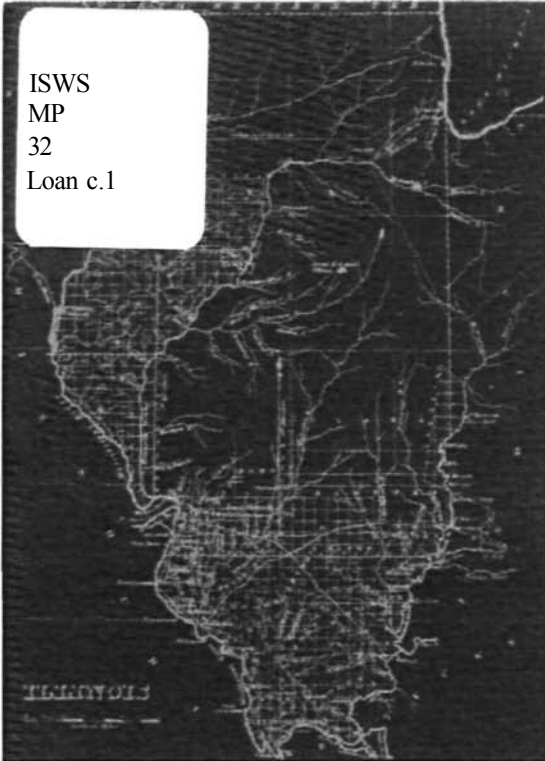
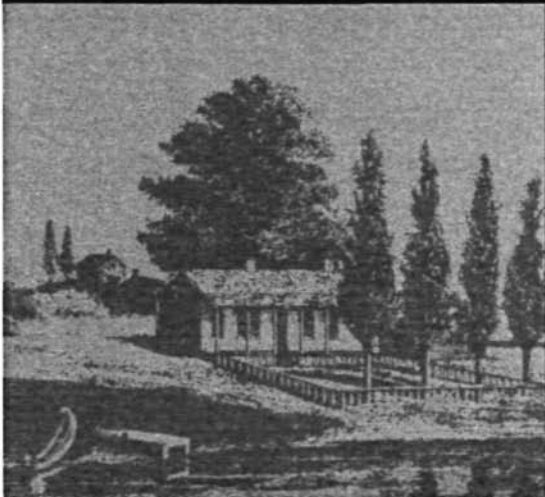


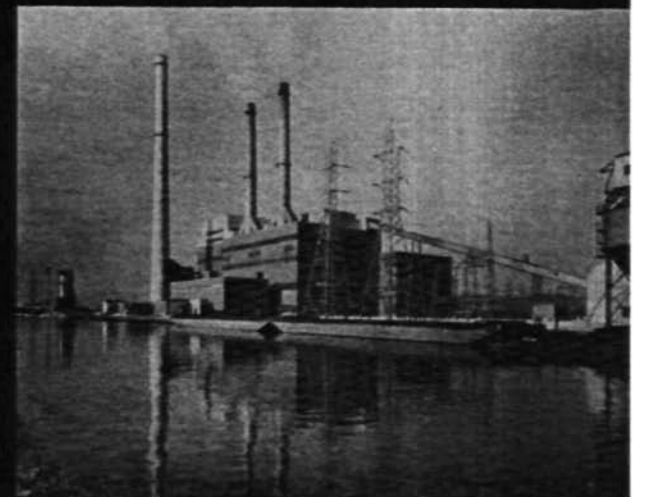
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THEN AND NOW



Water Resources
in Illinois
1818-1968



CONSIDER OUR WATER It is the universal liquid of life and part of our very being. It is everywhere around us, in the air and earth. Without it we could not survive, nor could any plant, animal, or other living thing.

Unknown

From the beginning

water was a resource of high importance to the people in the land that became the new state of Illinois in 1818. Water's abundance — and its irregularities — meant wealth, well-being, and problems . . . then as now.

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first the explorers...

