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USGS/NOAA NORTH AMERICAN PACKRAT MIDDEN DATABASE DATA DICTIONARY

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U.S. DEPARTMENT OF THE INTERIOR
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INTRODUCTION

Packrats, also known as wood rats or trade rats, are herbivorous Sigmodontine rodents belonging to the genus *Neotoma* (Vaughan, 1990). Twenty-one North American species of packrat are widely distributed from the Northwest Territories of Canada (65˚23' N) to tropical Nicaragua (13˚ N) (Vaughan, 1990). Arid and semi-arid lands of the southwestern United States presently support six different packrat species, which have probably persisted in the region, at least intermittently throughout the past 40,000 years (Vaughan, 1990).

Vaughan (1990) summarizes the ecology of modern packrats in North America and the southwestern U.S. All modern packrats demonstrate a habit, unique among rodents, of collecting various items from their surrounding environment. These animals gather a variety of materials including plant debris, rocks, bones, insect parts, and human artifacts, generally from within a limited foraging range (30-50 m) of their dens. Not every packrat species has the same dietary preferences or collecting habits, and some species sample their environments better than others by collecting a greater variety of plant materials from the surrounding landscape. Materials collected by the packrat are brought back to the den, which may occupy a cave or rock shelter, or consist of a house situated in an open area, built of woody plant materials such as branches or cactus joints. The packrat deposits the collected items, along with fecal material, urine, and food wastes to form a refuse heap called a midden. The animal compacts the midden debris and its viscous urine functions to cement the midden material together to form a gray to dark brown solid mass (Spaulding *et al*., 1990).

Middens deposited in dry caves and rock shelters can remain intact for tens-of-thousands of years (Finley, 1990). Mummified remains of ancient plants and animals encased in packrat middens are often perfectly preserved and can usually be identified to species. These fossil plant and animal remains provide excellent materials for radiocarbon dating, and assemblages of remains supply detailed inventories of the plants and animals that lived at the collection site for discrete points in the past. Fossil middens often contain remains of plants that do not presently live in the vicinity of the site, indicating that the surrounding flora has changed since the time of deposition. Studying midden assemblages of various ages therefore, can provide detailed records of vegetation change through time.

In the arid regions of the southwestern United States plant macrofossil assemblages recovered from packrat middens are among the best sources of information on late Pleistocene and Holocene vegetation changes. Urine cemented middens of ancient packrats are frequently found in dry caves, rock shelters and rock crevices throughout the region. Over the past forty years, scientific study of ancient packrat middens has revealed a wealth of information on the history of late Quaternary vegetation change in the southwestern U.S. Unfortunately, scientists studying packrat middens use many different methods of collecting and analyzing midden data, which makes it difficult to compare data and conduct analyses utilizing data, produced by midden investigators using different scientific methods.

The North American Packrat Midden Database is a joint project developed by the U.S. Geological Survey and the National Oceanic and Atmospheric Administration, with the purpose to provide researchers with access to standardized midden data that can be useful for investigating late Quaternary changes in plant species distributions in response to climate and environmental change. The database currently contains original data from more than 900 packrat midden samples collected from over 270 local areas (caves or rock shelters) ranging from Montana to Northern Mexico (Figure 1). Midden data including locality information, midden sample ages and plant taxa lists, were collected from 66 published and unpublished sources. Data were entered into a Microsoft Access database with the intent to preserve the data in the original format used by each investigator. In order to facilitate the comparison and use of data from different sources, the database translates original species relative abundance data into a uniform format. This document describes the structure of the North American Packrat Midden Database, the methods used to compile the data, and provides a data dictionary.

STRUCTURE

The North American Packrat Midden Database consists of nine tables where identical fields are linked with simple joins (Table 1 and Figure 2). Joined fields contain unique values, which allow the data tables to be linked. Each publication, midden sample and plant taxon is distinguished by a unique code. Publications are represented by reference numbers (refnum), midden samples by sample codes (samcode), and plant taxa by variable numbers (varnum). Seven of the nine tables contain data and two of the nine tables are look up tables (Table 1).

A data dictionary, which describes the content of the individual fields comprising each data table is provided in the following pages. Sample tables 2 through 8, in the final section of this report, display the layout of each data table and provide samples of the type of data entered in each table.

Figure 1. Packrat midden localities in western North America.

