ILLINOIS

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FINAL REPORT

on the

NATIONAL BIOLOGICAL SURVEY-STATE OF ILLINOIS

PARTNERSHIP

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I. Introduction

Rationale: National Biological Service Initiative -- State Partnerships

As stated by the NBS, "State governments are major collectors and managers of biological information and are major natural resource decision makers in their own right. In addition, many federal programs are organized on a state basis. A major component of the NBS strategy will be to develop strong working arrangements between NBS and state governments for biological data sharing. NBS will attempt to build capacity for locating, organizing, integrating and delivering biological information within each state. In doing so, NBS will be the facilitator, with the goal of preserving state control and building state capability.

NBS will achieve this goal by initiating pilot efforts with selected states that will 1) achieve specific objectives identified by the participating states, while 2) helping NBS identify the most appropriate structures and strategies for ensuring strong state capability in this area."

In a large working meeting of NBS staff, museum directors, and others held at the Smithsonian Institution on February 25, 1994, one Breakout Group specifically addressed the question of State Partnerships. The recommendation of the Group was that "A state contact should be determined by the state and acknowledged by NBS at the earliest opportunity for purposes of interaction and communication with NBS, or the regional Ecocenter, and for identifying and developing the intrastate partnerships. The state contact should develop the necessary advisory committee(s) with representation from the science, policy, management, and user communities."

The Illinois Natural History Survey, with financial support from NBS undertook six projects to meet the objectives of the NBS-State Partnership Initiative, (1) A List of the Species of Illinois, (2) Publication of The Fishes of Champaign County: a Model for Long-term Monitoring, (3) Establishment of an Internet Host for Distribution of INHS Databases and Other Holdings, (4) Specimen-based Biological Collections Database Development and Entry on Internet, (5) Directory of Illinois Systematists, Ecologists & Field Biologists, (6) and Development of an Illinois Partnership. Following are final reports on the projects, arranged under NBS program headings.

II. NBS Program: Inventory and Monitoring

Mission: "To inventory and monitor the Nation's biological resources to determine and evaluate their status and trends to meet the needs of resource managers and to report on these to the people of the United States."

Project 1. List of Species of Illinois

Project Leader - Steven R. Hill

In order to make available to the general public and research community information on the organisms of Illinois collected since the formation of the Illinois State Agricultural Society (much later to become the Illinois Natural History Survey [INHS]) in 1853, a proposal was made and accepted by the National Biological Service [NBS] to compile a list of computerized names arranged in a taxonomic hierarchy and to make it available on the Internet. Funding was obtained for one and a half years (January 1995 - June 1996). The primary reason for the project was to help stabilize the names in use for Illinois species of plants and animals and to provide a useful and concise reference for those attempting to work with the Illinois biota.

The research of the past century and a half has accumulated in the form of many papers, reports, and carefully documented collections of specimens. However, there has been no single list of the organisms in Illinois either in print or in computer format. Published lists of various groups, while as complete as the researchers could make them, were by their very nature outdated as soon as they appeared in print. Not only do animals and plants move around as individuals or in the form of seeds and spores, but professional botanists and zoologists also discover new species, and uncover mistakes in naming organisms (nomenclature) that must be corrected. A centralized, easily updated and widely available list of Illinois organisms would be extremely valuable to State agencies, educators, students, farmers, and others with an interest in the state's flora and fauna.

Because of the biotic surveys that have been completed in Illinois, Illinois is one of the few states that has attempted even to estimate the number of species found within its boundaries. In 1991, a publication by INHS listed the major taxa found in Illinois and estimated the number in each taxon. The total number of organisms occurring in Illinois was estimated to be at least 53,754; some groups (e.g. vertebrates) are well-known; others (e.g. insects and fungi) are poorly known.

The database on Illinois organisms, funded by the National Biological Service, was begun in January 1995. Among the expected accomplishments during this period was the entry of the best-known (and more "popular") groups of plants and animals into the database followed by lesser-known (and less "popular") groups as time permitted. During the initial phase of setup, the following tasks were accomplished:

1. ILPIN (Illinois Plant Information Network) nomenclatural information (a pre-existing database on the plants of Illinois housed on a SUN computer system) was gathered into a NBS plant database ready for updating.

2. IFWIS (Illinois Fish & Wildlife Information System) nomenclatural information was gathered into a NBS animal database ready for updating.

3. Fields for the database were decided upon; Filemaker software templates were created; the first databases were entered and revised [ferns and fern-allies and gymnosperms/conifers]. See Table 1 for field descriptions. See Table 2 for a sample record.

4. Personnel were hired and trained. Steven R. Hill [Botanist] was already on staff. Duties: coordinate project; plant nomenclature. Technical Supportive Scientists hired were: Lawrence Keller. Duties: literature research; nomenclature and entry of animal records; Margaret (Peggy) R. Waltershausen. Duties: literature research; nomenclature and entry of plant records.

During the period of funding, over 15,000 individual species records were researched, edited, and entered into a series of files in Filemaker software format. Filemaker was chosen to conform with software used to computerize the INHS collections and other databases. Each record had available the 25 fields itemized in Table 1. This completed approximately 29% of the estimated total number of organisms in Illinois. This includes (among the animals) all of the vertebrate groups, mollusks, sponges, cnidarians, annelids, spiders, and significant numbers of other invertebrates including insects. Among plants, this includes all known flowering plants, ferns, conifers, mosses, liverworts, lichens, and algae. Groups still awaiting entry include the majority of the fungi, mites, protozoans, bacteria, flatworms, and many insects.

Experts at INHS on the various groups of Illinois organisms were consulted throughout the entry and revision process to insure coordination of efforts and to minimize duplication of effort. Collections personnel were also consulted to insure that the same standard references were used to coordinate organism datafiles with collection databases within INHS.

The groups that have been entered and the number of entries made have been included as Table 3. Finally, arrangements were made with INHS computer database managers and network supervisors to coordinate the transfer of the file data to an on-line format available through the INHS home page. Organisms can be illustrated with computer-scanned images to assist in identifications. These data will be useful for adults and children, for professionals and non-professionals alike. Indications from tests of data retrieval by means of Oracle software demonstrate that the project has been a success. The entire database is expected to be on-line and ready for fine

adjustments in the fall of 1996. Upon completion of these adjustments, the information will become available to the public and research community through the Internet and the INHS home page. Further information on this procedure is available through James Crowder at INHS.

Table 1. Description of Fields Entered for Illinois Organisms

Field name	Entry requirements
Kingdom	Alphabetical; There are 5 kingdoms: Plantae [= plants], Animalia [= animals], Fungi, Protista, Monera
Division_Phylum	Alphabetical; Plants are separated into Divisions; Animals into Phyla; Divisions end in -ophyta; Phyla have no standardized ending, but often end in -a
Class	Alphabetical; Plant classes end in -opsida; Animal classes often end in -a or-ia
Order	Alphabetical; Plant classes end in -ales; Animal classes often end in -es or -a
Family	Alphabetical; Plant families end in -aceae with 8 exceptions: Compositae [=Asteraceae], Cruciferae [= Brassicaceae], Gramineae [=Poaceae], Guttiferae [=Clusiaceae; Hypericaceae], Labiatae [=Lamiaceae], Leguminosae [=Fabaceae], Palmae [=Arecaceae], Umbelliferae [=Apiaceae]; Animal families end in -idae. Alternate plant family names have been separated by "_"
Genus	Alphabetical; one-word, first letter capitalized
Specific epithet	Alphabetical; one word, rarely with a hyphen "-"; never capitalized; no standard ending
Specific authority	Alphabetical or numerical; with other characters, including " ( ) > & - . "

Infraspecific rank	Alphabetical; possibilities: var., ssp., subsp. We are not including the rank "form" [="forma"]
Infraspecific epithet	Same form as specific epithet
Infraspecific authority	Same form as specific authority
Synonym 1	Alphabetical and numerical; full name with rank and authorities, like combining Genus, specific epithet, and specific authority fields as above, along with infraspecific rank, epithet and authority if necessary. Animal names generally have the date of publication at the end, sometimes separated by a comma. Additional synonyms and/or information can be put in the comments field See Appendix 1 for additional remarks on synonyms.
Field name	Entry requirements
Synonym 2	Same form as Synonym 1
Common names	Alphabetical, some hyphens; First letter of each common name capitalized, the others lower case, except for proper names; there may be several common names in this field connected by semicolons. Normally, only two common names have been included for any organism, but there are exceptions. Ideally, this should be reduced to one. Many common names have been entered in all capital letters, as was the case in IFWIS and ILPIN. Therefore, any searches of this field should be non-case specific
Status	Alphabetical and numerical; Possibilities: Not listed; Endangered in Illinois [=SE]; Extirpated in Illinois [=EX; =extinct]; Threatened in Illinois [=ST]; Illinois Watch List [no legal status]; Federally endangered [=FE]; Federally threatened [=FT]; Federal candidate [=C2]; Not in Illinois [=NA]. More than one possibility within the same field will be separated by semicolons. Additional qualifications or information can be put in the comments field

Literature	Alphabetical and numerical; references separated by semicolons; will need a full bibliography connected with this field so that each citation which has been abbreviated here can be written out in full somewhere on the system
Native	Alphabetical; possibilities: Yes; No. Additional qualifications or information can be put in the comments field
Taxon code	Alphabetical and Numerical; ILPIN numbers are numerical only; XXX has been added to some records that were not in ILPIN or which were of uncertain status within ILPIN. [example: 40 5 5 7 35 5 0 1 0 0]. ILPIN is the pre-existing Illinois Plant Information Network; IFWIS is the pre-existing Illinois Fish & Wildlife Information System (animal data).
Comments	Alphabetical and numerical; free-form; anything can appear here; comments can deal with distributions, change in status, nomenclatural changes, etc.
Binomial	A supplemental field not used in searches generally, a combination of fields 6 & 7 used to help load information from other files
Field name	Entry requirements
Taxon group	The English common name for the major group to which the organism belongs. For example, snakes, flowering plants, spiders, birds, mammals, mosses
Record ID	A unique alphabetical and numerical code for each record used for indexing by software
Creation date	Date the record was created and entered
Modification date	Date an existing record was changed/updated
File ID	A 2-letter code unique to each Filemaker file for indexing and updating by software

Table 2. Sample Record for Resurrection Fern, *Pleopeltis polypodioides* (L.) E.G. Andrews & Windham var. *michauxiana* (Weatherby) E.G. Andrews & Windham:

Kingdom	Plantae
Division_Phylum	Polypodiophyta
Class	Polypodiopsida
Order	Polypodiales
Family	Polypodiaceae
Genus	Pleopeltis
Specific epithet	polypodioides
Specific authority	(L.) E.G.Andrews & Windham
Infraspecific rank	var.
Infraspecific epithet	michauxiana
Infraspecific authority	(Weatherby) E. G. Andrews & Windham
Synonym 1	Polypodium polypodioides var. michauxianum Weatherby
Synonym 2	
Common names	Resurrection fern; Gray polypody
Status	Not listed
Literature	Flora of North America 1993 v. 2 p. 326; Mohlenbrock 1986 Guide to the Vascular Flora of Illinois p. 77
Native	Yes
Taxon code	40 5 5 7 35 5 0 1 0 0
Comments	Generally epiphytic
Binomial	Pleopeltis polypodioides
Taxon Group	Ferns_Pteridophytes
Record ID	pt67
Creation Date	4/20/95
Modification Date	6/18/96
File ID	pt

Table 3. Number of Records Entered (Arranged by Taxonomic Group and File name, alphabetical within Kingdom).

