

Illinois Drought of 1999-2000

*edited and approved by the
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State Map showing Precipitation Deficits and Noted Public Surface Water Supply Systems

U. S. Drought Monitor (map of conditions during various drought time frames)

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Responses to Questions Raised at the 5/30/00 State EOC Liaison Meeting (with attachments)

INTRODUCTION

The Drought Response Task Force (DRTF) convened on August 12, 1999, in response to the dry weather and high temperatures experienced in July. The DRTF formally met by conference call a total of nine times. The DRTF approved an “inactive status” on July 7, 2000, following above average statewide rainfall in June, which provided for favorable climatic indices and agency reports. In addition to the DRTF meetings, the drought status was discussed as the first agenda item at the three quarterly State Water Plan Task Force (SWPTF) meetings held during this period.

Convened ⇒ August 12, 1999 DRTF
November 23, 1999 SWPTF
December 10, 1999 DRTF
February 22, 2000 SWPTF
March 30, 2000 DRTF
April 14, 2000 DRTF

May 2, 2000 DRTF
May 19, 2000 DRTF
May 25, 2000 SWPTF
June 5, 2000 DRTF
June 21, 2000 DRTF
July 7, 2000 DRTF ⇒ Inactive Status

A summary report was prepared on each meeting and distributed to the DRTF representatives, Illinois Department of Natural Resources (IDNR) Director Brent Manning, Illinois Environmental Agency (IEPA) Director Thomas Skinner and Renee Cipriano, Senior Advisor to the Governor for the Environment and Natural Resources. The following is a list of individuals who participated in at least one of the DRTF meetings.

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IDPH - Env. Health

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Ken Kunkel
Sally McConkey
Bob Scott

IDNR - Public Affair

Carol Knowles
Joe Khayyat

The IDNR/State Water Survey (SWS) issues a monthly summary report on the state's water and climate data, called the “Illinois Water and Climate Summary.” The DRTF Co-Chairmen utilize this information in their decision of when to convene the DRTF, in addition to any potentially

impacted resources or water supply issues which are brought to their attention. Upon the decision to convene, the IDNR/Office of Water Resources (OWR) makes the contacts and arrangements for the meeting, and serves as the focal point for the collection and dissemination of information. The OWR Director coordinates the meetings. The OWR prepares a summary report on each meeting.

The meeting structure provides for a “conditions” or problem report from each representative, and begins with an overview of the detailed water and climate data monthly report as prepared by the SWS. Data on precipitation, soil moisture, river and reservoir levels, ground-water levels, and climate forecasts and projections are provided. Statistical data comparisons to historical records and water budget projections on certain water supply systems are also presented. The IEPA normally follows with a detailed report on the status of the state’s public water supply systems. This report provides water level and remaining water supply capacity information, highlighting the systems currently considered being at-risk. For those systems at-risk, the options identified for alternative water supply are presented. The Department of Public Health (IDPH) provides information on any specific health related problems. Notice of any area increases in well drilling permits or water hauling activity is given, which generally indicates an impact on ground-water supplies. The Department of Agriculture (IDOA) provides data on weather and crop reports, soil moisture conditions, planting statistics, and notification of any sale of livestock due to the drought. The IDNR/Division of Fisheries reports on any problems with fisheries on any of the state’s reservoirs and streams due to, for example, thermal or low-flow conditions. The Illinois Emergency Management Agency (IEMA) provides notice on any requests for assistance they have received and alerts the group of any specific community concerns.

Following these reports, the group discusses the information and establishes the areas of concern requiring further attention and close monitoring, with the course of action decided by the group. The IDNR Public Affairs Office serves to provide drought status information to the public and press releases as necessary. The Governor’s Office (OG) representative provides drought status information and resource related problems to the OG’s Senior Advisor, allowing for timely intervention by the broad powers vested to the Governor during an emergency.

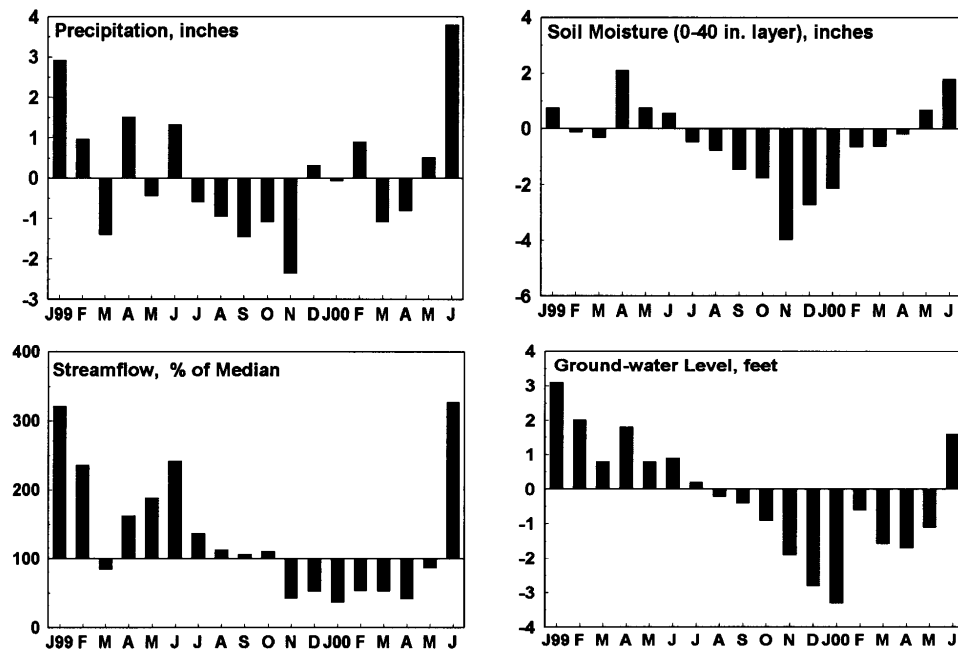
This report has been prepared to provide an historical summary of the nature and resource effects of the 1999-2000 drought and the activities of the State of Illinois, in response to that drought. As such, the majority of this report utilizes data, excerpts and information as collected through the various DRTF and SWPTF meeting minutes and summaries. This report also addresses other recent activities which relate to drought preparedness. These include the recent completion of a national drought policy report, the water supply conference held in Chicago on July 18-20, 2000, and the Governor’s decision to form a water resources advisory committee.

Drought of 1999-2000 Overview

Dry conditions began in Illinois in July 1999 due to a sudden and consistent reduction in the amount of precipitation that was falling over the state (Figure 1). Precipitation in the prior six months (January-June 1999) showed a statewide total of 22.70 inches or 22 percent above average. The other water resources of the state, soil moisture levels, streamflow amounts, and shallow well ground-water depths, reflected the above average precipitation condition, and gave no indication of concern as to the availability or status of the water resources in the state. The termination point for much of Illinois' water, the state's reservoirs of public water, showed no concern; only one of 39 reporting reservoirs was more than one foot below normal.

As the summer progressed, precipitation deficits grew and slowly lowered water levels with the other water resources as well. Since the decrease in rainfall began in midsummer when public water needs, crop use, and evaporation are all at seasonal maxima, each water resource measure began an almost immediate response to the reduction in statewide rainfall. However, as was seen later, the recovery to normal water levels at the end of the drought occurred on very different time scales. By the time the strong decrease in precipitation ended in December 1999, all water resource indicators had reduced to low levels and continued to drop or maintain low values even though precipitation in December and successive months returned to near average levels.

Figure 1. Statewide departures from normal, January 1999 - June 2000



A precipitation drought has been defined by scientists at the SWS as when one or more climatological districts in the state average less than 60 percent of the precipitation usually observed over a 3-month period, 70 percent of the average precipitation for a 6-month period, or 80 percent of average for 12 successive months. From Table 1, it was clear by this definition that at the end of the nearly 5-month period covering most of July through November 1999, all of the state was experiencing precipitation drought conditions. Statistically, it was the fifth driest July-November period in Illinois since record keeping began in 1895. In addition, the conditions present were strikingly similar in appearance to the precipitation deficit trends observed during the early stages of the most extreme droughts in Illinois history, those beginning in 1908, 1917, 1930, 1953, and 1976.

All water resources were falling well below normal monthly values, first in soil moisture, and then progressively in shallow ground-water and streamflows (Figure 1), and finally in reservoir levels. By the first of December 1999, 34 of 36 reporting reservoirs were below normal pool, 13 of which were at levels at least 3 feet or more below their normal pool. Soils, stream banks, river banks, and reservoir edges were all dry and/or drying, and it would require several months of above normal precipitation to not only refill visible areas with water, but the adjacent bank areas of soil as well.

Table 1. Average Precipitation Across Illinois between 7/3/1999 - 11/30/1999 by District

<i>Crop Reporting District</i>	<i>Precipitation</i>	<i>Average</i>	<i>Deviation from Average</i>	<i>Percent of Average</i>
NW	10.87	16.29	-5.42	67
NE	9.98	16.39	-6.41	61
W	9.26	16.96	-7.70	55
C	9.79	16.18	-6.39	61
E	9.33	16.15	-6.82	58
WSW	8.26	16.10	-7.84	51
ESE	8.11	16.63	-8.52	49
SW	7.58	16.99	-9.42	45
SE	6.97	16.72	-9.75	42
STATEWIDE	8.98	16.46	-7.49	55

Precipitation returned to normal in December 1999. Statewide precipitation totals for December through February were slightly above normal across most of the state (Figure 1). However, climatologically, these are the driest three months of the year in the state and the absolute amount of precipitation was relatively low, resulting in only modest increases in the near-surface soil moisture conditions. In addition, some of the precipitation was locked up in snow which could slowly sublimate back to the atmosphere directly. Consequently, drought levels were maintained in most areas and some reservoir levels continued to decline.