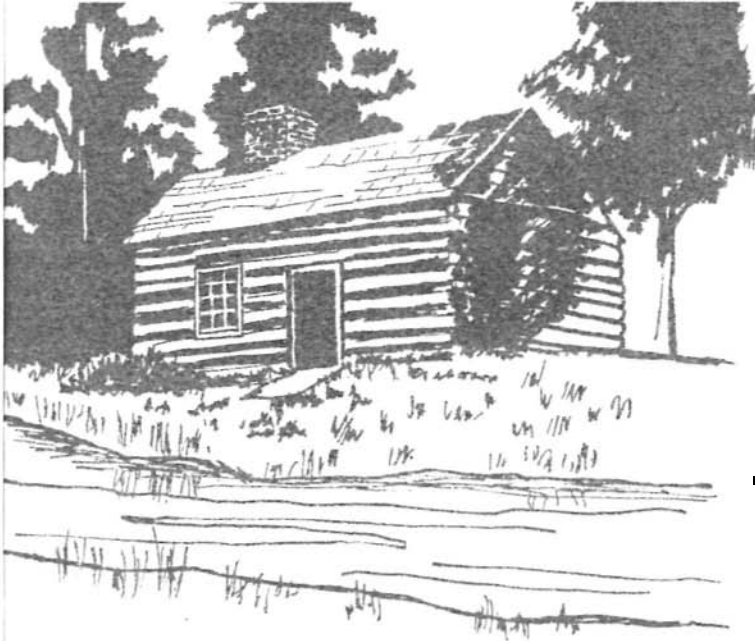
men came by the rivers
the only routes through the wilderness

the first white men on Illinois land
Marquette and Joliet in 1673
found the Illinois River country to be good

We have seen nothing like this river that we enter, as regards its fertility of soil, its prairies and woods; its cattle [buffalo], elk, deer, wildcats, bustards, swans, ducks, parroquets, and even beaver. That on which we sail is wide, deep, and still, for 65 leagues. In the spring and during part of the Summer there is only one portage of half a league [at Chicago].

Father Jacques Marquette





...then the settlers

The situation of this Territory is good for trade having the advantage of Water carriage on all sides. . . .

Gershom Flagg, Pioneer Letters 1818

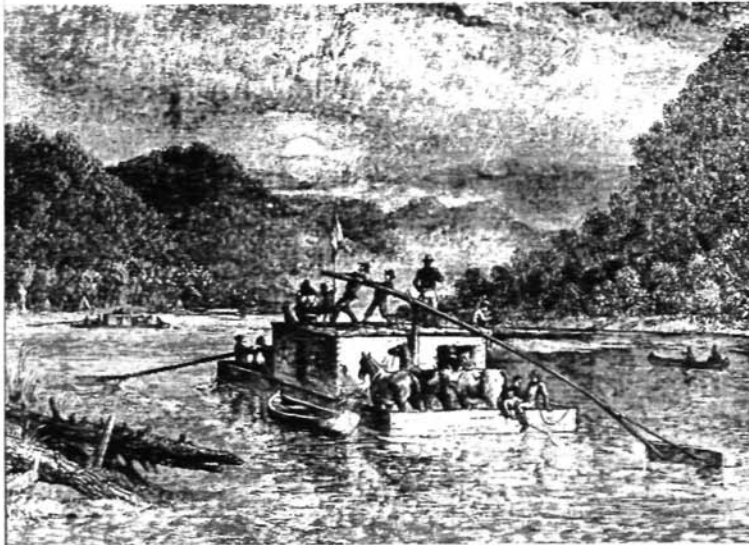
Nature has been eminently bountiful to Illinois, in bestowing the means of internal navigation without the expense of cutting canals, perhaps nowhere else to be found in the world. The courses of the principal rivers, with their branches, are not less than 3,000 miles; viz. 2,000 internally and 1,000 on the frontiers.