Kingdoms	Divisions/Phyla	Total Entered
Monera	Cyanophyta	132
	Schizophyta	0
		Subtotal: 132
Protista	Acrasiomycota	0
	Chlorophyta	657
	Chrysophyta	439
	Dictyosteliomycota	0
	Euglenophyta	69
	Hyphochytriomycota	0
	Labyrinthulomycota	0
	Myxomycota	66
	Oomycota	0
	Plasmodiophoromycota	0
	Protozoa	35
	Pyrrophyta	24
	Rhodophyta	5
		Subtotal: 1,295
Fungi	Ascomycota	469
	Basidiomycota	225
	Chytridiomycota	0
	Deuteromycota	0
	Zygomycota	0
		Subtotal: 694
Plantae	Bryophyta	504
	Equisetophyta	13
	Lycopodiophyta	16
	Magnoliophyta	3,046
	Pinophyta	22
	Pteridophyta	80
		Subtotal: 3,681
Animalia	Acanthocephala	18
	Annelida	164
	Arthropoda	8,373
	Chordata	830
	Cnidaria	9
	Ectoprocta_Bryozoa	9
	Entoprocta_Kamptozoa	1
	Gastrotricha	13
	Mollusca	319

(cont.)

cont. Animalia

Kingdoms	Divisions/Phyla	Total Entered
	Nematoda	37
	Nematomorpha	2
	Nemertea	1
	Pentastomida	0
	Platyhelminthes	111
	Porifera	12
	Rotifera	153
	Tardigrada	13
		Subtotal: 10,065
		Total Entered: 15,867

Appendix 1. SYNONYMS in the list of Illinois Organisms

Fields labeled SYNONYMS refer to names no longer accepted as correct that have been used in 20th Century literature for a given organism. The purpose of the fields is to assist in searches for organisms by scientific name, even if the name is no longer the accepted one for a given organism. If a person inquires about a given organism and uses a name no longer considered current, the correct current name can still be found along with its associated information in the database by means of these fields.

The synonym lists in this database, then, do not necessarily include all basionyms (the first published name for the organism) nor all available nomenclatural synonyms for Illinois organisms. Only those names used by various authors in 20th Century literature as correct names for Illinois organisms are included.

Misapplied names: if an incorrect name has been applied to an Illinois organism in the major literature due to incorrect identification with a type, it may be included as a synonym with the remark "*misapplied* or "*sensu auth.*".

Taxonomic synonyms will be included as synonyms *with authorities cited* if they have been used as the correct name for Illinois organisms in the major literature.

If species are split into two or more new species as a result of additional research, the original name by which the several species were known will be included as a synonym with the remark "*in part*" to indicate that the original use of the name referred to more than one currently accepted species.

Not all of the names used in 20th century literature have been included in the synonym fields. The arbitrary date of 1950 has been set, for the most part, in determining what alternate names have been used for organisms in Illinois.

Project 2. Fishes of Champaign County: a model for long-term monitoring
Project Leader - R. Weldon Larimore

The objective of natural resource protection is to maintain, or to restore, selected habitats and ecosystems in conditions as close to natural as possible. Consequently, meaningful environmental indicators, as useful measurements of the biological integrity of ecosystems, must incorporate historical data. The 135-year-old Illinois Natural History Survey is in the unique position on having the best historical and recent data on several groups of organisms. Large portions of the data are automated (for fishes, amphibians, reptiles, mussels, crustaceans, vascular plants) and, for some groups of organisms, have been analyzed for long-term spatial and temporal changes; e.g., "Fishes of Illinois" (Smith 1979) compared data of the 1950's-1970's with those of the late 1880's, Forbes and Richardson's "Fishes of Illinois" (1908).

The fishes of Champaign County, Illinois, have received as intensive and prolonged study as any group of organisms in any area of equal size in the New World. The long period of observation has furnished an unusual opportunity to evaluate the ecological changes that have occurred in a highly developed agricultural and urban region and to relate these changes to the distribution and abundance of stream fishes. The fishes of Champaign County were first studied around 1900 (Forbes & Richardson 1908); since then three additional surveys have been made, at 30-year intervals: Thompson and Hunt (1930), Larimore & Smith (1963), and Larimore, Bayley, and Osborne (1993). The study not only provides a model for studies on long-term environmental monitoring but offers an example of the utility of the data generated.

The most recent study, that of Larimore, Bayley, and Osborne was completed in 1993, and funding was provided by the NBS for publication of the results. The publication is in press and will appear in fall 1996 as Illinois Natural History Survey Bulletin, Volume 35, Article 2. An internet entry announcing the availability of the publication and its value as a model for studies on long-term environmental monitoring will appear shortly after the publication date. The following is a summary of the results of the study.

Streams and their aquatic communities are directly influenced by the past and present activities of man. In Champaign County, marshes and tall grass prairie have been converted to farm lands that have been subjected to intense fertilizer and pesticide applications, converted to cities and highways, and have been the dumping ground of domestic and agricultural wastes. Such practices can be expected to have significant influences on aquatic communities. An understanding of man's influences on aquatic systems is therefore essential for the management and preservation of the associated streams. The availability of historical information on the fish communities inhabiting the streams of Champaign County (Forbes and Richardson 1908, Thompson and Hunt 1930, and Larimore and Smith 1963) in conjunction with data collected in the present study provided a unique opportunity to

relate a century of biological observations with dramatic changes in land drainage, agriculture, and urbanization. Thus, the importance of this study is not restricted to its geographic location, or to a unique assemblage of fishes, but rather, to long-term patterns in fish community composition and structure in a midwestern, agricultural setting. Understanding the long-term implications of such changing land-use practices on stream fish assemblages is critical to sound environmental management and planning.

Stream fishes in the six drainage basins of Champaign County, Illinois were quantitatively sampled from June 1987 through October 1988. Species richness and composition were compared to three historical fish surveys that had sampled the same locations in the late 1890's, in 1928, and in 1959 and 1960 at approximately 30-year intervals. Ninety-two species have been recorded from the county during the past century. Of 18 previously recorded species not taken in the recent survey, 16 were never common in the county and 5 are listed as Illinois Endangered Species. With species disappearing and new ones being taken, the total numbers collected in the past three surveys have been virtually the same, 73-73-74. Data on land use, water quality, and physical habitat were related to fish communities as part of this project but not presented here.

A total of 81 independent fish taxa from unrepeated samples were used for comparison among all four surveys (three historical surveys and present survey). We found that species richness dropped after the second survey as water quality declined in the county during the 1930 to 1960 period. Tests of association and time trends indicated 11 taxa (species or species complex) generally increased in percentage of occurrence through time, 5 taxa decreased, 10 taxa showed more complex changes, and the remaining 21 taxa showed no significant association or trend. Biomass of sportfish, including largemouth bass, spotted bass, smallmouth bass, rock bass, channel catfish, and grass pickerel, increased during the past 30 years in Champaign County streams. Historical evidence indicates that poor water quality may have been a major limiting factor to most fishes in the 1950's. Results from the present survey indicate that water quality has greatly improved during the past 30 years, with the elimination of seven principal areas of chronic pollution. The physical habitat currently limits the distribution and abundance of most fish in Champaign County. The land-use/cover conditions in Champaign County during the 1950's were quantified and compared to those that existed during the recent survey in an attempt to identify potential land-use changes that may be associated with the distribution and abundance of fish populations. Urban spread has taken much agricultural land and reduced water retention in the floodplains, while the reduction of cattle feed lots and conservation tillage have improved the streams.

The limiting physical habitat is still a function of land-use practices associated with agriculture, particularly channelization and channel maintenance for drainage. Although the dredged streams may never regain the diversity of habitat that existed before channelization, some farmers and drainage engineers are limiting channel maintenance and permitting the

development of instream meanders, bars, pools, and bank vegetation. Most of the fishes of Champaign County quickly accept these modest habitat improvements.

III. NBS Program: Information and Technology Services

Mission: "The mission of Information and Technology Services (I&TS) is to provide access to, disseminate, and share biological resource data and information of the United States. Specifically, I&TS plans and implements information technology systems for the objective and effective collection for storage, retrieval, analysis, use, and timely dissemination of comprehensive biological data and information to promote wise stewardship of the Nation's natural resources."

Project 3. Establishment of an Internet Host for Distribution of INHS Databases and Other INHS Holdings

Project Leader - James W. Crowder

A long-term goal of the Illinois Natural History Survey's network support staff is building an electronic information infrastructure easily navigable by research, public, and administrative users. This intranet will act as a conduit for research activities, public interaction, and administrative processes. The Survey's computing infrastructure will gather data and information from the originating source and become part of the Survey research and administrative process. This effectively makes INHS computing infrastructure a window into the form, function, and processes that make up the Natural History Survey instead of static materials produced by the processes, thus creating a dynamic view of research productions, business information flow, and community interaction.

The technologies required for such an electronic infrastructure are young and ever changing. The efforts required for such a transition include major philosophical and computation changes internal to INHS, the entities we work with, and the community we serve. Though most of these changes are outside Survey control, the rapid growth of the Internet and computing technologies not only makes such an infrastructure possible but also a realistic goal in the not-too-distant future. Thanks to support from NBS, such an information infrastructure is starting to emerge at INHS and will continue to grow long after this project is over.

NBS provided funding for one crucial piece of INHS public computing environment: an Internet-accessible host to house Survey electronic publications and databases. The projects associated with establishing an Internet host have given INHS staff a solid framework upon which to build the Survey's electronic information exchange and gathering systems, and knowledge to share with others about the process. These projects include The

List of Species of Illinois, Specimen-based Biological Collections Database, Directory of Illinois Systematists, Ecologists & Field Biologists, Annual Report of the Illinois Natural History Survey, Illinois Natural History Survey Reports, and the Illinois Natural History Survey Publications Catalog.