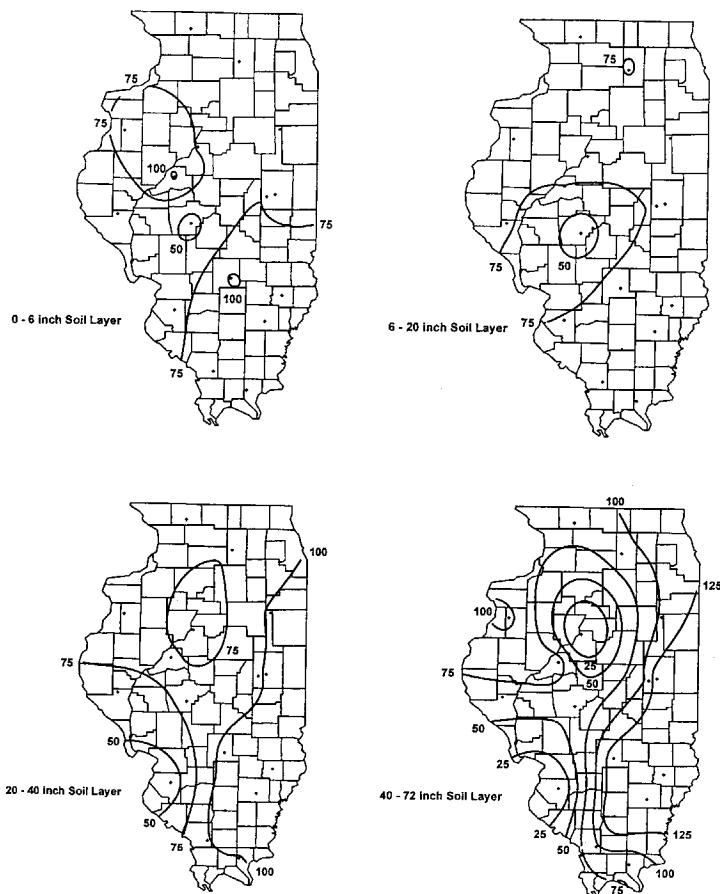
On March 13, 2000, the IDNR issued a press release on the drought-stressed conditions in Illinois and that water supply concerns were being monitored. SWS Chief Derek Winstanley and IEPA/Bureau of Water Chief Jim Park recommended that managers, officials and users having surface water supply systems needed to be aware of the risk of drought and to start planning for possible water supply shortages in the coming months. SWS State Climatologist Jim Angel stated the prospects for making up the rainfall deficit in Illinois during the spring and summer were not encouraging. Extended droughts typically last for 18 to 20 months and occur over a large geographical area. Historical data suggest droughts causing significant streamflow deficiencies occur about once every 12 years in Illinois. The resemblance of the past several months to prior Illinois drought periods was again made. Jim Angel stated that comparing data at that time to historical records suggested about a 50 percent chance that the precipitation deficit would remain steady or get worse, and only about a 15 percent chance that the deficit would be made up in the following 12 months.

In addition to the precipitation drought criteria, SWS scientists have defined a 10-inch precipitation deficit as a threshold for surface water drought conditions. On April 14, 2000, the SWS issued a press release designating a moderate precipitation drought in Illinois (Table 2), with a moderate soil-moisture drought (Figure 2), and a severe streamflow drought (Figure 3) in central and southwestern Illinois. Collectively, the nine months from July 1999 through March 2000 ranked as the 8th driest period since 1895. Statewide, precipitation from July 3, 1999, through April 3, 2000, was 69 percent of normal and deficits between 8 and 11 inches were occurring in all Illinois crop reporting districts except for the northwest and the southeast districts. Near normal precipitation totals in December through February had been sufficient to improve moisture conditions across the state near the surface and deeper layers in eastern Illinois. The SWS cited the reasons for the April drought designation as continuing dry conditions, a normal increase in water demands, NOAA's Climate Prediction Center forecast of a slightly above average risk of below normal rainfall, and a significant historical probability for the patterns to persist. The press release stated that water conservation measures should be encouraged.

Table 2. Average Precipitation Across Illinois between 7/3/1999-4/13/1999 by District

<i>Crop Reporting District</i>	<i>Precipitation</i>	<i>Average</i>	<i>Deviation from Average</i>	<i>Percent of Average</i>
NW	18.33	24.92	-6.59	74.00
NE	17.39	25.85	-8.47	67.00
W	18.64	26.65	-8.01	70.00
C	18.21	26.57	-8.36	69.00
E	17.70	26.89	-9.18	66.00
WSW	17.51	27.50	-9.99	64.00
ESE	20.15	29.66	-9.51	68.00
SW	21.09	31.22	-10.13	68.00
SE	25.06	32.41	-7.35	77.00
STATEWIDE	19.13	27.78	-8.65	69.00

Figure 2. April 15, 2000 observed percent of normal moisture based on 1985-1995 mean



Rainfall during the last two weeks in April through the end of May 2000 helped to reduce the deficits, particularly in the northern region of the state, shrinking the “bull’s-eye” area of the drought. As of the end of May, precipitation deficits of around 10 inches remained in the WSW, SW, ESE and W crop reporting districts. Water conservation measures were encouraged in these areas. Early June rainfall was heavy in northern and southern Illinois and about average in central Illinois. A large-scale storm system went through the state on June 20-21, 2000, producing heavy rains over the central and southwestern sections and removing all regions from the 10-inch deficit drought threshold definition. This brought streamflow conditions to “normal” or “above normal” in the lower three-quarters of the state and to “much above normal” for the northern part of the state, where flooding conditions were being experienced in some areas. Precipitation records indicated that June was the third wettest since 1895, with precipitation above average in the central portion of the state and very heavy in northern and southern Illinois. These rains reduced the statewide deficit from July 3, 1999 to July 6, 2000, to only 4.06 inches, with the NW district showing a surplus. With all water data indices showing recovery from drought and no resource concerns having been voiced, the DRTF was placed in an “Inactive Status” at the July 7, 2000 DRTF meeting.

Statewide for this drought, the largest statewide average precipitation deficit occurred about the period between July 3, 1999 through May 18, 2000, showing a deficit of 9.04 inches. Statewide, precipitation for this time period was 72 percent of normal. All state districts recorded precipitation levels between 64 and 82 percent of normal. The WSW district showed the largest regional deficit of 11.64 inches for this ten and one-half month period. Total precipitation for the WSW district during this period was 20.60 inches, being 64 percent of normal. By July 6, 2000, this deficit had been reduced to 5.93 inches.

La Nina and Climate Forecasts

Upon convening the DRTF in August 1999, it was reported that a weak La Nina event was occurring. In late November, La Nina conditions were projected to last for several more months. Although the statistical correlations between climate conditions and La Nina events are not very strong in Illinois, information on those relationships was brought to the attention of the DRTF as one factor to consider. Specifically, La Nina winters have an increased chance of being warmer and wetter than average, a relationship based on a relatively small number of past La Nina events in the last 50 years. The pattern in spring was noted for being less pronounced. Another factor brought to the attention of the DRTF was the persistence of drought conditions based on historical data. Interestingly, using historical data back to 1895, the odds of a dry winter following a dry fall are fairly strong, which is opposite to what is the most likely outcome of a La Nina winter.

In November 1999 the climate outlook for the winter as issued from the NOAA Climate Prediction Center indicated a slight preference for above normal temperatures but no preference for either above or below normal precipitation in Illinois. The SWS reported that November had been the third warmest and third driest month in 105 years. In February 2000 the National Weather Service called for an increased chance of below average precipitation in southwestern Illinois for the months of March, April, and May. No area in the state was shown as having an increased chance for above normal precipitation. The climate outlook from NOAA in March 2000 forecasted a preference for above average temperatures and below average precipitation for April, May, and June. As of the last DRTF meeting on July 7, 2000, the forecast remained the same with a preference for above average temperatures and below average precipitation through September.

Public Surface Water Supply System Impacts

During the drought period there were several communities which were monitored by the IEPA and the SWS. Some communities came on the watch list early in the drought and some came later. The following list represents communities which were reported on at various DRTF meetings. A statewide map referencing these communities, with precipitation deficits by Crop Reporting Districts, is included as an attachment. This list should not be considered a list of “at-risk” water supply systems. As can be seen below, the geographic locations of these systems are within the districts that had the greatest rainfall deficits. Obviously, other systems would have been identified if similar precipitation deficits occurred in their watersheds.

Selected water level data for these supply systems are provided to illustrate the impact of the drought on these water supplies. More complete data on reservoir levels during the 1999-2000 drought are available from both the SWS and the IEPA. The SWS monitors month-end water levels at 42 reservoirs throughout the State, 35 of which are public water supply reservoirs. These readings are published monthly in the SWS Water and Climate Summary. Additional mid-month water level readings were also collected for selected reservoirs from February through June 2000. The IEPA also monitored water levels for selected water supply systems and provided reports of these conditions to the DRTF during the period of drought.

Central (C) - Bloomington, Decatur

West Southwest (WSW) - Ashland, Carlinville, Gillespie, Mount Olive, New Berlin,

Palmyra-Modesto, Pana, Sorento, Springfield, Staunton, Taylorville

East Southeast (ESE) - Farina, Oakland, Paris

Southwest (SW) - Alto Pass, Marion, Vienna

Central District (C)

Bloomington (McLean Co.) had no immediate concern but was watched since it could be a big problem in an extended drought period. Following the drought of 1988-1989, the dam at Lake Evergreen had been raised 5 feet. As of the end of March 2000, Lake Bloomington was about 10 feet down and Lake Evergreen was down about 6 feet. Lake Evergreen was providing virtually all the water supply and was said to be dropping about one foot per month. There was very little inflow into the lakes, and the Mackinaw River was at record low flows for that time of year, eliminating the ability to pump into Lake Evergreen. If the situation continued in the same pattern which occurred in 1953-54, there would have been little or no inflow into the lakes for another nine months. By the middle of May, Lake Bloomington was down about 9 feet, and Lake Evergreen was down about 8 feet. Flows in the Mackinaw River were still too low to enable pumping. The remaining storage was estimated at 4 billion gallons, which was equivalent to 322 days of supply, assuming an average usage of 12.4 mgd. Evaporative losses for the next six months were estimated to reduce the supply by 45 days. Rains during the last five days of May, brought the level of Lake Bloomington up 3 feet, and Lake Evergreen up one foot, adding about 50 days of water supply. Also, the Mackinaw River rose enough to provide for 126 million gallons to be pumped into Lake Evergreen during May. At the end of June 2000, Lake Bloomington was down only 2.2 feet from spillway level, and Lake Evergreen was down 6.8 feet.

