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Threatened and Endangered Species Plan GIS Phase

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Abstract

During FY96, the Ecology Group (ESH-20) has begun to develop a Geographic Information System (GIS) data base for the Threatened and Endangered Species Habitat Management Plan. ESH-20 will use this data base to store ecological data, both spatial and tabular. Additionally, we will use the power of a GIS to query, analyze, model, and display data. We currently have a GIS data dictionary, a data base design, and have begun importing data into the design. Many data sets are completely imported into the data base. Currently, the data base contains 12,021 records. The data that have been imported into the data base can be queried, displayed, and analyzed spatially. We have an ArcView application that demonstrates these abilities. In addition, this application will serve as a screening tool for ESH-20 biologists performing assessments of new projects being proposed at the Laboratory.

1.0 Introduction

The development of data integration with a Geographic Information System (GIS) is Task 2 of the Threatened and Endangered Species Habitat Management Plan (TES HMP) (1996). The Threatened and Endangered Species (TES) GIS is an important component of the TES HMP. We intend the TES GIS to be the primary data base for TES data and other ancillary information. We will use the GIS to display, query, analyze, and model biological data. In addition, the GIS will be the repository for much of the tabular data that has previously been stored in paper form or in other electronic forms such as spreadsheets and text documents. In the past years, data owners have kept and managed their own data, leading to data losses and inconsistency in data base definitions and use. The centralized TES GIS data base will allow for consistent data base definitions and should reduce the loss of data.

We are using ARC/INFO as our GIS for the TES HMP. ARC/INFO was developed by Environmental Systems Research Institute, Inc. (ESRI) and it is used throughout federal agencies, including the Department of the Interior, U.S. Fish and Wildlife Service. Within ARC/INFO, ARC is used for all spatial analysis and INFO is the data base.

During FY96, the GIS development was broken down into 4 subtasks: development of a draft data dictionary, data inventory/data base design/naming conventions, data entry/ conversion, and map production.

2.0 Subtasks

2.1 Subtask 1: Development of a Draft Data Dictionary

A data dictionary is utilized to store metadata (description of data set) about the coverages and to provide a robust tool to facilitate the management of the information. We based the GIS organization on a single

hierarchy of themes (e.g., ecology, geology, and hydrology). This hierarchy is implemented as a directory structure of superthemes with the coverage names following a naming convention that directly codes for the theme and content of the coverage data sets. Therefore, to manage the biological data, we used a data dictionary to document the various data sets. This metadata will conform with the Content Standards for Digital Spatial Metadata from the Federal Geographic Data Committee (FGDC). The data dictionary also supports other data types such as American Standard Code Information Interchange (ASCII) and includes vectors (GIS coverages as points, lines, and polygons), rasters (GIS grids and images), terrain models, and documents. This integration into a data dictionary enables many data base functions to be automated and provides a single source for information on all aspects of the TES HMP project. The data dictionary will be the key to creating the hypertext links via Hyper Text Markup Language (HTML) to tie together the disparate information pertinent to the TES HMP project.

The data dictionary is comprised of a collection of INFO tables related to each other by key items. All files and tables reside in a specific directory, /gis/sys/admin. There, the INFO tables are stored in the info directory and ARC Marco Language (AML) programs and menus are stored in the /gis/sys/admin/amls/olnd directory. The relationship between the various tables is summarized here. The relates (the common item in two tables that links them together) are depicted by connecting lines with the relate item shown with the line.

```
DICT------geoset------
    |- CHGLOG ----- reqnum -----
    |- GNOTES            | - RNOTES
    |- QNOTES
    |- DICT_TABLS
            |
            ------ table ------
                    | - TABL_ITMS
```

A brief explanation of each of these tables is given below:

geoset: A geographic data set.

DICT: The main data dictionary table.

CHGLOG: The change log for the geoset, a unique record for each change or edit to the coverage or other data set.

RNOTES: Individual request/edit notes for each record in CHGLOG. This allows more detailed information about the process steps that a geoset has undergone. RNOTES is related to the CHGLOG table via the reqnum item.

GNOTES: Geoset notes. This stores the abstract of the geoset and other pertinent data about the geoset.

QNOTES: Quality control information about the geoset. This is intended to store the FDGC-formatted metadata information about the geoset.

DICT_TABLS: Stores information about tables related to the geoset, including the Arc Attribute Tables (pat, aat, etc.). This table provides for individually documenting related data.

TABL_ITMS: Stores information about individual items in the related tables and is related to the DICT_TABLS table via the table item.

The table definitions for these INFO tables are presented in Table 1 through Table 6.

The dictionary is envoked from ARC or from a Unix system prompt. From ARC the dictionary AML is run by 'Arc: &r dict'. From a Unix system prompt, the command 'dict' is typed in, followed by the enter key. Tables 7, 8, and 9 are examples of a biological coverage in the DICT, DICT_TBLS, and TABL_ITMS tables, respectively.

2.2 Subtask 2: Data Inventory/Data Base Design/Naming Conventions

2.2.1 Data Inventory

From January through April of 1996, a complete data inventory was made of ESH-20 biology data. During the inventory, the content, owner, and format of each data set was noted. After the data inventory was complete, the data needed to be organized into a functional GIS data base design.

2.2.2 Data Base Design

In May 1996, we began the data base design process. Resources from ESH-20 (the Biology Team), Facility for Information Management, Analysis, and Display (FIMAD), and ESRI were used. The TES GIS team interviewed each ESH-20 ecological data owner to determine owner and data users needs. From the interviews and reviewing each data set, a draft design was formulated. The principle organizing structure for the TES GIS was based on thematic content of the various data sets. The thematic structure was also intended to be hierarchical. The physical directory of the data as well as the naming convention for individual files reflect this thematic organization. All ecology data were stored under the supertheme of ECOL (Ecology). The following diagram illustrates the general structure of the ECOL supertheme into super-subthemes, thematic groups or layers, and themes or coverages.

Supertheme: ECOL
- Super-subthemes: ANIMAL, PLANT, TAE
  - Thematic group or Layer: (See Table 10)
    - Theme or Coverage: (See Table 10)

The design of the layers or thematic groups as well as individual themes and coverages are contained in Table 10. This table also indicates any related tables to the coverage and details their design.

2.2.3 Naming Conventions

As part of the review of data, meeting with data owners, and developing a design for each data set, it became apparent that naming conventions were needed. These conventions were needed for raw files from the field activities as well as within the GIS data base.

We established a naming convention for raw field data files. The file name could not be longer than 8 characters followed by a 3-character extension. The file name must contain a designation of the field study area, date, type of field data, and the plot or transect number. The example below illustrates the file name for the first vegetation transect conducted in upper Guaje Canyon on September 26, 1996.

GCU92696.V01

G = Guaje, C = Canyon, U = upper, 92696 = Date, V = Vegetation, and 01 = first transect for that date.

File naming conventions were also adopted within the GIS data base. All spatial data or coverages were automatically given a PAT or AAT extension by the ARC/INFO software, however, other related data sets needed a standardized convention. Table 11 contains the naming convention and definitions of files used in the GIS data base.

2.3 Subtask 3: Data Entry/Conversion

Upon completing the draft data base design, tables were defined in INFO and data existing in electronic form were converted to ASCII and imported into the INFO tables. However, some data files needed extensive editing prior to import. Table 12 shows an example of an electronic vegetation transect field data form and the fields and field order required for the GIS data base. In August of 1996, with the aid of our ESRI contractor, AML programs were written to ease the requirement for hand editing files. Several data automation programs were written that would reorganize data files for import to INFO. These AMLs are presented in Tables 13, 14, 15, and 16. Meanwhile, other non-electronic data were being manually entered into the data base.

From June 1, 1996, through September 15, 1996, a variety of ecological data sets have been developed within the GIS. Many of these data sets have both spatial and related attribute tables. A status of major data sets is given in Table 17.

2.4 Subtask 4: Map Production

For each major data set having spatial and attribute data, we produced maps. We used either ARCPLOT, a subsystem of ARC/INFO, or ArcView, a desktop GIS for map query and display. Eight maps were produced and are numbered Map 1 through Map 8. In addition to producing maps of spatial data sets, we generated tables with selected records of attribute data associated with the spatial data set. Map 1 contains locations of the vegetation transects conducted by ESH-20 throughout the Laboratory. Table 18 lists records of attribute data associated with the selected transect illustrated on Map 1.

Map 2 shows wetlands within the Laboratory and immediately adjacent areas. We developed the wetland coverage by using both the U.S. Fish and Wildlife's National Wetland Inventory (1990) for the area, as well as data collected with Global Positioning System (GPS) by ESH-20 during biological surveys of wetlands.

Locations of observation and field studies for invertebrates are shown in Map 3. The locational data are an approximate location. Table 19 lists selected records from the terrestrial insect data set. This table gives descriptive information as to the location, as well as what insect was found, by whom, and on what date.

The next map, Map 4, shows the locations of bird observations. These observations are from Laboratory employees, the general public, and personnel within ESH-20. This is a shared data set between ESH-20 and Bandelier National Monument. The locational data are given by the observer and may be considered approximate locations. The data

set does not contain locational data pertaining to ESH-20 formal bird censuses. This coverage is still being developed. Table 20 lists selected records of the attribute data associated with these bird observations.

Map 5 shows habitat for sensitive bird species. These habitat boundaries were developed by extensive field studies by a variety of bird experts of the area. At this point, attribute tables associated with these habitats are still under construction.

Many small mammal studies have been conducted at the Laboratory in the last five years. Map 6 displays the locations of these small mammal studies. In addition to the locational data, a vast amount of attribute data are associated with these locations. Table 21 lists selected records from individual small mammals that were captured at these locations. In addition to this table, Table 22 gives contaminant information associated with small mammals captured.

ESH-20 shares another data set with Bandelier National Monument, the mammal observation data set. This data set is similar to the bird observation data, except that not only does the data set give locations of large and medium-sized mammal sightings from the general public, but also contains locational data of ESH-20 formal studies on large and medium-sized mammals. These locations are displayed on Map 7 and attribute information associated with the informal (general public) observations is contained in Table 23. Information pertaining to ESH-20 formal studies is found in Table 24.

We initiated a study in ESH-20 to look at daily movements of elk by using GPS radio collars. These data are received by ESH-20 via an Argos satellite and the coordinate information transferred to our GIS data base. These locations are shown on Map 8. Table 25 lists selected records of attribute data associated with these locations.

2.5 An ArcView Program Application

During the first week of October 1996, we, with the aid of ESRI, will develop an ArcView program application that will demonstrate the abilities of the current data sets and will be a valuable tool to ESH-20 biologists and, eventually, Laboratory Project Leaders. We have designed the application to query the data bases to determine if the location of a proposed new project at the Laboratory will be in the potential or actual habitat of any TES as well as within wetlands. Figure 1 shows a simplistic diagram of the application. In addition, later versions of the application will show where other biological data exist relative to the project area. This application will help ESH-20 biologists determine where there are data gaps and if additional surveys are required.

3.0 Summary

During FY96, ESH-20 has begun to develop a GIS data base for the TES HMP. ESH-20 will use this data base to store ecological data, both spatial and tabular. In addition, we will use the power of a GIS to query, analyze, model, and display data. We currently have developed a GIS data dictionary, a data base design, and have begun importing data into the design. Many data sets are completely imported into the data base. Currently, the data base contains 12,021 records. The data that have been imported into the data base, can be queried, displayed, and analyzed spatially. We have an ArcView application that demonstrates these abilities. In addition, this application will serve to be a screening tool for ESH-20 biologists performing assessments of new projects being proposed at the Laboratory.

4.0 Acknowledgments

We would like to acknowledge FIMAD and ESRI (Bridgett Ady, Andy Huntington, and Larry Battan) for all of their help and assistance with all phases of the TES GIS data base development. Without their help, support, and patience we would not have completed FY96 requirements on time. In addition, we would like to acknowledge Teralene Foxx, TES HMP Project Leader, and John Huchton, ESH-20 Biology Team Leader, for their support, encouragement, and technical advice. Last but not least, we would like to thank all members of the Biology Team for their contribution to the data base design. The information they gave us was invaluable in designing the data base.

5.0 References

Foxx 1996: T.S. Foxx, "Threatened and Enadangered Species Habitat Management Plan for Los Alamos National Laboratory," Los Alamos National Laboratory internal report (March 1996).

USFWS 1990: Department of the Interior, U.S. Fish and Wildlife Service, "The National Wetland Inventory," U.S. Fish and Wildlife Service, Albuquerque, New Mexico (1990).

ArcView Application

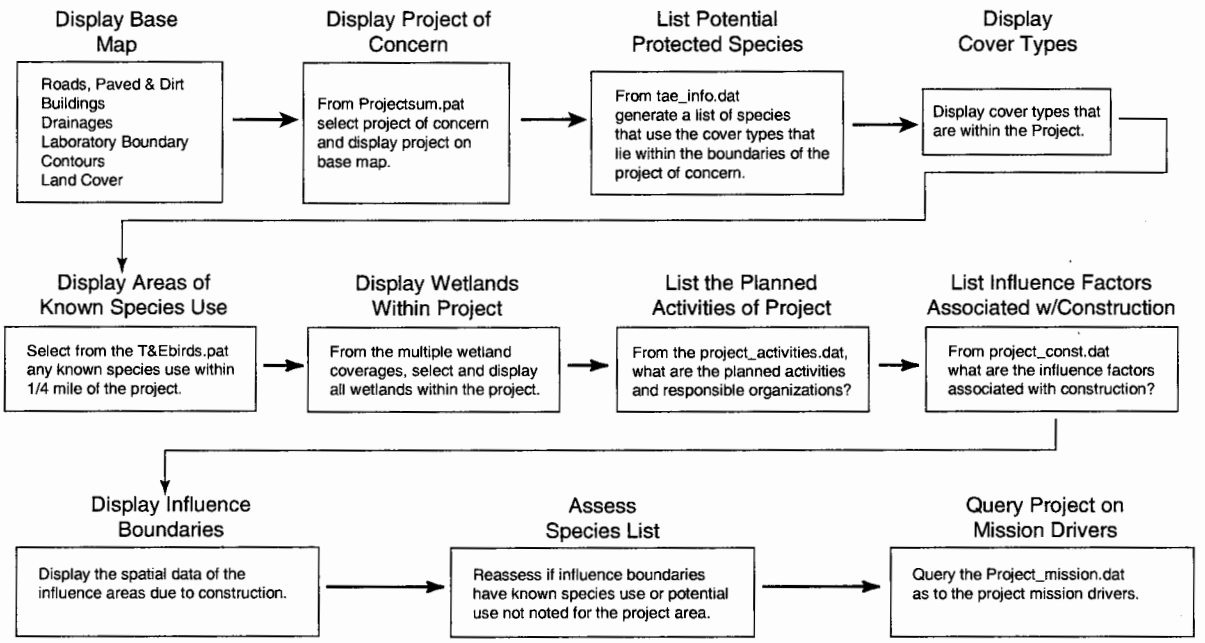


Table 1. Items in the main DICT table.

Item	Definition	Desc	Example
Source			
1. dict-id	4, 5, B	Unique record number	<integer>
2. geoset	15, 15, C	Name of Geo dataSet	t<catg>_<ou/ta>_<opt>
3. desc	80, 80, C	Short description of GeoSet	Technical Area boundaries
4. restrc	15, 15, C,	Use restrictions	none|inhouse|wapproval| needto know
5. contact	80, 80, C	Contact for further info	Tom Garrison 665-2404

Item	Definition	Desc	Example
Administrative			
6. catgry	6, 6, C	Super-Theme	BND
7. ocatgry	30, 30, C	Old Super-Theme	BND
8. theme	6, 6, C	Theme name	bnd (boundaries)
9. locatn	60, 60, C	Location (full pathname)	/gis/boundaries
10.type	8, 8, C	Type of dataset	|cover|layer|table|image|grid
11.anno	15, 15, C	Annotation available	-,dxf
12.topol	8, 8, C	Topology of cover	poly<arc,point,net,link>
13.aextent	10, 10, C	Aerial extent	LANL, REG, STATE
14.appxmb	4, 6, F, 2	Approximate size (Mb)	1.2
15.map	5, 15, C	Biology or FIMAD map number if avail.	g100999
16.status	6, 6, C	Status of data set	CUR, DEL, REN
17.update	8, 8, I	Date of last QC check	3Nov1993
18.flag	4, 4, C	Misc. use flag	yes

Table 2. Items in GNOTES and QNOTES tables (related to dict table by geoset).

Item	Definition	Desc	Example
1. geoset	15, 15, C	Name of Geo dataSet	bnd_ta
2. note	70, 70, C	A note line	an example note

Table 3. Items in DICT_TABLS table (related to dict table by geoset).

Item	Definition	Desc	Example
1. geoset	15, 15, C	Name of Geo dataSet	bnd_ta
2. table	15, 15, C	Table name	bnd_ta.lut
3. desc	8, 8, C	Description of table	look up values for tas
4. status	40, 40, C	status of the table	complete

Table 4. Items in TABL_ITMS table (related to dict_tabls by table).

Item	Definition	Desc	Example
1. table	20,20,C	Table name	bnd_ta.lut
2. item	20,20,C	Table of the item	id
3. itmdef	8,8,C	Item definition	20,20,C
4. valreq	1,1,C	Value required?	yes|no
5. itmdesc	40,40,C	Item description	thematically unique identifier
6. datadomain	80,80,C	The domain of the values	character|positive real
7. comment	80,80,C	Comment	misc. comment or note

Table 5. Items in the CHGLOG table (related to the dict table by geoset).

Item	Definition	Desc	Example
1. geoset	15,15,C	Name of Geo dataSet	t<catg>_<ou/ta>_<opt>
2. reqnum	6,6,I	Request number	10001
3. date	8,10,D	Request date	4/23/96
4 notes_file	15,15,C -	location of notes	file
5 source	80,80,C	Source of data	USGS, DGL format
6 source_date	30,30,C	Date the data was developed	September 1987
7 source_proj	30,30,C-	Map projection of source file	New Mexico State Plane, NAD87
8 source scale	10,10, I	Original scale of the source data	1:24000
9 media	20,20,C	What type of media are the data on	Electroic spreadsheet
10 m_qual	30,30,C	Quality of the dedia	Good
11 capture_proj	30,30,C	What projection data were captured in.	New Mexico State Plane, NAD87
12 capture_scale	30,30,C	What scale were the data captured in.	1:24000
13 capture_accu	30,30,C	How accurate was the capture	complete
14 pos_err	20,20,C	Position error	None
15 attr_err	20,20,C	Attribute errors	None
16 assigned	10,10,C	Who is assigned to data	Tom Garrison

Table 6. Items in Rnotes table (related to the chglog table by regnum).

