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2007

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8/1/06

AGENDA
ARKANSAS-OKLAHOMA ARKANSAS RIVER
COMPACT COMMISSION
ANNUAL MEETING

September 13, 2007
9:00 a.m.
Arkansas Oil and Gas Commission
Hearing Chamber, Second Floor
3309 Phoenix Avenue, Fort Smith, Arkansas

A. **Call to Order**
B. **Introductions and Announcements**
C. **Approval of Agenda**
D. **Consideration and Approval of Meeting Minutes of September 28, 2006 Annual Meeting**
E. **Report of the Chairman** –Dick Seybolt, Federal Commissioner
F. **Report of the Treasurer** – Earl Smith, Arkansas
G. **Report of the Commissioners**
1. Arkansas
2. Oklahoma

H. **Committee Reports**
1. Budget Committee, Lou Klaver, Chair
2. Engineering Committee, Lou Klaver, Chair
3. Environmental and Natural Resources, Derek Smithee, Chair
4. Legal Committee, Dean Couch, Chair

I. **Unfinished Business**
J. **New Business**
1. Appointments/Assignments to Committees and Selection of Chairs
   a. Budget Committee
   b. Engineering Committee
   c. Environmental and Natural Resources Committee
   d. Legal Committee
2. Election of Officers (Secretary and Treasurer)
3. 2008 Annual Meeting

K. **Federal and State Government Representative Reports**
L. **Public Comment**
M. **Adjournment**

Minutes of the
ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION
Regular Meeting

September 13, 2007
9:00 a.m.
Arkansas Oil and Gas Commission
Hearing Chamber, Second Floor
3309 Phoenix Avenue, Fort Smith, Arkansas

A. CALL TO ORDER

Federal Commissioner and Chairman Dick Seybolt welcomed all in attendance to Fort Smith, Arkansas. Chairman Seybolt called the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) to order at 9:00 a.m. on September 13, 2007, in the hearing chamber of the Arkansas Oil and Gas Commission, in Fort Smith, Arkansas.

B. INTRODUCTIONS

Commission members in attendance were Richard C. Seybolt, Federal Commissioner and Chairman; Oklahoma Commissioners Duane Smith, and Miles Tolbert; and Arkansas Commissioners Randy Young, and Mike Carter. Commissioner Gary Sherrer, Oklahoma, and Commissioner Scott Campbell, Arkansas, were absent. Chairman Seybolt asked for those in attendance to make self-introductions (Attachment A.).

Chairman Seybolt recognized a quorum of Commissioners present, and asked if there were any announcements. Being none, the Chairman proceeded with the agenda.

C. APPROVAL OF AGENDA

Chairman Seybolt asked for a motion to approve the agenda. There were no additions or deletions to the agenda. Commissioner Randy Young moved that the agenda be approved, and Commissioner Miles Tolbert seconded. The motion carried. (Attachment B.)

D. Consideration and Approval of Meeting Minutes of September 28, 2006, Annual Meeting.

Chairman Seybolt stated that the minutes of the September 28, 2008 Annual Meeting had been distributed. Commissioner Mike Carter moved to approve the minutes of the meeting.

Commissioner Miles Tolbert asked if the suggested changes made by Oklahoma had been made, and Commissioner Randy Young responded that the changes had been made. Commissioner Tolbert seconded the motion.

The motion carried.

E. REPORT OF THE CHAIRMAN

Chairman Seybolt said his report would be brief, due to circumstances that are holding up additional work by the Commission, and out of its care, custody, and control, and the Commission had not been able to proceed with many activities it was engaged in earlier, and so have not been able to do anything this year.

F. REPORT OF THE TREASURER

Mr. Earl Smith, Arkansas, stated the FY 07 Financial Report reflected income and expenses through June 30, 2007. He said there was a total income of $7,083.89, and expenses of $4,375.00, leaving a net gain of $2,708.89. He said the total bank account balance as of June 30, 2007, totaled $33,287.87.

Commissioner Randy Young moved to approve the Treasurer's Report, and Commissioner Miles Tolbert seconded. The motion was unanimously approved. (Attachment C.)

G. REPORT OF THE COMMISSIONERS

1. Arkansas

Commissioner Randy Young presented the report for the State of Arkansas. Commissioner Young submitted a written report, and highlighted some of the activities of the state during the past year, including the announcement that all projects under 319(h) of the Clean Water Act will have a monitoring component in the future. He named several projects of interest to the Commission regarding the Nonpoint Source Management Program, and he detailed the components of the Illinois River CREP proposal that has been submitted to Washington, D.C. for review and approval. He added the Northwest Arkansas Conservation Authority has proposed a $60 million dollar project with cooperative funding through the ANRCC, saving approximately $4.5 million

in costs of building the treatment plant by deferring the principal and interest payment. Commissioner Young concluded his report stating the State Legislature approved changes to the State Mitigation Banking Program, and also approved $300 million in general obligation bonds for the purposes of developing water resources and abating pollution within the state.

Commissioner Carter made additional comments regarding the general obligation bonding available for Oklahoma, noting the significance of the authority for the ANRCC. (Attachment D.)

2. Oklahoma

Commissioner Duane Smith presented a written report for the State of Oklahoma, and said Oklahoma would present a three-part report. He would make comments, Secretary of Environment Miles Tolbert would make comments, and Mr. Mike Thralls, Director of the Oklahoma Conservation Commission would also update the Commission on that agency's activities.

Mr. Smith highlighted several areas of interest. He brought the Commission up to date regarding the Oklahoma Comprehensive Water Planning effort that was initiated following an appropriation by the Oklahoma Legislature in 2006. He said that at the end of the day, the State wants to have a 50-year plan for every city and every rural water district in Oklahoma for obtaining water. The current status will be evaluated, add reasonable population projections in place and evaluate whether those needs can be met, and if not, how--both in terms of technical, financial, and environmental. He provided a schematic on the two-pronged approach: public participation and technical support. He explained the process for identifying issues by region of the state by conducting 42 public meetings to receive input from individual stakeholders, there will then be regional meetings to flesh out issues by region, and culminate with a Town Hall where selected persons across the state will come together to review the issues that have been put into the process, and make recommendations on water policy in Oklahoma.

Commissioner Carter asked if Oklahoma faced the same issues as Arkansas--groundwater in the west and surface water in the east? Commissioner Smith responded that primarily western Oklahoma is groundwater, and the largest groundwater user is irrigation; public use is primarily surface water. Supply is not as much a problem as distribution. He said there is a 38% increase in population growth projection. The percentage is much higher in northeast Oklahoma rather than other parts of the state. Other issues include, scenic rivers and meeting environmental and recreational needs, and water supply; population declines projected in some areas; and water resources financing.

Commissioner Smith reported that $2.9 million was loaned to the Town of Westville through the OWRB Financial Assistance Program, an example of a small community that has stepped up to the plate and upgraded its plant to have a discharge of .5 mg/l, (limit is 1.0 mg/l), which is difficult for small communities.

Commissioner Smith concluded his report announcing the 28th Annual Governor's Water Conference and Water Resources Research Institute Symposium will be held October 23-25, in Oklahoma City.

Commissioner Tolbert introduced Mr. Mike Thralls, Director of the Oklahoma Conservation Commission (OCC), who spoke about Non Point Source issues in northeastern Oklahoma. He distributed information on the Priority Watersheds Program and the Conservation Reserve Enhancement Program (CREP), and a PWP project entered into jointly with the Arkansas Natural Resources Commission, Beaty Creek Project.

Mr. Thralls informed the members the Nonpoint source management program in northeastern Oklahoma managed by the OCC has three prongs: monitoring, education, and implementation. There are 80 sites for monitoring on a rotating basin program in cooperation with the OWRB to determine where Nonpoint source impacts are developing. The Blue Thumb Program initiated in the early 1990s works both in the urban and rural areas to educate citizens on what Nonpoint source pollution is and what the sources are and how to then address the problems. There are several best management implementation programs and several are in the Arkansas River Basin. Mr. Thralls said a project in the Illinois River Basin at of cost of $3.7 million was initiated in 2000 with the first phase completed in 2005, and an additional program will be initiated with Clean Water Act 319 funding. He said the Spavinaw Creek watershed, which provides water for the City of Tulsa, has an ongoing project and he referred to the Beaty Creek information distributed which the result of that program now shows a 31% reduction in the level of phosphorous loading over what would have been without the installation of Best Management Practices. He also noted the Honey Creek watershed project in the Grand River watershed, the CREP program in the Illinois River watershed, the state's litter export program (moving litter from impacted to non-impacted watersheds), the state's litter tax credit program, and the NRCS litter export program in involving nutrient and non-nutrient watershed. He said there is a litter-to-energy program that is moving slowly, and construction on a building near Jay, Oklahoma, has begun. Mr. Thralls concluded his report with an update on flood control rehabilitation projects.

Commissioner Carter stated there are parts of the country-Arkansas and Oklahoma--that welcome large amounts of litter transport for agricultural purposes. He asked if any progress has been made in transporting large amounts. Mr. Thralls replied some progress has been made, but more is needed. Commissioner Carter said that is the solution to the problem, but additional funding is needed in both states. Mr. Thralls said that litter has been made available for what it can be used for, the problem with litter is that it is difficult to handle; its bulky and timing is an issue, as well as the challenge of spreading the litter. Commissioner Carter asked if the explosive issue is a factor, and Mr. Thralls said it is not.

Chairman Seybolt asked about an update on the research by the University of Arkansas regarding litter. Commissioner Young said there was a project on litter incineration as a heat source that is still on going, but litter is difficult to handle and research and development is needed.

There were no other comments, and Commissioner Smith concluded the report. (Attachment F.)

H. COMMITTEE REPORTS

1. Budget Committee

Ms. Lou Klaver, Oklahoma, Chair of the Budget Committee, advised the Commissioners that she and Mr. Earl Smith had reviewed the Commission budget. She said the Committee recommended the assessment to the states remain the same at $3,500 per state. The Committee asked that the Commission consider the balance in the checking account, and to place one-half the amount (one-half of $29,000) in a short-term CD until such time there is a project that determined a need.

There were no other questions, and the Commissioner Tolbert moved to approve the report, and Commissioner Young seconded. The motion carried unanimously. (Attachment G.)

2. Engineering Committee

Ms. Lou Klaver, Oklahoma, Chair of the Engineering Committee, informed the Commissioners that the Engineering Committee did not have an assignment so there is no report. However, an issue was raised recently prior to the Compact meeting with regard to Terrance Lamb's annual yield hydrologic data report for water year 2006. She said that something unique happened this past year, and information is found on page six of the report. The Committee has not had an opportunity to review the information, and recommended the Commission assign to the Committee to review the document and water use to determine why it appears there may be a deficiency in the state yield of the Arkansas subbasin. She said according to Mr. Lamb's report, flow was deficient across the Stateline on an annual basis. The Engineering Committee recommended the Legal Committee look at the provisions of the Compact and look at what was the cause, especially evaporation loses, etc.

Mr. Earl Smith, Arkansas Natural Resources Commission, stated to the Commission that in his memory this is the first time that any of the five subbasins violated the standard. He believed the report needed to be reviewed to determine what happened.

Commissioner Duane Smith moved to approve the Engineering Committee report, and Commissioner Randy Young seconded.

