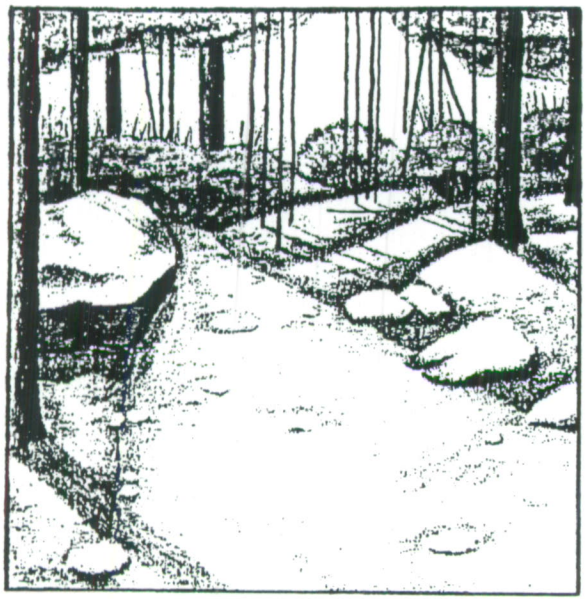
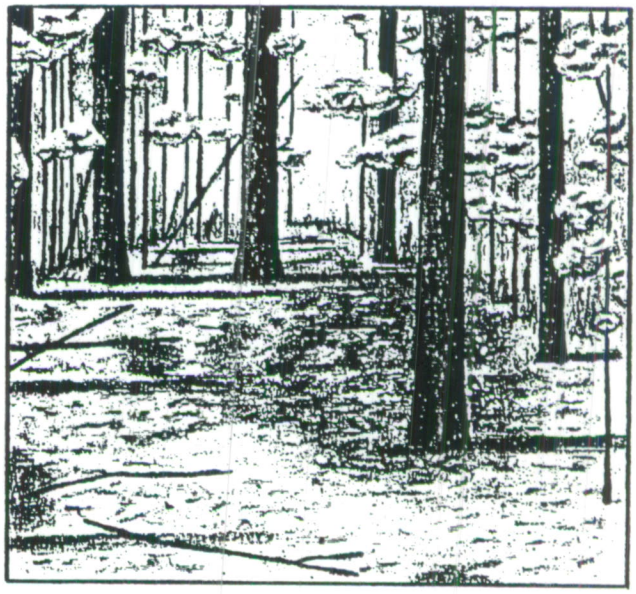
STRATEGIC PLAN FOR THE ECOLOGICAL RESOURCES OF ILLINOIS





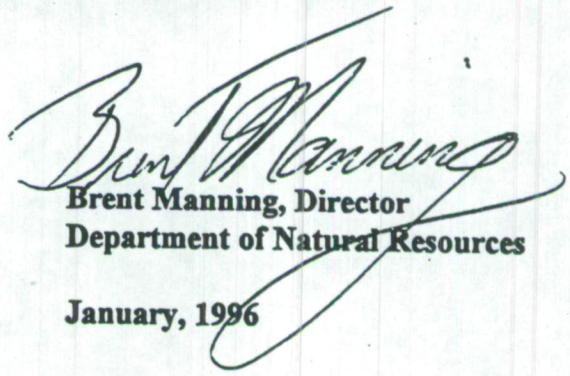
FOREWORD

It is a great pleasure to present to you this "Strategic Plan for the Ecological Resources of Illinois" (SPERI). The publication of this plan is the culmination of a two-year joint planning process of the Illinois Department of Natural Resources (Department), Illinois Endangered Species Protection Board (Board), and the Illinois Nature Preserves Commission (Commission). The plan was conceived from its inception to be consistent with and an extension of the then Illinois Department of Conservation's Strategic Plan. The plan also was formulated with extensive public and professional input.

My hope is that this plan will guide private landowners, researchers, not-for-profit organizations, private businesses and local, regional, and state agencies in collaborating to shape the future landscape of the state of Illinois. I challenge you to select several of the 47 tasks in the Strategic Plan, and incorporate them into your personal, professional, and organizational short- and long-term goals. Such shared ownership of the responsibility to secure the ecological resources for the future is critical.

I am very pleased that upon completion of the initial draft of this plan, the Board, Commission, and Department, along with the many organizations and interests who participated in formulation of this plan, began to immediately pursue some of the identified tasks.

When development of the SPERI began, we could not have anticipated the organization of the then several natural resources agencies into the new Department of Natural Resources. The narrative of the plan has been altered to reflect the reorganization, but the SPERI probably does not fully take advantage of the opportunities that the new DNR presents. I encourage all of you to consider the possibilities that access to the expertise of the Scientific Surveys, State Museum, Office of Water Resources, Office of Mines and Minerals which includes the Abandoned Mined Land Reclamation Council, and the Division of Energy and Environmental Assessment may present for the preservation, protection, and enhancement of Illinois' ecological resources.



Brent Manning, Director
Department of Natural Resources

January, 1996

STRATEGIC PLAN FOR THE ECOLOGICAL RESOURCES OF ILLINOIS

ACKNOWLEDGMENTS

Preparation of *The Strategic Plan for the Ecological Resources of Illinois* was funded by the Illinois Department of Conservation and conducted in collaboration with the Illinois Endangered Species Protection Board and the Illinois Nature Preserves Commission.

Gretchen Bonfert, Green Strategies, Springfield, Illinois, compiled this strategic plan and convened the public meetings whereby participants contributed to the plan. Illustrations on the cover and in the body of the plan were created by Ann Mankowski, of Champaign, Illinois.

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STRATEGIC PLAN FOR THE ECOLOGICAL RESOURCES OF ILLINOIS

INTRODUCTION:

The State of Illinois possesses a rich diversity of plants, animals, lands, and waters that, combined with the natural processes of their interactions, comprise our natural landscapes. Because Illinois has developed extensive agricultural, industrial, transportation, and urban infrastructures, our natural landscapes have been greatly reduced. The fate of prairies, clean rivers and streams, towering rock formations, wetlands and forests--and the plants and wildlife they support--rests with both the public and private sectors. More than 90 percent of the land area of the state is privately owned. Cooperative protection, management, restoration, and research are essential to ensure that the natural communities of the Prairie State exist for the enjoyment, education, and quality of life of future generations.

STATUS OF THE ECOLOGICAL RESOURCES OF ILLINOIS:

The decline of the state's ecological resources are documented in *The Changing Illinois Environment: Critical Trends,* which was completed in 1994 as a joint effort of the Illinois Department of Energy and Natural Resources and the Nature of Illinois Foundation. Below are excerpts from the Executive Summary of the project:

"*Past damage to Illinois streams and rivers has taken a heavy toll.* Of the species present in Illinois at the turn of the present century, about one in five fish, one in three amphibians and reptiles, more than half the freshwater mussels, and one in five crayfish have been extirpated--eliminated from the state--or are threatened by extinction.