Item	Definition	Desc	Example
1. reqnum	6,6,I	Request Number	10001
2. note	80,80,C	A note line	imported DLGs

Table 7. A Selected Record from the DICT Table

Dict-id	Geoset	Desc	Restrc	Contac	Catgry	Ocatgry	Theme	Locatn	Type
1	birdobs	Location of informal bird observat-ions	none	David Keller: kellerd@lanl.gov	ECOL	N/A	birdob	/gis/ecol/animl/bird	COVER
Anno	**Topol**	**Aextent**	**Appxmb**	**Map**	**Status**	**Update**	**Flag**		
N/A	point	REGION		N/A	CUR	19960926			

Table 8. A Selected Record from the DICT_TBLS Table

Geoset	Table	Desc	Status
birdobs	birdobs.dat	Attributes associated with bird observations	complete to date

Table 9. A Selected Record from the TABL_ITMS Table

Table	Item	Itmdef	Valreq	Itmdesc	Datadomain	Comment
birdobs.dat	birdobs_id	4, 5, B	Y	thematically a unique identifier	real	

Table 10. TES data base design.

LAYER: VEGETATION

Coverage Name: LandCov Vegetation coverage Created from Landsat GRID Coverage

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Description/Values	Comments
Polygon	Landcov.PAT	Area	Y	8,8,F			
		Perimeter	Y	8,8,F			
		LandCov#	Y	4,5,B			
		LandCov-ID	Y	4,5,B			
		LandCov_ID	Y	6,6,I		Unique ID for LandCover Polygons	
		LandCov_COD	Y	4,4,C	Habitat.VVT PHabitat.KEY	Alternate Nam: Habitat_COD	
Region Subclass	LanCov.PATMicro	Area	Y	8,8,F		Microhabitats e.g., Riparian	Digitize
		Perimeter	Y	8,8,F			
		Micor#	Y	4,5,B			
		Micro-ID	Y	4,5,B			
		Micro_COD	Y	4,4,C	Micro.VVT		
Region Subclass	LanCov.PATWet	Area	Y	8,8,F		Wetlands	Digitize; Create from NWI
		Perimeter	Y	8,8,F			
		Wet#	Y	4,5,B			
		Wet-ID	Y	4,5,B			
		Wet_COD	Y	4,4,C	Wet.VVT		
Region Subclass	LandCov.PATZone	Area	Y	8,8,F		Vegetation Zones	Create from underlying Landcover
		Perimeter	Y	8,8,F			
		Zone#	Y	4,5,B			
		Zone-ID	Y	4,5,B			
		Zone_COD	Y	4,4,C	Zone.VVT		
Region Subclass	LandCov.PATSoil	Area	Y	8,8,F		Soils	Use FIMAD Soil Coverage?
		Perimeter	Y	8,8,F			
		Soil#	Y	4,5,B			
		Soil-ID	Y	4,5,B			
		Soil_COD	Y	4,4,C	Soil.VVT		

Table 10. TES data base design.

LAYER: PLANTS

Coverage Name: VasPlants Vascular Plants

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Description/Values	Comments
Point	VasPlants.PAT	Area	Y	8,8,F			Many records in field
		Perimeter	Y	8,8,F			notes by:
		VasPlants#	Y	4,5,B			NM State Plane
		VasPlants-ID	Y	4,5,B			Canyon, Mesa Name
		Site_ID	N	10,10,C	VasSite.DAT VasPlants.DAT	CODING SCHEME NEEDED FOR TRANSECTS. STATIONS and SITES LOCATIONS.	TA, GPS, Plot etc.
		Old_ID	N	10,10,C			Terri Foxx can verify locations
Line	VasPlants.AAT	FNODE#	Y	4,5,B		Transect Data	
		TNOBE#	Y	4,5,B			
		LPOLY#	Y	4,5,B			
		RPOLY#	Y	4,5,B			
		Length	Y	8,18,F,3			
		VasPlants#	Y	4,5,B			
		VasPlants-ID	Y	4,4,B			
		Trans_ID	Y	10,10,C	VPTrans.DAT	Unique Transect ID	
		Old_Trans_ID	N	10,10,C			

Coverage Name: Survey Biological Survey Areas

Polygon	Survey.PAT	Area	Y	8,8,F			Field Notes.
		Perimeter	Y	8,8,F			
		Survey#	Y	4,5,B			Terry Foxx can verify area locations
		Survey-ID	Y	4,5,B			
		Survey_ID	Y	10,10,C			
		Old_ID	N	10,10,C			
Region Subclass	Survey.PATVasPI	Area	Y	8,8,F		Vascular Plant Survey	Each type of biological and
		Perimeter	Y	8,8,F			archaeological survey area
		VasPI#	Y	4,5,B			could be a subclass
		VasPI-ID	Y	4,5,B			of survey.
		VasPI_ID	N	6,6,C	VasSurvy.DAT		
		Old_ID					

Table 10. TES data base design.

Data Tables

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Description/Values	Comments
	VasSite.DAT	Site_ID	Y	6,6,C	VasPlants.DAT	Basic data from each collection site	Plant field notes and forms
		Date	Y	Date			
		Time	N	5,5,C			
		Contam_ID	N	10,10,C	Contam.DAT	Contaminant Analysis Sample ID	
		Classifier	N	20,20,C		Name	
		Elevation	N	5,5,I			
		Aspect	N	3,3,C			
		Slope	N	3,3,I			
		Landform	N	30,30,C		Basalt, Tuff, Rock Crevices, Cliffs	CODING SCHEME?
		Wood_Type	N	20,20,C			CODING SCHEME?
		Veg_Summary	N	30,30,C			
		Site Feature	N	20,20,C		Mesa, Canyon, Slope of Canyon, Mountain	CODING SCHEME?
		Adj_Com_Plant	N	20,20,C		burrows, tracks, scat	CODING SCHEME?
		Adj_Com_Animals	N	20,20,C			CODING SCHEME?
		Animal_Ind	N	20,20,C			CODING SCHEME?
		Disturbance	N	30,30,C			CODING SCHEME?
		Threats	N	20,20,C			CODING SCHEME?
		Picture_Pol	N	20,20,C			
		35MM_No_Roll	N	10,10,C			
		Photo_Loc	N	10,10,C		Photo archive location	
		Data_Source	Y	20,20,C			
	VasPlants.DAT	Site_ID	Y	7,7,I			
		Type_COD	Y	1,1,C			
		Species_COD	N	4,4,C	Pspecies.VVT HabInd.DAT		
		DBH	N	4,4,I			
		Cover%	N	4,4,F			
		Height	N	3,3,I			
		Data_Scource	Y	20,20,C			

Table 10. TES data base design.

Data Tables (cont)

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Description/Values	Comments
	VasSurvy.DAT	VasSurvy_ID	Y	6,6,C	VasSvyPl.DAT		Survey Forms
		Date	Y	Date			
		TA	N	2,2,I			
		Can_Mesa_Name	N	20,20,C			
		Drainage	N	20,20,C		Nearest Drainage	
		Survey_Type	N	10,10,C		Endangered Species, Herbarium etc.	CODING SCHEME?
		Survey_Level	N	10,10,C		Reconnaissance etc.	
		Habitat_COD	N	4,4,C	Habitat.VVT	Habitat (Community)	
		Topography					
		Site_Condition				Disturbed etc.	
		Disturbance					
		Collection-id			Herb.VVT		
		Comments					
		Photographs/Slides					
		Photo_Loc					
		Results					
		Data Source					
	VasSvyPl.DAT	VasSurvy_ID	Y				
		Species_COD	Y	4,4,C	Pspecies.VVT Hablnd.DAT		
		Cover	N	4,4,F			
		Canopy_class	N	1,2,I		1=5%, 2=6-25%, 3=26-51% 4=51-75%, 5=76-95%, 6=96-100%	
		Tree_number	N	4,4,I			
		Size_class	N	1,1,I		1=4", 2=4-6", 3=7-8", 4=9-10", 5=10-12", 6=13+"	
		Stage	N				
		Native	N	3,3,C		Yes/No	CODING SCHEME?
		Phenology	N	2,2,C			

Table 10. TES data base design.

Data Tables (cont)

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Description/Values	Comments
	VSLayer.DAT	VasSurvy_ID	Y				
		LayerNo	Y	1,1,I		1,2,3	
		Trees	N	3,3,I			
		Shrubs	N	3,3,I			
		Forbs	N	3,3,I			
		Grasses	N	3,3,I			
	VPTrans.DAT	Trans_ID	Y	10,10,C		Overstory Data (calc. from raw data)	
		Location_Name	Y	20,20,C			
		Species_COD	Y	4,4,C	Pspecies.VVT HabInd.DAT		
		Type	Y	1,1,C		U=Understory, O=Overstory	
		Nonplant_Cov	N	4,4,F		Non Plant Cover %	
		Plant_Cov	N	4,4,F		Plant Cover	
		Recorder	N	20,20,C		Name	
		Av_DBH	N	4,4,F		Average DBH	
		Number	N	4,4,F		Number of Plants/Trees	
		Rel_Denisty	N	4,4,F			
		Trees_Acre	N	4,4,F		Trees per acre	
		Cover	N	4,4,F		percent cover	
		Rel_Cover	N	4,4,F		percent relative cover	
		Frequency	N	4,4,F			
		Rel_frequency	N	4,4,F			
		Import_index	N	4,4,F		Importance Index	
		Raw_Data_Loc	N	20,20,C		Location of Raw Data	
	HabInd.DAT	Species_COD	Y	4,4,C	Pspecies.VVT	Habitat Indicator Species	
		Weediness	N	10,10,C			
		Wetlands_Nat	N	20,20,C		Facultative, etc.	
		Wetlands_Reg7	N	20,20,C			
		Other	N	20,20,C		Disturbance,Flood, Fire, Old Fields etc.	CODING SCHEME?
		Native_Am_Use	N	10,10,C		Food, Medicine, etc.	

Table 10. TES data base design.

LAYER: BIRDS

Coverage Name: BirdObs — Bird Observations from 2 sources 1: LANL Bird Cenus and 2: Informal Observations

Feature Class	Table Name	Entities	Value Req'd	Data Type	Associated Tables	Discription/Values	Comments
Point	BirdObs.PAT	Area	Y	8,8,F			
		Perimeter	Y	8,8,F			
		BirdObs#	Y	4,5,B			
		BirdObs-ID	Y	4,5,B			
		BirdObs_ID	Y	7,7,I			
		Old_Obs_ID	N	10,10,C		ID Number from historical records	
Line	BirdObs.AAT	FNODE#	Y	4,5,B			
		TNODE#	Y	4,5,B			
		LPOLY#	Y	4,5,B			
		RPOLY#	Y	4,5,B			
		Length	Y	8,18,F,3			
		BirdTrans#	Y	4,5,B			
		BirdTrans-ID	Y	4,4,B			
		BirdTrans_ID	Y	10,10,C		User-Defined Transect_ID to Describe Transect	
		Old_Trans_ID	N	10,10,C		Old TransectID	

Coverage Name: BirdAtlas — Bird Atlas Compiled from Observations in Grid Blocks

Polygon	BirdAtlas.PAT	Area	Y	8,8,F			
		Perimeter	Y	8,8,F			
		BirdAtlas#	Y	4,5,B			
		BirdAtlas-ID	Y	4,5,B			
		BirdAtlas_ID	Y	3,3,I			
		Block_No	Y	3,3,I			

Table 10. TES data base design.

LAYER: BIRDS

Data Tables

	BirdObs.DAT	BirdObs_ID	Y	4,5,C			
		Obs_Type	Y	4,4,C		LANL or INFM	
		Species_COD	Y	4,4,C	Species_VVT	Species Code	
		Habitat_COD	N	4,4,C	Habitat_VVT	Habitat Code	
		Number_Obs	Y	2,2,I		Number of Birds Sighted	
		Land_Own_COD	N	2,2,C	Land_Own.VVT	Land Ownership	
		Collar_ID	N	15,15,C		Collar_ID For Future Collaring Programs	
		EMScan_Av	N	3,3,I		Lean body mass gms from EM Scan (av)	
		Date	Y	Date		Day, Month, Year	
		TA	N	2,2,I		Technical Area	
		Location_Name	N	20,20,C		Location Name	
		Sighted_By	N	20,20,C		Name of person (PUBL or LANL who made observation)	
		Comments	N	128, 128,C		Comments	
		Data_Source	N	20,20,C			
	BirdTrans.DAT	BirdsTrans_ID	Y	6,6,I			
		Date	Y	Date			
		Species_COD	Y	4,4,C	Species_VVT		
		Habitat_COD	Y				
		Number_Obs	Y	2,2,I		Number of Birds sighted within Specific Radius	
		Rel_Abundance	Y	4,4,F		Percentage	
		Method	N	20,20,C		Method	
		Comments	N	128,128,C			
	BirdAtlas.DAT	Block_No	Y	4,4,I			
		Species_COD	Y	4,4,C	ASpecies.VVT		
		Date	Y	Date			
		Breeding_Cat	Y	12,12,C	Breeding Category		
		Reported_by	Y	20,20,C	Reporter Name		

Table 10. TES data base design.

LAYER: INVERTEBRATES

Coverage Name: Inverts Aquatic and Terrestrial Invertebrates

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Status	Automation Comments
Point	Inverts.PAT	Area					
		Perimeter					
		Inverts#					
		Inverts-ID					
		Sample_ID					
		Old_Sample_ID					
Data Tables							
	AlSample.DAT	Sample_ID	Y	7,7,I		Aquatic Invertebrates by Sample	
		Station_ID	N	10,10,C			
		Date	Y	Date		Day, Month, Year Collected	
		Collector	Y	20,20,C		Name of Collector	
		Dom_Taxa_COD	Y	4,4,I	InFamily_COD	Dominant Taxa (Family) Code	
		Biodiversity	N	4,4,I			
		Location-Name	Y	20,20,C		General Location Name	
	AlSpecies.DAT	Sample_ID	Y	7,7,I		Aquatic Invertebrates by Species in Sample	
		Family_COD	Y	4,4,C			
		Genus	N	20,20,C			
		Species	N	20,20,C			
		Qual_Rel_Abund	Y	10,10,C		Qualitative Abundance (rare, common etc.)	Saul Cross to provide codes
		Absolute Abundance	Y	8,18,F,3		Absolute Abundance	
		LifeStage_COD	N	3,3,I	LifeStage.VVT	Pupa, Juvenile etc.	
		CTQ	N	3,3,I		Community Tolerance Ouotient (calculated)	
	TerArtho.DAT	Sample_ID	Y	7,7,I		Terrestrial Arthropods	
		Trap_ID	Y	10,10,C			
		Trap_Days_No	N	3,3,I		Number of Trapping Days	
		Date	Y	Date			

Table 10. TES data base design.

LAYER: INVERTEBRATES

Data Tables (cont.)

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Status	Automation Comments
		Habitat_COD	N	4,4,C	Habitat.VVT	Collection Habitat Under Trees and Shrubs	
		Family_COD	Y	4,4,I	Family.VVT		
		Genus	N	20,20,C			
		Species	N	20,20,C			
		Abs_Abund	Y	5,5,I		Absolute Abundance	
		Collector	Y	20,20,C			
	TerInsect.DAT	Sample_ID	Y	7,7,I			
		Trap_ID	Y	10,10,C			
		Date	Y	Date			
		Family_COD	Y	4,4,I	Family. VVT		
		Genus	N	20,20,C			
		Species	N	20,20,C			
		Abs_Abund	Y	5,5,I		Absolute Abundance	
		Collector	Y	20,20,C			
	TerSnail.DAT	Sample_ID	Y	7,7,I		Terrestrial Snails	
		Station_ID	Y	10,10,C			
		Date	Y	Date			
		Col_Hab_COD	N	4,4,C	Habitat.VVT	Collection Habitat Under Trees and Shrubs	
		Family_COD	Y	4,4,C	Family.VVT		
		Genus	N	20,20,C			
		Species	N	20,20,C			
		Collector	N	20,20,C			
	WatQlty.DAT	Sample_ID	Y				
		Ph					
		Temp					
		Conductivity					
		DO				Dissolved Oxygen	

Table 10. TES data base design.

LAYER: REPTILES and AMPHIBIANS

Coverage Name: ReptAmph Vegetation Coverage Created from Landsat GRID Coverage

Feature Class	Table name	Entities	Value Req'd	Data Type	Associated Tables	Description/Values	Comments
Point	ReptAmph	Area	Y	8,8,f			
		Perimeter	Y	8,8,F			
		ReptAmph#	Y	4,5,B			
		ReptAmph-ID	Y	4,5,B			
		ReptAmph_ID	Y	7,7,I			
		Old_ID	N	10,10,C			

Data Tables

	ReptAmph.DAT	ReptAmph_ID	Y	7,7,I			
		Species_COD	Y	4,4,C			
		Date	Y	Date			
		Trap_ID	Y	10,10,C			
		SVL_mm	N	4,4,I			
		TTL_mm	N	4,4,I			
		RTL_mm	N	4,4,I			
		Mass_gms	N	4,4,I			
		Collector	Y	20,20,C			
		Transponder_No	N	15,15,C	Trnspond.EXP		Link to Transponder Table
		Comments	N	128,128,C			

LAYER: MAMMALS

Coverage Name: Lmammal Vegetation coverage Created from Landsat GRID Coverage

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
Point	LMammal.PAT	Area	Y	8,8,F		Large and Medium mammals	
		Perimeter	Y	8,8,F			
		LMammal#	Y	4,5,B			
		LMammal-ID	Y	4,5,B			
		Capture_ID	Y	7,7,I		Unique ID per Capture	

Table 10. TES data base design.

LAYER: MAMMALS (cont.)