Commissioner Young commented that Mr. Lamb is present, and traveled from Florida, and he asked the Commission to allow Mr. Lamb a few minutes to comment about the report.

Mr. Terrance Lamb addressed the Commission and said it is simple to explain, there was a drought in the Arkansas River Basin in the 2006 Water Year at a time the large reservoirs evaporated water off, and a few cities used some of the water. He said

mainly evaporation is the biggest problem, and there was not enough water to fulfill the percentage that was supposed to come across the state line into Arkansas, in the main stem of the Arkansas River. Mr. Lamb explained the mean annual flow levels in the basin and said this is the first time since he has been compiling the report beginning in 1973 that this has occurred. (Mr. Lamb's report, "Annual Yield and Selected Hydrologic Data for the Arkansas River Basin Compact, Arkansas-Oklahoma, 2006 Water Year" is Attachment "G.")

Commissioner Smith asked why Mr. Lamb used cfs (cubic feet per second) as the measurement rather than "acre feet per year." Mr. Lamb answered the USGS collects much of the data and that is its measurement for water; the agricultural community refers to acre-feet. He said that wherever possible, he tried to show both figures. Commissioner Smith referred to the computation of annual yield, (page 6) and in the Arkansas River there is noted the actual runoff from subbasins as 213 cfs, and he asked if the annual amount is converted to cfs? Mr. Lamb said the monthly flows are averaged so that the average flow for the year is 213 cfs at Fort Smith. Some months it was more, other months it was less. Commissioner Smith said the Compact does not talk about a monthly average, but an annual yield.

Mr. Lamb explained the method for the Compact computations is to collect the data from the stream flow sites in the Compact area, and then it is adjusted for what the flow would have been if it not affected by people, and that is the annual yield that would occur. He said then the percent of depletion allowed by the Compact is then applied to the annual yield, not the flow.

Commissioner Smith asked again about the measurement of cfs. Mr. Lamb responded that the depletions caused in major reservoirs, found in table three on page 9, are done in both cfs and acre-feet, and traditionally, the main annual yield tables are done in cfs, and that can be converted to acre-feet easily. Commissioner Tolbert asked the formula for converting cfs to acre-feet; Commissioner Young answered that 1 cfs for a year is 724 acre-feet. Mr. Lamb said the amounts are taken from the actual gage site, then converted to the actual physical or political boundaries according to subbasin, because there are no gages at the state line, and so is adjusted to be at the lines.

Commissioner Smith asked if the 47% deficiency (shown in Table 1, page 6) is that on a daily basis? Mr. Lamb said that is an average of 47 cfs for the year. The annual yield would've been 651 cfs, but it was on 213 cfs, so the percentage is taken from the annual yield and subtracted from the actual flow. There is water flowing all the time, but in the 2006 Water Year, there was a lot less.

Mr. Earl Smith stated that the annual yield on the table is expressed in rates, and can easily be expressed in volumes, using the appropriate conversion factor. Mr. Lamb said that some people think in cfs, and others think in acre-feet, and he understood and will include that in the report in the future.

Commissioner Smith said he is more concerned with how the outflows are calculated in volumes.....and he read from the Compact, "although allocations are based on annual yield, to be determined by December 31, of each year, the current records will be required in the event Article 5.e., need to be met...." He said the Compact itself has general ideas of how to calculate, which is what has been done over the years, and

this is the first time we've had that. Listening in on the Engineering Committee discussion yesterday, it is appropriate to go back and review how those numbers are put in the report, and make sure everyone concurs on the calculations and the numbers, and in the event Oklahoma is deficient on the Compact, it needs to take action to be in compliance.

Mr. Lamb noted the definition of "annual yield" as included in the report on page three. Commissioner Carter said he was looking at the current flows reported by the USGS (not in the 2006 Water Year Report) at various locations, and noted the majority of all of them are below the 50-year average. And he asked if Mr. Lamb would consider 2006 an aberration, part of the long-term trend that could create difficulties? Mr. Lamb answered that based upon his 40-plus years experience in hydrology, its an aberration; based on the knowledge he has obtained the last few years, he wasn't sure. Commissioner Smith added that one of the issues is that the last five years there has been a drought cycle, and the previous 20-plus years have been the longest, wettest period in history, and we are used to it not being a problem. The last five years in some cases, and in particular in the basin, have been the worst 365 days, or worst drought of record. He said that he suspected that with the lake levels substantially below normal when runoff does come, the Corps of Engineers has a management policy on those reservoirs that the states don't control, and as the reservoirs levels are brought to the top of the conservation pool, that could have an impact on the total flow coming versus the flow going out. He wants everyone to understand the numbers, and suggested talking to the Corps.

Commissioner Carter said that his point is that the reservoirs were noticeably lower the last year, and he wondered if that is a source of concern, and Mr. Lamb says maybe yes, maybe, no. Commissioner Smith said that if there were a 20-year drought, like there has been a 20-year wet cycle, it would be a concern. Commissioner Carter responded he agreed about the wet and dry cycles, and it has been noticed the phosphorous levels have been decreasing the last several years, so maybe all the phosphorous levels that were calculated during those period, maybe they should be re-evaluated.

Chairman Seybolt stated for clarification that if measurements at Fort Smith of the flow of the Arkansas River are only measuring the inflows through the Compact, what affect does Lake Keystone have? Mr. Lamb responded Keystone is upstream, and he does take the year-end contents and subtract it from the prior year beginning contents, and the second column (page 9) indicates a change in content. And, then take into account precipitation and evaporation, which is a lot on a big lake, and the diversions were larger because it was a dryer year. Mainly, its because there wasn't enough rain. Commissioner Young said the states needed to be planning for that.

Mr. Earl Smith added that appendix adopted by the Compact years ago indicates precisely how to calculate annual yield, and the Engineering Committee could review that and report to the Commission, with the understanding this is the first time this has occurred and the process needs to be reviewed. Mr. Lamb said it should be remembered the Compact is a political document, it is not straightforward, so depletions are positive numbers and accretions are negative numbers.

Commissioner Carter asked if there had been a motion; Commissioner Smith said he moved to approve the Engineering Committee report, and when the Commission reviews committee assignments; the review of the data will be assigned to the Engineering Committee.

Chairman Seybolt said there was a second to the motion, and he asked if there was any other discussion. There was no other discussion, and the Chairman called for the question. The motion was unanimously approved.

3. Environmental and Natural Resources Committee

Mr. Derek Smithee, Oklahoma, Chairman of the Environmental and Natural Resources Committee, stated that the Committee met the previous afternoon and was well attended with good discussion. He said there are three presentations to be made to the Commission today. Mr. Steve Loop will present the Arkansas report, Mr. Monty Porter will present the Oklahoma report, and Dr. Nelson will do a presentation on his work looking at water quality in the watershed.

Mr. Loop addressed the Commission and said there was a discussion at the Committee about the Compact process and that in 1993 the 40% reduction goal was set to look at annual loads based on flow and concentrations, and then computed the rolling five-year average and determined the value. The Arkansas stations continued trends that are typical over the past several Compact meetings. Reductions have been seen, and the target value was achieved on three of the four stations and is in the 40-60% range, with Barren Fork as the cleanest and the Illinois River; however, there is some trouble with Sager Creek. He suspected that primarily the concentrations are driving the increases in loadings along Sager Creek, and probably the wastewater treatment plants from the city of Siloam Springs and there have been efforts made to address the problem, and is on track with the Arkansas Department of Environmental Quality (ADEQ) process. He expected a significant change in Sager Creek after 2009. The trends in the values seem to be driven by flow, as 2003 and 2006 were low-flow years and there have been significant reductions in concentrations also.

Commissioner Tolbert said it would be interesting to see how the hydrologic cycle changes over time, and hopefully a wetter period in the future but interesting to see if the gains are flow driven or long-term progress, but its nice to see numbers decreasing. Commissioner Carter asked if the difference of the trends in reductions regarding Sager Creek could be a point source? Mr. Earl Smith responded that is the only thing different in the basin, and Commissioner Carter asked if the Environmental Committee should look at whether that is the source of the problem? Commissioner Tolbert said it would be worth investigating, but it is his sense there is fairly good consensus of that.

Mr. Monty Porter presented Oklahoma's report. He used a PowerPoint as an informational presentation, and there is also a three-ring binder containing the Environmental Committee Report that includes Oklahoma's information on the State's Beneficial Use Monitoring Program, and a special section that includes the Compact waters. He noted introductory portions of the report that reference water quality trends

and mean annual discharges, BUMP, streams/rivers, lakes/reservoirs, and impaired waters list (303d list), water quality standard revisions relative to the Compact area, phosphorous loading report (illustrated by a PowerPoint presentation), funding provided by the OWRB Financial Assistance Program, permits issued for water rights in the watershed, and information on the watershed (CREP) program operated by the Oklahoma Conservation Commission.

Mr. Porter said there are four stations in Oklahoma that are reviewed located at the Barren Fork at Eldon, Illinois River at Tahlequah, Illinois River at Watts, and Flint Creek near Kansas. The .037 total phosphorous criterion was promulgated by the OWRB several years ago, Mr. Porter said, and the table in the report indicates none of those sites are supporting the criterion as yet. Other notable waters in the Compact area are also included in the report: Spavinaw, Eucha, and Wister Lake.

Mr. Porter reviewed the phosphorous loading report for the basin. Generally, the numbers have decreased over the 5-year cycle for all sites. He directed the Commission to Table 1. indicating all stations but Flint Creek near Kansas show a significant downward trend in total phosphorus concentrations when only lower flow data are analyzed. Conversely, the Kansas data demonstrate a significant upward trend in total phosphorus concentration. He said that of particular note is that the site at Flint Creek near Kansas is below Sager Creek confluence.

Mr. Porter talked about the calculation of water quality trends at different flow regimes at all four sites. All data since 2003 has been reviewed, separated high flow and lower flow data at 1999 (when USGS began collection of target high flow samples in the area), and then trends are calculated on the raw data on the full adjustment data. This year, calculation trends on all data have been included in the report (1999-2006). The Illinois River at Watts continues to trend downward, an upward trend at the Illinois River near Tahlequah '93-'99 but downward since 1999, Flint Creek at Kansas trend was upward no matter how the data was partitioned, and the Barren Fork at Eldon is somewhat like Tahlequah as in the whole period of record its trend was upward but had gone downward since 1999.

A new component of the report is the discussion of mean annual discharges, and he noted the red line in Figure 1. and Figure 2. (in that section) that represents the median of those discharges (flows) to establish a reference point. From 2003-2006, flows have been below the median mean annual discharge, and near the driest over the 20-year period of record, which he asserted was one of the primary causes of load reduction, and reduced trends. The site at Sager Creek is included in the report and shows high phosphorous.

Commissioner Carter asked about seasonal correlation and Mr. Porter said the Kendall slope estimator adjusts for the season; it's a non--parametric test. Commissioner Smith asked about the graphs that indicated the 20% reduction is being met, and that affected the 5-year rolling average, minimizing the high flow loads, and in the sampling that was not captured. With any trend analysis we need to understand how the data is collected. Mr. Porter said there is some high flow data, but it was lucky that is was collected, and a flow separation model was used to determined if it was a low flow or not. Commissioner Smith asked if a base flow number has been established

for those creeks, and Mr. Porter said that is a moving target, base flow moves depending upon the season and established over a period of time. Commissioner Smith said a number of factors influence the loading besides just a high flow reading, and is there any evaluation how that happens--i.e. intensity of rainfall or a rain event followed by a dry period and whether on the front or back side of the hydrograph when sampled, are those things all just averaged in? Mr. Porter said there are general rules but not standardized. Commissioner Smith said there are other pieces that have an impact that aren't understood very well.