"*While water quality in Illinois streams is improving in many respects, ecological quality remains low.* Populations of native fish and aquatic plants are rebounding following precipitous declines in the discharge of industrial effluents into Illinois' 26,000 miles of streams, but full recovery remains a distant hope.

"*Physical, rather than chemical, changes are probably the most perturbing force in Illinois stream ecology.* For example, urbanization is encroaching on Illinois streams; sedimentation smothers stream bottoms; and widespread channelization has altered water flow. Dams contribute to upstream flooding, (and almost every sizable stream in Illinois is dammed in at least one spot), and drainage of wetlands destroys important habitat.

"*Outside its major river valleys, Illinois has lost an estimated two to nine inches of topsoil over the last 150 years.* While net soil movement from erosion is lower overall, it remains sizable enough that sedimentation is one of Illinois' top water quality problems; Peoria Lake, the largest and deepest of the bottomland lakes on the Illinois River, lost 68 percent

of its capacity between 1903 and 1985. However, Illinois has been a national leader in conservation tillage during the last 15 years, when soil conservation practices increased sharply.

"*By 1976 less than 1/100th of one percent, or 2,352 acres, of high-quality original prairie remained in the Prairie State.* Four of every five remaining tracts of prairie are less than ten acres in size. One in three is smaller than one acre--too small to be a self-sustaining ecosystem.

"*Illinois wetlands harbor a great wealth of biological diversity.* An estimated 64% of Illinois' threatened or endangered species inhabit wetlands. Presettlement wetlands constituted one acre in every five in Illinois; wetlands have since dwindled to 918,000 acres, of which only 6,000 acres are undisturbed. Recent laws have slowed the rate of wetlands destruction, and federal rules have led to the mitigation of wetland losses by the construction or restoration of wetlands. Unfortunately, even intact wetlands remain vulnerable to invasion by pollutants, sediments, and exotic species; artificial wetlands to date have duplicated neither the biological diversity nor the hydrological complexity of natural wetlands.

"*Introduction of non-native species--either deliberately or accidentally--are a growing threat to native populations.* These species have rendered the ecology of Lake Michigan unstable, and native mussels are threatened by accidentally introduced zebra mussels. Invasion of Illinois forests by exotic insect and plant pest species are increasing in severity and scope.

"*Habitat fragmentation and other physical changes have surpassed conventional pollution as threats to ecosystem functioning.* The splintering of wetlands, prairies, and forest into fragments makes it harder for small, isolated populations of plants and animals to breed; it also leaves them vulnerable to accidental eradication through fire or other mishap. Competition from exotic species often increases as well, since many exotics, from cowbirds to honeysuckle, thrive along the increased 'edge' environment produced when contiguous habitats are split by development.

"*Humans have become so ecologically dominant in Illinois* that it is impossible to draw clear lines separating natural systems from the social, economic, political, and technological systems that influence them."

> *Conservation is sometimes perceived as stopping everything cold, as holding whooping cranes in higher esteem than people . . . the choice is not between wild places or people, it is between a rich or an impoverished existence . . .*[1]

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[1]Thomas E. Lovejoy, 1991, quoted by Rodes, B.K. and R. Odell, in *A Dictionary of Environmental Quotations*, 1992, Simon and Schuster, 335 pp.

THIS PLAN: WHY, HOW, WHAT NEXT?

The *Strategic Plan for the Ecological Resources of Illinois* was designed to complement and advance other planning and evaluation efforts concerning the state's natural resources, such as Governor Edgar's Water Resources and Land Use Priorities Task Force, the Critical Trends Assessment Project, the Conservation Congress, and the Strategic Plan for the Illinois Department of Conservation.

The purpose of the *Strategic Plan for the Ecological Resources of Illinois* is to challenge public and private agencies, organizations, and every Illinoisan to do their part to improve the ecological diversity of the state. This plan relies on cooperation between and among the public, private, and not-for-profit sectors which share responsibility for, and ownership of, the lands of Illinois. Readers are encouraged to review this plan and identify actions that they or their organizations can take to achieve the goals and objectives, pursue the strategies, and accomplish the tasks stated in this plan.

On June 18, 1994, a symposium was held at Illinois Wesleyan University in Bloomington, Illinois, to address the status of--and threats to--the ecological resources of the state. The 85 participants heard and subsequently discussed presentations on landscape diversity, community diversity, species diversity, and genetic diversity. The discussions at the symposium then carried over to a workshop on July 8-9, 1994, in Springfield, Illinois, where 38 participants grappled with the challenges facing Illinois' ecological resources. The workshop participants contributed to the goals, objectives, strategies, and tasks outlined in this strategic plan.

The participants at the symposium and workshop came from communities across Illinois, including the Rockford, Macomb, Chicago, Peoria, Joliet, Carbondale, and Champaign areas. They represented a variety of public agencies, non-governmental organizations, research institutions, private citizens and landowners. Participants included representatives of the Illinois Department of Conservation, Illinois Endangered Species Protection Board, Illinois Nature Preserves Commission, U.S. Forest Service, county conservation and forest preserve districts, Max McGraw Wildlife Foundation, The Nature Conservancy, Natural Land Institute, Openlands Project, The John G. Shedd Aquarium, Illinois State University, Illinois Wesleyan University, Southern Illinois University, and the Illinois Natural History Survey.

An implementation group, which will include representatives of public, private, and not-for-profit organizations, will be assembled during the year following publication of this strategic plan. The primary purpose of the group will be to evaluate progress in accomplishing the 47 tasks in the plan.

THE DIVERSITY APPROACH

This plan focuses on the rarest plant and animal resources in Illinois, which encompass so much of the state's biodiversity. This emphasis is essential for protecting and restoring the ecological resources of the state. This strategic plan is divided into four sections addressing the protection and restoration of landscape diversity, community diversity, species diversity, and genetic diversity. These represent different methods, from broad to microscopic, for measuring the numbers, types, and distribution of plants and animals across the state. Each section presents separate goal statements, followed by objectives, strategies, and one or more tasks to be undertaken to make progress toward each goal. It is suggested that the document be read in its entirety, as concepts presented in each section build upon information presented in previous sections.

LANDSCAPE The landscape is a collection of terrestrial and aquatic communities. *Landscape diversity* is a measure of the number of natural communities in a region. A diverse, natural landscape provides areas for plants and animals which require different conditions for germinating, feeding, producing seed or young, resting, breeding, and hibernating.

Natural resource management at the landscape scale is believed to be the most efficient, comprehensive, and cost-effective approach to biodiversity preservation. Otherwise, natural landscapes are degraded through fragmentation. The result is isolated patches of natural communities that deteriorate over time, with subsequent declines in community diversity, species diversity, and genetic diversity.

Progress toward achieving the protection and restoration of landscape diversity in Illinois will begin when we are able to maintain a continuum of natural communities across a variety of land forms and water systems. Because of the magnitude of land conversion that has occurred in Illinois, restoration will be a major activity for achieving unfragmented landscapes.

