DATA MANAGEMENT IN RECENT MAMMAL COLLECTIONS

by

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leading museum collections in developing and implementing progressive ideas and procedures.

I also thank Ms. Amy Halter and Ms. Susan Fishman-Armstrong for their assistance in processing and refining my research data (and the accompanying specimens!) upon return from the field methods excursion. Also, the support and suggestions of Ms. Emma Dawson, Ms. Katie Anderson, Ms. Jacqueline Chavez, and Ms Marcia Revelez were greatly appreciated. Thank you to Dr. Bradley, Dr. Clyde Jones, and Ms. Brenda Rodgers for reviewing portions of this manuscript and making valuable suggestions. Special recognition and thanks belong to Dr. Robert C. Dowler who ignitec my interest in mammalogy and mammal collection management and encouraged me to pursue a Master's degree in Museum Science from Texas Tech University.

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ABSTRACT

Current trends in museum practices show increasing awareness of the importar role complete and accurate data play in collection management. Careful integration of computer technology into data management procedures can reduce the effort associated with multiple transcriptions of data, increase the accuracy and consistency of data, and result in a more useful electronic database. WildCat is a relational database managemer system developed in 1997 to facilitate data management in the Recent mammal collection of Texas Tech University. WildCat consists of four distinct parts, the third o which, WildCat III, is a data entry application for use in-house and in the field. WildCa III allows a new approach to data management by introducing computerized data entry into the first stages of data gathering rather than at the more traditional final stage. This thesis determines the effectiveness of WildCat III in the capture of field-generated data, provides information concerning the use of computers in field situations, and discusses the impact electronic data capture has on mammal collections management.

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CHAPTER I

INTRODUCTION

The quality of data associated with specimens in systematic mammal collections has long been a concern not only for researchers but also for museum professionals responsible for maintaining such collections. In many museum collections where research and exhibition are practiced, the data associated with a specimen quite often determines the value of that specimen. According to Hall (1962), the data associated with a specimen may be more valuable than the specimen itself. Therefore, maintenanc of collection-related data is of utmost importance to ensure the perpetual value of scientific specimens.

Traditionally in many mammal collections, the primary source of data for a specimen is the specimen tag. Data tags are immediately visible thereby facilitating collection organization and other management duties. However, data tags hold a limited amount of information on a relatively small space. Maintenance of secondary data sources, such as field notes, personal journals and preparation catalogs, collection catalogs, inventory lists, accession cards, and loan records is imperative for collection data to be complete and accurate. Historically, processing primary and secondary data was accomplished using various hand-written methods. As collections grew, paper-base data collections also grew but soon became redundant, disorganized, unmanageable, and inaccessible. Data must remain accessible to remain valuable (Yates, 1987). To make

data management simpler and more effective, museum professionals turned to technology.

In the past, various technological advances, such as typewriters, were used to enhance data handling, but computers soon became the tools of choice for curators, collections managers, and museum registrars to aid in data management. Computers have been used as collection management tools to varying degrees of success, and today, electronic data management still offers particular advantages to users. In any museum collection, not only mammal collections, computers should only be used for those jobs which computers can complete better than humans, such as generating reports, searching for particular data, or creating labels. Electronic databases can allow for the storage of more data, greater access to data, and more efficient processing of data, but no computer can do any specific task without being told to do so. Without proper programming, a computer will not curate a collection, ensure data accuracy or completeness, or solve collection management problems. Computer are best used as collection management tools (McLaren et al., 1987).

The mammal collection database at the Natural Science Research Laboratory (NSRL) of the Museum of Texas Tech University was updated in 1997 from a flat database model to a relational database model. The NSRL's flat database stored data fo every specimen in the collection in a single table similar in structure to a spreadsheet. Entering all the data for every specimen in a collection created a great deal of redundancy where many of the specimen records contained identical data. Maintaining data in a flat database system consumes time for data entry, leads to a greater chance for

error as data are entered repeatedly, uses greater physical space on a computer hard drive, and results in slower and limited searching and printing capabilities (Monk, 1997).

To increase the efficiency of data handling, the NSRL moved to a relational database model written in Microsoft® Visual FoxPro®. Relational databases reduce data redundancy by storing related collection data in separate tables and linking those tables via key fields (Fig. 1). By restructuring the flat NSRL database into linked tables like collecting site data, specimen data, and inventory data, the physical size of the database is reduced, a great deal of data redundancy is eliminated, and the data is much more efficiently accessed and retrieved (Monk, 1997).

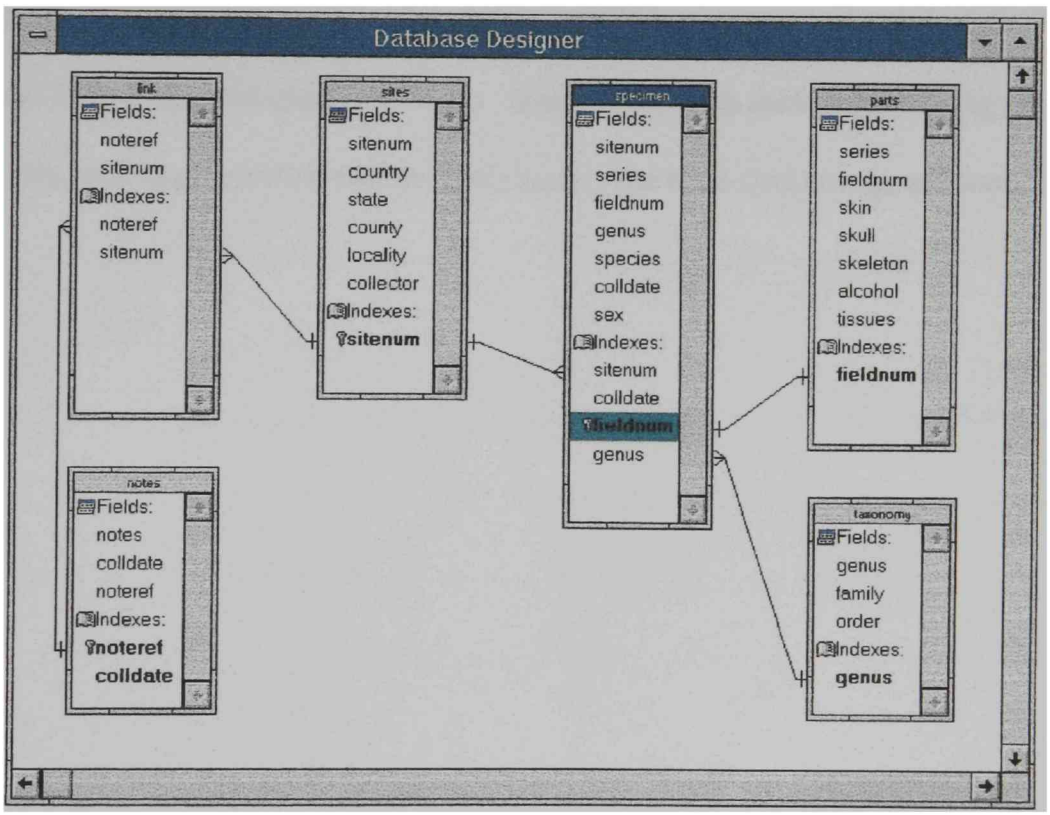

Figure 1. Relational database design schematic (partial) illustrating the linking of separate tables using key fields (in bold typeface).

Although computers and relational databases do indeed offer great advantages to data management, the placement of computer use in typical collection management procedures can actually alter a computer's effectiveness. For example, entering data into a computer at the end of a series of data handling steps will not save effort associated with recording field and museum data by hand, deciphering non-standard data, and transcribing that data into various ledgers and catalogs by hand. Ultimately, data entry at the end of data handling only serves to record less complete and less accurate data from a great number of data sources. By introducing computerized data entry into the first stages of the data gathering process, many labor-intensive and error-prone data handling steps can be avoided, thus resulting in a more complete, accurate, and concise initial database. Likewise, subsequent collection management tasks such as generating reports, inventories, and catalog sheets will be made easier, less time-consuming, and more error free.