Dr. Marc Nelson presented a report, "Illinois River 2006 Water Quality Assessment at the Arkansas Highway 59 Bridge." He said he had presented the report to the Committee on the previous day, and it is somewhat complicated, and he used mixed units i.e., kilograms and pounds, so he asked the Commission to pay close attention. The report is about phosphorous transport in the Illinois Watershed and Northwest Arkansas. There were a number of different monitoring sites, and he focused primarily on the Illinois River Bridge at HWY 59. Funds for the sites is provided by the Arkansas Natural Resources Commission through the 319 Program, as well as local stakeholders. The Moores Creek site has been funded by the USDA grant.

Dr. Nelson said all the sites were monitored with the same monitoring protocols except for the trigger level for the City of Rogers and part of the City of Bentonville because those are urban watersheds and quickly developing. Ballard Creek is almost an entirely agricultural watershed that drains into Oklahoma and Lake Frances, and is below the 59 Bridge monitoring site. Moores Creek is an FDA site and has been studied for about 20 years and is a mixed-use watershed. The Illinois River watershed site also looks at the comparison to the White River watershed which is basically the east one-half of the Arkansas drainage; the West Fork of the White River, the White River itself (before entering Beaver Lake), and the Kings River to Table Rock Lake

Dr. Nelson explained the sampling protocols using an automatic water sampler and U.S. Geological Survey gauging stations, measuring the depth of the water, the gauge develops rating curves at each site that converts the depth to flow so there is instantaneous flow and there is an annual discharge for each of the six sites. The sites collected information during baseflow and storm flow. From the discharge at the USGS stations, the loads are calculated for each 30-minute time period during the year.

The report contains information from the data collection of the sites since 1996, and Dr. Nelson focused on the information gathered in 2006 and compared it to the historical records. The data provides the loads transported during baseflows and during storm flows; as a fairly consistent average, the 3/4 of the phosphorous is transported during storm events and 1/4 during the baseflow, and regarding TSS, 98% is transported during storm events, and 2% during baseflow. And with nitrates, it's the opposite when more is transported during base flow.

Dr. Nelson discussed the data shown on page 8 regarding trends in discharge and annual loads of the Illinois River at 59 Bridge. The base flow loads increased over the 10-year period, and there is a correlation between discharge and base flow loads because the discharge does not vary more than a factor of 2, and is fairly consistent. The base flow loads correlate very closely with the amount of phosphorous discharged

by the wastewater treatment plants in the watershed. He said there is a relationship between how strong the storm events are, how tiny the storm event, whether there have been previous storm events, there are a lot of factors that go into determining how transport occurs as a result of those storm events, its not strictly flows, including the timing of the sampling which is extremely important. He discussed the partitioning of the phosphorous and what are the sources of the phosphorous, whether point source or non point source. He detailed how he calculated his estimation, and he stated his opinion is that base flow phosphorous is a result of point source because it is 56% of the discharge from the wastewater treatment plant, and 44% was measured in the storm flows. He said what happens is wastewater treatment plant phosphorus discharged to the river begins to flow down the river and is utilized by the different biological communities but it is not tied up permanently and it is used and then washed down during the next storm event, and absorbed in the sediment. Phosphorous taken up during base flow conditions, actually comes back out during storm flow conditions. It all ends up being moved down the river in approximately the same year.

Dr. Nelson said the rest of the point source phosphorous is not showing up in the base flow, its showing up in the storm flows. The remaining component of the base flow phosphorous is from the non point sources. In his opinion, Dr. Nelson said, if there were no point sources in the watershed there would be a background level of phosphorous; phosphorous comes from a variety of sources and the primary source in the Illinois River watershed, he believed, comes from sediment deposited during storm flows and are transported with those storms flows and dropped at the end of the storm, end up in the sediment and the original sediment that was there was scoured and moved downstream, so these are new sediments with phosphorous contained in the soil. There are other sources and based upon the watershed could be significant. He said then that he believed the phosphorous is partitioned during the base flow and storm flow between sources or non-point source and point source. He described the relationship for determining the partitioning of 56% phosphorous transported and 44% removed, by measuring the input of phosphorous to the watershed through point sources and non point sources and the outputs through base flow and storm flows.

Commissioner Tolbert asked if the animal inputs were treated as independent input, or was there an exception. Dr. Nelson said that was treated as independent inputs. He said he did not discuss accumulations in the watershed, and so that was taken out. The phosphorous from animals is taken from soil test phosphorous and is slightly different and so all inputs were all included and phosphorous was not removed from grazing. Commissioner Tolbert said then that over time the total phosphorous inputs are overstated because some of that pasture fertilizer is being counted twice; and Dr. Nelson said that it is.

J.D. Strong, Office of the Oklahoma Secretary of Environment asked if the animal input was estimated or actual measurement. Dr. Nelson said the Arkansas Agriculture department was contacted about how many broilers were produced and the percentage of pounds per litter produced per boiler was calculated--the true value varies. He said the application value is small, but what is significant is the accumulation in the watershed rather than how much is showing up at the 59 Bridge.

Dr. Nelson said the five-year study used to calculate 18,000 pounds of non point sources contributed and that number has remained constant, even though the point source contribution has dropped from 135,000 pounds to 30,000 pounds, so the total number during base flow has dropped significantly, but the non point source remains the same. He said that is significant because of the target value of .037 developed by Oklahoma -- he said he does not advocate nor states that is what the number should be at the state line--but he discussed scenarios of what that number means in terms of the numbers he has already presented. He said the .037 is equivalent to 9,000 kilograms of phosphorous in the Illinois River at the 59 Bridge. The non point source contribution is 8,000 kg, meaning the point sources are 1,100 kg; divided by the number of point sources (4) which equals 275 kg per year and at 6.5 mgd equals a discharge limit of 0.05 mg/l that would be required by point sources to achieve the .037 in each scenario. There are two sources of phosphorous in the river during base flow conditions point source and non point source and both have to be considered, not just one or the other. There has been a 50% reduction in the non point source equivalent to a .025 mg/l so to meet the 0.37, there needs to be a reduction in the point source and the non point source. It is difficult to reduce during base flow because what has accumulated over a year, is not what is applied in a year.

Dr. Nelson briefly reviewed the data from the other sites with the Commission. He said that across the board, the load is down; highly correlated to the discharge of non point sources. The trends are down, particularly in the base flows and in the reduction of point sources.

Dr. Nelson briefly reviewed the data from the other sites with the Commission. He said that across the board, the load is down; highly correlated to discharge non point source is more difficult. The trends are down, particularly in the base flows and in the reduction of point sources.

Commissioner Carter asked if Dr. Nelson had an estimate as to how much phosphorous is being brought in as opposed to how much is going out each year? Dr. Nelson responded he looked at how much is deposited and another way is to look at how much is brought into the watershed, but those numbers are difficult to obtain from agriculture. Commissioner Smith asked about the number of stream flow concentration reduction to attain .037, and Dr. Nelson answered 8,000 kg should be reduced to 4,000 kg – or reduced by one-half – in order to attain .037. Commissioner Smith asked about the calculations done in a dry year and Dr. Nelson said in a drier year with less flow the same numbers would have a higher concentration, and realistically you cannot look at a dry year and compare, you must look at long term values. Commissioner Young asked if he had the ten-year data on sediment load trends, and Dr. Nelson answered he did not have the ten-year trends or averages on the sediment loads, but the sediment loads have been increasing. He said the data is available, though. Commissioner Smith asked if he knew why it was increasing, and Dr. Nelson answered because of development, with high levels of suspended solids transported, and phosphorous binding with sediment that settles into the bottom of the river.

Ms. Delia Hawks, Illinois River Partnership, spoke to the Commission about their public awareness efforts and education campaign.

There was no other discussion or presentations to the Commission. Commissioner Young moved to accept the report by the Environment and Natural Resources Committee, and Commissioner Tolbert seconded. The report was unanimously accepted. (Attachment H.)

4. Legal Committee

Mr. Ed Swaim, in the absence of the Chairman Dean Couch, Oklahoma, said to the Commissioners the Legal Committee did not have an assignment from the previous year. There was no action by the Commissioners in regard to the report by the Legal Committee.

I. UNFINISHED BUSINESS

There were no items of unfinished business brought before the Commission for consideration.

J. NEW BUSINESS

1. Appointments/Assignments to Committee and Selection of Chairs

Chairman Seybolt said the committees would remain the same as they are currently comprised:

a. Budget Committee – Earl Smith
b. Engineering Committee – Earl Smith
c. Environmental and Natural Resources Committee - Earl Smith
d. Legal Committee – Edward Swaim

2. Election of Officers (Secretary of Treasurer)

Chairman Seybolt said Earl Smith will continue to serve as Treasurer, and Laura Brown with the Arkansas Soil and Water Conservation Commission will serve as the 2008 Compact Commission Secretary.

Regarding New Business, Commissioner Young stated he and Commissioner Smith had discussed that Oklahoma will follow up on the annual yield on the Compact compliance report, looking into what Mr. Lamb reported, and come back to a report at the annual meeting next year on the significance of the yield from the Arkansas sub basin.

Chairman Seybolt said that as part of Commissioner Smith's motion to approve the Engineering Committee report was to assign to the Engineering Committee the review of the annual yield report and compact compliance. There were no other

Committee assignments. Commissioner Young stated it would be appropriate for the Legal Committee to meet jointly with the Engineering Committee as it reviews the compact compliance.

Commissioner Young moved to elect Laura Brown and Earl Smith of Arkansas to assume the offices of Secretary and Treasurer, respectively. Commissioner Carter seconded. The motion was unanimously approved.

3. 2008 Annual Meeting

The 2008 meeting is to be held the fourth Thursday in September, which will be September 25, 2008. Chairman Seybolt announced the meeting would be held Grand Lake, Oklahoma.

K. FEDERAL AND STATE GOVERNMENT REPRESENTATIVE REPORTS

1. Mr. Bob Blazs, United States Geological Survey, stated to the members that his purpose at the Compact meeting is to inform the Commissioners of flow information in the basin. He distributed copies of the streamgaging report, and highlighted the trends in stream flows for Water Year 2006. Commissioner Smith commented about the data regarding the flows and the compact computation of annual yield, and thought that should be discussed. Mr. Blazs all sites were about 30% of the average annual flows. Mr. Earl Smith addressed Commissioner Smith's question stating the gauges of the sites not in the Compact area are subtracted and the yield is the runoff of the Compact area. (Attachment I)

2. Mr. John Gage addressed the Commissioners and presented a Bureau of Reclamation Activity Report for the Oklahoma-Texas Area Office. He mentioned expansion work being done at Ft. Cobb Reservoir, and other planning program projects ongoing at Lake Thunderbird, Walnut and Lower Arkansas River Basins in Kansas, and the Water 2025 Grant Challenge Program. (Attachment J).

