AGRICULTURE

INTRODUCTION

There are an estimated 41,684 farms contained within Illinois' portion of the Illinois River Basin. The average size of each of these farms is 314 acres. In 1985 each of these farms realized an average net income of $16,563 after expenses, a marked increase over the 1984 net income after expenses of $4,096. This provides an example of the volatile economic climate within which farmers must operate.

Statewide, the number of farms has declined steadily from 253,000 in 1910 when records began, to 87,000 in 1986. The largest loss in farm numbers occurred between the years 1982 and 1985 with the loss of 14,000 farms. These figures provide the basis for the argument that if farmers are to remain competitive, they must become better managers and adopt the most cost effective methods of production available.

The issue of encouraging farmers to adopt better and more environmentally conscious cropping practices was among a number of issues that were raised at the April 1-3, 1987 Governor's Conference on the Illinois River.

The purpose of this paper is to provide insight into some of the farming practices and programs that farmers are adopting.

BACKGROUND

The evolution of agriculture in Illinois has been based on production. History has shown that when innovations, such as the self scouring plow, the steam engine, internal combustion powered tractors, hybrid seed, fertilizers, and chemical pesticides, would allow the farmer to increase his production while maintaining or reducing his labor requirements, the farmer readily adopted those innovations.

The adoption of newer innovations and farming methods made farmers more efficient. They were able to produce more crops on greater acreages without significant increases in labor requirements. As farmers became more efficient, they had more spendable income. That income was used to trade horsepower for mechanization and to purchase more land. Statewide, average farm size has increased from 150 acres in 1950 to 330 acres in 1986.

The end result of this efficiency is that large amounts of acreages were no longer needed to produce food for work animals. Fields used for hay or grazing, and protected from soil erosion through a cover crop in a crop rotation or through permanent cover in pasture, were plowed up and put to continuous row crops in an effort to further increase production and thus increase farm income.

Though no detailed discussion of livestock production is presented in this paper, it will be mentioned as a contributor to conditions as they currently exist in the Illinois River Basin.

During this head long rush to remain competitive by becoming more efficient, there were of course areas that remained in a forage producing land use. Steepness of slope and other characteristics which made these lands unsuitable for row crop production led to their use as grazing areas for ever increasing numbers of livestock. Increasing efficiency in feed grain production led to farmers' realization that they could become more efficient in producing livestock as well by placing large concentrations of animals on these lands and supplementing their forage intake with surplus feed grains. These concentrations of animals frequently exceeded the carrying capacity of the land. The vegetative cover was reduced to the point where it would no longer protect the soil and erosion occurred.

Recently however, this trend toward all out production is being reversed. Decreasing land values, increasing fuel, machinery, materials and labor costs, and depressed commodity prices have combined to force farmers to pay more attention to the net return rather than the gross return on their investment in materials and labor. Farmers are responding to this situation by adopting conservation tillage practices. Table 1 provides a Soil and Water Conservation District summary of the number of farms, acreage in farms, average farm size, acres of cropland in farms and percent of conservation tilled cropland within the Illinois River Basin.

TABLE 1
FARMS AND CROPLAND ACRES WITHIN THE
ILLINOIS RIVER BASIN BY SOIL AND
WATER CONSERVATION DISTRICT (SWCD)

SWCD	No. Farms in Basin	Farm Basin Acreage	County Avg. Farm Size	Basin Cropland	* % of Total Cropland in Cons. Tillage
Adams	562	153,426	273	116,366	37%
Brown	481	151,881	316	101,482	12%
Bureau	1,091	342,574	314	300,136	64%
Calhoun	300	61,200	204	34,828	41%
Cass	550	220,464	401	177,044	46%
Champaign	428	137,388	321	132,073	21%
Christian	1,131	401,505	355	372,795	9%
DeKalb	454	156,176	344	146,236	58%

SWCD	No. Farms in Basin	Farm Basin Acreage	County Avg. Farm Size	Basin Cropland	* % of Total Cropland in Cons. Tillage
DeWitt	629	215,847	343	204,617	27%
Ford	512	184,320	360	175,727	68%
Fulton	1,440	422,041	293	299,473	30%
Greene	912	312,325	342	238,845	39%
Grundy	606	228,168	377	208,811	48%
Hancock	774	225,234	291	183,797	46%
Henderson	20	7,520	376	6,243	44%
Henry	115	30,705	267	27,438	40%
Iroquois	1,899	679,721	358	637,058	52%
Jersey	582	159,468	274	118,596	40%
Kane-DuPage	760	185,440	244	166,195	55%
Kankakee	1,173	379,052	323	357,315	27%
Kendall	616	186,139	302	171,174	18%
Knox	1,089	340,857	313	272,380	37%
Lake	513	92,135	180	76,455	48%
LaSalle	2,146	637,108	297	584,573	34%
Lee	173	58,880	341	54,304	48%
Livingston	1,835	627,653	342	594,562	47%
Logan	1,024	364,230	356	342,575	61%
Macon	875	310,625	355	295,638	26%
Macoupin	1,306	348,702	267	281,220	37%
Mar-Put	917	290,910	317	248,670	66%
Mason	672	305,031	454	268,724	44%
McDonough	1,109	343,322	310	287,506	55%
McHenry	339	72,885	215	63,871	46%
McLean	2,126	745,113	350	701,075	71%
Menard	520	195,294	376	173,752	39%
Montgomery	1,097	300,578	274	266,406	46%
Morgan	1,074	339,977	317	281,595	48%
North Cook	28	6,500	232	6,000	22%
Peoria	1,161	281,122	242	231,630	27%

SWCD	No. Farms in Basin	Farm Basin Acreage	County Avg. Farm Size	Basin Cropland	* % of Total Cropland in Cons. Tillage
Piatt	233	100,889	433	96,135	52%
Pike	475	170,050	358	125,513	58%
Sangamon	1,372	474,352	346	430,446	27%
Schuyler	657	230,699	351	153,151	46%
Scott	454	141,922	313	109,944	64%
Shelby	215	56,545	263	49,171	24%
Stark	474	179,044	378	164,951	43%
Tazewell	1,251	346,950	277	311,348	41%
Vermilion	94	33,840	360	31,237	40%
Warren	470	152,750	325	131,472	51%
Will-So Cook	1,781	396,282	222	360,736	26%
Woodford	1,169	299,557	256	270,687	43%
TOTAL	41,684	13,084,396	314	11,441,976	40%

* Percentage figures are based on all cropland acres within a county's boundaries and do not necessarily correlate directly with cropland acres contained within the river basin for those counties that are not wholly contained within the river basin.

Conservation tillage figures were obtained from the 1986 report of the Conservation Tillage Information Center and include such cultural practices as No-till, Ridge-till, Strip-till, Mulch-till, and reduced tillage. For a cultural practice to qualify as conservation tillage, 30% or more of the previous crop's residue must be present on the soil surface after planting.

ACTIVITIES, PROGRAMS, AND STUDIES

Historically, informational/educational efforts have been the primary means of motivating farmers to adopt conservation farming methods. However, with the adoption of the State's erosion and sediment control program in 1980, the T by 2000 Plan in 1985, and the passage of the Federal Food Security Act of 1985 (Farm Bill), a major shift in emphasis has been placed on farmers to reduce their costs of production and control cropland erosion through implementing conservation practices.

The Erosion and Sediment Control Program establishes a standardized mechanism through which a complaint for excessive erosion can be filed against agricultural landowners. The program legislation also established a cost-share fund within the Department of Agriculture to provide assistance to persons found to be in violation of the standards.

The State T by 2000 plan is a compilation of the plans developed by the 98 Illinois Soil and Water Conservation Districts and establishes a listing of strategies with recommendations to be pursued by the State in achieving the erosion and sediment control goals.

Illustration 1 lists the goals for the State's Erosion and Sediment Control Program.

ILLUSTRATION 1
SCHEDULE for ILLINOIS
SOIL and WATER CONSERVATION DISTRICT'S
SOIL EROSION and SEDIMENTATION CONTROL
PROGRAM and STANDARDS

January 1, 1983 - Programs EFFECTIVE (in compliance)
Soil loss at or below 4 "T"* (4-20 tons/ac.)

January 1, 1988 - Land 5% slope or less - "T" or less (1-5 tons/ac.)
Other land - 2 "T" or less (2-10 tons/ac.)

January 1, 1994 - 1.5 "T" or less (1½-7½ tons/ac.)

January 1, 2000 - "T" or less (1-5 tons/ac.)

*"T" means tolerable average annual tons per acre of soil loss.

The 1985 Farm Bill established a set of "conservation compliance provisions" which farmers must meet if they wish to remain eligible for USDA program benefits. These conservation compliance provisions require all farmers farming highly erodible land to have a conservation farm plan for controlling erosion developed for all of the land they own or control by 1990. Each farmer must then have his plan fully implemented by 1995 or the farmer will lose eligibility to participate in any USDA programs providing price support, loans or other agriculture benefits. Since over 80 percent of Illinois' farmers participate in one or more USDA programs, it is anticipated that the Conservation Compliance provisions will have a profound and lasting effect on the cropping practices used by farmers.

Conservation tillage practices are the easiest and most economical soil erosion control practices for farmers to implement and these practices will control erosion on gently sloping soils. The fact that farmers are adopting conservation tillage as part of their cropping practices is evidenced by the "% of total cropland in conservation

tillage" column in Figure 1. Conservation tillage alone however, will not control erosion on all lands. The Soil Conservation Service calculates that there are 1,188,700 acres of highly erodible land (HEL) in the Illinois River basin. HEL is land that, because of soil type and/or steepness of slope, is better suited for less intensive agricultural use. The Farm Bill allows for this land to be taken out of production and placed in a permanent cover of grass or trees under the Conservation Reserve Program (CRP).