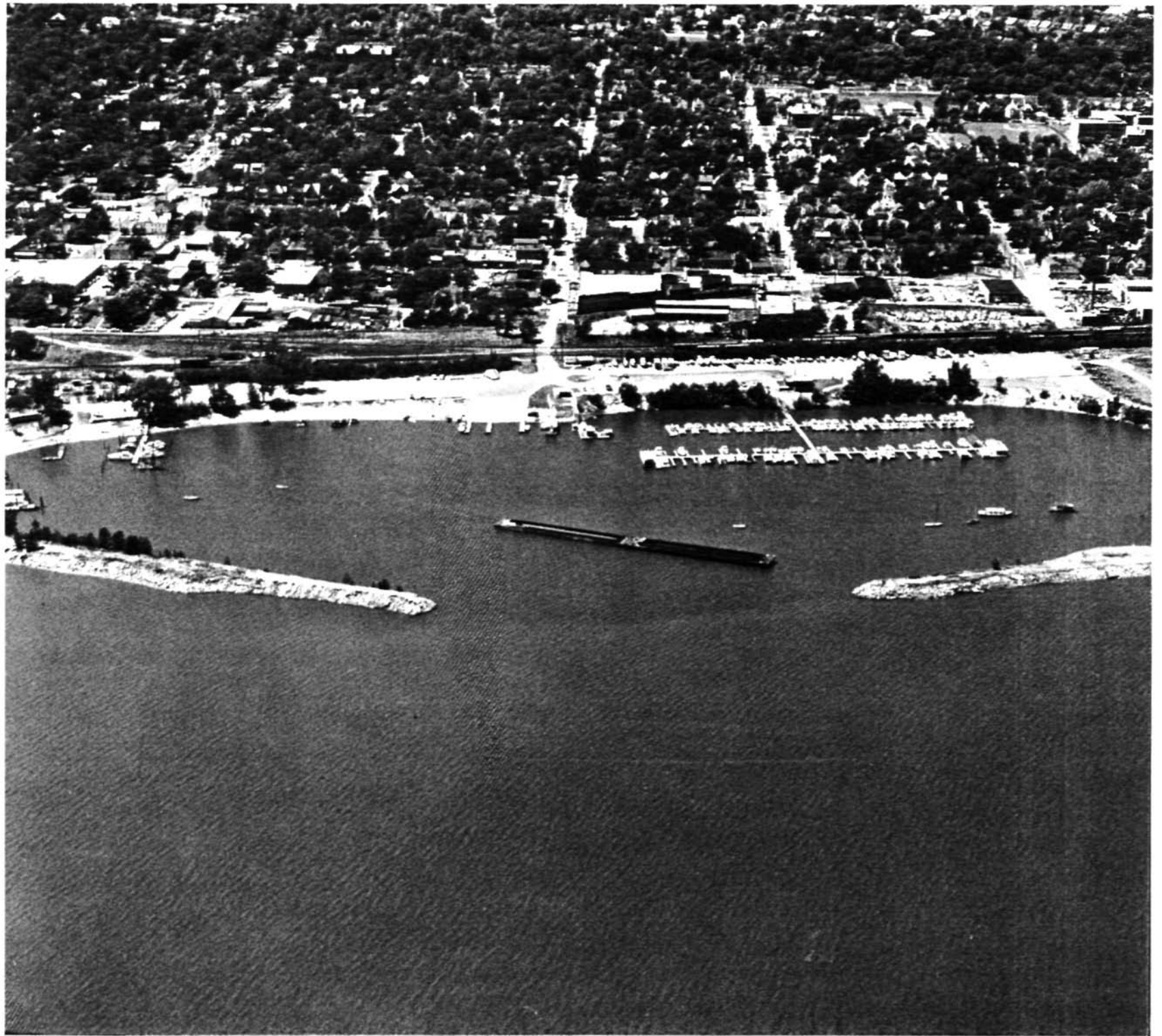
Doniel Blowe 1820

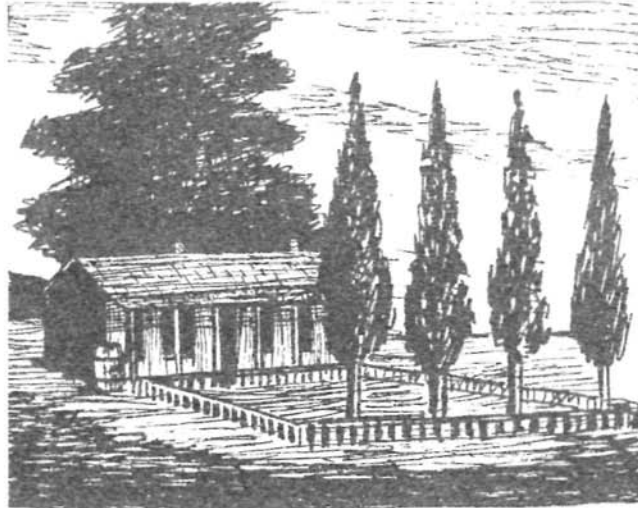
The great rivers and lakes were the first pathways into the wilderness. These paths led to Illinois — by the Mississippi on the west, the Ohio and Wabash on the south and east, and Lake Michigan on the northeast. The state was shaped by these tremendous border waters. Crisscrossing its broad prairies were other major waterways. In all, Illinois has more than 2,700 interior streams.