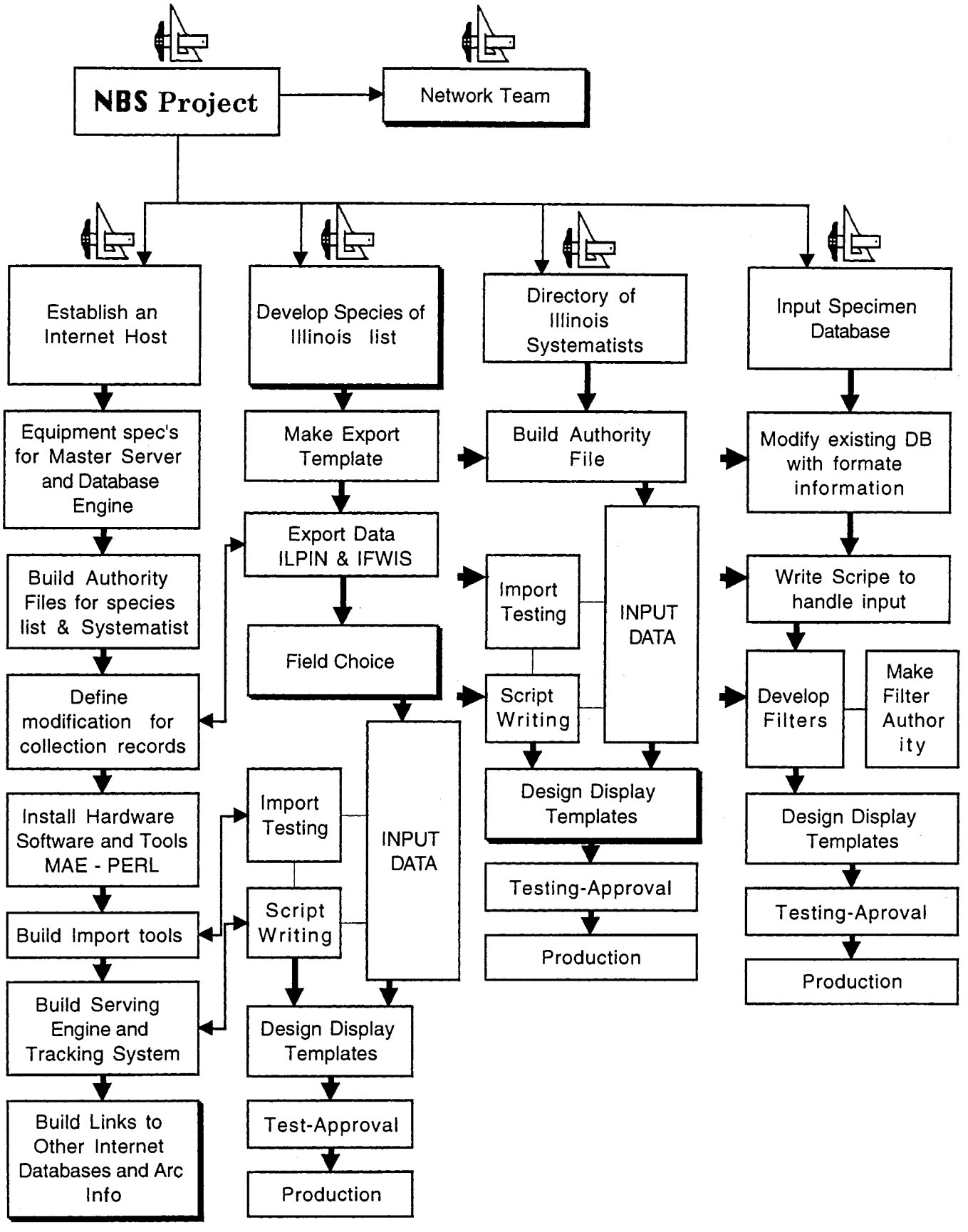
The first phase of establishing an Internet host involved choosing a host, operating system, database engine, and Web-serving software. A Sun Spark Station running Solaris for the operating system and Oracle for the database and Web engine where chosen. Choices were based on compatibility concerns, cross-departmental data exchange needs, existing architectures and support personnel, and GIS components already in place. The new system fits well into INHS' over-all computing model. NOTE: see Figure 1.1 for a diagram of project and resource structure.

Next, each project was evaluated to determine the form and format in which each should be developed and published, what system pieces need to be built, and how dynamic updates of data could be achieved. Common elements were found and a framework identified for each project. Next, projects were broken down into two key groups, dynamic databases and static publications.

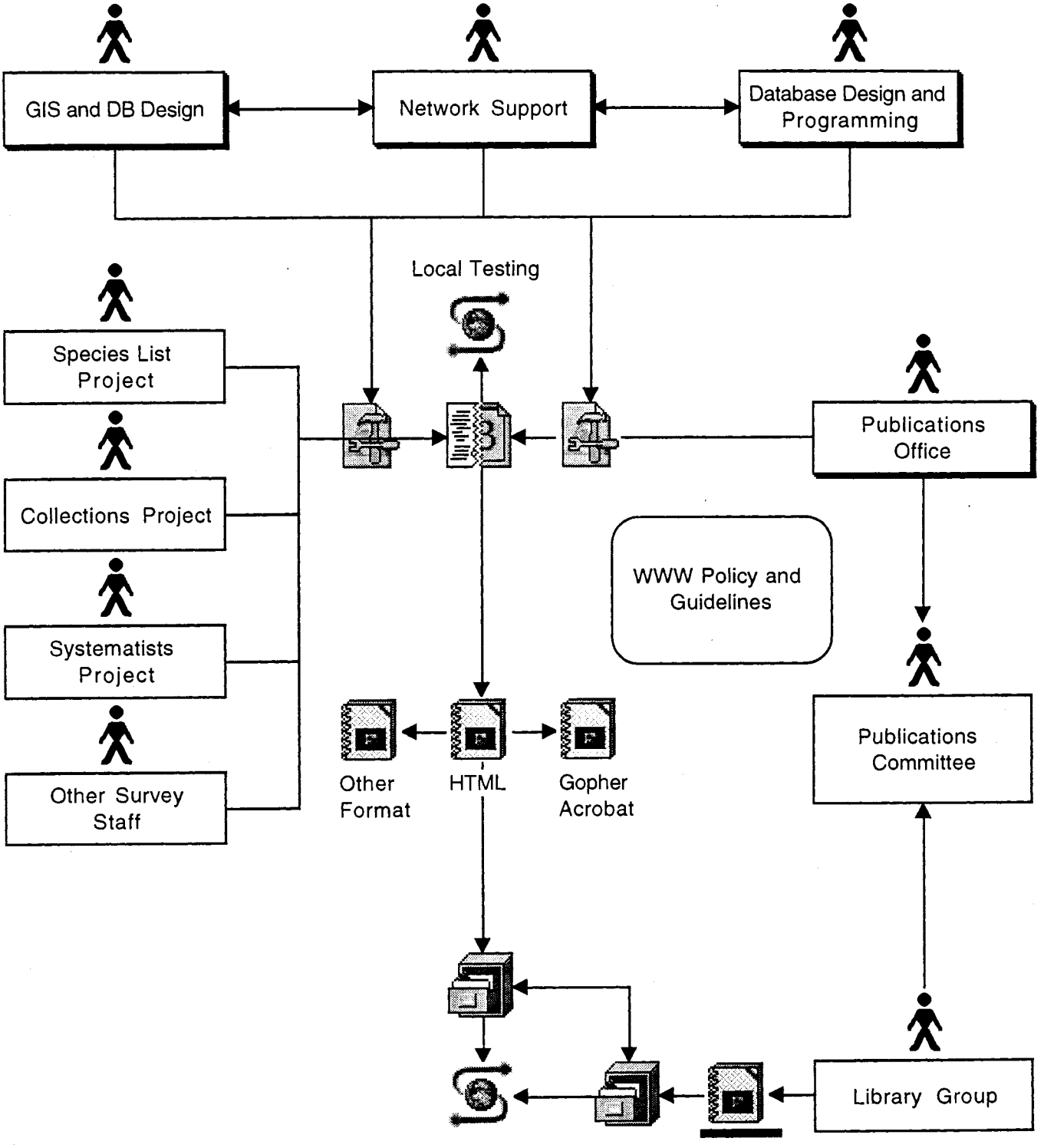
The first type of publication addressed was static documents (Publications Catalog, Annual Report, Survey Reports). Converting existing documents to HTML by NBS-funded personnel would have been an easy solution for satisfying grant requirements but would have done little for future electronic INHS publications. Instead, INHS network staff and NBS-funded personnel developed a procedure for INHS publications and other Survey staff to follow when producing both printed and electronic materials. Also, policy and procedures were developed through INHS publication and network committees. The end results are a successful policy and procedure guideline that has been used as a template by numerous other state agencies, a publications group that develops projects in parallel for printed and electronic publication, and update responsibility shifted to information sources; that is, Grants and Contracts, Human Resources, Library Services, and many scientific staff produce and update their own materials with little assistance from computer personnel.

NOTE: see Figures 1.2, 1.3, and 1.4 for on-line access to the following URLs
http://www.inhs.uiuc.edu/chf/annual-report/..... loop up
http://www.inhs.uiuc.edu/chf/pub/survey-report
http://www.inhs.uiuc.edu/chf/pub/pubs-catalog/
or
http:/www.inhs.uiuc.edu/lib
http://www.inhs.uiuc.edu/chf/grants
http://www.inhs.uiuc.edu/chf/personnel

Top Level Drawing



Network Team



Parent File List

Project Name ServerRoot

File Name inhshome.html **Children**

File Type ○ Acrobat ○ graphic ◉ text ○ Other...

Served via ☐ ftp ☐ gopher ☒ http ☐ wais ☐ other...

Server Name Xinu_Server

File Location ResData/mosweb/

Owner Name James Crowder

Center ☐ CAE ☐ CBD ☐ CEE ☒ CHF ☐ CWE

ID Number INHSPUB-00001

Modification Date 7/7/95

Comments INHS Home Page NCSA server deamon Port 80

WWW System www.inhs.uiuc.edu

Port ◉ 80 ○ 70 ○ Other

Office of the Chief Authority File: SLCHF

Center CHF | Second Center

First Name | Middle Initial | Last Name: Information Office

Office Phone: 3-6800

Email Address: pduzan@mail.inhs.uiuc.edu

Building: Natural Resources Building

Room No. 174

Other Addresses:
Natural Resources Building
607 East Peabody
Champaign IL 61820-6917

Home Address | Home Phone | "Label" to print on list

Degree (check if Ph.D.): ○ Ph.D.

Research Area/Service Type/Working Title: information office; pub sales

Mail Groups: ☒ No ☐ L2 ☐ L4 ☐ L6 ☐ L1 ☐ L3 ☐ L5

Status: ○ Retired ○ Hourly ◉ Staff List ○ Other

Home Page Address

Include Online? ○ Yes ◉ No

Remove Home Page Access? ☐ Yes

Link to Publications? ○ Yes ◉ No

Last Modification: 10/30/95

ID: SLCHF0148

I HAVE REVIEWED MY DATABASE RECORD. PLEASE MAKE THE FOLLOWING CHANGES:

INHS Library World Wide Web Links

File author ex: LIBWWWLIST

Title

Illinois Department of Energy and Natural Resources

Link Address

http://www.isgs.uiuc.edu/enr2/enr.html

Subject General Environmental Info **Type** State Government Agency

Include a link in following lists

Dataset ○ Yes ◉ No

CHF ○ NO ◉ YES CWR ◉ NO ○ YES CAR ◉ NO ○ YES

CBD ◉ NO ○ YES CES ◉ NO ○ YES GIS ◉ NO ○ YES

Include Online

◉ Yes ○ No

Additional Information

LIB-INHS00019

1/10/96

Dataset No

The second type of project concerned database-related material and required special attention. First, information source fields and files were defined (i.e., each project leader chose what data would be gathered and entered). Computing staff added input based on what type of export and fields would be needed for easy export, and existing data sources were imported or altered to meet the new requirements.