CHAPTER II

MATERIALS AND METHODS

WildCat III

WildCat is a relational database management system developed in 1997 to facilitate data management in the Recent mammal collection of Texas Tech University. A relational database management system is a software program used to "create, maintain, modify, and manipulate a relational database" (Hernandez, 1997, p. 17). WildCat consists of four distinct parts, the third of which, WildCat III, is a data entry application for use by researchers in the field and museum staff members in-house. WildCat III allows a new approach to data management by introducing computerized data entry into the first stages of the data gathering process rather than in the more traditional final stage. Computerized data capture early in the data gathering process benefits general data management by reducing errors associated with transcription and by decreasing time attributed to maintaining a hand-written cataloging system. Relational databases reduce data redundancy; i.e., a WildCat III user needs not repeatedly enter site information for each specimen from the same locality. Site data are entered once in WildCat III and linked to each of many specimens that may have been collected and processed from that site.

In the field, WildCat III will permit data capture on a laptop computer, thereby creating an initial, relational, electronic database of all data from field notes, personal preparation catalogs, specimen tags, and tissue tubes for every specimen resulting from a

given collecting trip. As designed, the use of WildCat III for data capture in the field is not "field cataloging" however. Upon return to the museum, the field-generated database is held in WildCat III until the electronic data are verified to be complete and accurate. After verification, the field-generated database is downloaded into WildCat I importing into the main database of the mammal collection. WildCat I is programmed to assign unique catalog numbers to new specimen records thereby maintaining a sequential, primary database which is available for search, distribution, and curation of the mamm collection and frozen tissue collection (Monk, 1997).

Materials

Equipment and supplies used in the field are divided by importance in electroni field data capture using WildCat III. Essential computer equipment includes the least amount of hardware and software required to capture data using WildCat III in the field Essential hard copy material includes hard copy data capture and data linking items. A the discretion of the trip coordinator, the secondary equipment may or may not be the responsibility of the computer operator. During the development of computerized field data capture, the field data ledgers (TK books) have functioned as an alternative data source and as a backup copy of the field-generated data in case of loss of electronic cop Additional equipment includes hardware and software to be used at the discretion and need of the computer operator.

Essential computer equipment:

- *IBM laptop computer* (with at least 16 megabytes of RAM) equipped with Microsoft® Windows 95 (or newer version) and WildCat III,
- *Extra battery* for powering computer,
- *AC adapter* for charging computer/battery,
- *DC adapter* for charging computer/battery,
- *Backup diskettes.*

Essential hard copy material:

- *Field Data ledgers* (called TK books in the Museum of Texas Tech University) with uniquely numbered sheets (Fig. 2) designated for the trip,
- *Bar coded skin/skull/skeleton/alcohol tags* (Fig. 3) with corresponding field ledger (TK) numbers,
- *Tissue tubes and bar coded tissue tube stickers* (Fig. 3) with corresponding field ledger (TK) numbers.

TK 94775

SPECIES CHAETODIPUS HISPIDUS

Country _____ **State** TEXAS **County** LASALLE
Specific Locality CHAPARRAL WMA
_____ (Locality same as: TK _____)
UTM or Lat/Long 14-465081-3131616
Elevation _____
Collector BRADLEY ET AL. **Collection Date** 20 JUL 99
Preparator F G HOFFMAN **No.** 26 **Preparation Date** 28 JUL 99

VOUCHER: ✓ **Skin** ✓ **Skull** ✓ **Post-cranial Skeleton**
_____ **Alcoholic** _____ **Other** _____

Museum Collection _____ **Catalog Number** _____

Measurements 181 - 86 - 23 - 11 - _____ = _____
(total) (tail) (hind foot) (ear) (tragus) (weight)

✓ **Male** _____ **Female** **Reproductive Condition** _____

TISSUE:

1 Heart/Kidney	1 Lung	_____ Reproductive Organs
_____ Heart	1 Spleen	_____ Entire Specimen
_____ Kidney	_____ Brain	_____ Lysis Buffer _____
1 Liver	1 Blood	_____ Alcohol _____
1 Muscle	_____ Embryo	_____ Other _____

OTHER PREPARATIONS:

_____ Mitotic	_____ Meiotic	_____ Tissue Culture
_____ Sperm	_____ Karyotype	_____ Other _____

MISCELLANEOUS:

Age:	Juvenile	Subadult	Adult
Molting:	Yes	No	
Broken Tail:	Yes	No	

Special Numbers _____ **ACUC Number** _____

Comments _____

Please fill out form completely. Items in bold are mandatory fields.

Figure 2: Completed field data ledger (TK, Tissue and Karyotype) sheet.

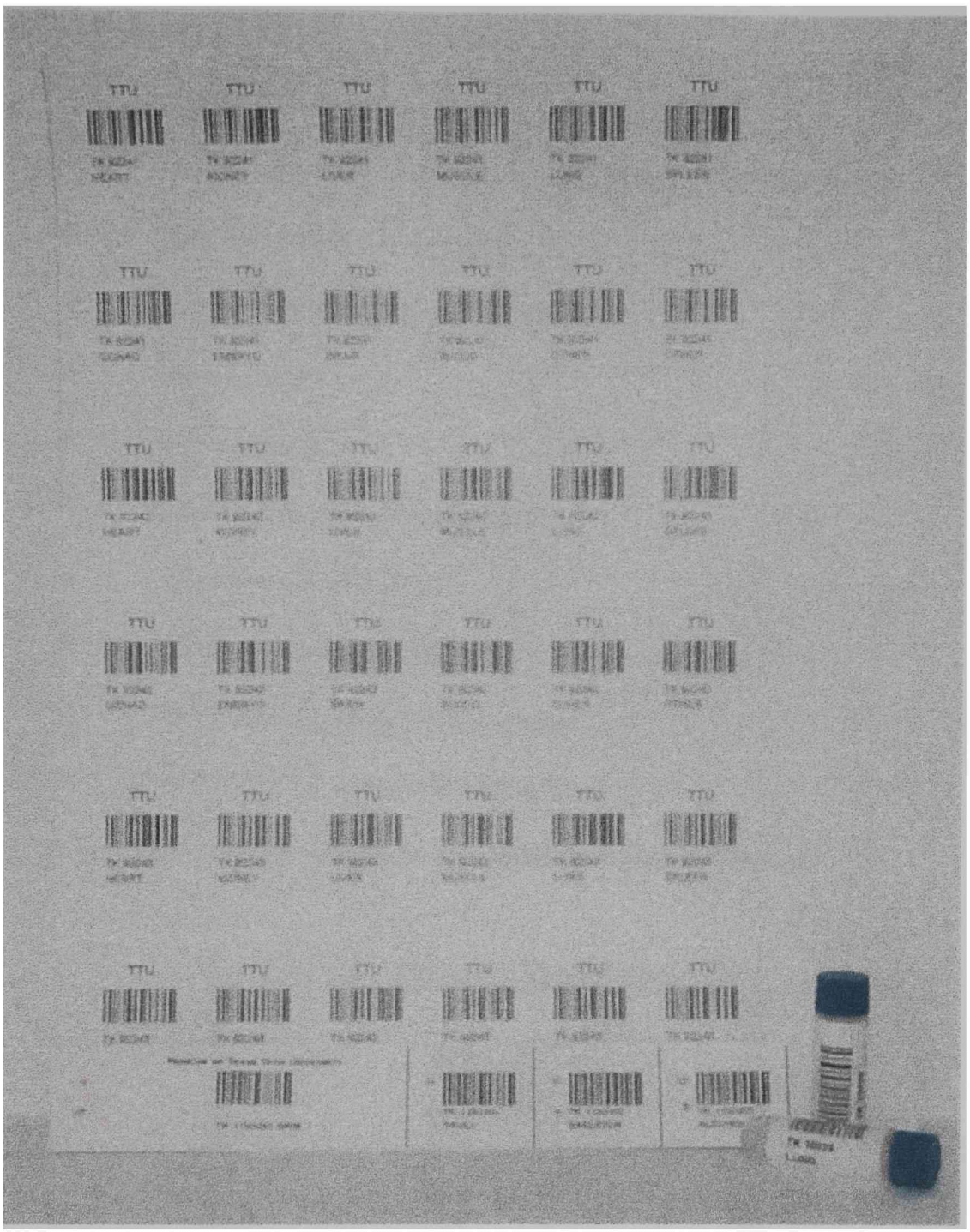

Figure 3: Bar coded specimen tags, tissue tubes and tissue tube stickers.