The pioneers built their settlements along the banks of rivers, which easily served many needs — transportation, water supply, an outlet for waste products. These settlements multiplied, grew into towns and cities. But the rivers are the same streams, called upon to serve the greatly increased, complex needs of modern Illinois.

Water resources — cycling in rivers and under the ground, ever renewed by generally abundant rainfall — were nature's gifts to Illinois which have been vital to its growth and wealth during its one hundred and fifty years of statehood.







storing water

abundant rainfall, sometimes

Rain barrels and cisterns were early necessities in Illinois country . . . to store water for the "dry spells" when even large streams disappeared

The first well dug [at Albion] was in the public-square, and more than a hundred feet deep, and no water. The next . . . but a limited supply. We knew not where to dig to find water. . . . This difficulty about water was all obviated afterward, when the property was divided. Tanks and wells then became as common as houses. But the want of water in the first instance was no light difficulty.

George Flower, Edwards County English Settlement 1617



The old lady's first call was made in about half an hour after our arrival, and accompanied by the tender of a barrel of rain-water, a kindness which those only can appreciate who have undertaken to clean such a house with lime-water, and that to be brought a distance of some dozen rods.

Eliza W. Farnham 1840

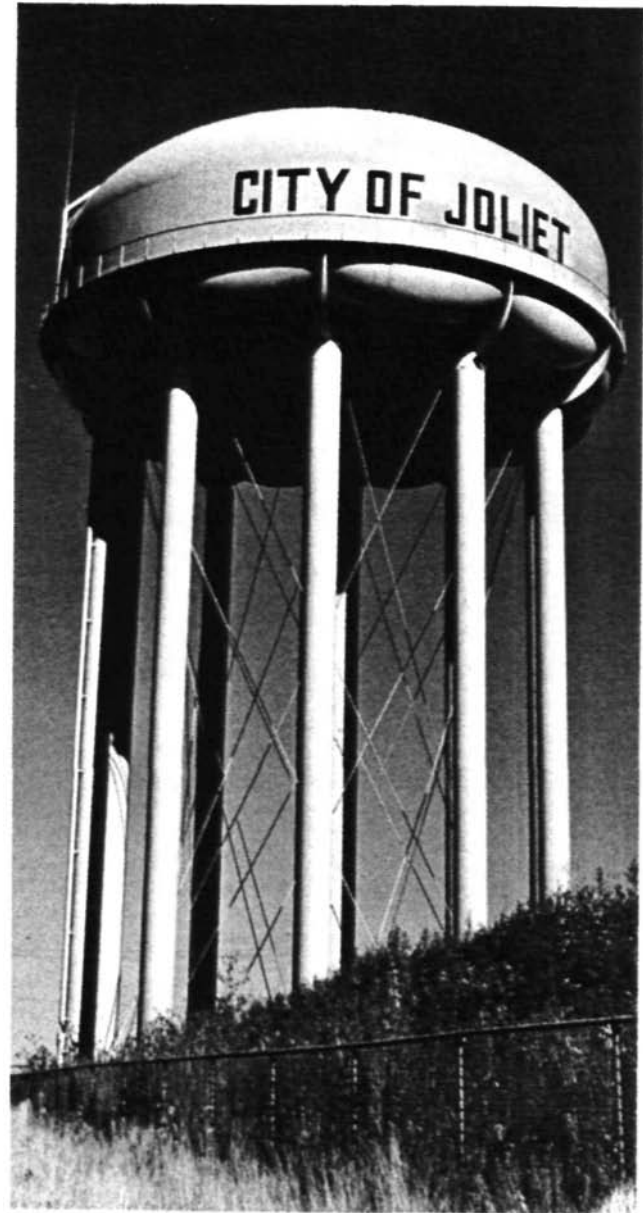
Settlers in Illinois quickly learned to improve on nature by impounding flood waters in reservoirs. Illinois now has more than 900 lakes or reservoirs, and 386 of these have a surface area of 40 acres or more. We also have numerous small lakes and nearly 58,000 farm ponds with surfaces less than 6 acres. Large reservoirs serve multiple purposes — for a city water supply, recreation, flood control.