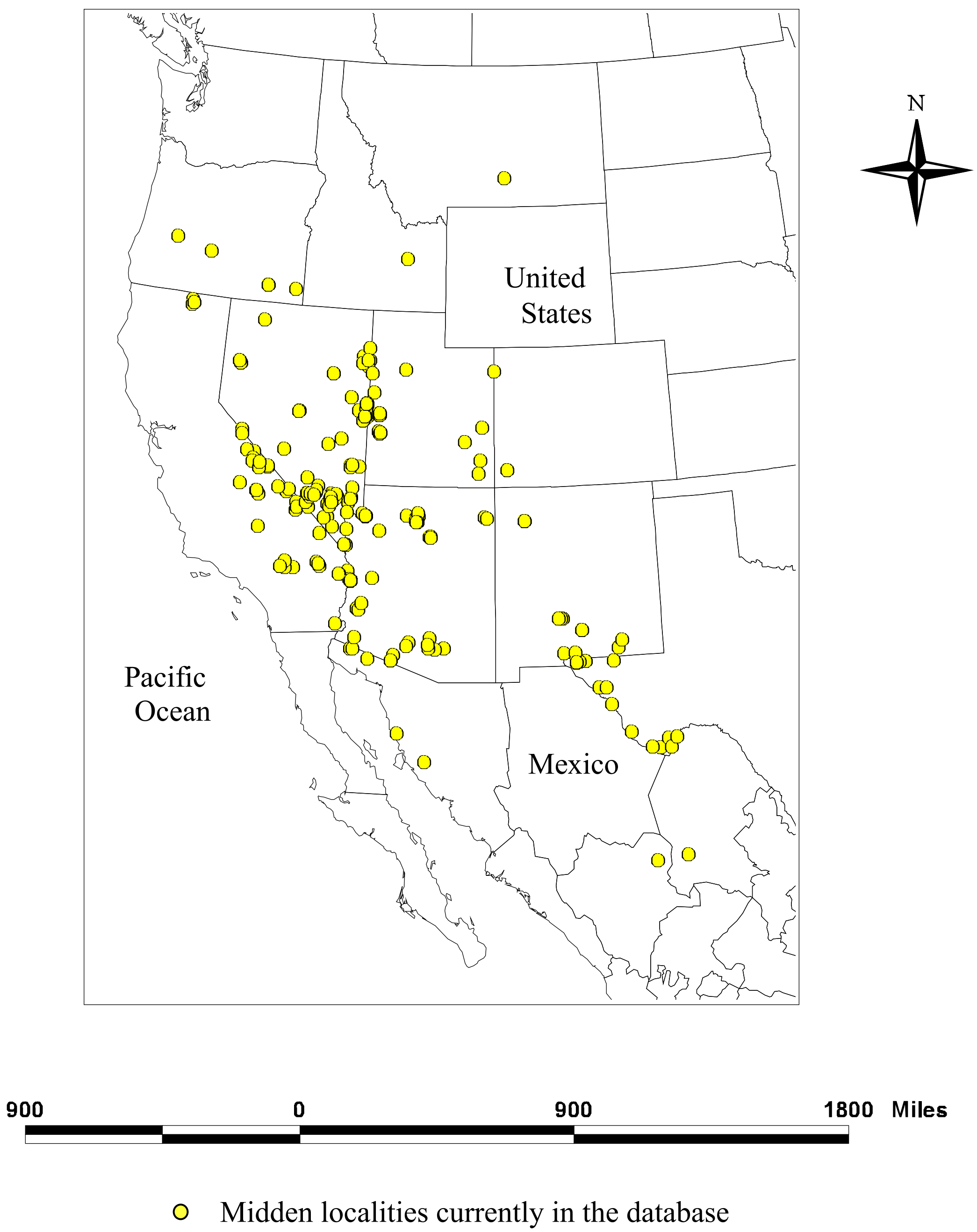

Table 1. Data table and look up table descriptions.

Data Tables	Content
1. REFERENCE	List of source publications.
2. MIDDEN SAMPLE SITES	Locality information.
3. AGE ^{14}C	Age data.
4. MIDDEN TAXA	A comprehensive list of plant taxa recovered from packrat middens.
5. TAXA PER SITE	Lists plant taxa collected, relative abundance and organ type (needle, seed, leaf etc.)
6. CODE TRANSLATION	Describes original counting schemes and translates each scheme into 0-1-2 relative abundance scale.
7. M COUNT TRANSLATION	Translates orginal macrofossil counts from each midden sample into the 0-1-2 relative abundance scale.
Look up Tables	
1. USE STATUS	Describes the usefulness of the data.
2. 0-1-2 CODE	Defines the 0-1-2 relative abundance scale.