Decatur (Macon Co.) was one of the first water supply systems to be discussed in convening the DRTF in August 1999. With the extreme heat that summer, Decatur requested a voluntary use restriction, due to the inability of the water treatment plant to keep up with demand. In December 1999 water capacity became the concern, and Decatur began pumping from four of their wells located in southern DeWitt County, contributing about 9 mgd of water into the Sangamon River for transport to their lake. In mid-February 2000 Lake Decatur was down about four feet below normal pool. The well drawdowns were reported at about 20 feet. In addition to the pumping of these wells owned by the City, ADM was also reported as pumping their wells to augment their supply, and plans were being made to reactivate the pumps in the Vulcan Materials ponds. The City also hired an engineering firm to prepare a long-range water supply development plan. Lake Decatur has a very large watershed to capacity ratio and quickly recharged to normal pool by the end of February, thereby minimizing the immediate drought concern.

West Southwest District (WSW)

As noted above, the largest rainfall deficit through the middle of May 2000 occurred in the WSW district. As a result, most of the reservoirs within this district were carefully being monitored.

Ashland (Cass Co.) has a two-lake system and had an estimated six to eight month supply remaining as of May 19, 2000. The “Old Lake” was 2.6 feet down. The “New Lake” was 3.6 feet down.

Carlinsville (Macoupin Co.) also has a two-lake system, with Lake 1 down 2.8 feet, and Lake 2 down 4.25 feet, below overflow as of May 19, 2000. Carlinsville had no restrictions as of May 19 but would restrict lawn watering in June if conditions persisted. The operating staff did not have an estimate of remaining capacity in either lake.

Gillespie (Macoupin Co.) had about 95 million gallons remaining as of May 19, 2000, and the potential for a water supply connection to a local quarry, if necessary. Their primary lake was down about 18 inches, and their secondary lake was down about 5.2 feet, below overflow. Gillespie had enacted a voluntary conservation plan and would enact mandatory requirements if conditions did not improve.

Mount Olive (Macoupin Co.) implemented a voluntary water plan on May 1, 2000. As of May 19, the Old Lake was down approximately 2.8 feet, and the New Lake was down approximately 5.5 feet, below overflow. The operating staff did not have an estimate of remaining capacity in either lake and had no emergency backup source.

New Berlin (Sangamon Co.) was identified as a concern at the February 22, 2000 SWPTF meeting. The reservoir was down 10 feet, and bulk water sales were curtailed. New Berlin had hired a consultant to find a long term reliable supply. New Berlin has a side-channel reservoir which was down 11 feet from normal as of the end of March 2000. They were able to do some pumping from Spring Creek in March and April, though the levels were very low. As of April 14, 2000, about 9.5 million gallons of capacity remained. Usage had dropped from 90,000 to 75,000 gpd, allowing for roughly a three to four month remaining supply. IEMA and the Sangamon County ESDA worked with New Berlin in obtaining the necessary resources which would enable pumping water from a private fishing pond. Service connections to the Curran Gardner Water District or the City of Jacksonville were also considered. Rains in the latter part of April, in combination with the ability to pump, allowed for a rise in lake level to 4 feet below normal, providing for about 142 days of water supply. On May 19, the reservoir was down about 8 feet. Mandatory conservation measures had reduced usage to 70,000 gpd, allowing for about 107 days of remaining water supply. With heavy June rains and the aid of four pumps, the reservoir was down only 1.5 feet on June 21, 2000.

Palmyra-Modesto (Macoupin Co.) Their reservoir was reported at 3 feet below average on March 30, 2000. The Board members felt that the level could be sustained, as it was thought to be partially spring fed. Though a supply of 833 days was calculated to remain, the reservoir was being monitored due to the extremely small watershed and to ensure the recharge ability of the reported spring. The reservoir held fairly steady in May, indicating a ground-water source of recharge.

Pana (Christian Co.) The lake was reported 3 feet below overflow on May 19, 2000, following a week when they received 3.5 inches of rainfall. The City passed an ordinance outlining a water restriction plan, if deemed necessary. The operating staff did not have an estimate of remaining water supply capacity. No other backup sources were identified.

Sorento (Bond Co.) On December 10, 1999, the reservoir was reported down 60.5 inches with remaining water supply capacity estimated at two to three months. The Village was seeking to find suitable pumps. Voluntary water conservation measures were being taken. On March 22, 2000, the reservoir was reported about 62 inches below overflow. The village was awaiting a new pump which they calculated could provide for a one-inch daily increase in their reservoir. As of May 2, 2000, they were still able to pump from Shoal Creek, and three months of storage was estimated to remain. Sorento was negotiating with the Three County Public Water District to provide a permanent connection. Sorento received a good rain in the last weekend of May which raised their reservoir level to about 33 inches below spillway. The operator was encouraged by the IEPA to continue pumping operations until the reservoir was full.

Springfield (Sangamon Co.) On December 10, 1999, Lake Springfield was down 4.5 feet below spillway but only about 1.5 feet below normal for that time of year. In mid-February, the lake was about 6 feet below spillway. Plans were being made to consider implementation of emergency procedures, which involved construction of a temporary dam and bypass on the Sangamon River, in order to back water up to the Horse Creek pump station. At the February 22, 2000 DRTF meeting, the SWS reported that Lake Springfield had a high probability to reach normal pool in the spring with the aid of the pumping facility, and the inability to do so, would indicate a severe drought.

On March 30, 2000, the lake was still about 6 feet down. The City was asking for voluntary restrictions. The SWS provided a graph indicating the current lake level pattern as similar to 1953-54 lake levels, as simulated using the current water supply system and water usage. The SWS indicated a 50 percent chance of continued low lake levels based on years having similar low March inflows. An estimated remaining supply of nine months was given, assuming the water used for ash sluicing was recycled. The IEPA had met with the City in working with the various applications as

needed from the Pollution Control Board to pump water from the Sangamon River. The City was also working with the COE for the temporary dam construction. In April, the City began recycling the ash pond water for use in their cooling towers, thereby conserving between 2 and 4 mgd.

On May 2, 2000, the lake was reported at 5.6 feet below spillway, and the City Council voted on mandatory conservation measures and policing powers, with a plan for tightening the restrictions upon reaching an elevation of 552. Cavitation and pumping problems would occur at a level below 547 for the water treatment plant, at a level of about 545 to 547 for the Lakeside power plant, and at a level of about 541 to 542 for the Dallman power plant.

On May 17, 2000, Vern Knapp of the SWS prepared a detailed report on the water supply status of Lake Springfield, which was at a level of 554.3 (full pool at 560). The report provided storage and remaining supply estimates, water use data, and supply adjustment data based on net and forced evaporation, pumping from the South Fork, and simulated inflow data from the 1953-54 drought. The water usage during the preceding five months was 19 mgd but was expected to be greater in the summer. In 1988, the average water use was 22.3 mgd. Using a water use rate of 22 mgd, along with adjustments for projected lake evaporation and inflow similar to what occurred in 1953-54, approximately 277 days (nine months) of supply remained above elevation 547. The table showed roughly an additional 4 billion gallons of capacity below elevation 547, which is equivalent to roughly another 6 months of supply.

On May 25, 2000, the IDNR met with Mayor Hasara and Phil Gonet to discuss the permitting criteria for the temporary dam. A permit had been issued in 1989 but was never constructed then, and the necessary inundation and flood easements were never obtained. Due to the critical situation, the IDNR agreed that the City could begin construction, under the agreement that they post satisfactory bond to cover any damage rights and begin acquisition of those necessary easements or property purchases. At the June 5 DRTF meeting, the lake level was slightly higher due to a 1.5-inch rainfall and the ability to operate both pumps on Horse Creek, which provided about 70 mgd during the previous week. Roger Selburg stated that, overall, the pump station had been able to provide about two feet of water to the lake since pumping began. Vern Knapp provided a graphical projection of probabilistic lake levels through the end of the year, simulating levels to what would have occurred during the 1953-54 drought with the current water supply system and water usage. The graph indicated that only under extreme drought conditions would a level below elevation 550 occur before the end of the year.

The heavy rains in June through early July, with continual pumping from the South Fork, brought the lake level to full by July 13, 2000. Rainfall was well above normal, and more than 8 inches had fallen on the Lake Springfield watershed from June 20, 2000 through July 13, 2000. At

the last DRTF meeting, it was reported that Springfield would still proceed with the ash pond recycling of water and would complete the plans for the Sangamon River temporary dam.

Staunton (Macoupin Co.) The dam had been raised nine feet and no problems were anticipated as of February 2000. On May 19, 2000, the lake was 4.5 feet below overflow. The operating staff did not have an estimate of remaining capacity of the lake. The City had requested voluntary conservation measures and had preliminary discussions toward implementing mandatory steps.

East Southeast District (ESE)

Farina (Fayette Co.) This system was first discussed in August 1999 and was reported as not having much flow in the creek, as used to supply one of their two side-channel reservoirs. On December 10, 1999, their primary reservoir was reported down 6 feet from normal pool, and their secondary reservoir nearly empty, with still very little flow in the creek to afford replenishment by pumping. The operator estimated two to three months of capacity remaining but noted that the water quality would deteriorate as the reservoir level dropped. The Village discontinued bulk sales and implemented a water conservation program. They also were investigating piping water from a nearby borrow pit. The February 18, 2000 IEPA report stated that two wells (10 gpm each) were being used to supplement filling of the reservoir, and the village would soon be installing a water line and pump station from a third borrow pit.

Oakland (Coles Co.) On November 6, 1999, the operator from Oakland contacted the IEPA Champaign Regional DPWS Manager with concerns about their low water conditions. Their reservoir was down 75 percent in volume and an estimated 35 to 40 days of supply remained at the present pumping rate of 140,000 gpd. The community (pop. 996) was asked to reduce water usage, and the Mayor was to approach every business and request a usage reduction. It was cited that, if this did not work, a rate surcharge and leak survey would be recommended. Oakland was a main topic of discussion at the November 23, 1999 SWPTF meeting. The village had contacted IEMA as it appeared that less than one month of water supply remained, even with usage having dropped to 120,000 gpd. A temporary solution of piping water from the 46-acre lake at Walnut Point State Park was being considered. The availability of pipe materials, assembly logistics, and freezing concerns were discussed. The IEPA recommended mandatory conservation measures. At the December 10, 1999 DRTF meeting, the IEPA reported that water restrictions had reduced usage to 99,000 gpd.