Additional equipment which may be useful:

- *Portable printer,*
- *User's manuals* for computer, Windows 95, and WildCat III,
- *Extra diskettes* not for backup,
- *Extension cords* for AC and DC adapters,
- *External mouse,*
- *Bar code scanner,*
- *Bar code "scan stop" card* (Fig. 4),
- *Cellular modem*-PC card,
- *Cellular phone* with extra battery,
- *Solar panel* as optional power source,
- *Other software* such as MS Office, etc.,
- *Carrying case* to protect equipment from physical damage.

Figure 4: Bar code "Scan Stop" card.

Methods

A continuation of the initial field test of WildCat III described in Automated Dat Management in Systematics Collections (Monk, 1997) was performed July 8-24, 1999, t capture data generated by Texas Tech University's Mammalogy Field Methods class led by Dr. Robert D. Bradley. Prior to this project, the individual (Raegan King) assigned to capture data electronically had no knowledge of either the program or general database design and usage. The designated computer operator was introduced to WildCat and learned to operate it in approximately 4 hours by following instructions contained in the existing WildCat III Data Entry User's Guide (Appendix D of Monk, 1997) and the NSRL Mammal Collection Data Standards Guide (Appendix A of Monk, 1997). Before use under field conditions, data capture for museum specimens was practiced in-house to ensure that the hardware worked properly and that the individual capturing the data understood the software. During the trip, the computer operator was responsible for using WildCat III to capture, maintain, and edit site and specimen data. Writing data in the field data ledgers and organizing bar coded specimen tags, labels, and tissue tubes was not assigned to the computer operator of WildCat III but was assigned to other members of the Field Methods class. After the trip, the computer operator verified all data, checking for accuracy and completeness, prior to cataloging the field collection int the mammal collection. Cataloging was completed by downloading the field-generated database into WildCat I and importing it into the main mammal collection database where the next series of unique catalog numbers were assigned. The newly cataloged data were immediately printed and stored with the hard copy mammal collection catalog

CHAPTER III

RESULTS AND DISCUSSION

A single WildCat III operator was able to capture data generated by the collecting and specimen preparation activities of the 17 class participants for the duration of the research trip. Upon return to the NSRL, the final computerized data set (excluding the frozen tissue inventory) for 598 specimens was found to contain fewer than 38 total errors or inconsistencies (including temporary species identifications). The 38 errors constituted 0.42% of the total number of possible errors (15 data categories were recorded for each of the 598 specimens). All errors were identified and corrected by NSRL staff members. Types of errors included but were not limited to incorrect personal preparation numbers, incorrect county names for localities, and incorrect Universal Transverse Mercator (UTM) coordinates.

Incorrectly recorded personal preparation numbers were primarily the result of mistakes in the individual record keeping of various students in the Field Methods class. Incorrectly recorded county names resulted from inaccuracies encountered in recording and communicating field locales or from confusing, multi-county maps of particular wildlife management areas. Incorrect UTM coordinates recorded in WildCat III occurred during transcription of written field notes to the computer. Also, the normal field procedure of many preparators processing animals from multiple localities simultaneously may have led to an increased error rate, requiring greater attention from the computer operator. Finally, temporary species identifications were assigned in the

field to all specimens; therefore, erroneous species identifications recorded in the computer database, in the TK books, and on specimen tags was not unusual. Species identifications were verified or corrected at the NSRL when the collecting trip was complete. In general, the same types of errors occurred in the data recorded in both the TK books and the computer. The greater frequency of errors in the TK books was attributed to multiple individuals entering data into the ledgers by hand.

Mistakes in the frozen tissue inventory were not considered part of the previously mentioned error rate, as "tissue inventory" was not included in the data categories printed on the hard copy editing sheets used at the NSRL. The Field Methods tissues were inventoried separately to resolve problems prior to their installation into the NSRL's vital tissue collection. Tissue inventory error types included incorrectly recorded tissue types (liver, heart, kidney, etc.), incorrectly recorded numbers of tissues for one animal, and incorrectly recorded numbers of multiple tubes of one tissue sample. Erroneous tissue data appeared in the TK books and the computerized database. The majority of errors in the database can be attributed to the number of individuals reporting information at one time and to the need to put tissues in the liquid nitrogen tanks before they begin to degrade. These two factors restricted the computer operator's ability to use the bar code scanner to inventory tissues during this field test. During this study, it was decided that the computer operator would enter all of the tissue inventory data by hand to prevent slowing the specimen processing by the 17 preparators. However, when the bar code scanner is used in the field to expedite data entry, some data must still be entered by hand. For example, if additional vials or tissue types are saved for which no bar coded

labels have been pre-printed (adrenal gland, for example) these data must be entered manually. When multiple tubes of one tissue type are collected and only one label is bar coded, the bar coded tube is scanned as many times as necessary to account for all the extra tubes of a given sample, or the number of tubes may be typed manually.

While the computer software performed well, the computer hardware was more problematic. When fully charged, the laptop computer's lithium battery provided power for only two hours of continuous use. The additional battery helped provide extended power as it too lasted two hours, but changing the battery and re-booting the computer during a specimen preparation session caused undesirable delays in data capture. As a result, the computer was often powered by automobile batteries and wall outlets when available. This dependence on such sources of electricity limited the intended mobility of the computer and operator. Cursor manipulation also was problematic due to the laptop's overly sensitive touch pad, thus affecting navigation through WildCat III. Finally, the computer was not equipped with any security control to limit access to the system and its programs. The need for such security protocols did arise during this field test, as one case of unauthorized use occurred and may have led to the corruption of various computer files near the conclusion of the trip. Equipment problems were associated with previously untested, limited computer hardware devices, and although the hardware problems affected the performance of WildCat III, these problems are not attributed to the data entry program itself.

WildCat III performed as expected during this extended field test. The resulting data set, though not error free, was as complete, concise, and accurate as a data set produced using any other method of field data capture. The resulting specimens and accompanying data were verified, corrected, and cataloged within one week of the end of the trip. This study verifies that the introduction of technology to museum collection management can reduce the effort associated with multiple transcriptions of data, increase the accuracy and consistency of data in the NSRL database, and result in a more useful electronic database which allows immediate access to such data (Monk, 1998).

For successful electronic data capture, it is important that new users of WildCat III be well trained in all aspects of the hardware and software. The laptop computer and its components should be thoroughly tested by the intended computer operator before taken into the field. Practice sessions under museum conditions, designed to test familiarity with aspects of data capture using the hardware, will result in greater efficiency and accuracy in the field. Also, familiarization with WildCat III is essential for the user to manipulate the program quickly and easily. An on-line version of the WildCat III user's manual can be found at www.nsrl.ttu.edu/wildcat (Appendix).

Although WildCat III succeeded in capturing field data in an extended trial, particular changes and additions to the system may make it more effective. The existing user's manual could be improved by including a "troubleshooting" section and glossary of terms, making the manual more understandable to a user with limited computer experience. As the manual states, the navigation controls (Fig. 5) may be unavailable at particular points in WildCat III but can be reactivated when desired. In this field test, it

was necessary to halt the data entry procedures to activate the navigation controls to facilitate the recording of orally reported data from multiple preparators. WildCat III would be more efficient if the navigation controls could be reprogrammed to stay active at all times. Also, the process of electronic data capture may be facilitated by using a portable printer to create daily, backup copies of data in hard copy format.