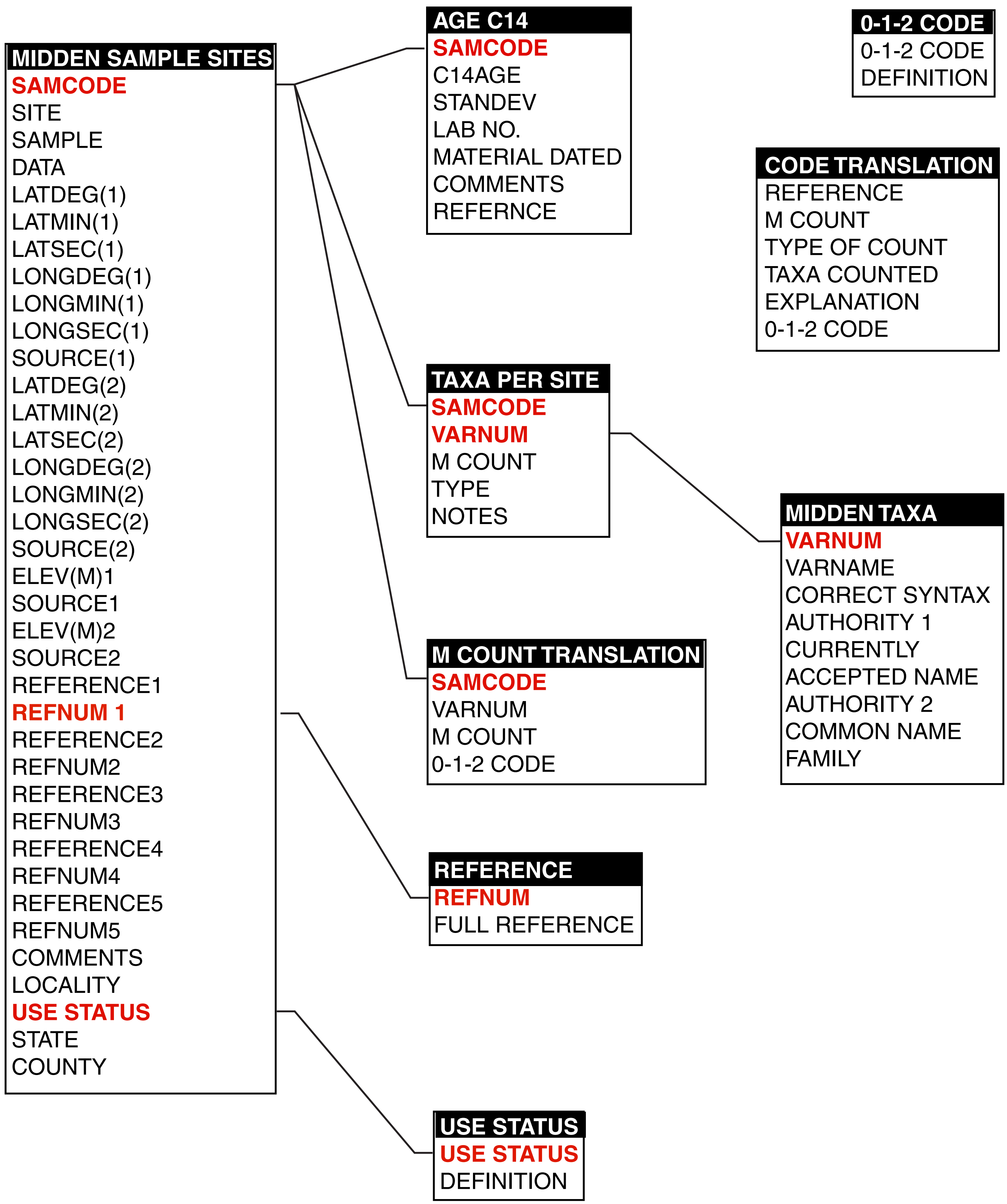

Figure 2. North American Packrat Midden Database table relationships.

DATA DICTIONARY: TABLE AND FIELD DESCRIPTIONS

Reference Table

Midden data from 66 published and unpublished sources has been entered in the database. Full references for all data sources can be found in the reference table. The reference table consists of the following fields.

Fields		Description
1.	REFNUM:	Reference Number. A unique number assigned to each reference.
2.	FULL REFERENCE:	Includes the author or authors, date of publication, title, journal or publication series.

Table 2 lists some sample references, as they would appear in the reference table.

Midden Sample Sites Table

The Midden Sample Sites Table provides locality information for each midden sample and contains the following 33 fields.

Fields		Description
1.	SAMCODE:	Sample Code. A unique code assigned to each midden sample.
2.	SITE:	Site name.
3.	SAMPLE:	Original sample identification code.
4.	DATA:	An X in this field means a list of plant macrofossil taxa collected from the midden is available.
5.	LAT DEG(1):	Degrees of latitude.
6.	LAT MIN(1):	Minutes of latitude.
7.	LAT SEC(1):	Seconds of latitude.
8.	LONG DEG(1):	Degrees of longitude.
9.	LONG MIN(1):	Minutes of longitude.
10.	LONG SEC(1):	Seconds of longitude.
11.	SOURCE(1):	Source of latitude/longitude data
12.	LAT DEG(2):	Degrees of latitude.

13.	LAT MIN(2):	Minutes of latitude.
14.	LAT SEC(2):	Seconds of latitude.
15.	LONG DEG(2):	Degrees of longitude.
16.	LONG MIN(2):	Minutes of longitude.
17.	LONG SEC(2):	Seconds of longitude.
18.	SOURCE(2):	Source of latitude/longitude data.
19.	ELEV(M)1:	Elevation in meters.
20.	SOURCE1:	Source of elevation data.
21.	ELEV(M)2:	Elevation in meters.
22.	SOURCE2:	Source of elevation data.
23.	REFERENCE1:	Author and date of publication where the data was most recently published.
24.	REFNUM:	Reference number of first reference.
25.	REFERENCE2:	Previous publication of data.
26.	REFNUM2:	Reference number of second reference.
27.	REFERENCE3:	Previous publication of data.
28.	REFNUM3:	Reference number of third reference.
29.	COMMENTS:	Miscellaneous comments. For information only.
30.	LOCALITY:	Geographic region. For information only.
31.	USE STATUS:	Describes the completeness of the data available.

1	OK to Use; Site/Dating/Complete taxa list exist
2	OK to Use; Site/Dating but no taxa list
3	Unpublished taxa list, not entered
4	Site info only
5	Processing
6	Data needs to be put into electronic format
7	Counting in progress by author
8	Still working on questions
* -9	Only partial taxa list published

* Some taxa lists include all plant taxa found in a midden sample, for some midden samples only partial taxa lists are available. Partial taxa lists are included in the database and designated with a -9 in the use status category.

