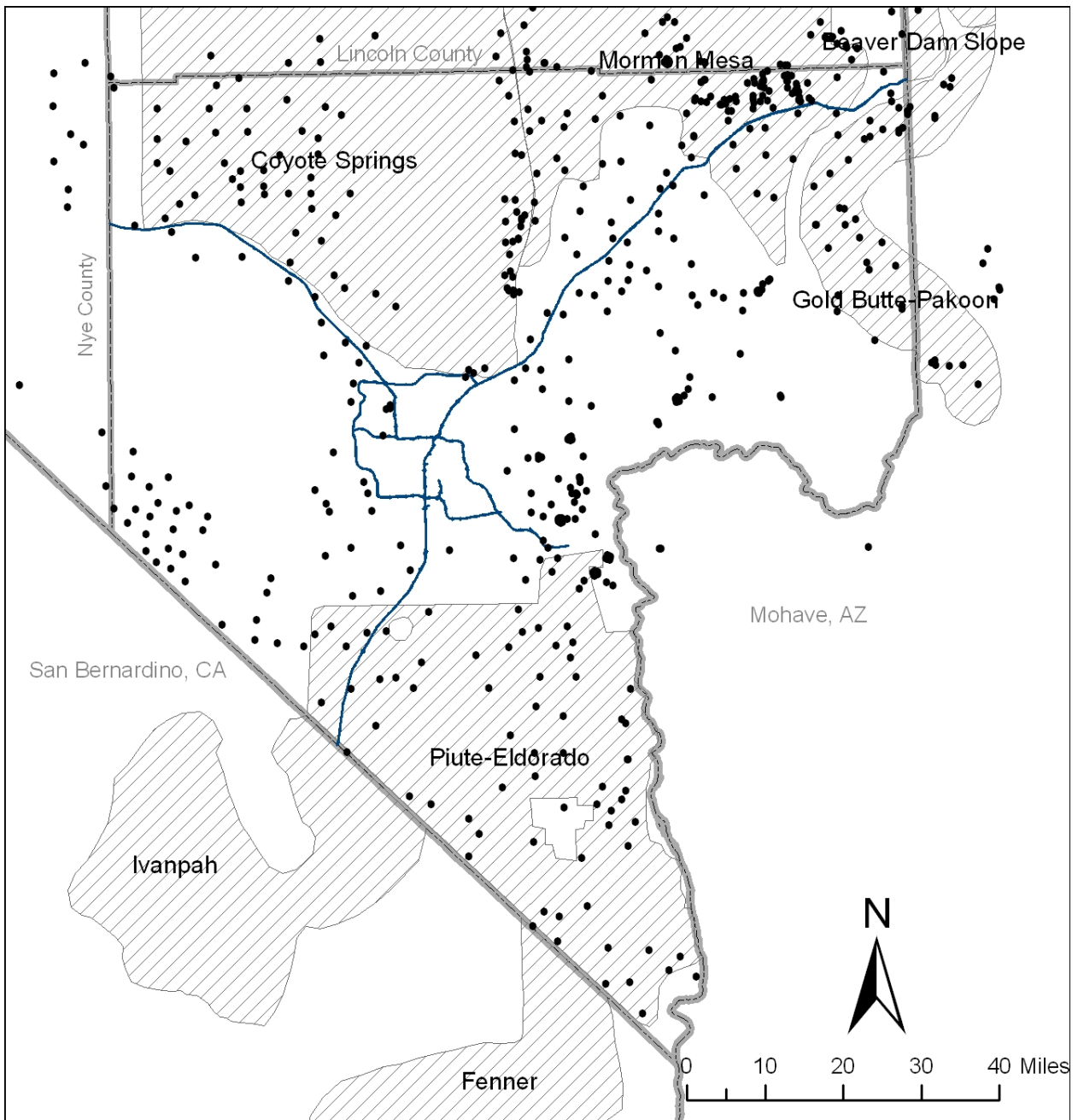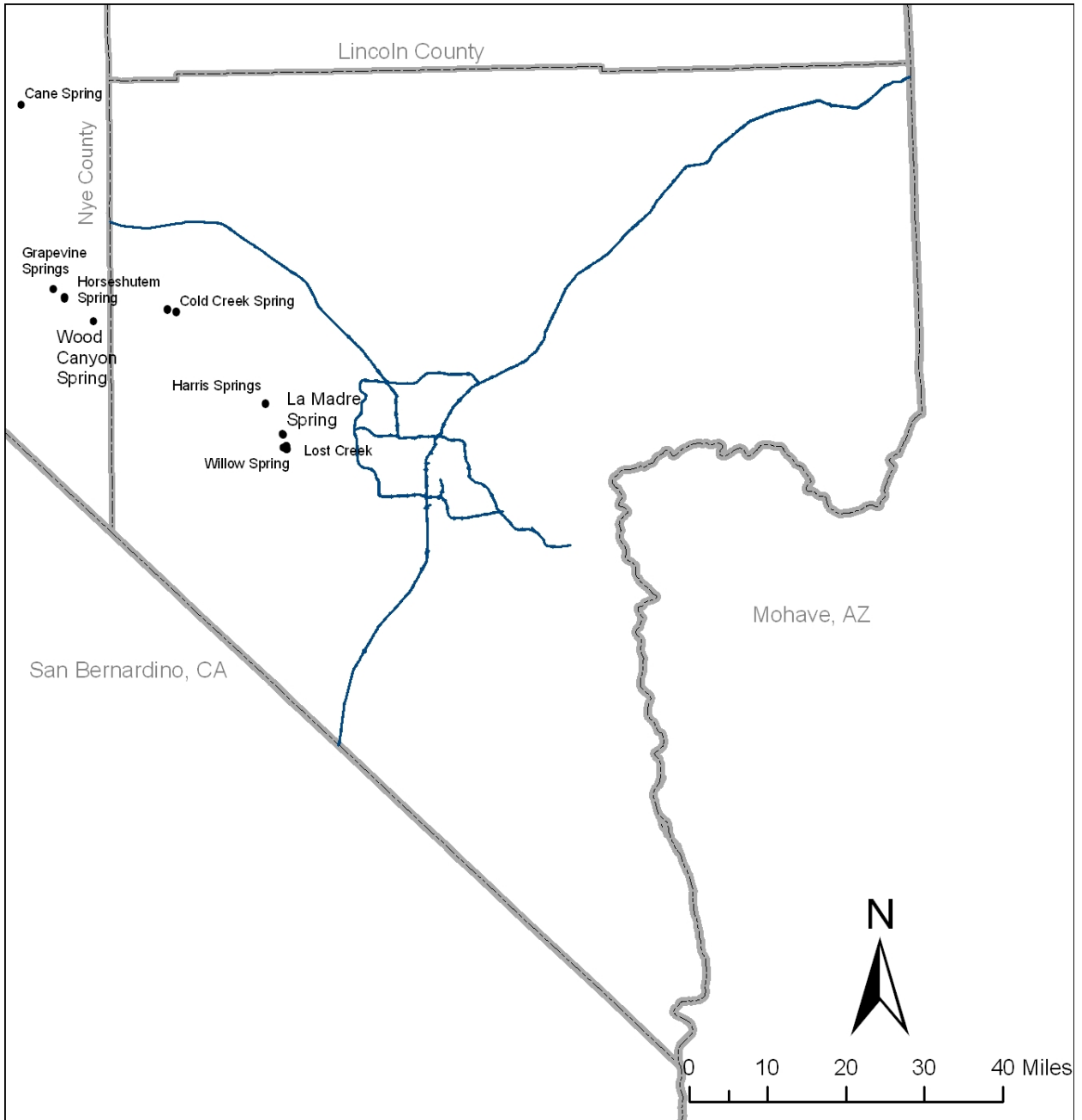
Figure 5. Threecorner milkvetch distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.