3. Mr. Ed Fite, Administrator, Oklahoma Scenic Rivers Commission, addressed the Commissioners and highlighted activities of the OSRC. He said the OSRC had received enormous support from the Oklahoma Office of the Secretary of Environment and the Oklahoma Conservation Commission, and there are now 14 active contracts totaling $625,000 to acquire 300 acres of riparian leases for a 30-year period along the Barren Fork and Illinois River, in Oklahoma. He said the OSRC has received gifted money from the poultry industry, and some of that will be used for leases with additional landowners. His also petitioned the Commission for support in establishing a permanent spelling for "Barren Fork.

Mr. Fite also thanked the Illinois River Partnership for its efforts in educating the public about issues involving the river.

There were no other reports by federal or state agencies.

L. PUBLIC COMMENT

There was no public comment. Commissioner Carter thanks Chairman Seybolt for his hospitality by providing dinner the evening prior to the meeting. He also complimented the Environmental Committee on its report. Commissioner Tolbert also thanked Commissioner Carter for the arrangements for the location of the dinner.

M. ADJOURNMENT

There being no further business, Federal Commissioner and Chairman Dick Seybolt thanked everyone for their attendance and adjourned the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission at 11:46 p.m., September 13, 2007.

Richard C. Seybolt
Federal Commissioner and Chairman

12/11/08
Date

Mary Schooley, 2007 Commission Secretary

Arkansas-Oklahoma Arkansas River Compact Commission
2007 Annual Meeting
September 13, 2007
Fort Smith, Arkansas

COMMISSIONERS:
Richard Seybolt, Chairman and Federal Commissioner
Mike Carter, Arkansas Commissioner
Randy Young, Arkansas Commissioner
Miles Tolbert, Oklahoma Commissioner
Duane Smith, Oklahoma Commissioner

ATTENDEES:

Dick Cassat, Arkansas Department of Environmental Quality, Little Rock, Arkansas
Ed Fite, Oklahoma Scenic Rivers Commission, Tahlequah, Oklahoma
Edward Swaim, Arkansas Natural Resources Commission, Little Rock, Arkansas
Steve Loop, Arkansas Natural Resources Commission, Little Rock, Arkansas
Tom Myers, City of Siloam Springs, Arkansas
Trevor Bowman, City of Siloam Springs, Arkansas
John Gage, U.S. Bureau of Reclamation, Oklahoma City, Oklahoma
Mary Leath, Arkansas Department of Environmental Quality, Little Rock, Arkansas
Teresa Marks, Arkansas Department of Environmental Quality, Little Rock, Arkansas
Steve Drown, Arkansas Department of Environmental Quality, Little Rock, Arkansas
Monty Porter, Oklahoma Water Resources Board, Oklahoma City, Oklahoma
B.G. Hendrix, Fort Smith, Arkansas
Jeff Quinn, AGFC, Mayflower, Arkansas
Stan Starling, Arkansas Department of Health-Engineering, Little Rock, Arkansas
Terry Lamb, HIS, Jacksonville Beach, Florida
Evan Teague, Arkansas Farm Bureau, Little Rock, Arkansas
K.C. Kraft, USDA Natural Resources Conservation SRNC, Stillwater, OK
Bob Blazs, US Geological Survey, Oklahoma City, Oklahoma
Peter Main, Southwestern Electric Power Co., Fayetteville, Arkansas
J.D. Strong, Oklahoma Secretary of Environment, Oklahoma City, Oklahoma
Mike Thralls, Oklahoma Conservation Commission, Oklahoma City, Oklahoma
Monty Porter, Oklahoma Water Resources Board, Oklahoma City, Oklahoma
Derek Smithee, Oklahoma Water Resources Board, Oklahoma City, Oklahoma
Mary Leath, Arkansas Department of Environmental Quality, Little Rock, Arkansas
Teresa Marks, Arkansas Department of Environmental Quality, Little Rock, Arkansas
Steve Drown, Arkansas Department of Environmental Quality, Little Rock, Arkansas
Reed Green, US Geological Survey, Arkansas
Lou Klaver, Oklahoma Water Resources Board, Oklahoma City, Oklahoma
Mary Schooley, Oklahoma Water Resources Board, Oklahoma City, Oklahoma

PLEASE WRITE CLEARLY AND FURNISH COMPLETE MAILING ADDRESS

ATTENDANCE

MEETING: **ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION ANNUAL MEETING**

LOCATION: Holiday Inn City Center, 700 Rogers Blvd, Fort Smith, AR

DATE: **September 13, 2007** **TIME: 9:00 a.m.**

NAME	MAILING ADDRESS /Email	REPRESENTING
Dick Cassat	5301 Northshore NLR AR	ADEQ
Ed Fite	PO Box 292 osrc@fullnet.net Tahlequah 74465	OSRC
EDWARD SWAIM	ANRC	ANRC
Steve Loop	ANRC	ANRC
Tom Myers	City of Siloam Springs	City
Trevor Bowman	P.O. Box 80 Siloam Springs AR 72761	City of Siloam Springs
John GAGE	OKLAHOMA City, OK	U.S.B.R.
Mary Leath Teresa Marks Steve Drown	5301 Northshore Dr North Little Rock, AR	ADEQ
Monty Porter	OWRB	OWRB
B.D. Hendrix	2215 ~~So~~ HO 7th Smith 72903	
Jeff Quinn	213 Hwy 89 South Mayflower, AR 72106	AGFC
Stan Starling	4815 W. Markham, Slot H-37 Little Rock, AR 72205	Ark Dept Health-Engineering
Terry Lamb	3458 Heron Dr. N. Jacksonville Beach, FL 32250	HIS

PLEASE WRITE CLEARLY AND FURNISH COMPLETE MAILING ADDRESS

ATTENDANCE

MEETING: **ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION ANNUAL MEETING**

LOCATION: Holiday Inn City Center, 700 Rogers Blvd, Fort Smith, AR

DATE: **September 13, 2007** **TIME: 9:00 a.m.**

NAME	MAILING ADDRESS /Email	REPRESENTING
EVAN TEAGUE	P.O. BOX 31, LITTLE ROCK, AR 72203 evan.teague@arfb.com	ARKANSAS FARM BUREAU IRWP
KC KRAFT (FOR GARY WILEY)	100 USDA, STE 206 STILLWATER, OK 74074	USDA - NATURAL RESOURCES CONSERVATION SRVC
Bob Blair	USGS - OK City	USGS
PETER MAIN	101 W. TOWNSHIP FAYETTEVILLE, AR 72703	SOUTHWESTERN ELECTRIC POWER CO.

Report of the Treasurer

Arkansas Oklahoma Arkansas River Compact Commission

September 13, 2007

The 2007 Year-end Financial Report covering July 1, 2006 through June 30, 2007 details income and expenses.

Total Income (FY 07)	$7,083.89
Total Expenses (FY 07)	$4,375.00
NET TOTAL	**$2,708.89**

Regions Bank Balance on June 30, 2007 totaled $33,287.87

Assessments for both states are current.

Income/Expense by Payee

7/1/2006 through 6/30/2007

8/17/2007

Payee	7/1/2006-12/31/2006	1/1/2007-6/30/2007	OVERALL TOTAL
INCOME			
Oklahoma Assessment 2006	0.00	3,500.00	3,500.00
Regions Bank	41.12	3,542.77	3,583.89
TOTAL INCOME	**41.12**	**7,042.77**	**7,083.89**
EXPENSES			
Johnson, Bunch & Associates	0.00	275.00	275.00
Shangri La Resort	500.00	0.00	500.00
Terrance Lamb	3,600.00	0.00	3,600.00
TOTAL EXPENSES	**4,100.00**	**275.00**	**4,375.00**
OVERALL TOTAL	**-4,058.88**	**6,767.77**	**2,708.89**

Register 7/1/06 - 6/30/07

Date	Num	Transaction	Payment	C	Deposit	Balance
7/31/2006	DEP	Regions Bank cat: Div Income memo: July 2006		R	7.56	30,586.54
8/31/2006	DEP	Regions Bank cat: Div Income memo: August 2006		R	7.56	30,594.10
9/11/2006	1128	Terrance Lamb cat: Yield Report memo: 2005	3,600.00	R		26,994.10
9/29/2006	DEP	Regions Bank cat: Div Income memo: Sept 2006		R	6.76	27,000.86
10/2/2006	1127	Shangri La Resort cat: Mtg. Expense memo: September 27, 2006	500.00	R		26,500.86
10/31/2006	DEP	Regions Bank cat: Div Income memo: Oct 2006		R	6.77	26,507.63
11/30/2006	DEP	Regions Bank cat: Div Income memo: Nov. 2006		R	6.34	26,513.97
12/29/2006	DEP	Regions Bank cat: Div Income memo: DEC. 2006		R	6.13	26,520.10
1/31/2007	DEP	Regions Bank cat: Div Income memo: January 2007		R	6.98	26,527.08
2/7/2007	DEP	Regions Bank cat: Arkansas Assessment 2006 memo: January 2007		R	3,500.00	30,027.08
2/9/2007	1129	Johnson, Bunch & Associates cat: Audit memo: 2004-2006	275.00	R		29,752.08
2/28/2007	DEP	Regions Bank cat: Div Income memo: February 2007		R	6.46	29,758.54
3/30/2007	DEP	Regions Bank cat: Div Income memo: March 2007		R	7.12	29,765.66
4/30/2007	DEP	Regions Bank cat: Div Income memo: April 2007		R	7.35	29,773.01
5/31/2007	DEP	Regions Bank cat: Div Income memo: May 2007		R	7.36	29,780.37
6/7/2007	DEP	Oklahoma Assessment 2006 cat: Div Income memo: June 2007		R	3,500.00	33,280.37
6/29/2007	DEP	Regions Bank cat: Div Income memo: June 2007		R	7.50	33,287.87

Arkansas River Compact Commission

ARKANSAS NATURAL RESOURCES COMMISSION
101 E. Capitol, Suite 350
Little Rock, Arkansas 72201
(501) 682-1611 (501) 683-3991 fax
www.anrc.arkansas.gov

OKLAHOMA WATER RESOURCES BOARD
3800 North Classen Blvd.
Oklahoma City, Oklahoma 73118
(405) 530-8800 (405) 530-8900 fax
www.owrb.state.ok.us

RECEIVED
FEB 09 2007
Oklahoma Water Resources Board

February 7, 2007

Ms. Lou Klaver
Oklahoma Water Resources Board
3800 North Classen Boulevard
Oklahoma City, Oklahoma 73118

Dear Lou:

As a member of the Budget Committee, please find enclosed your state's three copies of the Arkansas-Oklahoma Arkansas River Compact Commission's Statement of Cash Receipts and Disbursements for July 2004 – June 2005 and July 2005 through June 2006. Should you have any questions, please call me.

Sincerely,

Earl T. Smith, P. E.
Chief, Water Management Section

ETS/lab

cc: Richard Seybolt

Enclosures

RECEIVED
FEB 09 2007
Oklahoma Water Resources Board

ARKANSAS - OKLAHOMA
ARKANSAS RIVER COMPACT COMMISSION
Statement of Cash Receipts
and Disbursements
July 1, 2004 through June 30, 2005
and
July 1, 2005 through June 30, 2006

Johnson & Bunch, PA

Certified Public Accountants

P. O. Box 5665
Jacksonville, AR 72078

Phone (501) 982-1975

Fax (501) 982-8165

Arkansas - Oklahoma Arkansas River Compact Commission
Little Rock, Arkansas

We have audited the accompanying statement of cash receipts and disbursements of the Arkansas - Oklahoma Arkansas River Compact Commission for the period July 1, 2004 through June 30, 2005 and for the period July 1, 2005 through June 30, 2006. The financial statement is the responsibility of the commission's management. Our responsibility is to express an opinion on this financial statement based on our audit.