On December 2, Governor Ryan approved the plan to pipe water from Walnut Point State Park. OWR coordinated the emergency pipeline project. The water volume to be withdrawn from

Walnut Point was to be limited to one foot of drawdown. This volume was estimated to provide about two feet of water to Oakland's reservoir and provide for another 120 days of supply. A total of 15,600 feet of pipe was delivered by IDOT and unloaded by a prison work crew. OWR obtained the pipe from the Fox Waterway Agency and the City of Havana. The pumps were furnished by the IDNR and IDOT. The OWR field crew began pumping on December 16. Pumping was completed on December 29, 1999. The project assured Oakland with water supply through the third week of April, barring any rainfall. Oakland has discussed their long term plan options as either dredging their reservoir, connecting with an existing water district, or possibly joining a new water district being proposed for the area.

Paris (Edgar Co.) This facility has twin lakes, with the east lake holding most of the volume. Dredging operations had occurred in the west lake during the early 1990's to provide more capacity. These lakes were reported to be within 30 to 40 percent of full capacity on February 22, 2000. On March 30, the SWS estimated about 100 days of remaining storage but expected the Paris lakes to fill within the next two months. Streamflows in the eastern fringes of central Illinois are less susceptible to extended dry periods and have typically rebounded in the latter spring during historical drought periods. As of May 2, 2000, the west lake was near full, with an estimated seven-month remaining supply. By May 16, 2000, overflow from the west lake into the east lake allowed for an increase in the water supply estimate to 246 days, not accounting for evaporation.

Southwest District (SW)

Alto Pass (Union Co.) In the late fall of 1999, in anticipation of dropping water levels, the Village extended an intake line into a deeper part of the reservoir. In taking this action, they did not expect any problems would occur unless the drought continued into the summer.

Marion (Williamson Co.) A potential water supply problem for the City of Marion was discussed at the SWPTF meeting on November 23, 1999. As of November 19, 1999, the reservoir level was down 5.75 feet from spillway, and water was being pumped from the Herrin reservoir. An interconnection was made with the City of Herrin, which obtained its water from Rend Lake. Marion had enacted water restrictions. The discussed options included piping water from Crab Orchard Lake (about 5 miles), or connecting directly to the Rend Lake system, through a feeder line located about three miles to the north. On December 10, 1999, Marion had completed installation of an in-line booster pump to supply water from the City of Herrin to the west side of Marion. This connection was estimated to provide 0.6 mgd. With total water supply usage at 1.8 mgd, this connection reduced the lake withdrawal volume to 1.2 mgd. Sufficient rains came over the next

couple months to fill Marion's reservoir. Marion continues with plans to construct a new reservoir. **Vienna** (Johnson Co.) The City took precautionary steps in the fall of 1999 by deciding to connect with the Millstone Public Water District for flow augmentation. Their remaining supply was estimated at between two and three months. The connection was completed in December 1999.

Ground-Water Supplies and Public Health Issues

In the fall 1999 a high volume of water hauling was occurring in central Illinois. There were also a large number of water well permits coming in from the northern part of the state. However, this was presumed to be a result of the favorable conditions for building and development in the area, and not a result of the drought.

At the DRTF meeting on March 30, 2000, the IDPH reported an increase in hauling for domestic use and for private rural water systems. The IDPH prepared a pamphlet for proper disinfection and water hauling procedures. During the 1988 drought, the IDPH saw an increase of about two thousand well construction/modification permits. During dry periods, the tendency is toward installation of new wells rather than deepening of existing wells. Though there had not been a marked increase in the number of permits, central Illinois was of most concern, and the IDPH was speeding up the permit process for critical water supply needs. It was stated that the deeper well systems were being affected, not only by the dry conditions, but also because of the greater use and dependency on these systems during these dry periods.

On May 19, 2000, the IDPH reported that data indicated no increase in water well permits or water hauling activity in northern and southern Illinois. In east-central Illinois, there was a doubling in the number of water well permits, and a marked increase in water hauling. In the west-central area, there also appeared to be a big increase in water hauling, and a lot of inquiries about the procedures for proper disinfection and water hauling.

On June 21, 2000, it was mentioned that there had been an increase in the number of dry holes encountered in the drilling of shallow wells. Overall, this drought only led to a slight increase in the average number of wells drilled but had a marked increase in water hauling in areas within the central part of the state.

By the end of October 1999, shallow ground-water levels were almost one foot below the average. At the end of January 2000, the levels had dropped to more than three feet below average. The SWS reported a rebound in some shallow wells in February, particularly in the southern parts of the state. The greatest shortfalls were occurring in central and southwestern Illinois, where widespread problems were reported with shallow private wells. There were no reported problems with deeper public water supply wells.

The average shallow ground-water level declined in March and April, with the statewide average level being close to two feet below normal at the end of April. Levels at this time ranged from 8.4 feet below average to 1.9 feet above average. One well in Pike County recorded a record low ground-water level for April. By the end of June, levels had returned to average or above average across most of the state. Overall, there were no public health issues related to this drought.

Streamflow and Reservoir Impacts

Upon convening the DRTF on August 12, 1999, the IDNR/Fisheries Division reported some fish kills in the northern lakes due to high water temperatures. Increases in temperature to 118-120 degrees on certain power plant lake returns had been reported. Several power plants requested longer durations for these higher temperature releases. Expectations were for large fish kills, but the lower temperatures during the previous week eased this concern. Streamflow levels were generally within the normal range. Most reservoir levels were less than one foot below normal.

At the end of November 1999, statewide streamflow was reported at about 43 percent-of-median, based on the 18 stations monitored monthly by the SWS. In southern Illinois, stations were recording flows below normal to much below normal, with at least two stations at or near the lowest level in about 80 years. The Big Muddy River at Plumfield was at a 7-day, 10-year low flow, as Rend Lake was experiencing a near record low and only providing for the minimum downstream release. As of the end of November 1999, 34 of 36 reservoirs reporting were at levels below the normal pool. The drought effects on fisheries were only occurring in the backwaters of lakes and rivers. However, there was a concern about the potential for fish kills in small lakes and ponds during the winter, if dry conditions continued and the winter was severe.

At the end of March 2000, about half the state was experiencing streamflow conditions much below normal. Low flows of this magnitude had only been experienced in six previous March periods, all of which fell within drought periods. The Mackinaw River at Congerville, the Vermilion River at Pontiac, and the Kaskaskia River at Vandalia were all at record low flows for March. Some winter fish kills had occurred due to low reservoir levels. There was a concern for fisheries at Coffeen and Newton Lakes if dry and above normal temperatures continued into the summer. Newton Lake was reported as having a large fish kill in 1999.

In mid-April 2000 most streams and rivers in central and southwestern Illinois were experiencing flows that were the lowest or second lowest for April. Roughly 70 percent of the state had “much below normal” flows, which is defined as within the lowest 10 percent of all flows on record. By the middle of May, flow levels returned to normal in northern and parts of southern Illinois. While flows in most streams rose in response to periodic rains, they generally receded

quickly in intervening dry periods, with very little sustained base flow. By June 26, 2000, streamflow levels had rebounded in the central and southwestern portions of the state. Flooding was occurring in northern Illinois, with several streams setting record June flows.

Lake Michigan

Between July 1999 and February 2000, Lake Michigan fell 22 inches, which according to reports by the Corps of Engineers, was the largest drop on record for any 7-month period. The level at the end of March 2000 was 18 inches below the long-term average for March and only 13 inches above the record low-levels that occurred in 1964. The low levels in the Great Lakes were associated with regional precipitation deficits in Michigan and southern Canada and were not directly related to the dry conditions being experienced in Illinois. The SWS had received numerous calls from the press in the Chicago area. There were navigation concerns regarding the lightening of loads in order to access the Calumet Harbor. As of the end of June 2000, Lake Michigan was 19 inches below its long term average level for June, but had risen three inches in the last month.

Soil Moisture and Agricultural Impacts

Upon convening the DRTF on August 12, 1999, roughly three-quarters of the state was experiencing soil moisture levels below optimum for crop production, with 32 percent of the state showing “very short” moisture levels. Overall, more than 80 percent of the corn and soybeans were in fair to excellent condition, with about 17 to 18 percent considered poor to very poor. No livestock problems were reported. In December 1999 the IDOA reported that the statewide yield was good to excellent, with corn averaging 146 bu/acre and soybeans at 43 bu/acre. The dry conditions in the fall did have an impact on the wheat, with 23 percent of the crop rated in “poor” condition. Statewide, top soil conditions showed 48 percent of the state “very short,” 47 percent “short” and only 3 percent “adequate.” In summary, the dry conditions over the last six months had little impact on agriculture due to the timing of the drought period, which for the most part did not cover the critical growing periods for row crop production.

On April 1, 2000, there was adequate soil moisture in the upper soil layers for seed germination. The big concern was what the situation would be when the roots went down into the deeper soil layers, which were experiencing large moisture deficits. An area centered around Peoria and in southwestern Illinois showed levels at 25 to 50 percent of normal for the 40-72 inch soil layer and levels between 50 and 75 percent of normal for the 20-40 inch soil layer.

On May 2, 2000, the IDOA reported that the agricultural conditions were in really good shape. Topsoil moisture had increased and conditions were conducive to planting. Only 5 percent

of the state was “short” on topsoil moisture. Planting was well ahead of normal with 58 percent of the corn planted compared to 8 percent the year before. About 8 percent of the soybeans had been planted. The farmers were apparently planting early to take advantage of the existing moisture and weather. Large deficits still existed in the deeper soil layers.

By May 18, 2000, 98 percent of the corn had been planted compared to a 61 percent five-year average, and 68 percent of the soybeans had been planted compared to a 28 percent average for that time of year. At that time, 71 percent of the wheat and 76 percent of the pasture ground were rated “good to excellent.” The season had been ideal for planting and growing conditions. On May 29, 2000, the crop and topsoil conditions were still very positive, with all the corn having been planted, and 97 percent of the soybeans planted compared to a 51 percent average for that time of year. The next critical period would be late June through early July when corn pollination would occur. On July 7, 2000, the IDOA stated that agriculture was in excellent shape, with 86 percent of the corn and 73 percent of the soybeans rated in the “excellent to good” category. The 20-40 inch soil layer had recovered in all areas except for the Peoria area. Deficits in the 40-72 inch soil layer still existed in the southwest and Peoria areas and were not expected to improve without continued normal to above normal rainfall into autumn.

As of mid-October 2000, with approximately 87 percent of the harvest complete, the state was on its way to a record soybean harvest of 471.5 million bushels or an average yield of 46 bu/acre. For corn, a near record crop of 1.7 billion bushels is expected, with an average yield of 155 bu/acre. The statewide record average is 156 bu/acre. The wheat crop harvested earlier in the summer 2000 totaled 52.4 million bushels or 57 bu/acre. The record is 61 bu./acre, with a 5-year average of 51 bu/acre. It is obvious that the 2000 crop season was excellent, if not exceptional, despite the drought conditions earlier in the year.

