



THE STATE OF ILLINOIS RESPONSE TO THE 1988-1990 DROUGHT

**SPECIAL REPORT NO. 17
OF THE
ILLINOIS STATE WATER PLAN TASK FORCE**

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BACKGROUND

The Water Plan Task Force for Illinois was appointed by Governor James R. Thompson in 1980 to guide policy decisions regarding the adequacy of programs to deal with increasing numbers of water issues. The Task Force is presently composed of members from the Office of the Governor, Illinois Water Resources Center, Departments of Transportation, Agriculture, Conservation, Commerce and Community Affairs, Mines and Minerals, Public Health, and Energy and Natural Resources. In addition, the Illinois Environmental Protection Agency, Emergency Services and Disaster Agency, Bureau of the Budget, and the Capital Development Board are also represented.

The continuing focus of the Task Force is on either significant water issues not being sufficiently addressed by current programs or emerging issues that can be anticipated to lead to future problems or conflicts. In consideration of public and advisory group views and its own maturing judgment, the Task Force identified ten issues upon which to proceed. These ten issues are:

* All members of the Illinois Drought Response Task Force.

1. Erosion and Sediment Control
2. Integration of Water Quality and Quantity Management
3. Water Conservation
4. Flood Damage Mitigation
5. Competition for Water
6. Aquatic and Riparian Habitat
7. Water-Based Recreation
8. Atmospheric Changes and Management
9. Drought Contingency Planning
10. Illinois Water Use Law

The Water Plan Task Force issued a special report dealing with the Drought Contingency Planning issue. It was recognized that several ongoing programs useful to the state's drought contingency programming activities were already in place within several agencies. This recognition led to the formation of a Drought Response Task Force (DRTF).

DROUGHT RESPONSE TASK FORCE

The DRTF is convened either by the Governor or by the Director of the Water Resources Division of the Illinois Department of Transportation. The DRTF is co-chaired by the Director of the Water Resources Division and the Head of the Public Water Supply Division of the Illinois Environmental Protection Agency. Representatives from the following state agencies are included on the DRTF:

Illinois Department of Transportation (Water Resources Division, Co-Chair).
(DOT/DWR)

Illinois Environmental Protection Agency (Public Water Supply Division, Co-Chair). (EPA/PWSD)

Illinois Department of Commerce and Community Affairs. (DCCA)

Illinois Department of Agriculture (Natural Resources Division).
(DOA/DNR)

Illinois Emergency Services and Disaster Agency. (ESDA)

Illinois Department of Energy and Natural Resources (Water Survey
Division). (DENR/SWS)

Illinois Office of the Governor. (OG)

It was recognized that the Illinois Department of Conservation (Office of Resource Management) (DOC/ORM) should also be included among the member agencies, and was soon added.

Each Task Force agency has technical expertise and capabilities in specific areas of drought management. Their capabilities include in-depth knowledge of statewide rainfall distribution on a daily basis, evaluation of alternate water supply sources for both emergency and long-range uses, installation of emergency pumping and piping equipment, water sanitation and quality considerations, graduated water conservation practices, aquatic habitat impact assessment, and methods of financing alternate water supplies.

The DENR/SWS issues a monthly summary of water and weather conditions for the entire state to each of the DRTF agencies throughout the year, and this information is used to detect the onset of a drought. This summary includes lake and stream stages, groundwater levels, soil moisture, and pertinent weather variables such as precipitation and temperature.

The co-chairs assess the water and weather information monthly and convene the DRTF when conditions show continual declines in the available water resources. Each of the agencies also maintains staff in the field, and the awareness of real or potential impacts from precipitation deficiencies is frequently brought to the attention of the DRTF through staff contact with the public and local units of government. When convened, the DRTF sets a schedule for regular weekly briefing meetings usually by conference telephone arrangements, but also, when necessary, face-to-face to resolve particular issues. The Water Plan Task Force was sensitized to the evolving 1988 drought as early as May, and the DRTF was convened and held weekly briefings until May 1990 when the drought was officially declared ended in Illinois.

PERTINENT ILLINOIS LAW

The DRTF does not possess any regulatory power unto itself, but those agencies that have statutory authority also carried that responsibility to the Task Force deliberations. The implementation of agency power is discussed where appropriate in the following pages. However, the state does preserve certain powers to be exercised for the common good.