We conducted our audit in accordance with generally accepted auditing standards for cash basis statements. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

The commission's policy is to prepare its financial statements on the basis of cash receipts and disbursements; consequently, certain revenue and related assets are recognized when received rather than when earned, and certain expenses are recognized when paid rather than when the obligation is incurred. Accordingly, the accompanying financial statement is not intended to present results of operations in conformity with generally accepted accounting principles.

In our opinion, the financial statement referred to above presents fairly, in all material respects, the recorded cash transactions of the Arkansas - Oklahoma Arkansas River Compact Commission for the period ended June 30, 2005 and June 30, 2006 on the basis of accounting described in the preceding paragraph.

Johnson & Bunch, PA

Johnson & Bunch, PA
Certified Public Accounts
January 25, 2007

Arkansas - Oklahoma Arkansas River Compact Commission

Statements of Cash Receipts and Disbursements
For the Period July 1, 2004 through June 30, 2005
and
For the Period July 1, 2005 through June 30, 2006

Cash balance, Regions Bank, July 1, 2004	$ 26,018
Cash receipts	
Member assessments	7,000
Interest income	29
Total cash receipts	$ 7,029
Cash disbursements	
Accounting	275
Conference expense	299
Postage	30
Yield report	3,600
Total cash disbursements	$ 4,204
Cash balance, Regions Bank, June 30, 2005	$ 28,843
Cash receipts	
Member assessments	7,000
Interest income	78
Total cash receipts	$ 7,078
Cash disbursements	
Conference	100
Delivery expense	884
Printing & reproduction	758
Yield report	3,600
Total cash disbursements	$ 5,342
Cash balance, Regions Bank, June 30, 2006	$ 30,579

2007
Report of Arkansas Commissioners
To
Arkansas-Oklahoma Arkansas River Compact Commission

Nonpoint Source Management Program

The Arkansas Natural Resources Commission continues to utilize 319(h) program to fund supplemental water quality monitoring in the Illinois and Upper White River Watersheds. Starting in 2007 all NPS projects funded through the 319(h) program are required to have a monitoring component to quantify the benefits of the project. Projects of interest funded in 2007 include:

Implementing Best Management Practices in the West Fork of the White River (WFWR), Washington County; this project includes:

- Ranking of critical areas (based on NRCS criteria) within the West Fork watershed
- Developing farm plans with prescribed BMPs
- Providing financial assistance to implement BMPs and a
- Demonstration of the proper and effective implementation of BMPs

Implementation of Low Impact Development Best Management Practices to Remediate Sediment from Urban Development in Fayetteville; this project includes:

- Demonstrating load reduction of sediment from urban sources,
- Demonstrating through the implementation of LID technologies, a decrease in NPS pollution (sediment and peak flows) from urban sources.
- Technology transfer workshops where at least thirty local engineers and developers will be trained in use of LIID technologies and
- The development of municipal policies, based upon modeling and monitoring results, to protect streams from NPS impact from urban development.

Utilizing Water Treatment Residuals to Reduce Phosphorus Runoff from Biosolids; this project includes:

- Demonstrating the efficacy, cost-effectiveness, practicality and sustainability of treating biosolids (sewage sludge) with water treatment residuals (alum sludge)

Illinois River CREP

An Illinois River CREP proposal has been sent to Washington DC for review and approval. This program provides federal, state, and private support to landowners who participate in voluntary conservation practices along streams in the Illinois River Basin. A total of $30,000,000 is proposed to support nutrient and sediment reduction measures in the Illinois River Basin.

State Mitigation Banking Program

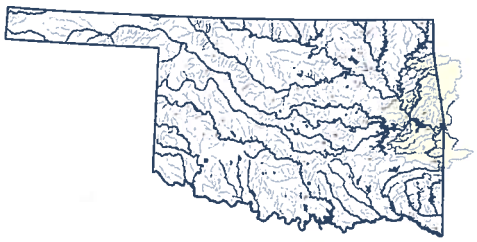
During the 2007 legislative session, the Arkansas General Assembly approved language in the state mitigation banking act allowing the Commission to purchase, produce, or sell stream mitigation credits in addition to wetland credits.

Commission staff is pursuing stream restoration opportunities in northwest Arkansas watersheds as part of the state mitigation banking program. Planning concept is as follows: potential stream restoration corridors are identified on a watershed basis. Over time, individual stream segments are restored based on voluntary landowner participation and mitigation credit demand. This kind of implementation scenario and watershed approach is being explored as a potential way to incorporate state water planning and water quality improvement efforts in northwest Arkansas.

General Obligation Bonds

In its 86th regular session, the Arkansas General Assembly passed and Governor Mike Beebe approved Act 631 that would allow the Arkansas Natural Resources Commission to issue up to $300 million in state of Arkansas general obligation bonds for the purposes of developing water resources and abating pollution within the state. Up to $100 million in bonds can be utilized for irrigation projects. Under the Arkansas constitution, the issuance of state general obligation bonds must be approved by the electors of the state. This approval will be requested as a ballot question in the 2008 General Election. If approved by the electors, funds under the authority would be available as early as July 2009.

OKLAHOMA COMMISSIONERS' REPORT
Arkansas-Oklahoma
Arkansas River Compact Commission

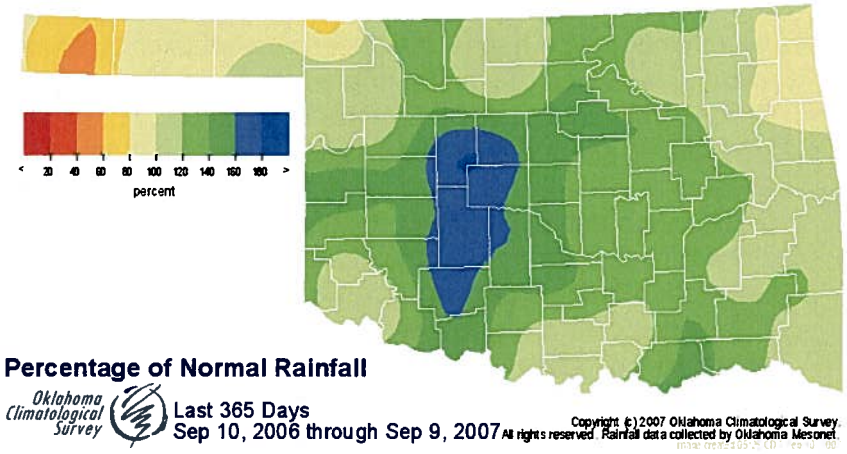


Annual Meeting: Fort Smith, Arkansas
September 12-13, 2007

CLIMATE

Recent rainfall has greatly improved drought conditions throughout Oklahoma. The recent statewide drought that has impacted the state over the past few years—drastically reducing river flows and lake and aquifer levels and causing severe impacts to domestic and municipal water supplies—is largely over.

For the past 365 days in the Compact region, Oklahoma's East Central climate division has received more than 53 inches of precipitation, 116 percent of normal rainfall (a surplus of about 7 inches). The adjacent Southeast (60 inches, a 9-inch surplus) and Northeast (47 inches, a 5-inch surplus) regions have also benefitted from abundant precipitation.



WATER RESOURCE STUDIES

Surface Water

- A cooperative study underway between the Oklahoma Water Resources Board, Indian Nations Council of Governments and U.S. Army Corps of Engineers will result in creation of a master plan for development along the 42-mile Arkansas River Corridor in the Tulsa vicinity (from Keystone dam to the Tulsa/Wagoner County boundary). Development strategies in this $500,000 cost-shared study will address recreational and ecosystem improvements, flood damage reduction, economic development potential and related issues.

Groundwater

- The ongoing **Arbuckle-Simpson Hydrology Study**, now in the fourth year of a five-year investigation, seeks to determine the maximum annual yield of the southern Oklahoma aquifer that will not reduce the natural flow of water from its springs or streams. The study team—consisting of a unique group of researchers from various state and federal agencies and universities—has made considerable progress in obtaining information necessary to determine how much water can be withdrawn from the aquifer while protecting springs and streams. To date, the investigation has focused on monitoring and evaluating various aspects of the aquifer system, which include characterizing groundwater and surface water flow, quantifying the hydrologic budget, and defining the geologic framework.

  The current focus of the study is on developing groundwater and surface water models and evaluating minimum instream flow requirements. The last year of study will be devoted to

evaluating various water management options. The study is funded through a 50/50 state/federal cost-share agreement with the Bureau of Reclamation. A total of $3.3 million has been allocated to the Study through State FY 2007.

Water Quality

- Continuing efforts to improve water quality in **Lake Thunderbird**, the OWRB and the Central Oklahoma Master Conservancy District (COMCD) have begun their sixth year of monitoring chlorophyll and nutrient concentrations in the lake. The OWRB has recommended several management alternatives to assist the lake in meeting its designated beneficial uses. Although Lake Thunderbird is still considered impaired due to turbidity and low dissolve oxygen, practices implemented by the COMCD have greatly improved the lake's algae and chlorophyll problems.
- Shoreline erosion control and revegetation work continues at **Lake Carl Blackwell, Lake Thunderbird, Lake Draper, Grand Lake, and Hudson Lake**. By demonstrating innovative ways to combat erosion and suspended sediment, the OWRB seeks to educate lake managers on the habitat-friendly benefits of establishing aquatic plants to improve water quality and the health of our state's aquatic communities.
- Progress continues on the OWRB's Federal Cost Share Agreement with the COE. This 50/50 partnership seeks the most feasible means to mitigate the impaired water quality of **Lake Wister** due to low dissolved oxygen. Through this project, scheduled for completion in 2008, all potential mitigation methods will be screened until the most feasible method is determined. Staff are also monitoring the success of a recent project to establish aquatic vegetation in the shallow reaches of Wister. Based on the success of these projects, the OWRB has completed a small grant from the National Fish and Wildlife Foundation to establish a sustainable source area of aquatic plants for Lake Wister. This "seed" money has successfully started a local, long-term planting effort to help reduce the lake's nutrient content, increase clarity, and provide valuable habitat for fish and wildlife.
- OWRB staff is midway through a cooperative project with the City of Oklahoma City to restore fish and wildlife habitat by the establishment of native aquatic plants along the shoreline of **Lake Stanley Draper**. The project will include education of lake managers while enhancing water quality, mitigating shoreline erosion and beautifying the lake.
- In response to recent ecological impacts to aquatic life resulting from golden algae blooms and other toxic-producing algae, OWRB staff are working with various state and federal agencies to monitor for this organism.
- OWRB staff have determined that **Lake Overholser** and **Lake Thunderbird** are adversely effected by excess nutrients and have proposed that they be designated as Nutrient Limited Watersheds (NLWs). The NLW designation triggers additional protection from nutrient loading from CAFOs and registers poultry operations for the lakes.
- Additional ongoing OWRB water quality projects include:
    - Probabalistic biological monitoring to assess stream ecosystem integrity throughout Oklahoma;
    - Probabalistic monitoring for EPA's National Lakes Survey will ocurr concurrently with a state level survey this coming summer. Lake water quality and ecosystem integrity will be asessed throughout Oklahoma;
    - Confirmatory stream and reservoir monitoring to assess Water Quality Standards beneficial use attainment status;
    - Confirmatory stream and reservoir monitoring to assess Water Quality Standards beneficial use attainment status prior to total maximum daily load (TMDL) completion; and
    - Streams Probabilistic Monitoring will be conducted in the Illinois River Basin beginning in the summer of 2007.