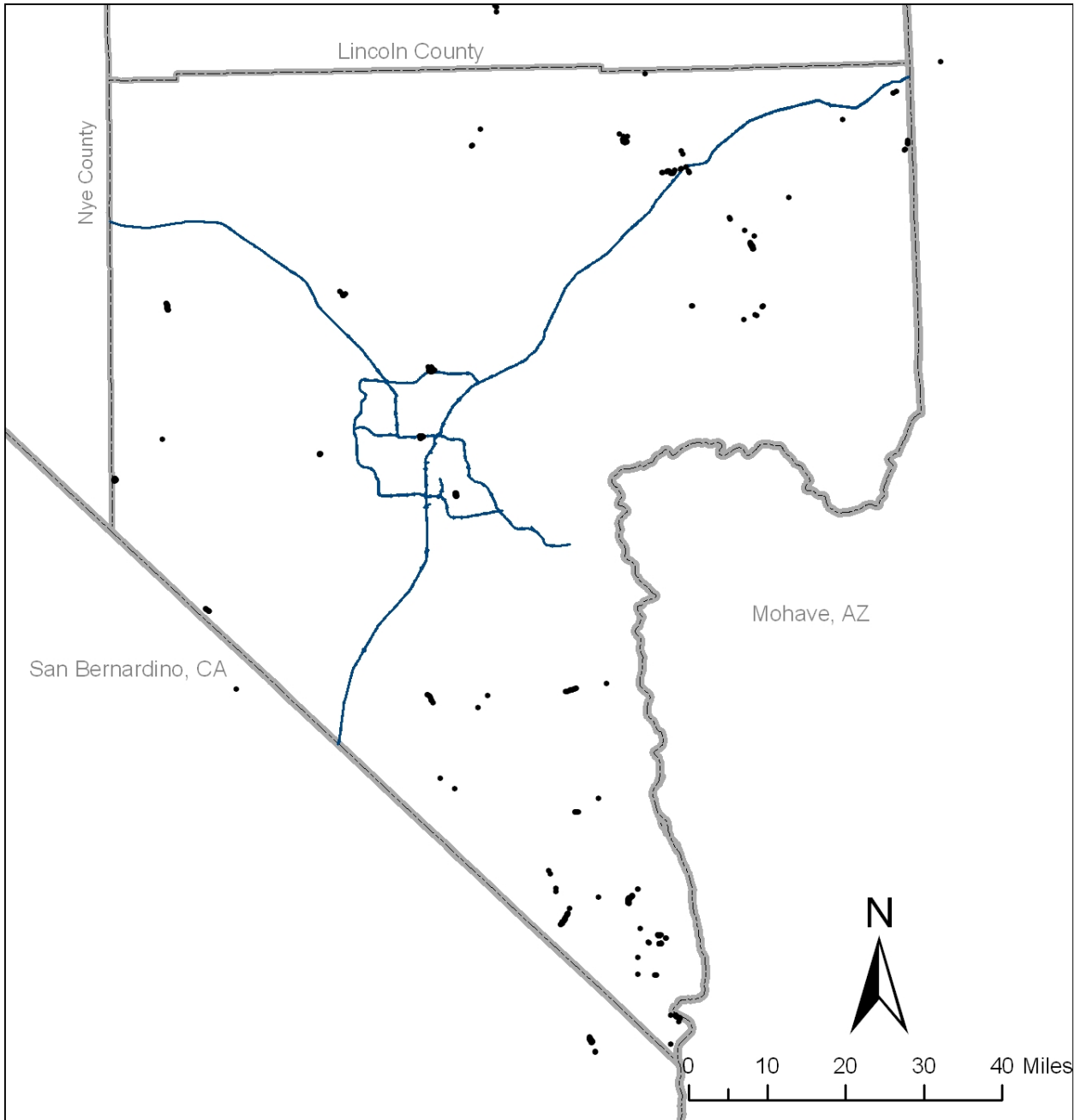
Figure 6. White-margined beardtongue distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.
