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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

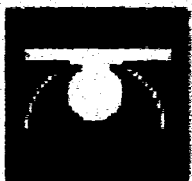
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April 2005



Illinois Natural History Survey Technical Report 05/02

**Annual Performance Report
(February 1, 2004-January 31, 2005)**

PROJECT NUMBER: T-02-P-001 (Amendment #2)

PROJECT TITLE: Development of an Illinois Comprehensive Wildlife Conservation Plan and Supporting Information Systems

Project 1 – Identification and Selection of Conservation Elements

Job 1.1 Identification and Selection of Conservation Elements

A task group of IDNR staff and the planning coordinator developed criteria for selecting priority species, and compiled a list of species in greatest need of conservation. These criteria and species lists were reviewed by the Endangered Species Technical Advisory Committees, scientists with other agencies and institutions, and IDNR staff. Each species was associated with one or more major habitat types. The revised criteria and list were again made available for comment from IDNR staff, other agencies, institutions, organizations, and the public.

Estimated expenses for Job 1.1 through December 31, 2004:

Estimated expenses for Job 1.1 is included in a summary table of related tasks located at the end of the section for Job 4.1 (the summary includes Tasks 1.1, 2.1, 3.3, and 4.1).

Project 2 - Distribution and Abundance of Conservation Elements

Job 2.1 Distribution and abundance of priority wildlife species

The distribution of threatened and endangered species was mapped with geographic locations reported in the Biotics database. For non-listed terrestrial vertebrate species, GAP Analysis created projected distribution maps. Distributions of fishes and mussels have been derived from available survey data, published accounts and museum specimens. For the species for which direct population measures are available, population size and trend were quantified. For the vast majority of vertebrate species, a qualitative description of abundance was possible. Species for which abundance can be very poorly quantified (or qualified), including most invertebrate species in greatest need of conservation, have been identified as knowledge gaps for future survey efforts.

A comprehensive source of current information on the distribution and habitat preferences of the terrestrial vertebrate species in Illinois (Element 1 in the CWCP) is the Illinois Gap Analysis Project (IL-GAP), which was conducted at the Illinois Natural

History Survey from 1998-2004 as part of the national USGS GAP program. Spatial database layers (i.e. GIS coverages) that were created as part of IL-GAP are 1) land cover layer showing existing natural vegetation to the level of dominant or co-dominant plant species from classification of satellite imagery; 2) predicted distributions of native terrestrial vertebrate species based on known locations and habitat preferences; and 3) public land ownership and private conservation lands. IL-GAP provides information on terrestrial vertebrate species distributions, habitat preferences, and potential locations for the species that the CWCP addresses. The data were also used to develop species richness models by habitat type (forest, grassland, herbaceous wetland, wooded wetland, streams and lakes, and ecotone/savanna) for the conservation plan using the predicted species distributions layers.

Expected Results, Benefits, and Deliverables:

The IL-GAP database is a centralized and comprehensive source of information on the terrestrial vertebrate species of Illinois. IL-GAP data coupled with the mapping and analytical capabilities of GIS technology are being used to provide information on species distributions statewide, identify areas of high biodiversity for the species addressed by the CWCP, and identify potential conservation opportunity areas (such as areas with rich biodiversity that are not currently protected by the state).

Estimated expenses for Job 2.1 through December 31, 2004:

Estimated expenses for Job 2.1 are included in a summary table of related tasks located at the end of the section for Job 4.1 (the summary includes Jobs 1.1, 2.1, 3.3, and 4.1).

Job 2.2 Distribution and abundance of game species

Distributions and abundances of game species have been mapped using habitat-abundance models, survey and harvest results, and other sources. By including these models, the State of Illinois is including an important species group into the comprehensive planning effort, making both nongame and game interests stakeholders in the planning and implementation processes, and demonstrating opportunity areas for diverse conservation interests to work cooperatively.

Estimated expenses for Job 2.2 through December 31, 2004:

[Note: No funds were requested for this Job].