To date, five different sign-up periods have been held for CRP during which farmers may submit a bid for an annual payment they will accept to take their HEL out of production for a period of ten years. During the first four sign-up periods, 97,681.6 acres were accepted into CRP within the Illinois River Basin counties. River Basin Farmers bid an additional 26,310.1 acres for acceptance during the just completed fifth sign-up. It is expected that approximately 90% of the acres bid will be accepted.

Table 2 provides a list of the counties that are wholly or in part included in the Illinois River Basin, the number of acres that have been bid for acceptance into the program during the five sign-up periods and the percentage of total acres of HEL that have been bid for acceptance into the program.

TABLE 2
HIGHLY ERODIBLE CROPLAND ACRES THAT HAVE BEEN BID FOR ACCEPTANCE INTO THE CONSERVATION RESERVE PROGRAM BY COUNTY

County	Acres	% of Cropland Acres of HEL*	County	Acres	% of Cropland Acres of HEL*
Adams	8,846.6	7.7%	Livingston	2,443.5	16.5%
Brown	1,626.3	6.0%	Logan	497.2	3.1%
Bureau	4,741.0	7.1%	Macon	589.0	5.0%
Calhoun	3,923.6	11.5%	Macoupin	3,570.4	11.1%
Cass	1,268.4	3.7%	Marshall	341.5	.8%
Champaign	458.9	6.9%	Mason	8,133.5	84.7%
Christian	376.8	1.4%	Menard	951.0	4.6%
DeKalb	1,443.7	8.6%	Montgomery	4,532.0	30.4%
DeWitt	199.0	1.9%	Morgan	715.1	1.4%
DuPage	0	0 %	McDonough	1,813.4	6.3%
Ford	1,206.4	6.3%	McHenry	1,932.6	3.8%
Fulton	3,220.4	5.9%	McLean	3,655.4	7.9%
Greene	6,573.1	14.2%	North Cook	0	0 %

County	Acres	% of Cropland Acres of HEL*	County	Acres	% of Cropland Acres of HEL*
Grundy	476.1	5.4%	Peoria	460.0	.9%
Hancock	7,353.1	9.1%	Piatt	399.7	10.5%
Henderson	449.0	2.2%	Pike	17,906.7	24.7%
Henry	4,782.1	3.4%	Putnam	231.9	1.5%
Iroquois	1,469.4	19.6%	Sangamon	1,231.4	3.1%
Jersey	2,459.6	4.9%	Schuyler	2,673.2	8.8%
Kane	221.4	.7%	Scott	1,268.5	7.3%
Kankakee	1,107.2	10.6%	Shelby	3,902.2	10.4%
Kendall	159.8	1.7%	Stark	719.3	1.7%
Knox	2,079.1	2.5%	Tazewell	1,105.2	3.4%
Lake	63.4	.5%	Vermilion	2,498.4	10.1%
LaSalle	2,747.9	11.2%	Warren	959.4	2.3%
Lee	1,625.8	6.8%	Will-So. Cook	1,501.2	2.4%
			Woodford	1,081.9	6.6%

*Highly Erodible Land
Total acres bid for acceptance 123,991.7
Total cropland acres of Highly Erodible Land 1,784,900

POSSIBLE COURSE OF ACTION

Though the 1985 Farm Bill is expected to have a significant impact on cropping practices as well as erosion control, it will not in itself correct many of the problems facing agriculture. Many farmers are still unaware of the ramifications of failing to have a farm plan prepared for their farm. Many of these same farmers don't recognize the need to do anything differently then they have in the past even though they may be aware that they are experiencing some soil loss. These farmers continue to apply fertilizers and pesticides at rates and amounts that are unnecessary because they have not been exposed to or taught the use of such management tools as soil testing and crop scouting. These techniques are being used by many farmers to gauge the investment in materials they must make to maximize their returns. In order for these farmers to become more knowledgeable about the alternatives available to them in terms of management practices, alternative land uses, and sources of assistance, it is necessary that a concerted effort be made to provide the appropriate information and training opportunities. It is important that any efforts made be supported by sound research that is relevant to the existing needs and conditions.

- Soil and Water Conservation Districts need to be funded from dedicated sources of revenue to allow for the continued employment of qualified personnel to assist farmers in developing farm plans and making proper erosion control management decisions. The amount of funds needed is addressed by a recommendation in the Section on Erosion.

- The University of Illinois Cooperative Extension Service should be provided an additional annual appropriation of $100,000 to develop training workshops to inform and educate farmers in choosing proper return-maximizing management options.

- Cooperative State, federal and local efforts to inform farmers of the conservation compliance provisions of the 1985 Food Security Act need to be strengthened.

- The U of I Agricultural Experiment Station should assume leadership in researching and developing alternative profitable land uses for highly erodible land.

- Farmers must be informed of the benefits of utilizing soil testing and crop scouting to maximize their profitability by utilizing the minimum effective quantities of fertilizer and pesticides.

- During the development of conservation farm plans, soil and water conservation districts and the USDA Soil Conservation Service should provide leadership in encouraging riparian landowners to adopt stream corridor protection measures through the use of critical area seeding, vegetative filter strip, and field windbreak practices.

URBAN STORMWATER MANAGEMENT

INTRODUCTION

Illinois has no uniform guidelines for the management of urban stormwater. Many states are legislating broad plans that require county and local officials to submit plans for review by the state to check for compliance with a master plan. Illinois provides assistance to communities in floodplain management and enforces regulations related to the flood insurance program. Other guidelines exist in the recommendations of the state's Water Quality Management Plan (WQMP) and the State Water Plan, neither of which require mandatory compliance.

The WQMP was created to provide a streamlined and consolidated approach to the evaluation of problems in urban stormwater management from the standpoint of receiving stream quality protection and enhancement. The objectives of the plan are consistent with the findings and objectives of the Federal Clean Water Act, Sections 208 and 303 (e), as well as the Governor's directives for a statewide plan for the management of water quality (and water quality related programs).

The State Water Plan was developed to provide guidelines for the management, development, and conservation of the water resources of the State, encompassing surface water resources (rivers and lakes), groundwater resources (public water supply), and atmospheric water (rainfall augmentation, evaporation). In the area of urban stormwater management, the plan is geared towards proper management of storm runoff primarily with respect to alleviating local and downstream flooding in urban areas. Most of the site specific recommendations pertain to the problems of the heavily urbanized northeast corner of the State.

Both of these plans are the results of cooperative efforts of state and local planning organizations.

BACKGROUND

Water Quality Considerations

One of the major activities impacting the Illinois River especially from the Chicago Metropolitan area, is the control/management of urban stormwater. Since in most cases these waters are managed as flood waters, the efforts to "move" water away from developed areas has contributed to increased velocity and transport, causing water quality impacts from pollutants and erosion of waterways.

The WQMP identifies goals and objectives based on the findings of the States 208 Urban Runoff Assessments and National Urban Runoff

Program (NURP). The NURP program was initiated to identify problems related to urban non-point source pollution, to identify the sources of the non-point problem constituents, and to investigate the effectiveness and feasibility of various "best management plans" in controlling the removal of these pollutants before reaching the receiving streams. The program was needed to fill informational research gaps in the Areawide Cleanwater Plans developed under Section 208. The study evaluated the contributions from urban runoff in a 5-year program. The general findings for Illinois communities, and Statewide recommendations are as follows:

WQM Plan Findings

Urban stormwater studies were conducted in the eight Standard Metropolitan Statistical Area (SMSA) urban centers of the State. Bloomington-Normal, Champaign-Urbana, Decatur, Kankakee, Peoria, Quad Cities (Illinois portion), Rockford, and Springfield. These studies were guided in part. by local steering committees (LSC) formed to represent each of the eight SMSA's.

Several conclusions were drawn from the SMSA studies in relation to the nature of urban runoff impact on water quality. Lead, copper, and iron exceed the existing general use water quality standards 25 to 30 times per year as a result of urban runoff at various points within each study area, and the once a year maximum may be 15 to 20 times the standard. Biochemical oxygen demand and suspended solids levels in urban runoff are frequently greater than allowable effluent limits for point sources. Limited data suggest that violations of the general use water quality standards for chlorides may occur as a result of urban runoff from snowmelt. Only occasional violations of the ammonia, zinc, and dissolved oxygen general use water quality standards were noted.

These results indicated that current general use water quality standards may not be the appropriate yardstick for problem definition when evaluating the impacts of urban runoff. The LSC's also concluded that the cost of 100 percent compliance could not be justified without a better understanding of the increased beneficial uses which would be gained in area streams.

The Northeastern Illinois Planning Commission (NIPC), a designated water quality management planning agency, emphasized urban runoff water quality problems in the northeastern region of the State. Municipal storm drainage systems were inventoried and analyzed, an extensive runoff sampling program was conducted, and simulation modeling was performed to test the effects of various improvement strategies. It was determined that there were three general categories of control measures to reduce urban runoff pollution: 1) by controlling the design, construction, and maintenance of the drainage network; 2) by preventing pollutants from entering the drainage network; and 3) by treating stormwater to remove pollutants before polluted runoff reaches a waterway.