Coverage Name: Lmammal Vegetation coverage Created from Landsat GRID Coverage

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
		Mammal_ID	Y	7,7,I		Unique ID per mammal (reused when animal recaptured)	
		OLD_ID	N	10,10,C		Old ID	
		Species_COD	Y	4,4,C	Species_VVT	Species Type Code	
		Trans_id					
		Status_COD	Y	2,2,I			
		Location_Name	N	40,40,C			

Coverage Name: Smammal Small Mammal

Point	SMammals.PAT	Area	Y	8,8,F		Small Mammals	
		Perimeter	Y	8,8,F			
		SMammal#	Y	4,5,B			
		SMammal-ID	Y	4,5,B			
		Capture_ID	Y	7,7,I		Unique ID per Capture	
		Mammal_ID	Y	7,7,I		Unique id per mammal (reused when animal recaptured)	
		Old_ID	N	10,10,C		Old ID	
		Species_COD	Y	4,4,C	Species_VVT	Species Type Code	
		Status_COD	Y	2,2,I			
		Location_Name	Y	20,20,C			

Coverage Name: Elk

Line	Elk.AAT	FNODE#	Y	4,5,B			
		TNODE#	Y	4,5,B			
		LPOLY#	Y	4,5,B			
		RPOLY#	Y	4,5,B			
		Length	Y	8,18,F,3			
		Elk#	Y	4,5,B			
		Elk-ID	Y	4,4,B			
		Mammal_ID	Y	7,7,I			
		Capture_ID	Y	7,7,I			

Table 10. TES data base design.

LAYER: MAMMALS (cont.)

Coverage Name: Elk (cont.)

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
Point	Elk.PAT	Area					
		Perimeter					
		Elk#					
		Elk-ID					
		Mammal_ID	Y	7,7,I			
		Capture_ID	Y	7,7,I			
Route	Elk.RATElk						

Coverage Name: Accident Accidents Cause by Large Mammals (usually Elk and Deer)

Point	Accident.PAT	Area	Y	8,8,F			
		Perimeter	Y	8,8,F			
		Accident#	Y	4,5,B			
		Accident-ID	Y	4,5,B			
		Mammal_ID	Y	7,7,I			
		Capture_ID	Y	7,7,I			
		Species_COD	Y	4,4,C	Species.VVT		
		Accident_Time	Y	10,10,C			
		Date	Y	DATE			

Coverage Name: Station Observations from Photo and Scent Stations

Point	Station.PAT	Area	Y	8,8,F			
		Perimeter	Y	8,8,F			
		Station#	Y	4,5,B			
		Station-ID	Y	4,5,B			
		Station_ID	Y	10,10,C	Station.DAT		
		Station_TYPE	Y	2,2,C		PH=Photo, SC=Scent	
		Month	Y	3,3,C			
		Year	Y	4,4,C			
		Photo_Loc	N	30,30,C		Could be path to image	

Table 10. TES data base design.

LAYER: MAMMALS (cont.)

Data Tables (cont.)

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
	MamOBS.DAT	Mammal_ID	Y			Wildlife Observation Data	
		Land_Own_COD	Y	2,2,I	Land_Own_VVT	Land Ownership Code	
		Number_Obs	Y	3,3,I		Number Observed	
		TA	Y	2,2,I			
		Location_Name	N	20,20,C			
		Observed_by	N	30,30,C			
	LMammal.DAT	Capture_ID	Y	7,7,I			
		Collar_ID	N	10,10,C		Can be reused - not unique to an individual	
		Sex	Y	1,1,C			
		Wght	Y	4,4,I			
		Hght/Lngth	Y	4,4,F			
		Foot_wdth	N	4,4,F			
		Tail_lgth	N	4,4,F			
		Ear_lgth	N	4,4,F			
		Foot_lgth	N	4,4,F			
		Age	Y	2,2,I			
		Rep_Status	N	10,10,C		Reproductive Status	
		Fetus_Number	N	2,2,I		Number of Fetus	
		Fetus_Removed	N	2,2,I		Fetus removed Yes/No	
		Collect_Stat_COD	Y	2,2,I	Collect_Stat_VVT	Status of animal at sample collection time	
		Collect_Date	Y	Date		Date of Collection	
		Death_Date	N	Date		Date of Death	
		Trap_Method	N	10,10,C		Trap Method	
		Capture_Status	Y	1,1,I		New (1) or Recapture (2,3 etc.)	
		Museum_ID	N	10,10,C		Museum/ Collection ID Number	
		Contaminant_ID	N	10,10,C		Sample ID for Contaminant Analysis	
		Comments	N	128,128,C			

Table 10. TES data base design.

LAYER: MAMMALS (cont.)

Data Tables (cont.)

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
	SMammal.DAT	Capture_ID	Y	7,7,I			
		Collar_ID	N	10,10,C		Unique for each Individual	
		Sex	Y	1,1,C			
		Wght	Y	4,4,I			
		Hght/Lngth	Y	4,4,F			
		Foot_Wdth	N	4,4,F			
		Tail_lgth	N	4,4,F			
		Ear_lgth	N	4,4,F			
		Foot_lgth	N	4,4,F			
		Age	Y	2,2,I			
		EMScam_Av	N	3,3,I		Lean body mass in grams from Average EM Scan	
		Rep_Status	Y	10,10,C		Reproductive Status	
		Fetus_Number	N	2,2,I		Number of Fetus	
		Fetus_Removed	N	2,2,I		Fetus removed Yes/No	
		Collect_Stat_COD	Y	2,2,I	Collect_Stat_VVT	Status of animal at sample collection time	
		Collect_Date	Y	Date		Date of Collection	
		Death_Date	N	Date		Date of Death	
		Trap_Method	N	10,10,C			
		Capture_Status	Y	1,1,I		New(1) or Recapture (2,3,etc.)	
		Museum_ID	N	10,10,C		Museum/Collection Code Number	
		Contaminant_ID	N	10,10,C		Sample ID for Contaminant Analysis	
		Comments	N	128,128,C			
	MDisease.DAT	Capture_ID	Y	7,7,I			
		Disease_COD	Y		Disease_VVT	Diseases Tested	
		Result	Y	3,3,C		Result (pos/neg)	
		Date	Y	Date		Date Tested	
		Sample_COD	Y		Sample_VVT	Sample Type Code	
	Parasite_DAT	Capture_ID	Y	7,7,I			
		Parasite_COD	Y		Parasite_VVT	Parasite Codes	

Table 10. TES data base design.

LAYER: MAMMALS (cont.)

Data Tables (cont.)

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
	FoodHab.DAT	Cature_ID	Y	7,7,I			
		Sample_COD	Y		Sample_VVT	Food Matter Sample COD	
		Method	Y			Analysis Method	
		Food_General	Y			General Food Category	
		Food_Genus	N				
		Food_Spec	N				
		Slide_Nmbr	N			Slide Number for Food Analysis	
		Comments	N				
	FoodRaw.DAT	Slide_Nmbr				Slide Number if Analysis Performed from Slide	
		Field_1				Relative Abundance by Field	
		Field_2				Relative Abundance by Field	
		Field_3				Relative Abundance by Field	
		Field_4				Relative Abundance by Field	
		Field_5				Relative Abundance by Field	
		Field_6				Relative Abundance by Field	
		Field_7				Relative Abundance by Field	
		Field_8				Relative Abundance by Field	
		Field_9				Relative Abundance by Field	
		Field_10				Relative Abundance by Field	
		Rel_Abund_Total				Relative Abundance from Entire Sample	

Table 10. TES data base design.

LAYER: MAMMALS (cont.)
Data Tables (cont.)

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
		Raw_Data_Loc				Raw Data Location (Path, Name etc.)	
	Deposition.DAT	Capture_ID					
		Location				Location(s) of Storage	
		Storage Type					
		Comments					
	Elk_Col/DAT	Capture_ID	Y	7,7,I			
		Collar_ID	Y	7,7,I			
		Collar_TYPE	Y	4,4,C		VHF,GPS	
		Frequency	Y				
		Serial_Number	Y				
	Elk_Radio.DAT	Capture_ID	Y	7,7,I		Data from Radio on Collar	
		Day	Y	3,3,I			
		Time_GMT	Y	4,4,C			
		Year	Y	4,4,I			
		Lat	Y				
		Lon	Y				
	Station.DAT	Station_ID	Y	10,10,C			
		Creature_Obs	Y	15,15,C			
		Number_Obs	Y	3,3,I			
		Size	N	2,2,C		SM =sm mammal, MM = med mammal, LM = large mammal	
Data Tables							
	T_E_Spec.DAT	Species.COD	Y	4,4,C			
		Type	Y	10,10,C			
		Croup	N	10,10,C			
		Family_COD	Y	4,4,C			

Table 10. TES data base design.

LAYER: MAMMALS (cont.)
Data Tables (cont.)

Feature Class	Table name	Entieies	Value req'd	Data Type	Associated Tables	Description/Values	Comments
		Class	Y	20,20,C			
		FedState	N	20,20,C			
		Distribution	Y	20,20,C			
		Threats	N	30,30,C			
		Requires	N	30,30,C			
		Breed_Habitat	N	20,20,C			
		Min_Elev	N	5,5,I			
		Max_Elev	N	5,5,I			
		LACounty	N	3,3,C		yes/no	
		LAReference	N	50,50,C			
		Reference	N	50,50,C			
		KeyDesc	N	128,128,C			
		Location_Name	N	20,20,C			
		Comments	N	128,128,C			
	Museum.DAT	Museum_COD	Y				
		Location	Y				
		Date	Y				
		Habitat					
	Legal_Stat.DAT	Species_COD	Y				
		Legal_Stat_COD	Y				
		Legal_Stat	Y				
		Date	Y			Date Legal Status Established	
		Comments					
	Contam.DAT	Contaminant_ID	Y			Analysis ID Number	
		Sample_Type	Y			Pelt, Overstory, Carcass etc.	
		Species_COD	Y				
		Source_COD	Y			Source type Animal, Plant, Sediment etc.	
		CAS_NO	Y			Pb, Hg etc. (Link to FIMAD Contaminant DB Table)	FIMAD
		Concentration	Y				

Table 10. TES data base design.

Key Tables							
		Conc_Unit	Y			PPM, PPB etc	
		Analysis_Method	Y				
	PHabitat.KEY	Habotat_COD	Y	4,4,C		Status of the Flora of the LA Nat Env Res Park	
		Species_COD	Y	4,4,C		LA8050-NERP, Vol II	
	Ahabitat.KEY	Habitat_COD	Y	4,4,C		Various Sources	
		Species_COD	Y	4,4,C			
VVT, LUT Tables							
	Habitat.VVT	Habitat_COD	Y	4,4,C			
		Habitat_Desc	Y	20,20,C			
	ASpeices.VVT	Species_COD	Y	4,4,C			
		Family_Name	Y	30,30,C			
		Scient_Name	Y	30,30,C			
		Common_Name	Y	30,30,C			
		Alt_Common_Name	Y	30,30,C			
	PSpecies.VVT	Species_COD	Y	4,4,C		Status of the Flora of the LA Nat. Env. Res. Park	
		Family_Name	Y	30,30,c		LA8050-NERP, Vol. II	
		Scient_Name	Y	30,30,C			
		Synonym_1	N	30,30,C			
		Synonym_2	N	30,30,C			
		Synonym_3	N	30,30,C			
		Elev_Min	Y	5,5,I			
		Elev_Max	Y	5,5,I			
		Occurrence	Y	20,20,C			
		Blooms	Y	20,20,C			
		Habit	Y	30,30,C			
		Common_Name	Y	30,30,C			
		Alt_Common_Name	N	30,30,C			

Table 11. Naming convention of ecological data within the GIS data base.

Type of File	**Description**	**File Name**	**File Extension**	**Example**
Data Table	Contains attribute data only	Same name as the coverage the table relates to	.dat	BirdObs.dat
Look-up Table	Contains an attribute value and an associated symbol code	Same name as the coverage the table relates to	.lut	BirdObs.lut
Expansion Table	contains definitions of codes used in other tables	Same name as the coverage the table relates to	.exp	BirdObs.exp

Table 12. An example of an electronic field data form for vegetation transects.
Note: The GIS data table attribute requirements are listed at the bottom of this table

DATE:	06/16/92
Location:	THREEMILE CANYON
Reader/Recorder:	JAMES/KATHY/ALETHEA/MARY
NUMBER OF FEET PER TRANSECT:	450

			Qtr. 1				Qtr. 2				Qtr. 3				Qtr. 4	
Plot #50	Species	No. Stems Shrubs	DBH Trees	% Cover	Species	No. Stems Shrubs	DBH Trees	% Cover	Species	No. Stems Shrubs	DBH Trees	% Cover	Species	No. Stems Shrubs	DBH Trees	% Cover
	PIPO	0	0	0.1	JUMO	1	3	10	PIPO	1	15.7	40	RONE	12	1.2	5
	ACNE	0	0	25	JUMO	1	2		PIPO	1	15.7		FONE	31	31.5	25
					JUMO	1	0.5		PIPO	1	15.7		QUGA	0	0	0.1
					ACNE	1	1.5	35	PIPO	1	6.7		JUSC	1	3	0.5
					ACNE	1	2.2		JUSC	1	0.5	5	JUSC	1	2.5	
					ACNE	1	2.5		FONE	25	2.5	15	JUSC	1	0.5	
					ACNE	1	3.1		RONE	9	0.9	5	RICE	12	1.2	0.5
					ACNE	1	1.5									
					ACNE	1	0.5									
					FONE	14	1.4	15								
					JUSC	1	4.5	5								
					SALX	4	0.4	5								
					BEFE	5	0.5	0.1								
			Qtr. 1				Qtr. 2				Qtr. 3				Qtr. 4	
Plot #50	Species	No. Stems Shrubs	DBH Trees	% Cover	Species	No. Stems Shrubs	DBH Trees	% Cover	Species	No. Stems Shrubs	DBH Trees	% Cover	Species	No. Stems Shrubs	DBH Trees	% Cover
	POPX	1	10.2	60	JUSC	1	8.3	30	RONE	9	0.9	15	FONE	11	1.1	5
	POPX	1	11.3		JUSC	1	1		RHTR	77	7.7	15	RHTR	20	2	5

Required Fields and Required Order of the GIS Data base
1.Trans_id 2.Location 3.Read_record 4.Trans_date 5.Ft_per_trans 6.Type
7.Scode 8.Nonplant_cov 9.Plant_cov 10.T_s_no 11.T_s_acre 12.Avg_dbh
13.Rel_density 14.Rel_cov 15.Per_freq 16.Rel_freq 17.Impt_index 18.Comments

