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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 2006

Liane Cordle, Kevin Cummings, Leon Hinz, Ann Holtrop, Chris Phillips, Jeff Walk,
and John Epifanio

Submitted to

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

Illinois Natural History Survey
1816 South Oak Street
Champaign, Illinois 61820

March 2006



ILLINOIS
NATURAL
HISTORY
SURVEY

Cross Center
Illinois Natural History Survey Technical Report 06/01

Illinois Natural History Survey

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Information Systems in Support of the Illinois Comprehensive Wildlife
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(Project: T-03-P-001)

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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, 2005 – February 3, 2006)

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

Project: T-03-P-001

Annual Report, Segment 1
4 February 2005 to 3 February 2006


Liane Cordle, Kevin Cummings, Leon Hinz, Ann Holtrop, Chris Phillips, Jeff Walk,
and John Epifanio

Illinois Natural History Survey
1816 South Oak Street
Champaign, Illinois 61820

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Dr. John Epifanio,
Project Coordinator
Illinois Natural History Survey



Dr. David Thomas,
Chief
Illinois Natural History Survey

**Annual Performance Report
(February 4, 2005-February 3, 2006)**

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 1.1 Expand the Illinois Conservation Practices Mapping System (ICPTS) to selected Illinois counties.

Conservation mapping is a valuable and necessary component to natural resources planning by displaying the distribution of conservation easements and providing associated data on type and size of practices. This job provides for the addition of conservation easements in the Upper Little Wabash River and this work continues and is scheduled to be completed in May 2005. The Upper Little Wabash Ecosystem Partnership has completed. 2011 contracts within the Upper Little Wabash Watershed. This encompasses the following counties: Effingham, Jasper, Cumberland, Shelby, and Coles counties. The number of enrollments mapped thus far (by USDA practice codes) include:

CP33	1	CP25	2
CP1	138	CP23	1
CP10	94	CP3	5
CP11	17	CP31	5
CP12	5	CP3A	143
CP13D	1	CP4D	309
CP2	53	CP8A	180
CP21	581	CP9	21
CP22	455		

For this area, the focus will be to digitize all easements within the watershed boundaries for each county. Then, when completed, the remainder of the counties (i.e., outside of the watershed) will be mapped.

Due to hiring restrictions within the IDNR, the initiation of digitizing efforts in the Illinois River basin has been delayed. However, job descriptions have been developed and will be posted when approved. We anticipate this job to be completed as specified.

Status: This work plan task is ongoing.

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.

This job focuses on the subset of IDNR Owned, Managed, and Leased Properties purchased with federal or special funds; these sites were assigned first priority for inclusion in the database. A total of 53 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 16 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 2 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.

Status: This work plan task is complete, final report pending.

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 Jobs 1.2 and 1.3, 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 (Figures 1 and 2).

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. The expansion of the Illinois Conservation Practices Tracking System to the Upper Little Wabash River Basin will further enhance IDNR's ability to understand the juxtaposition of critical habitats and conservation easements, and to focus conservation efforts in these areas.

Status: This work plan task is complete, final report pending.

Estimated expenses for Work Plan Tasks 1.2 and 1.3 through December 31, 2005:

Work Plan Task 1.3 Original *						
Category	On-campus (598177)			Off-campus (598176)		
	Allocation	Expenses	Balance	Allocation	Expenses	Balance
Personnel						
Salary & Wages	66,312	66,166	146	20,960	21,538	-578
Benefits	20,418	20,122	296	4,638	5,014.52	-377
Travel	1,000	1,079	-79.02	1,000	-	1,000
Commodities	-			-	3.78	-3.78
Equipment	-			-		
Contractual	-			-		
Direct Costs	87,730	87,367	3637	26,5987	26,5567	42
Indirect Costs	17,546	17,473	73	5,320	5,311	9
TOTAL (Direct + Indirect)	105,276	104,840	436	31,9186	31,868	50

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 & Wages	13,262	12,839	423	15,000	14,962.50	37.50
Benefits	3,916	4,052	-136	1,155	1,150.63	4.37
Travel	-			-		
Commodities	-	166.38	-166	-		
Equipment	-			-		
Contractual	-			-		
Direct Costs	17,178	17,057	121	16,155	16,113.13	41.87
Indirect Costs	3,436	3,412	24	3,231	3,222.61	8.39
TOTAL (Direct + Indirect)	20,614	20,469	145	19,386	19,335.74	50.26

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. FINAL REPORT SUBMITTED MARCH 2005.

Work Plan Task 2.2 Create datasets for input into stream modeling analysis. FINAL REPORT SUBMITTED MARCH 2005.