In the future, to meet growing demands for water, reservoir storage will **be** even more important. It is one way of actually enlarging our usable water resource. More than 800 possible future reservoir sites in Illinois have been identified, and these could provide six times the water storage of today's reservoirs, lakes, and ponds.



Central Illinois Public Service Company's Coffeen Lake

Lou Yaeger Lake, multi-purpose lake at Litchfield



Water storage in elevated tanks



water for power

in a country so level

We have many mills around us; mostly turned by ox or horse power. The want of good water courses for mills is an evil felt in all the west. But steam power is remedying it.

John G. Bergen 1830

The descent of the River Des Plaines is here [at Lockport] sufficient to afford ample water-power for mills and manufactories, and this, in a country so level that the water half the time does not know which way to run. . . .

James K. Paulding 1842

Streams in the nearly level prairie country had one fault . . . not enough gradient to power the mills. Today we see this problem in a lack of locations for hydroelectric plants. Only 10 such plants operate. Some 80 steam-generating plants produce most of our electric power, requiring immense quantities of water for cooling and condensing . . . over 13 billion gallons of water per day.

AND TRANSPORT

It is not impossible that at some distant day . . . Chicago may become one of the points in the direct line between the northern lakes and the Mississippi [by canal]; but . . . this communication, will, we think, at all times be a limited one;

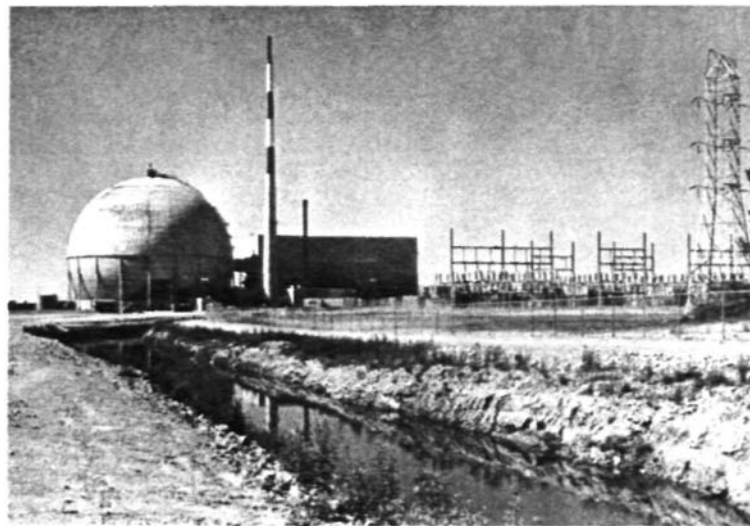


the dangers attending the navigation of the lake and the scarcity of harbours along the shore, must ever prove a serious obstacle to the increase of the commercial importance of Chicago.

William H. Keating, *Engineering Expedition* 1823

Now through the Port of Chicago comes water-borne commerce from two seas — the Atlantic and the Gulf of Mexico. The Mississippi and Ohio Rivers, the Illinois Waterway, and the St. Lawrence Seaway form an extensive inland system for commercial navigation. The Port of Chicago is an important world export center, moving in and out nearly 8 million tons of overseas cargo a year.

