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Illinois Natural History Survey

**Development and Expansion of the Natural Resource Data
and Information Systems in Support of the Illinois
Comprehensive Wildlife Conservation Plan**

Annual Segment Report 2005

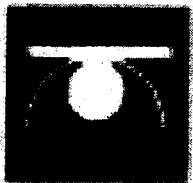
Liane Cordle, Kevin Cummings, Ann Holtrop, Chris Phillips, and John Epifanio

Submitted to

Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702

Illinois Natural History Survey
607 East Peabody Drive
Champaign, Illinois 61820

March 2005



Illinois Natural History Survey Technical Report 05/01

Cross Center

Illinois Natural History Survey

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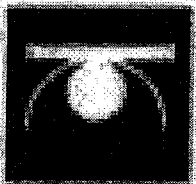
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**Illinois Natural History Survey
Center for Aquatic Ecology and Conservation, Center for
Biodiversity, Center for Wildlife and Plant Ecology**

(February 4, 2004 – February 4, 2005)

**Development and Expansion of the Natural Resource Data
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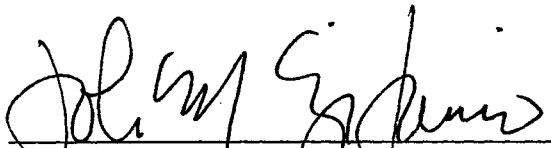
Project: T-03-P-001

Annual Report, Segment 1
4 February 2004 to 3 February 2005

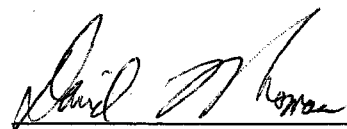
Liane Cordle, Kevin Cummings, Ann Holtrop, Chris Phillips, and John Epifanio

Illinois Natural History Survey
607 East Peabody Drive
Champaign, Illinois 61820

March 2005



Dr. John Epifanio,
Project Coordinator
Illinois Natural History Survey



Dr. David Thomas,
Chief
Illinois Natural History Survey

Annual Performance Report
(February 4, 2004-February 3, 2005)

PROJECT NUMBER: T-03-P-001

PROJECT TITLE: State Wildlife Conservation Plan/Strategy Data System

JOB 1: Conservation Mapping in Support of the Comprehensive Wildlife Conservation Plan and Wildlife Conservation Strategies

Work Plan Task 1.2 *Map all IDNR sites purchased with federal and special funds including the Habitat, Pheasant, Migratory Waterfowl Stamp, and Furbearer Funds.*

Work Plan Task 1.3 *Develop initial phase of a complete GIS dataset of state owned and leased properties.*

The development of a spatial database of conservation-related lands owned, managed, or leased (OMLP) by IDNR is the focus of this job. This job addresses Elements 2 and 4 in CWCP by providing accurate boundary information and current conservation and management practices and activities on IDNR lands, many of which contain key habitats and community types. Many of the aspects of developing the spatial database apply to Tasks 1 and 2, i.e. establishing a research protocol, developing digitizing standards and metadata, incorporating the necessary descriptive fields, and developing a structure to incorporate site reporting and evaluation. A geodatabase was created in the form of a parcel-based mapping system. Facilities for mapping outer extent property boundaries as well as corner monument markers, interior parcel lines, right-of-way and easement extents, and historical boundary change information have been built into the OMLP GIS data management system. A large portion of the mapping project involves thorough research of existing paper and database records for relevant and critical historical information for each property. Personnel are familiar with the organization and format of the property documents. A procedure for accurately and consistently digitizing aspects of each property has been developed and implemented. Federal Geographic Data Committee (FGDC) compliant metadata has been created for the GIS data layers and will be updated as necessary. A quality assurance, quality control (QA/QC) methodology was developed to insure the data created meets the accuracy standards defined in the OMLP project data input methodology. A prioritized list of IDNR properties to be included in the OMLP database has been developed. An initial ArcIMS interface has also been created to provide IDNR staff with access to the information.