Under the Illinois Emergency Services and Disaster Agency Act of 1988 the Governor is given broad powers to respond as necessary to an emergency. These powers include the suspension of any statutes, rules, or regulations and the taking of real estate following certain provisions. These powers last for 30 days and follow an emergency declaration by the Governor, which may be renewed.

The application of these powers is generally triggered by a request from a local unit of government. Local units of government generally make these requests when their local resources or authorities are insufficient to respond to an emergency.

The DRTF and its member agencies continue to closely monitor the activities of all units of local government and are prepared to advise on the appropriateness of a request for a disaster declaration. In general, any emergency declaration sought through ESDA should be initiated or clearly supported by a local unit of government and concurred in by a lead state agency if the request demands actions outside of ESDA's capabilities or expertise.

The basic issue before the DRTF in 1988 and 1989 was whether the state would want to use its powers to mandate that a local community and/or public water supply implement an appropriate drought response such as water conservation.

A number of factors must be generally understood concerning this issue. First, the DRTF and its agencies have the capabilities to monitor all "potential water-short" systems and generally have ample opportunity to encourage an appropriate voluntary response by the local unit of government. Secondly, it must be understood that any measures that could conceivably be mandated by the state could also be undertaken by the appropriate local unit of government under their own powers. Third, it would be impossible to mandate that a unit of local government undertake an activity when that unit of local government does not have clear statutory powers to implement the mandate. Finally, the "State Mandates Act" requires that the state may have to fully fund the resulting expenses incurred by a local unit of government due to an activity mandated by the state.

The State Water Plan's 1983 report on Drought Contingency Planning strongly encourages the use of "voluntary measures" as the most appropriate response by a local unit of government. The general information and arguments - needed to encourage an appropriate voluntary response by a local unit of government are the same as the information and arguments that would be needed to obtain a higher level of response or mandate from an agency or the Governor's Office. If these arguments are not persuasive on the local level it is likely that they would not be persuasive at a higher level.

In general the agencies on the DRTF must put a significant effort into encouraging local communities and public water supply systems to voluntarily undertake the measures necessary to extend the viability of their water supply systems. The DRTF will not issue a mandate that a community or public water supply implement water conservation measures if the community or public water supply chooses not to do so.

SEVERITY OF THE 1988 ILLINOIS DROUGHT

The summer of 1987 was generally 40-50% drier than average in Illinois, except for August when rainfall was about 150% of the 1951-1980 average. A dry fall permitted an early and efficient harvest, but November and December were very wet in the state. January and February of 1988 reported near average precipitation. A change to less frequent and a reduced magnitude of precipitation was experienced from mid-February through September. This change in precipitation was not perceived to be a problem until mid- to late May. By this time the precipitation shortfall was clear, and the potential impacts on agriculture became a serious concern due to the accumulation of soil moisture deficits and surface and ground-water deficits.

From January through March of 1988 statewide precipitation was within 9% of average, although there were relatively long periods without precipitation, especially after mid-February. April, however, marked the first month when precipitation was below average for the entire state. Indeed, west-central Illinois received less than 1 inch, whereas 4 inches is average. With time, west-central Illinois emerged as that portion of the state with the greatest precipitation deficit. The statewide deficit accumulated at a greater rate during the next two months with less than 50% of average precipitation observed in each month from April through June.

About two-thirds of the state received less than 50% of average rainfall during July, August, and September. Only the extreme northeast, northwest, and a narrow band in

south-central Illinois recorded summer precipitation of as much as 60-70% of average. The remnants of Hurricane Gilbert provided some short-lived relief with 1 to 2 inches of rain in eastern and southern Illinois.

Records for the statewide average precipitation extend back to 1878. Although the number of stations increased from about 40 in the late 1800s to about 170 in the 1900s, the stations were fairly uniformly distributed over the state during the 113-year period. Based upon this long-term record, only four years, 1901, 1930, 1953, and 1963, were drier than the drought of 1988. The extreme values of precipitation deficit were rather equally distributed throughout the period with a frequency of occurrence of about once every 21 years.