Table 13. The AML written for data automation of overstory vegetation transects, TAC.AML.

```
/*-----------------------------------------------------------------------
/*          Environmental Systems Research Institute
/*-----------------------------------------------------------------------
/*  Program: TAC.AML
/*  Purpose: Reads data from xxxC.TXT text file and loads into VEG_TRLN.DAT
/*-----------------------------------------------------------------------
/*    Usage: tac.aml <in_file>
/*
/* Arguments: in_file        - the name of the ascii text file to load
/*
/*
/*  Routines: ERRROR     - Handles any errors that may occur.
/*          WARN - Handles any warnings that may occur.
/*
/*  Globals: none
/*-----------------------------------------------------------------------
/*    Calls: none
/*-----------------------------------------------------------------------
/*    Notes: The <in_file> needs to be in the following format:
/* line  1: skip - no data needed from this line
/* line  2: LOCATION (contained in single quotes)
/* line  3: TRANS_ID (contained in single quotes)
/* line  4: TRANS_DATE (contained in single quotes) ie: '06/23/96'
/* line  5: READ_RECORD (contained in single quotes)
/* line  6: FT_PER_TRANS (no quotes, must be numeric)
/* line  7: COMMENTS (contained in single quotes)
/* line  8: blank line
/* lines 9 to the next blank line: contain data in the following format:
/*  'SCODE', T_S_NO, T_S_ACRE, REL_DENSITY, AVG_DBH, PLANT_COV, REL_COV, (con't)
/*   PER_FREQ, REL_FREQ, IMPT_INDEX
/* line  x: at least one blank line
/* line  x+1 to the end of flie: contain data in the following format:
/*  'SCODE', T_S_NO, T_S_ACRE, REL_DENSITY, PLANT_COV, REL_COV, (con't)
/*  PER_FREQ, REL_FREQ, IMPT_INDEX
/*
/*-----------------------------------------------------------------------
/*    Input: ascii data file with above format
/*   Output: records added to VEG_TRLN.DAT
/*-----------------------------------------------------------------------
/*  History: Andy Huntington (ESRI) - 7/31/96 - original coding
/*
/*=======================================================================
/*

&severity &error &routine error
&severity &warning &routine warn

&args in_file

/* set the info_file to receive the data
```

```
&set info_file veg_trln.dat

/* Do some error checking

&if [null %in_file%] &then &do
  &type Usage: tac.aml <in_file>
  &return
&end

&if ^ [exists %in_file% -file] &then &do
  &type <in_file> %in_file% does not exist.  Exiting...
  &type Usage: tac.aml <in_file>
  &return
&end


/* Open file and check status

&set fileunit [open %in_file% openstat -r]
&if %openstat% ne 0 &then
  &return &error Error opening <in_file> for reading.  Exiting...


/* Initialize count variable to count number of records added
&set number_added 0


/* Read the universal data that applies to all records in file

/* Record 1.  Contains only header information.
&set record [read %fileunit% readstat]

/* Record 2 contains LOCATION item value
&set record [read %fileunit% readstat]
&set location [unquote %record%]

/* Record 3 contains TRANS_ID item value
&set record [read %fileunit% readstat]
&set trans_id [unquote %record%]

/* Record 4 contains TRANS_DATE item value
&set record [read %fileunit% readstat]
&set trans_date [unquote %record%]

/* Record 5 contains READ_RECORD item value
&set record [read %fileunit% readstat]
&set read_record [unquote %record%]

/* Record 6 contains FT_PER_TRANS item value
&set record [read %fileunit% readstat]
&set ft_per_trans [unquote %record%]

/* Record 7 contains COMMENTS item value
```

```
&set record [read %fileunit% readstat]
&set comments [unquote %record%]

/* Record 8 contains a blank line - do nothing with it
&set record [read %fileunit% readstat]


/* NONPLANT_COV and TYPE item values are not included in the file.

/* Universally set the value of NONPLANT_COV to be blank.
&set nonplant_cov 0


/* Record 9 until the blank section contains multiple data for each record.
/* Add the data to the INFO file using CURSORS.  Other option would be to write
/* out the data to an ascii file in the correct format, and then use ADD FROM
/* in INFO or TABLES.

/* First, declare and open a cursor on the INFO file
cursor tempcur declare %info_file% info rw
cursor tempcur open

/* postion cursor to last record in file if have more than 0 records
/* (want to add data to end of file instead of top)

&if %:tempcur.aml$nsel% gt 0 &then
  cursor tempcur %:tempcur.aml$nsel%

/* Read record 9 to the first blank line (end of first section), or to end of
/* file, whichever comes first, and parse data into variables.

/* move to record 9
&set record [read %fileunit% readstat]

&do &until %readstat% = 102 or %record% = ''

  /* set variables for each element in the line

  &set record [unquote %record%]

  &set scode [unquote [extract 1 %record%]]
  &set t_s_no [extract 2 %record%]
  &set t_s_acre [extract 3 %record%]
  &set rel_density [extract 4 %record%]
  &set avg_dbh [extract 5 %record%]
  &set plant_cov [extract 6 %record%]
  &set rel_cov [extract 7 %record%]
  &set per_freq [extract 8 %record%]
  &set rel_freq [extract 9 %record%]
  &set impt_index [extract 10 %record%]

  /* for top section, set TYPE to T
  &set type T
```

```
 /* if any of the above variables for the numeric items contain blanks,
 /* change them to "0" (zero)

 &do var &list t_s_no t_s_acre rel_density avg_dbh plant_cov rel_cov per_freq ~
rel_freq impt_index
   &if [quote [unquote [value %var%]]] = ' ' &then
     &set %var% = 0
 &end

 /* Now that the variables are set, add a record to the INFO file and
 /* set the cursor variables.  Also, count up number of records added.

 cursor tempcur insert
 &set number_added = %number_added% + 1

 &do item &list trans_id location read_record trans_date ft_per_trans type ~
comments scode nonplant_cov plant_cov t_s_no t_s_acre avg_dbh rel_density ~
rel_cov per_freq rel_freq impt_index
   &set :tempcur.%item% [value %item%]
 &end

 /* delete the above record specific variables
 &do var &list scode t_s_no t_s_acre rel_density avg_dbh plant_cov rel_cov ~
per_freq rel_freq impt_index record
   &dv %var%
 &end

 &set record [read %fileunit% readstat]
 &type %readstat%

/* end the "do until " loop"
&end


/* Skip the section of blank records

&do &while %record% = '' and %readstat% ne 102
  &set record [read %fileunit% readstat]
&end


/* Now should be positioned at first record for the second section.  The same
/* proceedure as above will be used for this section, but the order of the values
/* is different, so it needs unique code.

/* AVG_DBH values are not included in the second section of the data file.
/* Insert a place holder for this value
&set avg_dbh = 0

/* read until the end of file or a blank line is reached.
&do &until %readstat% = 102 or %record% = ''
```

```
 /* set variables for each element in the line
 &set record [unquote %record%]


 &set scode [unquote [extract 1 %record%]]
 &set t_s_no [extract 2 %record%]
 &set t_s_acre [extract 3 %record%]
 &set rel_density [extract 4 %record%]
 &set plant_cov [extract 5 %record%]
 &set rel_cov [extract 6 %record%]
 &set per_freq [extract 7 %record%]
 &set rel_freq [extract 8 %record%]
 &set impt_index [extract 9 %record%]

 /* for top section, set TYPE to S
 &set type S

 /* if any of the above variables for the numeric items contain blanks,
 /* change them to "0" (zero)

 &do var &list t_s_no t_s_acre rel_density plant_cov rel_cov per_freq ~
rel_freq impt_index
   &if [quote [unquote [value %var%]]] = ' ' &then
     &set %var% = 0
 &end

 /* Now that the variables are set, add a record to the INFO file and
 /* set the cursor variables.  Also, count up number of records added.

 cursor tempcur insert
 &set number_added = %number_added% + 1


 &do item &list trans_id location read_record trans_date ft_per_trans type ~
comments scode nonplant_cov plant_cov t_s_no t_s_acre avg_dbh rel_density ~
rel_cov per_freq rel_freq impt_index
   &set :tempcur.%item% [value %item%]
 &end

 /* delete the above record specific variables
 &do var &list scode t_s_no t_s_acre rel_density plant_cov rel_cov ~
per_freq rel_freq impt_index record
   &dv %var%
 &end

 &set record [read %fileunit% readstat]

/* end the "do until " loop"
&end


/* clean up
```

```
/* close the in_file
&set closestat [close -all]

/* close and remove the cursor
cursor tempcur remove

/* report number of records added to INFO file
&type
&type Total number of records added to %info_file%:  %number_added%
&type

/* end of aml...
&return


/* error routine
&routine error
&severity &error &fail
&type An error has occurred in TAC.AML...
&type Please check the input file carefully for correct format.
&set closevar [close -all]
&if [quote [extract 2 [show cursor tempcur]]] = 'OPEN' &then
  cursor tempcur remove
&type
&type Total number of records added to %info_file%:  %number_added%
&type
&type *** Please check records in %info_file% carefully. ***
&type *** Invalid data might have been added. ***
&type
&return &error Terminating program TAC.AML.


/* warning routine
&routine warn
&severity &warning &ignore
&type A warning condition occurred.
&return
```

Table 14. The AML written for data automatioin of understory vegetation transects, TAC.AML.

```
/*-----------------------------------------------------------------------
/*          Environmental Systems Research Institute
/*-----------------------------------------------------------------------
/*  Program: TAU.AML
/*  Purpose: Reads data from xxxU.TXT text file and loads into VEG_TRLN.DAT
/*-----------------------------------------------------------------------
/*    Usage: tau.aml <in_file>
/*
/* Arguments: in_file   - the name of the ascii text file to load
/*
/*
/* Routines: ERRROR    - Handles any errors that may occur.
/*           WARN      - Handles any warnings that may occur.
/*
/*  Globals: none
/*-----------------------------------------------------------------------
/*    Calls: none
/*-----------------------------------------------------------------------
/*    Notes: The <in_file> needs to be in the following format:
/* line  1: skip - no data needed from this line
/* line  2: LOCATION (contained in single quotes)
/* line  3: TRANS_ID (contained in single quotes)
/* line  4: TRANS_DATE (contained in single quotes) ie: '06/23/96'
/* line  5: READ_RECORD (contained in single quotes)
/* line  6: FT_PER_TRANS (no quotes, must be numeric)
/* line  7: COMMENTS (contained in single quotes)
/* line  8: blank line
/* lines 9 to the end of file: contain data in the following format:
/*  'SCODE', NONPLANT_COV, PLANT_COV, REL_COV, PER_FREQ, REL_FREQ, IMPT_INDEX
/*
/*-----------------------------------------------------------------------
/*    Input: ascii data file with above format
/*   Output: records added to VEG_TRLN.DAT
/*-----------------------------------------------------------------------
/*  History: Andy Huntington (ESRI) - 7/31/96 - original coding
/*
/*=======================================================================
/*

&args in_file

&severity &error &routine error
&severity &warning &routine warn

/* set the info_file to receive the data
&set info_file veg_trln.dat

/* Do some error checking
```

```
&if [null %in_file%] &then &do
  &type Usage: tau.aml <in_file>
  &return
&end

&if ^ [exists %in_file% -file] &then &do
  &type <in_file> %in_file% does not exist.  Exiting...
  &type Usage: tau.aml <in_file>
  &return
&end


/* Open file and check status

&set fileunit [open %in_file% openstat -r]
&if %openstat% ne 0 &then
  &return &error Error opening <in_file> for reading.  Exiting...


/* Initialize count variable to count number of records added
&set number_added 0


/* Read the universal data that applies to all records in file

/* Record 1.  Contains only header information.
&set record [read %fileunit% readstat]

/* Record 2 contains LOCATION item value
&set record [read %fileunit% readstat]
&set location [unquote %record%]

/* Record 3 contains TRANS_ID item value
&set record [read %fileunit% readstat]
&set trans_id [unquote %record%]

/* Record 4 contains TRANS_DATE item value
&set record [read %fileunit% readstat]
&set trans_date [unquote %record%]

/* Record 5 contains READ_RECORD item value
&set record [read %fileunit% readstat]
&set read_record [unquote %record%]

/* Record 6 contains FT_PER_TRANS item value
&set record [read %fileunit% readstat]
&set ft_per_trans [unquote %record%]

/* Record 7 contains COMMENTS item value
&set record [read %fileunit% readstat]
&set comments [unquote %record%]
```

```
/* Record 8 contains a blank line - do nothing with it
&set record [read %fileunit% readstat]


/* TYPE, T_S_NO, T_S_ACRE, AVG_DBH, REL_DENSITY item values are not included
/* in the file.  Set them universally.

&set t_s_no 0
&set t_s_acre 0
&set avg_dbh 0
&set rel_density 0

/* For this file (TAxxxU.TXT), set TYPE to U
&set type U


/* Record 9 until the blank section contains multiple data for each record.
/* Add the data to the INFO file using CURSORS.  Other option would be to write
/* out the data to an ascii file in the correct format, and then use ADD FROM
/* in INFO or TABLES.

/* First, declare and open a cursor on the INFO file
cursor tempcur declare %info_file% info rw
cursor tempcur open

/* postion cursor to last record in file if have more than 0 records
/* (want to add data to end of file instead of top)

&if %:tempcur.aml$nsel% gt 0 &then
  cursor tempcur %:tempcur.aml$nsel%

/* Read record 9 to the first blank line or end of file,
/* and parse data into variables.

/* move to record 9
&set record [read %fileunit% readstat]

&do &until %record% = '' or %readstat% = 102

  &set record [unquote %record%]

  /* set variables for each element in the line

  &set scode [extract 1 %record%]
  &set nonplant_cov [extract 2 %record%]
  &set plant_cov [extract 3 %record%]
  &set rel_cov [extract 4 %record%]
  &set per_freq [extract 5 %record%]
  &set rel_freq [extract 6 %record%]
  &set impt_index [extract 7 %record%]

  /* if any of the above variables for the numeric items contain blanks,
  /* change them to "0" (zero)
```

```
 &do var &list nonplant_cov plant_cov rel_cov  per_freq rel_freq impt_index
  &if [quote [unquote [value %var%]]] = '' &then
   &set %var% = 0
 &end

 /* Now that the variables are set, add a record to the INFO file and
 /* set the cursor variables

 cursor tempcur insert
 &set number_added = %number_added% + 1

 &do item &list trans_id location read_record trans_date ft_per_trans type ~
comments scode nonplant_cov plant_cov t_s_no t_s_acre avg_dbh rel_density ~
rel_cov per_freq rel_freq impt_index
   &set :tempcur.%item% [unquote [value %item%]]
 &end

 /* delete the above record specific variables
 &do var &list scode nonplant_cov plant_cov rel_cov per_freq rel_freq ~
impt_index record
   &dv %var%
 &end

 &set record [read %fileunit% readstat]

/* end the "do until " loop"
&end


/* clean up

/* close the in_file
&set closestat [close -all]

/* close and remove the cursor
cursor tempcur remove

/* report number of records added to INFO file
&type
&type Total number of records added to %info_file%:  %number_added%
&type

/* end of aml...
&return
```

```
/* error routine
&routine error
&severity &error &fail
&type An error has occurred in TAU.AML...
&type Please check the input file carefully for correct format.
&set closevar [close -all]
&if [quote [extract 2 [show cursor tempcur]]] = 'OPEN' &then
  cursor tempcur remove
&type
&type Total number of records added to %info_file%:  %number_added%
&type
&type *** Please check records in %info_file% carefully. ***
&type *** Invalid data might have been added. ***
&type
&return &error Terminating program TAU.AML.


/* warning routine
&routine warn
&severity &warning &ignore
&type A warning condition occurred.
&return
```

Table 15. The AML written for data automation of one file type of bird census data, A.aml.

```
/*-----------------------------------------------------------------------
/*          Environmental Systems Research Institute
/*-----------------------------------------------------------------------
/*   Program: A.AML
/*   Purpose: Reads data from UP-LA-95.XLS.CSV text file and loads into
/*          BIRDCENC.DAT INFO file.
/*-----------------------------------------------------------------------
/*     Usage: a.aml <in_file>
/*
/* Arguments: in_file        - the name of the ascii text file to load
/*
/*
/*  Routines: ERRROR      - Handles any errors that may occur.
/*          WARN - Handles any warnings that may occur.
/*
/*   Globals: none
/*-----------------------------------------------------------------------
/*     Calls: none
/*-----------------------------------------------------------------------
/*     Notes: The <in_file> needs to be in the following format:
/* line  1: LOCATION:,<location>,TEMP...
/* line  2: OBSERVERS:,<observers>,WIND...
/* line  3: DATE:,<date>,TIME...
/* line  4: blank
/* line  5: blank
/* line  6: header information - no data needed
/* line  7: header information - no data needed
/* lines 8 to the end of file contain data in the following format:
/*   <point:time:day>,<habitat>,<species>,<0-25>,<25-50>,<50-75>, (con't)
/*   <75-100>,<age>,<sex>,<breeding>,...
/*
/*-----------------------------------------------------------------------
/*     Input: ascii data file with above format
/*    Output: records added to BIRDCENC.DAT
/*-----------------------------------------------------------------------
/*   History: Andy Huntington (ESRI) - 8/2/96 - original coding
/*
/*=======================================================================
/*

&severity &error &routine error
&severity &warning &routine warn

&args in_file

/* set the info_file to receive the data
&set info_file BIRDCENS.DAT

/* Do some error checking
```

```
&if [null %in_file%] &then &do
  &type Usage: a.aml <in_file>
  &return
&end

&if ^ [exists %in_file% -file] &then &do
  &type <in_file> %in_file% does not exist.  Exiting...
  &type Usage: a.aml <in_file>
  &return
&end


/* Open file and check status

&set fileunit [open %in_file% openstat -r]
&if %openstat% ne 0 &then
  &return &error Error opening <in_file> for reading.  Exiting...


/* Initialize count variable to count number of records added
&set number_added 0


/* Read the universal data that applies to all records in file

/* OLD_TRANS_ID is set to <in_file>
&set old_trans_id %in_file%

/* This file does not contain information for r25-100.  Initialize
/* to be 0.
&set r25-100 0

/* Record 1.  Contains LOCATION item value
&set record [read %fileunit% readstat]
&set location [unquote [after [before %record% ,TEMP] LOCATION:,]]

/* Record 2 contains OBSERVER item value
&set record [read %fileunit% readstat]
&set recorder [after [before [quote %record%] ,WIND] OBSERVERS:,]

/* Record 3 contains DATE item value
&set record [read %fileunit% readstat]
&set date [extract 2 [unquote %record%]]

/* Skip next four records
&set record [read %fileunit% readstat]
&set record [read %fileunit% readstat]
&set record [read %fileunit% readstat]
&set record [read %fileunit% readstat]

/* Record 8 until the end of file contains data for each record.
/* Add the data to the INFO file using CURSORS.  Other option would be to write
```

```
/* out the data to an ascii file in the correct format, and then use ADD FROM
/* in INFO or TABLES.

/* First, declare and open a cursor on the INFO file
cursor tempcur declare %info_file% info rw
cursor tempcur open

/* postion cursor to last record in file if have more than 0 records
/* (want to add data to end of file instead of top)

&if %:tempcur.aml$nsel% gt 0 &then
  cursor tempcur %:tempcur.aml$nsel%

/* Read record 8 to the end of file, and parse data into variables.

/* move to record 8
&set record [read %fileunit% readstat]

&do &until %readstat% = 102 or %record% = ' '

  &set record [unquote %record%]

  /* check for new point.  If new point, then set variables for point and habitat.
  /* For new points, the format is slightly different since extract on data without
  /* leading commas produces different results

  &if [quote [extract 1 %record%]] cn ':' or [quote [extract 1 %record%]] cn '-' ~
or [quote [extract 1 %record%]] cn '/' &then &do
    &set point [extract 1 %record%]
    &set habitat [extract 2 %record%]
    &set spp_code [extract 3 %record%]
    &set r0-25 [extract 4 %record%]
    &set r25-50 [extract 5 %record%]
    &set r50-75 [extract 6 %record%]
    &set r75-100 [extract 7 %record%]
    &set age [extract 8 %record%]
    &set sex [extract 9 %record%]
    &set breeding [extract 10 %record%]
    /* set point_id to be combination of location and point variables
    &set point_id %location% %point%
  &end

  &else &do
    /* set other values for each element
    &set spp_code [extract 1 %record%]
    &set r0-25 [extract 2 %record%]
    &set r25-50 [extract 3 %record%]
    &set r50-75 [extract 4 %record%]
    &set r75-100 [extract 5 %record%]
    &set age [extract 6 %record%]
    &set sex [extract 7 %record%]
    &set breeding [extract 8 %record%]
  &end
```

```
/* if any of the above variables for the numeric items contain blanks,
 /* change them to "0" (zero)

 &do var &list r0-25 r25-50 r50-75 r75-100
  &if [quote [unquote [value %var%]]] = ' ' &then
   &set %var% = 0
 &end

 /* Now that the variables are set, add a record to the INFO file and
 /* set the cursor variables.  Also, count up number of records added.

 cursor tempcur insert
 &set number_added = %number_added% + 1

 &do item &list point_id date habitat spp_code r0-25 r25-50 r50-75 ~
r75-100 r25-100 age sex breeding recorder old_trans_id
  &set :tempcur.%item% [value %item%]
 &end

 /* delete the above record specific variables
 &do var &list spp_code r0-25 r25-50 r50-75 r75-100 age sex breeding
  &dv %var%
 &end

 &set record [read %fileunit% readstat]
 &type %readstat%

/* end the "do until " loop"
&end


/* clean up

/* close the in_file
&set closestat [close -all]

/* close and remove the cursor
cursor tempcur remove

/* report number of records added to INFO file
&type
&type Total number of records added to %info_file%:  %number_added%
&type

/* end of aml...
&return
```

```
/* error routine
&routine error
&severity &error &fail
&type An error has occurred in A.AML...
&type Please check the input file carefully for correct format.
&set closevar [close -all]
&if [quote [extract 2 [show cursor tempcur]]] = 'OPEN' &then
  cursor tempcur remove
&type
&type Total number of records added to %info_file%:  %number_added%
&type
&type *** Please check records in %info_file% carefully. ***
&type *** Invalid data might have been added. ***
&type
&return &error Terminating program A.AML.



/* warning routine
&routine warn
&severity &warning &ignore
&type A warning condition occurred.
&return
```