32.	STATE:	2-letter state code. For information only.
33.	COUNTY:	County name. For information only.

When available, midden sample locality information including elevation, latitude and longitude, state, county and geographic region (mountain range, drainage etc.) were recorded directly from written reports. In some instances locality information was interpreted from accompanying maps or topographic maps. Sometimes information about a specific midden sample may be available in multiple written reports. Reference1 usually lists the most recently published information on a particular midden sample. Additional sources of information are listed as additional references. Pieces of information such as latitude, longitude and elevation may also be found in multiple publications and this information is not always consistent. If this information is found in more than one source and the most accurate data cannot be determined all available information and sources will be included in the Midden Sample Sites Table. Table 3 shows how sample data are arranged in the Midden Sample Sites Table.

Age ^{14}C Table

This table provides information about carbon-14 dates on individual midden samples. It is linked to the Midden Sample Sites table by the sample code. Age data were taken directly from written reports and include carbon-14 dates with standard deviations, laboratory numbers, the material dated and the source reference. Sample age data are shown in Table 4.

Fields		Description
1.	SAMCODE:	Sample Code. A unique code assigned to each midden sample.
2.	^{14}C AGE:	Age in years before present.
3.	STANDEV:	Standard Deviation. Range of possible error.
4.	LAB NO.:	A number assigned by the laboratory.

5.	MATERIAL DATED:	May consist of various plant materials, dung or matrix.
6.	COMMENTS:	Miscellaneous Comments. For information only.
7.	REFERENCE:	Source of data.

Midden Taxa Table

The Midden Taxa Table is a comprehensive list of all plant taxa that have been recovered from all midden samples included in this database and consists of the following eight fields. Table 5 shows sample data from the Midden Taxa Table.

Fields		Description
1.	VARNUM:	Variable number - a unique number assigned to each taxon.
2.	VARNAME:	Variable name – the original botanical name used by the macrofossil analyst.
3.	ORIGINAL SYNTAX:	The original syntax used by the macrofossil analyst, if it is different from the syntax accepted in the database.
4.	AUTHORITY 1:	The name (or names) which identify the person (or persons) who described the plant species. Should the original species name be revised, the name of the original authority is shown in parentheses followed by the name of the authority who created the existing combination of genus and species names. The names of these authors are often abbreviated.
5.	CURRENTLY ACCEPTED NOMENCLATURE:	The currently accepted latin or botanical name.
6.	AUTHORITY 2:	Author of currently accepted varname.
7.	COMMON NAME:	Common name (or names).
8.	FAMILY:	Family of the taxon.

Each unique taxon has been assigned a unique variable number (varnum). Original botanical names used by macrofossil analysts have been entered into the varname field. If the syntax used by the analyst does not conform to the syntactic rules of the database, the original syntax may be modified to conform to the database only, if the modification does not change the meaning of the level of identification. If it is necessary to change the syntax of a botanical name, the original syntax will be shown in the original syntax field. If the botanical nomenclature used by the analyst is no longer current due to taxonomic changes, the original botanical name used by the analyst will be preserved in the varname field, and the new botanical name will be specified in the currently accepted nomenclature field. Authorities of old and new botanical names, common names and family names are also included in the Midden Taxa Table. An explanation of the taxonomic rules used in the design of the Midden Taxa Table follows.

Taxonomic Rules: Synonomy

Two kinds of synonomy are used in the Midden Taxa Table, nomenclatural and syntactic. Lists of botanical names submitted to the database should conform to the nomenclatural and syntactic conventions used in the database. If contributors' names do not conform to the conventions of the database, names will be modified according to the following taxonomic rules.

Nomenclatural synonomy refers to botanical nomenclature. Botanical Nomenclature follows Kartesz, (1999). The database equates old and new botanical names. When performing a search of a particular taxon all synonyms will be considered.

Examples of Nomenclatural Synonomy:

Family level synonomy:

1. Asteraceae = Compositae
2. Poaceae = Gramineae

Genus level synonomy:

1. *Berberis trifoliolata* = *Mahonia trifoliolata*
2. *Forsellesia* sp. = *Glossopetalon* sp.

Species level synonomy:

1. *Larrea tridentata* = *Larrea divaricata*
2. *Gutierrezia bracteata* = *Gutierrezia californica*

Syntactic Synonomy refers to syntax that applies to the non-Latin parts of botanical names. In the determination of plant macrofossils, syntax helps to define the degree of certainty of the identification. Examples of syntax commonly used in the identification of plant macrofossils from packrat middens are listed below. The syntactic rules used in this database generally follow the rules defined by Birks and Birks, (1980); The North American Pollen Database Manual, (1997); and Watts and Winter, (1966). When submitting taxa lists please follow the recommended syntactic rules outlined as follows.

Family level use of syntax:

1. If a specimen (or specimens) can only be identified to family level the following syntax is often used.

   * Family => Asteraceae

   Family sp. => Asteraceae sp.

   * Use of the family name alone (Family => Asteraceae) is preferred. Data that do not conform to this syntax will be modified. Family sp. => Asteraceae sp. will be changed to Family => Asteraceae.

2. When multiple specimens can be identified to family level and more than one morphological type can be distinguished the abbreviation undiff. (undifferentiated) may be used. Family undiff. is acceptable syntax.

   Family undiff. (undifferentiated) => Asteraceae undiff.

3. When a specimen/s belongs to one of two similar families and assignment to a single family cannot be made, the following syntax is often used.