COMMUNITY A community is a grouping of plant and animal species that occur together in a landscape because they are dependent upon each other or share the same habitats during various phases of their lives. The Illinois Natural Areas Inventory recognized eight classes of communities (forests, prairies, savannas, wetlands, lakes and ponds, streams, caves, and primary successional areas with little or no soil, such as cliffs and beaches) which were further divided into specific natural communities, such as wet sand prairies and dry upland forests. *Community diversity* is measured in terms of the number of communities in a landscape.

SPECIES A species is a group of organisms that shares a common set of genes and can interbreed with each other. *Species diversity* describes the total number of species present in a community.

GENETICS Genes are the basic information units that determine the variety of life. Genes define the characteristics of living organisms, characteristics that are passed on to future generations. *Genetic diversity* is a measure of the variety of genes a species possesses. Evaluating the genetic diversity of different populations of the same species may reveal whether that species can adapt to changing conditions and reproduce.

ECOSYSTEM MANAGEMENT Natural communities, and the rocks, soil, water and climate associated with them, interact continuously as ecosystems. Land managers and researchers are challenged to implement an ecosystem management approach which complements natural processes and interactions. The following excerpt is taken from the Illinois Department of Conservation's Strategic Plan:

"Think of ecosystem-based management in terms of an automobile. The automobile, like an ecosystem, is comprised of systems such as the suspension, engine, brakes, superstructure and electrical. These systems contain parts (species). A dependable, smooth running automobile requires all systems to be in good repair and maintained. If not, the automobile may run, but not efficiently, may not be dependable or safe, or may not run at all. Keeping an automobile in top running condition requires continual monitoring and maintenance.

"Similarly, stewardship of natural resources at any ecosystem scale requires that managers consider all the parts (biological and physical features) and how they interact and function in and among the biotic communities that constitute the ecosystem. People influence ecosystems in positive and negative ways. It is the Department's goal to maintain healthy ecosystems and where ecosystems are 'out of tune' to restore them."

WHY ECOSYSTEM MANAGEMENT? Because it benefits all species--including humans. For example, working comprehensively to reduce the sedimentation that kills fish in streams, fills in public water supply reservoirs, and impoverishes our soils is beneficial to all. Preserving the diversity of plants and animals keeps the promise of discovery alive for:

- new medicines and other commercial products,
- disease-resistant plants for agricultural and horticultural uses,
- children and adults wandering a path in the woods or in a prairie, and
- the recovery of endangered and threatened plants and animals.

This strategic plan provides guidance for protecting and restoring the ecological resources of Illinois and can be a tool for broadening discussions with others whose livelihood, economic prosperity and personal health depend upon the landscape of Illinois. In the long term, it's more than a matter of dollars and cents: it's maintenance of our quality of life.

WHO IS RESPONSIBLE? WE ALL ARE.

The State of Illinois, through the Illinois Department of Natural Resources, the Endangered Species Protection Board, and the Illinois Nature Preserves Commission, is charged with protecting and managing the state's natural resources, including plant and animal populations, and offering programs to participants seeking assistance with managing their property, ranging from prairie, to timber, to recreational facilities. Units of local government such as county forest preserve districts, county conservation districts, park districts, and municipalities, protect and manage lands that possess ecological significance and lands that provide recreational opportunities. Many private and not-for-profit organizations actively protect and manage natural lands and provide opportunities for education, recreation, and volunteer participation.

Ultimately, it is up to each individual to care for the Illinois landscape. Working to improve our quality of life involves planning and taking actions that benefit the natural resources of the state. Publications, such as the *Landowner's Guide to Natural Resources Management Incentives,* offer a menu of the current opportunities for assistance in land conservation and restoration.

Since 1989, a portion of the real estate transfer tax has been used to accomplish the unique and vital work of acquiring the last natural areas in Illinois and provide management guidance, conduct related research, and accomplish stewardship activities. One of the biggest challenges to this new revenue source, known as the Natural Areas Acquisition Fund, is to protect it and to use it effectively.

By law, the Natural Areas Acquisition Fund is to be used by the Illinois Department of Natural Resources "for the acquisition, preservation and stewardship of natural areas, including habitats for endangered and threatened species, high quality natural communities, wetlands, and other areas with unique or unusual natural heritage qualities." Illinois citizens are very fortunate that this program exists, ensuring that the rarest natural lands in the state will be protected and managed for future generations. However, the emphasis of this strategic plan is NOT land acquisition, but rather challenging landowners to look anew at their property.

> ***In reality stewardship does not call for more land acquisition by governments to preserve ecosystems, but for a change of attitude about everyone's backyard.***[2]

WHAT IS YOUR BACKYARD? It doesn't end at your fence line, nor at the county line. Your backyard includes where you go for outdoor recreation, the urban sprawl on the edge of your community, the outlying woods and fields of your county, nearby tracts of publicly-owned land . . . ALL are your backyard.

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[2] James P. Karp, 1993, "A Private Property Duty of Stewardship: Changing Our Land Ethic," *Environmental Law,* Northwestern School of Law of Lewis and Clark College, Vol. 23, No. 3:749 (pp. 735-762).

A 1991 survey conducted by the U.S. Fish and Wildlife Service showed that "4.8 million Illinois residents 15 years of age and older engage in fishing, hunting or non-consumptive outdoor recreational activities. Of those surveyed, 3.5 million participated in non-consumptive activities in which the enjoyment of wildlife was the primary purpose, 1.5 million fished, and 457,000 hunted."[3]

> ***The real substance of conservation lies not in the physical projects of government, but in the mental processes of citizens . . . All the acts of government, in short, are of slight importance to conservation except as they affect the acts and thoughts of citizens.***[4]

While the term "infrastructure" may bring to mind sanitary sewers, sidewalks, issuance of capital development bonds, and public water supply systems, that concept is incomplete. Ecological infrastructure is just as essential for maintaining our neighborhoods and quality of life. Our ability to maintain and improve the ecological resources of Illinois depends on the prevention of:

- **decline or disappearance of native species from Illinois,**
- **loss of habitat,**
- **deterioration of the natural landscape due to pollution and unplanned development,**
- **management actions that benefit one species but are detrimental to others or the natural community as a whole,**
- **contamination and sedimentation of surface waters,**
- **contamination and excessive withdrawals of groundwater resources, and**
- **air pollution.**

Such prevention efforts require looking at the "big picture" of what surrounds us-- not just a rare species in a rare setting--but the entire watershed in which species, natural communities, and rural and urban land uses occur.

As Charles Lindbergh said in an address to the Alaska legislature in 1968,

> ***I don't think there is anything more important than conservation, with the exception of human survival, and the two are so closely interlaced that it is hard to separate one from the other.***[5]

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[3] U.S.Fish and Wildlife Service, 1994, *An Ecosystem Approach to Fish and Wildlife Conservation: An Approach to More Effectively Conserve the Nation's Biodiversity,* 14 pp.

[4] Aldo Leopold, 1937, "Conservation Blueprints," *American Forests* Vol. 43, No. 12: 596.

[5] Charles A. Lindbergh, 1968, quoted by Rodes, B.K. and R. Odell, in *A Dictionary of Environmental Quotations*, 1992, Simon and Schuster, 335 pp.