Table 16. The AML written for data automation on a second file type of bird census data, B.aml.

```
/*-----------------------------------------------------------------------
/*          Environmental Systems Research Institute
/*-----------------------------------------------------------------------
/*  Program: A.AML
/*  Purpose: Reads data from UP-LA-95.XLS.CSV text file and loads into
/*          BIRDCENC.DAT INFO file.
/*-----------------------------------------------------------------------
/*    Usage: a.aml <in_file>
/*
/* Arguments: in_file        - the name of the ascii text file to load
/*
/*
/*  Routines: ERRROR     - Handles any errors that may occur.
/*          WARN - Handles any warnings that may occur.
/*
/*  Globals: none
/*-----------------------------------------------------------------------
/*    Calls: none
/*-----------------------------------------------------------------------
/*    Notes: The <in_file> needs to be in the following format:
/* line  1: LOCATION:,<location>,TEMP...
/* line  2: OBSERVERS:,<observers>,WIND...
/* line  3: DATE:,<date>,TIME...
/* line  4: blank
/* line  5: blank
/* line  6: header information - no data needed
/* line  7: header information - no data needed
/* lines 8 to the end of file contain data in the following format:
/*  <point:time:day>,<habitat>,<species>,<0-25>,<25-50>,<50-75>, (con't)
/*  <75-100>,<age>,<sex>,<breeding>,...
/*
/*-----------------------------------------------------------------------
/*    Input: ascii data file with above format
/*   Output: records added to BIRDCENC.DAT
/*-----------------------------------------------------------------------
/*  History: Andy Huntington (ESRI) - 8/2/96 - original coding
/*
/*=======================================================================

&severity &error &routine error
&severity &warning &routine warn

&args in_file

/* set the info_file to receive the data
&set info_file BIRDCENS.DAT

/* Do some error checking
```

```
&if [null %in_file%] &then &do
  &type Usage: a.aml <in_file>
  &return
&end

&if ^ [exists %in_file% -file] &then &do
  &type <in_file> %in_file% does not exist.  Exiting...
  &type Usage: a.aml <in_file>
  &return
&end


/* Open file and check status

&set fileunit [open %in_file% openstat -r]
&if %openstat% ne 0 &then
  &return &error Error opening <in_file> for reading.  Exiting...


/* Initialize count variable to count number of records added
&set number_added 0


/* Read the universal data that applies to all records in file

/* OLD_TRANS_ID is set to <in_file>
&set old_trans_id %in_file%

/* This file does not contain information for r25-100.  Initialize
/* to be 0.
&set r25-100 0

/* Record 1.  Contains LOCATION item value
&set record [read %fileunit% readstat]
&set location [unquote [after [before %record% ,TEMP] LOCATION:,]]

/* Record 2 contains OBSERVER item value
&set record [read %fileunit% readstat]
&set recorder [after [before [quote %record%] ,WIND] OBSERVERS:,]

/* Record 3 contains DATE item value
&set record [read %fileunit% readstat]
&set date [extract 2 [unquote %record%]]

/* Skip next four records
&set record [read %fileunit% readstat]
&set record [read %fileunit% readstat]
&set record [read %fileunit% readstat]
&set record [read %fileunit% readstat]

/* Record 8 until the end of file contains data for each record.
/* Add the data to the INFO file using CURSORS.  Other option would be to write
```

```
/* out the data to an ascii file in the correct format, and then use ADD FROM
/* in INFO or TABLES.

/* First, declare and open a cursor on the INFO file
cursor tempcur declare %info_file% info rw
cursor tempcur open

/* postion cursor to last record in file if have more than 0 records
/* (want to add data to end of file instead of top)

&if %:tempcur.aml$nsel% gt 0 &then
  cursor tempcur %:tempcur.aml$nsel%

/* Read record 8 to the end of file, and parse data into variables.

/* move to record 8
&set record [read %fileunit% readstat]

&do &until %readstat% = 102 or %record% = ' '

  &set record [unquote %record%]

  /* check for new point.  If new point, then set variables for point and habitat.
  /* For new points, the format is slightly different since extract on data without
  /* leading commas produces different results

  &if [quote [extract 1 %record%]] cn ':' or [quote [extract 1 %record%]] cn '-' ~
or [quote [extract 1 %record%]] cn '/' &then &do
    &set point [extract 1 %record%]
    &set habitat [extract 2 %record%]
    &set spp_code [extract 3 %record%]
    &set r0-25 [extract 4 %record%]
    &set r25-50 [extract 5 %record%]
    &set r50-75 [extract 6 %record%]
    &set r75-100 [extract 7 %record%]
    &set age [extract 8 %record%]
    &set sex [extract 9 %record%]
    &set breeding [extract 10 %record%]
    /* set point_id to be combination of location and point variables
    &set point_id %location% %point%
  &end

  &else &do
    /* set other values for each element
    &set spp_code [extract 1 %record%]
    &set r0-25 [extract 2 %record%]
    &set r25-50 [extract 3 %record%]
    &set r50-75 [extract 4 %record%]
    &set r75-100 [extract 5 %record%]
    &set age [extract 6 %record%]
    &set sex [extract 7 %record%]
    &set breeding [extract 8 %record%]
  &end
```

```
 /* if any of the above variables for the numeric items contain blanks,
 /* change them to "0" (zero)

 &do var &list r0-25 r25-50 r50-75 r75-100
  &if [quote [unquote [value %var%]]] = ' ' &then
    &set %var% = 0
 &end

 /* Now that the variables are set, add a record to the INFO file and
 /* set the cursor variables.  Also, count up number of records added.

 cursor tempcur insert
 &set number_added = %number_added% + 1

 &do item &list point_id date habitat spp_code r0-25 r25-50 r50-75 ~
r75-100 r25-100 age sex breeding recorder old_trans_id
   &set :tempcur.%item% [value %item%]
 &end

 /* delete the above record specific variables
 &do var &list spp_code r0-25 r25-50 r50-75 r75-100 age sex breeding
   &dv %var%
 &end

 &set record [read %fileunit% readstat]
 &type %readstat%

/* end the "do until " loop"
&end


/* clean up

/* close the in_file
&set closestat [close -all]

/* close and remove the cursor
cursor tempcur remove

/* report number of records added to INFO file
&type
&type Total number of records added to %info_file%:  %number_added%
&type

/* end of aml...
&return
```

```
/* error routine
&routine error
&severity &error &fail
&type An error has occurred in A.AML...
&type Please check the input file carefully for correct format.
&set closevar [close -all]
&if [quote [extract 2 [show cursor tempcur]]] = 'OPEN' &then
  cursor tempcur remove
&type
&type Total number of records added to %info_file%:  %number_added%
&type
&type *** Please check records in %info_file% carefully. ***
&type *** Invalid data might have been added. ***
&type
&return &error Terminating program A.AML.



/* warning routine
&routine warn
&severity &warning &ignore
&type A warning condition occurred.
&return
```

Table 17. Status of major data sets.

Dataset Name	Contents	Status	Type of Data	Number of Records or Locations
PLANT				
Veg_trln.aat	Vegetation Transects	90% of known transect locations are in the TES data base.	Coverage	> 100
Veg_trln.dat	Attribute data associated with vegetation transects.	75 % of known transect attribute data are in an INFO table	Data Attributes	> 2,000
Herbarium.dat/pat	Locational data and attribute data related to the LANL Herbarium collection.	Manual data entry is 75% complete. Import to INFO needed. Spatial coverage needs to be developed after data entry is complete.	Coverage Data Attributes	600
NPDESwet.pat Frijpoly.pat Whitepoly.pat Guajepoly.pat Puyepoly.pat Frijnwi.aat Whitenwi.aat Guajenwi.aat Puyenwi.aat	Locational data of wetlands.	Wetlands reside in 9 coverages. Will reduce to 1 coverage.	Coverage	600
Plant.exp	Expansion table with definition of plant codes.	In an INFO table.	Expansion Table	1072
ANIMAL				
Inverts.pat	Locational data related to invertebrate studies conducted at LANL.	All terrestrial insect study locations are in ARC/INFO. 25% of the aquatic invertebrate locations are in.	Coverage	25
TerInsect.dat	Attribute data associated with terrestrial insect studies. Coverage is inverts.pat	All terrestrial insect data have been import to an INFO table	Data Attributes	1558
Aispecies.dat	Attribute data associated with aquatic invertebrates. Location data stored in Inverts.pat	25% of the data attribute information are in an INFO table. Data for studies conducted in Guaje and Los Alamos Canyons are completely imported.	Data Attributes	~ 500
Birdobs.pat	Locational data associated with informal bird surveys.	100 % of locational data are in an ARC/INFO coverage	Coverage	52
Birdobs.dat	Attribute data associated with the bird observations.	100 % of data attributes have been imported to the INFO table	Data Attributes	2161

Table 17 (cont.)

Dataset Name	Contents	Status	Type of Data	No. of Records or Locations
smmamal.pat	Locational data asociated with small mammal surveys.	100 % of the locational data are in an ARC/INFO coverage.	Coverage	25
smmammal.dat	Data attribute information associated with small mammal studies.	All data from 1990 through 1995 have been imported in to the INFO table.	Data attributes	2067
contam.dat	Contaminant data attributes associated with ecological studies.	Small mammal and plant contaminant data from 1994 and 1995 have been imported into an INFO table.	Data attributes	717
mammalobs.pat	Locational data associated with informal surveys and formal surveys involving large and medium-sized mammals.	100 % of the locational data are in an ARC/INFO coverage.	Coverage	96
mammalobs.dat	Data attribute information associated with informal observations of large and medium-sized mammals.	100% of the collected data are in an INFO table.	Data attributes	263
lgmammal.dat	Data attributes associated with formal studies of large mammals.	100 % of the 1995 data attributes have been imported into an INFO file.	Data attributes	8
elk.pat	Locational data associated with LANL's GPS elk tracking study	All data from April through August have been imported to an ARC/INFO coverage	Coverage	633
accident.pat	Locational data associated with traffic accidents involving animals	All data through 1994 have been imported into an ARC/INFO coverage.	Coverage	114
TAE				
TESbirds.pat	Locational data associated with sensitive bird habitat	Habitat locations for 4 bird species have been developed.	Coverage	18
MISC				
Projectsum.pat	Locational data associated with proposed projects.	Data entered weekly as projects are reviewed.	Coverage	150
Projectsum.dat	Attribute data for proposed projects. Coverage is Projectsum.pat	Dat entered weekly as projects are reviewed.	Data attributes	140

Tables 18 through 25

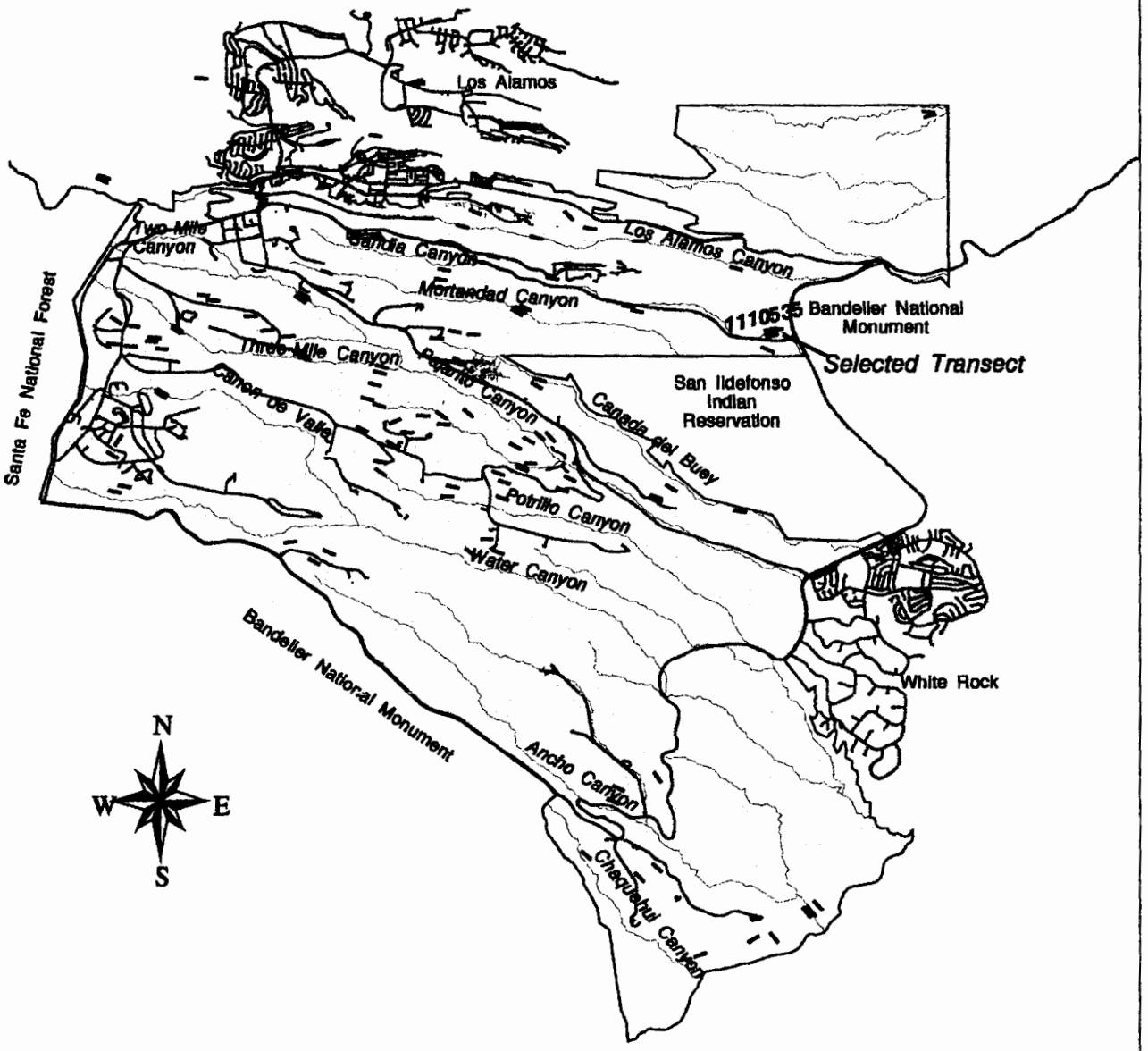
have been inserted behind

the Map they reference.

Map 1: Vegetation Transects

Selected Transect Shown with Id Number

(See next page for attribute information)



Legend

- Selected Transect
- Vegetation Transects
- LANL
- Paved Roads
- Drainages

1:72679

2 0 2 4 6 8 10 12 Kilometers

2 0 2 4 6 8 Miles

LOS ALAMOS NATIONAL LABORATORY

BIOLOGY TEAM, ESH-20 ECOLOGY GROUP

PREPARED: SEPTEMBER, 1996

Table 18. Attribute Data for Vegetation Transect 1110535

Trans_id	Location	Read_record	Trans_date	Ft_per_trans	Type	Scode	Nonplant_cov	Plant_cov
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	SOIL	32.49	0
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	ROCK	0.14	0
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	LITTER	46.67	0
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	CRUST	1.29	0
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	BOGR	0	5.14
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	ARDR	0	3.29
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	SPCR	0	2.5
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	MEAL	0	1.49
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	AGAL	0	0.01
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	BRTE	0	3.04
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	ARCA	0	0.26
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	CHNA	0	0.86
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	STCO	0	0.07
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	CRJA	0	0.07
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	ARFR	0	0.36
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	BADI	0	0.16
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	VETH	0	0.01
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	GRTR	0	0.14
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	ARLU	0	0.07
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	ANPA	0	0.01
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	IPAG	0	0.04
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	LOWR	0	0.21
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	ERCA	0	0.29
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	OENX	0	0.23
1110535	LOWER SANDIA	TIM HAARMANN/DEBBIE RISBERG	19930602	700	U	POAX	0	0.43

Location of transect 1110535 is shown on Map 1.

