ILLINOIS' FIRST STATE OF THE ENVIRONMENT REPORT

The Changing Illinois Environment: Critical Trends

Executive Summary of the Critical Trends Assessment Project

Twenty-three years after the first Earth Day, Illinois has made impressive strides in repairing the damage done by 150 years of sometimes heedless development of its natural resources. Although much has been accomplished, more remains to be done.

The Critical Trends Assessment Project, or CTAP, seeks to develop a base of practical, real-world information that will help Illinois citizens and policy-makers shape effective and economical environmental policies for the future on a sound ecosystem basis.

As a first step, CTAP undertook the first comprehensive examination of the Illinois environment. The project involved staff of the Illinois Department of Energy and Natural Resources (ENR), including the Office of Research and Planning, the Geological, Natural History, and Water surveys, and the Hazardous Waste Research and Information Center. They were assisted by the state's other natural resource agencies.

The technical findings generated by the initial CTAP investigations fill seven volumes. These have been condensed into a 100-page summary report titled, *The Changing Illinois Environment: Critical Trends*. Highlights of that summary report follow.

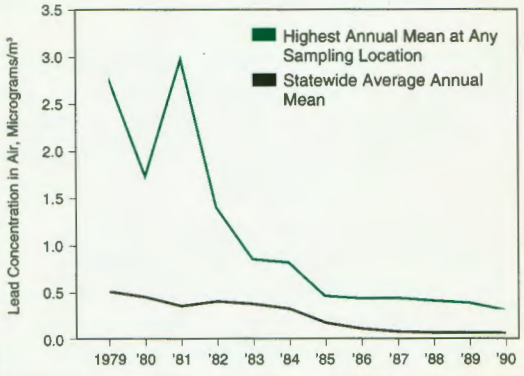
A PROFILE OF THE STATE'S ENVIRONMENT EMERGES FROM CTAP FINDINGS.

ILLINOIS REMAINS A RESOURCE-RICH STATE. While erosion continues to pose troubling questions about long-term sustainability, Illinois soils remain richly productive under appropriate management. The state's coal reserves are ample, even if their use is environmentally problematic because of their sulfur content and because of concerns about global warming. Water and buildable land remain abundant, although conflicts over their use are likely to continue.

IN GENERAL, ILLINOIS IS A CLEANER AND HEALTHIER PLACE FOR HUMANS THAN IT HAS BEEN IN DECADES. Stream pollution is less widespread, in large part because of substantially lower discharges by industrial and municipal sewage treatment plants. One proof of progress is the fact that the rate of species decline among fish statewide has dropped since 1950.

IN GENERAL, AIR QUALITY IN ILLINOIS IS IMPROVING. From 1978 through 1990 concentrations of "criteria" pollutants and several heavy metals were either steady or decreased. Acidity of precipitation decreased in the 1980s. Ozone levels are reduced or stable, and lead concentrations are down substantially in all areas of the state. Emissions of air pollutants from utilities and factories are down substantially. For example, between 1973 and 1989, particulate matter from industrial sources dropped 87%, sulfur oxides 67%, nitrogen oxides 69%, hydrocarbons 45%, and carbon monoxide 59%.

Figure 2-5 Statewide Trends in Airborne Lead Concentrations in Illinois 1979–1990