Drought Impact Summary

The tendency toward dry weather began the second week in July 1999. By November 21, 1999, Illinois was in a 3-month precipitation drought with statewide precipitation at 49 percent of normal. From July through November 1999, the statewide average accumulated deficit was about 7 inches. All of the Midwestern states were experiencing a precipitation deficit. The deficits in Illinois were greater in the southern two-thirds of the state. The impacts on water supplies became apparent and noted at Marion and with the emergency assistance provided to Oakland. Some river levels in southern Illinois were experiencing record lows. Several fish kills were reported due to low water levels and high temperatures. Shallow ground-water levels were dropping and a high volume of water hauling was occurring in central Illinois. Except for an early wheat crop impact, an overall

agricultural impact did not occur, since it mostly followed the critical row crop growing period.

Statewide precipitation from December 1, 1999 through the end of February 2000 was slightly above average, with the northern and southern regions of the state receiving the most precipitation. While the precipitation was sufficient to fill Marion's reservoir, large deficits still existed in most of the state. Water supply concerns unfolded at several small communities such as New Berlin, and close monitoring began at Decatur, Bloomington, and Springfield. Though we were entering the spring season, the long range forecast and chances for making up the deficit were not encouraging. The accumulated deficit pattern closely followed those of the past drought periods in Illinois, namely 1930-31, 1953-54, and 1976-77. It was unlike the 1988-89 drought which began in the spring.

Precipitation in March and April was below normal, making the period from July 1999 through April 2000 the 8th driest since 1895. The largest precipitation deficits were in the central and southern portions of the state, with deficits ranging from 8 to 11 inches for this 10-month period. Most of the central and southwestern portions of the state had received "much below normal" precipitation, greatly constraining the ability to recharge reservoirs by pumping from adjacent streams. Springfield was estimated to have a 9-month water supply remaining above the water supply intake level, and New Berlin's remaining supply was projected at less than 5 months. Topsoil moisture was in favorable condition, and planting was well ahead of normal. The subsoil moisture levels remained a concern when the row crops would need that moisture later in the summer. In addition to the dry conditions, the average temperature for the period from July 1999 through May 2000 ranked as the 3rd highest in the last 105 years of record, with an average temperature of 52.4 (F) degrees. Nearly all of this warming occurred from November through March. Thus, enhanced evaporation was not much of an issue.

Early May rains helped the northern and southern parts of the state, but the drought conditions remained in central and southwestern Illinois. Mandatory water conservation measures were enacted in several communities within these regions, and water supply operators became concerned about the uncertainty of their remaining storage volumes. A doubling of water well permits and a marked increase in water hauling were noted in east-central Illinois. By the end of May 2000, all districts except for the western district reported above average rainfall for the month. Precipitation deficits of around 10 inches since July 1999 still existed in the WSW, SW, ESE and W districts. Lake Springfield was estimated to be at a level one foot higher than what would have occurred in June of 1954, using the current water system and usage. The much needed rains came in June, with central Illinois receiving above average rainfall, and the rest of the state receiving much above average rainfall. This brought all streamflow levels to at least normal, filling most

reservoirs and providing for some recharge of subsoil and shallow ground-water wells.

Accumulated precipitation deficits still existed in all parts of the state as of the beginning of June 2000. However, by that time the two northern districts were no longer in a drought, having deficits less than 5 inches, with several areas experiencing flood conditions. The drought of 1999-2000 in Illinois had a duration of roughly 11 months for most of the lower three-quarters of the state, with the most notable effects concentrated in the central and southwestern parts of the state. The drought had very little effect on agriculture since it did not span the 1999 or 2000 critical growing seasons for row crop production. Though several communities experienced water supply problems, for the most part, the effects on community systems were not severely felt, with some only implementing conservation measures and others able to replenish their reservoir systems through pumping. Several communities chose to interconnect to other systems. There were several systems that could have experienced problems had the dry weather continued.

Though difficult to quantify, the drought effects may have been felt most by households which had to have water hauled in to replenish their shallow wells or for livestock use. Though the 1999-2000 drought ranked within the top ten (out of 105 years of records) for several duration periods between July 1999 through May 2000, this drought will probably not be remembered as one of the worst droughts with regard to economic or social impacts. Probably the biggest reason for this is that the drought did not span across an entire summer season when water use is highest and the critical growing periods for row crop production occur.

DRTF Summary of Activities

Beginning on March 30, 2000, the DRTF began meeting twice per month. The primary reason for the DRTF is to report on the resource data collected, the impacts on those resources, and the activities of the represented agencies in regard to their individual roles and areas of responsibility. As such, the DRTF was informed and able to assess the interrelationships of the resources being impacted and the extent and severity of those impacts. This information transfer positioned the DRTF to be prepared to provide a coordinated assistance effort as needed and to provide accurate information and response to the public. It also allowed for timely information updates on the drought status and a report on any areas of concern to the Governor's Office.

The SWS prepares and distributes a monthly report entitled "Illinois Water and Climate Summary," which reports data monitored by the SWS on a regular basis. This report is available on the Internet (<http://www.sws.uiuc.edu/warm/>) and is linked to various other drought and climate related sites. During the drought the SWS also issued a total of eight updates on the drought status beginning on March 8, 2000, with the latest being July 7, 2000. On three occasions, the IDNR

provided press releases concerning the drought. As such, this data was not only used by the DTRF but was also able to be viewed by the public at large. The SWS was also the lead in handling press questions concerning the nature of the drought and handled many inquiries concerning the level of Lake Michigan.

The attention and assistance given to ensuring an adequate water supply for domestic and public use is probably one of the most important functions of the DRTF. During this drought, the IDPH prepared a pamphlet on the proper disinfection methods and procedures for treating hauled water, since they had received numerous inquiries for information on this subject. The IDPH also assisted in expediting permit issuance for additionally needed domestic well supplies or modifications. The IEMA provided updates on the assistance the Sangamon County ESDA provided to New Berlin, in locating Crisafulli pumps and the tractors needed to operate them. The IEPA continually monitored and reported on the status of the public surface water supply systems. Throughout the drought, the IEPA assisted the operators in estimating supply capacities, identifying backup and contingency options and advising them on conservation measures. The SWS provided water supply estimates on several public water supply systems including Bloomington, Decatur, Paris, and Springfield. Vern Knapp of the SWS prepared a water supply status report of Lake Springfield on May 17, 2000, and a probabilistic projection of lake levels through the end of 2000. A copy of this report was provided to the City of Springfield. The OWR also assisted the City of Springfield in allowing special considerations with respect to construction of the temporary low level dam on the Sangamon River. During the drought, the DRTF provided general assistance, and attended several meetings at the request of the City of Springfield.

As discussed earlier, the State provided direct assistance to the City of Oakland in obtaining critical water supply from Walnut Point State Park. The DRTF allowed for a coordinated effort and delivery of water within six weeks of the regional IEPA/Public Water Supply Division first being contacted on November 6, 1999. The IEMA asked the DRTF for assistance shortly thereafter. On November 24, 1999, IDNR and IEPA officials discussed the coordination measures and details concerning the installation of the needed pipeline and pumps. Governor Ryan approved the plan on December 2, 1999. The OWR Havana maintenance crew and inmates from the Illinois Department of Corrections (IDOC) had the pipeline up and running on December 16, 1999. By December 29, 1999, more than 13 million gallons of water had been pumped. The OWR coordinated the combined effort and oversaw the installation. The IDNR, IEMA, IDOT, IEPA, IDOC, the City of Havana, and the Fox Waterway Agency were all involved in providing some form of assistance. The emergency relief assured Oakland with enough water supply through the third week of April 2000. In May 2000 the SWS was contacted by several communities who were concerned

with the uncertainty of the volume capacity remaining in their water supply reservoirs. The SWS had some estimates but they deviated sometimes greatly from what the community had estimated. Bathymetric surveys of the reservoirs were needed in order to obtain a reliable estimate of remaining supply and to allow for proper planning and conservation measures. The OWR offered to provide assistance in this area, and survey work began on June 5, 2000. The OWR conducted bathymetric surveys at the following lakes: Old Lake Mt. Olive, New Lake Mt. Olive, Lake Carlinville, Lake Carlinville Two, Staunton, Sorento, and Lake Pana. The OWR provided the SWS with \$10,000 out of their Water Development Program Funds, to assist in surveying the shallow areas at Lake Pana, and to provide a survey of Lake Taylorville.

Meeting Comments and Proposals

Below are several comments, proposals, and issues raised during the various meetings concerning the drought. It is not a complete list but just a summary as taken from meeting notes.

- The SWS proposed the following four steps in order to produce a probabilistic forecast of drought and water-supply adequacy for selected public water supplies that are expected to be most at risk (Full Proposal in Minutes of February 22, 2000 SWPTF meeting - V. Knapp)
 1. Update the SWS's public water supply database to include actions taken within the last five years by communities to improve their water supply capability.
 2. Identify the systems that appear to have a risk of water supply shortages.
 3. Obtain needed hydrological and water use data on each system.
 4. Develop water budget models to produce a probabilistic forecast of available

water

levels and water supply status for each selected system.

- At the May 30, 2000 Emergency Operation Center (EOC) Liaisons Regional Meeting, the EOC committee requested that the DRTF address issues which relate to them in assisting IEMA and other agencies to better respond to drought emergencies. Included as Appendix A are the four questions raised by the committee, and the DRTF's response to those questions. There was much discussion relating to the individual agency authorities in responding to drought situations, absent a declaration of an emergency by the Governor. Don Kauerauf, IDPH member on the EOC committee, suggested the establishment of a trigger type threshold with mandates toward water supply conservation. This suggestion raised several comments with respect to legal concerns in setting and adhering to mandates, and the complications involved in establishing water supply "adequacy" criteria due to

changing conditions in water usage, reservoir sedimentation, community expansion or emergency management plans. Other comments related to the role of the community as being inherently responsible for the “emergency” drought action plan, and the state’s role toward providing additional assistance through regular and routine contacts, which normally provides the community the impetus to take action.

National Drought Policy Commission (NPDC) Report

In accordance with the National Drought Policy Act of 1998 (PL. 105-199), the Commission prepared a report for Congress to review on developing a national drought policy. This report was being prepared, coincidentally, during this drought and was completed for distribution in May 2000. The full report is 47 pages and is entitled “Preparing for Drought in the 21st Century.”