The original DISE database was altered drastically. Most values were redefined, and text input fields were replaced with check boxes and additional information fields. This made developing logic programs to extract the data from DISE much easier and typing errors less likely. The DISE database is the only data source that must be in a fixed export order. Due to the simplistic nature of the input fields, most values can only be yes or no through the use of a radio button. This in turn allows only for yes and no options to be exported. Due to the number of fields (234) and the fact that only one database exists, we chose to embed a script in the data set that exported in the correct order. An on-line entry form and update tool is under construction, and will be on-line this summer. Incoming information will then be passed to whomever is responsible for updating the pages.

The species list databases were developed, and data was imported from existing data sources and modified. Sources included IFWIS, ILPIN, collection record look-up files, and Survey staff. Many separate files exist, each having its own unique ID. Export can be in any order as long as the template record is at the top. This species list of Illinois is mapped to the list used for collection records. One of these data sets will be given priority for update privileges on the Web. Authority has not been assigned for updates yet; this will be decided over the summer. One set of files will be actively updating the data set. This may vary depending on taxon group but currently the species list is the official update tool.

The collections records were already in electronic format for many data sets. Collection files were altered to accommodate import and tracking components. The Web system uses a template from each data source. Unfortunately, the current data sets consist of different data fields because each has been maintained by a different curator. However, agreement was reached about which fields to employ, and common fields were defined. Mapping between collections is now possible and working well. On-line collections will be updated by collection curators. A program reads and breaks up the data file to build an Oracle import file. NOTE: see Figure 1.2 for a diagram of collection database files.

With fields and files defined, extraction tools were developed to import all data entry files into the Web database system. Each set of files and fields has filter and checking functions built specifically for it. This allows greater error checking and reporting capabilities, and referencing and indexing between fields and files. Most data source files have four common fields that allow easy tracking of data updates and possible errors. Also, exclusive information about the database is sorted in the on-line database engine. Tracking fields are

Creation Date
Modification Date
File ID
Record ID

Creation Date and Modification Date apply to records and are used to determine what data records need to be updated. File ID identifies a file or database source. Record ID is a set of fields stored in a database record or view and allows tracking the origin of on-line data. This allows multi-source files to be merged into one concurrent system but still being able to find the original sources of data.

Source	files	fields	records	
DISE 1	234	~413		
Species List	48	26	~10,000	
Insect list	1	16	2,500	
Staff Information	5	23	~200	see figure 1.3
Library	1	16	~150	see figure 1.4
Web Doc Index	1	17	~4,500	see figure 1.5
Collection Lookup				
Mammal	1	22	644	see figure 2.1
Fishes	1	36	2,006	see figure 2.2
Herps	1	29	1,481	see figure 2.3
Mollusk	1	24	1,156	see figure 2.4
Crust	1	24	223	see figure 2.5
Collection Catalog				
Mammal	1	26	630	see figure 3.1
Fishes	1	33	68,770	see figure 3.2
Herps	1	45	11,478	see figure 3.3
Mollusk	1	52	18,596	see figure 3.4
Crust	1	49	5,448	see figure 3.5

In addition, all source databases have a metadata (dummy record) defining each field in the database. This allows common fields to be identified and will allow additional information to be added as the databases grow in complexity. Currently over 300 distinct fields exist across all data sources. This number is expected to increase greatly as GIS and complex INHS data sources are expanded.

Exporting data to the Web system is a simple pull-down menu option for most database users. This function writes to a networked drive all information in the data source file. Once on the server an automated script opens the file, determines data source, field export order, and available fields. It then looks at the latest known update and builds an Oracle import file to update changed data sets. This file is then loaded into the on-line database replacing old records or creating new records when needed. Updates will be further enhanced over the summer with on-line update options and report

gathering options for staff and other Web developers. Also, the library will be expanded to include data from Department of Natural Resources offices, and will be part of a dynamic Web referencing page.

All database fields and functions will be published internally for Natural History Survey staff. Also, many specifications will be made available for individuals or institutions interested in accessing dynamic data from INHS. This comprehensive list will give Survey scientists and administrative staff insight into the Survey's information infrastructure and allow collective groups to work with appropriate types of data and information.

Detailed explanations of program script functionality are beyond the scope of this report, but will be included on-line at a later date. Many pieces are currently being developed and modified to integrate other non-NBS data sources. At present there are approximately 15 system scripts ranging from a few lines of code to two that are over 1000 lines. Scripts and rules developed inside the Web server engine include approximately 45 programming pieces that range from one to six pages.

Problems

The project also has had a couple of major problems along the way, mostly with our database engine. Though Oracle is an exceptional database company and relational database engine, Version 1.0 of its Web system was not all it should have been. Staff had to go through two major Web system upgrades. Also, a major database and operation system upgrade had to be performed. This took much time away from the programming task. Problems with the database to Web interface left the system down for over two months, waiting for Oracle to correct a problem. The first upgrade left much of the programming code obsolete. Finally, in March the problems with access were fixed but this has left our project with little time left to develop an interface. Work has been feverish but due to the lost time all search options and window interfaces will not be functioning when the system is opened up for public access. Those features will be on-line sometime in 1996.

In summary, all electronic publications required by the grant have been entered into the Survey's database engine and are accessible. The Survey has also developed other electronic publications in conjunction with other INHS staff and other allied agencies. The National Institute for the Environment, North American Benthological Society, Illinois Hazardous Waste Research and Information Center, and the Illinois State Geological Survey have information housed in the Survey's Web system. The coming year will see major changes to the INHS Web system and shared information system. In conjunction with our parent organization, INHS will be developing a cross-departmental database, allowing easier access to public users who may not know which institution holds the data they need. Advanced features, such as forms, tables, Java, and live HTML, are an integral part of the Natural History

Survey's Web system, making it one of the more advanced systems on the Internet.

Project 4. Specimen-based Biological Collections Database Development and Entry on Internet -

Project Leaders - Loy R. Phillippe and K. R. Methven

Herbarium

Computerization of the Illinois Natural History Survey Herbarium (ILLS) began about 1 January 1989. The primary reason for computerizing the data was for rapid access to the large amount of valuable information that in its present condition was not readily attainable. With the herbarium computerized, locations of vouchered species by state, county, habitat, and legal location would be easily and rapidly available. Computerization allows us to make lists of vouchers for nature preserves or natural areas, to find potentially interesting community locations through study of indicator species, and conduct searches for rare plant information. This computerized information can then be made available to a wide variety of interested persons. Also, individuals studying specific species may obtain printed or computer copies of the data without duplication of effort. Lack of data for various species or locations may indicate species or areas requiring more study.

Filemaker was selected as the computer program that best fit our needs. This program has rapid search capabilities, is easy to use, is easily modified, is relational and is capable of handling large amounts of data. Using this program, we developed a series of fields which reflect herbarium label data and any additional data typically associated with curatorial work. Table I lists the fields we presently utilize and the entry requirements for computerization.

When data from the specimens are entered into the computer various layouts can be generated depending on the type of information we wish to provide. Layouts can be generated to reflect any number of fields that are needed. If a request is made for all known species vouchered in our herbarium from a specific location, a layout can be generated to find that information and the information then can be printed to reflect the specific data requested. When labels are typed for new specimens added to our collection the data do not need to be typed a second time. The label data need only be incorporated (imported) into our existing herbarium computer file. Table II is an example of a label developed from the fields.

Actual computerization began 1 January 1989 and by 1 January 1995 (4 years) the project was 60.5% completed. Funds were provided by the National Biological Service (NBS) from 1 January 1995 to 30 June 1996 (1.5 years). We are presently at 92% completion, an increase of 31.5%; 170,234 of the 185,014 vascular plants have been computerized. Table III lists the vascular plants

families in the ILLS herbarium, with the families in bold having been computerized.

The Survey is dedicated to this project and our goal will be to complete 100% of this project by 31 December 1996. After this date, work will begin to resolve any problems, such as duplicate records, and new specimens will be continually incorporated. Soon after this project is complete we plan to begin computerization of the herbarium at the University of Illinois.

Table I. Computerization for Vascular Plants at the Illinois Natural History Survey

Field name	Entry requirements
Family #	Family numerical acronym
Family	Family name (according to Engler and Prantl system) for those families with two correct scientific names always utilize the name with the -aceae ending Apiaceae -not- Umbelliferae Arecaceae -not- Palmae Asteraceae -not- Compositae Brassicaceae -not- Cruciferae Fabaceae -not- Leguminosae Clusiaceae -not- Guttiferae Lamiaceae -not- Labiatae Poaceae -not- Gramineae
Genus	Genus name
Species name	Specific epithet name
Auth.	Authority name (may be abbreviated as in book)
S/V/F	Subspecies use ssp. Variety use var. Forma use f.
Taxon	Enter appropriate name (ssp. name or var. name or f. name)

Author	Authority name for the ssp. name or var. name or f. name
Cultivar	If cultivated plant then put cultivar name if known.
State	Spell out name of the state or province
Co.	Spell out name of county or parish, please follow the spelling as recorded on the attached sheet, do not abbreviate any county names or any part of a county name. The word county is not included as part of this field, the word county is automatically entered if a county or parish name is entered.
T/R/S	Examples: T. 2N, R. 8W, NE1/4 NE1/4 SECT. 25 T. 2N, R. 8W, Sect. 25 & 26 Leave this field blank if this information is not provided by the collector.
Field name	Entry requirements
Lat/Long	Examples: 41°N. Lat. 88°W. Long. 41° 9' 20" N. Lat. 88° 27' 15" W. Long.
Locality	A narrative description of the collection site, always put a zero in front of decimal points, but not behind (example: 0.25 mile NOT 2.0 mile). No fractions (example: 0.5 mile NOT 1/2 mile, 2.25 mile NOT 2 1/4 mile). Use digit not word descriptions for a number (example: 7 miles north of Champaign NOT seven miles north of Champaign). No abbreviations except those listed below or when abbreviations used by the collector are not understood and should be entered as used by the collector. (example: southeast NOT SE, mile NOT M., Central Illinois Railroad NOT CIRR). Only the following abbreviations are to be used: U.S. D.B.H. U.S.G.S. Any other abbreviations should be cleared with collection manager (Loy R. Phillippe)
Habitat	Narrative description of the habitat. Also, this field may be used for comments (example: common, flowers white, cultivated).