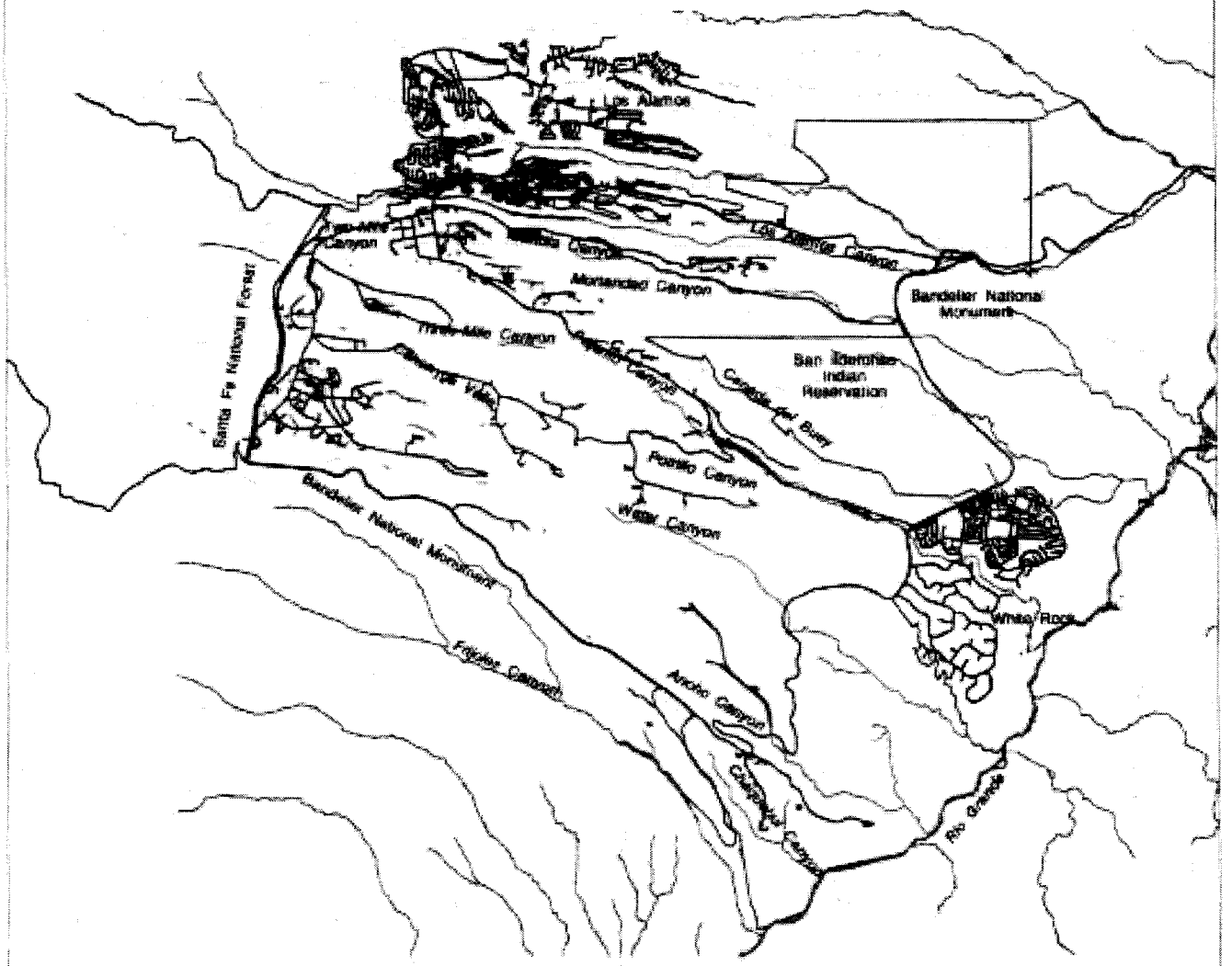
Table 18. Attribute Data for Vegetation Transect 1110535

T_s_no	T_s_acre	Avg_dbh	Rel_density	Rel_cov	Per_freq	Rel_freq	Impt_index	Comments
0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	
0	0	0	0	6.25	0.03	1.79	4.02	
0	0	0	0	24.99	0.27	16.96	20.98	
0	0	0	0	15.97	0.16	9.82	12.89	
0	0	0	0	12.15	0.11	7.14	9.65	
0	0	0	0	7.22	0.21	13.39	10.31	
0	0	0	0	0.07	0.01	0.89	0.48	
0	0	0	0	14.79	0.2	12.5	13.64	
0	0	0	0	1.26	0.11	7.14	4.2	
0	0	0	0	4.17	0.03	1.79	2.98	
0	0	0	0	0.35	0.01	0.89	0.62	
0	0	0	0	0.35	0.01	0.89	0.62	
0	0	0	0	1.74	0.01	0.89	1.31	
0	0	0	0	0.77	0.06	3.57	2.17	
0	0	0	0	0.07	0.01	0.89	0.48	
0	0	0	0	0.69	0.03	1.79	1.24	
0	0	0	0	0.35	0.01	0.89	0.62	
0	0	0	0	0.07	0.01	0.89	0.48	
0	0	0	0	0.22	0.06	3.57	1.89	
0	0	0	0	1.04	0.03	1.79	1.41	
0	0	0	0	1.39	0.03	1.79	1.59	
0	0	0	0	1.11	0.04	2.68	1.89	
0	0	0	0	2.08	0.04	2.68	2.38	

Location of transect 1110535 is shown on Map 1.

Map 2: Wetlands

Map contains NWI wetlands and wetlands mapped during LANL biology surveys



Legend

Wetlands	Paved Roads
LANL	Drainages

1:86174

3.1 0 3.1 6.2 9.3 12.4 Kilometers

2.1 0 2.1 4.2 6.3 8.4 Miles

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BIOLOGY TEAM, ESH-20 ECOLOGY GROUP

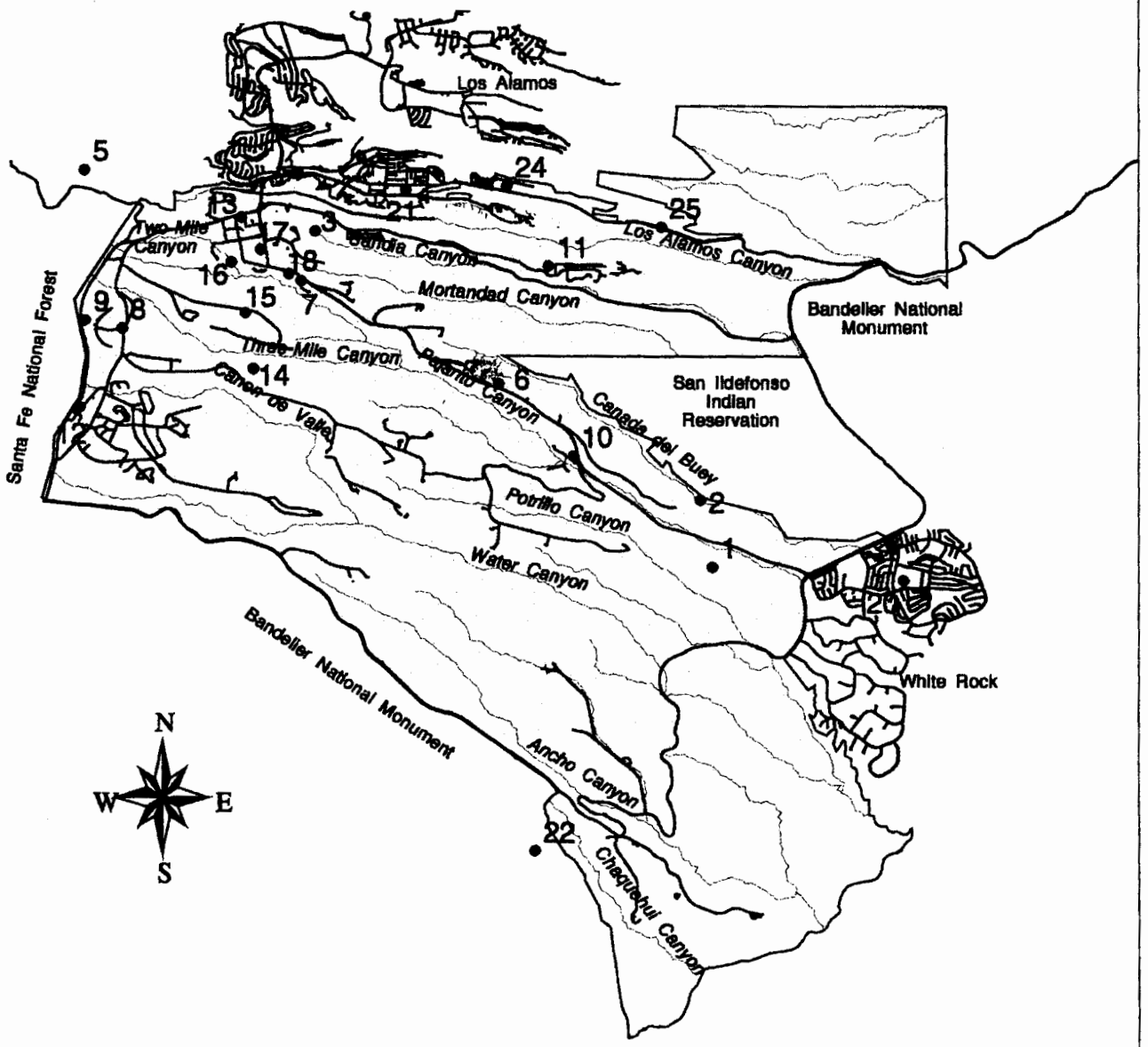
PREPARED: SEPTEMBER, 1996

N W E S

Map 3: Insect Observations

Locations Shown with Loc_no Number

(See next page for observation attribute information)



Legend

- Insect Observations
- LANL
- Paved Roads
- Drainages

1:72679

2 0 2 4 6 8 10 12 Kilometers

2 0 2 4 6 8 Miles

LOS ALAMOS NATIONAL LABORATORY

BIOLOGY TEAM, ESH-20 ECOLOGY GROUP

PREPARED: SEPTEMBER, 1996

Table 19. Insect Observations
(Selected records from inverts.dat table.)

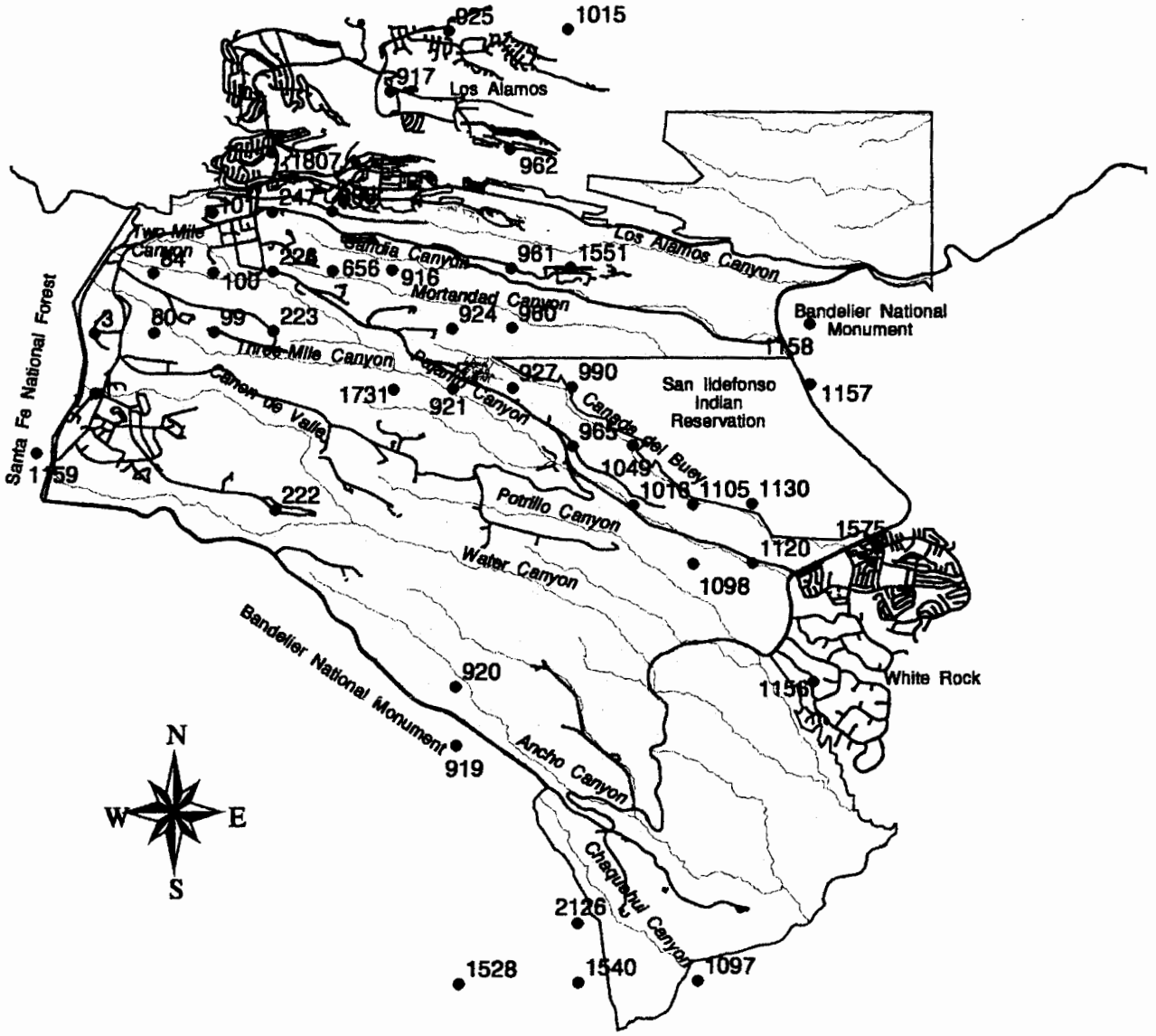
Loc_no	Sample_i	Trap_id	Family	Genus	Abs_abund	Location	Date	Collector	Identifer
3		0	Aeshnidae	Aeschua multicolor	1	Sandia Canyon	2E+07	T. Haarmann	Flint
1		0	Aeshnidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
13		0	Aeshnidae		1	TA-3 Otowi Bldg.	2E+07	D. Yeamans	
1		0	Aeshnidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
12		0	Aeshnidae		1	TA-16 Pond	2E+07	T. Haarmann	
1		0	Libellulidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Libellulidae	Libellula quadrimacu	1	Pajarito Wetlands	2E+07	T. Haarmann	Flint
1		0	Libellulidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Libellulidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
9		0	Libellulidae		1	TA-8 Ice Pond	2E+07	T. Haarmann	
1		0	Libellulidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Libellulidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
3		0	Gomphidae	Ophiogomphus severus	1	Sandia Canyon	2E+07	T. Haarmann	
13		0	Gomphidae		1	TA-3 Otowi Bldg.	2E+07	D. Yeamans	
3		0	Coenagrionidae	Argia vivida	1	Sandia Canyon	2E+07	T. Haarmann	Flint
8		0	Coenagrionidae	Argia vivida	1	TA-8	2E+07	T. Haarmann	Flint
3		0	Coenagrionidae	Argia vivida	1	Sandia Canyon	2E+07	T. Haarmann	Flint
3		0	Coenagrionidae	Argia vivida	1	Sandia Canyon	2E+07	T. Haarmann	Flint
1		0	Coenagrionidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Coenagrionidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Coenagrionidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Coenagrionidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Coenagrionidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Coenagrionidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Coenagrionidae		1	Pajarito Wetlands	2E+07	T. Haarmann	
2		0	Gryllacrididae	Stenopelmatus fuscus	1	Canada del Buey	2E+07	T. Haarmann	
2		0	Gryllacrididae		1	Canada del Buey	2E+07	T. Haarmann	
1		0	Gryllacrididae		1	Pajarito Wetlands	2E+07	T. Haarmann	W. Mackay
2		0	Gryllacrididae		1	Canada del Buey	2E+07	T. Haarmann	
1		0	Gryllacrididae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Gryllacrididae	Stenopelmatus fuscus	1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Gryllacrididae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Gryllacrididae		1	Pajarito Wetlands	2E+07	T. Haarmann	
1		0	Gryllidae	Ceuthophilus pallidu	1	Pajarito Wetlands	2E+07	T. Haarmann	T. Haarmann

Previous page shows observation location by loc_no number.

Map 4: Bird Observations

Locations Shown with Birdobs-id Number

(See next page for observation attribute information)



Legend

• Bird Observations	Paved Roads
LANL	Drainages

1:75429

3 0 3 6 9 12 Kilometers

2 0 2 4 6 8 Miles

LOS ALAMOS NATIONAL LABORATORY

BIOLOGY TEAM, ESH-20 ECOLOGY GROUP

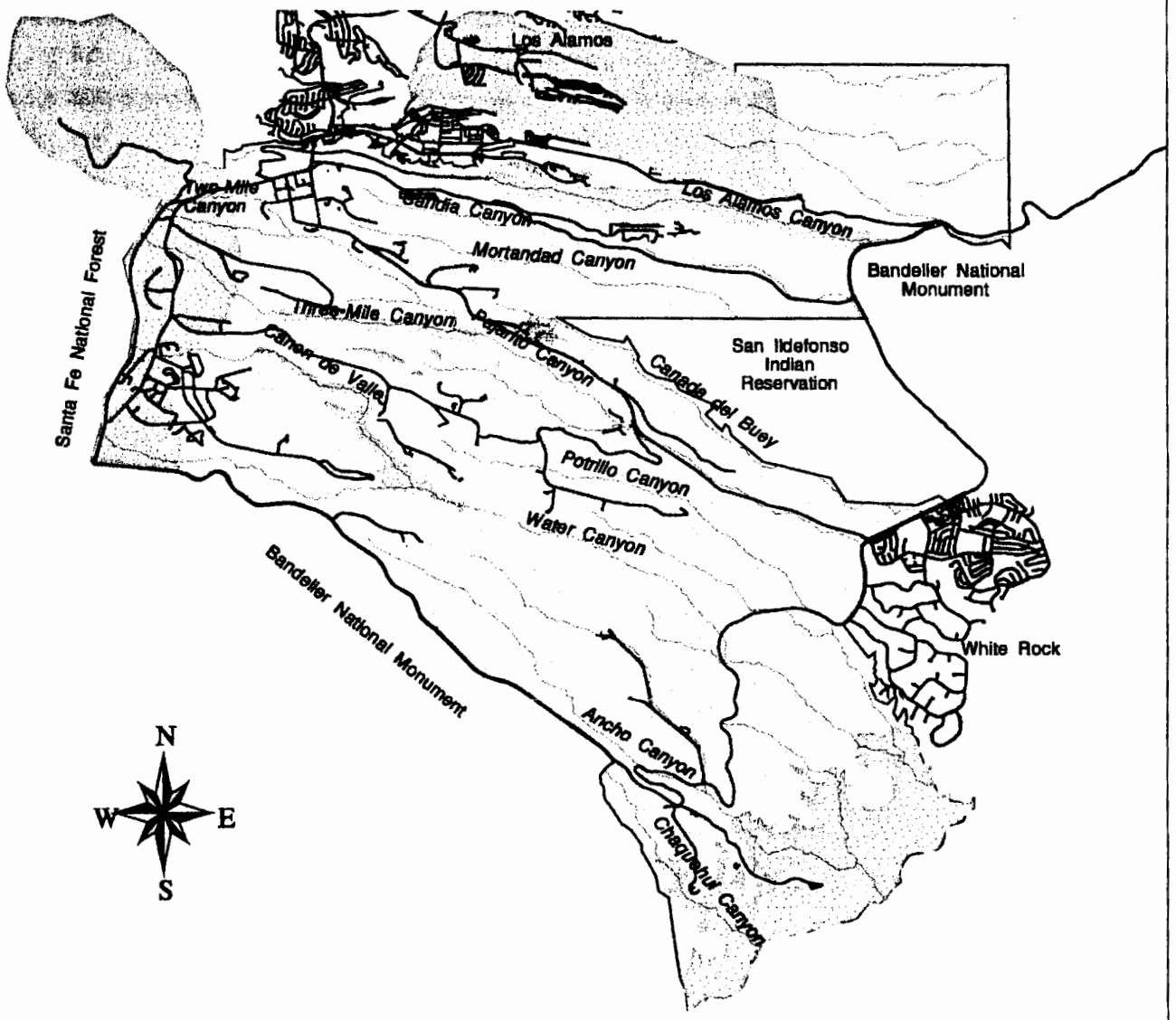
PREPARED: SEPTEMBER, 1996

Table 20. Bird Observations
(Selected records from birdobs.dat table.)