Job 2.3 Location and condition of terrestrial and wetland habitats

Identifying and characterizing the remaining key wildlife habitats (Element 2 in the CWCP), or "green infrastructure", in the state using GIS technology is the focus of this component. This Job builds on the work we conducted under a previous contract with the Illinois Department of Natural Resources (IDNR). The green infrastructure study

makes use of more current land cover data (1999-2000) and uses an expanded set of filters and data to identify and prioritize areas for conservation and restoration. The methodology used identified and characterized the remaining tracts (hubs) of land of a critical size and the connecting links (corridors) between them. The hubs were based on the forest and grasslands identified in the Land Cover of Illinois 2000 database, and the wetlands based on the National Wetlands Inventory (NWI). Forested and emergent wetlands were buffered and then combined to create wetland complexes. Impoundments, ponds and backwaters of the Illinois and Mississippi river systems were included as well. Corridors are often delineated by streams and ridges. In Illinois, corridors are mainly found along streams. The Illinois Streams Information System (ISIS) database was the basis for corridors in this study. An initial coarse filter based on size was applied to select areas for further analysis. Hubs of forests 150 acres or greater, grassland 40 acres or greater, wetland complexes 250 acres or greater, and impoundments, ponds and backwaters went into this final statewide green infrastructure dataset. ISIS area forest and grass bankside vegetation data composed the corridors. The end result was a statewide database of potential wildlife habitat resulting from the delineation of hubs and corridors.

Habitat locations have been determined from 1999-2000 land cover data. Their relative importance as habitat for the species in greatest need of conservation has been analyzed based upon 1) presence of threatened/endangered species, 2) recognition as an Illinois natural Areas Inventory site (high quality natural community), 3) diversity of species in greatest need of conservation (based upon GAP Analysis for terrestrial vertebrates, IDNR basin surveys for fishes, and museum records for freshwater mussels), and 4) patch size (terrestrial habitats only).

The relative condition of key habitats has described from Critical Trends Assessment Project data, which has compiled information on the composition and biotic integrity of streams, grasslands, forests and wetlands throughout the State of Illinois. EcoWatch data, collected by citizen-scientists and IDNR personnel, and data collected by Illinois Natural History Survey form the core of the Critical Trends Assessment Project. To gather more detailed information on the condition of habitats in specific regions of the state or within proposed conservation opportunity areas, we are polling IDNR field staff and regional experts for qualitative and/or quantitative habitat condition assessments.

The potential wildlife habitat areas were then characterized as already protected or as unique natural resources (presence of natural communities, or endangered or threatened species. Databases such as the Illinois Natural Areas Inventory, Illinois Nature Preserve, and public land (e.g. IDNR Owned, Leased, and Managed Properties to be developed under Job 4.3, Illinois Recreational Facilities Inventory, IL-GAP project stewardship layer) were used in this step. Green areas were further characterized using information from databases such as significant aquatic features, IL-GAP (species richness developed in Job 2.1), pre-settlement land cover, railroad prairies and floodplain locations. All of the datasets used to characterize the potential wildlife habitat areas were weighted.

Further analysis is being conducted to spatially characterize green areas. Additional attributes to be determined include area, location, type, shape, spatial arrangement relative to other green space, and landscape context (surrounding land cover types).

Expected Results, Benefits, and Deliverables:

The goal of this component is to create a GIS database that can be used to identify and evaluate contiguous “green” areas and corridors with important natural resources to guide conservation, management, land acquisition, and restoration efforts. This GIS data layer will provide one of the base layers to help develop, support, and enhance conservation efforts of the CWCP.

Estimated expenses for Job 2.3 through December 31, 2004:

Job 2.3	Allocation	Expenses	Balances
Personnel - Salary and Wages	149,952	89,202	60,750
Benefits	44,431	27,119	17,312
Travel	2,000	587	1,413
Commodities	400	498	-98
Equipment	2,800	2,520	280
Contractual	1,900	12	1,888
Direct Costs	201,483	119,938	81,545
Indirect Costs	40,297	24,117	16,180
TOTAL (Direct + Indirect)	241,780	144,055	97,725

Job 2.4 Location and condition of stream habitats

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 and Job 4.2 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.

Estimated Expenses for Jobs 2.4 through December 31, 2004:

Job 2.4	Allocation	Expenses	Balances
Personnel - Salary and Wages	85,000	4,538	80,462
Benefits	25,186	1,252	23,934
Travel	5,000	-	5,000
Commodities	2,500	-	2,500
Equipment	-	-	-
Contractual	4,000	-	4,000
Direct Costs	121,686	5,791	115,895
Indirect Costs	24,337	299	24,040
TOTAL (Direct + Indirect)	146,023	6,090	139,933

Job 2.5 Update of species occurrence and habitat condition data

Field surveys are being undertaken to determine the location and relative abundance of cryptic species identified as priority species due to poorly known status (e.g, nocturnal wetland birds, herptiles). This work will be undertaken, as needs are determined, in small regions of the state and in specific habitat types to determine presence/absence and relative abundance of priority species.