Estimated expenses for Work Plan Tasks 2.1 and 2.2 through December 31, 2005:
 [Note: the project is complete and the accounts have been closed out and cleared]

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

Work Plan Task 3.1 Update the Biotics 4 information system

Biotics 4 is the information system used by the Illinois Department of Natural Resources' Natural Heritage Database Program to track all locational data and descriptive information on state and federally listed threatened and endangered

species, natural areas, nature preserves, and other high quality features. The data within Biotics 4 are a critical component of Illinois' state Comprehensive Wildlife Habitat Conservation plan, and necessary for all stages including development, implementation, and monitoring.

The Natural Heritage Database Program originally used a database system called the Biological and Conservation Database (BCD) to track significant resources throughout the state. BCD was a DOS-based relational database with very little spatial capabilities. In order to utilize more current and powerful software and integrate spatial tracking, the Database Program upgraded to the Oracle-based Biotics 4 (Biological Tracking and Conservation System) database in February 2003. Biotics 4, which was developed by NatureServe, combines geographic information systems (GIS) and powerful relational database technologies to organize, map, and analyze data about T&E species, natural communities, natural areas, and other significant natural resources.

Status: This work plan task was completed in February 2003.

Work Plan Task 3.2 Software and hardware upgrades will be completed for handling the new data systems

An Oracle data server and software was purchased for use by the Biotics 4 database. This hardware and software, purchased prior to the February 2003 installation of Biotics 4, was necessary to upgrade the Natural Heritage Database Program software from BCD to Biotics 4.

Additional hardware and software, including 20 computer workstations and 28 ArcView GIS software licenses, were purchased for field staff who are the primary users of Biotics 4. Twenty-eight (28) Global Positioning System (GPS) receivers were obtained to aid the field biologists in their collection of precise T&E species location data. In an effort to train staff in the use of these new technologies, staff of the Natural Heritage Database program provided 4 regional GPS training workshops to field staff in September 2003 and 4 custom ArcView training sessions in February, March, and April of 2004. Field staff responsible for tracking and managing endangered species, natural areas, and nature preserves attended the sessions, which provided hands-on lessons in these technologies as well as take-home documentation. Ongoing phone support for these technologies was also provided to field staff through November 2004.

Status: This work plan task was completed in November 2004.

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".

Results, Benefits, and Deliverables:

A web-based mussel database for use by IDNR field staff has been essentially completed. 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. Work continues on the development of field data collection protocols and fine-tuning the web-based interface. 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

Status: This work plan task is ongoing.

Estimated expenses for Work Plan Tasks 3.3 through December 31, 2005:

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

Work Plan Task 3.4 Develop or enhance existing appropriate web interfaces to provide IDNR program managers and biologists with a tool for viewing and reporting natural resources and related information considered pertinent for developing and refining the state comprehensive wildlife habitat conservation plan (e.g., threatened and endangered species occurrence records, state natural and managed areas, ICPTS conservation easements, etc.)

Currently, many IDNR field offices have dial-up connections although high-speed connections have been installed in the IDNR Pittsfield office. Other changes in the Information Technology structure within IDNR and State of Illinois may obviate the feasibility of implementing this task. We are exploring options for this work.

Status: This work plan task is ongoing.

Work Plan Task 3.5 Complete the initial development phase of a site resource management tracking system. An information needs assessment and system feasibility study will be conducted to identify the necessary elements and steps

for revising MANAGE. The logical and physical design of the tracking system with database schema, and planning and development of a detailed implementation plan for the system will be completed.

The information needs assessment and system feasibility study was completed by ESRI (Environmental Systems Research Institute, Inc.) in 2004. Efforts to develop the logical and physical design have centered on correspondence with potential contractors and required administrative procedures within IDNR and Central Management Services. For the next reporting period work we anticipate hiring of contractors and completion of this task.

EXPECTED RESULTS, BENEFITS AND DELIVERABLES:

The appropriate data management tools must be in place to efficiently process data, prioritize data collection, and guide conservation efforts. Upgrading the Biotics 4 (formerly known as BCD/MANAGE) software and embracing new information system technologies will allow for improved tracking of species and habitat information and management activities on a local, regional, and statewide basis. These upgrades will enable the Department to use quality information for the development of wildlife conservation plans and will assist in tracking progress and monitoring effects of conservation activities.

Status: This work plan task is ongoing.

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

Just over 60% of the Element Occurrence Records have been evaluated or field surveyed, entered in an Excel spreadsheet and a FileMaker Pro database at INHS and sent to the Database entry staff in Springfield (see Table below). The non-bat mammals and the remaining amphibians and reptiles will be surveyed this year.