The spring-summer droughts impacting the greatest area of Illinois since 1901 are those of 1914 and 1936, affecting 60% of the state, that of 1988 with 54%, and that of 1930 with 38%. By this criterion the drought of 1988 was the third worst drought in Illinois and impacted a larger area than that of 1930.

Using the departure from average for the 113-year available record as a severity indicator for comparison with previous Illinois droughts, the July-August period in 1988 ranks third behind 1983 and 1936. However, a comparison between these three ranking droughts and all other July-August droughts in the long climatic record of droughts in the state shows them to be outliers. In simple terms, the 1988 drought was an extreme event.

The water year extending from October 1987 through September 1988 ended with accumulated precipitation deficits of less than 2 inches in parts of southern Illinois to greater than 14 inches in western counties. The deficit continued to build until the water year beginning October 1, 1988.

During the last quarter of 1988, the statewide precipitation began to recover with nearly the expected average in October and December and more than twice the average for November. The recovery continued through the first five months of 1989 with statewide averages ranging between 121% in February to 65% in June. In spite of the improvement of precipitation, the water resources were still below expectations. Streamflow in the major Illinois streams was in the lower two quartiles of historical flows, and the ground water showed little recovery to pre-drought levels by the end of the 1988-1989 water year.

The fall and early winter months of October, November, and December 1989 were very dry statewide, providing little relief to the stressed water resources in Illinois. Early in 1990 and especially in February, the precipitation began a return to more average conditions with a corresponding recovery of the surface waters and some improvement of

ground-water supplies. Some public water supply reservoirs that were below spillway level since 1987 were fully recovered with precipitation 209% of average across the entire state.

During May 1990 the statewide precipitation was one and one-half times the expected average, and the Drought Response Task Force declared the drought that began in the fall of 1987 was finally ended.

TASK FORCE ACTIVITIES

The DOT/DWR established the agenda for the weekly conference call, which usually began with a discussion of past rainfall, the accumulating deficit, and the outlook for precipitation in the short- and long-term. This was followed with a briefing by the EPA/PWSD on public water supplies that were in danger, and the status of crops and livestock by the DOA/DNR. The ESDA and DCCA described their emergency equipment and funding application requests. The DOC/ORM reported on the status of 160 state-owned and public lakes and any observed impacts on fish, forestry, and wildlife. The OG representative provided guidance regarding policy issues and maintained an awareness of the entire evolving drought picture to brief the Governor and seek executive power if deemed necessary.

All participating agencies with statutory authority reacted to accelerate requests through their respective systems regarding permits, variances, and other forms of assistance.

DOT/DWR Activities

In addition to serving the DRTF as the Co-Chairman and as the focal point for the information from all participating agencies, the DOT/DWR acted directly to resolve emerging water use conflicts.

For example, the DOT/DWR, with support from other agencies, met with irrigators to seek voluntary restriction on their water use where such high-capacity wells were presumed to impact domestic wells in the area. The meeting was very successful and achieved nearly 100% cooperation among the irrigation well operators.

The DOT/DWR was also involved in developing the state's position regarding the diversion of additional Lake Michigan water through the Illinois River system to assist commercial barge traffic below St. Louis.

A public utility requested permission from DOT/DWR to alter the dike structure around a cooling water lake for the purpose of importing additional water from a nearby

abandoned strip-mine lake to make up losses due to excessive evaporation and the inability to withdraw adequate water from the primary nearby river source.

EPA/PWSD Activities

The Public Water Supply Division maintained liaison with water treatment plant operators throughout the state and retained records of available resources and consumption. They also worked directly with several communities to assist in resolving water quality issues as new sources were sought. This information was communicated during the weekly meetings, and other agencies responded as appropriate.

Based on historical supply performance, the agency carefully monitored 35 public water supplies on a weekly watch list. Of these 35, 16 have repeatedly experienced water shortages in less severe droughts than that of 1988-1990.

Some emergency permitting was granted to use water supplies not previously considered for public use. An example was that of a small community requesting the use of water from an interstate highway borrow pit by connection to the existing water treatment plant and distribution system.

The EPA assisted the U.S. Army Corps of Engineers to ensure that water quality standards were met in the development of an abandoned well and supply system for a small community in eastern Illinois. They also worked closely with suppliers reaching into new surface waters and various quarries to ensure maintenance of high-quality water for the public.