OKLAHOMA WATER QUALITY STANDARDS

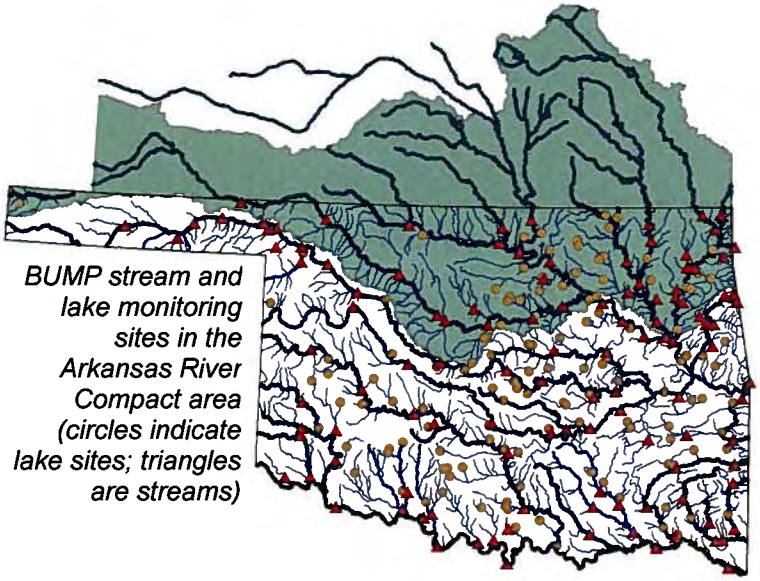
New criteria for perchlorate, pending EPA review, will principally affect the Army Ammunition plant in McAlester located on a tributary to Lake Eufaula. Also pending EPA review and approval are phosphorus criteria for the Tulsa water supply lakes, Eucha and Spavinaw. Average total phosphorus concentration will be limited to 16.8 ug/l in Lake Eucha and 14.1 in Spavinaw Lake to help Tulsa with taste and odor problems. The OWRB has adopted revised assessment procedures for metals, toxins, and sediments.

THE 2007 OKLAHOMA LEGISLATIVE SESSION

The Oklahoma State Legislature adjourned this year's session on May 25. Following last year's success in obtaining dedicated funds to update the Oklahoma Comprehensive Water Plan (OCWP) and recapitalize the Financial Assistance Program, the OWRB had hoped to make additional progress in removing the cap and other limitations on the REAP Gross Production Tax Water Projects Fund, the source of that funding. Unfortunately, proposed legislation to deal with that issue was not heard in the House of Representatives. Also, no additional funding was allocated to the OWRB to continue or complete priority water studies, including the Arbuckle-Simpson Hydrology Study and Red River chloride control study. Water programs received only a small percentage of the state budget.

BENEFICIAL USE MONITORING PROGRAM

The OWRB's Water Quality Division continues to monitor water quality conditions and trends statewide through the Beneficial Use Monitoring Program (BUMP) and Oklahoma Water Watch (OWW) Volunteer Monitoring Program. The BUMP includes 72 stream and lake monitoring sites within the Compact area in Oklahoma. Annual BUMP reports are available on the Board's Web site at www.owrb.state.ok.us and on CD.

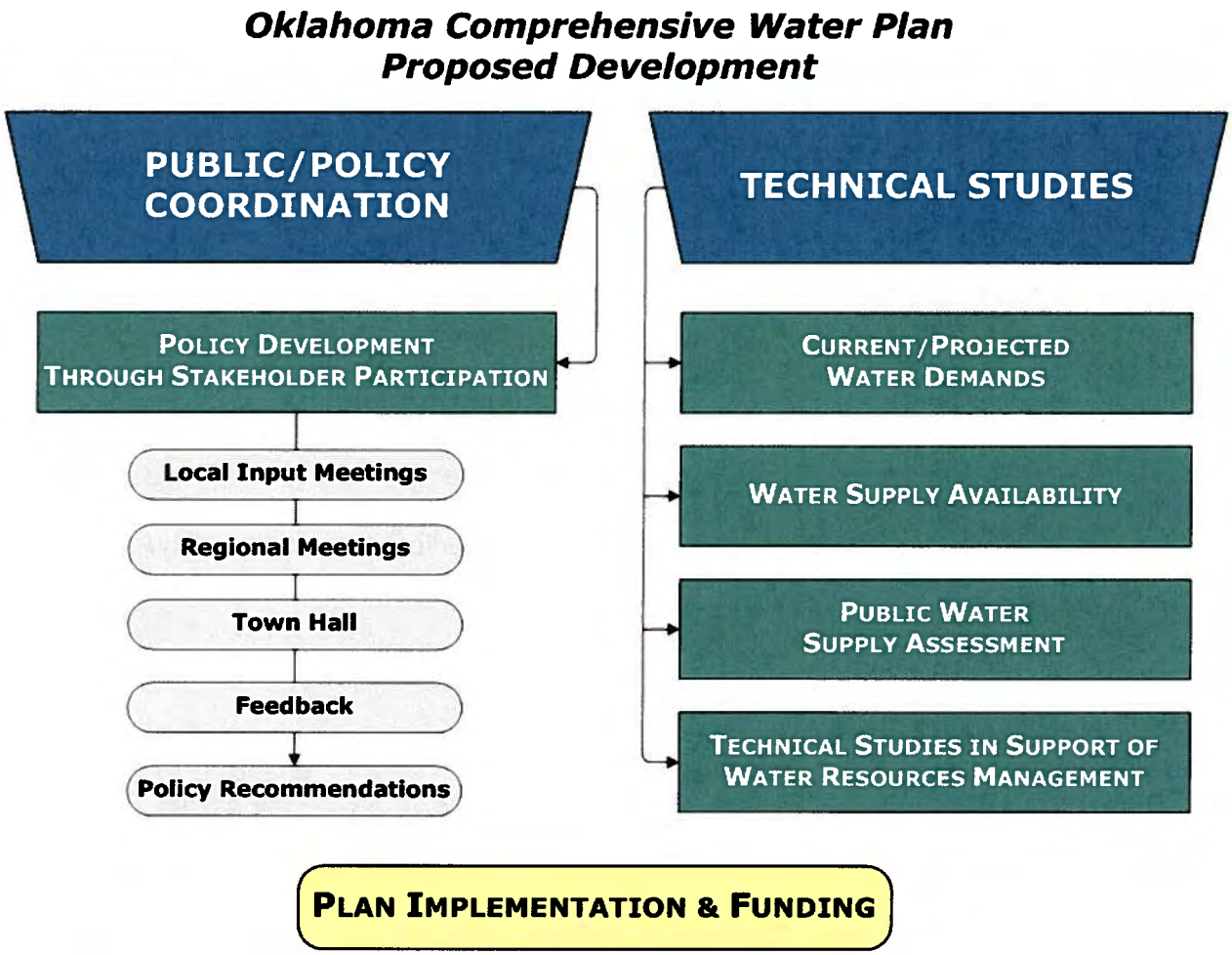


BUMP stream and lake monitoring sites in the Arkansas River Compact area (circles indicate lake sites; triangles are streams)

The BUMP, recognized by EPA as one of the finest state-run monitoring programs in the nation, facilitates science-based decision-making concerning impaired waters. In tandem with Oklahoma's Water Quality Standards and the National Pollutant Discharge Elimination System (NPDES) program, the BUMP has become a cornerstone of state water quality management.

UPDATE OF THE OKLAHOMA COMPREHENSIVE WATER PLAN

The OWRB has begun the update of the Oklahoma Comprehensive Water Plan, planned for completion in 2011. The agency has contracted with the Oklahoma Water Resources Research Institute, located at Oklahoma State University, to facilitate the stakeholder participation and public policy development phase of the update. The first of more than 40 statewide listening sessions began in the Panhandle in April. The technical study/engineering phase—including a statewide assessment of water supply infrastructure—will solicit assistance from various state and federal agencies and organizations, as well as consultants.



WATER RESOURCES FINANCING

The Oklahoma Water Resources Board administers the State *Financial Assistance Program* (FAP), backed by the Statewide Water Development Revolving Fund, which awards loans and grants for the construction and improvement of water and sewer facilities. In all, through the OWRB's five loan and grant programs, more than $1.65 billion in financing has been provided for water and sewer projects in Oklahoma with a total estimated savings of more than $521 million to Oklahoma communities.

The Water Board's Bond Loan Program is the highest rated, uninsured state bond program in Oklahoma. In turn, this enables the OWRB to provide an extremely competitive interest rate on loans for community drinking water projects, leading to even more savings for citizens who rely so much upon dependable water supply. To date, the Board's Bond Loan Program—which provides financing from proceeds of revenue bonds to eligible communities for sewer and water improvements and refinancing—has approved 320 bond loans totaling more than $628 million throughout Oklahoma. The emergency grant program, funded by interest earnings on the Revolving Fund, has approved 531 grants for more than $31 million. These grants have stimulated many millions of dollars more in local water/wastewater projects.

The Board also provides loans through the *Clean Water (CWSRF) and Drinking Water Construction Revolving Fund (DWSRF) Programs* for various wastewater and water treatment/distribution projects, respectively, which are often required to bring borrowers into

compliance with EPA requirements. The CWSRF Loan Program, which provides funds for the construction of new wastewater facilities or the replacement or rehabilitation of existing facilities, has approved 182 loans for more than $644 million. The DWSRF, a cooperative program administered jointly by the OWRB and Oklahoma Department of Environmental Quality, was created to assist municipalities and rural water districts in constructing drinking water treatment and distribution system improvements required to comply with the federal Safe Drinking Water Act. The program has approved 72 loans for more than $330 million in the state.

The *Rural Economic Action Plan (REAP)* grant program is operated by the Board in a manner very similar to its emergency grant program. REAP gives priority to communities with populations less than 1,500 and rural water districts with less than 450 household taps. The Board has approved 476 REAP grants totaling more than $43 million in Oklahoma.

WESTVILLE TREATMENT PLANT UPGRADE

In August, the Westville Utility Authority, which owns and operates a water/sewer system that serves 827 customers in Adair County, completed construction of its new, state-of-the-art wastewater treatment plant. The Authority has been under a consent order with the Oklahoma Department of Environmental Quality that called for an upgrade of its wastewater treatment system, which discharges effluent into the Barren Fork River that flows into the Illinois River, a designated Scenic River included on Oklahoma's list of impaired waters. Monitoring results indicated community violations for all three indicator organisms specified in Oklahoma's Water Quality Standards: fecal coliform bacteria, Escherichia coli, and Enterococci. The Town of Westville is the only potential point source of bacteria within the Barren Fork watershed in Oklahoma.

The cost of the new facility was almost $2.9 million. Construction was funded through a $680,480 Rural Development loan, $1,950,000 Rural Development grant, an OWRB REAP grant of $99,969, and an OWRB emergency grant of $100,000. Effluent produced at the plant has consistently out-preformed that required by the OPDES discharge permit requirement by producing less than one-half the mandated phosphorus level of 1.0 mg/L.