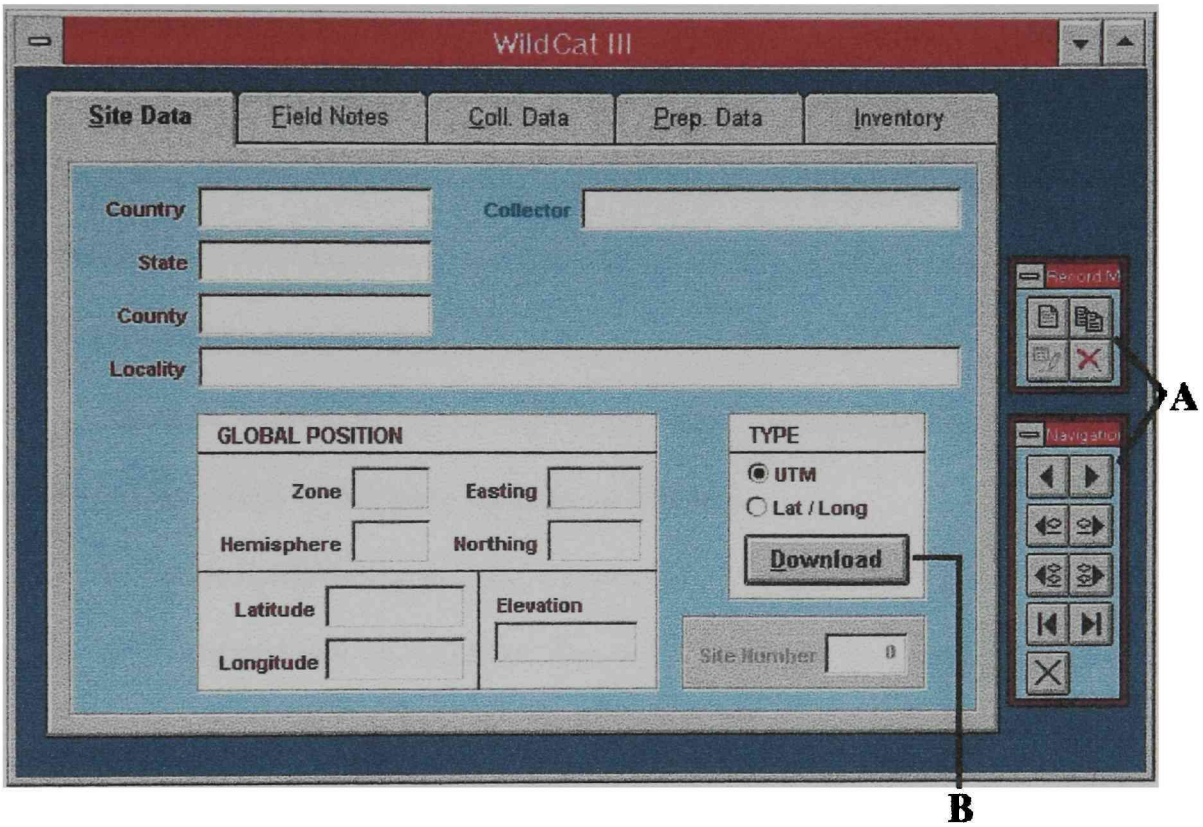

Figure 5: Site data capture screen from WildCat III. "A" indicates navigation controls, and "B" indicates UTM data "download" option.

This field test revealed general and specific issues that, once solved, will make electronic field data capture more effective. From a general standpoint, computerized data capture will be enhanced if field party members are familiar with all activities required for the successful completion of a field trip. Field members need to be familiar

with collecting primary locality data (both classical and UTM coordinates), entering data into a field computer, using bar codes, preparing study skins, pulling and preserving tissues, including appropriate data for field notes, and how all of these tasks interface for the success of a field trip. Collection of field data has always required concerted effort to ensure accuracy of data accompanying specimens and to ensure efficiency of the trip so that as many specimens as possible can be collected and processed. Because the initial capture of locality and field data form the basis for future data sets generated from the electronic file (i.e., field notes, specimen labels, museum catalogs, etc.), it is important for all field members to spend a little extra effort to ensure that the initial capture is accurate and complete.

Specific suggestions concerning the three most common problems experienced during this electronic data capture study are as follows:

1. Transcription errors in UTM coordinates

Mistakes in the final data set resulting from erroneous transcriptions of UTM coordinates can be reduced once the necessary hardware is installed on WildCat III to electronically download (Fig. 5) coordinates directly from Global Positioning System equipment.

2. Computer hardware problems

Security. The installation of security measures such as passwords will help ensure that the computer, its programs, and the data contained in WildCat III are not accidentally or intentionally altered by unauthorized users.

Power supply. The computer's energy problem caused by short-lived batteries may be alleviated by using a solar panel to generate power. The use of solar panels will also provide an alternative power source in the event that AC/DC energy is not available.

Cursor manipulation. The cursor movement problems stemming from the laptop computer's overly sensitive touch pad may be unique to the particular computer but can be addressed by installing an external mouse; however, doing so in turn eliminates the possibility of using the bar code scanner as the two pieces of equipment use the same computer port. The choice concerning equipment usage depends upon the value of each piece of equipment and how it would benefit the data capture process.

3. Errors in tissue inventory

Errors in the frozen tissue inventory can be reduced by using the bar code scanner to enter tissue data rather than typing the data by hand. When the hand held bar code scanner is used, a temporary holding freezer or ice chest would allow the computer operator to scan tissues into WildCat III at a less frantic pace. An intermediate "island" freezer for temporary cold storage of tissue tubes would increase the computer operator's access to such material, as the tissue tubes are inaccessible once they are dropped in the liquid nitrogen tanks. Also, a smaller ratio of preparators pulling tissues to data entry personnel would permit the use of bar code scanning equipment in a more efficient manner. However, these two

alternatives may not be feasible in many field situations and therefore do not solve the current difficulties experienced in the field-collection of tissue data.

During this field test, problems occurred in recording and verifying all the variations associated with tissue collection in the field primarily because WildCat III uses two modes of data entry: keyboarding data and scanning bar codes. As currently designed, the two modes of data entry cannot be used simultaneously; entering tissue inventory using the bar code scanner interrupts the keyboarding process. To minimize such disruptions it may be more feasible to use WildCat III only to record *variances* in standard tissue data for each specimen rather than recording *all* tissue data from each specimen in the field. When the collection of tissues are returned to the museum, then all the vials should be scanned and inventoried to determine if any samples were lost, unlabeled, mislabeled, or otherwise problematic. Inventory taken at the time of tissue installation will ensure that the records for the tissue collection are accurate and verified.

Most problems associated with any electronic data capturing system can be overcome with patience, proper usage, and practice. As discussed previously, detailed knowledge of hardware and software associated with WildCat III is imperative for the operator to perform successfully. Furthermore, adequate knowledge of WildCat III and the NSRL's bar coding process is important for all members of a research team using this system as the accuracy and completeness of initial data has a lasting effect on all subsequent data handling procedures. Typing data into and navigating through WildCat

III takes time which may not correspond exactly to a traditional field-oriented specimen preparation schedule, but further field experience with WildCat III should ease this problem.

CHAPTER IV

CONCLUSION

Any discipline based on tradition such as museum collections management or mammalogy field methods is likely to resist change, and introducing electronic equipment to a paper-based data recording methodology certainly qualifies as change. In order for new technologies and methods to be of value, they must be embraced by all those involved with the project. According to the Society for the Preservation of Natural History Collections (1994), maintenance of data and collection documentation is an important responsibility of any person who may collect, prepare, use, and care for scientific specimens. General knowledge and correct utilization of programs such as WildCat III are essential to their livelihood in data management procedures. Designing, testing, and implementing computer technology generates attention to detail and general review of the value of current data and collection management methods.

As new fields of science such as bioinformatics are emerging, much more scientific data will be in demand. Undoubtedly, efficiently managed mammal collections benefit the researchers who use them, but such collections also serve a broader constituency. Likewise, bioinformatics is relevant to scientists and the general public as well. Data sets used in fields like bioinformatics will need to be larger, more complex, and diverse (Baker et al., 1998) to help us understand and make decisions concerning biodiversity, environmental quality, and resource distribution (Parker et al., 1998). Data management constitutes a great portion of mammal collection management, and the

importance of good data management cannot be over emphasized. Complete, accurate, and efficiently managed data make individual specimens more valuable, thereby enhancing the value of an entire museum collection (McLaren et al., 1987).