Birdobs-id	Code	Month	Day	Year	Land	Ta	Numobs	Status	Vegtype
1	COCO	10	2	1991	L	3	1	1	410
1	PIPI	10	17	1991	L	16	1	1	225
3	COAU	8	21	1991	L	8	1	1	410
3	SIPY	8	21	1991	L	8	1	1	410
3	CYSI	8	21	1991	L	8	1	1	410
3	MELE	10	22	1991	L	8	1	1	240
3	CAGU	10	22	1991	L	8	1	1	210
3	FASP	6	28	1991	L	8	1	1	999
3	COAU	6	28	1991	L	8	1	1	999
3	SASA	6	28	1991	l	8	1	1	140
3	BUJA	2	25	1991	L	8	1	1	240
3	BUJA	2	26	1991	L	8	1	1	240
3	BUJA	2	27	1991	L	8	1	1	240
3	CYST	2	28	1991	L	8	1	1	420
3	FASP	3	5	1991	L	8	1	1	240
3	FASP	3	6	1991	L	8	1	1	240
3	FASP	3	15	1991	L	8	1	1	240
3	FASP	3	21	1991	L	8	1	1	240
3	NUCO	4	2	1991	L	8	1	1	240
3	SICU	4	5	1991	L	8	1	1	240
3	SASA	4	8	1991	L	8	1	1	240
3	COAU	4	25	1991	L	8	1	1	240
3	BUJA	4	25	1991	L	8	1	1	240
3	FASP	4	25	1991	L	8	1	1	240
3	COAU	4	29	1991	L	8	1	1	420
3	PIVI	4	29	1991	L	8	1	1	420
3	TUMI	4	29	1991	L	8	1	1	420
3	JUHY	4	29	1991	L	8	1	1	420
3	PAGA	4	29	1991	L	8	1	1	420
3	SICU	4	30	1991	L	8	1	1	240
3	SIME	4	30	1991	L	8	1	1	240
3	LOCU	5	1	1991	L	8	1	1	420
3	PIER	5	1	1991	L	8	1	1	420
3	SICU	5	1	1991	L	8	1	1	240
3	CYST	5	1	1991	L	8	1	1	420
3	FASP	5	3	1991	L	8	1	1	140
3	FASP	5	7	1991	L	8	1	1	140
3	FASP	5	8	1991	L	8	1	1	140
3	PILU	5	9	1991	L	8	1	1	0
3	PILU	5	10	1991	L	8	1	1	260
3	SIPY	5	10	1991	L	8	1	1	410
3	TUMI	5	10	1991	L	8	1	1	410
3	DECO	5	10	1991	L	8	1	1	410
3	SPPA	5	10	1991	L	8	1	1	260
3	COAU	5	10	1991	L	8	1	1	410
3	TRAE	5	10	1991	L	8	1	1	410
3	BUJA	5	13	1991	L	8	1	1	140
3	COCO	5	13	1991	L	8	1	1	140

Previous page shows observation location by Birdobs-id number

Map 5: Identified Potential Habitat for Sensitive Bird Species



Legend

Potential Habitat	Paved Roads
LANL	Drainages

1:73589

3 0 3 6 9 12 Kilometers

2 0 2 4 6 8 Miles

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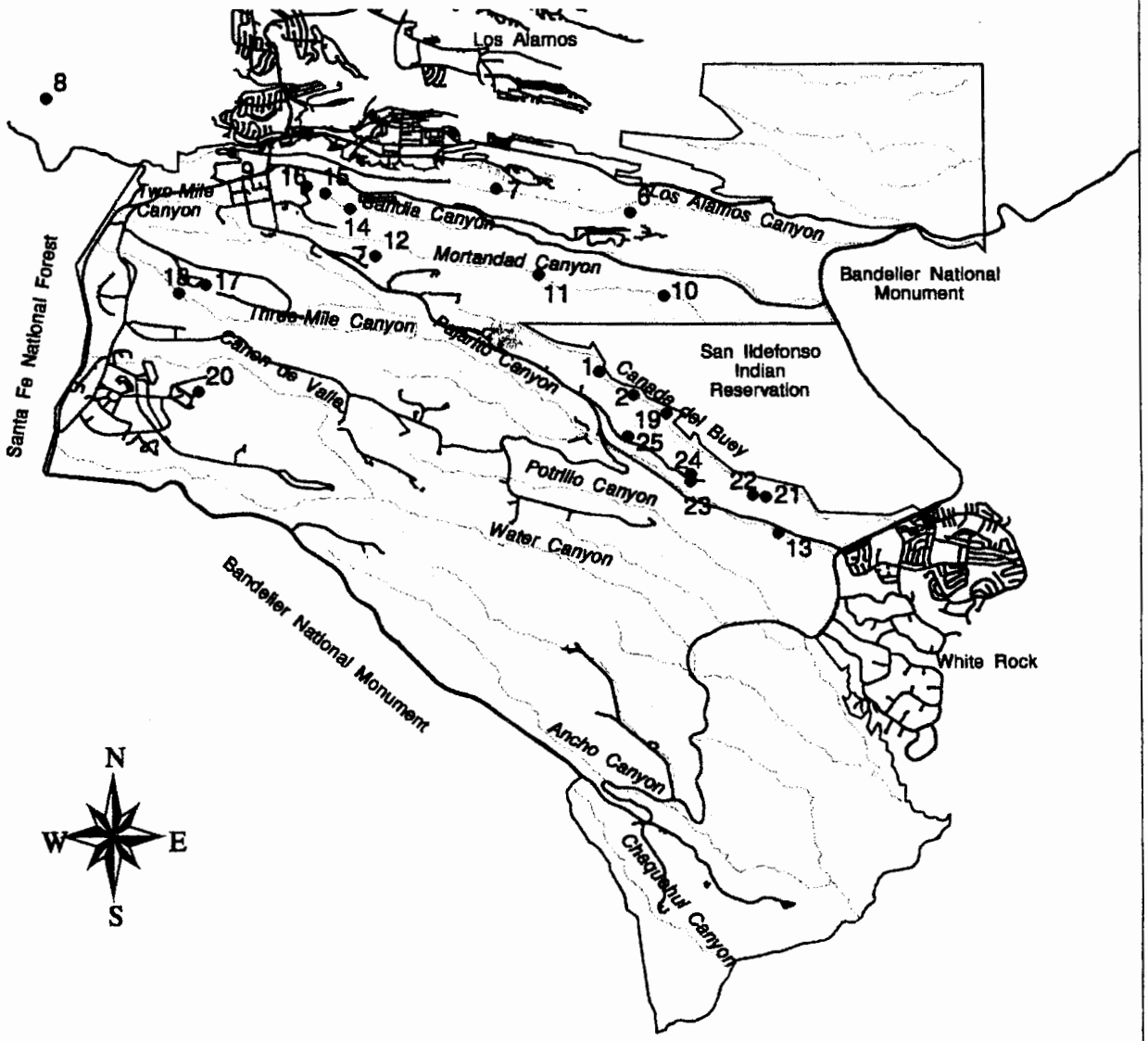
Map 6: Locations of Small Mammal Studies

Locations Shown with Site_id Number

(See next page for small mammal attribute information)



Legend

• Study Locations	Paved Roads
LANL	Drainages

1:73589

3 0 3 6 9 12 Kilometers

2 0 2 4 6 8 Miles

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PREPARED: SEPTEMBER, 1996

Table 21. Small Mammal Data
(Selected records from smmam.dat table.)

Trap_date	Mortality_cod	Mortality_date	Site_id	Contam_id	Capture_id	Mammal_id	Museum_id	Location	Sublocation
34507	1	34507	22	24	1807	1807	0	TA54	N/A
34507	1	34507	22	24	1805	1805	0	TA54	N/A
34507	1	34507	22	24	1808	1808	0	TA54	N/A
34507	1	34507	22	24	1803	1803	0	TA54	N/A
34507	1	34507	22	24	1809	1809	0	TA54	N/A
34507	1	34507	22	24	1806	1806	0	TA54	N/A
34507	1	34507	22	24	1801	1801	0	TA54	N/A
34507	1	34507	22	24	1802	1802	0	TA54	N/A
34507	1	34507	22	23	1792	1792	0	TA54	N/A
34507	1	34507	22	23	1798	1798	0	TA54	N/A
34507	1	34507	22	23	1797	1797	0	TA54	N/A
34507	1	34507	22	23	1800	1800	0	TA54	N/A
34507	1	34507	22	23	1794	1794	0	TA54	N/A
34507	1	34507	22	23	1796	1796	0	TA54	N/A
34507	1	34507	22	23	1795	1795	0	TA54	N/A
34507	1	34507	22	23	1799	1799	0	TA54	N/A
34507	1	34507	22	22	1789	1789	0	TA54	N/A
34507	1	34507	22	22	1790	1790	0	TA54	N/A
34507	1	34507	22	22	1786	1786	0	TA54	N/A
34507	1	34507	22	22	392	1703	0	TA54	N/A
34507	1	34507	22	22	1788	1788	0	TA54	N/A
34507	1	34507	22	22	1784	1784	0	TA54	N/A
34507	1	34507	22	22	1785	1785	0	TA54	N/A
34507	1	34507	22	22	1787	1787	0	TA54	N/A
34507	1	34507	21	21	385	2222	0	TA54	N/A
34507	1	34507	21	21	386	2223	0	TA54	N/A
34507	1	34507	21	21	384	2221	0	TA54	N/A
34508	1	34508	21	21	390	2218	0	TA54	N/A
34508	1	34508	21	21	387	2224	0	TA54	N/A
34508	1	34508	21	21	389	2263	0	TA54	N/A
34508	1	34508	21	21	391	2216	0	TA54	N/A
34508	1	34508	21	21	388	2215	0	TA54	N/A
34506	1	34506	21	20	379	2220	0	TA54	N/A
34506	1	34506	21	20	380	2262	0	TA54	N/A

Previous page shows small mammal study locations by site_id number.

Table 21. Small Mammal Data
(Selected records from smmam.dat table.)

Mammal_id	Grid_number	Trap_number	Subtrap	Method	Sp_code	Capture_status	Sex	Rep_status	Fetus_number	Fetus_removed
1807	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1805	2	N/A	N/A	SNAP	PEMA	N	U	UNDETERMINED	0	N/A
1808	2	N/A	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
1803	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1809	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1806	2	N/A	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
1801	2	17	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1802	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1792	2	N/A	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
1798	2	14	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
1797	2	13	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
1800	2	16	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1794	2	10	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1796	2	12	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
1795	2	11	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1799	2	15	N/A	SNAP	PEMA	N	U	UNDETERMINED	0	N/A
1789	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1790	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1786	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1703	2	N/A	N/A	SNAP	PEMA	R	U	UNDETERMINED	0	N/A
1788	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1784	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1785	2	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
1787	2	N/A	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
2222	1	N/A	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
2223	1	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
2221	1	N/A	N/A	SNAP	PEMA	R	U	UNDETERMINED	0	N/A
2218	1	N/A	N/A	SNAP	PEMA	R	U	UNDETERMINED	0	N/A
2224	1	N/A	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A
2263	1	N/A	N/A	SNAP	PEMA	R	U	UNDETERMINED	0	N/A
2216	1	N/A	N/A	SNAP	PEMA	R	U	UNDETERMINED	0	N/A
2215	1	N/A	N/A	SNAP	PEMA	N	M	UNDETERMINED	0	N/A
2220	1	12	N/A	SNAP	PEMA	R	U	UNDETERMINED	0	N/A
2262	1	13	N/A	SNAP	PEMA	N	F	UNDETERMINED	0	N/A

Previous page shows small mammal study locations by site_id number.

Table 21. Small Mammal Data
(Selected records from smmam.dat table.)

Mammal_id	Total_weight	Bag_weight	Net_weight	Body_length	Tail_length	Ear_lengt	Foot_length	Tag_number	Comments	E1
1807	16.5	0	16.5	7.5	6.5	0	0	0	NO COMMENTS	0
1805	0	0	0	0	0	0	0	0	NO COMMENTS	0
1808	20	0	20	9	6.5	0	0	0	NO COMMENTS	0
1803	12	0	12	6.5	5.5	0	0	0	NO COMMENTS	0
1809	15.5	0	15.5	8	6	0	0	0	NO COMMENTS	0
1806	15	0	15	7	7	0	0	0	NO COMMENTS	0
1801	15.5	0	15.5	8	7	0	0	0	NO COMMENTS	0
1802	18.5	0	18.5	8	7	0	0	0	NO COMMENTS	0
1792	16	0	16	7.5	6.5	0	0	0	NO COMMENTS	0
1798	13	0	13	7	5.5	0	0	0	NO COMMENTS	0
1797	21.5	0	21.5	9.5	7	0	0	0	NO COMMENTS	0
1800	14.5	0	14.5	6.5	6	0	0	0	NO COMMENTS	0
1794	47	0	47	11.5	6.5	0	0	0	NO COMMENTS	0
1796	14	0	14	7	5.5	0	0	0	NO COMMENTS	0
1795	13	0	13	8	6.5	0	0	0	NO COMMENTS	0
1799	0	0	0	0	0	0	0	0	VERY GREY	0
1789	21	0	21	8	7	0	0	0	NO COMMENTS	0
1790	17.5	0	17.5	6.5	5.5	0	0	0	NO COMMENTS	0
1786	13	0	13	7	5.5	0	0	0	NO COMMENTS	0
1703	0	0	0	0	0	0	0	2216	NO COMMENTS	0
1788	14	0	14	7	5.5	0	0	0	NO COMMENTS	0
1784	9.5	0	9.5	6.5	5.5	0	0	0	NO COMMENTS	0
1785	14	0	14	7.5	6.5	0	0	0	NO COMMENTS	0
1787	14.5	0	14.5	6.5	6.5	0	0	0	NO COMMENTS	0
2222	13	0	13	7	5.6	1.7	1.8	2221	NO COMMENTS	0
2223	17.5	0	17.5	8.5	9.5	2	2	2222	NO COMMENTS	0
2221	0	0	0	0	0	0	0	2263	NO COMMENTS	0
2218	0	0	0	0	0	0	0	2263	NO COMMENTS	0
2224	47	0	47	11	10.2	1.4	2.9	2223	NO COMMENTS	0
2263	0	0	0	0	0	0	0	2215	NO COMMENTS	0
2216	0	0	0	0	0	0	0	2218	NO COMMENTS	0
2215	12.5	0	12.5	7.5	5.5	1.3	1.7	2224	NO COMMENTS	0
2220	0	0	0	0	0	0	0	2215	NO COMMENTS	0
2262	45	0	45	12	10	1.6	3	2220	NO COMMENTS	0

Previous page shows small mammal study locations by site_id number.

Table 21. Small Mammal Data
(Selected records from smmam.dat table.)

Mammal_id	E2	E3	E4	E5	Avg_emscan
1807	0	0	0	0	0
1805	0	0	0	0	0
1808	0	0	0	0	0
1803	0	0	0	0	0
1809	0	0	0	0	0
1806	0	0	0	0	0
1801	0	0	0	0	0
1802	0	0	0	0	0
1792	0	0	0	0	0
1798	0	0	0	0	0
1797	0	0	0	0	0
1800	0	0	0	0	0
1794	0	0	0	0	0
1796	0	0	0	0	0
1795	0	0	0	0	0
1799	0	0	0	0	0
1789	0	0	0	0	0
1790	0	0	0	0	0
1786	0	0	0	0	0
1703	0	0	0	0	0
1788	0	0	0	0	0
1784	0	0	0	0	0
1785	0	0	0	0	0
1787	0	0	0	0	0
2222	0	0	0	0	0
2223	0	0	0	0	0
2221	0	0	0	0	0
2218	0	0	0	0	0
2224	0	0	0	0	0
2263	0	0	0	0	0
2216	0	0	0	0	0
2215	0	0	0	0	0
2220	0	0	0	0	0
2262	0	0	0	0	0

Table 22. Select Records from the Chemical.dat Table
Table shows chemical concentratons of an analyte by media.