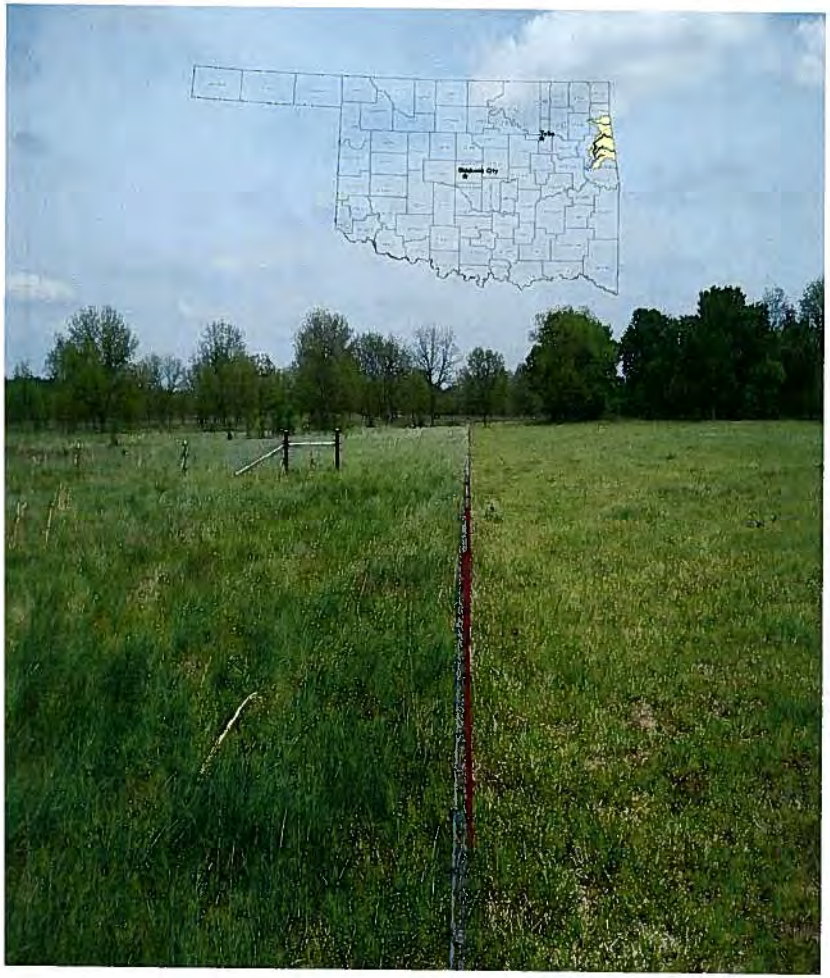
OKLAHOMA GOVERNOR'S WATER CONFERENCE & SYMPOSIUM

On October 23-25, the Oklahoma Water Resources Board and Oklahoma Water Resources Research Institute are co-hosting the 28th Annual Governor's Water Conference and Water Symposium in Oklahoma City at the Cox Convention Center. This year's theme is "Water for Life" and includes a symposium exploring technical issues as well as the interrelationship between science and policy development. A very special banquet will be held Wednesday evening, October 24, celebrating the OWRB's 50th anniversary as Oklahoma's water agency. Registration is available by contacting the OWRB at 405-530-8800 or through the OWRRI's Web site at http://environ.okstate.edu/OKWATER/2007.

- **89 Cooperators** (71 in OK, 18 in AR)- 63% landowners in OK, 28% AR landowners participated.
- **$1,468,727** worth of practices installed
  - **$495,800 State Funds** ($96,467 Priority Watershed Funds, $399,333 General Revenue)
  - **$546,615 Federal 319 Funds**
  - **$426,311 Landowner Funds**
- Installation of the following Best Management Practices (BMPs):
  - Protected 330 acres of riparian area, installed 5 acres of field buffer. Installed 34 off-site watering facilities, 9.4 miles fencing. Included 28 landowners and cost approx. $238,110.
  - Installed 4 litter cakeout/cleanout houses for $70,119.
  - Improved pasture on 7,135 acres of watershed to reduce nutrient runoff through prescribed grazing (including cross-fencing), nutrient management, and alternative water supply. Planted 1,683 acres of pasture that was formerly either cropland or poorly vegetated pasture. Included 72 landowners and $703,264.
  - Insured proper application of Phosphorus (in litter) either by land applying based on soil and litter tests in the watershed or transporting litter outside of watershed. Involved 16 landowners and $48,613.
  - Replaced 25 inadequate septic tanks and/or lateral fields for $59,815
  - Installed 45 Heavy Use Areas and 14 winter feeding/waste storage facilities to reduce impacts of cattle in watershed- $348,806.

Water Quality Monitoring Results:

- **Paired Watershed Design:** monitored sites on Beaty Creek, and Little Saline Creek (control watershed) to correct for the effects of weather on monitoring results
- **Monitored Phosphorus using continuous flow-weighted sampling.** First in the Nation to use this methodology. Result is 5 years of weekly loading estimates to Beaty Creek.
- **Used an EPA-developed paired watershed method** to estimate what Phosphorus loading to Beaty Creek (corrected for weather effects) would have been without implementation of BMPs. Compared that estimate to the loading actually measured in Beaty Creek (corrected for weather effects) to determine that **phosphorus loading to Beaty Creek had been reduced by 31% over what it would have been without the installation of BMPs.**



CREP

Conservation Reserve Enhancement Program

WHO: OK State Legislature • U.S. Department of Agriculture • OK Conservation Commission • OK Conservation Districts

WHAT: This program pays eligible landowners in eligible watersheds to establish areas of riparian buffers along streams, removing those strips of land from agricultural production for 15 years.

HOW: A zone of trees and other woody plants is allowed to grow along streams with an unmowed grass/forb zone growing between the trees and fields. Alternate water sources are supplied for cattle that are denied access to streams.

WHY: Riparian buffers filter out up to 90% of pollutants flowing over the land before they reach the stream. The plant roots stabilize streambanks, while leaves shade the stream.

LEGISLATIVE FUNDING
(Example)

$1 from State Legislature + $4 from USDA = $5

Each $1 from State Legislature = $5

ECONOMIC BENEFITS

The CREP brings federal money to Oklahoma at a rate of 1:4. The money goes directly to landowners and businesses in rural Oklahoma. This money allows farms to remain profitable while meeting environmental goals of the state and nation. Money spent in these rural areas enhances local economies.

ENVIRONMENTAL BENEFITS

- Woody roots of trees and shrubs hold streambanks together, preventing stream bank erosion, which at times contributes over 50% of the eroded sediment traveling downstream to receiving waterbodies.
- As large branches and trees die, some of them fall into the stream, providing needed cover for larger game fish.
- Shade produced by these buffers decreases water temperatures by 6 to 9 degrees F, allowing the water to hold more oxygen. The same shade also inhibits the growth of algae, vastly decreasing the negative effects of nutrients in the stream.

Priority Watersheds Program

WHO: U.S. EPA • OK State Legislature • OK Conservation Commission • OK Conservation Districts • Participating OK Citizens

WHAT: This program focuses on installation of best management practices (BMPs) that reduce the amount of nonpoint source pollution entering water in priority watersheds in Oklahoma.

HOW: Using State Legislature and EPA 319 funds, the OCC and conservation districts offer landowners cost-share funds, education, and technical assistance to install best management practices on their land. Education is a huge part of the program that often includes volunteer monitoring, seminars, workshops, and farm tours, giving citizens the knowledge to prevent nonpoint source pollution.

WHY: Best management practices reduce the transport of nutrient, soil, bacterial and other pollutants into water. This helps restore waterways for beneficial uses such as swimming, fishing, or use as a drinking water supply.

Soil conservation BMPs reduce erosion.

- drop structures
- no-till agriculture
- grassed waterways
- pasture establishment, improvement, or management

Manure storage and management system BMPs reduce runoff of manure.

- soil testing services
- heavy use areas for livestock
- pasture management systems
- winter feeding structures livestock
- cake out sheds and litter storage buildings

Water source BMPs lure livestock away from streams.

- ponds
- wells
- freeze-proof tanks

Riparian BMPs allow vegetation to stabilize banks, shades streams, and filter pollutants.

- fencing

ENVIRONMENTAL BENEFITS

- Less bacteria entering water
- Improved drinking water quality
- Improved appearance of waterways
- Reduced flooding
- Less soil filling-in waterways
- Improved aquatic habitats for fish

ECONOMIC BENEFITS

- $ This program brings in federal dollars to the state and the local economy at a ratio of 3:2.
- $ When beneficial uses such as swimming and fishing are restored, tourism dollars increase, bringing money to local economies.
- $ Landowners usually see an increase in farm profitability after installing BMPs.

Oklahoma Conservation Commission • Water Quality Division

ANNUAL YIELD AND SELECTED HYDROLOGIC DATA FOR THE ARKANSAS RIVER BASIN COMPACT, ARKANSAS-OKLAHOMA, 2006 WATER YEAR

By Terrance E. Lamb

Hydrologic Information Services

Prepared for the
ARKANSAS RIVER COMPACT COMMISSION,
ARKANSAS-OKLAHOMA

Little Rock, Arkansas
2007

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4. Estimates of annual depletion for the sub-basins caused by withdrawals and returns for the 2006 water year....9

CONVERSION FACTORS

Multiply	By	To obtain
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
acre	4,047	square meter (m^2)
	0.004047	square kilometer (km^2)
square mile (mi^2)	2.590	square kilometer (km^2)
cubic foot (ft^3)	0.02832	cubic meter (m^3)
acre-foot (acre-ft)	1,233	cubic meter (m^3)
	1.233x10-6	cubic kilometer (km^3)
cubic foot per second (ft^3/s)	28.32	liter per second (L/s)
	0.02832	cubic meter per second (m^3/s)
ton per day (ton/d)	0.9072	megagram per day (Mg/d)

Temperature in degrees Celsius (C) can be converted to degrees Fahrenheit (F) as follows:

$$F = 1.8 \times C + 32$$

ABBREVIATIONS

AC-FT	Acre-foot
ACID M.	Acidification method
CHLOR-A	Chlorophyll a
CHROMO FLUOROM	Chromatographic/fluorometric
COLS./100ML	Number of colonies per 100 milliliters
DEG. C	Degrees Celsius
DIS IT	Dissolved incremental titration
E.	Escherichia
FLTRD (other abbreviations sometimes used)	Filtered
Ft	Feet
FT FM L BANK	Feet from left bank
INST	Instantaneous
K	Non-ideal count
MG/L	Milligrams per liter
MM of Hg	Millimeters of mercury
m	Micron
mG/L	Micrograms per liter
ML	Milliliters
MM	Millimeters
NTU	Nephelometric turbidity units
SED.	Sediment
SUSP.	Suspended
T/DAY	Tons per day
TOT IT	Total incremental titration
UM-MF	Micron membrane filter
UNCORR.	Uncorrected
US/CM	Microsiemens per centimeter at 25 degrees C
Celsius	
WAT DIS	Water dissolved
<	Less than
>	Greater than
-- or ---	No data available
%	Percent

ANNUAL YIELD AND SELECTED HYDROLOGIC DATA FOR THE ARKANSAS RIVER BASIN COMPACT, ARKANSAS-OKLAHOMA, 2006 WATER YEAR

By Terrance E. Lamb

ABSTRACT

The computed annual yield and deficiency of the sub-basins as defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, are given in tables for the 2006 water year. Actual runoff from the sub-basins, depletion caused by major reservoirs in the compact area, and depletions due to other water uses also are given in tabular form. Computed monthly mean discharges are shown for the streamflow stations in the Arkansas River Basin. Water-quality data are shown for water-quality stations sampled in the Arkansas River Basin.