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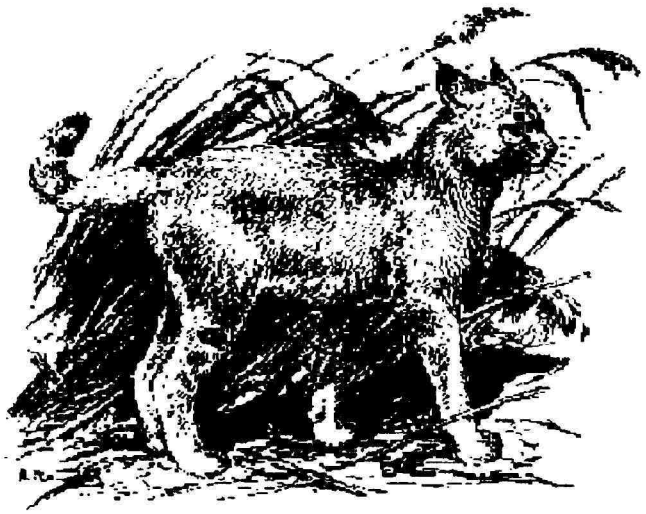
APPENDIX

ON-LINE USER'S MANUAL FOR WILDCAT III

www.nsrl.ttu.edu/wildcat

Welcome to WildCat III



WildCat III is the NSRL's data entry application for use in-house and in the field. As a part of the NSRL's relational database management system (written in Microsoft Visual FoxPro®), WildCat III reduces data transcription and errors commonly associated with a hand-written data management system. WildCat III allows data to be entered directly into the computer during the first stages of the data gathering process. The NSRL is currently testing the use of computers (and WildCat III) in the field as Texas Tech's mammalogists gather specimens and data to provide valuable information about our natural surroundings.

Tour WildCat III

The NSRL's Mammal Collection Data Standards Guide is used to assist data entry using WildCat III. The standards outlined in the NSRL's guide are based on Documentation Standards for Automatic Data Processing in Mammalogy, version

2.0, American Society of Mammalogists, 1996. Permission has been granted for this use. The standards for most of the NSRL's data fields have been taken verbatim from the ASM's Documentation Standards. A fewchanges have been made to some fields to allow for the particular quirks of the database management system (WildCat) used in the mammal collection at Texas Tech University. We do not propose to replace the ASM's standards in any way and encourage other collections to follow them as closely as possible.

NSRL's Mammal Collection Data Standards Guide

The American Society of Mammalogists

The Society for the Preservation of Natural History Collections

 The NSRL is a division of the Museum of Texas Tech University.

NSRL homepage

Museum Science Course "Data Management" lecture topic: Field Use of Computers

Museum Science Course "Data Management" lecture topic: WildCat and Bar Codes

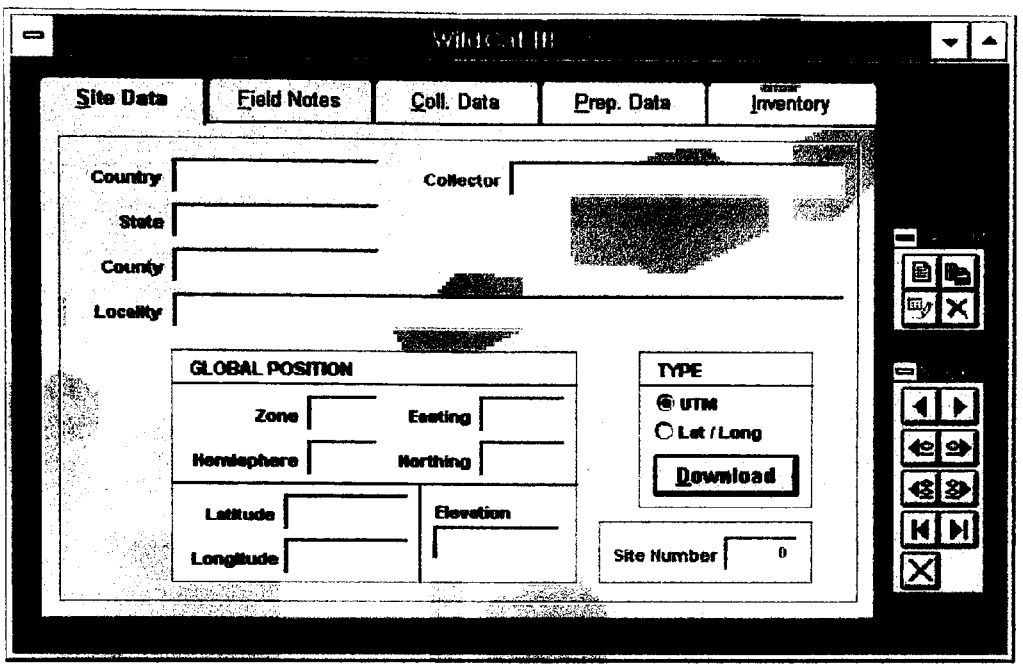
Museum of Texas Tech University

Texas Tech University's Department of Biological Sciences

Feedback? Tell us what you think of this tour.

WildCat III Tour

Site Data Screen:

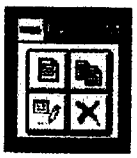


This page is used for COLLECTING SITE DATA entry. "NEW RECORD" on the Record Manipulation Controls will create a blank record, except for COLLECTOR, which follows the default, but may be changed if desired. "DUPLICATE RECORD" on the Record Manipulation Controls will fill in all fields except LOCALITY and GLOBAL POSITION, which should be unique for each new collecting site.

Click on the folder tabs to view other screens: Field Notes, Coll. Data, Prep. Data, and Inventory.

Also click on Record Manipulation Controls, Navigation Controls, Country, State, County, Locality, Collector, Global Position, Type, Site Number.

Record Manipulation Controls



New record

- **For Site Data, clicking will create a blank record except for COLLECTOR.**
- **For FIELD NOTES, clicking will create a blank record with the current date as the default, but the date can be changed if desired.**
- **For COLL.DATA, clicking will create a blank record except for COLLECTOR.**
- **is unavailable for PREP. DATA.**
- **is unavailable for INVENTORY.**

Duplicate record

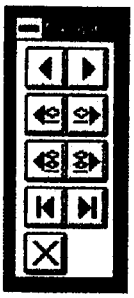
- **For SITE DATA, clicking will fill in all fields except LOCALITY and GLOBAL POSITION which must be unique.**
- **is unavailable for FIELD NOTES.**
- **For COLL. DATA clicking will duplicate all data except PREP NUMBER. Automatically entered data may be changed.**
- **is unavailable for PREP. DATA.**
- **is unavailable for INVENTORY.**

Edit record

Delete record

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Navigation Controls



Previous or next record

Skip ahead or back 10 records

Skip ahead or back 100 records

First or last record

Exit WildCat III

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Country

Country

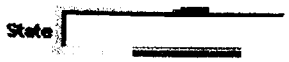
Enter data in ALL CAPS.

COUNTRY is entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls.

Data in this category are to be written out completely and anglicized or transliterated before data entry (e.g. UNITED STATES, or PEOPLE'S REPUBLIC OF CHINA).

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

State



Enter data in ALL CAPS.

STATE is entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls.

Enter the state, province, or other first level political subdivision of the collecting locality.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

County

County

Enter data in ALL CAPS.

COUNTY is entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls.

Also enter the appropriate geographic designation abbreviation: CO=county, PAR=parish, DIST=district, DEPT=department, ID=island, IDS=islands. Do not use a period following the abbreviation.

 Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Locality

Enter data in ALL CAPS.

LOCALITY is *not* entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls.

It is vital that the LOCALITY description is uniquely identifiable. If it is necessary to use identical LOCALITY descriptions (e.g., "CHAPPARAL WMA"), then add an identifier such as "SITE 1" or "TRAP LINE A".

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Collector

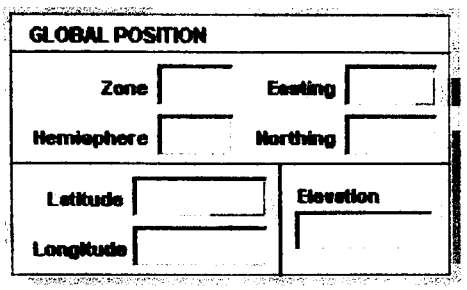
Enter data in ALL CAPS.

COLLECTOR is entered automatically by clicking "NEW RECORD" or "DUPLICATE RECORD" on the Record Manipulation Controls.

Note that COLLECTOR is used by the system in identifying unique site descriptions. A group of people in a collecting trip are best identified by the name of the main COLLECTOR (such as "BAKER, R J ET AL") with the names of other individuals listed in the field notes.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Global Position Data Fields



Enter GPS data for ZONE+EASTING+HEMISPHERE+NORTHING (UTM coordinates) *or* LATITUDE+LONGITUDE+ELEVATION. UTM data are preferred over LAT/LONGs when given a choice.