Port of Chicago



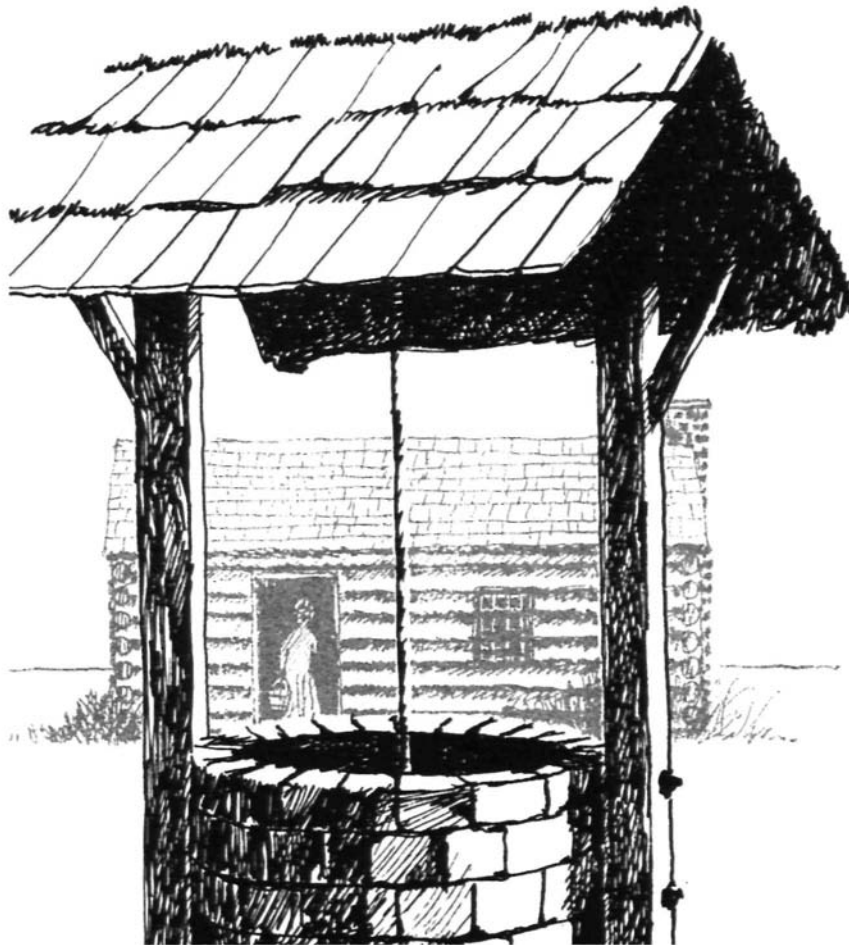
Dresden Nuclear Power Station neat Morris



on the prairies

No water near, a well was of the first necessity.

George Flower, Edwards County English Settlement 1817



It is true, that there is a dearth of water upon the surface. . . . On the other hand, it is a fact equally well ascertained, that water is every where found, in great abundance, at a distance of a few feet below the surface. We have known but a few spots at which water could not be procured by digging. . . .

James Hall 1838

Today, wells pumping water from under the ground are the source of water supply for almost all rural residents in Illinois, for the majority of our towns and cities especially in northern Illinois, and for many industries. Our total groundwater resource is sizeable, capable of supplying as much as 7 billion gallons per day, but it is unevenly distributed through the state.

CITY WATER

Early settlers first drew water from the Chicago River but when it became polluted they turned to the lake shore or shallow wells. The settlers either carried water home in buckets or bought their water from peddlers in horse-drawn water wagons [at 10-25 cents a barrel].

City of Chicago, Department of Water and Sewers

Chicago's first water system, starting in 1842, cost \$24,000 and served about one-fifth of the 4,500 population. The water was pumped through an intake pipe, extending about 150 feet into Lake Michigan, to an elevated wooden tank — from which it flowed by gravity through 2 miles of wooden mains made from 10-foot cedar logs.

Today, still from Lake Michigan, the Chicago Water System supplies an average of over 1 billion gallons of water a day throughout the year to serve the water needs of 4½ million people within the city and some 70 suburbs. The water is distributed through 4,083 miles of underground pipe.

Chicago's Central District Filtration Plant . . . largest water purification plant in the world



water quality and pollution

Of one fact I have long since satisfied my mind, that ordinary fevers are not caused by the use of the water in the West. Exceptions may be made in some cases, where a vein of water is impregnated with some deleterious mineral substance. The use of a well, dug in the vicinity of a coal bed in Illinois, was supposed to have caused sickness in a family for two seasons. . . . Water of excellent quality may be found in springs, or by digging from 20 to 30 feet, throughout the western states. Most of the water thus obtained is hard water, from its limestone qualities, but it is most unquestionably healthy. Those persons who emigrate from a region of sandstone, or primitive rock, where water is soft, will find our limestone water to produce a slight affection of the bowels, which will prove more advantageous to health than otherwise, and which will last but a few weeks.