   * Family/Family => Chenopodiaceae/Amaranthaceae

   Family or Family => Chenopodiaceae or Amaranthaceae

   Family **–** Family => Chenopodiaceae **–** Amaranthaceae

   * If a distinction between two similar families cannot be made on the basis of morphology alone, a slash should be used between multiple family names rather than "or" and "**–**". Data that do not conform to this syntax will be modified.

Genus and species level use of syntax:

1. When the genus and species are certain, the taxon should be written as:

   Genus species => *Quercus alba*

2. When the genus is certain and the species cannot be determined, the taxon should be written as:

   Genus sp. => *Quercus* sp.

3. When multiple specimens belong to the same genus but multiple species may be present the following syntax is commonly used.

   Genus spp. (multiple species) => *Quercus* spp.

   * *Genus* undiff. (undifferentiated) => *Quercus* undiff.

   * The database uses *Genus* undiff. rather than *Genus* spp. Data that does not conform to this syntax will be modified.

3. When a specimen (or specimens) belongs to one of two similar genera the following syntax is commonly used.

   * *Genus*/*Genus* => *Ostrya*/*Carpinus*

   Genus or *Genus* => *Ostrya* or *Carpinus*

   Genus – Genus => *Ostrya – Carpinus*

   * If a distinction between two similar genera cannot be made on the basis of morphology alone, a slash should be used between multiple genus names, rather than "or" and "–". Data that do not conform to this syntax will be modified. The database also accepts:

   Genus species/*Genus species* => *Rhus aromatica*/*Rhus virens*

Placement of cf.:

If the family, genus or species is uncertain but the specimen resembles a specific family, genus or species, cf. (compares to) can be used to show that the specimen has the form of a particular family, genus or species. Use of cf. implies uncertainty because of poor preservation, inadequate reference material or ill-defined morphology.

1. If the species is uncertain cf. should be placed before the species name.

   Genus cf. *species* => *Quercus* cf. *alba*

It is considered proper syntax to abbreviate the genus name when using cf. However, most macrofossil analysts do not abbreviate the genus when using cf. therefore, the genus abbreviation will not be used in this database.

Genus cf. *G. species* => *Quercus* cf. *Q. alba* => *Quercus* cf. *alba*

2. If the genus or family is uncertain cf. should be placed in front of the genus or family name as follows:

   cf. *genus* => cf. *Quercus*

   cf. Family => cf. Asteraceae

   Family cf. *genus* => Asteraceae cf. *Brickellia*

   Do not use parentheses around cf. behind the genus or family name such as:

   Genus (cf.) => *Quercus* (cf.)

   Family (cf.) => Asteraceae (cf.)

Use of type:

Type is used when one fossil type is present and three or more taxa are possible alternatives. Type should always be placed after the family, genus or species and preceded by a hyphen (North American Pollen Database Manual, 1997). Data that do not conform to this syntax will be modified. The following examples are all accepted in the database.

1. Family – type => Asteraceae – type
2. *Genus* – type => *Quercus* – type

   Rather than: *Genus* type => *Quercus* type

   Genus (type) => *Quercus* (type)

   Genus s.l. (sensu lato – in the broad sense) => *Quercus* s.l.

3. *Genus species* – type => *Quercus alba* – type
4. *Genus*/*Genus* – type => Avena/Festuca – type

   Rather than: *Genus* – type/*Genus* – type => *Avena* – type/*Festuca* – type

Other acceptable syntax:

subf. = subfamily

ssp. = subspecies

var. = variety

These abbreviations should be placed in front of the appropriate subfamily, subspecies or variety name.

indet. = indeterminable

The use of indet. implies that the specimen (or speciemens) is too poorly preserved to be indentified to a lower taxonomic level. The level of taxonomic uncertainty should be specified as follows:

Family, genus indet. => Asteraceae, genus indet.

Genus, species indet. => Quercus, species indet.

<u>Taxa Per Site Table</u>

The Taxa Per Site Table lists the plant taxa by variable number, collected from each midden sample and consists of the following five fields.

Fields		Description
1.	SAMCODE:	Sample Code. A unique code assigned to each midden sample.
2.	VARNUM:	A unique number corresponding to a specific taxon.
3.	M COUNT:	Macrofossil Count. Original symbols or numbers used to represent relative abundance.
4.	TYPE:	Plant organs identified (needle, seed, leaf etc.)
5.	NOTES:	Miscellaneous notes. For Information Only.

Lists of plant taxa collected from midden samples were input directly from source references. If a list of plant taxa collected from a specific midden sample was published in more than one source, the most recently published taxa list was entered into the database and assumed to be the most accurate list. The relative abundance of each taxon has been entered into the M Count field and the type of plant organ or organs identified was included in the Type field when available. Table 6 displays how taxa lists appear in the Taxa Per Site Table.

Code Translation Table

Packrat midden analysts use a variety of counting schemes to represent the relative abundance of plant macrofossil taxa collected from midden samples. The Code Translation Table describes the type of counting scheme used by each macrofossil analyst. Some common schemes use numeric codes or symbols to represent relative abundance. Examples of common counting schemes are shown in table 7.

Fields		Description
1.	REFERENCE:	Author or authors, date of publication, title, journal or publication series.
2.	M COUNT:	Macrofossil Count. Original symbols or numbers used to represent relative abundance.
3.	TYPE OF COUNT:	General type of counting scheme used.
4.	TAXA COUNTED:	Specifies whether all plant remains were counted or only specific taxa.
5.	EXPLANATION:	Defines the symbols used to represent relative abundance.
6.	0-1-2 CODE:	The M count translated into a 0-1-2 relative abundance scale.