Zone

- **Enter numerical data only (2 digits).**
- **If GPS software/hardware is installed, the computer enters this data automatically. See TYPE.**

Hemisphere

- **Enter 2 character code (e.g. NO, or SO).**
- **If GPS software/hardware is installed, the computer enters this data automatically. See TYPE.**

Easting

- **Enter numerical data only (6 digits).**
- **If GPS software/hardware is installed, the computer enters this data automatically. See TYPE.**

Northing

- **Enter numerical data only (7 digits).**
- **If GPS software/hardware is installed, the computer enters this data automatically. See TYPE.**

Latitude

- **Enter data in degrees, minutes, seconds, direction (e.g. 28 52 30 N).**
- **If GPS software/hardware is installed, the computer enters this data automatically. See TYPE.**

Longitude

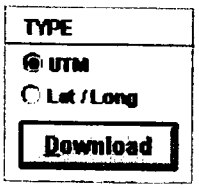
- Enter data in degrees, minutes, seconds, direction (e.g. 15 10 05 W).
- If GPS software/hardware is installed, the computer enters this data automatically. See TYPE.

Elevation

- Enter numerical data followed by a space and "M" (meters) or "FT" (feet) to indicate units.
- If GPS software/hardware is installed, the computer enters this data automatically. See TYPE.

 Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Type



UTM
Lat / Long

- Automatically designates which TYPE of data are used.

Download

- Clicking here activates the GPS software/hardware (if installed) to automatically download UTM coordinates or LATITUDE/LONGITUDE data. The computer automatically enters data in the appropriate fields in the GLOBAL POSITION box (see GPS).

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Site Number

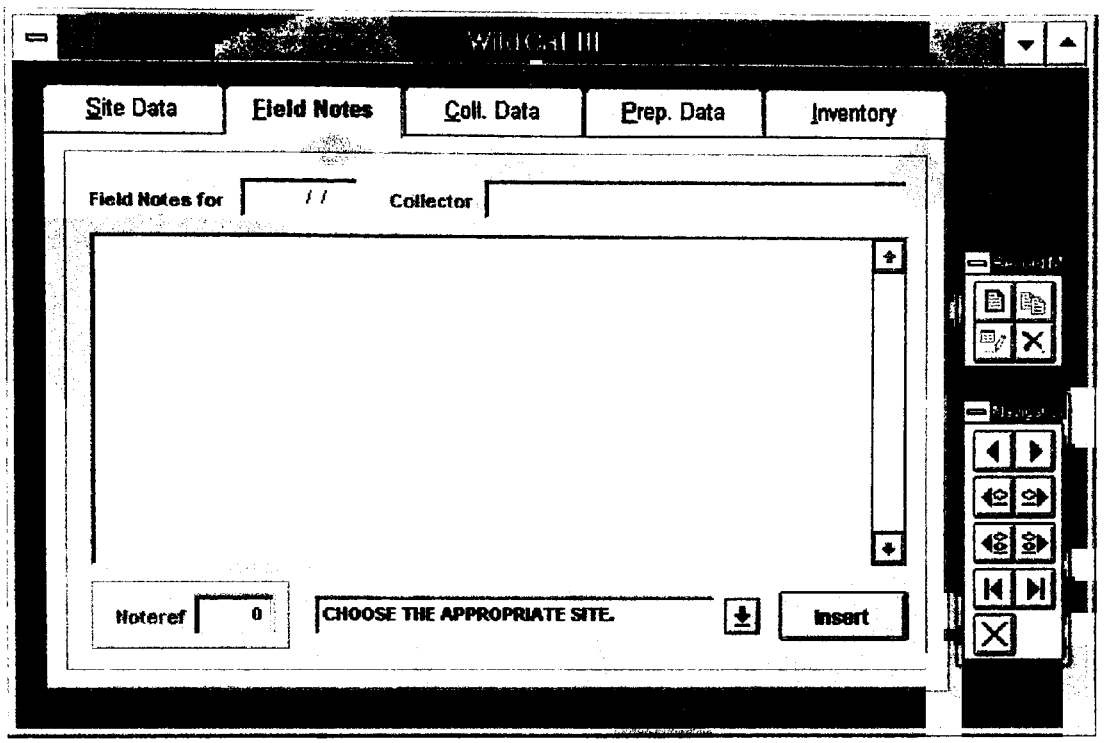
SITE NUMBER is for database use only.

The computer automatically assigns this number as each unique SITE is entered. This number is used to link specimen data on the COLLECTION DATA page.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

WildCat III Tour

Field Notes Screen:

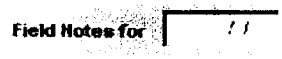


This page is used for the entry of FIELD NOTES. Create a new page of notes for each day of the collecting trip. A single collector must not use multiple pages of notes on a particular date, even if several collecting sites are used in one day. Use only one page of notes for each day. Also, it is not necessary for each person on a collecting trip to keep individual notes. A single page of notes, where the name of the trip leader is entered as COLLECTOR, will suffice, but the name of the other collectors should be included in the typed notes.

Click on the folder tabs to view other screens: Site Data, Coll. Data, Prep. Data, and Inventory.

Also click on Record Manipulation Controls, Navigation Controls, Field Notes for..., Collector, Noteref, Insert, and the data entry box.

Field Notes Date



Dates for FIELD NOTES are entered as mm/dd/yy (all numerical values).

The current date is entered as the default each time "NEW RECORD" is clicked on the Record Manipulation Controls. Dates may be changed, but be sure that specimens which correspond to the FIELD NOTES entry are given the same date.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Noteref

NOTEREF is for database use only.

The computer automatically assigns this number as each page of FIELD NOTES is created. This number is used to link FIELD NOTES to matching locality and specimen data.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Insert

Click ⬇ to display a drop down list of all possible localities associated with the COLLECTOR at the top of the FIELD NOTES page. Highlight to choose the appropriate site.

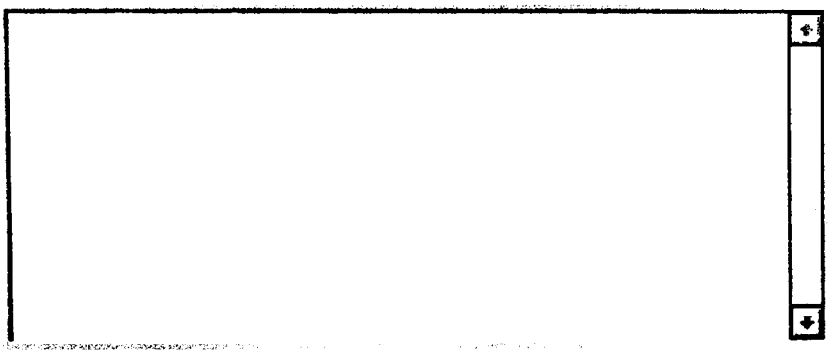
Displays the chosen collecting locality.

Click 

to link the locality description into the field notes data entry box.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Field Notes



Enter data in ALL CAPS.