John Mason Peck, Guides for Emigrants 1831-1836



As the little trading centers began to grow into cities, the questions of the 1840s and 1850s became: Should hogs and cows be barred from city streets? And if so, what shall be done with the garbage piled in the gutters for the hogs to dispose of?

Our city Hogs are a very industrious and refined race as evidenced by their labors and amusements. They are now in the enjoyment of the city . . . amuse themselves by digging holes in the gutters . . . and stir up a most beautiful batter. . . . Now, every thing ready, his swinship takes a walk about the city. He notices, especially, all newly painted fences. . . .

Illinois Journal, Springfield September 7, 1853

Pollution is the greatest threat to our water resources today. The use of water to dilute and carry away waste products is natural and necessary. But, in our modern complex society, waste loads too great for the rivers cause pollution, harming the use of the water for other water-supply needs. As these wastes increase, more treatment is required. Now, city water treatment plants remove disease-producing organisms to make water safe to drink, and may soften hard water or remove iron and other undesired minerals.

Water treatment plant at Springfield





wet prairies were avoided

Wet prairie, which are found remote from streams, or at their sources, the soil is generally cold and barren, abounding with swamps, ponds, and covered with a tall coarse grass.

Samuel R. Brown 1817

[There are two kinds of "prairas"] one low, wet, and flat, occasionally cold and unproductive, contributing to form the sources of streams, and exhibiting the appearance of being the bottom of lakes, long since drained or dried up, and covered with a very coarse, tall grass. Of this kind there are few in the state. The other species is from 25 to 80 feet higher, consisting, commonly, of a deep, strong, dry, warm, dark colored, sandy loam. . . .

. . . even the high prairas are supposed to be too wet for plough fields: they seem to be designed by nature, as sources from whence to supply many of the tributary streams, which form the sheet of waters, that in a manner surround the state. The greater portion [of the north and east] is wet prairas, well calculated for the raising of stock. . . .

Edmund Dana 1819

Today those broad wet prairies, by-passed until all other regions were settled, are the vastly productive agricultural areas of central Illinois — richest cropland in the world. This was possible only after men learned how to control and manage water, to drain the wet prairies and protect soils from erosion.

Vast expanse of corn



sometimes floods

I had never before had such an impression of the power of water . . . in geological changes; nothing can resist such a flood.

Flood on the Mississippi, a Mr. Thompson 1851

The greatest floods of which we have any account [at Shawneetown], were in 1813 and 1815, when the water covered all the streets, and entered the lower apartments of the dwellings, reaching nearly to the second floors. Since that time the inhabitants have not been expelled by the conquering element, although the water annually covers the plain in the rear of the town, and advances in front to their very doors. . . .

James Hall 1820

Floods still cause much destruction in Illinois, and our flood damages average \$30 million annually. Major floods, such as the 1965 Mississippi River flood, are well-publicized disasters. But most of our annual flood damage is the sum of losses from frequent flooding of small streams. This problem increases as we continue to build homes and factories on the natural flood-plains of rivers and streams.

SOMETIMES DROUGHTS

We have had a very remarkable dry summer there are streams 40 miles in length which have entirely stopped running — two thirds of the wells and springs have dried and the grass is not more than half its usual length.

Gershom Flagg, Edwardsville 1820



Droughts occur in all parts of Illinois, but long severe droughts over large portions of the state are infrequent. One severe drought period was 1930-1936, and notable droughts occurred in 1953-1955 and in 1962-1964. Dry periods are most frequent and most severe in southern and southwestern Illinois, and least frequent and severe in northern and eastern Illinois.

Our use of irrigation water to combat short-term agricultural drought has increased, from 307 acres irrigated in 1940 to over 14,000 acres in 1964. However, irrigation is limited in Illinois because it is very expensive, and other means of increasing crop yields are tried first.

Water-supply reservoirs in Illinois may be harmed not only by droughts but also by sedimentation, where eroded soil sediment fills the storage space intended for water.



Dry reservoir

City in flood





PRECIPITATION varies on an average from about 32 inches a year in the northern part of the state to 46 inches in the south.



STREAMFLOW, if spread over the state, would vary in depth from about 8 inches a year in the north to 15 inches in the south.