0	=	Absent
1	=	Rare
2	=	Present
7	=	Can't translate
9	=	Possible contaminant
99	=	Need to make a decision

In order to facilitate the use and comparison of relative abundance data from midden samples analyzed using different counting methods, each counting scheme was translated into a uniform 0-1-2 relative abundance scale resulting in a standardized dataset.

Rules for Translating the M Count into the 0-1-2 Relative Abundance Scale

1. For counting schemes that use symbols such as *, X, and +, one symbol is represented in the 0-1-2 code by the number 1 (rare), and two or more symbols translate to the number 2 (present).
2. For numeric relative abundance scales, the number 1 is represented in the 0-1-2 code by the number 1 (rare) and the number 2 or greater translates to the number 2 (present).
3. For percent abundance scales and raw counts, less than or equal to five % or five specimens translates as number 1 (rare). Greater than 5% or more than 5 specimens translates as number 2 (present).
4. For macrofossil weight in grams, < or = to .003 translates to the number 1 (rare) and > .003 translates to the number 2 (present).
5. For macrofossil weights measured on a Log base 10/kg scale, < or = to 1.60 translates to the number 1 (rare) and > 1.60 translates to the number 2 (present). The value 1.60 = 5 macrofossils/kg.

<u>M Count Translation Table</u>

This table lists the taxa recovered from each site, the M Count, and the equivalent 0-1-2 Code. Taxa in the M Count Translation Table are listed by variable number. Table 8 shows sample data from the M Count Translation Table.

Fields	Description
1. SAMCODE:	Sample Code. A unique code assigned to each sample.
2. VARNUM:	Variable Number. A unique number assigned to each taxon.
3. M COUNT:	Macrofossil Count. Original symbols or numbers used to represent relative abundance.
4. 0-1-2 CODE:	The original macrofossil counts translated into the 0-1-2 relative abundance scale.

ACCESSING THE DATABASE

The North American Packrat Midden Database can be accessed via the Internet at http://climchange.cr.usgs.gov/data/midden/. The data can be queried by publication (author and date of publication), taxon, geographic area (state/country), locality name, latitude/longitude, and ^{14}C age. Data file output options are web pages, tab-delimited ASCII files, and comma-delimited ASCII files.

SUBMITTING DATA

When submitting data, please provide data in a Microsoft Excel Spreadsheet. Please follow the structure and format of the data tables outlined in this report. Submit data to:

Laura Strickland
U.S. Geological Survey
Earth Surface Processes Team
Box 25046, MS 980
Denver Federal Center
Denver, CO 80225
lstrickland@usgs.gov

SAMPLE TABLES 2 – 8.

Table 2. Reference table; sample data.

REFNUM	FULL REFERENCE
1m	Betancourt, J. L., and Davis, O. K. (1984). Packrat middens from Canyon de Chelly, Northeastern Arizona: Paleoecological and Archaeological Implications. Quaternary Research 21, 56-64.
2m	Betancourt, J. L., and Van Devender, T. R. (1981). Holocene vegetation in Chaco Canyon, New Mexico. Science 214, 656-658.
3m	Betancourt, J. L. (1984). Late Quaternary plant zonation and climate in southeastern Utah. Great Basin Naturalist 44, 1-35.
4m	Bright, R. C., and Davis, O. K. (1982). Quaternary paleoecology of the Idaho National Engineering Laboratory, Snake River Plain, Idaho. American Midland Naturalist 108,21-33.
5m	Cole, K. L., and Webb, R. H. (1985). Late Holocene vegetation changes in Greenwater Valley, Mojave Desert, California. Quaternary Research 23, 227-235.
6m	Cole, K. L. (1981). Late Quaternary Environment in the Eastern Grand Canyon: Vegetational Gradients Over the Last 25,000 Years. Unpublished Ph.D. thesis, University of Arizona.
7m	Cole, K. L. (1983). Late Pleistocene vegetation of Kings Canyon, Sierra Nevada, California. Quaternary Research 19, 117-129.
8m	Cole, K. L. (1986). The Lower Colorado Valley: a Pleistocene Desert. Quaternary Research 25, 392-400.
9m	King, T. K., Jr.. (1976). Late Pleistocene - Early Holocene history of coniferous woodlands in the Lucerne Valley Region, Mohave Desert, California. Great Basin Naturalist 36, 227-238.
10m	Lanner, R. M., and Van Devender, T. R. (1974). Morphology of pinyon pine needles from fossil packrat middens in Arizona. Forest Science 20, 207-211.

Table 3. Midden sample sites table; sample data.