The NIPC Plan concluded that a comprehensive program was necessary to reduce pollution from urban runoff. There were two phases to the recommended program. The first emphasized voluntary actions by local governments within the areawide framework provided by the Plan. The second phase would involve the issuance of general area or specific permits for individual discharges.

A target reduction of 25 percent in the amount of biochemical oxygen demanding materials (BOD) carried into waterways by urban stormwater runoff was recommended for areas already urbanized. The program also recommended that BOD loadings from areas which will undergo urbanization by the year 2000 be 50 percent lower than the BOD loadings from areas that were already urbanized. An exception to this policy concerned areas draining directly into Lake Michigan. Here, a 50 percent reduction in BOD was recommended for both present and future urban areas.

The NURP study was a national program that funded 28 individual demonstration/research projects throughout the country. Two of those projects were in Illinois; one conducted by NIPC and the other a cooperative effort of IEPA and ISWS. The study identified the nature, cause, severity and possible management methods, related to urban runoff. The conclusions of the study were presented in such a manner as to encourage the recommended preventive measures which could be implemented at the local level.

As participants in the ongoing NURP Study, NIPC soon realized the significance of urban runoff in this area. In 1981 they initiated a survey of communities to establish how many flood detention ordinances and erosion control ordinances were in place. The results were as follows:

County	No. of communities surveyed	% with Flood detention ordinances	% with erosion control ordinances
Cook	115	98.3	29.6
Dupage	30	97.6	53.3
Kane	19	42.1	31.6
Lake	47	66.0	38.3
McHenry	25	48.0	16.0
Will	24	45.8	33.3

The purpose of the survey was to obtain a general picture of the programs in the area, and act as a focal point to introduce the "management through enforced ordinance" concept to those communities surveyed.

ACTIVITIES, PROGRAMS, AND STUDIES

As a continuance of or result of these studies, many organizations have developed model ordinances and management guidances on urban runoff control. As part of their contract efforts with IEPA, the Planning Commissions have continued to focus attention of such

items as detention basin design, stream protection, and the concept of urban runoff control measures within designs of new development.

At the Federal level, interest in urban stormwater management has increased. The National Environmental Policy Act (NEPA) has always required an assessment of primary and secondary impacts from activities sponsored with Federal funds. With the enactment of the 1987 FWPCA amendments (Water Quality Act) renewed and expanded focus on urban stormwater management can be found in Section 319 and 405.

Section 319 (Nonpoint Source Management Programs) requires, among other things, the identification of streams and lakes impacted by urban nonpoint pollution, and the identification of management practices to minimize adverse impacts. Much of this will be derived from the earlier 208 and NURP studies along with any recent information available from the planning commissions and Illinois State Water Survey.

Section 405 (Municipal and Industrial Stormwater discharges) establishes specific dates and criteria for the implementation of a federal/state permit program to regulate discharge from significant storm sewer systems.

Water Quantity Considerations

Whether it is right or wrong, urban stormwater management at the practitioner's level is primarily guided by economic issues. For as long as urban areas have been flooded by both local and upstream storms, the primary emphasis has been put on the topic of how to effectively route these flows to minimize the economic hardships of real property damage and interruption of services (such as transportation and utilities). Water quality issues, although recognized as being important, usually received a lower priority when management decisions are made. The Metropolitan Sanitary District of Greater Chicago (MSDGC) is attempting to satisfy both of these priorities with the Tunnel and Reservoir Plan (TARP) but this plan is the exception, not the rule.

Historically, there have been three major components to an urban stormwater management plan: a conveyance system (storm sewers and ditches), storage facilities (detention basins), and floodplain zoning (flood insurance programs). The efficient merging of these components into a comprehensive plan in developing areas can provide an acceptable solution to the economic issues related to urban stormwater management and also may meet, at least partially, the objectives of the WQMP. The NURP program described previously found that detention and retention facilities in urban stormwater systems can be quite effective, if properly designed, in removal of several constituents commonly found in urban non-point source pollution.

Implementation of stormwater management plans in newly developed areas is not nearly as difficult as instituting a comprehensive plan in existing urban areas. In northeastern Illinois, Chicago and the communities in close proximity are so densely developed that open

space for detention storage is simply not available or is too expensive to obtain. Compounding the problem in Chicago is the existence of combined sewers, which carry both storm and sanitary sewage. The TARP which is currently being implemented by MSDGC is an expensive plan which has been widely and openly criticized. However, taking a look at the storm events of October 1986 and August 1987, the benefits of the project are obvious. In the case of the 1986 storm, nearly 0.5 billion gallons of storm and sanitary sewage were dumped into Lake Michigan. Without TARP, this figure could have been 1.25 billion gallons.

The storm of August 1987 set both rainfall records and receiving water stage records at many locations in the Chicago area. Damages due to the flooding are expected to exceed $100,000,000. The first phase of TARP is only 50% complete but managed to contain one billion gallons of stormwater. Nearly 1.5 billion gallons were released to Lake Michigan.

CONCLUSIONS

Except for Rockford, Champaign-Urbana and the Quad Cities, all the SMSA urban centers are tributary to the Illinois River Basins Watershed. The findings of these studies and NURP are reflective of what can be found throughout the watershed near urban areas. The need for a "quick-fix" to flooding problems in urban areas has led to increased drainage through channelized streams, culverts or pipes, increasing water velocity which transports larger particles and greater quantities of pollutants from urban centers. Urban stormwater has been identified as a significant problem in the upper reaches of the Illinois River Basin primarily associated with intensive urban development and stream modification for flood control.

The IEPA has encouraged the implementation of the WQMP recommendations through technical and public information activities. Through NIPC, SIMAPC, and the Association of Illinois Soil and Water Conservation Districts (AISWCD), several workshops on urban soil erosion and sedimentation control were held throughout the basin area. Discussions focused not only on technology, but upon effective local management initiatives through ordinances and other control measures. Technical documents on stormwater management continue to be developed and published through these organizations.

The State has continued to research the effects of urban stormwater runoff through studies of the State Water Survey, the regulation of stormwater outfalls causing known water quality violations (NPDES permit), and the development of the IEPA's soil erosion and sedimentation control requirements.

The enactment of the Water Quality Act of 1987 included section 405 "Municipal and Industrial Stormwater Discharge", the Federal response to the conclusions of the 208 SMSA studies, NURP, and further evaluations. This program will mandate management of stormwater discharges by both municipalities and industry where water quality integrity can be impacted. This response is a result of

municipalities and industries throughout the country failing to take proper measures in a voluntary and conscientious manner to control potential water quality violations.

The IEPA has encouraged the implementation of the WQMP recommendations through technical and public information activities. Through NIPC, SIMAPC, and the Association of Illinois Soil and Water Conservation Districts (AISWCD), several workshops on urban soil erosion and sedimentation control were held throughout the basin area. Discussions focused not only on technology, but upon effective local management initiatives through ordinances and other control measures. Technical documents on stormwater management continue to be developed and published through these organizations.

From a statewide perspective, the control of urban runoff is a necessary component to prevent impairment of water uses in an urban setting. Local units of government have primary responsibility for the management of urban drainage.

POSSIBLE COURSES OF ACTION

- Maximize the education/information transfer functions. A program of education/information transfer would: (1) acquaint developers and local officials with the need for use of proper stormwater management techniques, (2) establish and promote anti-litter activities, and (3) inform homeowners of the proper use and application of fertilizers and pesticides.

- Municipalities and counties should adopt and enforce adequate stormwater detention ordinances, as appropriate. Model ordinances developed by the Northeastern Illinois Planning Commission (Suggested On-Site Stormwater Detention Basin Ordinance, January 1980) and Southwestern Illinois Metropolitan Planning Commission (Model Stormwater Detention Ordinance for Developing Areas, January 1982) are available for reference and consideration by individual communities.

- Since it is the primary responsibility of the local, State or federal agency to control urban runoff contributions arising from their individually directed activities and facilities, the following preferred control practices are recommended: administrative procedures for personnel training, improved equipment utilization and scheduling, and controlled application programs for de-icing or other related right-of-way clearance programs.

- Municipalities, township, county and State highway organizations, the Illinois State Toll Highway Authority, and facility engineering departments at State and federal installations should review the effectiveness of programs for control of the application of de-icing materials, personnel training in proper storage and application methods, equipment usage in order to minimize any negative water quality impacts.

- Although TARP has been an expensive undertaking, the potential benefit of the plan has surfaced during its performance during two major storms in the last year. If phase one of the plan is completed, the storage capacity of the system for water to be treated (water quality phase) would increase from the current 1 billion gallons to approximately 2.2 billion gallons. The stormwater storage phase, phase 2, is just starting at the O'Hare site. If completed, phase 2 would provide an additional 15 billion gallons of storage. This additional storage capacity would have significantly reduced the 100 million dollars in damages incurred during the August 1987 event. It is therefore recommended that funding be sought to complete phase 1 as soon as possible. The cost of this work is easily justifiable in relation to the damages that it would help to circumvent. Additional funding should also be sought for at least 50% completion of phase 2 in a timely manner.

COMMERCIAL FISH AND MUSSEL RESOURCES

BACKGROUND - FISH

During the mid-1800's, commercial fishing was a thriving economically important industry within the Illinois River basin, providing good jobs and incomes to thousands of basin residents. The millions of pounds of fish annually harvested from its waters were extremely vital in the feeding of hundreds of thousands of people during the period when the nation's population was expanding at a rapid rate. Likewise, the commercial harvest of mussels from 1890 to 1940, and again since 1963, has also played an integral economic role in the lives of hundreds of other basin residents and their communities.