The report stated that the guiding principles of national drought policy should be to favor preparedness over insurance, to set research priorities based on their potential to reduce drought impacts and to coordinate the delivery of federal services. The NPDC recommended that Congress pass a National Drought Preparedness Act, which would establish a non federal/federal partnership through the creation of the National Drought Council. Five goals with specific recommendations were outlined. The first centered around drought preparedness programs, adequate funding of existing federal programs, and the development of drought management plans for federal facilities. The second provided recommendations for funding a plan to modernize, expand and coordinate a system of observation networks, with a single point access to comprehensive data and information. The third goal included a recommendation to explore different approaches to crop insurance. The fourth included a recommendation that the U.S. Department of Agriculture establish a single procedure to trigger all of the Department’s disaster programs. The fifth goal recommended the coordination of federal drought programs through a National Drought Council. Two responsibilities cited for the National Drought Council would be to develop a handbook for emergency drought preparedness measures and to develop a handbook on water supply techniques.

Illinois Water Supply Conference

Another drought preparedness effort which emerged, coincidentally, with this drought was the *Illinois Water Supplies: Is the Well Running Dry?* conference, held in Chicago on July 18-20, 2000. The conference was organized by the SWS and the University of Illinois, Office of Continuing Education. The program’s organization provided for excellent presentations by Illinois leaders, managers and scientists in the areas of water supply, water quality, and related legal, management and socioeconomic issues. The forum provided for questions and open discussion,

with keynote speakers being Lt. Governor Corrine Wood and former U.S. Senator Paul Simon. The presentations included discussions on water supply projections to actual use, the distribution of Illinois aquifers and surface water supplies, the Mahomet aquifer system, irrigation, and Lake Michigan water supply. Several water quality presentations discussed contamination and issues relating to upcoming regulations. Other topics included regulations and authorities pertaining to water use and planning, environmental impacts, societal costs, water reuse, and climate change.

Governor's Water Resources Advisory Committee

In June 2000 the Governor announced the creation of a water resources advisory committee, having 27 members, comprising state agency directors, chairmen of boards and commissions, and representatives from a host of interest groups. The committee will be co-chaired by IDNR Director Brent Manning and IEPA Director Thomas Skinner. The committee is to focus on the state's water resources and usage, including the effects of peaker plants. It will also examine the various economic and social issues related to energy producing facilities and water use in Illinois and present recommendations for action to the Governor in December 2000. This committee is to closely examine the impact of industry, agriculture and population on Illinois water supplies.

Summary and Discussion

Statewide, the period from July 1999 through May 2000 ranked as the 10th driest and the 3rd warmest period since 1895. In probabilistic terms this drought was fairly significant. Yet with respect to economic losses and societal hardships, this drought will probably not leave a lasting memory. The biggest reason for this is the timing of the drought, which did not span over an entire spring-summer season, when impacts on agriculture would have been great and municipal water demand is at its peak. The drought had little effect on agriculture. Spring 2000 rains allowed proper planting conditions and eased municipal irrigation demands for lawn watering.

The largest impacts and concerns of the DRTF centered around the public surface water supply systems. While careful monitoring and capacity estimates were continually made of large systems such as Marion, Bloomington, Decatur, and Springfield, there were several smaller systems which would have been at-risk had the drought continued. Many of these smaller systems were unable to report a remaining capacity estimate, which brought the concern of a small window of time in instituting an action plan, such as what happened at Oakland. The DRTF report on the 1988-1990 drought stated that with each returning drought, the number of troubled communities decreases because they have previously adopted a long-range solution. It also stated that it adds new communities to the problem list due to aging facilities, lost reservoir capacity due to sedimentation,

and in some areas, increased usage due to local development. This drought did not fully test some of these smaller systems, and without system modification or better information which supports an adequate yield, these systems will again be of concern when the next drought hits these areas again.

The SWS reported at the recent water supply conference that international climate studies all agree that average temperatures are on the rise, but there is no general consensus on changes in average precipitation. Another speaker mentioned the fact that each month about 6.8 million people are added to the world's population. And another report mentioned that the major droughts of the 20th century occurred in the 1930's and 1950's, and Illinois has gone nearly 40 years without a prolonged severe drought. The question becomes, how will water be supplied during a severe drought, assuming that greater demands will exist. How do we do it at the least cost, and without creating significant environmental effects on our natural resources?

Several positive trends toward preparedness are ongoing simply due to technology. The Internet, for example, allows easy and readily available access to drought information which is certain to improve immensely and be readily available for almost everyone's use over the next decade. Improvements in plumbing fixtures, materials, measuring devices, and replacement of transmission lines should decrease losses and unaccountable or unnecessary use. The "dial toilet" as mentioned by former Senator Paul Simon at the water supply conference, could soon become available at your local home improvement store. As water rates go up with increasing monitoring and treatment costs, people will react more quickly to the leaky faucet and may think twice about a bath versus a shower or how their lawn looks compared to their neighbors.

We may also expect a trend toward increased public water supply demands in the future, besides that considered solely as a result of an increase in population. As we find out more about certain public health risks with our water, we may see that many private domestic water purification systems are unable to satisfactorily provide the treatment necessary to assure a safe supply. Increased monitoring of certain constituents in these private supplies may indicate serious concerns. Many of these systems may become abandoned or will need to connect to a municipal supply or water district for at least drinking, cooking, and bathing purposes. These connections will increase the length of transmission lines and coincidental loss due to leakage.

Probably the single most beneficial effort the State of Illinois could make toward drought preparedness has to do with ensuring the adequacy of public water supply systems. This will require the funding for adequate data collection and system analyses as discussed as a recommendation. Without knowledge of the systems which are at-risk and the capacity levels of those systems, conservation measures are not necessarily too little but would probably be too late. When the next big drought comes, the State may be scurrying to find the needed material supplies, manpower, and

water to assist communities truly in need. This will probably result in a declaration of a drought emergency and funding may be made available to provide for emergency water supplies. The responsiveness of the DRTF and the resources of the State will be able to provide the means to assist the communities in need. However, there may be a big cost involved. Do the cost benefits involved in analyzing the ability of public water supply systems to meet demand exceed the costs that the State would save (in not having to provide emergency relief) with communities which took proper action based on these analyses? How should the State address systems which are determined to not have an adequate water supply based on these analyses? What level is adequate? Does some form of a cost share grant program make sense for the State to execute, in providing assistance to communities for system analyses, drought preparedness plans, or in preparation of plans to construct or modify facilities in order to provide an adequate water supply?

The opportunity to make some beneficial changes toward drought preparedness appears to be at-hand. The drought is still somewhat fresh in our mind. There is the momentum of the national drought policy, the findings and discussions of an excellent water supply conference, and the Governor's decision to form a Water Resources Advisory Committee. During the drought of 1988-1990, the practices of recycling and mulching of grass clippings were in their infancy. Today, these practices have become commonplace. Though Illinois is a water-rich state and water is a renewable resource, there is a finite usable amount in any period of time. As the population grows, we should expect for now, that the water supply demand will increase and the recreational demand placed on those water resources will also increase. We also must consider the environmental demand and the protection of biotic life during these stressed drought periods.

Within these given constraints, it would be reasonable to expect that water conservation may become a more accepted practice in Illinois. It may not be surprising to see that dormant summer lawns and less water dependent landscapes become the accepted practice in cities and towns. It may also be reasonable to expect that water rates will go up with the increasing monitoring and treatment requirements. As rates go up, better conservation technologies and practices will develop.

We will have water to drink. The means, price, effort, and consequences in getting that water are somewhat controllable. Better drought preparedness does come at a cost. While the State can possibly provide technical assistance and emergency drought planning, the communities must have the willingness and desire to understand the limitations of their systems, to follow their emergency management plans, and to provide the funding as necessary to ensure an adequate water supply.

Upcoming Activities

The Midwest Technology Assistance Center for Small Public Water Systems (MTAC) has developed a Technical Needs Assessment form that was forwarded to small systems in the Midwest, defined as serving populations less than 3300. MTAC is currently in the process of producing a report which will summarize the results of the roughly 200 responses they have received. In addition, MTAC contracted the Illinois Section, American Water Works Association (AWWA), to prepare a guide to aid small community water systems in the development of an emergency response plan. This guide is entitled *Public Water System Emergency Planning Interactive Guide* and is available on CD. An interactive, web-based version of this guide along with the Technical Needs Assessment Report will be available on the MTAC web site (<http://mtac.sws.uiuc.edu/>).

On November 13 and 14, 2000, the Illinois Water Resources Center and conference sponsors held a conference in Urbana entitled *Illinois Water 2000*. The agenda for the conference included drought response and water conservation topics, present and future lake management issues along with a variety of other technical and educational water resource related issues. Keynote speakers for the conference included Lieutenant Governor Corrine Wood and Don Wilhite, Director of the National Drought Mitigation Center from the University of Nebraska-Lincoln.

The review of this report was discussed at the November 8, 2000 SWPTF meeting. Director Vonnahme had asked that the DRTF members submit suggestions or comment with respect to addressing the "Meeting Comments and Proposals" section of this report, as cited on page 23, or other recommendations with respect to how the State can provide better drought preparedness. These comments will be provided and discussed at the next SWPTF meeting.