SAMCODE	SITE	SAMPLE	DATA	LAT DEG(1)	LAT MIN(1)	LAT SEC(1)	LONG DEG(1)	LONG MIN(1)	LONG SEC(1)	SOURCE(1)	ELEV(m)1	SOURCE1
AC2A	Arch Cave	#2A	X	39	17		114	5			1980	
AC4	Arch Cave	#4	X	39	17		114	5			1980	
AC6	Arch Cave	#6	X	39	17		114	5			1980	
AC8	Arch Cave	#8	X	39	17		114	5			1980	
AC9	Arch Cave	#9	X	39	17		114	5			1980	
AL1A	Ajo Loop	1A	X	31	58		112	47			550	
AL1D	Ajo Loop	1D	X	31	58		112	47			550	
AL1G	Ajo Loop	1G	X	31	58		112	47			550	
AL2B	Ajo Loop	2B	X	31	58		112	47			550	
AL2C	Ajo Loop	2C	X	31	58		112	47			550	
AL3A	Ajo Loop	3A	X	31	58		112	47			550	
AL4	Ajo Loop	4	X	31	58		112	47			550	
AL5B	Ajo Loop	5B	X	31	58		112	47			535	
AL6B	Ajo Loop	6B	X	31	58		112	47			550	
AL6C	Ajo Loop	6C	X	31	58		112	47			550	
BASIN1	Basin Canyon	#1	X	36	42		115	16			1635	
BASIN2A	Basin Canyon	#2A	X	36	42		115	16			1630	
BASIN2B	Basin Canyon	#2B	X	36	42		115	16			1630	
GA1	Garrison	#1	X	38	57		114	3			1640	
GA2	Garrison	#2	X	38	57		114	3			1640	
NBM1	Newberry Mountain	#1	X	35	16		114	37			850	
NBM2	Newberry Mountain	#2	X	35	16		114	37			850	

Table 3 - Continued.

SAMCODE	REFERENCE1	REFNUM1	REFERENCE2	REFNUM2	COMMENTS	LOCALITY	USE STATUS	STATE	COUNTY
AC2A	Thompson, 1984	30m			99999	Snake Range	1	NV	White Pine
AC4	Thompson, 1984	30m			99999	Snake Range	1	NV	White Pine
AC6	Thompson, 1984	30m			99999	Snake Range	1	NV	White Pine
AC8	Thompson, 1984	30m			99999	Snake Range	1	NV	White Pine
AC9	Thompson, 1984	30m			99999	Snake Range	1	NV	White Pine
AL1A	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL1D	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL1G	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL2B	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL2C	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL3A	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL4	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL5B	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL6B	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
AL6C	Van Devender, 1987	56m			99999	Puerto Blanco Mountains	1	AZ	Pima
BASIN1	Spaulding, 1981	24m			99999	Sheep Range	1	NV	Clark
BASIN2A	Spaulding, 1981	24m	Spaulding, 1980	23m	The taxa list is from Spaulding, 1981	Sheep Range	1	NV	Clark
BASIN2B	Spaulding, 1981	24m	Spaulding, 1980	23m	The taxa list is from Spaulding, 1981	Sheep Range	1	NV	Clark
GA1	Thompson, 1984	30m	Thompson And Mead, 1982	27m	The taxa list is from Thompson, 1984	Snake Valley	1	NV	White Pine
GA2	Thompson, 1984	30m	Thompson And Mead, 1982	27m	The taxa list is from Thompson, 1984	Snake Valley	1	NV	White Pine
NBM1	Leskinen, 1975	11m	Van Devender and Spaulding, 1979	36m	The taxa list is from Leskinen, 1975	Newberry Mountains	-9	NV	Clark
NBM2	Leskinen, 1975	11m			99999	Mojave Desert	-9	NV	Clark

Table 4. Age ^{14}C table; sample data. (Please note: MS Access does not allow us to italicize scientific names.)

SAMCODE	C14AGE	STANDEV	LABNO	MATERIAL DATED	COMMENTS	REFERENCE
A	9320	300	UCLA-644	matrix	99999	50m, 55m
A1	10250	200	A-1099	Juniperus sp. twigs	99999	42m, 14m
A2	18320	400	A-1101	Juniperus osteosperma and Juniperus monosperma twigs	99999	42m, 14m
A2	1840	200	A-1103	Pinus monophylla needles	1st run produced insufficient gas volume for a count. A 2nd run produced a very young age on very little gas and may be in error.	14m
A3	> 30000	9999	A-1100	Juniperus osteosperma twigs	99999	36m, 42m, 14m
A3	21000	400	USGS-196	Juniperus sp.	99999	36m

Table 5. Midden taxa table; sample data. (Please note: MS Access does not allow us to italicize scientific names.)

VARNUM	VARNAME	ORIGINAL SYNTAX	AUTHORITY 1	CURRENTLY ACCEPTED NOMENCLATURE	AUTHORITY 2	COMMON NAME	FAMILY
273	Abies lasiocarpa		(Hook.) Nutt.	same		subalpine fir	Pinaceae
354	Abutilon cf. parvulum		Gray	same		dwarf indian mallow	Malvaceae
210	Abutilon sp.		Miller	same		indian mallow	Malvaceae
205	Amaranthus/Chenopodium		L./L.	same		amaranth, pigweed/goosefoot	Amaranthaceae/Chenopodiaceae
717	Apiaceae			same		carrot family	Apiaceae
848	Atriplex spinosa		(Hook.) Collotzi	Grayia spinosa	(Hook.) Moq.	spiny hop-sage	Chenopodiaceae
810	Avena/Festuca-type	Avena sp./Fesuca sp. type	L./L.	same		oats/fescue	Poaceae
241	Artemisia tridentata-type	Artemisia tridentata (type)	Nutt.	same		common sagebrush	Asteraceae

Table 6. Taxa per site table; sample data.