Although fish and mussels are still being harvested commercially from portions of the Illinois River Basin, the importance of these industries to the basin's economy has declined significantly over the past 70 years due to man's use, abuse or total disregard of its valuable natural resources. The waters of the Illinois River Basin have the potential of producing and yielding greater economic and recreational benefits for its citizens, but such is not likely to occur until the many problems and issues regulating these valuable resources are dealt with in a bold, forthright and constructive manner.

Before the 20th century most native American fishes were viewed solely as an important and valuable food resource -- vital to the welfare of its citizens and growth of the nation. Little attention was given to or value placed on recreation qualities of the species we consider as "game or sport" species today. Walleye, sauger, pike, crappie, sunfish and the various basses, along with the buffalo fishes, catfishes, bullheads, carpsuckers, freshwater drum, sturgeon and paddlefish, were all taken commercially in Illinois prior to 1905.

From 1850 to 1880, before any significant changes occurred within the Illinois River basin and carp were not present, 5 to 10 million pounds of fish were annually harvested from the Illinois River Basin and its tributary streams. As the basin's population grew larger, concern was voiced about whether the river could continue to provide the quantities of fish needed, because for many of its residents, the principal meat available and consumed was fish. Similar concerns expressed in other parts of the country prompted the U.S. Fish Commissioner to authorize the importation of carp in 1879 to bolster the nation's supply of food fish, for such was deemed essential to the nation's growth and welfare. The first distribution of fingerling carp was made in 1881 and what occurred thereafter was to have a significant impact on the commercial fisheries of the Illinois River basin.

Although it was intended that carp be cultured as food fish in farm ponds, many of them quickly became established in the country's lakes and

rivers following the overtopping of or erosion of pond dams. Within nine years following the first stocking of carp in Illinois, the 1891 Report of the Illinois Fish Commissioners stated that carp were becoming abundant in the Illinois River, resulting in some large catches being made. In 1897, Illinois River commercial fishermen harvested an estimated 3,678,000 pounds of carp. Two years later, the Illinois River Basin produced 6,332,990 pounds of carp valued at $189,981. In 1908, Illinois River commercial fishermen caught a record 24,763,000 pounds of fish valued at $1,135,000, of which approximately 17 million pounds were carp.

During the 1890-1915 period, except for the Columbia River Basin, the State of Illinois was the nation's leading producer of freshwater fish, the majority of them being harvested from the Illinois River Basin. They were frequently shipped live by the railway carload from such ports as Havana to Chicago, St. Louis, New York, Boston, and Philadelphia. Several thousand Illinois River Basin residents were actively engaged in the harvesting, processing, shipping and marketing of its fish. Chicago soon became the freshwater marketing center of the United States and every Illinois River port could boast two or more thriving fish markets. Because of their great supply and cheap cost, Illinois River fish were the principal meat eaten by hundreds of thousands of immigrants and the poorer classes of people throughout the country during the late 1800's and early 1900's. Illinois River fish were often featured menu items in the finer dining establishments of larger cities.

Man-induced changes in aquatic habitat have been impacting fish and wildlife resources of the Illinois River basin since the early 1900's. The diversion of water from Lake Michigan starting in 1900, while greatly increasing surface water area to the benefit of fisheries, was tempered by aquatic habitat losses through destruction of then existing "inshore and alongshore vegetation" and the flushing of Chicago's sewage and industrial wastes into the Illinois, degrading water quality. As increased quantities of sewage entered the Illinois River, the effect was devastating to its many fishes. Upper stretches of the river became void of oxygen and toxic. Kills of fish and their food organisms became common occurrences. By 1913, the commercial catch of fish plummeted to 10 million pounds, which was approximately the same harvest as that taken from the river in 1897, prior to the diversion. The main reasons appear to be direct effects of toxic sediments on bottom-dwelling fish and loss of a food supply for bottom-feeding fish.

By 1921, the commercial fish harvest had fallen further to 4 million pounds. Unexplainably the harvest rebounded to roughly 10 million pounds the following year. In the summer of 1923, the river was practically anaerobic as far downstream on Chillicothe, with conditions virtually impossible for the existence of fish. In 1928, Thompson found that most carp in the more polluted upper stretches of the river exhibited a rachitic bone malformation of the head and gill covers known as a "knothead" condition. The last year that in excess of 5 million pounds of commercial fish were harvested was 1950. Thereafter, the annual commercial catch continued to decline further as the cumulative loads of toxic materials and sewage from Chicago and other cities bordering the river continued to take a vicious toll on water quality and the production of vital aquatic fish food organisms. Mayflies, which are indicators of clean water and

an important food of many species of fish, were no longer present in the upper two-thirds of the river after 1950. Fingernail clams, preferred by carp, channel catfish, and freshwater drum, virtually disappeared from the river above Beardstown after 1950. The loss of the rivers important fish food organisms was undoubtedly one of the major factors contributing to the ever-declining poor commercial catches from 1950 to the early 1980's.

In 1970, the commercial catch fell below the one million pound mark and continued to decline further until 1978, when a meager 306,016 pounds were harvested from the entire river basin. Since 1982, the annual commercial fish harvest has remained relatively constant at slightly more than one million pounds. This slight increase in the commercial catch can be attributed largely to the passing of more stringent water pollution laws and their enforcement, resulting in some improvement in water quality in that portion of the river upstream of Pekin. Positive changes in the river's sport fish population have also been quite evident. Good walleye, sauger and white bass fishing is now present in the Starved Rock and Marseilles pools of the upper river, where 15 years ago only sickly, scrawny bullheads, goldfish and knothead carp with eroded fins and open sores on their bodies could be found.

The practices of the agricultural community over the past 50 years have resulted in many deleterious impacts to the river and its numerous life forms. The clear cutting of timberlands, the cropping of steep sloped lands, and the intensified production of row crops have resulted in an alarming increase in the rate of soil erosion. The deposition of sediments in the river has resulted in its loss of flow capacity, the filling of adjacent bottomland lakes which are essential fish production areas; and caused the smothering of valuable bottom-dwelling organisms, fish nests and eggs, and the degradation of quality fish habitat, thus affecting the production of both sport and commercial species. The increased production of row crops and practice of monoculture have resulted in greater use of herbicides, insecticides and fertilizers. Many of the agricultural chemicals used are persistent in nature and extremely toxic to fish and their food organisms. When these chemicals are transported to aquatic environments, they are bio-accumulated by some fish, causing their flesh to be unsuitable for consumption.

Another event that has altered the aquatic habitat and water quality of the Illinois River, influencing its production of fish, has been the development of navigation. The ever-increasing barge traffic has resulted in wave turbulences that have increased the turbidity of its waters and caused erosive scouring of river bottom and shoreline directly affecting the ability of some river commercial fishes to feed and reproduce.

In summary, the commercial harvest of fish from the Illinois River Basin has been an important economic activity over the past 125 years, providing jobs and income to thousands of basin residents and contributing to the growth and welfare of the state and nation. The quantities of fish produced within the basin have been determined to a large degree by the cumulative impacts of human activities: the polluting of basin waters by human wastes, industrial and agricultural chemicals; the modification of the river to accommodate navigation, altering its flow, and physical and biological characteristics; and the changes in agricultural practices which

have accelerated the rate of sedimentation and destroyed many of its highly productive bottomland waters and associated overflow lands. The total sum of the many physical, chemical and biological modifications of the basin waters and land has resulted in the virtual ruination of once valuable and vital commercial fishery and other valued natural resources.

BACKGROUND - MUSSELS

Prior to 1900, at least 38 species of mussels were found within the basin of the Illinois River, in varying degrees of abundance. Following the discovery of pearls in the mussels of the Pecatonic River in Wisconsin in 1889, "pearl fever" quickly spread to virtually every midwestern river containing mussels, including the Illinois River and its tributary. Until 1905, the only harvesting of mussel was for the pearls they might contain.

The perfecting of the technique for making buttons from freshwater mussel shells in 1891 developed the Illinois commercial mussel harvesting industry. Initially the mussel shells needed by the button making industry were harvested from the reach of the Mississippi River above St. Louis; however, as the mussel beds were subject to depletion after several years of exploitation, the commercial harvest of mussels spread to other rivers within the Mississippi River drainage basin, including the Illinois River.

In the Report of the State Fish Commission of 1906, "the rapid growing industry on the Illinois River in the taking of mussels for the manufacture of pearls" was noted. Also described were the methods of harvest, the prices paid ($4 - $14) per ton of shells, and the profitable income ($2 - $7) a man could make in a day. One of the first accounts of the vast quantities of shells harvested from the Illinois River indicated that 19,027,370 pounds or 9,514 tons valued at $86,000 were harvested from the Illinois River between Havana and Meredosia. The Illinois Fish Commission Report of 1910, stated "The great mussel beds along the Illinois River have attracted to them a large number from other states, until now thousands of men with boats are engaged in digging for them from LaSalle to Grafton along this river". In the Report "Fisheries of the United States, 1908", the value of the Illinois River mussel products (shells and pearls) was documented to be worth $139,000. This same report stated "The pearl-button industry has a $2,000,000 capital investment and production of $6,000,000 of products". The U.S. Fish Commissioners Report of 1913 indicated that 861 basin residents were engaged in mussel harvest, and the value of the shells and pearls taken were worth $128,892. This report was also the first documented evidence that the commercial mussel fishery of the Illinois River was beginning to decline. Although no poundages or tonnages have been quoted by Starrett, he has stated that the maximum commercial shell harvest occurred in 1909.