1999-2000 DROUGHT

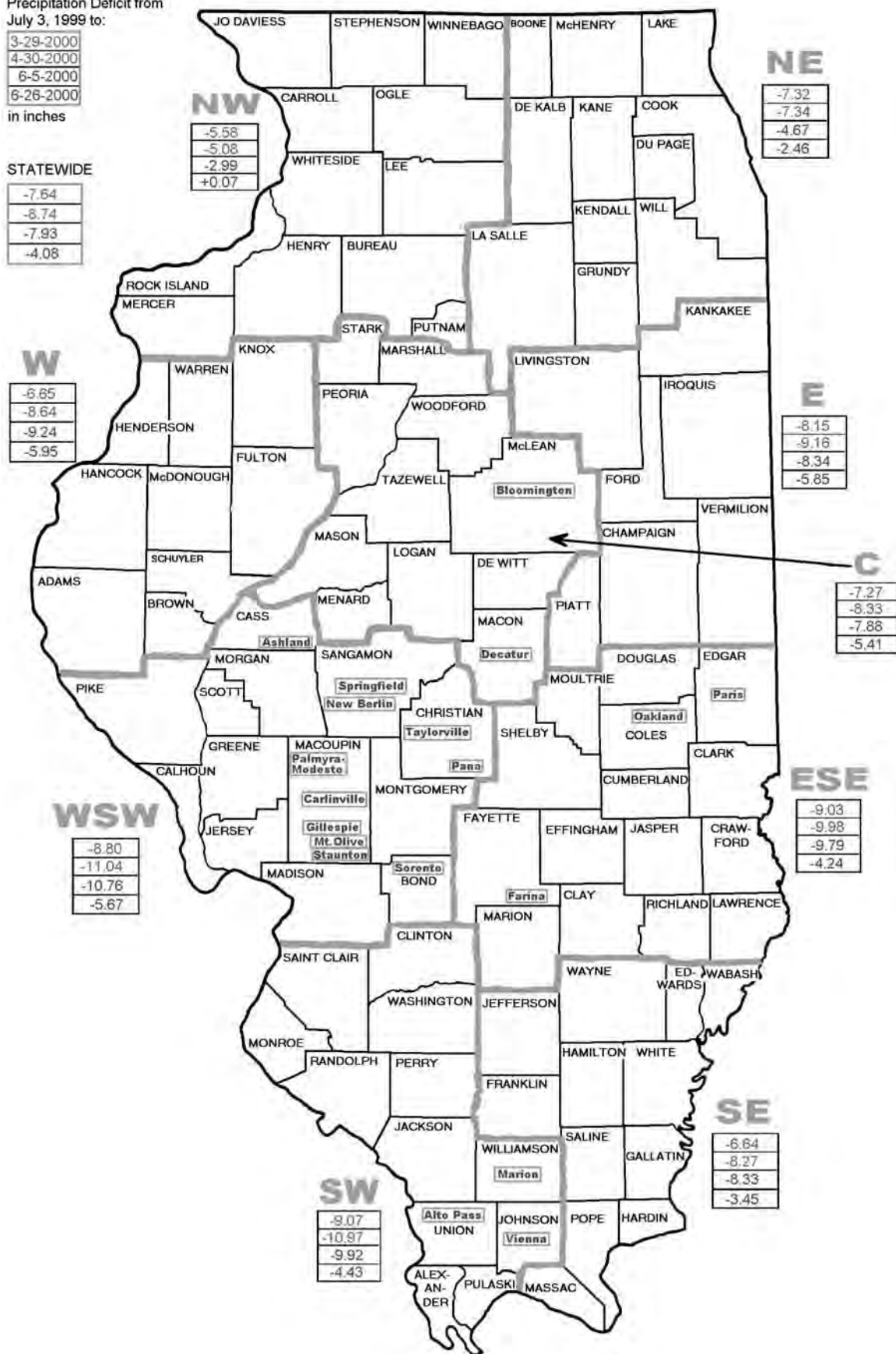
By Crop Reporting District
Precipitation Deficit from
July 3, 1999 to:

- 3-29-2000
- 4-30-2000
- 6-5-2000
- 6-26-2000

in inches

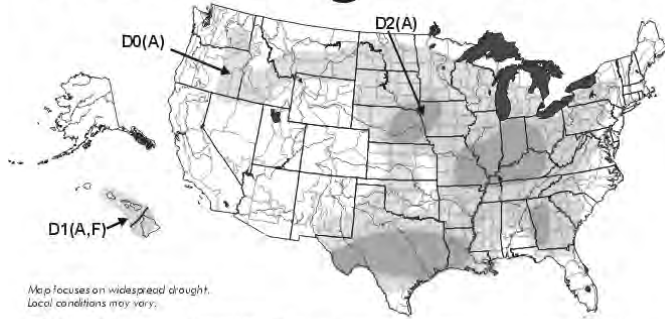
STATEWIDE

- 7.64
- 8.74
- 7.93
- 4.08



November 30, 1999 Valid 7 a.m. EST

U.S. Drought Monitor



Map focuses on widespread drought. Local conditions may vary.

D0 Abnormally Dry
 D1 Drought-First Stage
 D2 Drought-Severe
 D3 Drought-Extreme
 D4 Drought-Exceptional
 Delimits Overlapping Areas

Drought type: used only when impacts differ
 A = Agriculture
 W = Water
 F = Wildfire danger



Plus (+) = Forecast to intensify next two weeks
 Minus (-) = Forecast to diminish next two weeks
 No sign = No change in drought classification forecast

Released Thursday, Dec. 2, 1999

January 25, 2000 Valid 7 a.m. EST

U.S. Drought Monitor



Map focuses on widespread drought. Local conditions may vary.

D0 Abnormally Dry
 D1 Drought-First Stage
 D2 Drought-Severe
 D3 Drought-Extreme
 D4 Drought-Exceptional
 Delimits Overlapping Areas

Drought type: used only when impacts differ
 A = Agriculture
 W = Water
 F = Wildfire danger



Plus (+) = Forecast to intensify next two weeks
 Minus (-) = Forecast to diminish next two weeks
 No sign = No change in drought classification forecast

Released Thursday, Jan. 27, 2000

March 28, 2000 Valid 7 a.m. EST

U.S. Drought Monitor



Map focuses on widespread drought. Local conditions may vary.

D0 Abnormally Dry
 D1 Drought-First Stage
 D2 Drought-Severe
 D3 Drought-Extreme
 D4 Drought-Exceptional
 Delimits Overlapping Areas

Drought type: used only when impacts differ
 A = Agriculture
 W = Water
 F = Wildfire danger

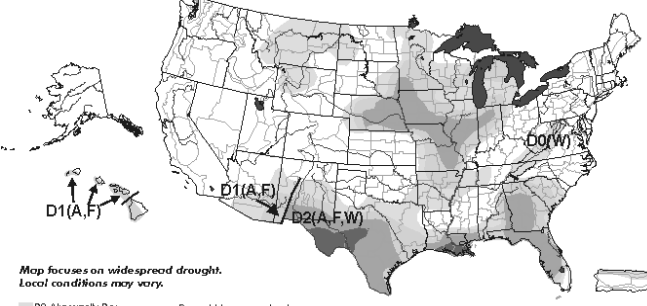


Plus (+) = Forecast to intensify next two weeks
 Minus (-) = Forecast to diminish next two weeks
 No sign = No change in drought classification forecast

Released Thursday, March 30, 2000

April 25, 2000 Valid 7 a.m. EST

U.S. Drought Monitor



Map focuses on widespread drought. Local conditions may vary.

D0 Abnormally Dry
 D1 Drought-First Stage
 D2 Drought-Severe
 D3 Drought-Extreme
 D4 Drought-Exceptional
 Delimits Overlapping Areas

Drought type: used only when impacts differ
 A = Agriculture
 W = Water
 F = Wildfire danger

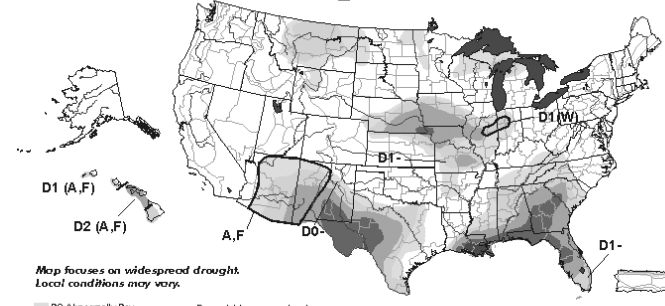


Plus (+) = Forecast to intensify next two weeks
 Minus (-) = Forecast to diminish next two weeks
 No sign = No change in drought classification forecast

Released Thursday, April 27, 2000

May 30, 2000 Valid 7 a.m. EST

U.S. Drought Monitor



Map focuses on widespread drought. Local conditions may vary.

D0 Abnormally Dry
 D1 Drought-First Stage
 D2 Drought-Severe
 D3 Drought-Extreme
 D4 Drought-Exceptional
 Delimits Overlapping Areas

Drought type: used only when impacts differ
 A = Agriculture
 W = Water
 F = Wildfire danger

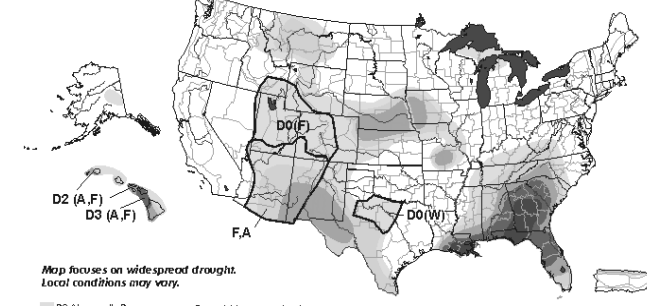


Plus (+) = Forecast to intensify next two weeks
 Minus (-) = Forecast to diminish next two weeks
 No sign = No change in drought classification forecast

Released Thursday, June 1, 2000

June 27, 2000 Valid 7 a.m. EST

U.S. Drought Monitor



Map focuses on widespread drought. Local conditions may vary.

D0 Abnormally Dry
 D1 Drought-First Stage
 D2 Drought-Severe
 D3 Drought-Extreme
 D4 Drought-Exceptional
 Delimits Overlapping Areas

Drought type: used only when impacts differ
 A = Agriculture
 W = Water
 F = Wildfire danger



See accompanying text summary for forecast statements

Released Thursday, June 29, 2000

**Drought Task Force Assignment
Emergency Powers During Drought Conditions
June 16, 2000**

Authority of The DNR - Office of Water Resources Relating to Drought Emergencies

The main regulatory responsibilities and authorities of the DNR-Office of Water Resources are covered under the Rivers, Lakes, and Streams Act (615 ILCS 5/4.9 et seq.) Section 5/8 "Complaint - Hearings" and Section 5/9 "Complaints as to Navigation" authorize the department to conduct hearings and issue orders concerning complaints, invasions and encroachments to any rights of the state or its citizens with respect to any public bodies of water. This authority could be used during a drought event to resolve water use disputes between interested parties and impacted user groups.

Since this authority applies only to public waters, it is limited to just 8% of the State's major rivers. These rivers include the Illinois, Fox, Kankakee, Rock, Sangamon, Peconica, Sugar, Wabash and portions of the Sanagamon, Kaskaskia, Big Muddy, Saline, Little Wabash, Spoon, Vermillion and limited reaches of others. See 17 Ill. Adm. Code Ch. I, Sec. 3704. Appendix A "Public Bodies of Water" for a complete listing of public waters.