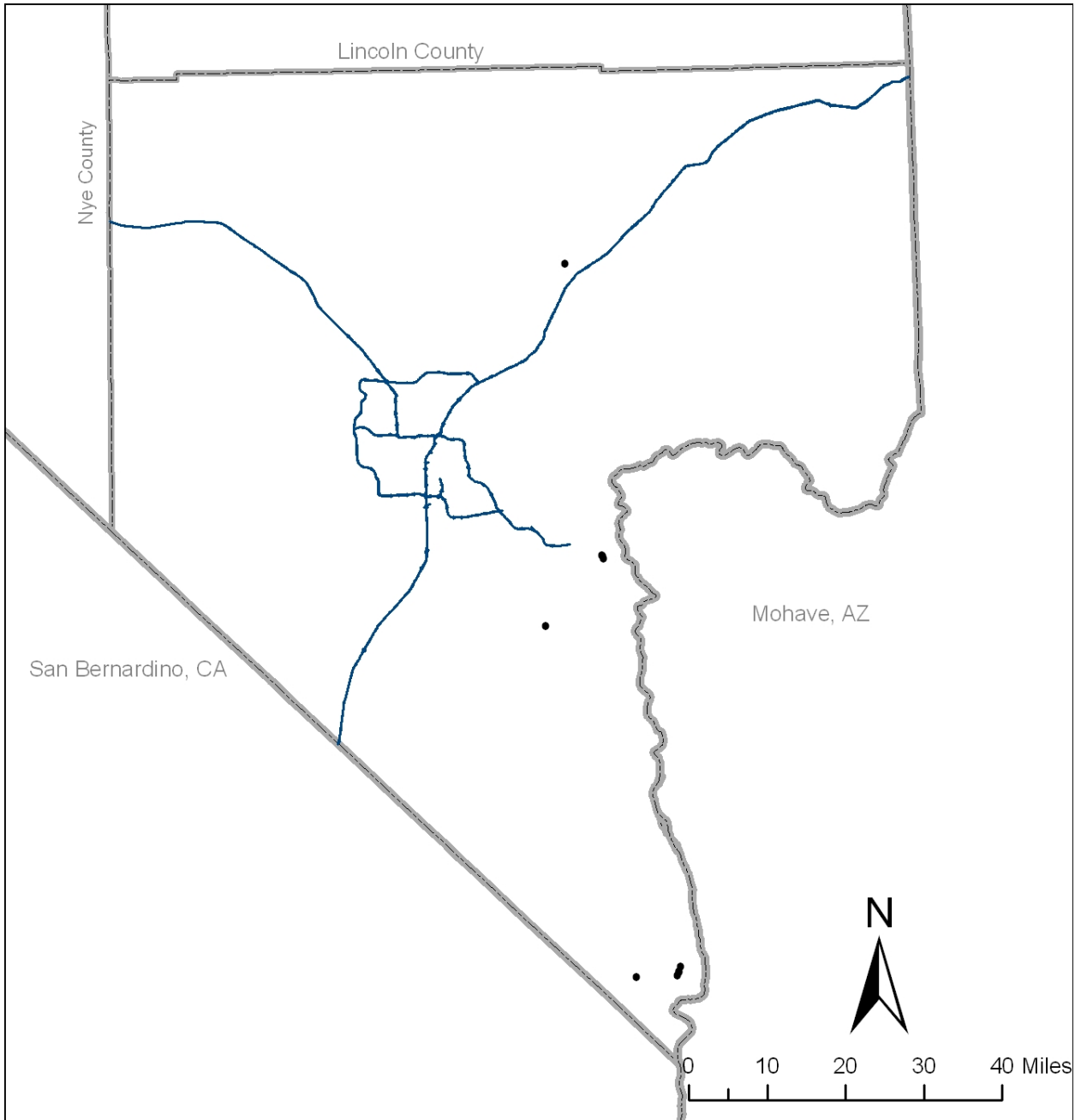
Figure 7. Desert tortoise distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.

Figure 8. Southern Nevada springsnail distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.