Over-exploitation of mussel beds and the rapid progression of pollution on that portion of the river upstream of the Peoria-Pekin metropolitan area were probably the major factors causing the decline in the commercial mussel fishery after 1915. Since 1915, virtually all mussel species upstream of Chillicothe have disappeared because of pollution. Although few specific records are available, it is known that the commercial harvest of Illinois River mussels continued until about 1940 in the river's

reach south of Havana. The manufacture of plastic buttons caused the total collapse of the mussel harvest industry in the early 1940's.

Individuals, who were engaged in mussel harvest on the Illinois River prior to 1940 and are once again active in the same effort, have described that the majority of the river's mussel beds they once harvested upstream of Meredosia are now covered with two to five feet of deposited sediments. This has undoubtedly resulted largely from the increased production of row crop since the early 1940's, resulting in increased soil erosion and rates of sedimentation. Other than the documentation of Paloumpis and Starrett in 1960 of the die-off of fingernail clams, no records exist of mussel mortality.

With the discovery that mussel shells from the Mississippi River drainage basin were the finest material available for the culture of pearls, the mussel harvest industry was revived around 1963. In 1965 and 1966, more than 1,118 tons of mussel shells were harvested from the lower reaches of the Illinois River each year. From 1967 to 1986, the annual harvest of mussel shells from the river has ranged from none to a high of 731 tons in 1985 having value of $402,452.

ACTIVITIES, PROGRAMS, AND STUDIES

Current programs relating to the commercial fishery have been discussed in detail in the "Aquatic Habitat, Forestry, Wildlife, and Natural Areas" issue paper in this report. These programs all provide necessary research and information relevant to the commercial fishery. These programs are: (1) The monitoring of fish populations at 21 sites on the Illinois River. This program monitors the number and types of fish found by electrofish sampling; (2) the Peoria Lake study being conducted by the State Water Survey, (3) the Natural History Survey study of channel catfish movement during and after a period of navigation shutdown, (4) a similar study being conducted for other fish species by the Department of Conservation, and (5) the team of State agencies and the U.S. Army Corps of Engineers project on safer disposal techniques of dredged material.

Relating to mussel populations, the Illinois Natural History Survey is continuing a study of the impacts of navigation, specifically fleeting of barges, on mussel beds. This study, funded by the Commercial Fisheries Research and Development Act, is being conducted on the Illinois River near Naples to assess mussel stress and mortality from movement and parking of barges in the vicinity of a mussel bed. Initiated in 1983, with an interim report in 1985, the 1987 field work will hopefully complete the study.

CONCLUSION

Because of apparent improvements in the water quality of the Illinois River, especially that portion above the Peoria-Pekin metropolitan area, it is quite likely that populations of the commercial fish species will increase in number, growth and flesh condition. There is current evidence this is occurring. It's highly unlikely that commercial harvest rates of

10 million pounds or more will be realized again, but an annual increase of 2 million pounds or more would certainly result in positive economic benefits within the basin. There is unlikely to be major improvement in the commercial fishery of the Illinois River until the food supply is restored.

The commercial mussels of the Illinois River Basin are undoubtedly facing a tenuous existence. It is unlikely that there will be a significant increase of mussel populations or harvest within the next ten years. The improvement in water quality upstream of the Peoria-Pekin area may result in some areas being repopulated and expansion of the few remaining mussel beds. If efforts are made to identify existing mussel beds in the river, perhaps measures can be taken to prevent their further degradation by industrial, agricultural, and navigational activities.

The commercial fish and mussel resources have both been seriously degraded by increased sedimentation and agricultural, industrial and domestic pollution. Until sedimentation is reduced and water quality is improved, the prospects of these detrimental impacts being diminished are slim.

POSSIBLE COURSES OF ACTION

1. Provide positive and forceful action to resolve the problem of sedimentation on our rivers.

2. Fund research projects designed to alleviate existing problems affecting the aquatic environment and its life forms from such activities as dredging, barge fleeting, shoreline stabilization, and channelization.

3. Encourage the funding of stream habitat creation or improvement projects.

4. Adopt and initiate a statewide greenways concept along major rivers.

5. Encourage the purchasing of floodplain and leveed lands for re-establishment of terrestrial and aquatic habitat.

ARCHAEOLOGICAL, HISTORICAL, AND PALEOBIOLOGICAL RESOURCES

INTRODUCTION

The Illinois River Basin has a long, dynamic, and exciting history. In addition to its geological history, its past is documented by archaeological, historical, and paleobiological sites. These sites record prehistoric and historic cultural development and environmental change for at least the past 12,000 years. Information from these sites is scientifically and educationally significant, and the sites themselves are popular tourist attractions. Important sites are being destroyed at an alarming rate by unregulated landscape modification and shoreline erosion. In most instances, there is no opportunity to adequately protect the most significant sites. Although site inventory and assessment are part of several ongoing federal and state programs, many state actions impact these sites without completing adequate cultural and paleobiological resource assessments. Furthermore, there is no comprehensive cultural and paleobiological resource management plan for the Illinois River Basin. Information from the Illinois River valley is used to illustrate the status of cultural and paleobiological resources and efforts to manage them. The conclusions drawn also characterize the situation in other areas of the Illinois River Basin.

BACKGROUND

The Illinois River Basin includes the Illinois River and its tributaries and their associated interfluvial uplands. Archaeological and historical sites (cultural resources) and fossil localities (paleobiological resources) are found in all of these environmental settings. The following analysis focuses on these resources in the Illinois River valley.

Illinois River Basin habitats have long supported a rich diversity of plant and animal communities attractive to Illinois' residents. The aquatic and terrestrial environs of the valley have provided sustenance and shelter for human groups for at least the past 12,000 years. The river also served as a major transportation and communication link between communities. Prehistoric Native American cultures flourished along the river valley, evolving from nomadic, hunting and gathering families to more sedentary agricultural societies with complex socio-political organization and long distance exchange networks reaching throughout eastern North America.

Euro-American explorers and pioneers were also drawn to the Illinois River valley. French explorers, in particular, documented many Native American villages along the river and established encampments at Starved Rock and Peoria. Pioneers soon discovered that the rich alluvial sediments of the floodplain were well suited to agriculture. The river served as the primary transportation link to the larger markets. Farmsteads, villages, and towns were soon established along the entire length of the river.

The geological character of the Illinois River valley, in particular the aggradation of thick deposits of sediment in the floodplain and along the valley margin, has preserved an extraordinary record of past environments and cultural development. Limited investigations of these deposits have

documented sites along the entire course of the Illinois River. In addition, caves containing fossil-bearing deposits are found along the lower reaches of the Illinois River.

Archaeological sites, localities once occupied by prehistoric or historic peoples, have been documented along the river shoreline, on the floodplain, and in valley margin and upland settings. Camps and villages established near the river by Native Americans are buried in river-deposited sediment. Major villages were often established along the river valley margin. Over the millenia, sediments eroding from nearby bluffs slowly accumulated. Preserved in these deposits, separated by lenses of sediment, are the remains of village sites representing centuries of cultural development. Although the depositional context of upland environments is different, well-preserved archaeological, historical, and fossil sites are found in the uplands as well.

Historic-era sites include both archaeological sites and standing structures. These sites provide a unique perspective of the interaction of Native Americans and Euro-American explorers and pioneers and the commercial, industrial, and agricultural development of Illinois.

Also embedded within deposits of the Illinois River valley and caves within the basin are natural accumulations of plant and animal fossils. These paleobiological sites document the natural history of Illinois and provide a perspective on regional and even global environmental changes. Furthermore, late Quaternary sites provide an independent record of environments and habitats important to human residents.

All these sites are nonrenewable resources. Those sites that remain today represent our only opportunity to learn about the prehistory of the Illinois River valley and although there is an extensive literature on Illinois history, archaeological investigations often provide a perspective of life not systematically recorded in historical accounts. Furthermore, the fossil deposits document environmental history, a record which modern ecologists now recognize as crucial to models of future environmental change.

Archaeological, historical, and paleobiological sites are being destroyed by 1) shoreline erosion and 2) unregulated landscape modification. A recent study of several archaeological sites along the Illinois River shoreline of Pike and Calhoun counties conducted by the State Museum indicates that shoreline erosion is a major factor in the destruction of these sites. Wave action, most of which is attributable to barge traffic, is considered the primary agent of erosion, but water elevation is another significant factor.

The landscape of the Illinois River valley is being modified at a rate unprecedented since large tracts of land were first drained and converted to agricultural production. These modifications facilitate housing and industrial development, trahsportation, agriculture, and recreation. Most landscape modification is undertaken by private concerns outside the jurisdiction of state and federal government. For example, the Zimmerman site, the Grand Village of the Kaskaskia Indians visited by Marquette and Jolliet in 1673, now listed on the National Register of Historic Places, is currently threatened by a housing development. A substantial amount of land modification is conducted under the aegis of various governmental bodies. The programmatic efforts of the federal and state government to protect

archaeological, historical, and paleobiological sites is discussed in the following section.