Need for Expanded Emergency Powers/Drought Management

The issue of drought response and management was reviewed extensively by the State Water Plan Task Force in 1983. The recommendations of the Water Plan Task Force for drought response have been followed by the State through the activation of the interagency Drought Response Task Force. Two activities in 1996 also reviewed the State's response to drought emergencies. The Global Climate Change Task Force published recommendations in January of 1996, which were updated in February of 1999, and the C-2000 consultant on water quantity issues published recommendations in July of 1996. The following description of the drought response and management issue by the Global Climate Change Task Force in their 1996 report summarizes current concerns regarding the need for improved state response.

"Water supplies in Illinois are controlled by thousands of independent public water supply entities. There is no statutory authority for any state agency to intervene in disputes between those entities when conflicts arise over limited water resources. Thus, Illinois courts are called upon to settle disputes on piecemeal basis, with inadequate rules of law to guide them, often leading to undesirable outcomes. In recent years, the governor has activated the drought response task force as needed to settle conflicts during drought. Lacking regulatory powers the task force relies on voluntary restrictions on users and arrangements between local water entities. These methods are useful and effective for moderate, short-term restrictions but insufficient in situations of chronic shortage. DNR's Division of Water Resources is best suited to settling water disputes. It has served as the lead state agency for water use administration allocating and regulating water supply from Lake Michigan through a permit system. It has also worked, statewide, in water supply planning and coordination of water supply users. State water law should be revised to give authority to the agency to settle water disputes. The Illinois Land and Water Use Task Force and the first Conservation Congress have already looked into this problem. Both concluded that the state does not have enough authority to deal with crises and that legislation is needed to fill the gap."

Options developed by the Water Plan Task Force

Option 1. Seek a directive from the Governor to the Department of Natural Resources to prepare a drought response plan that would become part of a "comprehensive plan and program for the emergency management of the State." (Source: Assessment of Illinois Water Quantity Law, July, 1996). Estimated

cost \$125,000.

Option 2. Seek legislation that would mandate advance planning for drought conditions. One sub-option is to do the planning at the state level. A second option is to supervise the planning at the state level but require it to be done at the local level. This approach could require such a plan within a given period of time and provide that if none is forthcoming, the state would do it. Under this type of legislation it would be determined in advance what emergency conservation measures would come into play, and what alternative sources, if any, of water supply are at hand. Furthermore, any necessary agreements or preconditions for tapping into the emergency supply could be entered into or taken care of in advance. (Source: Assessment of Illinois Water Quantity Law, July, 1996). Estimated cost \$500,000 for planning over three years.

Option 3. Develop appropriate legislation to deal with water emergencies. (Source: The Illinois Response to Climate Change, Report of the Task force on Global Climate Change, January, 1996 and Climate Change Developments: Kyoto and Beyond, February, 1999). This recommendation was expanded in the C-2000 "Assessment of Illinois Water Quantity Law" report which stated; "seek more comprehensive legislation that would give a state water management agency authority to (1) declare the existence of a drought, (2) issue conservation and anti-waste measures that would apply during the emergency, and (3) expedite the location of, and access to, additional temporary supplies during the emergency. The statute could authorize general regulatory measures that would apply at times other than emergencies for areas that experience frequent drought problems. Estimated cost \$150,000 to draft rules and prepare initial response plan and program.

Responses to Questions Raised at 5/30/00 State EOC (Emergency Operations Center) Liaison Meeting

Question (1.) What authorities are available to State agencies for use prior to and during a drought emergency? Can the State require more stringent water conservation programs, system interconnections, leak detection surveys, etc. when a community is reluctant to respond in a more timely or appropriate manner?

Response: See attached issue papers on drought authorities and 11/16/88 Drought Task Force Paper on mandates and emergency declarations. These issue papers indicate that the powers of State agencies to respond to drought emergencies, outside of a Governor's Emergency Declaration, are very limited and the authorities that do exist require time consuming administrative processes. Recent studies on needed improvements to the State's water law have clearly identified the need for clarified and expanded drought and emergency management powers.

Question (2.) What plans and programs need to be in place at this time?

Response: All water supply systems should have drought and emergency response plans. These plans should be reviewed and updated as needed. When a system's supplies appear limited as identified by the Drought Task Force "watch list," immediate communications must be initiated and maintained between local community officials, the water supply system operator, IEPA field staff and IEMA regional coordinator to monitor the drought situation and respond as necessary.

Question (3.) What programs are in place for regional coordinators to use and apply?

Response: None. Regional coordinators must work with each individual water supply system and its unique situation.

Question (4.) What is the policy regarding the trigger level for state involvement during a drought?

Response: An official policy for state involvement does not exist. This issue was previously addressed by the Drought Task Force in 1988. At that time the Task Force concluded that "any emergency declaration sought through IEMA 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 IEMA's capabilities or expertise."

Illinois Environmental Protection Agency

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276

MEMORANDUM

From: Roger D. Selburg, P.E., Manager, Division of Public Water Supplies
Phone: 217/785-8653 Fax: 217/782-0075 e-mail: epa3181@epa.state.il.us

Date: June 15, 2000

To: Don Vonnahme, Director, Office of Water Resources

Subject: Emergency Powers - Drought Conditions (June 6 meeting - info request)

Municipal and investor owned water supplies have authority to adopt an ordinance or to petition the ICC for a revised tariff that can limit or curtail water use or levy fines against individuals who fail to adhere to water use restriction advisories. The Illinois PCB regulations contain provisions regarding adequacy of the water supply as does the Environmental Protection Act. Agency design requirements provide for the demonstration of an adequate, long-term source of supply for new entities and when expansion of a water supply is proposed. Also, routine inspections of water supplies involve a review of the source adequacy and, if appropriate, can result in placement of the water supply on restricted status or critical review which will halt the expansion of the service area. The Agency has in fact taken this administrative action where groundwater supplies have failed to provide additional wells as needed.

Failure of a water supply to provide an adequate source of supply can also result in the filing of a law suit to compel the supply to provide an adequate source and possibly file for quicker response should a water supply refuse to take any actions. If restricted status or critical review has been an inadequate administrative remedy, the Agency has filed enforcement cases to compel the installation of additional wells. However, the Agency has not seen the need to file cases against surface water supplies because, to date, the surface water supplies have taken appropriate actions to preserve the adequacy of the surface water source.

On-set of a possible drought is considered by the Drought Committee when rain fall shortage is noted and Illinois State Water Survey is called upon to review state and regional precipitation patterns and other factors. If the analysis reveals that drought conditions may be possible, Agency Field Operations Staff start collecting information and advising water supply officials to start reviewing plans to contend with the possible water shortage situations. Officials are advised as early as possible of pending drought conditions and they are expected to start revising or possibly prepare to implement conservation programs and reviewing alternative water supply sources. Exact timing for implementation is a judgement call and depends upon a multitude of factors such as: availability of an alternative source; success of conservation programs; actual vs. predicted rain/temperature; stream flow and groundwater conditions; availability of equipment needed for response; and other factors. Time required to implement alternative supply plans would also be considered; however, this too is quite variable and situation specific.

Authority of the Illinois Department of Public Health Regarding Drought Situations

Under the authority of the Illinois Groundwater Protection Act, the Illinois Department of Public Health regulates all private, semi-private and non-community water systems. The location and construction of these water systems are in accordance with up to date industry and sanitary standards and are regulated through the Illinois Water Well and Pump Installation contractor's License Act, the Illinois Water Well Construction Code Law and the Illinois Water Well Pump Installation Code Law.

Semi-private water systems are not public water systems but provide water to a segment of the public other than an owner occupied single family dwelling. Examples include business and rental property with less than 25 persons. Restrooms made accessible to the public must be supplied with potable water under this rule. A non-community water system supplies water to a non-residential population of 25 or more persons for at least 60 days per year. The source of all semi-private and non-community water supplies, when made accessible to the public are subject to the Public Area Sanitary Practice Code and the Drinking Water Systems Code. The above laws do not restrict the amount water that can be used.

When a drought occurs, it may affect only a part of the state. Further, areas of the state with limited water supplies may be more severely affected as opposed to areas with more abundant water supplies. Most of the counties in Illinois have water supplies ordinances. If water use has to be restricted, it could be accomplished more effectively on a local basis. When a severe drought occurs, these counties could amend their ordinances to restrict the use of water. Municipalities could do the same through their own ordinances. Springfield has such an ordinance in place at this time to restrict water use during the current drought.

There needs to be a emergency planning committee assembled to start looking at a response plan for a community if a water supply is lost. The response plan should be activated as only in the worst case scenario. The measures to implement must be planned well in advance to the loss of a water supply. Committee members should include at a minimum: IEMA, IDPH, IEPA, ING (National Guard), ISP, IDOT, IDNR, and the Governor's Office.

STATE OF ILLINOIS
DROUGHT TASK FORCE POLICY ON
MANDATING WATER CONSERVATION AND EMERGENCY DECLARATIONS

Introduction

The State of Illinois standing Drought Task Force is an interagency drought response committee that was first organized by the Governor in 1976. In 1983, the State Water Plan Task Force published a report which detailed a number of recommendations which comprise the State's drought response framework. This report was entitled "Drought Contingency Planning, Special Report No. 3 of the Illinois State Water Plan Task Force." The drought response framework discussed in this report states that "If the drought is considered to be of a serious nature by the Drought Task Force, a disaster declaration can be sought from the Governor."

Drought Status and Response

Since June of 1988, the Drought Task Force has monitored the drought status on a weekly basis and continues to reassess the need for the State to respond to changing conditions or encourage appropriate responses by various other officials and groups. Of special concern to the Drought Task Force is whether the public water supply systems within the State will be able to maintain a viable supply of water through the months of October, November and December which are normally months of low precipitation, and whether these systems will be able to remain viable if the drought continues through the Spring of 1989. In response to these concerns the Drought Task Force has posed two questions. One question is "Whether the State should mandate that water conservation measures be undertaken by a community?" The second question is "How and when would the Drought Task Force recommend a disaster declaration from the Governor?"

Mandatory Water Conservation

The basic issue before the Drought Task Force is 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 Drought Task Force 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 Drought Task Force 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 Drought Task Force 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.

Disaster Declaration

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

The Drought Task Force and its member agencies must continue to closely monitor the activities of all units of local government and be 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.