Collector(s)	Enter name as shown on attached list (example: R.A. Evers, NOT R. A. Evers or Robert A. Evers). Enter all the collector names.
Coll.#	Enter number (example: 115272 or C-194). When collecting number is not given, enter s.n.
Date	Day Month Year (Example: 5 March 1949 NOT 3/5/49) if no date is given, enter No Date
Det.	Enter individual that identified the specimen and year of determination. Must put Det.: in front of the one that identifies the specimen (example: Det.: Loy R. Phillippe, (ILLS) 1991). Place determiners in order with most recent determinations first (at the top).
Acc. No.	Enter ILLS vascular plant specimen number. The number located on herbarium sheet within the map of Illinois, not on the collector's label.
Calc County	Do not enter anything in this space. This enters county automatically when a county name is entered in the county field. If no county is entered in the county field, the word county is omitted automatically.
Serial number	Do not enter here, this counts number of specimens entered.
<u>Field name</u>	<u>Entry requirements</u>
Country	If specimen is collected in the United States, leave this space blank. If specimen is from outside the United States, enter the name of that country here.
Status	Presently do not enter anything here; this will be completed at the end of the computerization of the entire herbarium. Abbreviation for state or federal status: SE = state endangered species ST = state threatened species WL = watch listed species C2 = federal candidate species FE = federal endangered species

FT = federal threatened species
I = introduced species

Table II. Example Herbarium Label.

Plants of Illinois

Apiaceae
Heracleum lanatum Michaux

Illinois: Jo Daviess County
42° 10' 54" North Latitude; 90° 15' 48" West Longitude
T. 26N, R. 1E, W edge NE1/4 NE1/4 Sect. 10
Savanna Army Depot, Bellevue 7.5 minute topographic map.
Open meadow along east edge of stream leading out of Beaty Hollow. East side of road. 3 foot tall white flowered herb. Plants common.
Loy R. Phillippe, Geoffrey A. Levin & Mike Moore 27429
5 June 1996 Det.: Geoffrey A. Levin (ILLS) 1996

Illinois Natural History Survey (ILLS)

Table III. Vascular Plant Families Computerized at ILLS

Families that have been entered into the computer as of 30 June 1996

FERN ALLIES
- Equisetaceae
- Isoëtaceae
- Lycopodiaceae
- Selaginellaceae

FERNS
- Anemiaceae
- Aspleniaceae
- Azollaceae
- Blechnaceae
- Dennstaedtiaceae
- Dryopteridaceae
- Hymenophyllaceae
- Lygodiaceae
- Marsileaceae
- Ophioglossaceae
- Osmundaceae
- Polypodiaceae
- Pteridaceae
- Salviniaceae
- Schizaeaceae
- Thelypteridaceae

GYMNOSPERMS
- Araucariaceae
- Cephalotaxaceae
- Cupressaceae
- Ephedraceae
- Ginkgoaceae
- Pinaceae
- Podocarpaceae
- Taxaceae

DICOTS

Acanthaceae
Aceraceae
Actinidiaceae
Aizoaceae
Amaranthaceae
Anacardiaceae
Annonaceae
Apiaceae
Apocynaceae
Aquifoliaceae
Araliaceae
Aristolochiaceae
Asclepiadaceae
Asteraceae
Balsaminaceae
Batidaceae
Begoniaceae
Berberidaceae
Betulaceae
Bignoniaceae
Bombacaceae
Boraginaceae
Brassicaceae
Buddlejaceae
Buxaceae
Cabombaceae
Cactaceae
Callitrichaceae
Calycanthaceae
Campanulaceae
Canellaceae
Cannabaceae
Capparaceae
Caprifoliaceae
Caricaceae
Caryophyllaceae
Casuarinaceae
Celastraceae
Ceratophyllaceae
Cercidiphyllaceae
Chenopodiaceae
Chrysobalanaceae
Cistaceae
Clethraceae
Clusiaceae
Combretaceae
Convolvulaceae
Cornaceae
Crassulaceae
Cunoniaceae
Cuscutaceae
Cyrillaceae
Degeneriaceae
Diapensiaceae
Dilleniaceae
Dipsacaceae
Droseraceae
Ebenaceae
Elaeagnaceae
Elaeocarpaceae
Elatinaceae
Empetraceae
Ericaceae
Erythroxylaceae
Eucommiaceae
Euphorbiaceae
Fabaceae
Fagaceae
Flacourtiaceae
Fouquieriaceae
Frankeniaceae
Fumariaceae
Garryaceae
Gentianaceae
Geraniaceae
Gesneriaceae
Goodeniaceae
Grossulariaceae
Haloragaceae
Hamamelidaceae
Hippocastanaceae
Hippocrateaceae
Hippuridaceae
Hydrangeaceae
Hydrophyllaceae
Illiciaceae
Juglandaceae
Lamiaceae
Lardizabalaceae
Lauraceae
Leitneriaceae
Lentibulariaceae
Limnanthaceae
Linaceae
Loasaceae
Loganiaceae
Loranthaceae
Lythraceae

Magnoliaceae
Malpighiaceae
Malvaceae
Melastomataceae
Meliaceae
Menispermaceae
Menyanthaceae
Molluginaceae
Monimiaceae
Monotropaceae
Moraceae
Myricaceae
Myrsinaceae
Myrtaceae
Nelumboaceae
Nyctaginaceae
Nymphaeaceae
Nyssaceae
Ochnaceae
Oleaceae
Onagraceae
Orobanchaceae
Oxalidaceae
Paeoniaceae
Papaveraceae
Passifloraceae
Pedaliaceae
Phytolaccaceae
Piperaceae
Pittosporaceae
Plantaginaceae
Platanaceae
Plumbaginaceae
Podostemaceae
Polemoniaceae
Polygalaceae
Polygonaceae
Portulacaceae
Primulaceae

MONOCOTS

Agavaceae

Dicots (continued)

Proteaceae
Pyrolaceae
Ranunculaceae
Rhamnaceae
Rhizophoraceae
Rosaceae
Rubiaceae
Rutaceae
Salicaceae
Santalaceae
Sapindaceae
Sapotaceae
Sarraceniaceae
Saururaceae
Saxifragaceae
Schisandraceae
Scrophulariaceae
Simaroubaceae
Simmondsiaceae
Solanaceae
Sphenocleaceae
Staphyleaceae
Sterculiaceae
Styracaceae
Symplocaceae
Tamaricaceae
Theaceae
Theophrastaceae
Thymelaeaceae
Tiliaceae
Turneraceae
Ulmaceae
Urticaceae
Valerianaceae
Verbenaceae
Violaceae
Viscaceae
Vitaceae
Winteraceae
Zygophyllaceae

Alismataceae
Araceae
Arecaceae
Bromeliaceae
Burmanniaceae
Butomaceae
Cannaceae
Commelinaceae
Cyperaceae
Dioscoreaceae
Eriocaulaceae
Haemodoraceae
Heliconiaceae
Hydrocharitaceae
Iridaceae
Juncaceae
Juncaginaceae
Lemnaceae
Liliaceae
Marantaceae
Mayacaceae
Najadaceae
Orchidaceae
Poaceae
Pontederiaceae
Potamogetonaceae
Ruppiaceae
Smilacaceae
Sparganiaceae
Typhaceae
Xyridaceae
Zannichelliaceae
Zingiberaceae
Zosteraceae

Insects

The Insect Collection at the Illinois Natural History Survey is one of the oldest and largest in North America. According to Arnett, et al. (1993) it ranks as the 9th largest insect collection in the United States, with over six million specimens. It contains 3,637 primary type specimens and has many significant holdings in the various insect groups.

Entomologists, worldwide, have been reluctant in tackling the tremendous job of databasing the insect collections found in both museums and research settings. The numbers of insect specimens compared to other natural history

collections has made it daunting and almost prohibitive. Yet, entomologists would like to see the databases completed and this information disseminated.

At INHS, we feel the databasing of the insects is extremely important. We have begun this long and tedious process by databasing one order at a time, starting with the aquatic insects. We also database all new accessions to the collection. A list of our primary types has also been completed.

The money allocated to us from NBS has allowed us to complete the databasing of our entire Plecoptera collection and begin the capture of specimen data from our Ephemeroptera collection. The INHS Plecoptera and Primary Type Databases can be downloaded from the Internet. As other databases are completed, this information will be made available on the Internet.

II. Methods and Materials

Computerization of the Insect Collection began in 1990 with the Illinois Lepidoptera database created by G. L. Godfrey and E. D. Cashatt. The database can be found at the Illinois State Museum and contains 22,935 records from Illinois private and public collections.

The current insect database was designed by M. Harris, D. Yanega, and K. Methven and implemented in 1991. Work on the database (1991 - present) has been done by both work-study students and collection staff. In 1995, one half-time data entry personnel was hired with NBS monies.

A. Database Software and Hardware

The databases run on Apple® Macintosh® computers using either Filemaker Pro developed by Claris™ Corporation or Microsoft® FoxPro® from the Microsoft Corporation. Both are relational databases.

B. Database Design

Locality information, identification and host information, if available, is captured in the primary database. There is a field to capture the data "as is". This information is then divided up and interpreted to be put into more searchable fields. This allows us to search the records to find specific information e.g. "stoneflies collected on 11 June 1896 in Illinois."

Each lot or specimen is given an accession number. This number allows the specimen to be retrieved easily and is important in creating a "relational" database.

The FilemakerPro database allows ease of field additions and changes. As additional information is determined or associated with the specimens, new fields can be created as necessary. For example, if a specimen is analyzed for DNA at a later date, we could create a field for this information.

From the primary database, many layouts of the information can be created. Reports, labels, species lists, etc. can easily be generated.

C. Breakdown of Fields of Entry:

Field name	Entry requirements
Catalogue #	INHS Catalogue #
Family	Family name
Species	Genus, species, and authority
Stream	Includes rivers, lakes, creeks, ponds, etc. No abbreviations in the field.
Drainage	Enter in parentheses, (e.g., Illinois River Drainage)
Stream code	Hierarchical 18 digit stream-drainage code.
Locality label	Exact information found on locality label, typos, errors and all
Location	A narrative description of the collection site. Do not begin with "at." Always put a zero in front of a decimal point (0.5) but not behind (2 not 2.0). The order of entry should be: distance, direction, location, stream descriptor (4.5 mi ESE Peoria, mouth of Green Creek).
Other labels	Second, third, fourth labels that are not the primary labels
Field name	Entry requirements

Males	# of males
Females	# of females
Nymphs/Penultimates	# of nymphs or penultimates
Undetermined	# of undetermined
Total individuals	total # of individuals
New material	newly accessioned material or retroactively captured data
Year	Year or years.
Collector(s)	First initial (period) second initial (period) (space) last name. (e.g., D. W. Webb)
Remarks	Information about the collection not on the label or any questions pertaining to the label information
Determinations	Name of person who & identified specimen
Verifications	followed by month and year (D. J. Voegtlin, 1995).
Types	Enter kind of type (e.g., holotype).
Date of Entry	Auto-entered in Filemaker.
Preparation	Pin, Vial, or Slide

III. Insect Database Progress

The entire Plecoptera collection has now been databased. Stoneflies are excellent environmental indicators of stream quality. The stonefly collection - containing 80,944 specimens, including 195 primary types (Webb 1980) - is the largest of this order in North America. This outstanding collection includes the voucher specimens for the reports produced by Frison. The Survey's collection of the small winter stoneflies, *Allocapnia*, is foremost in the world. These specimens are the basis of the monograph by Ross and Ricker (1971).