ACTIVITIES, PROGRAMS, AND STUDIES

Legislation

All federal undertakings that modify the landscape are subject to a series of historic preservation laws (especially the National Historic Preservation Act, 1966) that mandate archaeological and historical site inventory and site assessment. This federal legislation created the Illinois State Historic Preservation Office (SHPO) (as part of the Illinois Historic Preservation Agency (IHPA)) that is charged with the creation of a state-wide preservation plan for the treatment of archaeological, historical, and architectural resources. Unfortunately, this plan has never been completed due to lack of staff and funding. Illinois' Archaeological and Paleontological Resources Protection Act provides safeguards for cultural and paleobiological sites on public lands, but it does not require that state agencies conduct site inventories and site assessments. Nevertheless, some state agencies, primarily the Illinois Department's of Transportation and Conservation, and all "Build Illinois" projects, are evaluating and protecting cultural and paleobiological resources under agreement with IHPA in the absence of federal involvement. Unfortunately, this policy is not consistently applied throughout all agencies of state government.

Site Inventory and Assessment

The Illinois Archaeological Survey (IAS), a not-for-profit corporation of professional archaeologists, maintains a comprehensive file of archaeological sites in the state. The Illinois State Museum and Historic Preservation Agency have access to a computer-based version of this file.

The most comprehensive archaeological survey of the Illinois River Basin, the Historic Sites Survey, which was conducted during the early 1970's, was funded by the SHPO. Although hundreds of sites were identified in the Illinois River valley and its tributaries, vast expanses of the Basin remain unsurveyed.

The U.S. Army Corps of Engineers is also heavily involved in activities that affect cultural and paleobiological resources along the Illinois River shoreline and floodplain. Although the U.S. Army Corps of Engineers has funded site inventories for extensive sections of the Illinois River valley, most of the valley has not been systematically surveyed. In addition, the Corps does not currently have a comprehensive program to protect significant sites threatened by destruction from cultural or natural factors. In fact, the resource trend analysis program corrdinated by the U.S. Fish and Wildlife Service for the Upper Mississippi River System Environmental Management program does not incorporate cultural resources.

The United States Congress has designated a 120 mile long cultural park between Chicago and Peru as the Illinois and Michigan Canal National Heritage Corridor. The National Park Service has initiated an inventory of archaeological resources in the corridor.

The Illinois Department of Conservation is conducting cultural resource

assessments in state parks where facilties are being developed or renovated. This program recognizes State Parks as conservancies of both Illinois' natural and cultural resources.

Segments of the Illinois River Basin have been surveyed under the auspices of the Fish and Wildlife Service and the Illinois Department of Transportation. Results of these projects have not been compiled into a comprehensive statement on cultural resources in the Illinois River Basin.

Through the Office of Surface Mining and Illinois Department of Mines and Minerals sponsored Lands Unsuitable for Mining program, the State Museum has developed a computer-based archaeological site file by transforming the IAS files into a digital format. This file includes archaeological and historic information, maps of site locations, and a bibliography of research reports on Illinois archaeology. Development of a file summarizing other attributes of archaeological sites such as age and physiographic setting is underway. In addition, a paleobiological site file and bibliography are currently being developed. These files provide a solid foundation for managing Illinois' cultural and paleobiological resources, but they are incomplete.

One limitation of the State Museum data file is the lack of information on historical sites and standing structures in the River Basin. The Illinois Historic Preservation Agency manages an extensive index card file on these properties that could be made more accessible by conversion to computer-based files. The addition of these files would complete a comprehensive file of all cultural and paleobiological data. These files would reside in interconnected files to insure that a comprehensive assessment of known cultural and paleobiological resources could be completed for any particular parcel of land.

Public Programming

There are a number of existing facilties that interpret the cultural and natural heritage of the Illinois River valley. These facilities include the Illinois and Michigan Canal National Heritage Corridor and Interpretive Center, Lockport Museum and Pioneer Settlement, Starved Rock State Park, the Chicago Portage National Historic Site, Dickson Mounds Museum, and the Kampsville Archaeological Museum and numerous small historical society museums. Each of these facilities has ongoing and/or planned programs that present information about the cultural heritage and/or environmental history of Illinois. These programs are popular and annually attract tourists from throughout the Midwest.

The aforementioned facilities represent a small fraction of parks and recreation areas along the Illinois River. There are numerous State Parks, Fish and Wildlife Management Areas, and Conservation areas that develop public programs about the modern ecology of an area. These areas also contain records of the past and in fact serve as conservancies for archaeological, historical, and paleobiological sites. They provide ideal locations for the development of public programs and exhibits on cultural and environmental history.

There are plans to develop a National Historic Trail from the Chicago Portage National Historic Site to the Mississippi River at Grafton following

the historic water route of the Illinois River and the Illinois and Michigan Canal. The planning process is taking into account cultural site attractions along the proposed route. These sites are recognized as opportunities for developing recreational and educational facilities.

CONCLUSIONS

Archaeological, historical, and paleobiological sites in the Illinois River valley preserve a unique perspective of Illinois' past. These sites are resources of scientific and educational information, and recreational opportunity. Unregulated landscape modification and shoreline erosion are destroying sites at an alarming rate. Although significant strides have been made in efforts to protect the Illinois' cultural and paleobiological resources, adequate management of Illinois River valley sites is seriously limited by three factors, 1) the absence of a comprehensive inventory of cultural and paleobiological resources, 2) the lack of a program to monitor and protect significant sites in jeopardy of destruction by natural or cultural factors, and 3) the lack of a comprehensive cultural and paleobiological resources management plan.

POSSIBLE COURSES OF ACTION

As outlined in the 1987 Governor's Task Force on Tourism report, it is essential that the state more vigorously protect Illinois' historic resources and cultural heritage, as well is its paleobiological resources. This can best be achieved by initating a program through which sites will be inventoried and assessed for National Register eligibility and scientific importance, and by developing a management plan to insure that the most significant sites are protected and preserved.

The following courses of action for the management and development of archaeological, historical, and paleobiological sites are recommended.

1) Compile, summarize, and evaluate existing records of sites in the Illinois River Basin;
2) Integrate existing information about cultural and paleobiological resources in the Illinois River Basin into an overall management plan to protect and develop these resources;
3) Inventory archaeological sites, standing structures, and paleobiological sites in areas inadequately surveyed;
4) Nominate eligible archaeological and historical sites for inclusion on the National Register of Historic Places
5) Collaborate with other management agencies to a) identify factors affecting the preservation of cultural and paleobiological resources and b) participate in studies to measure the impact of factors affecting these resources;
6) Implement pilot studies to monitor and protect significant sites.
7) Establish state historic preservation laws modelled after existing federal legislation to insure adequate protection of significant cultural and

paleobiological sites.

8) Develop some significant sites for tourism and the education of Illinois citizens.

ECONOMIC DEVELOPMENT

INTRODUCTION

The twenty-one counties adjacent to the Illinois River form an important economic and demographic region in the State of Illinois. The region contains more than half the state's population, although several counties in the region have no urban population. Although most of the region's counties are below the state average in per capita personal income, Cook County is above the average, and several of the counties had total personal incomes of more than one billion dollars. The majority of adults in all but one county had 12 or more years of school. The region accounted for 18 percent of the State's livestock receipts, and 17 percent of crop receipts. With Cook County, the region is an important industrial area, with substantial employment in all major industries. The services industry is the largest employer with 679,596, followed by manufacturing with 609,331. The region receives over 60 percent of statewide travel expenditures, with Cook County receiving the largest portion of that percent.

BACKGROUND

The key to the success of the Illinois economy is cooperation among business, government, labor and individual citizens. As the public and private sectors have begun to better understand their importance to each other, they are combining resources to raise economic development efforts to new highs. The Department of Commerce and Community Affairs (DCCA), the state's primary economic development agency, is working to reshape attitudes toward business development that will foster greater cooperation between the private and public sectors. The wide range of services geared to promote economic development and improving the quality of life, through grants to communities, loans to businesses and job training programs to individuals, is helping to create economic activity which puts more Illinoisans to work.

ACTIVITIES, PROGRAMS, AND STUDIES

The Build Illinois Program enables the Department to integrate its programs with other state, local and federal programs to capitalize on economic development opportunities and to prepare the state's economic infrastructure for the future. The Department of Commerce and Community Affairs' Build Illinois programs include: Corridors of Opportunity; Large Business Loan; Infrastructure Development; Small Business Loan; and Incubator Development.

Build Illinois Corridors Of Opportunity And Development Program

The purpose of the Corridors of Opportunity and Development program is to encourage economic development through regional cooperation.

The program strategy embraces the principle that a diversified economy can be established through the specialization of certain regions, defined by transportation routes and the availability of key resources to attract targeted industries. Grants are available to corridor councils to assist in the achievement of their individual marketing plans and development strategies.

The corridor councils, composed of area representatives, will structure and implement a development strategy for a particular corridor of opportunity. These councils also will play a crucial role in the implementation of the program and the access of available matching funds. Individual councils are representative of the entire region, identifying all the various resources of a region for marketing purposes, so companies will know the benefits of expanding or locating there. Each area is encouraged to develop its assets on a multi-county, multi-municipality basis, thereby fostering regional cooperation. The approved corridors within the Illinois River basin are described in the following paragraphs.

Crossroads of Opportunity Corridor -- This includes 37 communities in the southern suburbs of Chicago. The South Suburban Regional Economic Development Coordinating Council, in conjunction with other area organizations, will utilize the $152,200 grant to implement a marketing and promotion program for the economic development of the region. Activities will include: the identification of targeted industries for attracting business; the development of marketing brochures; direct mail campaigns; marketing follow-up through telephone and direct client contact; advertisements in trade journals; and public relations efforts to promote the results of a regional Fantus business climate study.