Task 1 focuses on the subset of IDNR OMLP properties purchased with federal or special funds; these sites were assigned first priority for inclusion in the database. A total of 48 federal and special interest sites have been completely researched and digitally mapped, and research of the paper records at IDNR has been completed for the remaining 21 federal and special fund sites. Of the sites not yet digitally mapped, most currently have incomplete paper records and three sites are pending acquisition by IDNR. Most of the remaining sites contain a portion of land that is leased from either a private company or other agency (i.e. Army Corps of Engineers, Central

Illinois Public Service, Illinois Power Company) and managed by IDNR. The legal descriptions for these sites (which can be difficult to obtain for some of the older sites) need to be obtained from the leasing agency in order to complete the paper records and digitize the site (work on these sites is being continued in the next phase of the project). QA/QC has been completed for 4 sites. Due to staffing shortages since July 2004, efforts have focused on trying to complete the digital mapping of each site and thus there has been a delay in the QA/QC evaluations.

Expected Results, Benefits, and Deliverables:

An accurate, centralized spatial database of property boundaries and descriptive information for conservation-related properties that IDNR owns, manages, or leases was designed and developed in this phase; additional properties are to be added in subsequent phases. The spatial capabilities of the GIS database will provide information such as location, size, proximity to other features, etc. that can be used in mapping and analysis. This database will provide important information to assist in planning future management of IDNR lands and of the state's natural resources as a whole.

Estimated expenses for Work Plan Tasks 1.2 and 1.3 through December 31, 2004:

Work Plan Task 1.3 Original *						
Category	On-campus (598177)			Off-campus (598176)		
	Allocation	Expenses	Balance	Allocation	Expenses	Balance
Personnel Salary and Wages	43,636	71,287	-27,651	43,636	43,935	-299
Benefits	12,528	22,157	-9,629	12,528	8,250	4,278
Travel	1,000	605	395	1,000	0	1,000
Commodities	-	-	-	-	-	-
Equipment	-	-	-	-	-	-
Contractual	-	-	-	-	4	-4
Direct Costs	57,164	94,049	-36,885	57,164	52,189	4,975
Indirect Costs	11,433	18,810	-7,337	11,433	10,438	995
TOTAL (Direct + Indirect)	68,597	112,859	-44,262	68,597	62,627	5,970

*A budget revision was approved by IDNR in January 2005 transferring funds from the off-campus to the on-campus account. This adjustment and pending earnings transfers for salaries have corrected the deficits shown on 12/31/04.

Work Plan Task 1.3 Supplemental						
Category	On-campus (C-FOAPAL # 597652)			Off-campus (C-FOAPAL #597651)		
	Allocation	Expenses	Balance	Allocation	Expenses	Balance
Personnel Salary and Wages	13,262	11,617	1,645	15,000	13,224	1,776
Benefits	3,916	437	3,479	1,155	3,944	-2,789
Travel	-	-		-	-	
Commodities	-	-		-	-	
Equipment	-	-		-	-	
Contractual	-	-		-	-	
Direct Costs	17,178	12,054	5,124	16,155	17,168	-1,013
Indirect Costs	3,436	2,411	1,025	3,231	3,434	-203
TOTAL (Direct + Indirect)	20,614	14,465	6,149	19,386	20,602	-1,216

JOB 2: *Ecological Classification of Rivers for Environmental Assessment and Management: Stream Attribution and Model Preparation*

Work Plan Task 2.1 *Describe stream reaches and catchments*

Work Plan Task 2.2 *Create datasets for input into stream modeling analysis*

The purpose of this job is to build statistical models for predicting riverine site habitats and biota from mapped landscape and local variables. The outcome of this work will be a set of models that can be used to predict biological and habitat conditions for all river segments, including sampled and unsampled reaches. Job 2.1 of T-3-P provided a large data set of attributes describing stream channels, riparian zones, and watersheds to use in developing the biological and habitat models. Further, Job 2.2 of T-3-P provided additional data to support development of fish, macroinvertebrate, flow, and water temperature models. To date, work on this job (which began in December 2005) has focused on developing the fish and water temperature models.