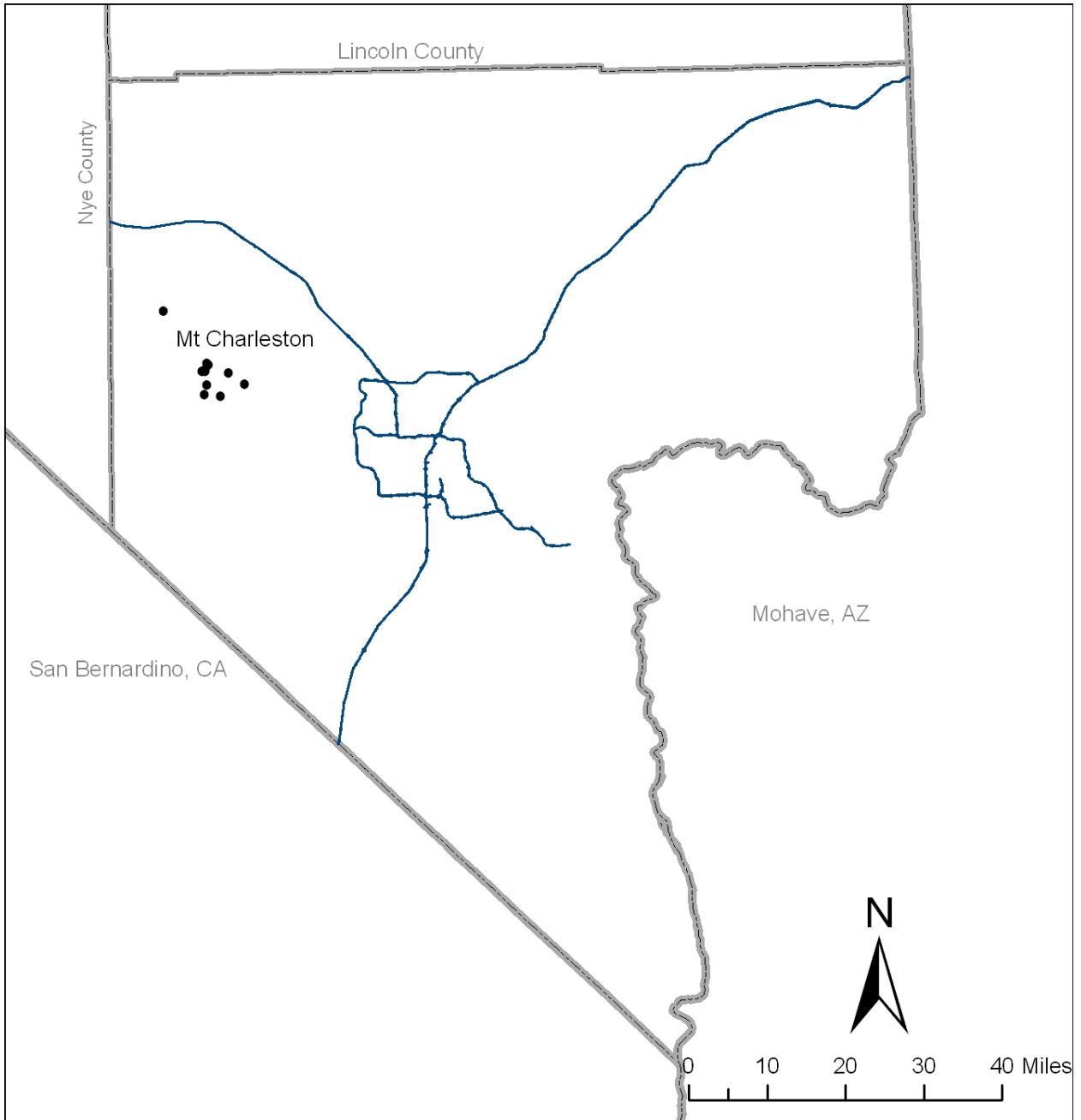
Figure 9. Phainopepla distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.

Figure 10. Western Burrowing Owl distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.

Figure 11. Mt.Charleston blue butterfly distribution and population units in Clark County. These points include all XY coordinates for location of this species as compiled in its master template table.