Landscape Diversity

Unique geologic formations, gravel-bottomed streams, bogs, savannas, upland oak-hickory forests, wetlands, gently rolling prairies and more, are represented in the diversity of Illinois' landscapes. Linking natural communities from stream bottoms on up to the crests of hill prairies, with restored areas in between, will be necessary to secure the landscape diversity of Illinois for future generations. By protecting, managing and restoring natural landscapes, viable populations of most of Illinois' animals and plants can be maintained.

An area encompassing several high quality natural lands and stream segments, linked by restored tracts across a diversity of land forms, may be referred to as an "ecological reserve." In these areas, which are envisioned at the scale of several square miles in size, there may be ample space to allow natural processes such as fire, windthrow, and succession to occur. Allowing natural systems to function over the long term is a necessity for preserving landscape diversity.

Preparation of a framework for an Ecological Reserve Program in Illinois is underway. The Ecological Reserve Program will provide the foundation for substantial restoration efforts by interested landowners. Protection and restoration of landscapes in ecological reserves are the most cost-effective measures that can be undertaken to maintain viable populations of most of Illinois' animals and plants, recover many endangered and threatened species, and prevent other species from becoming endangered or threatened.

Participating in assembling ecological reserves will be all manner of landowners: municipalities, businesses, citizens, and public interests. Public land acquisition is not necessarily a prerequisite for improving and maintaining ecological diversity. The core of the effort should be cooperative land management with willing partners.

Given the degree of land conversion and fragmentation in our state, restoration of extensive areas is required to restore landscape diversity. These landscape-scale restoration needs raise other issues at the community diversity, species diversity and genetic diversity levels. To restore large land areas, we must first evaluate the availability of existing plant materials, seed and plant production capability, and the human and financial resources of organizations, agencies, and individuals.

Ecological reserves offer a variety of opportunities for recreation and restoration. Allocation of management activities and direction of recreational activities, such as hunting, fishing and nature observation, should be based on the best site-inventory information possible.

Goal I Establish a system of ecological reserves.

Objective Assure viable populations of the majority of Illinois' plants and animals are maintained over the long term by establishing at least one ecological reserve in each of Illinois' natural divisions.

Strategy A statewide coalition should be established to develop criteria for designating and promoting the formation of Ecological Reserves.

TASK:

(1) The leaders of the Illinois Department of Natural Resources, Illinois Natural History Survey, Illinois Nature Preserves Commission, and Illinois Endangered Species Protection Board should invite participants to serve on an Ecological Reserves Panel as part of a new Ecological Reserves Program. The panel would include representatives of governmental and non-governmental conservation organizations, universities, and major zoological botanical and research organizations.

Objective Establish ecological diversity goals for each ecological reserve that are shared by participating landowners.

Strategy Provide technical assistance to ecological reserve partners, with conditions that partners meet reasonable management-related performance criteria related to the ecological integrity of the reserve.

TASK:

(2) The Illinois Department of Natural Resources, U.S. Fish and Wildlife Service, Illinois Nature Preserves Commission, U.S. Forest Service, representatives of county forest preserve and conservation districts, and The Nature Conservancy should develop generic "partners' performance criteria for landscape scale projects" which can be tailored to specific ecological reserves.

Goal II Demonstrate to the public the efficiencies of ecosystem management on today's publicly-owned land.

Objective On contiguous parcels of publicly-owned conservation lands, conduct consistent and complementary management activities.

Strategy Where two or more adjacent properties are owned by one public organization, the properties should be managed comprehensively for all game and non-game species.

TASKS:

(3) The Illinois Department of Natural Resources' research and resource conservation offices should collaborate to prepare one integrated management plan for each group of tracts of department-owned land, beginning with the largest clusters of properties.

(4) Where two or more conservation areas owned by units of local government are divided by a political boundary, but are part of the same ecosystem, the managing agencies should collaborate to prepare a unified management plan.

(5) Public conservation agencies should manage their land holdings to provide habitats for species that are rare or non-existent on private lands.

(6) The Illinois Department of Natural Resources should invest in upgrading and electronically mapping its Biological Conservation Database so that it can be shared with other regulatory and land management organizations and agencies interested in preserving endangered and threatened species, natural areas, and ecological reserves.

(7) Conservation agencies should leverage financial support forecosystem-based land management through existing federal programs directed by the U.S.D.A. Natural Resource Conservation Service, U.S. Department of the Interior, and the U.S. Environmental Protection Agency, by developing integrated watershed and ecosystem-based land management programs.

Goal III Increase the maintenance and restoration of natural lands in private ownership.

Objective Create additional incentives for private landowners and organizations to buy and manage lands to benefit the ecological diversity of the state.

Strategy Explore modifying state and federal tax provisions, including tax credits and property tax reductions, to benefit owners of lands held for conservation purposes.

TASKS:

(8) Conservation agencies in Illinois should investigate and work to generate support for changes in federal tax laws to recognize and reward land uses which support landscape-scale diversity. Offering tax credits for habitat maintenance and improvements and compliance with the federal Endangered Species Act could be considered. Also, similar to the manner in which air emissions credits are traded under the federal Clean Air Act, consideration should be given to creating a market for trading development rights for acres providing habitat for native species (Hudson, 1993).

(9) Conservation easements are a valuable tool in assembling an Ecological Reserve. A conservation easement is an agreement in which landowners retain ownership of their property while committing to manage or allowing another party to manage the land for conservation purposes. The existing Open Space Land Acquisition and Development Fund (OSLAD), which is used to partially reimburse units of local government for land acquisition, capital developments and improvements, can also be used to acquire easements instead of purchasing the property. In 1994, a law was passed to reduce the property tax valuation from 33 1/3% to 8 1/3% for lands covered by a conservation easement. Now that this tax reduction is uniform statewide, the Illinois Department of Natural Resources should use part of its existing OSLAD program to offer this option to landowners.

Objective Promote regional and local natural resource planning.

Strategy Increase the focus on natural resources protection planning.

TASKS:

(10) Require comprehensive planning efforts by state and local governments, including protection and conservation of ecosystem function and associated natural communities, to precede approval of major public works projects such as highways and airports. These projects consume natural lands and alter ecosystem processes directly and indirectly. In addition, all of the associated, subsequent development drawn to the initial project multiplies the effect on the landscape. While plans for major projects are quick to present the economic projections for collateral development, the collateral destruction of natural resources usually has not been considered.

(11) In eight northeastern states, laws exist that authorize municipalities to form bodies known as "conservation commissions." Persons in Illinois who are involved in land conservation and land use planning should evaluate this approach for possible use in Illinois. (Since 1958, over 400 conservation commissions have been created in Vermont and Maine. Over 85% of New Hampshire and Rhode Island towns have also created such commissions to establish community-based responsibility for natural resources and inventory the areas' natural resources, receive gifts of land and grants, assist planning and zoning boards with issues affecting local natural resources, and provide educational opportunities.)