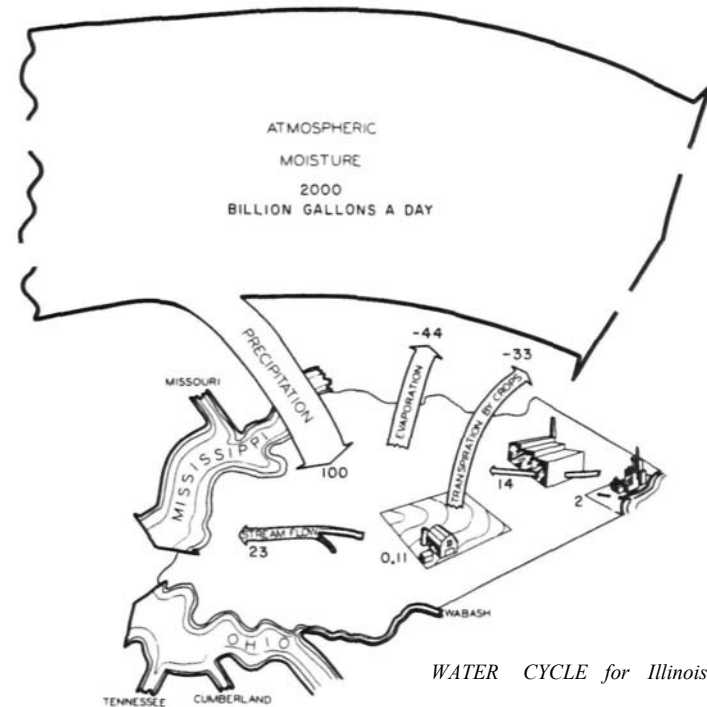


GROUNDWATER is abundant in the north, along major rivers, and in ancient buried valleys such as the Mahomet Buried Valley.

the resource-then and now

The waters of the earth move in an endless cycle from ocean to atmosphere and back to the ocean. The total never changes — in one of its forms as a liquid, vapor, or solid, the amount of water is the same today as it was thousands of years ago. The same resource that served 30,000 residents when Illinois became a state now serves over 10,500,000 persons.

Although water is generally abundant in Illinois, it is unevenly distributed in amount and quality. Almost all of the 16.3 billion gallons of water we use daily eventually returns, in some form, to the streams. Very little of it is consumed, but its quality is changed. If the change is one of pollution, the water is "lost" for many beneficial uses. Thus, water is a resource that must be continuously measured and studied if we are to use it wisely and find ways to manage and increase the usable supply to meet our future needs.



WATER CYCLE for Illinois

THE ILLINOIS STATE WATER SURVEY was founded in 1895 in efforts to trace and control water-borne disease, a concern prompted by dreadful typhoid epidemics.

This task of making a "survey of waters" in *the* state was assigned to the University of Illinois Chemistry Department. With considerable foresight, these first Survey scientists extended their chemical surveys to broader studies of water supplies.

In 1917 the Water Survey became a scientific division of the State Department of Registration and Education under the direction of the Board of Natural Resources and Conservation, a nonpolitical committee composed of eminent scientists and professional persons.

The Water Survey is the primary agency in Illinois concerned with water resources. Its traditional research and service programs encompass assessment and evaluation of groundwater and surface water resources as to quantity and quality, and related studies of water use and conservation, development of supplies, and meteorologic factors affecting water resources.

To facilitate studying the varied aspects of water resources, the Survey has five technical sections; hydrology, hydraulic systems, chemistry, water quality, and atmospheric sciences.

Current research activities reflect the growing need for detailed technical information on water and for ways of increasing usable supplies by storage, reuse, or weather modification. Special studies provide information that will meet the needs of planners, developers, and operators to assure maximum beneficial use of our water resources.

Data on water resources gathered through its 73 years of research, often in cooperation with other agencies, now form invaluable background material. As our use of water stretches ever nearer the limits of the total available supply, the need for research increases sharply. Much more accurate measures of all water resource elements and greater understanding of nature's processes are required. Only through such knowledge can we assure an adequate supply of clean, safe water for every community in Illinois.



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William C. Ackermann, *Chief*

This priceless water has been here before and by God's plan will be returned again and again for us to use according to our maturity, either with wisdom or with shameful neglect.

Unknown

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