With funds from NBS, the computerization of the Ephemeroptera collection has commenced. There are approximately 19,500 specimens, including 45 primary types of mayflies, housed at the Survey (Webb 1980). Some of this material was the basis for the publication by Burks on the mayflies of Illinois. This collection, as well as other aquatic insect collections, is heavily used in conjunction with studies assessing the environmental health of freshwater habitats.
Listed below is the entire number of specimens databased as of 15 June 1996:

Total number of specimens databased.

Group	# of specimens databased
Acari 3	
Amber	550
Araneae	5,860
Coleoptera	778
Collembola	21
Diptera	536
Ephemeroptera	2,915
Hemiptera	197
Homoptera	50,467
Hymenoptera	398
Lepidoptera (at INHS in Filemaker Pro)	4,230
Lepidoptera (IL Lepidoptera Database - INHS + IL State Museum)	22,935
Mecoptera	7
Neuroptera	35
Odonata	1,041
Opiliones*	2,063
Plecoptera*	80,944
Primary Types	3,637
Trichoptera	5,719

*All locality and identification label information for the order has been entered.

IV. INHS Insect Databases on the Internet

The Plecoptera and Primary Type database can be found at the Internet address http://www.inhs.uiuc.edu. Certain fields are available on the net and can be downloaded. The Illinois Lepidoptera database created by G. L. Godfrey and E. D. Cashatt will be found at the Illinois State Museum Site and linked with the INHS homepage. Technical information about databases on the web

can be found in the report from James Crowder, Project 4, part B. Database of Specimen-based Biological Collections.

Project 5. A Directory of Illinois Systematists, Ecologist, & Field Biologists, Third Edition

Project Leaders - Kenneth R. Robertson and Jennifer A. Tate

Illinois is fortunate to have many biologists who have expertise in Illinois organisms and ecosystems. This directory provides a centralized list of the systematists, ecologists, and field biologists who live or conduct research in Illinois. A computerized database has been completed that provides information on 513 persons who supplied information about their areas of scientific expertise.

The first edition of this Directory was published by the Illinois Natural History Survey in 1986 and emphasized Illinois research scientists. In 1989, a revised edition was issued which included 460 Illinois biologists. This second edition utilized code numbers to summarize categories of responses and gave an index of individuals selecting each category.

The goal of the third edition was to electronically publish a similar directory on the World Wide Web so that scientists not only in Illinois, but also nation- and worldwide, might have access to the information about Illinois biologists. Such a medium also allows for a more rapid mechanism when searching for experts of a certain field. For example, rather than flipping back and forth through many book pages, one can query the search engine for all scientists in Illinois who conduct research on birds and will be given a list of individuals matching that request. This directory is the first to supply detailed information about Illinois biologists on the World Wide Web (http://ibis.inhs.uiuc.edu:7999/ows-bin/owa/inhs_web.web_human). While a number of professional societies have membership lists, there has been no single source that gives the addresses, phone numbers, e-mail addresses, and specific areas of expertise for this group in the state.

Procedures:

The database for the second edition was maintained on a Macintosh computer in a Filemaker Pro 2.0 program. Using that database, new Illinois biologists were added by consulting membership listings of such societies as the American Ornithologist's Union, American Society of Ichthyologists and Herpetologists, Association of Plant Taxonomists, Botanical Society of America, Ecological Society of America, Herpetology Society, Insect and Spider Collections of the World, Natural Areas Association, North American Benthological Society, North American Fisheries and Aquatic Scientists, Society for the Study of Evolution, and Society of Wetland Scientists. Staff lists of the Illinois Natural History Survey, Illinois State Museum, Illinois Department of Natural Resources, Field Museum of Natural History, Morton Arboretum, University of Illinois, and other state agencies were also

consulted. Biologists not included in the previous database were added, and records (addresses and phone numbers) for those already in the database were updated. Persons who were known to have moved from the state or who were deceased were removed from the database.

In February 1995, approximately 300 trial questionnaires were sent to staff members at the Illinois Natural History Survey and the University of Illinois. Each was asked to fill in personal information regarding name, title, university or organization, phone and fax numbers, e-mail address, degree information, and job description, as well as information about specific fields of expertise. The fields included expertise on endangered and threatened species, geographical areas within Illinois (including Illinois Natural Divisions) and outside the state, natural communities and habitats; ecological systems, habitat status, levels, and approaches; systematics, and methodologies. The information from the returned questionnaires was entered into the Filemaker database as text for each field.

Tom Kompare (Illinois Natural History Survey) created a new database format with "clickable" boxes for each category of response (Figure 1). This format greatly decreased the time needed to enter the information for each individual. The questionnaires that had already been entered into the old format were re-entered into the new database, as were those that continued to be returned.

The questionnaire was revised to include biodiversity and computer database information (Figure 2). Approximately 1,400 questionnaires were copied, folded, and stapled by the University of Illinois Campus Copy Center, and in April, 1,355 questionnaires were mailed to all biologists included in the database. During the next 4 months, the information from the returned questionnaires was entered into the "clickable" Filemaker database. In addition to saving the file on the Macintosh computer, a back-up was also saved on the INHS Server.

In August 1995, the information for each field was proofread by exporting the records into a Microsoft Word file and printing a hard copy. A few individuals were telephoned or e-mailed because their handwritten information was not legible. Corrections for spelling and other errors were entered into the Filemaker database.

The Filemaker data was exported by Jim Crowder into a format for use on the World Wide Web. For information on this aspect of the project, see Project 4 - Establishment of Internet Host for Distribution of INHS Databases. When the preliminary World Wide Web site was established, we met with Jim to discuss search options and changes to the site.

A map of the geographical areas in Illinois defined as Northwestern, Northeastern, Northern, Central, South-Central, Southern, Eastern, and Western on the questionnaire was developed to outline the areas in Illinois where biologists conduct research (Figure 3). The map also illustrates the counties located in these areas.

Because many people did not list an e-mail address on the returned questionnaire, searches were conducted using the "ph" listing of Universities

as well as home pages for organizations on the World Wide Web. If found, the addresses were entered into the Filemaker database. We were able to locate approximately 80 of the 234 individuals that had blank entries.

Direct links to other pages on the World Wide Web were added to the Filemaker database by conducting searches on Yahoo and Infoseek Guide for a particular institution, university, or home page. We found 373 links for organizations, 166 for departments, 488 for universities granting degrees, and 5 for the User Home pages. These links allow the viewer to proceed directly to other home pages related to the individual biologist.

In late May 1996, e-mail messages were sent to the 364 individuals with e-mail addresses. Letters were then sent to 220 individuals without e-mail addresses and with invalid e-mail addresses. Both messages informed the respondents that the site was active and that they could view their home page (Figure 4) at http://ibis.inhs.uiuc.edu:7998/owsbin/owa/inhs_web.web_human or they could follow the links from the Survey home page (http://www.inhs.uiuc.edu) to the "Office of the Chief," then to the "Mail Room," and finally to the "Directory of Illinois Systematists, Ecologists, and Field Biologists." The respondents were invited to e-mail their corrections and comments to an account created by Jim Crowder (dise@mail.inhs.uiuc.edu). As of 18 June 1996, 36 messages were received from respondents (phone calls and corrected copies of records were also received). Changes were made to the respective records and comments on the site format were forwarded to Jim Crowder. New questionnaires were received by two individuals who learned of the Directory from co-workers and wished to be included.

A synopsis of the project was written and a link was established to a page which informs the viewer of the history and development of the current edition of the Directory. A logo was designed which will be on the Illinois Directory of Systematists, Ecologists, and Field Biologists home page along with links to the Directory "source" page and the National Biological Survey home page.

In order for the scientific names of species to be underlined or italicized on the web site, a special code was entered into the database fields for those words (for example, threatened and endangered species and systematic specialty and research). These commands allowed the computer to read the code and correctly italicize scientific names of species on the web.

In June 1996, the Filemaker Pro 2.0 program was upgraded to a Filemaker Pro 3.0 program. The database format did not change, but the upgraded version allowed for an increase in the performance of the database.

Results and Conclusions:

Of the 1,355 questionnaires that were mailed, 513 were returned completed (including 235 new individuals), 89 were marked "return to sender," and the remaining 755 were unaccounted for. We were able to successfully forward some of the questionnaires that were returned to us.

The web site is now active and can be accessed at http://ibis.inhs.uiuc.edu:7998/ows-bin/owa/inhs_web.web_human or by following the links from the Survey home page (http://www.inhs.uiuc.edu) to the "Office of the Chief," then to the "Mail Room," and finally to the "Directory of Illinois Systematists, Ecologists, and Field Biologists." The search capabilities are currently by name or organization only, but will be extended to include each category of response.

Many biologists included in the Directory work outside academia and do not have access to the World Wide Web. The search options are best appreciated on the Internet, but the updated information about the biologists would still be useful in a printed version. We are considering issuing a printed version, although this is outside the scope of the NBS project.

Top 5 responses in selected categories are as follows:

City: Natural communities:
Champaign-Urbana: 121 (C=80, U=41)
Chicago: 75
Springfield: 30
Carbondale: 27
Peoria: 16

Forests: 132
Wetlands: 121
Prairie: 101
Stream: 97
Savanna: 69

Institution:
Illinois Natural History Survey: 81
University of Illinois
- Urbana-Champaign: 47
- Chicago: 9
- Springfield: 1

Illinois Department of Natural Resources: 55
Field Museum: 26
Southern Illinois University: 26

Systematic expertise:
Flowering plants: 157
Insects: 122
Birds: 111
Mammals: 103
Fishes: 95

Profession:
Field biologists: 312
Ecologists: 295
Systematists: 128
Resource managers: 123
Preservation/Protection Specialists: 73

Future Maintenance:

The Filemaker database will be maintained at the Illinois Natural History Survey by Kenneth R. Robertson. The server will be automated so that when changes are made in the database, they will be downloaded directly to the web site. Jim Crowder anticipates putting the questionnaire on-line so that new biologists can enter information by computer. Ultimate control of the information displayed will be at INHS, however.