Argonne Regional Consortium -- A grant of $21,000 was awarded for a high Technology Corridor to serve southwest Cook, northeast Will and southeast Kane counties. Funding will support a feasibility study for the development of a technology-oriented small business incubator at Argonne National Laboratory and the development of technical requests-for-proposal for its construction, as well as an assistance program to secure Argonne supply contracts for small to medium-sized businesses within the consortium's region.

Lake County Economic Development Commission -- The Commission received a grant of $48,910 for a High Technology Corridor of Opportunity in Lake County. This corridor will focus on the attraction of firms specializing in raw materials and peripheral pharmaceutical supplies and recruiting specific high technology industries. The expansion of high technology business will be accomplished through a marketing campaign to identify appropriate sites, provide information on existing business locations and the development of a survey instrument.

Enterprising Zone Corridor Council -- It will serve Fulton, Peoria, Tazewell an Woodford counties. The Economic Development Council for the Peoria Area was granted $40,000 to commission an independent. professional research firm to do an in-depth, current analysis of the region's labor market. The study

will examine: available skill levels of people in the region; levels of under-employment; wage rates; level of unionization by job category; and absenteeism. The information will be used to develop a marketing campaign for the corridor.

Central Illinois Corridor of Opportunity -- It will serve Bureau, LaSalle, Putnam, Marshall, Peoria, Woodford, Livingston, Iroquois, Fulton, Tazewell, McLean, Ford, Mason, Logan, DeWitt, Sangamon, Macon, Piatt, Champaign, Vermilion and Menard counties. This council will develop and implement a Central Illinois marketing program which consists of three components: research; development of marketing tools; and marketing activities. Under the research component, a consultant will study the cost factors associated with doing business in Central Illinois. The marketing tools component includes the development of a regional promotional publication with community or company-specific inserts. In addition, a multi-media/video marketing production will be prepared. To complete this program, a comprehensive marketing plan will be developed. Implementation of the plan includes space advertising and targeted marketing activities. Grant funding was $150,000.

Illinois and Michigan Canal National Heritage Corridor -- It received a grant of $85,770 and serves Cook, Will, Grundy, LaSalle and Bureau counties. It is based upon a system of major transportation links between the Great Lakes and the Mississippi River. The corridor offers programmatic links to integrate recognition and interpretation of the area's natural and historic resources with the development of its recreation, tourism and economic potential. The Illinois and Michigan Canal National Heritage Corridor Commission will conduct a feasibility study to define key themes for the corridor and identify site locations for information centers. Following the initial study, specific program plans and an implementation strategy will be developed for each site location.

Northern Automotive Corridor -- This Corridor serves communities geographically located along Routes 51 and I-74 in Stephenson, Winnebago, Boone, Ogle, LaSalle, DeKalb and Peoria counties. The Council, utilizing its grant of $90,000, will implement a multi-faceted marketing campaign to include a series of targeted direct mailings to high potential supplier firms in both the U.S. and Japan, a cooperative print media campaign in auto industy trade publications and a program to promote existing Illinois companies as viable local suppliers to the Midwest.

Chicago Economic Development Commission -- It was allocated $825,000 to develop a five-year economic development plan for the City of Chicago. The Commission will bolster the tourism/convention business, develop a comprehensive strategic plan for the development of Chicago as a financial services center, identify ways to keep and attract Chicago's professional and skilled personnel in the area and develop Chicago's neighborhoods and industrial parks.

I-57 Corridor -- This focuses on high technology and centers along I-57 from Will County to Champaign-Urbana. The Council, which received a grant of $49,955, will implement a targeted marketing campaign for the region. As part of the campaign, a marketing brochure and slice presentation will be developed, and a media advertising campaign will be conducted. In order to attract target industries to the corridor, participating communities will conduct a direct mail campaign.

Additional corridor projects will be funded as new councils develop. Future funding priorities will be given to support activities identified in currently funded feasibility studies.

The Department of Commerce and Community Affairs reports annually to the Governor and General Assembly on the status of all corridors of opportunity, including a description of each, the funds allocated and their purpose, and any feasibility studies and marketing plans that have developed as a result of the state expenditures.

Build Illinois Large Business Development Program

The Large Business Development Program provides direct financing to large businesses locating in Illinois or for the expansion or retention of existing Illinois firms.

Financing awards are made on a highly selective basis. The program provides long-term, fixed-rate, low-interest loans and is an integral part of the Build Illinois initiative to further economic development and job creation in the State of Illinois.

The program provides loans which will not exceed 25 percent of the total cost of a project up, to a maximum of $2 million. The business must leverage or include additional financial resources for the project. The Department Director may waive the limit and percentage if a larger amount is necessary to accomplish the purposes of the program. The money can be used for land and buildings, machinery and equipment, construction or renovation and infrastructure improvements/site preparation.

For the purposes of this program, a company must be mature and stable, with a well defined market, employ at least 500 employees, have a proven record of earning, sell their products or services to regions beyond Illinois and have multi-state location options.

Build Illinois Large Business Development funds have been awarded to the following businesses located in counties bordering the Illinois River.

Peoria County--The AMKOR Corporation received $1,500,000, in Fiscal Year 1986, to be applied toward the construction of the 220,000 square foot automotive replacement filter manufacturing facility in the southtown area of Peoria. AMKOR will incorporate "state-of-the-art" equipment and processes into this operation that will allow production to Japanese and American automakers' specifications. Approximately 700 jobs will be created.

The City of Peoria received $2 million, in Fiscal Year 1986, to assist in the Southtown I AND II blight removal program implemented in 1974. The 300-acre site is adjacent to downtown Peoria.

The City of Peoria received $900,000, in Fiscal Year 1987, for further land acquisition and clearance in the Southtown Redevelopment area.

Tazewell County--The City of Morton was reimbursed $37,517, in Fiscal Year 1986, for options to purchase real estate for potential sites for the planned Diamond-Star Motors Corporation project.

The City of Pekin received $1 million, in Fiscal Year 1987, to construct a 33,000 square foot building between 2nd and 3rd Streets and Sabella and St. Mary Streets. The building will be leased mostly to state agencies.

Cook County--The Melrose Park Development Corporation received $950,000, in Fiscal Year 1987, to create the Mid-Metro Idustrial Park at Lake Street and Carson Drive in Melrose Park. Up to 900 jobs will be created and retained through this project.

OSI Idustries received $675,000, in Fiscal Year 1987, for the purchase, expansion and improvements of their Chicago plant. As a result of the project, 225 jobs will be created and 355 jobs retained within eighteen months of the loan award.

Build Illinois Public Infrastructure Program

A top priority of Illinois communities is the repair and replacement of decaying water and sewer systems, bridges, roads and schools, an expense few local governments can afford to finance entirely with local funds. As resources to fund capital improvements diminish, Illinois communities are blending traditional debt instruments and grants in innovative ways and making use of a wide variety of state and federal funding mechanisms.

During the 1985 Spring legislative session, the Illinois General Assembly established the Build Illinois Public Infrastructure Loan and Grant Program. The program targets Illinois communities (without regard to population) where infrastructure development or improvement is essential to initiate the expansion or retention of an existing firm or to attract a new firm. Funds are awarded on a specific project basis with emphasis placed on significant job creation or retention. Public Infrastructure Funds have been awarded to the following communities in counties bordering the Illinois River.

Tazewell County-The Village of Mackinaw received $140,000, in Fiscal Year 1986, for the construction of roads and water improvements to Fitzgerald Equipment Company and Meyer Agri-Products. As a result of this project, 32 jobs will be retained.

Will County--The Village of Crest Hill received $75,000, in Fiscal Year 1987, to extend a 12-inch water main to Canton Farm Road to benefit Hendrickson Stamping Company. Fifteen jobs will be created.

The Village of Mokena received $1 million, in Fiscal Year 1987, for infrastructure improvements to extend water and sewer lines along 191st Street, from Wolf Road to U.S. 45.

The Village of Beecher received $305,000, in Fiscal Year 1987, for construction of a well, wellhouse and looping of several dead end water mains to provide a safe and adequate water supply.

Cook County--Calumet City received $294,200, in Fiscal Year 1987, to induce V-G Supply Company to locate a warehouse distribution facility. The company proposes to purchase a vacant 60,000 square foot warehouse and renovate the facility to enable the location of the distribution warehouse. Grant funds will be used for extension of water line, sewer line, paving and lighting. As a result of this project. seven jobs will be created and 37 jobs will be retained.

The Village of Crestwood received $1 million, in Fiscal Year 1987, to pay for improvements in the village's water system which will allow it to join the Mid-Mark Water Commission. Mid-Mark presently supplies a reliable source of Lake Michigan water to the Village of Midlothian and the City of Markham. By joining Mid-Market and completing improvements, the Village of Crestwood will solve supply and pressure problems created by recent growth and increased consumption. Furthermore, the changes will meet future growth and increase in consumption. The project will create 200 jobs.

The Village of Park Forest received $750,000, in Fiscal Year 1986, to complete the necessary infrastructure serving the village's industrial park. The improvements will consist of earthwork, pavement construction, storm and sanitary sewer construction and street-lighting installation. The project will create 75 jobs and retain 34 jobs.

Northwestern University Research Park received $500,000, in Fiscal Year 1987, to upgrade the Center for Multiphase Flow and Transport. The Center, affiliated with the Basic Industry Research Institute, consists of faculty from five engineering departments of the Technological Institute--the Departments of Mechanical and Nuclear Engineering, Biomedical Engineering, Civil Engineering, Engineering Sciences and Applied Mathematics, and Chemical Engineering--all have common research interests in momentum, energy, and mass transport in multiphase flow. The net result will be the modernization of four general laboratories plus an hydraulic laboratory. In addition, Build Illinois Program funds will be used to purchase movable and scientific equipment for the Center.