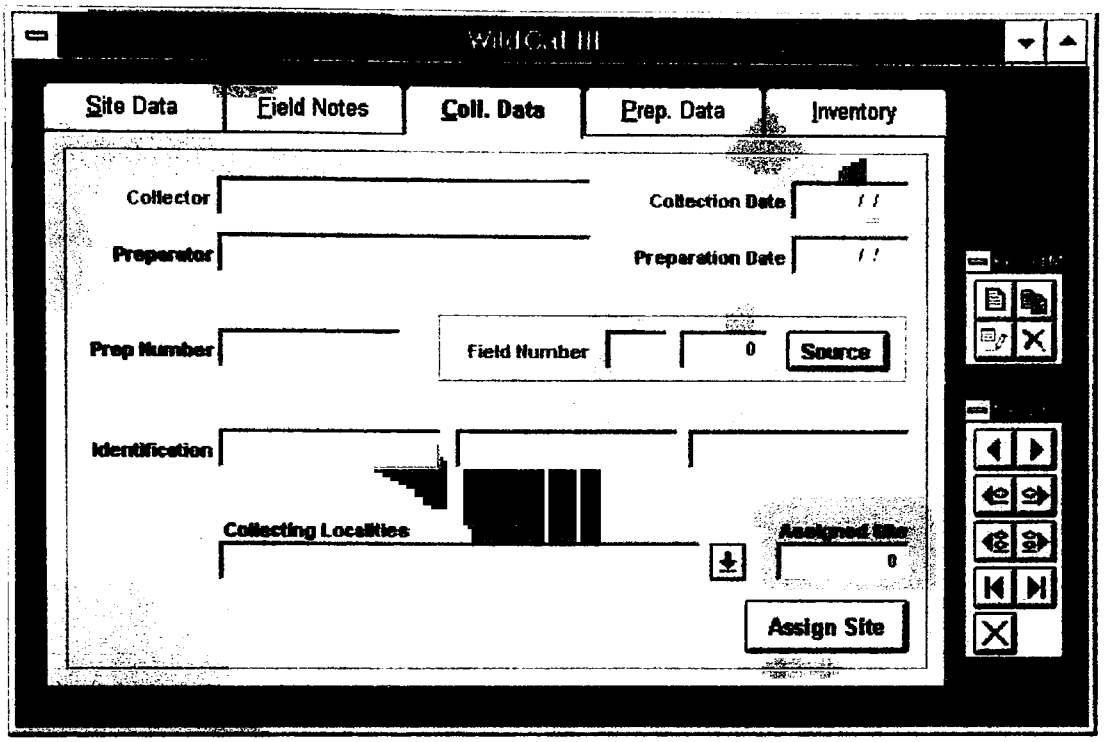
Create a new page of FIELD NOTES for each day of the collecting trip by clicking "NEW RECORD" on the Record Manipulation Controls. "DUPLICATE RECORD" is unavailable on this page.

FIELD NOTES should be typed in this box just as written field notes would be recorded in a field notebook. Use the drop down list to select collection sites, and click on INSERT to link the location descriptions into the field notes. DO NOT TYPE LOCALITY DESCRIPTIONS! Use the "paste" command to place locality descriptions throughout the entered field notes.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

WildCat III Tour

Collection Data Screen:



This page is used for the entry of COLLECTION DATA for each specimen. The computer will prompt the user to enter a new FIELD NUMBER in order to create a new record. "NEW RECORD" on the Record Manipulation Controls will create a blank record except for COLLECTOR which is entered automatically. "DUPLICATE RECORD" on the Record Manipulation Controls will duplicate all data except PREP NUMBER. It is possible to use the "DUPLICATE RECORD" command from any pre-existing record, not only the last one entered. Select the diesired record with the Navigation Controls and click "DUPLICATE RECORD".

Click on the folder tabs to view other screens: Site Data, Field Notes, Prep. Data, and Inventory.

Also click on Record Manipulation Controls, Navigation Controls, Collector, Collection Date, Preparator, Preparation Date, Prep Number, Field Number, Source, Identification, Collecting Localities, and Assign Site.

Collection Date

Collection Date [/ /

COLLECTION DATEs are entered as mm/dd/yy (all numerical values).

COLLECTION DATE is entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Preparator

Enter data in ALL CAPS.

PREPARATOR is entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Preparation Date

Preparation Date [/ /]

PREPARATION DATEs are entered mm/dd/yy (numerical values only).

PREPARATION DATE is entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Preparation Number

Prep Number

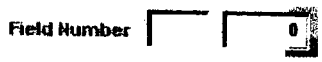
Enter data in numerical values only.

PREP NUMBER is *NOT* entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls. Data must be entered by hand.

It is not necessary to note PREP NUMBERs in FIELD NOTES as any reports generated will automatically include this data.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Field Number



If data are entered using the bar code scanner:

- **The FIELD NUMBER acronym (text only, such as TK or FN) is automatically entered in the first box.**
- **The FIELD NUMBER (numerical values only) is automatically entered in the second box.**

If data are entered by hand:

- **Type the FIELD NUMBER acronym (text only, such as TK or FN) in the first box.**
- **Type the FIELD NUMBER (numerical values only) in the second box.**

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Source

Source

Click to change the method of entering the FIELD NUMBER (choose to scan bar codes or type data by hand).

 **Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).**

Identification

Enter data in ALL CAPS.

IDENTIFICATION is entered automatically by clicking "DUPLICATE RECORD" on the Record Manipulation Controls, but data may be changed by hand.

Enter the specimen's genus in box 1.

Enter the specimen's specific epithet in box 2 (if known at time of data entry).

Enter the specimen's subspecific epithet in box 3 (if known at time of data entry).

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Collecting Localities

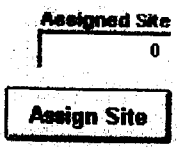
DO NOT type data into this field.

Choose the matching COLLECTING LOCALITY from the drop-down list by clicking the arrow button. Localities were previously entered on the SITE DATA screen.

It is absolutely necessary to link the specimen to its collecting site. Not doing so will lead to "orphans" (specimen records which are unidentifiable because of incomplete data) in the database.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Assign Site



Click the ASSIGN SITE button to link the collecting locality data to the specimen.

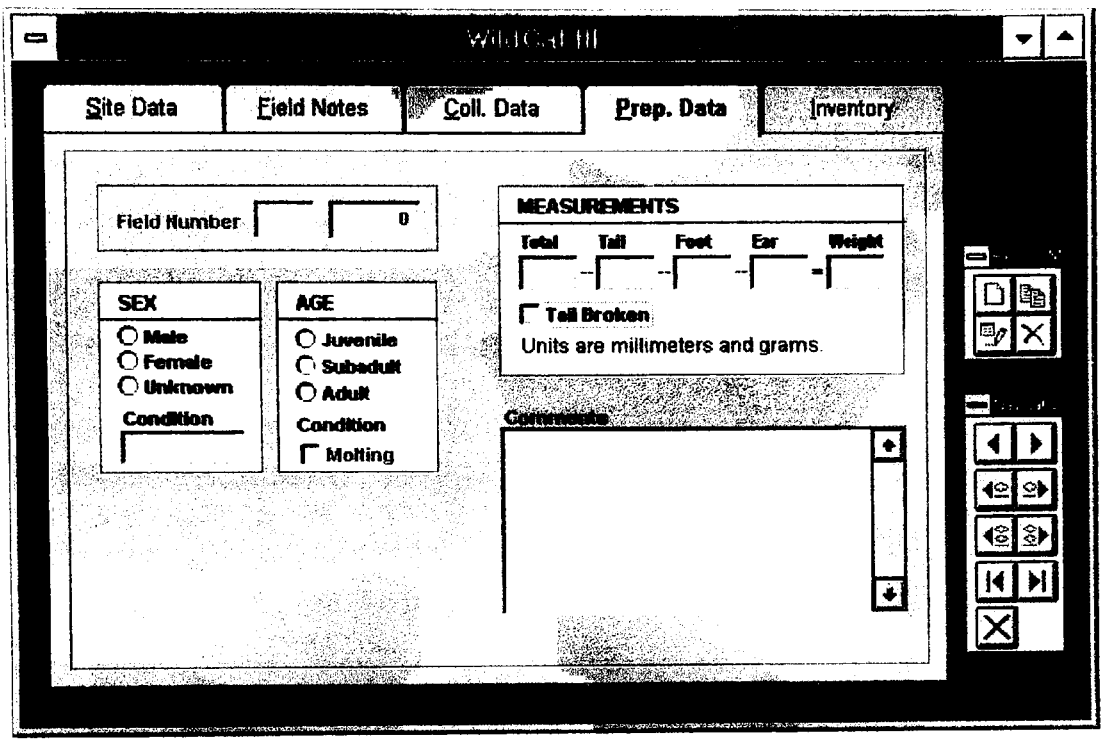
Data are automatically entered (in numerical values only) into the ASSIGNED SITE box when the matching collecting locality from the drop-down list is chosen (see COLLECTING LOCALITIES).

It is absolutely necessary to link the specimen to its collecting site. Not doing so will lead to "orphans" (specimen records which are unidentifiable because of incomplete data) in the database.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

WildCat III Tour

Preparation Data Screen:

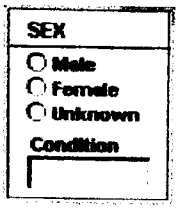


This page is used for the entry of data taken during the PREPARATION of each specimen. "NEW RECORD", "DUPLICATE RECORD", and "DELETE RECORD" on the Record Manipulation Controls are unavailable on this page as are the Navigation Controls. The only PREP DATA record available is the one that was active on the COLLECTION DATA screen when the PREP DATA screen (or tab) was activated. The navigation controls can be re-activated by using the navigation menu in your computer's toolbar. This will allow access to other records, but care must be taken to ensure that the incorrect records are not accidentally altered.