Comments from biologists about the Directory:

"I congratulate you on a useful and attractive (addition) to the information available on the web."
- Michael Dillon, The Field Museum

". . . I think this will be a great service for ecologists."
- Steve Harper, US Army CERL

"It's great to see such info. on the web! Good job."
- Daniel Nickrent, Southern Illinois University

"It's good to see the directory up; I'll look forward to the full search capabilities."
- Margaret Thayer, The Field Museum

"Thanks. Nice listing. I'm sure that this was a lot of work."
- Beth Middleton, Southern Illinois University

Figure 1. Filemaker Database

Last Name	Title	First Name	Middle
Admiraal	Ms.	Alicia	K. Nugteren

Organization: Illinois Natural History Survey
Degree: M.S.
Year awarded: 1991
Department: Center for Wildlife Ecology
Granting University: Iowa State University
Building: 172 Natural Resources Building
E-mail: nugteren@ux1.cso.uiuc.edu
Street Address: 607 E. Peabody Drive
Phone: (217) 244-2168
Fax: (217) 333-4949
City: Champaign
State: IL
Zip Code: 61820

Profession

Practicing Professional ☒ Amateur Biologist ☐ Administrator ☐ Student ☐
Retired but active in research ☐ Retired and inactive in research ☐

Do you consider yourself

Systematist ☐ Ecologist ☒ Field Biologist ☒ Resource Manager ☐
Preservation/Protection Specialist ☐ Collection Manager ☐ Other ☐

Threatened & Endangered Species

Geographical Expertise

Statewide ☒ N Illinois ☐ NE Illinois ☐ NW Illinois ☐ Central Illinois ☐
South-Central Illinois ☐ E Illinois ☐ W Illinois ☐ S Illinois ☐

Natural Divisions

Wisconsin Driftless ☐ Rock River Hill Co. ☐ Northeastern Morainal ☐ Grand Prairie ☐ Upper Miss. and Ill. River Bottomlands ☐
Miss. and Ill. River Sand Areas ☐ Western Forest-Prairie ☐ Middle Mississippi Border ☐ Southern Till Plain ☐
Wabash Border ☐ Ozark ☐ Lower Mississippi River Bottomlands ☐ Shawnee Hills ☐ Coastal Plain ☐

Other Geographical Areas: Iowa.

Natural Communities Expertise

Forests ☐ Upland forest ☐ Sand forest ☐ Floodplain forest ☐ Flatwoods ☐
Prairie ☐ Blacksoil prairie ☐ Sand prairie ☐ Gravel prairie ☐ Dolomite prairie ☐ Hill prairie ☐ Shrub prairie ☐
Savanna ☐ Silt/Loam savanna ☐ Sand savanna ☐ Barrens ☐
Wetlands ☒ Marsh ☐ Swamp ☐ Bog ☐ Fen ☐ Sedge meadow ☐ Panne ☐ Seep/Spring-wetland community ☐
Pond & Lake ☐ Pond ☐ Lake ☐ Lake Michigan ☐
Stream ☐ Creek ☐ River ☐ Spring-Aquatic communities ☐ Illinois River ☐ Mississippi River ☐
Wabash/Ohio Rivers ☐ Waterfall ☐
Primary ☐ Glade ☐ Cliff ☐ Lake shore ☐
Cave & Sinkhole ☐ Terrestrial cave community ☐ Aquatic cave community ☐ Sinkhole ☐
Cultural ☐ Cropland ☐ Pasture ☐ Successional ☐ Developed land ☐ Tree plantation ☐
Artificial pond ☐ Artificial lake ☐ Cemetery ☐ Mine spoils/Reclamation ☐
Urban areas ☐ Community restoration/reconstruction ☒

Different Habitat Expertise

Ecological Expertise

System: Terrestrial ☐ Freshwater ☒ Marine ☐

Habitat Status: Natural ☒ Human-disturbed ☒ Artificial ☐ Managed ☒

Level: Population ☐ Species ☐ Community ☒ Ecosystem ☒ Landscape ☒ Biosphere ☐

Approach: Applied ☐ Basic ☐ Behavioral ecology ☐ Biological control ☐ Community classification ☐
Community description ☐ Competition ☐ Cultivation/Husbandry ☐ Demography/Life history ☐
Ecological genetics ☐ Energetics/Energy budgets ☐ Environ. impact assessments ☐ Evolutionary ecology ☐
Experimentation ☐ Faunistic surveys ☐ Floristic surveys ☐ Geographic info. systems ☐ Herbivory ☐
Human ecology ☐ Impact of non-native species ☐ Models ☐ Nutrient cycling ☐ Nutrition ☐
Pathology ☐ Pest management ☐ Physiological ecology ☐ Plant/Soil relations ☐ Pollination biology ☐
Population ecology ☐ Quantitative field ecology ☐ Reclamation ☐ Restoration ecology ☒
Resource management ☐ Seed biology ☐ Spatial pattern mapping ☐ Succession ☐
Toxicology ☐ Weed ecology ☐

Other

Ecological Research My research has focused on aspects of wetland restoration and creation. I have conducted studies on establishing vegetation in a created wetland near Gurnee, Illinois. Currently, I am coordinating efforts to develop guidelines for restoring and creating wetlands.

Systematic Expertise

Flowering Plants ☐ Gymnosperms ☐ Ferns & Fern Allies ☐ Bryophytes ☐ Fungi ☐ Lichens ☐ Algae ☐
Bacteria ☐ Mammals ☐ Birds ☐ Reptiles & Amphibians ☐ Fishes ☐ Insects ☐
Arachnids ☐ Crustaceans ☐ Mollusks ☐ Worms ☐ Coelenterates ☐ Protozoans ☐

Other

Systematic Specialty

Systematic Research

Methodology

Anatomy/Histology ☐ Biogeography ☐ Cladistics ☐ Cytology/Chromosomes ☐ Ecology/Behavior ☐
Embryology ☐ Floristics/Faunistics ☐ Gross morphology ☐ Hybridization ☐ Molecular ☐
Protein analysis ☐ Allozymes ☐ Serology ☐ Nuclear Genome ☐ Nuclear ribosomal RNA ☐
Chloroplast DNA ☐ Mitochondrial DNA ☐ Nomenclature ☐ Numerical phenetics ☐ Palynology ☐
Physiology ☐ Reproductive biology ☐ Revisionary/ Monographic ☐ Systematic theory ☐ Ultrastructure ☐

Other

Biodiversity Information

Collection ☐ Population data ☐ Ecological data ☐ Other related data ☐ Specimen-based database ☐
Automated population data ☐ Automated ecological data ☐ Automated other related data ☐

Different Biodiversity Information

Database Information

Database Size (Megabytes)

Database Format

Database Management System

Data Distribution Policy

User Notes

New
ok
2/3/95

Record ID dbcbd00001 **Mod Date**

Link Organization http://www.inhs.uiuc.edu/

Link Department http://www.inhs.uiuc.edu:80/chf/cwe_home.html

Link Building

Link Granting University http://www.iastate.edu/

Link User Homepage

Figure 2. Questionnaire

QUESTIONNAIRE

Directory of Illinois Systematists, Ecologists, and Field Biologists, Third Edition[1]

NAME

last	first
middle name or initial	title (Dr., Mr., Ms.)

ADDRESS

university or organization		
department		
building		
street address		
city	state	zip

PHONE

voice	FAX	e-mail

DEGREE

most advanced degree	university granting degree	year awarded

PROFESSION

1. Do you consider yourself: (check all that apply)

☐ a practicing professional	☐ an administrator	☐ a student
☐ an amateur biologist	☐ retired but active in research	☐ retired but inactive in research

2. Do you consider yourself: (check all that apply)

☐ a systematist	☐ a resource manager	☐ a collection manager
☐ an ecologist	☐ a preservation or protection specialist	☐ other _____
☐ a field biologist		

ENDANGERED AND THREATENED SPECIES

Please list any endangered and threatened species with which you conduct research or have expertise.

[1]Return to Kenneth R. Robertson, Center for Biodiversity, Illinois Natural History Survey, 607 E. Peabody Drive, Champaign, IL 61820. Voice: (217) 244-2171. Fax: (217) 333-4949. e-mail: krrobert@uiuc.edu

EXPERTISE – GEOGRAPHICAL

1. Check all that apply for Illinois.

- ☐ statewide
- ☐ northern Illinois
- ☐ NE Illinois
- ☐ NW Illinois
- ☐ central Illinois
- ☐ south central Illinois
- ☐ eastern Illinois
- ☐ western Illinois
- ☐ southern Illinois

Natural Divisions

- ☐ Wisconsin Driftless
- ☐ Rock River Hill Country
- ☐ Northeastern Morainal
- ☐ Grand Prairie
- ☐ Upper Mississippi River and Illinois River Bottomlands
- ☐ Illinois River and Mississippi River Sand Areas
- ☐ Western Forest-Prairie
- ☐ Middle Mississippi Border
- ☐ Southern Till Plain
- ☐ Wabash Border
- ☐ Ozark
- ☐ Lower Mississippi River Bottomlands
- ☐ Shawnee Hills
- ☐ Coastal Plains

2. If appropriate, list the specific counties of Illinois in which you conduct research or have extensive field experience; also list other states, countries, or specific areas in which you have expertise.

EXPERTISE – NATURAL COMMUNITIES IN ILLINOIS (check all that apply)

- ☐ **FORESTS**(general)
- ☐ upland forest
- ☐ sand forest
- ☐ floodplain forest
- ☐ flatwoods
- ☐ **PRAIRIE** (general)
- ☐ blacksoil prairie
- ☐ sand prairie
- ☐ gravel prairie
- ☐ dolomite prairie
- ☐ hill prairie
- ☐ shrub prairie

restorations (see cultural)

- ☐ **SAVANNA** (general)
- ☐ silt/loan savanna
- ☐ sand savanna
- ☐ barrens
- ☐ **WETLAND** (general)
- ☐ marsh
- ☐ swamp
- ☐ bog
- ☐ fen
- ☐ sedge meadow
- ☐ panne
- ☐ seep/spring-wetland comm.
- ☐ **POND & LAKE** (general)
- ☐ pond
- ☐ lake
- ☐ Lake Michigan
- ☐ **STREAM** (general)
- ☐ creek
- ☐ river
- ☐ spring-aquatic communities
- ☐ Illinois River
- ☐ Mississippi River
- ☐ Wabash/Ohio rivers
- ☐ waterfall
- ☐ **PRIMARY**
- ☐ glade
- ☐ cliff
- ☐ lake shore
- ☐ **CAVE & SINKHOLE** (general)
- ☐ terrestrial cave community
- ☐ aquatic cave community
- ☐ sinkhole
- ☐ **CULTURAL** (general)
- ☐ cropland
- ☐ pasture
- ☐ successional
- ☐ developed land
- ☐ tree plantation
- ☐ artificial pond
- ☐ artificial lake
- ☐ cemetery
- ☐ mine spoils/reclamation
- ☐ urban areas
- ☐ community restoration or reconstruction

EXPERTISE – HABITATS

If different from above, list the habitats in which you conduct research or have extensive field experience.