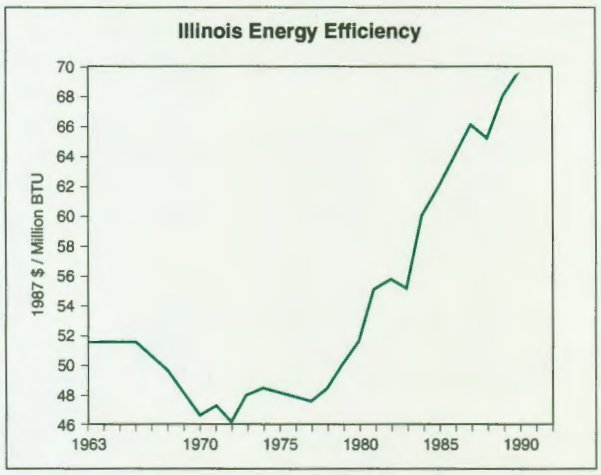


Source: *Air Resources*, Illinois State Water Survey, 1994

CURRENT GROUNDWATER WITHDRAWALS DO NOT EXCEED LONG-TERM SUPPLIES in spite of the fact that roughly one billion gallons of groundwater are pumped from Illinois aquifers every day to irrigate crops, cool power plants, and supply drinking water. The "mining" of groundwater has been largely reversed as Chicago suburbs have switched to Lake Michigan as a water source. Surface water supplies, while stretched by drought in some parts of the state, are generally adequate in quantity and quality.

INJURIES TO THE LAND HAVE BEEN DIMINISHED MARKEDLY. Mineral extraction has slowed and surface mining must meet strict regulatory standards. Land reclamation laws enacted beginning in 1962 have seen nearly 108,000 acres of the state's 153,000 strip-mined acres reclaimed to some kind of productive use. Net landfill capacity in Illinois increased since the mid-1980s, but again, these newer facilities are substantially less polluting than their predecessors and many materials are no longer landfilled at all, such as yard wastes and lead batteries.

ENERGY EFFICIENCY IMPROVED STEADILY IN ILLINOIS THROUGHOUT THE 1980S and energy consumption is showing a downward trend. Output of greenhouse gases declined 18% from 1970–1990, although the state's annual global carbon dioxide production exceeds by fivefold its share of the world's population.



Source: *Earth Resources*, Illinois State Geological Survey, 1994

THE NUMBER OF OLD WASTE SITES THAT ARE POTENTIALLY HAZARDOUS CONTINUE TO INCREASE AS MORE ACCURATE SURVEYS ARE CONDUCTED. Clean-up continues to be costly and time-consuming, but tighter regulations are making the practice of storing and disposing officially designated hazardous wastes on land less attractive.

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.

ILLINOIS HAS MORE FOREST TODAY THAN IT HAS HAD SINCE THE TURN OF THE CENTURY. Wooded acreage increased by 41% since 1926. However, the increase in forest acreage has not been matched by an increase in quality. Today's forest is more likely to be populated by fast-growing, less commercially desirable species such as maples and beeches rather than the oaks and hickories of the past. (Since 1962, the acreage dominated by maples has increased 40-fold.)

PHYSICAL, RATHER THAN CHEMICAL, CHANGES ARE PROBABLY THE MOST PERTURBING FORCE IN ILLINOIS STREAM ECOLOGY TODAY. 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.

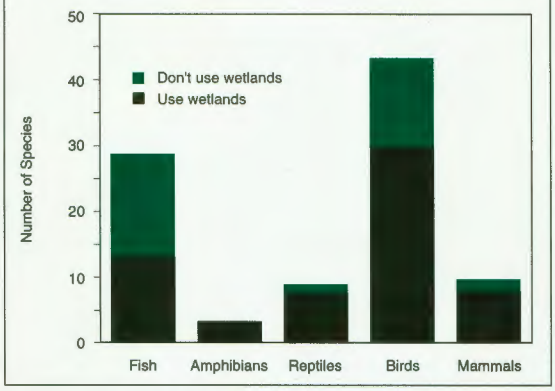
FORWARD STRIDES ARE MIXED WITH CONCERNS FOR THE FUTURE.

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% 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 1%, OR 2,352 ACRES, OF HIGH-QUALITY ORIGINAL PRAIRIE REMAINED IN THE PRAIRIE STATE. Four of every five remaining acres 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, and artificial wetlands to date have duplicated neither the biological diversity nor the hydrological complexity of natural wetlands.

Figure 7-3 Wetland Use by Endangered and Threatened Vertebrate Species



Source: *Ecological Resources*, Illinois Natural History Survey, 1994

INTRODUCTIONS 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. Invasions 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 forests 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.