Two variables needed for the fish model, water temperature (i.e., field measurements) and stream length, were not included in Job 2.2 of T-3-P. Therefore, we contacted staff at the Illinois Environmental Protection Agency and requested water temperatures collected near the time of each fish sample. Of the 444 sites that had fish data, 391 also had water temperature data. Staff will be contacting two IEPA field offices in attempts to uncover data for the remaining 53 sites. The next step in developing the fish model is to standardize fish abundance data to catch per unit effort (CPUE). For this job, CPUE is defined as the natural log (catch of each species per 100 m of stream length sampled +1). Before CPUE can be calculated, the length of stream sampled had to be extracted from the IDNR's Fisheries Analysis System (FAS) database. Many fish samples were missing stream lengths in the database, thereby requiring staff to review field sheets from each sample and/or to contact IDNR stream biologists to fill in missing data. As of February 1, stream lengths for all but 49 fish samples have been recorded. During the next few months, additional attempts will be made to uncover missing length data.

Initial efforts in developing the flow model have centered on editing and formatting data collected by temperature loggers in 2003-2004. Data collected by the temperature loggers was exported and formatted to work with various statistical software packages. After reviewing the downloaded data, we observed several data points that appeared erroneous. One possible explanation for poor data is that as water levels dropped in late summer, the loggers became exposed and collected air rather than water temperature. During this reporting period, efforts began to edit erroneous data points. These efforts, along with efforts to summarize hourly temperature readings into daily mean, daily maximum, and daily minimum, will continue in the next few months. Data collected by loggers in 2004-2005 have not yet been downloaded. Similar to the 2003-2004 data, these data will be edited and formatted after they are downloaded.

Finally, a job announcement to fill a vacant position that will support this Job 2.1 and Job 2.2 was posted from January 14 - January 31. Search committee members are reviewing applications and expect to have an additional staff member working on these jobs by mid- to late February.

Expected Results, Benefits, and Deliverables:

Primary products for this project are attached and described as Appendix 1 to this report. This will be delivered to Illinois Department of Natural Resources separately as an INHS – CAEC Technical Report 2005/04 by Holtrop et al. (March 2005)

Final expenses for Work Plan Tasks 2.1 and 2.2 through December 31, 2004:

Category	Off-campus 2.1 & 2.2		
	Allocation	Expenses	Balance
Personnel - Salary and Wages	70,932	75,694	-4,762
Benefits	20,401	20,139	262
Travel	5,000	3,103	1,897
Commodities	7,000	4,640	2,360
Equipment	--	--	--
Contractual	900	660	240
Direct Costs	104,233	104,236	-3
Indirect Costs	20,851	20,847	3
TOTAL (Direct + Indirect)	125,084	125,084	--

JOB 3: Enhance and Integration of Resource Information Systems to Support Wildlife Planning

Work Plan Task 3.3 *Develop the mussel database as part of the Fisheries Analysis System (FAS) and link to existing INHS museum collections*

One of the first tasks in developing the comprehensive wildlife plan/strategy is to identify the distribution and abundance of key wildlife species and to document the extent and condition of their habitats. One of the wildlife groups requiring protection are freshwater mussels. Freshwater mussels are possibly the most endangered aquatic biota in the U.S. Thus, increasing our understanding of these organisms is essential for their protection and management. The development of a web-based freshwater mussels database for use by IDNR field staff is the focus of this job. We have developed a database and interface for web-based access to abundance and distribution data on Illinois freshwater mussels. We have also: (1) developed appropriate data tables on sampling methods, mussel data, a mussel species list, basic habitat data and similar information, (2) Coordinated sampling location information with the INHS Mollusk Collection database to ensure linkage and compatibility and (3) Added, edited, and verified, sampling location information in the "Stations" Table (contains sampling location data) for mussels. We are in the process of Beta testing the database and related applications with field staff and other appropriate personnel. We have also met and worked with the IDNR *Ad Hoc* Mussel committee to initiate development of standard sampling protocols as a prerequisite for developing a "Mussel Index of Biotic Integrity".