Group	Original Number of Records to Survey/ Evaluate	Number Records Surveyed/ Evaluated to Date	Number Records Verified to Date	Number of records remaining to Survey	Number Supp. Sites Surveyed to Date	Number Supp. Sites Verified to Date
Invertebrates						
Crayfish	21*	20	12	1	0	
Isopods/	14**	11	3	3	0	

amphipods						
Snails	1	1	0	0	0	
Insects	40	27	10	13	0	
Mussels	120	55	5	65	0	
Fish	141	106	48	35***	12	12
Amphibians	46	12	10	34	22	15
Reptiles	130	45	7	85	18	2
Birds	572	460	27	112	182	59
Mammals						
Bats	52	20	12	32	20	20
Other Mammals	45	0	0	45		
Totals	1182	757	134	425	254	108

* 8 of these records were found to be based on misidentified specimens- should be removed from the database

** 7 of these records were found to be based on misidentified specimens- should be removed from the database

*** these remaining sites are all large river sites and will not be sampled during this job.

Status: This work plan task is ongoing.

Work Plan Task 4.2 Survey and Update Rare Communities and Habitats of the INAI.

Aerial surveillance allows biologists to determine if an INAI and critical habitat sites have been destroyed or degraded as well as to witness the overall condition of the site and its communities. This method of surveillance has several advantages in that it allows a large number of sites to be visited in a short period of time, it is the only way to survey sites for which the landowner will not grant access, and it is a means to examine large sites in their entirety.

During this reporting period, IDNR and Illinois Nature Preserve Commission (INPC) biologists identified priority sites for surveillance. Estimated costs of aerial flights were determined in order to conduct aerial surveillance on priority INAI sites and other INAI sites within yet-to-be-determined flight routes. Due to air space conditions as well as site specific needs, surveillance will be performed with either fixed wing aircraft or helicopter. Pilots have been contacted, preliminary flight plans developed, and field

staff have been allotted flight time as needed. Some specific dates have already been scheduled by field staff.

It is anticipated that all flights will be completed by 30 September 2005 and a final report and summary was be completed by 31 December 2005.

Status: This work plan task is ongoing. Submitted by Robert Szfoni.

Work Plan Task 4.3 Data Entry and Product Development.

During this task, the number of Data Entry Technicians on staff for this project varied from one to two. Data Entry Technicians logged, entered, and mapped faunal data received by the Illinois Natural Heritage Database program as part of a multi-year effort to update information in Biotics 4 for use within Illinois' Comprehensive Wildlife Conservation Plan. During this task, the Data Entry Technicians processed 1,650+ records for both new T&E populations and updates to existing T&E populations as well as high quality natural communities, colonial bird colonies, and geological features. All records were screened for accuracy under an established quality control process.

Two Geographic Information System (GIS) workstations and 2 monitors were purchased to replace the outdated systems used by the Illinois Natural Heritage Database program for work on Biotics 4.

Status: This work plan task was completed in November 2004.

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 & Wages	40,000	39,150	850	42,000	41,878	122
Benefits	3,064	1,758	1,306	3,217	3321	-104
Travel	57,446	58,081	-635	0	0	0
Commodities	5,400	5,354	46	0	0	0
Equipment	3,600	2,767	833	0	0	0
Contractual	67,647	39,179	28,468	0	0	0
Direct Costs	177,157	146,289	30,868	45,217	45,199	18
Indirect Costs	35,431	29,258	6,173	9,044	9040	4
TOTAL (Direct + Indirect)	212,588	175,547	37,041	54,261	54,239	22

Work Plan Task 4.4 Developing a Negative Data Database.

A negative occurrence database was developed by the Illinois Natural Heritage Database Program in May 2003. Records of recent site surveys without element occurrences (i.e. lacking evidence of T&E species or natural areas) were entered into a spatial database, using ArcView GIS shapefile format, within the Biotocs 4 database. The negative occurrence database will serve IDNR as a valuable complement to the element occurrence information currently provided by Biotics 4. While Biotics 4 is designed to track where information statewide on T&E species locations or resources of concern have been surveyed and found to occur, it fails to provide any information about the remaining areas of the state without element occurrence records. The negative occurrence database helps fill this void in information by confirming sites without T&E species or habitat in need of protection.

EXPECTED RESULTS, BENEFITS AND DELIVERABLES:

The systematic survey of historic T&E occurrences and INAI communities statewide and the creation of a negative occurrence database will provide the means to update a significant portion of the Illinois Natural Heritage Database Program's Biotics 4 database, which in turn will assist in providing a clear picture of the status of wildlife and

wildlife habitat resources in the state. Biotics 4 is expected to play an integral role in the planning and monitoring of management strategies under Illinois' comprehensive state wildlife conservation plan.

Status: This work plan task was completed in May 2003.

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