FARMS ARE INCREASINGLY MORE SPECIALIZED. Nearly 2/3 of acreage is planted in crops such as corn or soybeans which usually require pesticides and the cultivation of which can expose topsoil to erosion.

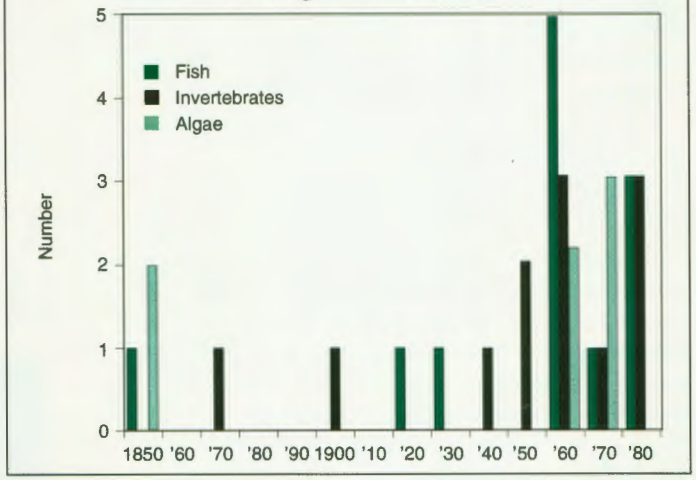
ILLINOISANS ARE ARRAYING THEMSELVES ON THE LAND IN SUBURBAN DENSITIES. By 1990, Illinois' urban fringe had grown to house 37% of the state's population—as many people as lived in its central cities. The trend has had effects on air quality, petroleum consumption, and land use that are disproportionate to the population. One estimate found that 17 of Illinois' top 20 farming counties are located in or adjacent to urbanized areas as defined by the U.S. Census Bureau.

LARGER INSIGHTS CAN BE DRAWN FROM THE CTAP REPORT.

ILLINOIS IN RECENT YEARS HAS MOVED FROM DIRTY INDUSTRIES (HIGH EMISSION) TOWARD CLEAN ONES (LOW EMISSION), from complex natural systems toward simpler ones, from stable natural systems toward unstable ones, from native species toward non-native ones, from integrated natural systems toward fragmented ones, from self-sustaining natural systems toward managed ones.

THE RESULT IS A TREND TOWARD A GENERIC ILLINOIS ENVIRONMENT populated mainly by "generalist" species able to exploit simplified ecosystems. Illinois still boasts an impressive range of habitat types. But habitat fragmentation and competition from exotic species have combined to render once-stable ecosystems less so. Complexity lingers mainly in habitats of only marginal use to humans, such as river bottomlands, swamps, hillsides and bogs.

Figure 11-2 Number of Species Introduced Into Lake Michigan Each Decade



Source: *Ecological Resources*, Illinois Natural History Survey, 1994

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.

ECONOMIC AND TECHNOLOGICAL CHANGES CAN HAVE SIGNIFICANT IMPACT IN CURBING POLLUTION. Greenhouse gas emissions peaked in 1970 but have declined since then as Illinois generated more of its electricity using nuclear power rather than fossil fuels.

WE DON'T KNOW ENOUGH. Agencies of both state and federal governments generally collect specific kinds of data for specific pollution control and wildlife management purposes. But whole ecosystems have proven to be too complex to be managed on a pollutant-by-pollutant or a species-by-species basis. Baseline data that might be used to monitor broader ecological conditions have not generally been systematically collected on a statewide basis. This has made it difficult to assess, much less to prevent or repair, the more subtle kinds of damage done to Illinois' natural ecosystems. ❖

To obtain copies of the summary report or the seven-volume technical report call the ENR Clearinghouse at 1/800/252-8955. TDD customers call 217/785-0211. CTAP information and discussion forums can also be accessed electronically at 1/800/528-5486.

The Executive Summary of the Critical Trends Assessment Project is a joint publication of the Illinois Department of Energy and Natural Resources and The Nature of Illinois Foundation.

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