Expected Results, Benefits, and Deliverables:

A web-based mussel database for use by IDNR field staff. We have linked this database to existing INHS museum collections database currently in ARC-IMS. We have developed and are beta testing data entry and report capabilities for IDNR field staff.

This database can be queried on a variety of fields and output results include the raw data and species distribution maps. This database is now up and running on-line at:

<http://spatial.inhs.uiuc.edu/maps/working/viewer.htm>

User name: mussel

Password: ill*moll

Estimated expenses for Work Plan Tasks 3.3 through December 31, 2004:

Work Plan Task 3.3			
Category	On-campus 3.3		
	Allocation	Expenses	Balance
Personnel - Salary and Wages	25,000	23,578	1,422
Benefits	7,178	6,918	260
Travel	500		500
Commodities	823	553	270
Equipment	6,000	2,716	3,284
Contractual*	5,500	1,882	3,618
Direct Costs	45,001	35,365	9,636
Indirect Costs	9,000	7,073	1,927
TOTAL (Direct + Indirect)	54,001	42,438	11,563

*A budget revision was approved by IDNR in February 2005 transferring funds from commodities to contractual services.

JOB 4: Re-evaluation of Historical Illinois Threatened and Endangered Species Occurrences and Illinois Natural Areas Inventory Habitat Sites

Work Plan Task 4.1 Update and Locate New Threatened and Endangered Faunal Species Records

Approximately half of the Element Occurrence Records have been field surveyed and all but the bat results have been entered in an Excel spreadsheet and a FileMaker Pro database at INHS (see Table). The data will be sent to Springfield as soon as we have hired the new data entry positions on T-02 funding. Search is nearing completion.

Group	Original Number of Records to Survey	Number Records Surveyed in 2003-4	Number Records Verified in 2003-4	Number of records to Survey in 2005	Number Supp. Sites Surveyed in 2003-4	Number Supp. Sites Verified in 2003-4
Invertebrates						
Crayfish	21	0		21		
Isopods	14	4	0	10		
Snails	1	1	0	0		
Insects	40	14	5	26		
Mussels	120	55	5	65		
Fish	141	96	47	45		
Amphibians	46	12	10	34	22	15
Reptiles	130	35	2	95	18	0
Birds	572	350	8	222	167	47
Mammals						
Bats	52	30	?*	22		
Other Mammals	45	0		45		
Totals	1182	597	77*	585	352	62

* bat data not yet received from surveyors

Work Plan Task 4.3 Data Entry and Product Development

Two Data Entry Technicians continued to log, enter, and map T&E species data, including a backlog of T&E species data that existed within the Illinois Natural Heritage Database Program in addition to some data collected under Task 4.1 of this job. To date, over 1,600 records have been entered on both new T&E populations and updates to existing T&E populations.

Estimated Expenses for Work Plan Tasks 4.1 and 4.3 through December 31, 2005:

Work Plan Task 4.1 and 4.3						
Category	On-campus 4.1			Off-campus 4.3		
	Allocation	Expenses	Balance	Allocation	Expenses	Balance
Personnel - Salary and Wages	40,000	40,000	0	42,000	41,720	280
Benefits	3,064	3,064	0	3,217	3,031	186
Travel	57,446	57,446	0	0	0	0
Commodities	5,400	5,400	0	0	0	0
Equipment	3,600	3,600	0	0	0	0
Contractual	67,647	67,647	0	0	0	0
Direct Costs	177,157	177,157	0	45,217	44,751	466
Indirect Costs	35,431	35,431	0	9,044	8,950	94
TOTAL (Direct + Indirect)	212,588	212,588	0	54,261	53,702	559