Goal IV Base management activities within an ecological reserve on comprehensive inventory information.

Objective Ensure that plant and animal species, natural communities, and potential threats to species and communities are identified at each ecological reserve.

Strategy As a potential ecological reserve is being assembled, inventory individual tracts in terms of species, natural communities, and potential threats (both on-site and off-site).

TASK:

(12) The Illinois Department of Natural Resources should offer site assessments to partners cooperating in landscape-scale preservation projects.

Strategy Ensure that recreational opportunities are provided in locations and at intensities that benefit users and do not harm the natural resources.

TASK:

(13) Beginning with its existing properties, the Illinois Department of Natural Resources should develop objective criteria for evaluating the capacity of a site to support recreational activities.

Goal V Ensure that the materials, equipment, and human resources needed for large scale restorations are available.

Objective Anticipate the supply and demand associated with restoration activity statewide.

Strategy Encourage public and private collaboration in developing restoration capacity.

TASKS:

(14) Estimate the availability of seed and plant materials from existing natural communities or restored areas.

(15) Estimate the projected need for restoration materials, equipment, and labor statewide. One potential factor to include is the capacity of the Abandoned Mined Lands Reclamation Council. The council's significant knowledge and equipment for improving the landscape could also be used to restore natural areas. Training in natural community restoration techniques would be needed.

(16) Encourage private nurseries to produce plant materials for which there is sizable demand but limited supply.

(17) Develop a directory of experts in the many areas involved in restoration work, ranging from wetland restoration to volunteer recruitment.

Community Diversity

Natural communities in Illinois are often referred to in the context of the Illinois Natural Areas Inventory (INAI), which was conducted from 1975-1978. It was produced by the University of Illinois and the Natural Land Institute, under contract with the Illinois Department of Conservation, and involved over 200 persons participating as volunteers or staff. The entire State of Illinois was studied using maps, aerial photographs and field inspections. Much of this information has been entered into the Biological Conservation Database, which is managed by the Illinois Department of Natural Resources, Division of Natural Heritage. The inventory is updated annually. Of the 390 sites that have been added to the inventory between 1978 and 1993, 10% were high quality natural communities, 10% were rivers and stream segments, and 80% were properties supporting threatened and endangered plants or animals.

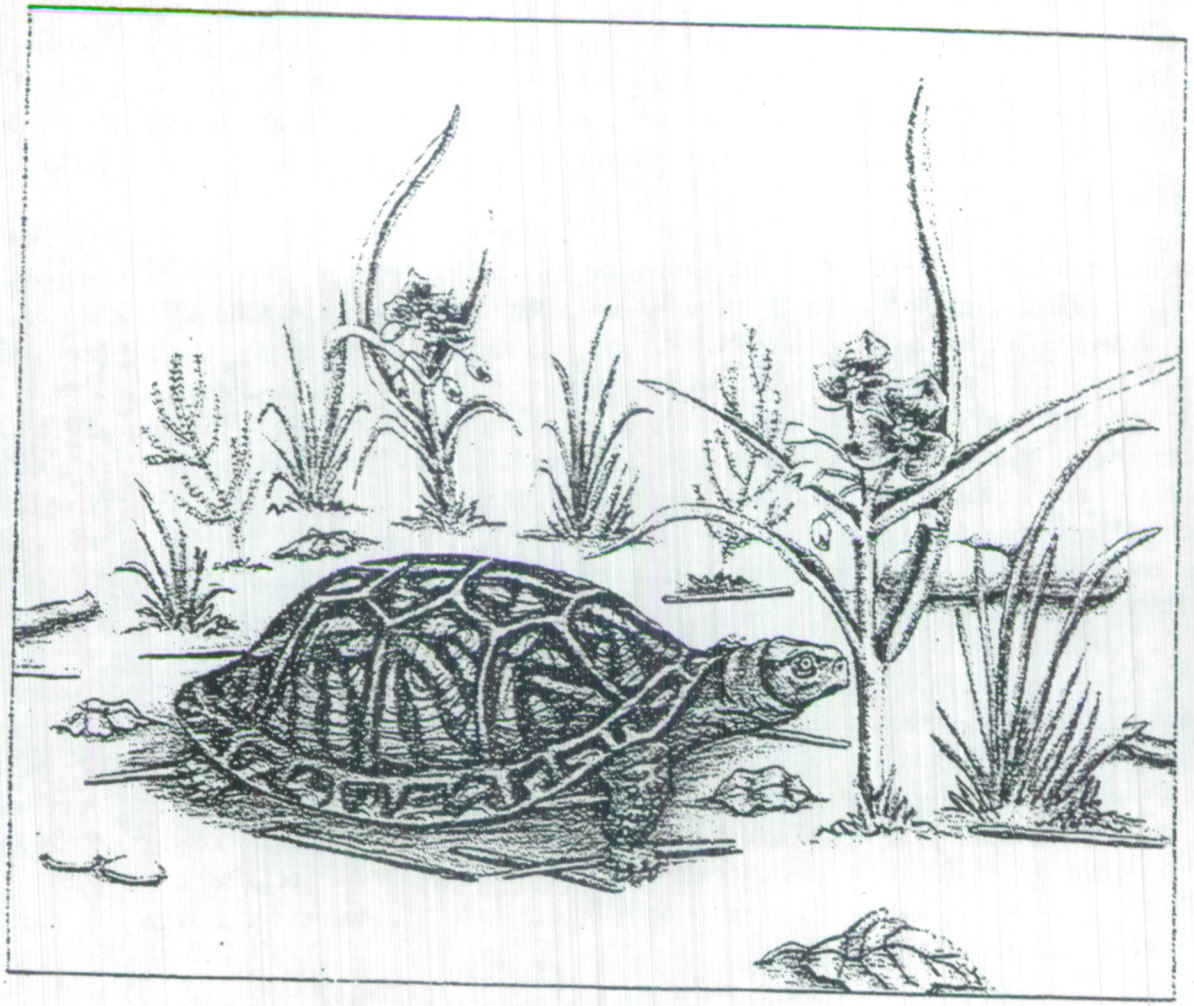
A *natural area* is an area of land in public or private ownership which retains, or has recovered to a substantial degree, its original character--although it need not be completely undisturbed. A natural area may have floral, faunal, ecological, geological or archaeological features of scientific, educational, scenic or aesthetic interest. Many of these rare areas will not endure as small, isolated parcels. Often these small sites do not survive due to invasion by aggressive plant and animal species from surrounding converted lands; or species from within the natural community are aggressive due to the lack of natural processes, such as periodic fire or predators that would maintain the balance among various species.

As more natural processes function on the landscape, less human intervention is needed. Where human intervention is needed, management activities should mimic natural processes. For example, prescribed burning is conducted on many natural lands to replicate the wildfires of the past which sustained native natural communities. Fire is a cost-effective and efficient management tool. Burning adds nutrients to the soil, increases the vigor of "desirable" plant species, weakens "undesirable" plant species, and stimulates some dormant seeds to germinate. Prescribed burning accomplishes fertilizing, weed control, and seeding in one action. While prescribed burning involves prior training and a carefully coordinated effort, all of the benefits to the site are accomplished in one day's prescribed burning activity.