Click on the folder tabs to view other screens: Site Data, Field Notes, Coll. Data, and Inventory.

Also click on Record Manipulation Controls, Navigation Controls, Field Number, Sex, Age, Measurements, and Comments.

Sex

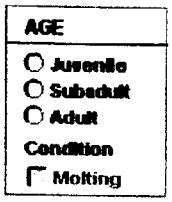


Data for SEX may be entered by using a mouse click or by using the arrow keys and hitting the space bar.

Type data for CONDITION in ALL CAPS (such as LACTATING).

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

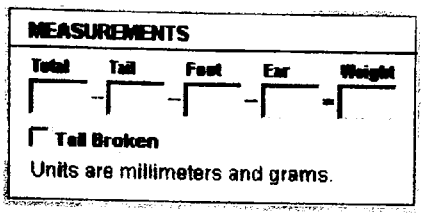
Age



Data for AGE may be entered by using a mouse click or by using the arrow keys and hitting the space bar.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Measurements



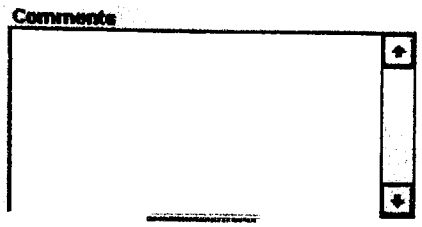
Enter data in numerical values only.

Be sure to verify the MEASUREMENTS, as this is the only place for recording this information.

Click the TAIL BROKEN box if necessary.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Comments

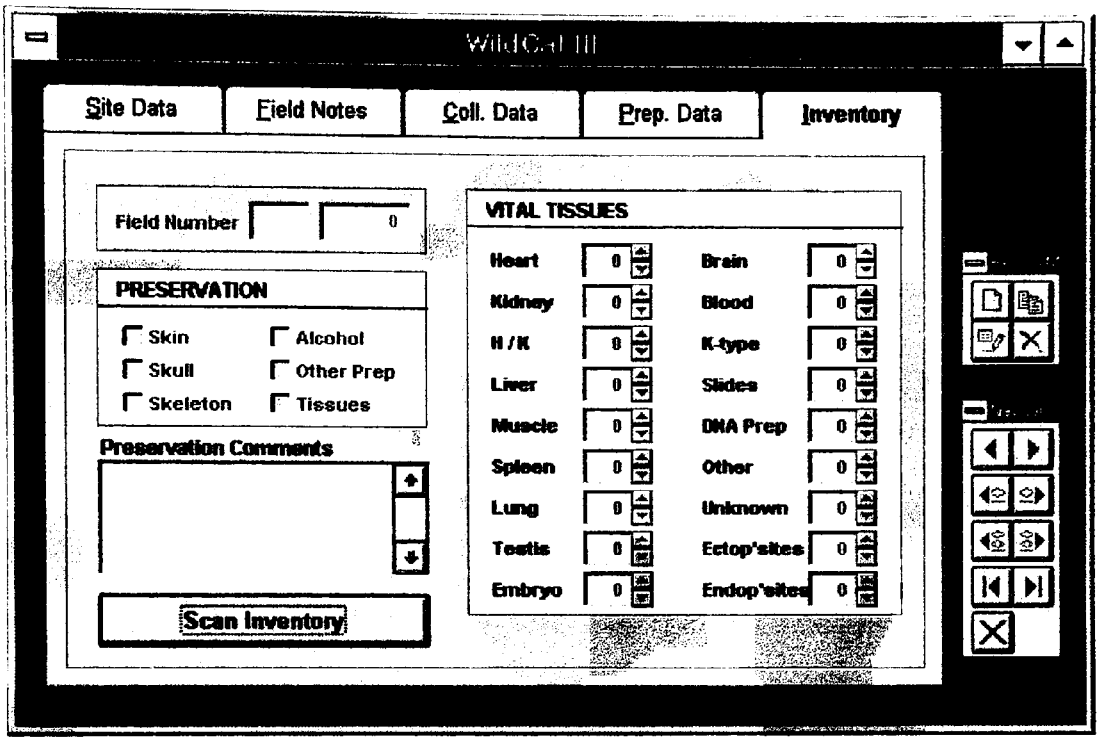


Type COMMENTS data in ALL CAPS (such as T=12MM *or* R 3, L 4 *or* TRAGUS=9MM).

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

WildCat III Tour

Inventory Data Screen:

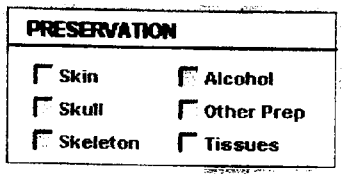


This page is used for recording the Preservation Status and INVENTORY for each specimen. on this page, data may be entered by hand (typing), or scanned from bar codes on the specimens. "NEW RECORD", "DUPLICATE RECORD", and "DELETE RECORD" on the Record Manipulation Controls are unavailable on this page as are the Navigation Controls. The only INVENTORY record available is the one that was active on the COLLECTION DATA screen when the INVENTORY screen (or tab) was activated. The navigation controls can be re-activated by using the navigation menu in your computer's toolbar. This will allow access to other records, but always verify the specimen number before making any changes.

Click on the folder tabs to view other screens: Site Data, Field Notes, Coll. Data, and Prep. Data.

Also click on Record Manipulation Controls, Navigation Controls, Field Number, Preservation, Preservation Comments, Scan Inventory, or Vital Tissues.

Preservation



PRESERVATION data may be hand entered by using a mouse click or by using the arrow keys and hitting the space bar. Click all parts that apply for one specimen (i.e. skin, skull, skeleton, and tissues).

Data are preferably entered using a bar code scanner. Click SCAN INVENTORY and use a portable bar code scanner to scan the bar codes of the different specimen parts (skin tags, skull tags, skeleton tags, alcohol tags, and tissue tube stickers). The computer automatically puts the scanned information in the appropriate sections of the INVENTORY screen for that particular record and matches scanned information to other records as well.

To stop scanning bar codes and return to keyboarding data, scan the bar code "scan stop code" provided by the NSRL.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Preservation Comments

Enter PRESERVATION COMMENTS data in ALL CAPS (such as ADDITIONAL LIVER IN LYSIS BUFFER).

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

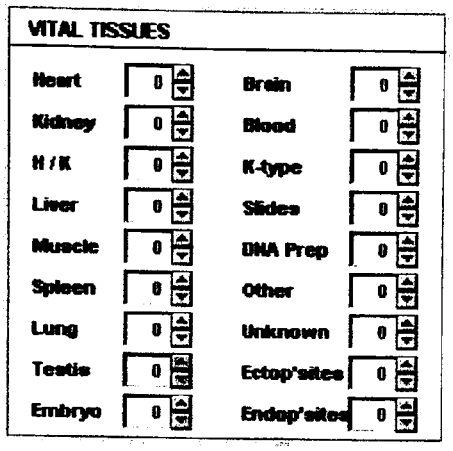
Scan Inventory

Click here to prompt computer to accept data from bar codes.

The computer will alert the user if an attempt is made to SCAN a bar code for which collection data has not been previously entered.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

Vital Tissues



VITAL TISSUE data may be hand entered by using a mouse click or by using the arrow keys and hitting the space bar. Click all tissue types that apply for one specimen (i.e. H/K, liver, muscle, spleen, blood, and karyotype).

Data are preferably entered using a bar code scanner. Click SCAN INVENTORY and use a portable bar code scanner to scan the bar codes of the different tissue tubes. If multiple tubes of a tissue are collected (e.g., 2 tubes of Liver for TK 12345) and only one tube is labeled with a bar code, simply scan the code twice.

The computer automatically puts the scanned information in the appropriate sections of the VITAL TISSUES area for that particular record and matches scanned information to other records as well.

To stop scanning bar codes and return to keyboarding data, scan the bar code "scan stop code" provided by the NSRL.

Back to: Site Data, Field Notes, Coll. Data, Prep. Data, or Inventory (or use the "back" button on your browser).

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Student Signature — Date: 13 NOV 2000

Disagree (Permission is not granted.)

Student Signature — Date