DCCA Activities

Pamphlets on water conservation were prepared, and more than 500 were distributed to municipalities for local copying and distribution. Additional drought-related material was prepared, printed, and distributed by the DCCA. DCCA coordinated communications efforts between the DRTF and local units of government.

The Community Development Assistance Program funds are administered by DCCA for the improvement of public facilities. A single small community applied for funds to redrill wells and reset pumps in an area of high irrigation pumpage. It was somewhat surprising that more applications for improvement of water systems were not requested during this very severe drought.

Two workshops were held in the state to obtain feedback from municipalities on their problems, with a total of 150 people in attendance. These were well attended with the

feeling of positive results. Some communities adopted DCCA's sample ordinance for water conservation. A mass mailing was prepared and distributed to community leaders offering assistance in the form of future workshops on local drought management by DRTF members. The mailing included model ordinances for communities to consider to provide local government authority to better deal with water emergencies.

Materials are still being distributed on request, but demand has slowed since the drought is behind us.

DOA/DNR Activities

The DOA/DNR publishes a weekly crop report that includes the condition of crops during the growing season and the status of soil moisture. This report provided a near real-time assessment throughout the 1988 and 1989 growing seasons of the impact of rainfall on agriculture in Illinois.

Livestock growers were a major concern of the DRTF, and a number of alternatives were considered to ensure water for their operations. Three reservoirs operated by the U.S. Army Corps of Engineers became available upon application for water hauling. The ESDA provided a pump and personnel at the allocation site, but fortunately the water emergency was not so severe for livestock and only a single permit was issued. In other areas of the state not so close to surface lakes, the EPA compiled a list of locations where treatment plant effluent was of sufficiently high quality that it could temporarily be used for livestock watering. Again, not only was there some concern over the use of the water by the growers, but other alternatives and ordinary on-farm supplies were adequate during the year.

The DOA/DNR established a "Hay Hotline" to serve as a means to bring together sellers and buyers. The sellers almost outnumbered the buyers by 2 to 1. The Hotline received numerous additional calls seeking information as opposed to regarding buying or selling. How many sales were actually made is not known, but the service provided was received very well by the agricultural community.

ESDA Activities

A minimal length of piping and at least two pumps are maintained by the ESDA for distribution within Illinois where needed to tap into alternate water supplies during emergencies. These minimal resources were strained by requests, but fortunately, solving a short-term problem in one community released them for use in other communities. The ESDA worked with the Illinois National Guard to provide water "buffalos" to those

communities without a nearby water source. The drought of 1988-1990 demonstrated that these facilities should be increased in anticipation of needs during the next water emergency.

Emergency funds are available to assist recovery from natural disasters, although no applications for such funds were received in spite of the spotty, but extreme, water shortages around the state.

DENR/SWS Activities

In addition to its role in providing weather and resource depletion data to the member agencies, the DENR/SWS was also responsible for evaluating alleged interference between high-capacity wells and nearby wells. This responsibility was statutorily given as part of the Illinois Water Use Act of 1983 as amended in 1987. Present law permits one well owner to file a complaint against another with the county Soil and Water Conservation District (SWCD). The complaint, including a description of the nature of the perceived impact, is then forwarded to the DENR/SWS for evaluation in the field and a written report is prepared for the SWCD. If it is found that a well constructed in accord with state standards is impacted by a high-capacity well, the DOA/DNR then has the authority to decrease pumpage from the offending well.

Nearly 160 complaints were filed during the 1988-1990 drought. No wells were confirmed as impacted by nearby irrigation practices. The complaints were initiated by individuals who experienced water source interruptions, but upon investigation it was found that most of the impacted wells did not conform to the standards established by the state for domestic wells in areas of high ground-water use.

The surface water and ground-water engineers in the DENR/SWS were strained to meet the enormous number of requests for assistance. These requests ranged from giving advice on new potential sources to evaluation of quantity from newly developed resources. The DENR/SWS database of nearly 100 years was invaluable for responding to the needs of individuals and local government units.

DOC/ORM Activities

The DOC/ORM provided indicators of drought severity by continuously monitoring the terrestrial and aquatic natural systems throughout the state. Many migratory birds departed typical habitats in search of suitable feeding areas. Some entirely left the state while others were concentrated in smaller, suitable areas subjecting them to predation. The

prairie grass seed crop was a total loss in 1988 posing future habitat problems for some terrestrial species.