The Illinois Natural Areas Inventory has guided--and will continue to guide--much conservation work statewide. However, one unanticipated effect of the inventory is that ecologically significant sites not granted INAI status may have been overlooked in the past at the county and local level, because they were thought not to be worthy of protection. Where this occurred, it is unfortunate and unjustified. Many sites that may have been overlooked are significant regionally and are worthy of protection. Securing the protection of community diversity in the future involves linking natural areas of local, regional, state, national, and global significance.

We cannot move fast enough to fully protect our remaining natural land and water resources. Natural areas are our fundamental guide and resource for restoring the landscape of Illinois. The native species and intact natural communities contained in small sites are essential to the ecological diversity of the state and are essential for the restoration and maintenance of large tracts. We must take care that the removal of plants and animals from a natural area--for the purpose of restoring another site--occurs without jeopardizing the integrity of the natural area and the species supported there.

Classification of terrestrial communities was emphasized in the Illinois Natural Areas Inventory. Two recent studies greatly advanced our knowledge of the quality of Illinois' rivers and streams: *Biological Stream Characterization* (Hite and Bertrand, 1989) and *Biologically Significant Streams* (Page et al., 1992). However, our ability to protect, manage and restore rivers and streams is not as advanced as our experience with terrestrial communities. Because of their interdependence, we must act comprehensively to preserve both natural lands and natural aquatic systems to ensure the future of the ecological diversity of Illinois.



Goal I Protect Illinois' highest quality rivers and streams.

Objective Ensure that Illinois' highest quality rivers and streams are identified so they can be given priority for protection.

Strategy Develop an aquatic classification system, combining the results of previous studies and the INAI system for terrestrial natural community classification, and also addressing preservation values and the identification of management needs.

TASK:

(18) Representatives of the Illinois Department of Natural Resources, Illinois Natural History Survey, Illinois Environmental Protection Agency, and non-governmental conservation organizations should develop an aquatic classification system for Illinois' flowing waters.

Objective Work with landowners along priority waterways to protect their property interests and to manage their lands to benefit the waterway and themselves.

Strategy Contact landowners to discuss incentives for creating buffer strips along waterways.

TASKS:

(19) Representatives of the Illinois Department of Natural Resources, Illinois Natural History Survey, Illinois Nature Preserves Commission, Illinois Environmental Protection Agency, The Nature Conservancy, and the Natural Land Institute should select five of Illinois' highest quality streams for a pilot protection program.

(20) Encouraging the maintenance of filter strips along Illinois rivers and streams should be a priority for all conservation organizations in Illinois: federal, state, county, municipal, private, and not-for-profit. Conservation easements, the Illinois Department of Natural Resources' Register of Land and Water Reserves, the Illinois Department of Agriculture's soil erosion control programs, and other financial incentives for landowners and cooperative management agreements are ways to create buffers to reduce siltation and pollution of streams.

(21) Public and not-for-profit entities capable of accepting conservation easements should collaborate to develop a uniform approach to landowners in a given watershed. Collaborators could include the Illinois Department of Natural Resources, Illinois Department of Agriculture, Illinois Environmental Protection Agency, Cooperative Extension Service, Soil and Water Conservation Districts, and U.S.D.A. Natural Resource Conservation Service.

(22) Work with landowners to address ways to reduce the impacts of impending projects affecting waterways. Recently, when developments that may be detrimental to waterways have been in the planning stages, a novel form of mitigation has been used. This mitigation involves the developer or the permitting agency financing outreach efforts to landowners located upstream and downstream from the proposed project to explore opportunities to protect, restore, or reduce project-related impacts to their property.

Goal II Restore damaged stream segments.

Objective Use the best stream restoration methods available.

Strategy Inventory all previous stream restoration efforts in Illinois to create guidelines for restoration methods.

TASKS:

(23) Representatives of the Illinois Department of Natural Resources, U.S. Forest Service, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, The Nature Conservancy, Openlands Project, Illinois Department of Agriculture, U.S.D.A. Natural Resource Conservation Service, and county conservation and forest preserve districts should collaborate to inventory all stream restoration projects and develop guidelines. The guidelines should include an evaluation of successful and unsuccessful techniques and discussion of relevant legal issues such as drainage laws.

(24) Once the inventory is completed, the participating entities should conduct a workshop to present the guidelines.

Goal III Conduct standardized monitoring of natural communities statewide.

Objective Be able to detect improvement or degradation of natural communities and determine the effects of management across properties of cooperating landowners.

Strategy Conservation agencies managing natural areas should collaborate to create uniform monitoring standards for evaluating the health of natural communities across the landscape.

TASKS:

(25) Convene a Monitoring Standards Group representing the various entities involved in monitoring and managing terrestrial and aquatic natural communities in Illinois: U.S. Forest Service, U.S. Fish and Wildlife Service, Illinois Department of Natural Resources (Office of Land Management and Education, Office of Resource Conservation, Office of the Scientific Research and Analysis, and Office of Realty and Environmental Planning), Illinois Nature Preserves Commission, Illinois Environmental Protection Agency, county forest preserve districts, county conservation districts, and The Nature Conservancy. The purpose of the group is to implement Task 26.

(26) The Monitoring Standards Group should conduct a survey of natural areas managers to (1) identify current monitoring methods for evaluating the quality of natural communities and (2) identify methods for evaluating the effectiveness of management activities. Based on the survey responses, the group should develop monitoring standards for use by all persons involved in field activities to preserve and restore the ecological diversity of the state. Previous monitoring standards efforts by the Natural Areas Association, as well as the current effort under way through the National Biological Service, may be helpful.

Goal IV Reduce the threat that certain aggressive species pose to natural communities.

Objective Where rare and/or sensitive native species are being damaged due to excessive populations of other species, halt the damage.

Strategy Restore appropriate population levels of species such as white-tailed deer, raccoon, beaver, sugar maples, gray dogwood, cattails, and cedars.

TASK:

(27) The Illinois Department of Natural Resources' resource conservation divisions should collaborate and consult with outside experts in the development of programs and management guidelines to reduce overpopulations of species that are damaging ecosystems.

Strategy Develop new cooperative partnerships for a more comprehensive approach to controlling introduced species.

TASKS:

(28) The Illinois Department of Natural Resources, U.S. Forest Service, and county forest preserve and conservation districts should commit to actively remove introduced species from their land holdings.

(29) Biocontrol of purple loosestrife is under way in several midwestern states. Other introduced species pose similar threats to commercially important and ecologically important species. Conservation agencies should support the Illinois Natural History Survey obtaining the capability to identify and culture candidate species for biocontrol of certain problem species.

(30) Determine if there is a need for a public or private entity in Illinois to better coordinate efforts to monitor and combat the introduction of non-native plants to the state which may harm natural areas, compete with agricultural crops, and increase land management costs. Options present in other states that could be considered include creation of an interdepartmental board that would include representation of agricultural and conservation interests, establishing an introduced species program in a natural resource agency, or a private, membership-based Exotic Plant Prevention Council.