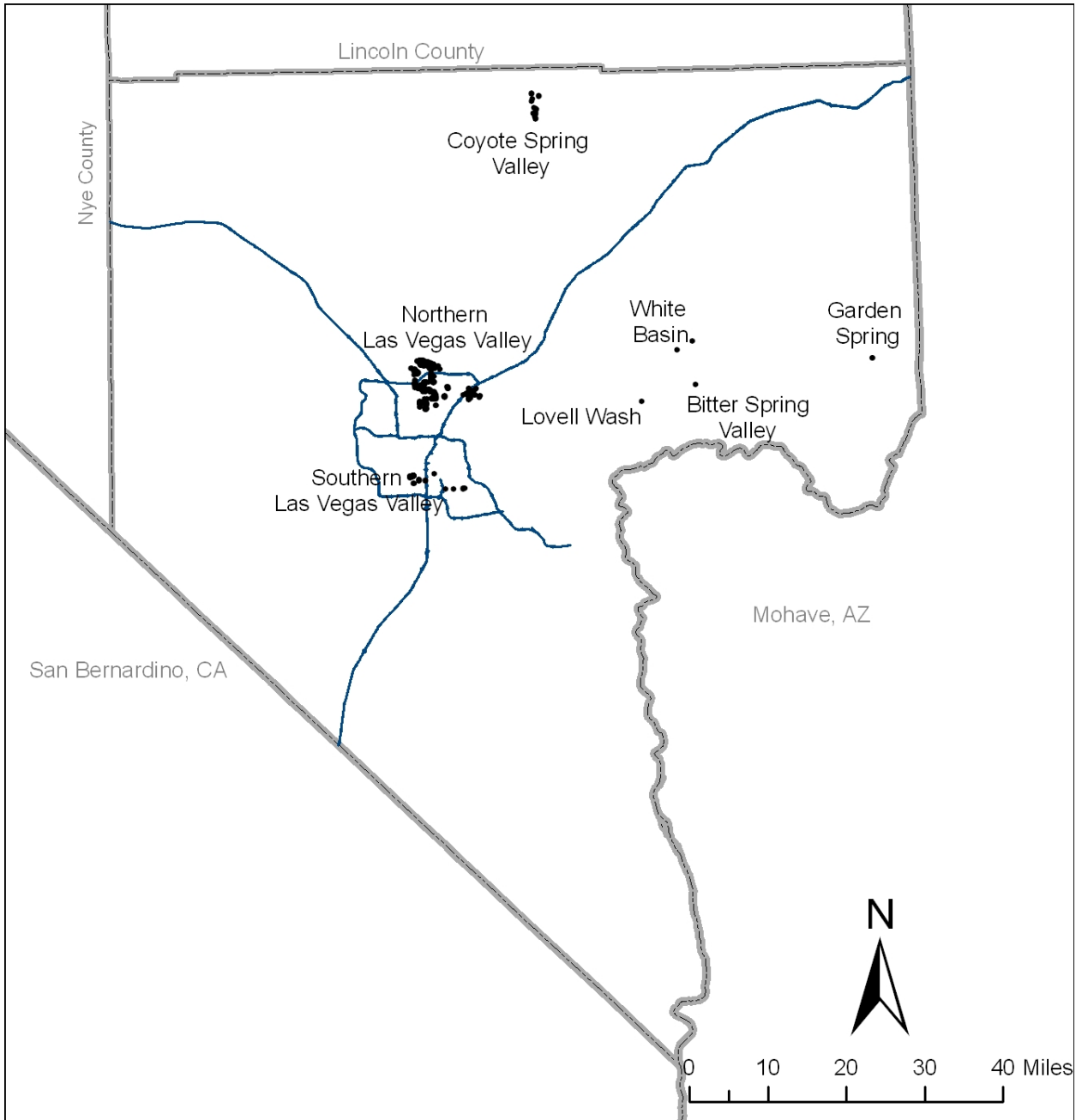
Figure 12. Las Vegas buckwheat distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.