SAMCODE	VARNUM	M COUNT	TYPE	NOTES
A	24	++	leaves, twis, flowers	
A	25	+	fruits	
A	33	+	leaves, achenes	
A	42	+	areoles, fruits, seeds	
A	139	+++	leafy twigs, seeds, wood	
A	140	+	fruits	
A	1254	+	leaves	
A	244	+	leaves, calyces, achenes	
A	246	++	twigs, seeds	
A	391	+	leaves, seeds	
A	409	+	leaves	
A	429	+	leaves	
A	444	+	achenes	
A	469	+	leaves	
A	511	+	involucres	
A	594	+	involucres	
A	596	+	leaves, fruits	
A	602	+	fruits	
A	606	+	leaves, twigs, flowers, seeds	
A	616	+	leaves, seeds	
A	923	+	leaves, capsules	
A	569	++	leaves, drupes	
A1	31	*	spines	
A1	38	***	twigs, seeds	
A1	90	**	leaves, thorns	
A1	1330	*	leaf fragments	
A1	341	**	twigs, seeds	
A1	458	*	achenes	
A1	1447	*	fruit, spine	
A1	576	**	leaves	

Table 7. Code translation table; sample data.

REFERENCE	MCOUNT	TYPE OF COUNT	TAXA COUNTED	EXPLANATION	0-1-2 CODE
Wells And Hunziker, 1976	P	Present/Absent	partial taxa list, Larrea sp. and Juniperus sp. only	-0- (nil) = absent; P(abundant) = present	2
Wells And Hunziker, 1976	-0-	Present/Absent	partial taxa list, Larrea sp. and Juniperus sp. only	-0- (nil) = absent; P(abundant) = present	0
Spaulding, 1977	X	1-3 scale		x = rare, xx = common, xxx = abundant	1
Spaulding, 1977	XX	1-3 scale		x = rare, xx = common, xxx = abundant	2
Spaulding, 1977	XXX	1-3 scale		x = rare, xx = common, xxx = abundant	2
Madsen, 1973	*	1-3* scale		* = rare, ** = common, *** = dominant	1
Madsen, 1973	**	1-3* scale		* = rare, ** = common, *** = dominant	2
Madsen, 1973	***	1-3* scale		* = rare, ** = common, *** = dominant	2
Wells And Woodcock, 1985	+	1-3 scale		+ = low, ++ = intermediate, +++ = high (principal constituent)	1
Wells And Woodcock, 1985	++	1-3 scale		+ = low, ++ = intermediate, +++ = high (principal constituent)	2
Wells And Woodcock, 1985	+++	1-3 scale		+ = low, ++ = intermediate, +++ = high (principal constituent)	2
Betancourt And Van Devender, 1981	1	1-5 scale		1 = rare, 2 = uncommon, 3 = common, 4 = very common, 5 = abundant	1
Betancourt And Van Devender, 1981	2	1-5 scale		1 = rare, 2 = uncommon, 3 = common, 4 = very common, 5 = abundant	2
Betancourt And Van Devender, 1981	3	1-5 scale		1 = rare, 2 = uncommon, 3 = common, 4 = very common, 5 = abundant	2
Betancourt And Van Devender, 1981	4	1-5 scale		1 = rare, 2 = uncommon, 3 = common, 4 = very common, 5 = abundant	2
Betancourt And Van Devender, 1981	5	1-5 scale		1 = rare, 2 = uncommon, 3 = common, 4 = very common, 5 = abundant	2
Van Devender, 1973	+	Percent Abundance		< or = to 5% is rare, > 5% is present, + (< 1%) is rare	1
Van Devender, 1973	2.6%	Percent Abundance		< or = to 5% is rare, > 5% is present, + (< 1%) is rare	1
Van Devender, 1973	13.9%	Percent Abundance		< or = to 5% is rare, > 5% is present, + (< 1%) is rare	2
Van Devender, 1973	2	Raw Counts		< or = to 5 is rare, > 5 is present	1
Van Devender, 1973	31	Raw Counts		< or = to 5 is rare, > 5 is present	2
Cole, 1981	2	Macrofossil/kg		< or = 5 is rare, > 5 is present	1
Cole, 1981	131	Macrofossil/kg		< or = 5 is rare, > 5 is present	2
Mehringer and Wigand, 1987	.001	Weights (g)		< or = .003 is rare, > .003 is present	1
Mehringer and Wigand, 1987	.007	Weights (g)		< or = .003 is rare, > .003 is present	2
Cole and Webb, 1985	0.8	Log base 10/kg		< or = 1.60 is rare, >1.60 is present: 1.60 = 5 macrofossils / kg	1
Cole and Webb, 1985	4.78	Log base 10/kg		< or = 1.60 is rare, >1.60 is present: 1.60 = 5 macrofossils / kg	2

Table 8. M Count translation table; sample data.

SAMCODE	VARNUM	M COUNT	0-1-2 CODE
A	429	+	1
A	569	++	2
A	139	+++	2
A	25	+	1
A	33	+	1
A	42	+	1
A	140	+	1
A	1254	+	1
A	244	+	1
A	246	++	2
A	409	+	1
A	24	++	2
A	444	+	1
A	469	+	1
A	511	+	1
A	594	+	1
A	596	+	1
A	602	+	1
A	606	+	1
A	616	+	1
A	923	+	1
A	391	+	1
A1	1330	*	1
A1	576	**	2
A1	341	**	2
A1	90	**	2
A1	1447	*	0
A1	458	*	1
A1	31	*	1
A1	38	***	2

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