Goal V Improve prescribed burning capability statewide.

Objective Because the traditional time period to conduct prescribed burning on natural lands is limited to several weeks during spring and autumn, the maximum number of persons possible should be trained and equipped to conduct prescribed burning on natural areas.

Strategy Increase prescribed burning training, activity, and evaluation.

TASKS:

(31) **An Illinois Fire Council should be created, involving the Illinois Department of Natural Resources, Illinois Nature Preserves Commission, Illinois Endangered Species Protection Board, The Nature Conservancy, Office of the State Fire Marshall, local fire departments, county conservation districts and forest preserve districts, and the Illinois Association of Park Districts. The Fire Council could be modeled after the program in Florida, meeting quarterly to consider possible legislation to address issues such as liability and the training and certification of burn leaders.**

(32) **The Fire Council should work to provide prescribed burning training that emphasizes techniques appropriate for the fragmented landscape of Illinois.**

(33) **The Illinois Department of Natural Resources should hire contractual employees during the burn seasons, so that prescribed burning can be conducted on state-owned or managed lands continually during those periods. The Department's existing "hot shot crews" are a mobile group that performs concentrated construction and repair projects at state sites during the summer months. Expanding and diversifying the capabilities of these crews may be possible with comprehensive training in prescribed burning techniques.**

(34) **The Illinois Department of Natural Resources should establish a research program to determine the effects on natural communities of spring vs. fall prescribed burns, and ascertain the appropriateness of the traditional seasonal periods for accomplishing prescribed burning.**

Species Diversity

There are over 2,500 native plant species in Illinois. Another 900 species that occur in Illinois are not native. These species may be referred to as "exotic," "alien," "introduced" or "non-native." Similarly, native and non-native animal species occur in Illinois. Plant and animal species from another country may thrive in Illinois because of many factors, including lack of predators, competitors, or disease. Some introductions occurred by accident--such as seeds clinging to other materials brought into Illinois. Other species have been introduced intentionally--cultivated for revegetation or for ornamental uses. Certain species, such as multiflora rose, were once thought to be useful, but are now deemed harmful, and their introduction is illegal under the Illinois Exotic Weed Act of 1988.

Two-thirds of all Illinoisans reside in northeastern Illinois, on less than 10% of the land area of the state. In northeastern Illinois, from the early 1970s to the early 1990s, population increased by four percent while the extent of development increased by at least 45 percent.[6] Thirty-four percent of the state's endangered and threatened species occur in this region of rapid development. Statewide, 75 percent of endangered and threatened animal species occur on private property. Of the 511 endangered and threatened species in Illinois, 363 are plants and 148 are animals. Half of Illinois' mussel species no longer occur in the state or are endangered or threatened. Clearly, efforts to recover endangered and threatened species, prevent the endangerment of other species, and collaborate with willing landowners for species protection, are crucial for the future species diversity of the state.

> ***The last word in ignorance is the man who says of an animal or plant: 'What good is it?' If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of eons, has built something we like, but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.[7]***

Goal I Prevent species from becoming endangered or from disappearing.

Objective **Determine which species or groups of species are vulnerable or "at risk."**

> **Strategy** **Using a prevention approach, determine why certain species--that are not rare now--may be in jeopardy in the future.**

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[6] Northeastern Illinois Planning Commission, 1992, *Northeastern Illinois Greenways Plan*, 66 pp.

[7] Aldo Leopold, 1939, "A Biotic View of Land," *Journal of Forestry*, Vol. 37, No. 9: 727.

TASK:

(35) The Endangered Species Protection Board, Illinois Department of Natural Resources, Illinois Nature Preserves Commission, and other specialists should identify key aspects of plant and animal species' life histories which could jeopardize their future viability, including seed dispersal mechanisms, pollination or breeding methods, reproductive success, and habitat preferences. Better understanding of each species is the key to preventing their endangerment or extirpation.

Objective Determine why Illinois' rarest species are threatened and endangered.

Strategy Evaluate factors contributing to the rarity of each listed species.

TASK:

(36) The Illinois Endangered Species Protection Board should categorize all endangered and threatened species in terms of why they are so rare, considering factors such as habitat loss, habitat requirements that are very specific or involve a large area, and the life history factors presented in Task 35.

Strategy Share responsibility for endangered and threatened species protection with units of local government.

TASK:

(37) Encourage units of local government to enter partnerships with the Illinois Department of Natural Resources for delegation of "consultation," the review of proposed developments, and actions that potentially affect threatened and endangered species.

Goal II Design species recovery efforts for efficiency: each recovery effort should benefit a number of species.

Objective Recovery efforts should be concentrated on a group of species or a single species that requires a sizable habitat area.

Strategy Focus on species or groups of species that will be influential in determining the size of future ecological reserves.

TASK:

(38) The Illinois Endangered Species Protection Board, the Illinois Department of Natural Resources, the Illinois Natural History Survey and collaborating conservation agencies, such as county conservation and forest preserve districts, should seek the funds to develop recovery plans for individual wide-ranging species, such as the river otter, and for groups of species, such as grassland birds, wetland-dependent species, and upland prairie species.

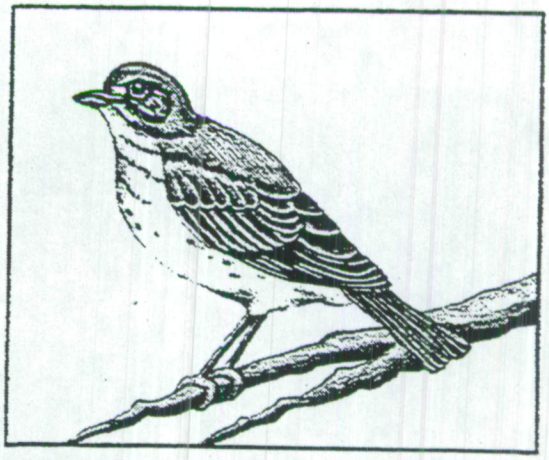
Goal III Look beyond the state's boundaries in prioritizing Illinois' species protection efforts.