Field surveys are determining the extent or condition of habitats that are not reliably assessed by remote imaging and existing monitoring projects. For example, with remote sensing techniques, successional habitats cannot be adequately distinguished from open woodland and forest. Grassland habitat is also problematic in that plant composition, vegetation structure and disturbance regimes are crucial in determining their adequacy for priority species. When feasible, field surveys describing habitat conditions and presence/absence of priority species are being completed simultaneously. GPS receivers are being made available to key field staff so that new information will be appropriately and precisely geo-referenced for integration into Biotics 4 and other information systems.

Job 2.6 Biotics 4 Updating

No work was completed on this task during this segment.

Project 3 - Identification of Detrimental Factors

Job 3.3 Identification of Detrimental Factors

For all of the vertebrate species in greatest need in conservation and for freshwater mussels, a small group of expert scientists for each taxa were gathered to assess the detrimental factors. A total of 20 detrimental factors across the broad headings of habitat, community, population and direct human stresses were scores as high, medium, and low concern for each species. Each score was also given a high-medium, low, and very low confidence ranking to identify species and stresses that are poorly known. The Critical Trends Assessment Project provided detailed data on factors that are affecting the health and integrity of key habitats on a statewide and landscape basis. A large body of literature has been consulted for factors that are shown and/or suspected of adversely affecting populations of priority species, habitats and natural communities in Illinois and the Midwest. Additionally, IDNR biologists, INHS scientists, and scientists within other agencies, organizations and institutions have been polled for factors adversely affecting priority species and habitats in each region of the State

Estimated expenses Job 3.3 through December 31, 2004:

Job 3.3	Allocated	Expenses	Balance
Personnel – Salary & Wages	43,636	43,490	146
Benefits	12,528	13,158	(630)
Travel	1,000	638	362
Commodities	-	-	-
Equipment	-	-	-
Contractual	-	-	-
Direct Costs	57,164	57,286	(122)
Indirect Costs	11,433	11,457	(24)
Total (Direct + Indirect)	68,597	68,743	(146)

Project 4 - Development of Conservation Opportunity Areas and Landscapes

Job 4.1 Selecting opportunity areas and landscapes

Using the GIS products of Jobs 2.1 and 2.3, as well as GIS layers provided by partner organizations (e.g., Important Bird Areas, TNC Portfolio Sites, C2000 strategic sub-watersheds), IDNR staff and the CWCP steering committee located sites and landscapes providing outstanding conservation opportunity (Element 2). Data from the analyses performed in Job 2.3 was used, as well as results of additional GIS analysis used to refine the ranking of these areas. Through regional meetings with IDNR staff and conservation partners, additional areas of concern were identified and located on the maps produced for these meetings. A GIS database was compiled from this data and used to create a map of landscapes that provide outstanding conservation opportunity. At the regional meetings, participants developed a management philosophy, established conservation objectives, and described priority conservation actions that were appropriate for each conservation opportunity area. The resulting conservation opportunity areas, and proposed management philosophies, objectives and actions have been made available for public comment.

Expected Results, Benefits, and Deliverables:

Maps were produced for regional and statewide meetings; the maps provided visual representation of a variety of natural resource data. A spatial database (GIS coverage) of identified opportunity areas for the plan/strategy was created.

Estimated expenses Job 4.1 through December 31, 2004:

Jobs 1.1, 2.1, 3.3, and 4.1	Allocation	Expenses	Balances
Personnel - Salary & Wages	58,070	55,010	3,059
Benefits	17,194	15,190	2,003
Travel	4,200	1,488	2,711
Commodities	1,900	797	1,102
Equipment	1,900	-	1,900
Contractual	7,515	3,580	3,935
Direct Costs	90,779	76,066	14,712
Indirect Costs	18,157	15,213	2,943
Total (Direct + Indirect)	108,936	91,279	17,656