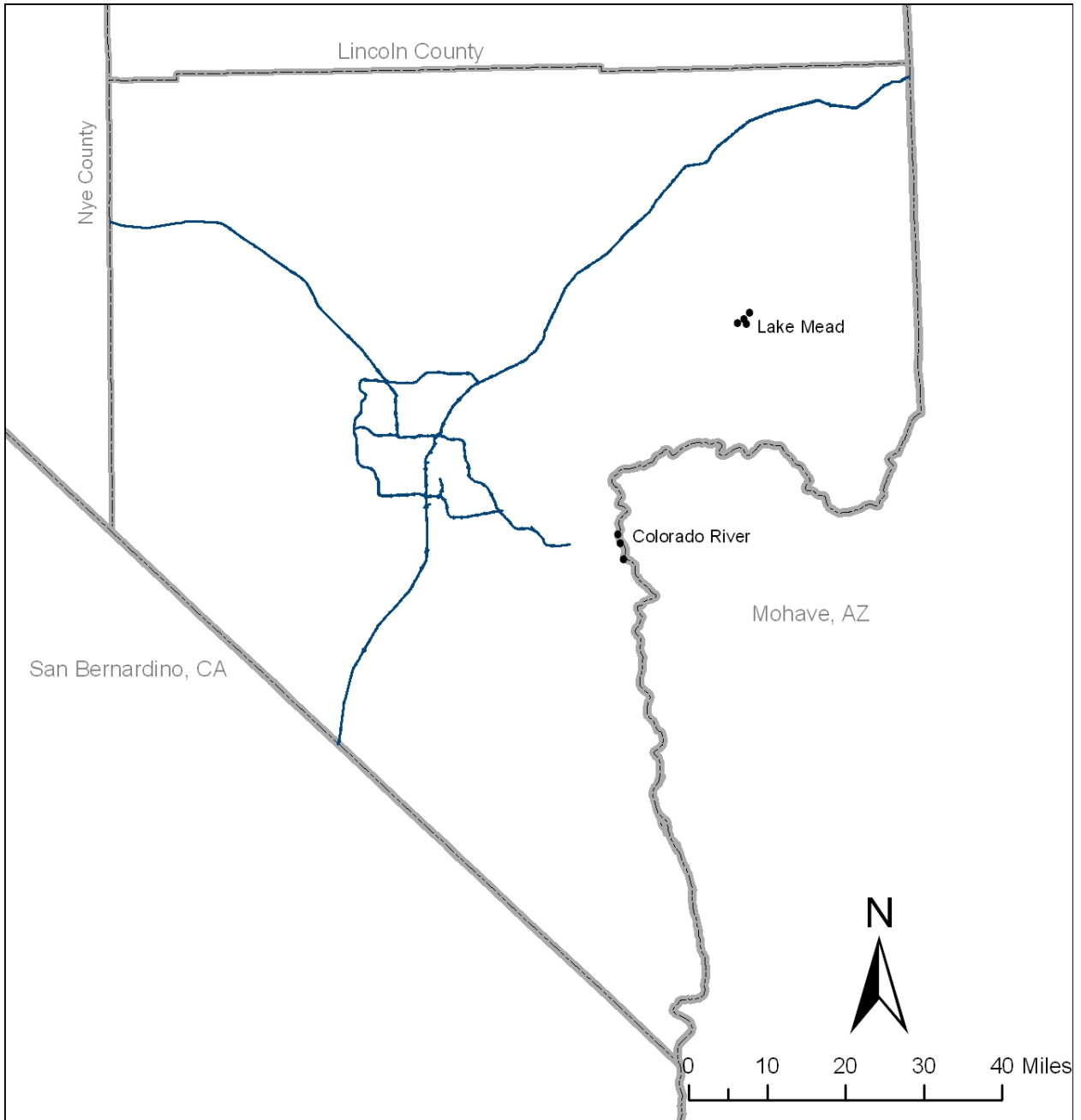
Figure 13. Relict leopard frog distribution and population units in Clark County. These points include all XY coordinates for location of this species as compiled in its master template table.
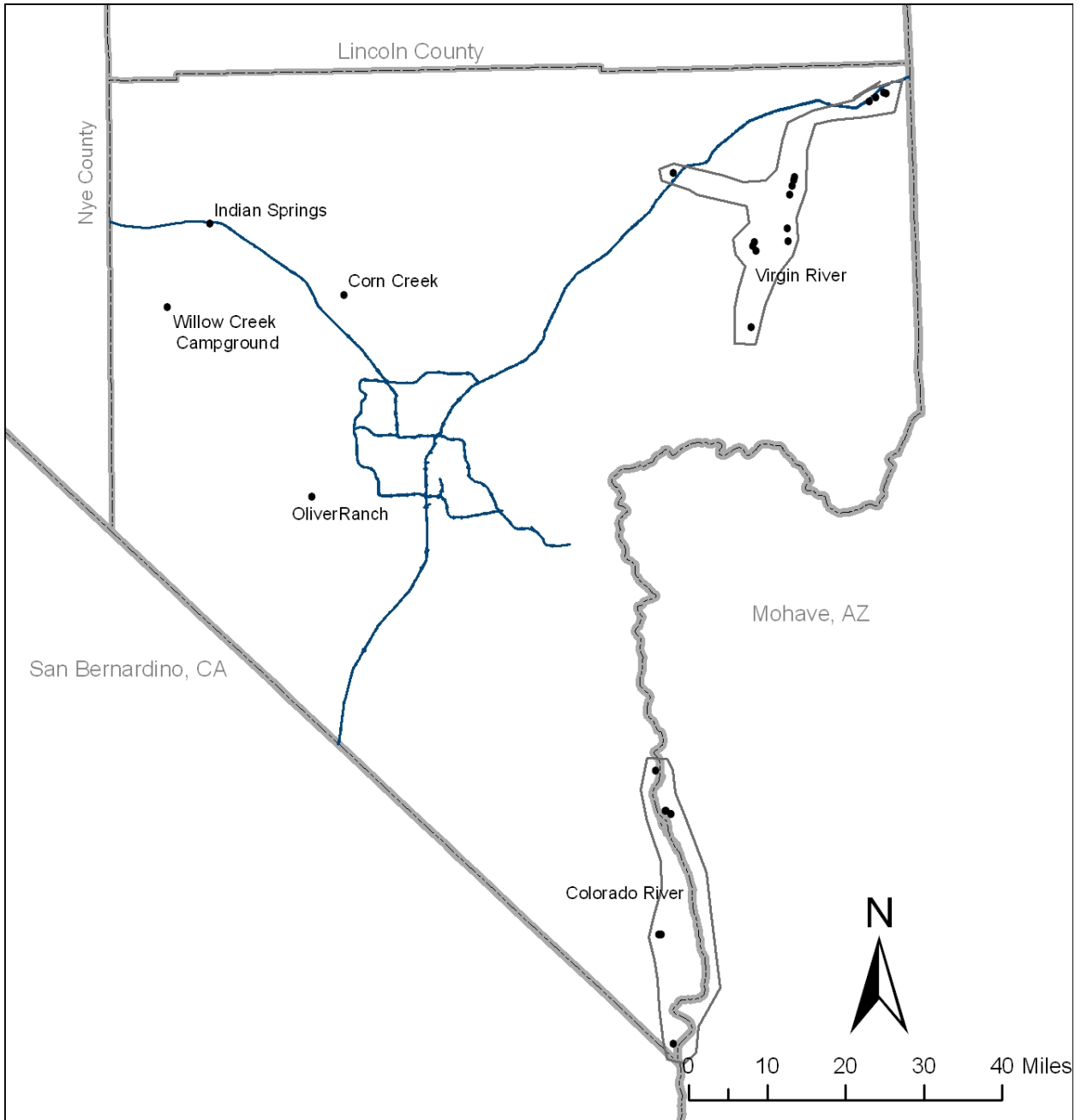
Figure 14. Southwestern Willow Flycatcher distribution and population units in Clark County and the vicinity. These points include all XY coordinates for location of this species as compiled in its master template table.

Step VIII. Compile and combine data tables for the 12 selected species.

Species-specific data tables were combined into a single table using the ArcGIS function 'ArcToolBox – Data Management Tools – General – Merge'. This was possible because data are point feature classes that use the same template for attribute table structure (see Table 2). The final table contains 12,886 records of 11 species (no records were available for the moss, *Claopodium whippleanum*).

Table 49. The number of records for the 12 species included in the database.

Species	Records
Claopodium whippleanum moss	0
Las Vegas bearpoppy	3,535
Las Vegas Valley buckwheat	1,653
Threecorner milkvetch	972
White-margined beardtongue	5,443
Mt. Charleston blue butterfly	11
Southern Nevada springsnail	26
Relict leopard frog	14
Desert tortoise	641
Phainopepla	554
Southwestern Willow Flycatcher	27
Western Burrowing Owl	10
Total	12,886

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Glossary

Geodatabase—The geodatabase is a collection of geographic datasets of various types used in ArcGIS and managed in either a file folder or a relational database.

Feature dataset—Objects that allow grouping related feature classes in ArcGIS geodatabase.

Feature class: —This is one of the most commonly used sources of data. It is composed of geographic features with the same type of geometry (point, line, or polygon) and set of attributes. Feature classes can be contained within a geodatabase or a geodatabase feature dataset.

Data table—Any table that contains data. For the prototype Status Tracking Database, tables were typically feature class or access tables.

Field—the header for data table, feature class, or access table.

Value—Information in a field of data records.