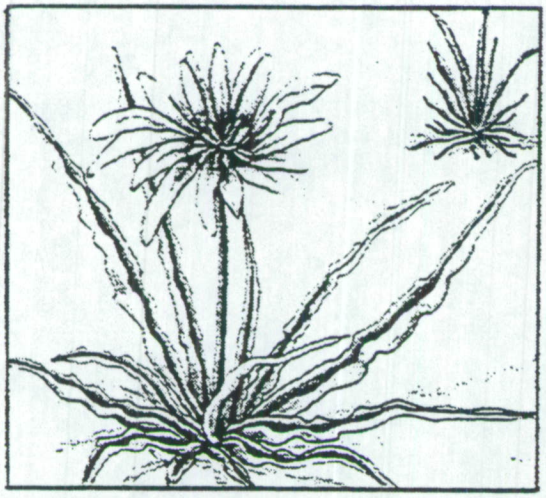
Objective **Apply a midwestern regional perspective to species protection.**

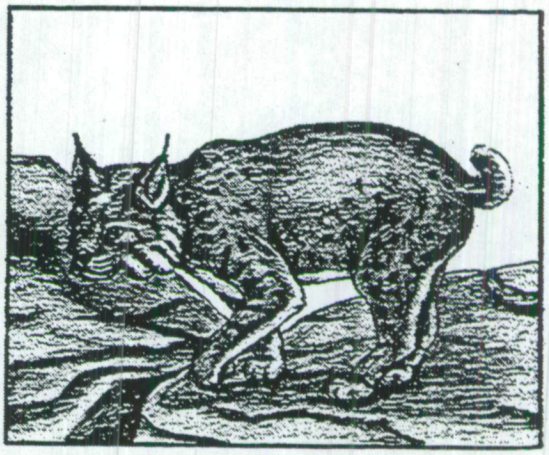
Strategy **Identify species common in Illinois but rare in one or more neighboring states.**

TASK:

(39) Conservation agencies should evaluate species that are abundant in Illinois, but which are listed as threatened or endangered in neighboring states. Understanding the genetics, life histories, and habitat requirements for these species relative to future management and restoration efforts in Illinois, should prevent them from becoming rare in Illinois, and ensure that species unique to the midwestern United States thrive. In special circumstances, these efforts may be complemented by translocating species into an area where the species no longer occur.







GENETIC DIVERSITY

Evaluation of genetic diversity within a species is sometimes the only way to determine the secrets to the future survival of some of Illinois' native species. These tests can provide indications about whether a species can reproduce, and whether there are any significant differences between or among two or more separate populations of the same species. The results of such tests can provide important insights about how natural communities should be managed and restored across the state.

When conducting large-scale restoration or recovery efforts involving certain plants or animals, genetic diversity concerns may arise. Below are examples of concerns that may arise.

A. Should seeds or offspring for a large-scale restoration be obtained from sources located within a certain distance of the restoration site?

B. Do populations of some plants and animals occurring in isolated locations eventually lose their ability to reproduce, experience a decline in their genetic diversity, or become less able to survive?

C. If habitat exists for a species, but the species still isn't doing well, is it because that species has a genetic problem?

D. Do populations of plants grown in a nursery setting for several generations experience changes that make them less able to adapt and reproduce when moved to a restored area?

Evaluation of the genetic diversity of plants and animals can appear to loom as a costly enterprise. Yet, answers to the questions raised above could markedly affect the restoration approach used with certain species. The answers could demonstrate that plant materials may be distributed broadly for use in restorations across the state (A, B above). The answers could also prevent undertaking a costly translocation or propagation effort that would have a low likelihood of success (B, C, D above).

There is a practical and cost-effective approach addressing these genetic diversity issues: rely on research institutions in Illinois which already have the capacity to conduct such tests, work cooperatively with interested parties to find the most efficient testing methods, and prioritize which species should be evaluated.

Goal I Understand the genetic diversity of plant and animal species that are candidates for future recovery and restoration efforts.

Objective Determine the most efficient and economical methods to determine the genetic diversity of certain plants and animals to address conservation issues.

Strategy Analyze the genetic attributes of endangered and threatened species, particularly those that are candidates for recovery.

TASK:

(40) Collaborating institutions should identify the most appropriate and current analytical methods to assess the genetic diversity of certain endangered and threatened plant and animal species which are identified in the Species Diversity section (Tasks 35, 36).

Strategy Evaluate the genetic diversity of various populations of certain common species which will be used extensively in future restoration projects.

TASK:

(41) The Illinois Nature Preserves Commission should identify prairie grass and tree species which are common to many natural communities. Because these species will be critical for ensuring the success of large scale restoration efforts, further knowledge about their habitat requirements and viability is necessary so that they reproduce and can be sustained in appropriate regions of the state.

Objective Ensure that native plant species, which are the foundation of many natural communities across the state, are available for restoration purposes.

Strategy Determine whether certain common native species differ in habitat requirements and behavior in different areas of the state.

TASKS:

(42) With the cooperation of conservation agencies, public and private nurseries, and research institutions, obtain samples of the species identified in Task 41 from several locations around the state, including nursery stock, to conduct genetic analyses. The purposes of the analyses are to a) determine how the genetic diversity of each species is distributed across the state, and b) how to manage the reproduction and distribution of seeds for restorations--while preserving the genetic diversity of the species and increasing the likelihood of successful restoration efforts.

(43) Conservation agencies and constituents should launch a public and private collaboration to expand Illinois' native plant production capability (see Tasks 14-17). (Due to years of demand for native plant materials exceeding the available supply, two sessions of the Conservation Congress recommended public-private partnerships to increase the supply.)

Goal II Make a long-term commitment to conservation genetics.

Objective Coordinate genetics research on native plant and animal species across the state.

Strategy Combine existing institutions' capabilities for genetic analyses with identified research priorities in the conservation of native plant and animal species.

TASKS:

(44) Conduct an inventory of the genetics research capabilities present in public and private institutions in Illinois and the potential for collaboration.

(45) Using existing funds and grant programs within the Illinois Department of Natural Resources, begin to support projects for conservation genetics research at institutions possessing that capability.

(46) A single office in Illinois should coordinate genetic research with, and disseminate information to, various institutions to address Illinois' long term conservation genetics research agenda.

(47) Establish a Center for Conservation Genetics in Illinois. The focus of the Center would be to conduct analyses on plant and animal species to advance the conservation and restoration of Illinois' genetic diversity, species diversity, natural community diversity, and landscape diversity.

RECOMMENDED READINGS

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U.S. Fish and Wildlife Service, 1994, *An Ecosystem Approach to Fish and Wildlife Conservation: An Approach to More Effectively Conserve the Nation's Biodiversity*, U.S. Fish and Wildlife Service, 14 pp.

THE TEN COMMANDMENTS FOR FIREARMS SAFETY

I **Treat every gun as if it were loaded and ready to fire;** keep your finger off the trigger until you are ready to shoot.

II **Watch that muzzle! Always** keep the muzzle pointed in a safe direction and be able to control the direction of the muzzle even if you should stumble.

III **Be sure the barrel and action are clear of obstructions** and that you have only ammunition of the proper size for the gun you are carrying.

IV **Always be sure of your target and what is beyond it before you shoot;** know identifying features of the game you hunt.

V **Unload guns when not in use.** Take down or have actions open; guns should be carried in cases to the shooting area.

VI **Never point a gun at anything you do not want to shoot;** avoid all horseplay with a firearm.

VII **Never climb a fence or tree or jump a ditch with a loaded gun;** never pull a gun toward you by the muzzle.

VIII **Always wear eye and ear protection when shooting.**

IX **Keep guns and ammunition separate** in locked storage beyond the reach of children and careless adults.

X **Avoid alcoholic beverages before or during shooting.**

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