Job 4.2 Mapping of Illinois' Natural Divisions

The Natural Divisions of Illinois is a classification of natural features in the state based on flora, fauna, and physiography which was derived from such factors as topography, soils, bedrock, glacial history, and the distribution of plants and animals. Fourteen natural regions are delineated in the state. The Natural Divisions designations are currently widely accepted and used in many natural resource applications. An update of the Natural Divisions GIS coverage is being done to create a new coverage with higher resolution, based on GIS data such as plant and animal distributions, land cover, soils, glacial boundaries, digital 1:24,000 quadrangle maps, and digital aerial photography, as well as input from IDNR-Springfield staff. Metadata for this project has been completed. We are currently working with IDNR personnel in the final phase of this Job to assess quality and verify adjustments made to the database based on their input.

Expected Results, Benefits, and Deliverables:

By defining the major ecosystem borders within Illinois, the Natural Divisions of Illinois will provide a key classification scheme for management of species, communities, and habitats (Elements 1, 2, and 4) in the state. The Natural Divisions GIS layer required enhancements to improve its resolution so it can be effectively used in the GIS environment (e.g. spatial information such as species distributions and habitat locations are correctly assigned to a natural division when conducting spatially based analyses).

Estimated expenses Job 4.2 through December 31, 2004:

[Note: No funds were requested for this Job].

Job 4.3 Mapping of IDNR's owned, managed, and leased property (OMLP project)

The first phase of the OMLP project, initiated under T-03-P-001, focused on the mapping of properties purchased with federal and special funds. This early focus was needed to provide a guide for the planning of conservation practices allowable on those properties. The federal or special fund sites that were unable to be completed as part of T-03-P-001 due to incomplete paper records are being addressed first under Job 4.3. The remaining sites to be mapped are properties partially owned by IDNR and partially leased from either a private company or other agency and managed by IDNR. (e.g. Army Corps of Engineers, Central Illinois Public Service, Illinois Power Company). Legal description information, which can be difficult to obtain for some of the older sites, needs to be obtained by the leasing agency in order to complete mapping the site. Six additional federal or special fund sites have been completed as part of Job 4.3, for a total of 54 completed sites. While some information is still needed on the remaining federal or special fund sites, mapping on the next priority listing of sites has begun. Eight sites have been completed on the next priority listing (which includes state parks, conservation areas, natural areas, fish and wildlife areas, trails and greenways, and state forests). 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 has been put into place to insure the data created meets the accuracy standards defined in the OMLP project data input methodology. QA/QC on federal and special fund sites is also ongoing. By providing accurate boundary information and current management on IDNR lands, the OMLP database will help managers in determining conservations priorities and actions (Element 4).

Expected Results, Benefits, and Deliverables:

The GIS database developed under this Job provides information on the precise boundaries and management practices for properties IDNR currently owns, manages, and leases for conservation purposes. This information is important for developing an effective and successful statewide conservation plan.

Estimated expenses Job 4.3 through December 31, 2004:

Job 4.3	Allocated	Expenses	Balance
Personnel – Salary & Wages	133,408	61,111	72,296
Benefits	37,181	17,144	20,036
Travel	8,000	-	8,000
Commodities	1,500	-	1,500
Equipment	3,000	-	3,000
Contractual	7,000	-	7,000
Direct Costs	190,089	78,256	111,832
Indirect Costs	38,018	15,651	22,366
Total (Direct + Indirect)	228,107	93,908	134,198

Project 5 - Involvement of Conservation Partners, Agencies and the Public in Developing, Implementing, and Evaluating the Comprehensive Wildlife Conservation Plan

Job 5.1 Consultation for partner coordination and public involvement

Coordination of the CWCP with other agencies and partners and public involvement are integrated into multiple Job s (Project 1, Project 3, Job 4.1, Project 6 (below)).

Professional consulting assistance helped develop a communications framework and ensured communications remained productive. Specifically, assistance was received in collecting contact information, creating opportunities for communication (i.e., printed, electronic and web-based, and in-person meetings), and facilitating regional meetings of conservation partners. Ensuring citizens have ample opportunity to learn about the

CWCP process and contribute constructively to the CWCP have been paramount, as is handling a large amount of feedback and responding appropriately. Consultation aided in establishing an efficient public involvement system.