EXPERTISE – ECOLOGICAL

1. Check all that apply:

SYSTEM
- ☐ terrestrial
- ☐ freshwater
- ☐ marine

HABITAT STATUS
- ☐ natural
- ☐ human-disturbed
- ☐ artificial
- ☐ managed

LEVEL
- ☐ population
- ☐ species
- ☐ community
- ☐ ecosystem
- ☐ landscape
- ☐ biosphere

APPROACH
- ☐ applied
- ☐ basic

- ☐ behavioral ecology
- ☐ biological control
- ☐ community classification
- ☐ community description
- ☐ competition
- ☐ cultivation/husbandry
- ☐ demography/life history
- ☐ ecological genetics
- ☐ energetics/energy budgets
- ☐ environ. impact assessment
- ☐ evolutionary ecology
- ☐ experimentation
- ☐ faunistic surveys
- ☐ floristic surveys
- ☐ geographic info. system
- ☐ herbivory
- ☐ human ecology
- ☐ impact of non-native species
- ☐ models

- ☐ nutrient cycling
- ☐ nutrition
- ☐ pathology
- ☐ pest management
- ☐ physiological ecology
- ☐ plant/soil relations
- ☐ pollination biology
- ☐ population ecology
- ☐ quantitative field ecology
- ☐ reclamation
- ☐ restoration ecology
- ☐ resource management
- ☐ seed biology
- ☐ spatial pattern mapping
- ☐ succession
- ☐ toxicology
- ☐ weed ecology
- ☐ Other _____

2. Briefly describe your ecological research and expertise.

EXPERTISE — SYSTEMATIC (if appropriate, ecologists fill out for organisms they work with)

1. With what groups of organisms do you work? (check all that apply)

- ☐ flowering plants
- ☐ gymnosperms
- ☐ ferns & fern allies
- ☐ bryophytes
- ☐ fungi
- ☐ lichens
- ☐ algae
- ☐ bacteria
- ☐ mammals
- ☐ birds
- ☐ reptiles & amphibians
- ☐ fishes
- ☐ insects
- ☐ arachnids
- ☐ crustaceans
- ☐ mollusks
- ☐ worms
- ☐ coelenterates
- ☐ protozoans
- ☐ other _____

2. What specific orders, families, genera, species, or other taxonomic groups are your specialty?

3. Briefly describe your systematic research.

4. What methodologies do you use? (check all that apply)

- ☐ anatomy/histology
- ☐ biogeography
- ☐ cladistics
- ☐ cytology/chromosomes
- ☐ ecology/behavior
- ☐ embryology
- ☐ floristics/faunistics
- ☐ gross morphology
- ☐ hybridization
- ☐ molecular
  - ☐ protein analysis
  - ☐ allozymes
  - ☐ serology
  - ☐ nuclear genome
  - ☐ nuclear ribosomal RNA
  - ☐ chloroplast DNA
  - ☐ mitochondrial DNA
- ☐ nomenclature
- ☐ numerical phenetics
- ☐ palynology
- ☐ physiology
- ☐ reproductive biology
- ☐ revisionary/monographic
- ☐ systematic theory
- ☐ ultrastructure
- ☐ other _____

BIODIVERSITY INFORMATION

1. Do you maintain one or more of the following: (check all that apply)

☐ collection	☐ specimen-based database
☐ population data	☐ automated population data
☐ ecological data	☐ automated ecological data
☐ other related data	☐ automated other related data

2. If your biodiversity information **differs** from your responses to the questions on geographical, natural community, ecological, and systematic expertise on pages 2-4, please describe below.

DATABASE INFORMATION (if applicable)

1. Database size in megabytes: _____

2. Current format (PC, Max, UNIX, other): _____

3. Database management system (specify): _____

4. Data distribution policy and access restrictions (describe): _____

Thank you for you cooperation!

The new edition of this Directory will be available on Internet by the fall of 1995. All respondents will receive instructions on how to access the database. There may be a printed version as well; if so, all respondents will receive a copy.

Figure 3. Map of geographical areas in Illinois

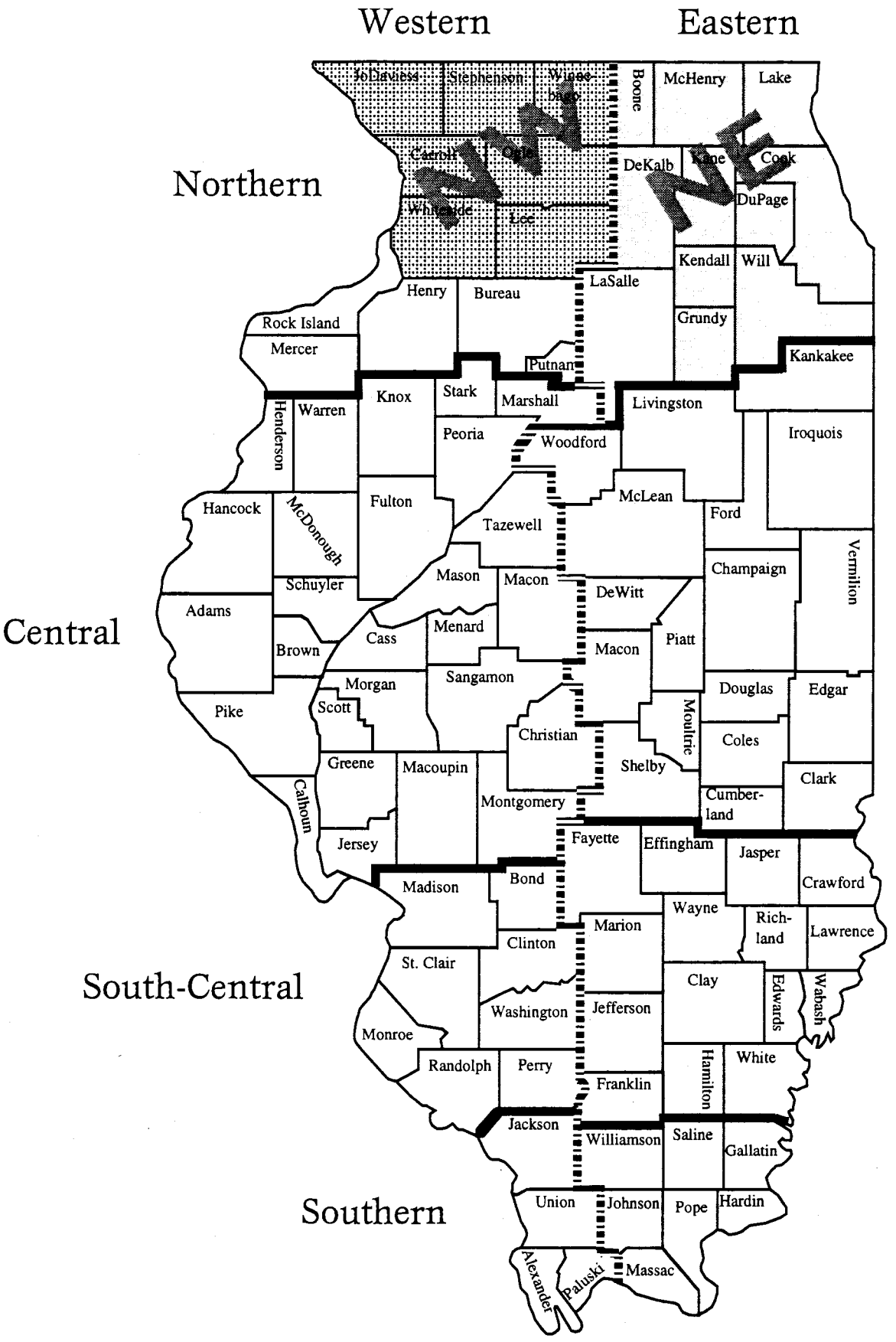


Figure 4. World Wide Web Personal Page

Dr. Kenneth R. Robertson

Phone	Fax	Email
(217) 244-2171	(217) 333-4949	krrobert@uiuc.edu

Mailing Label

Dr. Kenneth R. Robertson
Illinois Natural History Survey
Center for Biodiversity
172 Natural Resources Building
607 East Peabody Drive
Champaign IL 61820

Additional Links

Organization
Illinois Natural History Survey

Education
Degree Ph.D. **Year awarded** 1971
Granting University
Washington University

Department
Center for Biodiversity

Home Page
Dr. Kenneth R. Robertson

NOTE: bold (Predefined Category) - Plain (Selected) - " " Individual Notes

Professional Status	Practicing Professional
Profession	Systematist
Geographic Expertise	All Illinois
Natural Divisions	Grand Prairie - Mississippi And Illinois River Sand Areas
Natural Communities	Prairie - Blacksoil Prairie - Sand Prairie - Hill Prairie - Fen - Gravel Prairie
Systematic Categories	Flowering Plants
Systematic Specialty	"Rosaceae, Convolvulaceae, Amaranthaceae"
Threatened and Endangered Species	"*Agalinis skinneriana, Talinum rugospermum, Napaea dioica* "
Methodology Categories	Floristics/Faunistics - Nomenclature - Gross Morphology - Revisionary/Monographic

Source: Directory of Illinois Systematists, Ecologist, and Field Biologists
Funded by: National Biological Service

Please report problems with this page to:
dise@mail.inhs.uiuc.edu
Subject: AUTO~DISE by NAME ID = dbcbd00375
Last Modified

IV. NBS Program: NBS Regional Facilities and Resources

Mission: "NBS field units are the primary vehicle for implementing NBS programs and projects, developed in accordance with Secretarial and Congressional guidance, and in consultation with the NBS partners."

Project 6. Develop Illinois Partnership

•Description: In 1993, the Illinois Natural History Survey (INHS) was designated in a Joint Resolution of the Illinois General Assembly as the official Illinois contact with the National Biological Survey (NBS).

Goal of the Partnership: to develop a network of Illinois institutions to work cooperatively, to our mutual benefit, with the NBS in order to exchange and transfer information on biological resources developed at local, state, and federal levels.

> Task 1. Establish the Steering Committee of the Task Force, seek Illinois Partnership Members, and plan the establishment of the Task Force.
>
> Task 2. Establish communication with other state NBS State Partnerships by means of a two-day conference hosted by the Illinois Natural History Survey.

One of the items included in our proposal was not accomplished and, in retrospect, was not destined to be accomplished. This proposal segment called for meeting with representatives of the other State Partnerships. One of the Investigators, Lorin Nevling, believed he knew what was meant by a State Partner based on his participation on the National Research Council that made the original recommendation and his subsequent participation with state representatives with Secretary Babbitt. His perception was that the Survey, Service, etc., would establish ongoing long-term relationships with certain state organizations that could support the NBS with useful products on a short-time basis. Partnerships are long-term, not ephemeral relationships. The long-term perception eventually proved incorrect and is a source of grave disappointment because of the lost opportunity it presented. There were five states included in the original Partnership group and these were contacted. However, before we could meet, another cluster of state Partnerships were announced. The Partnership program turned out not to be a partnership, but the establishment of a short-term grant program. After this

became evident, there was absolutely no point in meeting with other "partners" because the commonality of cause was destroyed.