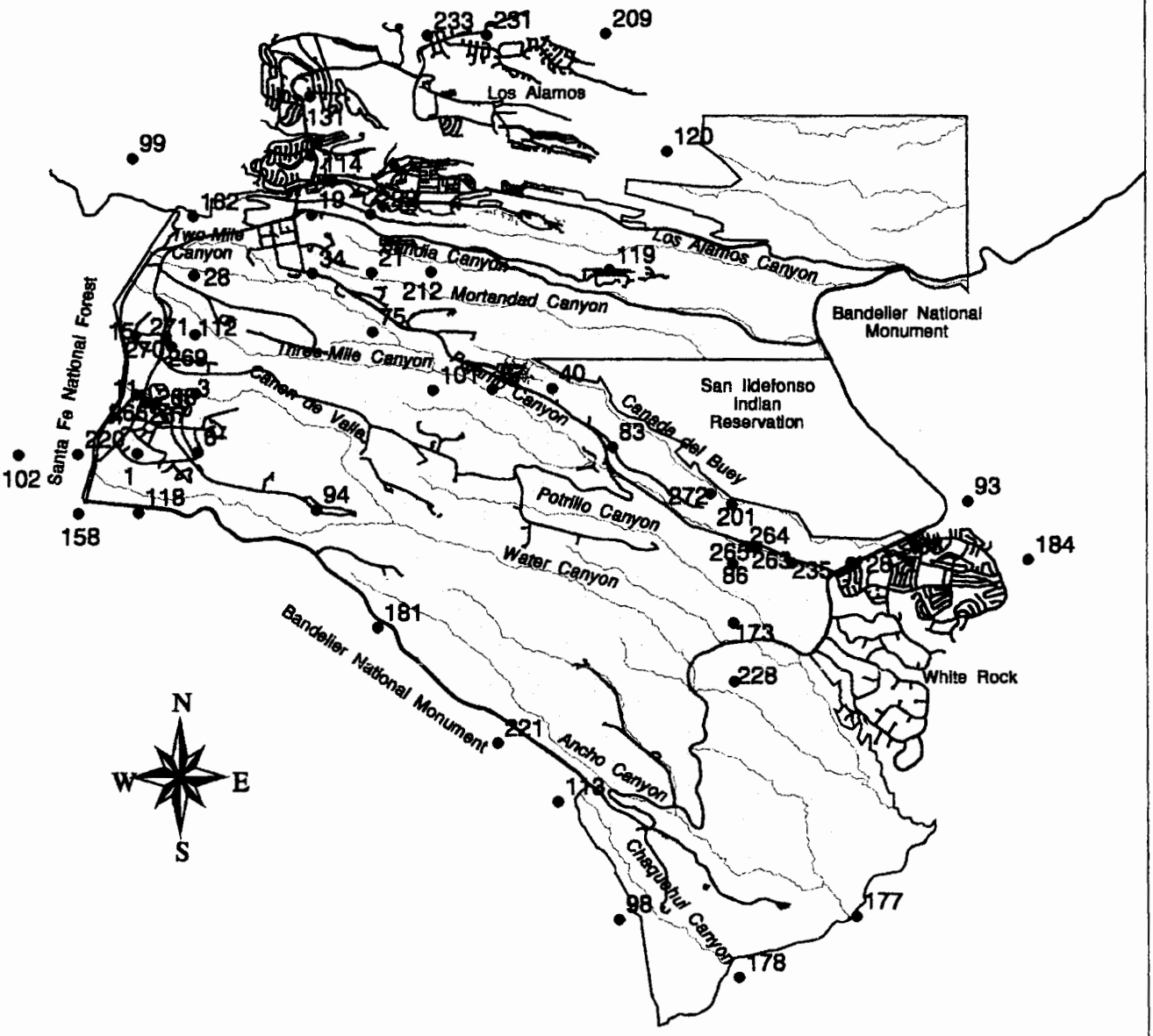
Month	Year	Contam_id	Sample_type	Location_num	Sample_name	Replicate	Chemical	Concentration
6	94	21	CARCASS	1	6211	3	CS137	0.04
6	94	21	CARCASS	1	6211	3	SR90	2.8
6	94	21	CARCASS	1	6211	3	CO60	1.12
6	94	21	CARCASS	1	6211	3	BI214	0.58
6	94	21	CARCASS	1	6211	3	AM241	0.012
6	94	21	CARCASS	1	6211	3	U	0.513
6	94	21	CARCASS	1	6211	3	PU239	0.02
6	94	21	CARCASS	1	6211	3	PU238	0.012
6	94	19	CARCASS	1	6211	1	PU238	0.137
6	94	19	CARCASS	1	6211	1	PU239	0.034
6	94	19	CARCASS	1	6211	1	U	0.384
6	94	19	CARCASS	1	6211	1	AM241	0.01
6	94	21	CARCASS	1	6211	3	K40	47.19
6	94	21	CARCASS	1	6211	3	EU152	2.66
6	94	19	CARCASS	1	6211	1	SR90	1.7
6	94	19	CARCASS	1	6211	3	TL208	0.26
6	94	20	CARCASS	1	6211	2	TL208	0.25
6	94	19	CARCASS	1	6211	1	TL208	0.22
6	94	19	CARCASS	1	6211	1	K40	50.15
6	94	20	CARCASS	1	6211	2	AM241	0.009
6	94	20	CARCASS	1	6211	2	U	0.565
6	94	19	CARCASS	1	6211	1	BI214	0.41
6	94	19	CARCASS	1	6211	1	CS137	0.04
6	94	19	CARCASS	1	6211	1	EU152	2.24
6	94	19	CARCASS	1	6211	1	CO60	0.94
6	94	20	CARCASS	1	6211	2	CO60	1.01
6	94	20	CARCASS	1	6211	2	BI214	0.72
6	94	20	CARCASS	1	6211	2	K40	49.47
6	94	20	CARCASS	1	6211	2	EU152	2.36
6	94	20	CARCASS	1	6211	2	PU239	0.023
6	94	20	CARCASS	1	6211	2	PU238	0.173
6	94	20	CARCASS	1	6211	2	CS137	0.04
6	94	20	CARCASS	1	6211	2	SR90	3.4
6	94	23	CARCASS	2	6222	2	U	0.397
6	94	22	CARCASS	2	6222	1	TL208	0.2
6	94	23	CARCASS	2	6222	2	PU238	0.001
6	94	23	CARCASS	2	6222	2	AM241	0.034
6	94	22	CARCASS	2	6222	1	CO60	0.94
6	94	22	CARCASS	2	6222	1	BI214	0.49
6	94	22	CARCASS	2	6222	1	K40	43.87
6	94	22	CARCASS	2	6222	1	EU152	2.89
6	94	24	CARCASS	2	6222	3	EU152	2.39
6	94	24	CARCASS	2	6222	3	CO60	0.96
6	94	24	CARCASS	2	6222	3	TL208	0.21
6	94	24	CARCASS	2	6222	3	K40	45.39
6	94	23	CARCASS	2	6222	2	SR90	0.6
6	94	23	CARCASS	2	6222	2	PU239	0.072
6	94	24	CARCASS	2	6222	3	BI214	0.5

(Contam_id is the key field to the smmam.dat table.)

Map 7: Mammal Observations

Locations Shown with Site_id Number

(See next page for observation attribute information)



Legend

- Mammal Observations
- LANL
- Paved Roads
- Drainages

1:73589

3 0 3 6 9 12 Kilometers

2 0 2 4 6 8 Miles

LOS ALAMOS NATIONAL LABORATORY

BIOLOGY TEAM, ESH-20 ECOLOGY GROUP

PREPARED: SEPTEMBER, 1996

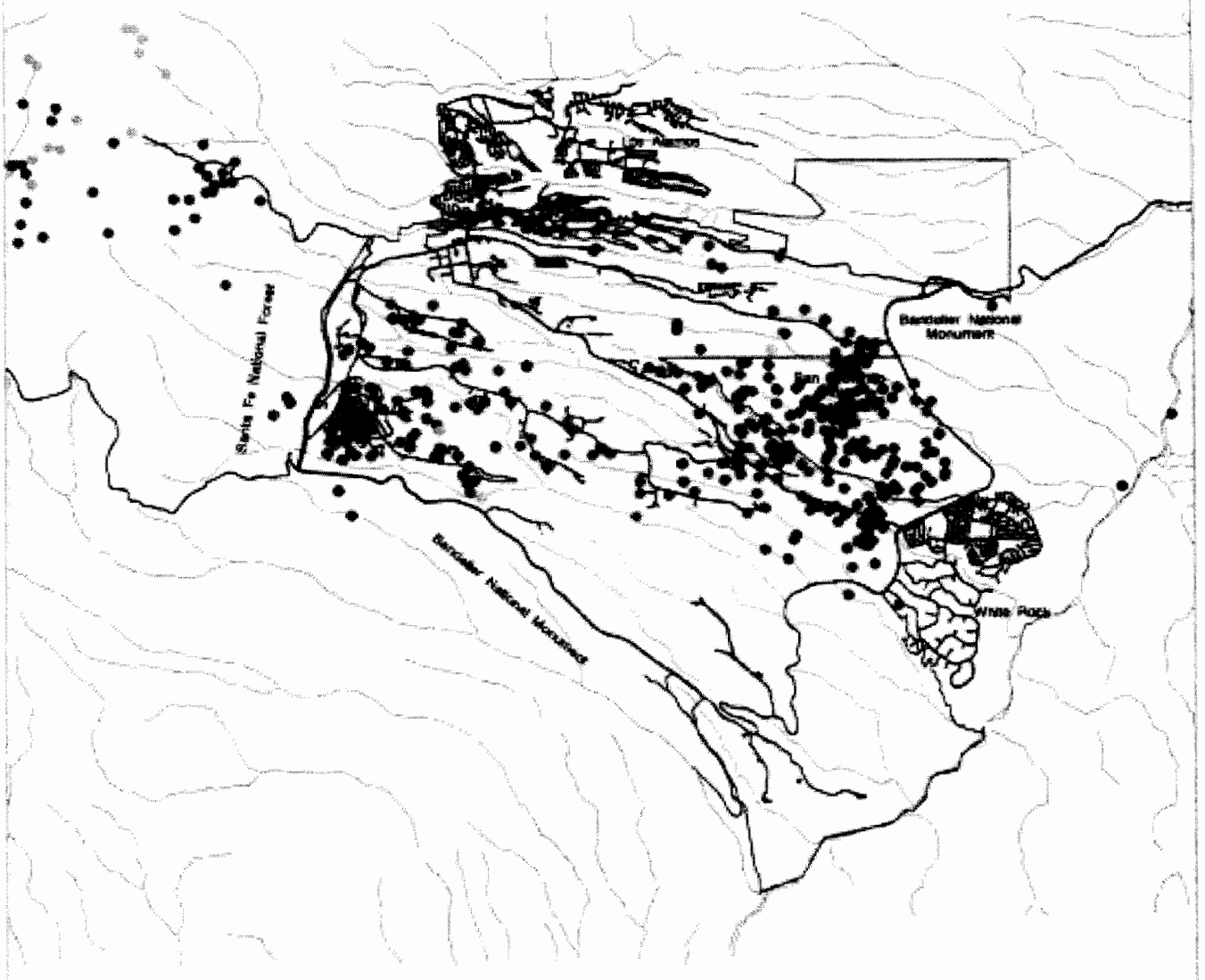
Table 23. Mammal Observations
(Selected records from mammalobs.dat table.)

Site_id	Code	Month	Day	Year	Land	Ta	Numobs	Status	Vegtype
1	ODHE	8	5	1991	L	0	1	1	405
1	ODHE	8	5	1991	L	0	1	1	405
1	OHDE	10	7	1991	L	0	3	2	405
1	ODHE	10	10	1991	L	0	4	1	405
1	ODHE	10	10	1991	L	0	1	1	405
1	ODHE	11	4	1991	L	0	4	1	405
1	ODHE	11	4	1991	L	0	10	1	405
1	PRLO	11	4	1991	L	0	1	1	140
3	ODHE	8	7	1991	L	0	3	2	405
3	CEEL	10	8	1991	L	0	13	1	405
3	CEEL	10	9	1991	L	0	26	1	405
3	CALA	10	10	1991	L	0	4	1	405
3	CEEL	7	8	1991	L	0	2	2	405
3	CEEL	7	8	1991	L	0	20	2	405
3	ODHE	7	23	1991	L	0	3	1	405
3	ODHE	7	30	1991	L	0	2	1	405
3	CALA	8	5	1991	L	0	5	2	405
3	ODHE	4	13	1993	L	0	3	1	420
3	CEEL	4	13	1993	L	0	20	1	420
3	CEEL	4	14	1993	L	0	2	1	420
3	ODHE	4	14	1993	L	0	10	1	420
3	CEEL	4	19	1993	L	0	44	1	420
3	ODHE	4	20	1993	L	0	6	1	420
3	CEEL	4	7	1993	L	0	14	1	420
3	ODHE	4	12	1993	L	0	1	1	420
3	ODHE	4	13	1993	L	0	3	1	420
3	CEEL	1	30	1992	L	0	2	1	405
3	CEEL	3	17	1992	L	0	6	1	405
3	CEEL	3	17	1992	L	0	5	1	405
6	ODEH	10	9	1991	L	0	5	2	405
6	ODHE	7	25	1991	L	0	3	1	405
6	CEEL	7	30	1991	L	0	20	2	405
6	CEEL	9	13	1991	L	0	2	1	420
6	ODHE	4	14	1993	L	0	1	1	420
6	CEEL	4	21	1993	L	0	14	1	420
6	ODHE	3	31	1993	L	0	2	1	420
6	CEEL	4	6	1993	L	0	57	1	420
6	CEEL	4	7	1993	L	0	6	1	420
6	CEEL	4	12	1993	L	0	33	1	420
6	CEEL	2	4	1992	L	0	3	1	405
6	CEEL	3	24	1992	L	0	14	1	405
6	CEEL	3	26	1992	L	0	14	1	405
11	ODHE	10	15	1991	L	0	3	1	225
11	ZZSQ	9	26	1991	L	0	1	1	420
11	ODHE	9	27	1991	L	0	3	1	250
11	ODHE	10	15	1991	L	0	3	1	225
11	CEEL	10	15	1991	L	0	24	1	225
11	CEEL	10	23	1991	L	0	1	1	225

Previous page shows observation by Site_id number.

Map 8: GPS Locations from 6 Radio-Collared Elk

(See next page for attribute information)



Legend

GPS Locations by Collar_Id Number

16033 - 16038

LANL

Paved Roads

Drainages

1:93196

3 0 3 6 9 12 15 Kilometers

2 0 2 4 6 8 10 Miles

LOS ALAMOS NATIONAL LABORATORY

BIOLOGY TEAM, ESH-20 ECOLOGY GROUP

PREPARED: SEPTEMBER, 1996

N W E S

Table 24. Large Mammal Data
(Selected records from lgmam.dat)

Trap_date	Mortality_cod	Mortality_date	Site_id	Contam_id	Capture_id	Mammal_id	Museum_id	Location
35136	0		265	0	1	1	0	PAJARITO ROAD
35139	0		272	0	2	2	0	CANADA DEL BUEY
35143	0		263	0	3	3	0	PAJARITO ROAD
35150	0		264	0	4	4	0	PAJARITO ROAD
35158	0		266	0	5	5	0	TA-16
35178	2	9/14/96	268	0	6	6	0	TA-16
35178	0		267	0	7	5	0	TA-16

Map 7 shows large mammal trap locations by site_id number.

Table 24. Large Mammal Data
(Selected records from lgmam.dat)

Sublocation	Trap_number	Subtrap	Method	Sp_code	Capture_status	Sex	Rep_status	Fetus_number	Fetus_removed
NEAR LIFT STATION	1		CLOVER	CEEL	N	F	PREGNANT	0	
ACROSS FROM SMALL MET TO	2		CLOVER	CEEL	N	F		0	
NEAR LIFT HOUSE BY CAMER	3		CLOVER	CEEL	N	F	PREGNANT	0	
NEAR LIFT HOUSE ON HILL	4		CLOVER	CEEL	N	F		0	
NEAR THE STEAM PLANT MAR	5		CLOVER	CEEL	N	F		0	
NEAR MARSH AT STEAM PLAN	6		CLOVER	CEEL	N	M		0	
NEAR MARSH AT STEAM PLAN	7		CLOVER	CEEL	R	F		0	

Map 7 shows large mammal trap locations by site_id number.

Table 24. Large Mammal Data
(Selected records from lgmam.dat)

Body_weight	Body_length	Tail_length	Ear_length	Foot_length	Age	Tag_number	Comments
650	58	0	0	0	5	16037	SUNNY AND CLEAR DAY
545	48	0	0	0	2	16036	OVERCAST MORNING; HAD IVORIES
617	62	0	0	0	5	16034	SUNNY AND CLEAR (30 DEG) MORNING
525	56	0	0	0	0	16035	SUNNYAND CLEAR (40 DEG)
545	52	0	0	0	2	16033	SUNNY, BREEZY AND 40 DEGREES
659	0	0	0	0	2	16038	SUNNY AND COLD: YOUNG WITH SPIKE
0	0	0	0	0	0	16033	RECAPTURED ELK NO NEW MEASUREMENTS WERE TAKEN

Map 7 shows large mammal trap locations by site_id number.

Table 25. Attribute Information for GPS Locations of Elk

Area	Perimeter	Elkgps#	Elkgps-id	Sequence	Capture_id	Collar_id	Julian_day	Gmt
0	0	1	1	5	1	16037	69	17:02
0	0	2	2	4	2	16037	68	18:00
0	0	3	3	3	3	16037	67	19.02
0	0	4	4	2	4	16037	66	20.00
0	0	5	5	1	5	16037	64	22.32
0	0	6	6	3	6	16036	68	18.00
0	0	7	7	2	7	16036	67	19.00
0	0	8	8	1	8	16036	66	20.00
0	0	9	9	5	9	16034	84	19.00
0	0	10	10	4	10	16034	83	20.00
0	0	11	11	3	11	16034	82	21.00
0	0	12	12	2	12	16034	81	22.03
0	0	13	13	8	13	16036	85	1.01
0	0	14	14	7	14	16036	84	2.00
0	0	15	15	6	15	16036	83	3.00
0	0	16	16	5	16	16036	82	4.02
0	0	17	17	4	17	16036	81	05:00
0	0	18	18	8	18	16037	85	1:00
0	0	19	19	7	19	16037	83	3:00
0	0	20	20	6	20	16037	79	7:01
0	0	21	21	1	21	16034	80	23:00
0	0	22	22	9	22	16036	86	00:00
0	0	26	26	9	26	16037	86	00:01
0	0	30	30	9	30	16034	92	11:02
0	0	31	31	8	31	16034	91	12:00
0	0	32	32	7	32	16034	90	13:00
0	0	33	33	6	33	16034	89	14:02
0	0	34	34	7	34	16035	92	20:00
0	0	35	35	6	35	16035	91	21:00
0	0	36	36	5	36	16035	90	22:00
0	0	37	37	4	37	16035	89	23:00
0	0	38	38	3	38	16035	89	00:00
0	0	39	39	2	39	16035	88	01:00
0	0	40	40	1	40	16035	87	02:02
0	0	49	49	2	49	16033	94	23:02
0	0	50	50	1	50	16033	94	00:33
0	0	56	56	9	56	16035	94	18:00
0	0	57	57	8	57	16035	93	19:01
0	0	68	68	2	68	16038	95	18:40
0	0	69	69	1	69	16038	94	19:15
0	0	70	70	6	70	16033	107	10:01
0	0	71	71	5	71	16033	105	12:02
0	0	72	72	4	72	16033	103	14:02
0	0	73	73	3	73	16033	102	15:02
0	0	97	97	9	97	16033	113	04:00
0	0	98	98	8	98	16033	111	6:01
0	0	99	99	7	99	16033	110	7:01
0	0	131	131	5	131	16038	115	22:01

Previous page shows GPS locations from 6 elk.