Estimated expenses Job 5.1 through December 31, 2004:

Job 5.1	Allocation	Expenses	Balance
Personnel – Salary & Wages	9,870	0	9,870
Benefits	2,924	0	2,924
Travel	2,100	719	1,381
Commodities	1,500	1,747	-247
Equipment	0	0	0
Contractual	16,530	16,932	-402
Direct Costs	32,924	19,398	13,526
Indirect Costs	6,585	3,879	2,706
Total (Direct + Indirect)	39,509	23,277	16,232

Job 5.2 Developing an Illinois CWCP website

A webpage provides an excellent forum for sharing data, reviewing documents, viewing maps, and receiving feedback from agency staff, conservation partners, and the public. The Illinois Department of Natural Resources has develop a website that provides background planning information, contains digital documents supporting (or part of) the CWCP, and allows for electronic public input. As the planning process has advanced, the content of the webpage has changed and currently includes a partial draft CWCP, lists of species in greatest need of conservation, opportunities for involvement in the planning process, periodic updates, conservation maps, and presentations. The URL is: <<http://dnr.state.il.us/orc/wildliferesources/theplan/>>.

Estimated expenses Job 5.2 through December 31, 2004:

Job 5.2	Allocation	Expenses	Balance
Personnel – Salary & Wages	52,281	8,215	44,066
Benefits	15,491	3	15,488
Travel	0	0	0
Commodities	0	0	0
Equipment	0	0	0
Contractual	4,000	0	4,000
Direct Costs	71,772	8,218	63,554
Indirect Costs	14,354	1,644	12,710
Total (Direct + Indirect)	86,126	9,862	76,264

Project 6 - Implementation, Evaluation and Review Strategy

Job 6.1 Developing an implementation, evaluation and review strategy

Through meetings with staff, regional partner workshops, and existing planning efforts, priority statewide conservation strategies have been developed and proposed in the partial draft CWCP. This partial draft will remain available for public comment for a 45-day period. IDNR staff are currently identifying the conservation actions most appropriate within the 15 natural divisions of Illinois. A workshop with Illinois Natural History scientists began the process of developing a comprehensive monitoring, research and evaluation framework. IDNR staff are currently evaluating the effectiveness of on-going monitoring actions, describing necessary monitoring actions that can be implemented near-term, and knowledge gaps where monitoring/evaluation techniques are lacking and development is required.

Estimated expenses Job 6.1 through December 31, 2004:

Job 6.1	Allocation	Expenses	Balance
Personnel – Salary & Wages	15,792	0	15,792
Benefits	4,679	0	4,679
Travel	3,000	1,707	1,293
Commodities	1,000	0	1,000
Equipment	0	0	0
Contractual	800	0	800
Direct Costs	25,271	1,707	23,564
Indirect Costs	5,054	341	4,713
Total (Direct + Indirect)	30,325	2,048	28,277

**Job 6.2 Information Coordinator for development of the Comprehensive State
Wildlife Conservation Plan.**

No work was completed on this task during this segment.

Estimated expenses Job 6.2 through December 31, 2004:

Job 6.2	Allocation	Expenses	Balance
Personnel – Salary & Wages	40,000	0	40,000
Benefits	11,852	0	11,852
Travel	3,000	0	3,000
Commodities	2,000	0	2,000
Equipment	0	0	0
Contractual	0	0	0
Direct Costs	56,852	0	56,852
Indirect Costs	11,370	0	11,370
Total (Direct + Indirect)	68,222	0	68,222

Project 7 - Report Development

Job 7.0 - Report Development

Comments on the partial draft CWCP are being received from the public, stakeholders, conservation organizations and agencies. A final CWCP is being developed (with integration of the initial round of comments and assessments of the 15 natural divisions) and is expected to be available for public comment for 60 days, beginning on or near 1 April 2005. IDNR intends to deliver the CWCP to the National Acceptance Advisory Team on 30 June 2005. A version of the accepted document will be printed or electronically produced for use by the IDNR, partner organizations, and other land and water conservation agencies.

Estimated expenses Job 7.0 through December 31, 2004:

Job 7.0	Allocation	Expenses	Balance
Personnel – Salary & Wages	16,266	0	16,266
Benefits	4,820	0	4,820
Travel	4,000	0	4,000
Commodities	1,000	0	1,000
Equipment	0	0	0
Contractual	9,600	0	9,600
Direct Costs	35,686	0	35,686
Indirect Costs	7,137	0	7,137
Total (Direct + Indirect)	42,823	0	42,823

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