Chicago Industrial Areas received $3 million, in Fiscal Year 1987, for comprehensive improvements to streets in the City of Chicago serving industrial areas. The improvements will include street resurfacing and reconstruction, installation of traffic signals, railroad crossing construction repair, landscaping, hydrant and light pole relocation, sewer and railroad line improvements and utility relocation and removal, and repairs to the Ogden Avenue viaduct, curb, gutter and sidewalk repairs as necessary.

The Illinois Export Development Authority received $1 million, in Fiscal Year 1986, to establish a reserve fund. The reserve fund is necessary for the Authority to receive an "AA" rating on its bonds. The Authority can then issue $15 million in bonds and use the proceeds to assist international trade transactions. The Authority will deposit the funds in a lump sum in an account to be overseen by a trustee. The funds will be "rolled over" to support additional bond sales after the initial $15 million issue matures.

The Village of Brookfield received $1 million, in Fiscal Year 1986, for improvements on Maple Avenue. The improvements consisted of the construction of new pavement, rehabilitation of sanitary sewers, water main valves, curbs, gutters, sidewalks, storm sewers, drainage gutters and associated work.

The Village of Lansing received $1 million, in Fiscal Year 1987, to improve the Ridge Road and Wentworth Avenue intersection. The project will provide a five-lane cross section with an expanded lighting system.

Lynwood received $500,000, in Fiscal Year 1987, to construct a 500,000 gallon, elevated water storage reservoir including foundation, asphalt surface access driveway, landscaping, on-site water supply piping, pumping system, automatic control modifications and the required engineering services for the project.

The Village of Berkeley received $800,000, in Fiscal Year 1987, to correct deficiencies in their water distribution system. They will construct a 250,000 gallon elevated tank, install water mains and a loop for the distribution system, and replace all defective water distribution valves.

Sauk Village received $250,000, in Fiscal Year 1987, for the improvement of the Lincoln-Lansing drainage ditch. The improvement will extend along the ditch from the vicinity of Jeffrey and Yates Avenue through the corporate limits of Sauk Village of the Linwood Reservoir. The improvement consists of the regrading of the ditch bottom and side slopes to improve flow characteristics. Erosion control measures will be employed to prevent further deterioration of the ditch which provides storm water drainage for the predominantly residential area of the Village.

The Village of Melrose Park received $25,000, in Fiscal Year 1987, to complete improvements to streets and alleyways in the central business district. As a result of these improvements, traffic flow in the business district will be greatly improved.

The City of Blue Island received $150,000, in Fiscal Year 1987, for a water and sewer line extension.

The Village of Franklin Park received $25,000, in Fiscal Year 1987, to assist in facade rehabilitation. The rehabilitation of commercial structures in the central business district will assist in the revitalization of the village.

The City of Chicago received $50,000, in Fiscal Year 1987, for initial costs associated with the expansion of DuSable Museum of African American History.

Build Illinois Small Business Development Program

The Small Business Development Program provides direct financing to small businesses (less than 500 employees) for expansion and subsequent job creation or retention along with a participating financial institution. The program provides favorable financing through long-term, fixed-rate, low-interest loans. The program is an integral part of the Build Illinois initiative to further economic development and job creation in the State of Illinois.

The program provides loans which will not exceed 25 percent of the total cost of a project up to a maximum of $750,000. The business must leverage or include additional financial resources for the project. The money can be used for land and buildings, machinery and equipment, working capital and construction, renovation or leasehold improvements.

Build Illinois Small Business Micro Loan Program

The Small Business Micro Loan Program provides participating direct financing to small businesses at a below-market interest rate in cooperation with private sector lenders. The purpose of the program is to help small businesses create or retain jobs and assist in providing businesses with the opportunity to expand. Funds may be used for acquisition of land or buildings; construction, renovation or leasehold improvements; purchase of machinery or equipment; or, inventory and working capital.

In Fiscal Year 1987, Small Business Micro Loans assisted the following businesses located in counties bordering the Illinois River: Dave Lewis Photography, Canton; Daniels Auto Supply, Braceville; Just Ears & Yesterday's Child, Inc., Peoria; Helen Gallagher's Enterprises, Inc., Peoria; Performance Pattern & Mold, Inc., Peoria; J.A. Hauter, Inc., Elmwood;Aggregate Equipment & Supply, East Peoria; Tompco, Inc., North Pekin; Advance Thermal Products, Schiller Park; Donut, Inc., Homewood; and in Chicago ETY Engineering; Instant Identification Images, Inc.; Lloyd M. Hughes Enterprises, Inc.; A-1 Box & Paper Company, Inc.; Aldridge Metals.

Build Illinois Small Business Incubator Program

During the 1985 Spring legislative session, the Illinois General Assembly established the Illinois Small Business Incubator Program. The program encourages business start-ups and job creation by offering funding support for

the development of small business incubators. Local government units, not-for-profit economic development organizations, educational agencies or any combination thereof may apply to the Department of Commerce and Community Affairs for financial assistance up to 50 percent of the cost of a local incubator project.

The business incubator is an innovative technique used by private developers and units of government to nurture fledgling businesses. Small business incubators can keep potentially large overhead costs manageable by paying for services on a shared basis or on a fee-for-service basis. The cash flow benefits, access to business assistance sources and the interaction with other entrepreneurs in an incubator facility can greatly improve the chances of success for start-up companies. As a support system, the incubator helps entrepreneurs become more experienced managers capable of dealing with daily operations.

Incubator facilities are generally targeted towards small firms that may require support in the areas of management technical or financial operations. Incubators are typically large commercial or industrial facilities subdivided to meet tenant needs for access to shared, centralized services such as receptionists, clerical and administrative help, shipping and receiving facilities and building security.

Many incubators provide direct management assistance counseling as well. Professional consulting services often include information on small business regulations; access to training in basic management and organizational skills; advertising, promotion, marketing and sales information; purchasing, control and distribution of inventories; recruitment of employees and labor relations, and financial counseling in areas like risk management, taxes, insurance and sources of capital.

Small business incubators are funded at major Illinois public and private universities with well established technology transfer programs and a demonstrated capacity to work with emerging business. In Fiscal Year 1986, over $1 million in Build Illinois program funds were awarded to incubator facilities -- two in Chicago, and one each in Decatur and Springfield. Financial assistance has been provided to incubators in Rock Island, Moline, Galesburg and Manteno. University-based incubators in Chicago, Evanston, Peoria and Champaign have been financed with Build Illinois and Technology Commercialization Center funds. In addition to these facilities, the state assisted with the development and funding of other incubators in Chicago, Bradley, Decatur, Galesburg, Macomb, Monmouth, Quincy, Rockdale and Rockford. These incubators have attracted over 56 firms and have created more than 460 firms. A Total of eight incubators have been funded by the State of Illinois at a cost of $2,540,725. Additional technical assistance is available through the Department of Commerce and Community Affairs' publication "Small Business Incubators: Handbook for Sponsors and Developers," "Guidelines for Determining the Feasibility of a Small Business Incubator" and "Managing a Small Business Incubator."

Build Illinois Equity Investment Fund

The Build Illinois Equity Investment Fund, a revolving loan fund administered by the Department of Commerce and Community Affairs' Small Business Bureau, was established in 1985 to provide capital for technology-based companies to undertake substantial job growth and expansion projects. The Equity Investment Fund can provide up to one-third of anticipated project costs, which may be used for the purchase of real estate, machinery and equipment, working capital, research and development costs or organizational fees. Any new or existing small business located or to be located in Illinois may apply for program funds. Investments will be recouped through royalties on product sales, participation certificates or repurchase of company stock. During Fiscal Year 1986, $933,000 was invested and 300 jobs were created. In Fiscal Year 1986, Cell Analysis in Lombard received $250,000 to create 33 jobs.

Tourism Programs

The Department's Office of Tourism has embarked on an extensive advertising campaign aimed at creating an inviting image for Illinois. Through its programs and advertising campaign, the Office of Tourism seeks to make Illinois one of the top tourist attraction states. The competition among surrounding states is very keen. The Department's goal is to portray Illinois as the Gateway to the Midwest in the international market and to make it the leader in the tourism industry.

The travel industry is a major factor in the Illinois economy. More than 30 million persons traveled in the state in 1986 and spent $9.4 billion. Illinois has consistently ranked among the top ten states in recent years in travel expenditures. The federal, state and local taxes that resulted from the 1986 travel in Illinois amounted to $1.3 billion. The travel industry is also a major employer. In 1986, 157,019 Illinoisans were employed in the travel industry with a payroll of $2.2 billion.

Travel Expenditures

Although all the counties in the Illinois River region garner travel expenditures, the spending is most significant in Tazewell, Peoria, LaSalle, and Will counties, and especially Cook County. Several counties receive relatively low, but not inconsiderable, expenditures, including Scott, Brown, and Putnam counties.

In 1985, the state received $8.3 billion in travel expenditures. The Illinois River region received nearly 66 percent of the statewide total, with Cook County receiving nearly 60 percent of that total. Will County, however, ranked second in income from travel, followed by Peoria County. Tazewell and LaSalle counties also received significant travel expenditures.

The Department of Commerce and Community Affairs administers numerous other programs assisting communities to improve their opportunities for economic development. Additional information is available by contacting the Department.