Numerous fish kills were reported, especially in small ponds, due to extremely hot water temperatures, lowered water levels, and diebacks of algal blooms. The severe impact on crops secondarily caused some small pond fish kills due to pesticide spraying to control spider mites on soybeans. On some major lakes and streams decreased concentration of dissolved oxygen was directly responsible for fish kills.

In addition to monitoring the drought impacts on these natural resources, the DOC/ORM maintains a number of lakes for recreation in Illinois, and those that represent sufficient storage as water supplies were made available, if necessary, in stressed areas. There was no need to draw upon these lakes for water supply.

OG Activities

The Office of the Governor staff representative served to provide the Governor with the current status of the drought and advice as to the proper time to intervene in water conflict issues within the powers vested in that office.

ASSESSMENT OF THE ILLINOIS DROUGHT RESPONSE TASK FORCE

The DRTF served the people of Illinois well by acting as the focal point for dealing with water shortage problems at all levels of need. The weekly meetings of the Task Force, composed of all agencies within Illinois state government with responsibilities for water, allowed information, funding, and permitting requests to be expedited during times of water resource stress.

The various agencies represented on the DRTF have, by their very nature and responsibilities, offices and personnel scattered throughout the length and breadth of the state. This was an important element in the early detection of problems and allowed the DRTF time to take appropriate action to ameliorate some problems.

The news media were used extensively by the DRTF to increase awareness by the people of the state's efforts to assist them in securing water for their health and safety. The success of this public relations effort was confirmed by the increased information flow to the Task Force from municipalities and individuals as the drought extended in time.

The single most important weakness of the DRTF was the lack of statutory authority to take any action to more directly alleviate water shortage problems. The DRTF served

in an advisory role only and could not mandate action by either individuals or municipalities. The previously mentioned Water Use Act is not an authority given to the DRTF, but is vested in the DOA and cooperating agencies. Some frustration was felt by Task Force members that some authority was not available when water resource problems were known and information was available to assist local units of government, and yet communities failed to act on the information and advice given by the Task Force.

SUMMARY AND DISCUSSION

The primary accomplishment of the DRTF was the relative success in advising local government units of their water problems and offering them possible solutions. The solutions were normally all within the ability of local governments to resolve. With each returning drought, the number of troubled communities decreases because they have previously adopted a long-range solution. At the same time, each successive drought adds new communities to the list of problems owing to either aging of existing facilities, sediment accumulation and other deterioration of impoundments, or due to local development in an already stressed water resource area.

The DRTF worked by the method of persuasion and was very successful in this most recent serious drought period. Most communities recognize their growing water resource problem and are willing to listen to advice. Surprisingly, no individual or local unit of government expected the state to solve their problem.

In retrospect, there are one or two things that are readily apparent and worthy of discussion. First, there is the question of the degree of authority that state government can or should possess to mandate measures regarding water resources and their use to individuals and local units of government. Second, differing levels of water shortage may make it desirable to define different levels of response from state government.

Illinois is a rich water resource state with both surface water impoundments and productive ground-water aquifers. Past tradition is that the only water problem most frequently encountered is that of too much water during periods of flooding. The issue of water use conflict is of recent origin and has not been addressed satisfactorily in Illinois law. The previously described Water Use Act (as amended) only applies to restrictions on ground-water withdrawal under defined emergency conditions in 4 of the 102 counties in the state. Should this law be re-examined, strengthened, and adopted for the entire state? Nearly 50% of the water resource use is derived from Lake Michigan diversion and feeds

the heavily populated northeastern counties of Illinois. However, the remaining 50% is largely ground water in the agricultural areas where competition for the resource is experienced most frequently. These questions were highlighted by the 1988-1990 drought and will become key issues for the DRTF in the future.

The second problem is when is a drought a drought? In the absence of accurate forecasts of water deficits, most droughts are initially "felt" as opposed to quantitatively measured. At what level of impact should the state activate a warning system that water resources are in jeopardy? A legitimate concern is that the state can overreact to a perceived problem only to have the problem disappear with the next catch of precipitation. This definition of level of involvement must be considered by the DRTF and the Water Plan Task Force.