INTRODUCTION

In 1955, the Congress of the United States granted consent to Arkansas and Oklahoma to enter into a compact for the apportionment of the waters of the Arkansas River and its tributaries as they affect the two States. An Arkansas-Oklahoma Arkansas River Compact committee was created with a Federal Representative acting as chairman. After research and deliberate negotiations had been completed, both States approved the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972. To meet the requirements of the Compact, State-line yields of the Arkansas River Basin are determined at the end of each year.

This report was prepared for the Arkansas River Compact Commission, Arkansas-Oklahoma by Hydrologic Information Services. Stream-flow and water-quality data were collected by the U.S. Geological Survey, in cooperation with the Arkansas Natural Resources Commission and the Oklahoma Water Resources Board. The U.S. Army Corps of Engineers, Tulsa District, furnished data from the Webbers Falls, Tenkiller Ferry, Robert S. Kerr, Wister, and Fort Gibson Lakes.

PURPOSE AND SCOPE

The purpose of this report is to present the annual yields and deficiencies computed for the 2006 water year and to present water quality data for the sub-basins in the Arkansas River Basin as defined in the Arkansas River Compact. The report includes data from stream-flow stations and water-quality stations sampled in the Arkansas River Basin during the 2006 water year. The area included in the Compact is shown on figure 1.

DEFINITION OF TERMS

The following terms used in this report are taken from Article II of the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972.

The term "Arkansas River Basin" means all of the drainage basin of the Arkansas River and its tributaries from a point immediately downstream from the confluence of the Neosho River

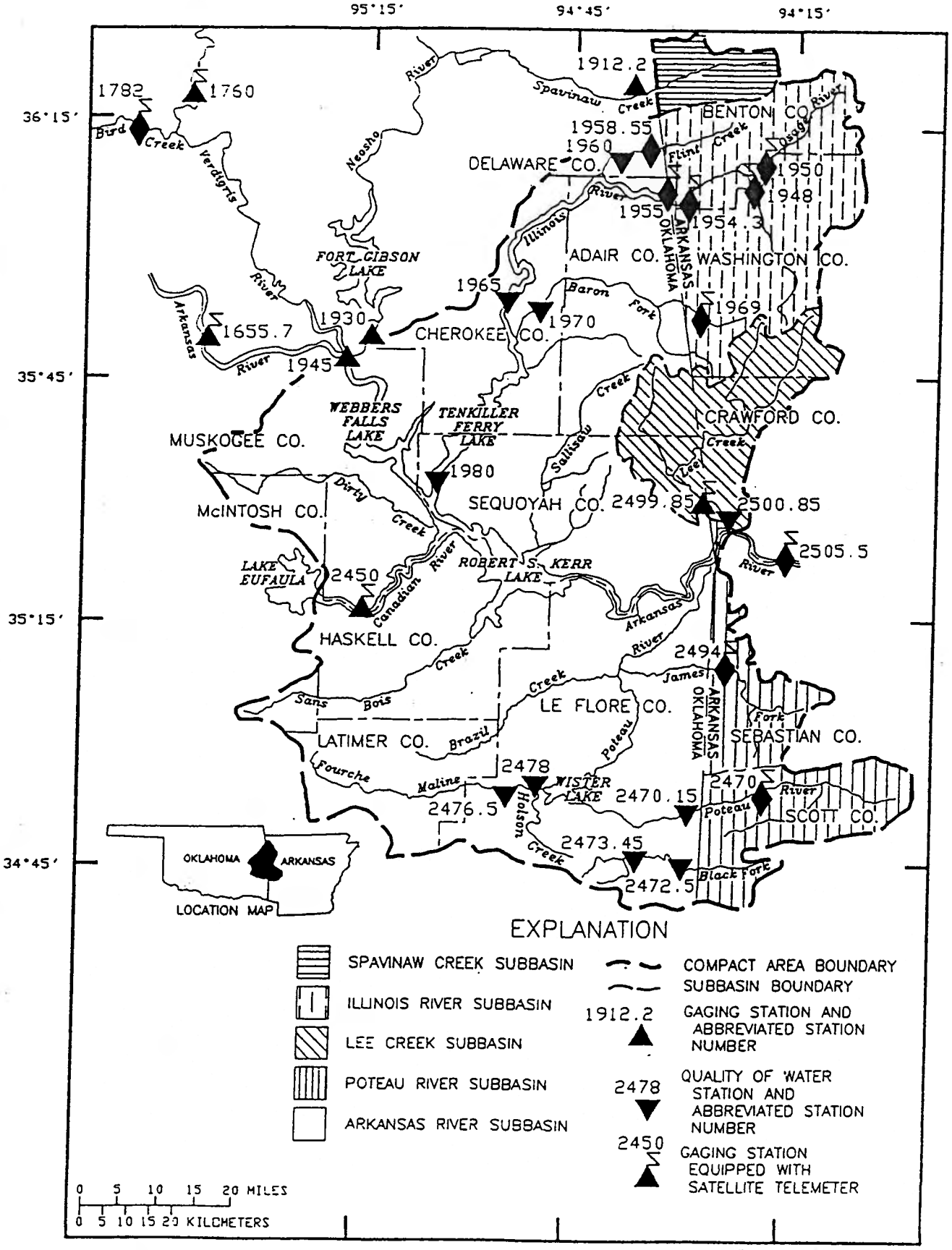

Figure 1.--Arkansas-Oklahoma Arkansas River Basin Compact area and subbasins.

with the Arkansas River (fig. 1) to a point immediately downstream from the confluence of Lee Creek with the Arkansas River, together with the drainage basin of Spavinaw Creek in Arkansas (fig. 1), but excludes that part of the drainage basin of the Canadian River upstream from Lake Eufaula Dam.

The term "Spavinaw Creek Sub-basin" means the drainage area of Spavinaw Creek in the State of Arkansas.

The term "Illinois River Sub-basin" means the drainage area of the Illinois River in the State of Arkansas.

The term "Lee Creek Sub-basin" means the drainage area of Lee Creek in the State of Arkansas upstream from the Oklahoma State line and in the State of Oklahoma.

The term "Poteau River Sub-basin" means the drainage area of the Poteau River in the State of Arkansas.

The term "Arkansas River Sub-basin" means all areas of the Arkansas River Basin in the Compact area except the four subbasins described previously.

The term "water year" means a 12-month period beginning on October 1 and ending September 30.

The term "annual yield" means the computed annual gross runoff from any specified sub-basin. The runoff would have passed any certain point on a stream and would have originated within any specified area under natural conditions without any manmade depletion or accretion during the water year.

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below.

Acre-foot is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease; others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Escherichia coli (E. coli) are present in the digestive tract of warm-blooded animals. In the laboratory, E. coli are defined as all organisms that produce orange/yellow colonies when incubated for two hours at 35°C± 0.2°C and transferred to 44.5°C±0.2° for 22-24 hours on mTEC agar (nutrient medium for E. coli growth), and stained with phenol red solution. Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are present in the intestines or feces of warm-blooded animals.

They are often used as indicators of the sanitary quality of the water. In the laboratory, they are defined as all the organisms that produce blue colonies within 24 hours when incubated at 44.5 °C ±0.2 °C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria also are present in intestines of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. These bacteria also are defined as all the organisms that produce red or pink colonies within 48 hours at 35 °C±0.5 °C on KF-streptococcus agar (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Code numbers have been assigned for agencies collecting and analyzing samples, and are listed in water-quality tables of this report as follows:

1028 Oklahoma District, Water Resources Division (WRD), U.S. Geological Survey
80513 Arkansas District, WRD, U.S. Geological Survey
80020 National Water Quality Laboratory, WRD, U.S. Geological Survey.

Contents are the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed based on a level pool and does not include bank storage.

Cubic foot per second is the rate of discharge representing a volume of 1 cubic foot passing a specified point during 1 second.

Deficiency is the amount the actual runoff is less than the minimum required flow.

Depletion is the difference between the inflow and outflow caused by major reservoirs.

Discharge is the volume of water that passes a given point within a given period.

- **Instantaneous discharge** is the discharge at a particular instant of time.
- **Mean discharge** is the arithmetic average of individual daily mean discharges during a specific period.

Dissolved refers to the material in a representative water sample that passes through a 0.45-micron membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved oxygen content of water in equilibrium with air is a function of atmospheric pressure and temperature and the dissolved-solids concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved solids, with small temperature changes having the more significant effect. Photosynthesis and respiration may cause diurnal variations in dissolved-oxygen concentration in water of some streams.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream upstream from the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas within the area, unless otherwise noted.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium

carbonate ($CaCO_3$).

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Mean concentration is the time-weighted concentration of suspended sediment passing a stream cross section during a 24-hour period.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed), expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Suspended-sediment discharge (tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity of sediment, as measured by dry weight or volume that passes a section in a given time. It is computed by multiplying discharge by milligrams per liter by 0.0027.

Sodium-absorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions with soil and is an index of sodium or alkali hazard to the soil. Water varies, in respect to sodium hazard, from that which can be used for irrigation on almost all soils to that which generally is unsatisfactory for irrigation.

Specific conductance is a measure of the ability of water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids concentration of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and the volume of water, per unit of time, flowing past the gage in a channel.

STORET parameter codes are codes assigned to specific hydrologic measurement types and constituents for computer storage of data. These five-digit codes (shown in parentheses) are included with the water-quality information in the Hydrologic Station Records section.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff", as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Tons per day is the quantity of substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected

form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating that the sample consists of a water-suspended-sediment mixture and that the analytical method determines all of the constituent in the sample.)

COMPUTATION OF ANNUAL YIELDS

The annual yield and deficiency (table 1) for each sub-basin was computed as defined by the Arkansas River Compact Committee (1972). Actual runoff for the sub-basins (table 2) was computed as defined by the Committee except for the station Lee Creek near Van Buren, which has been moved 3.2 miles upstream near Short, Oklahoma.

Table 1. --Annual yield and deficiency for the sub-basins for the 2006 water year, as defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972

[Flow in cubic feet per second]

Sub-basin	Actual runoff from the Sub-basins	Total depletions or accretions (-)	Annual yield	[a]Percent depletion allowed	Minimum required flow	[b]Deficiency
Spavinaw Creek	19.0	[c]1.0	20	50	10	0
Illinois River	277	[e]-32.0	245	60	98	0
Lee Creek	180	[c]0.61	181	100	0	0
Poteau River	128	[c]5.04	133	60	53	0
Arkansas River	213	[d]438	651	60	260	47

a Defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972.

b The amount of actual runoff less than the minimum required flow.

c Based on 2000 water year water-use data.

d Based on 2000 water year water-use data and 2006 direct diversions from lake storage.

e Based on 2000 water year water-use data and 36.5 cfs estimated imported from the White River Basin in 2006.

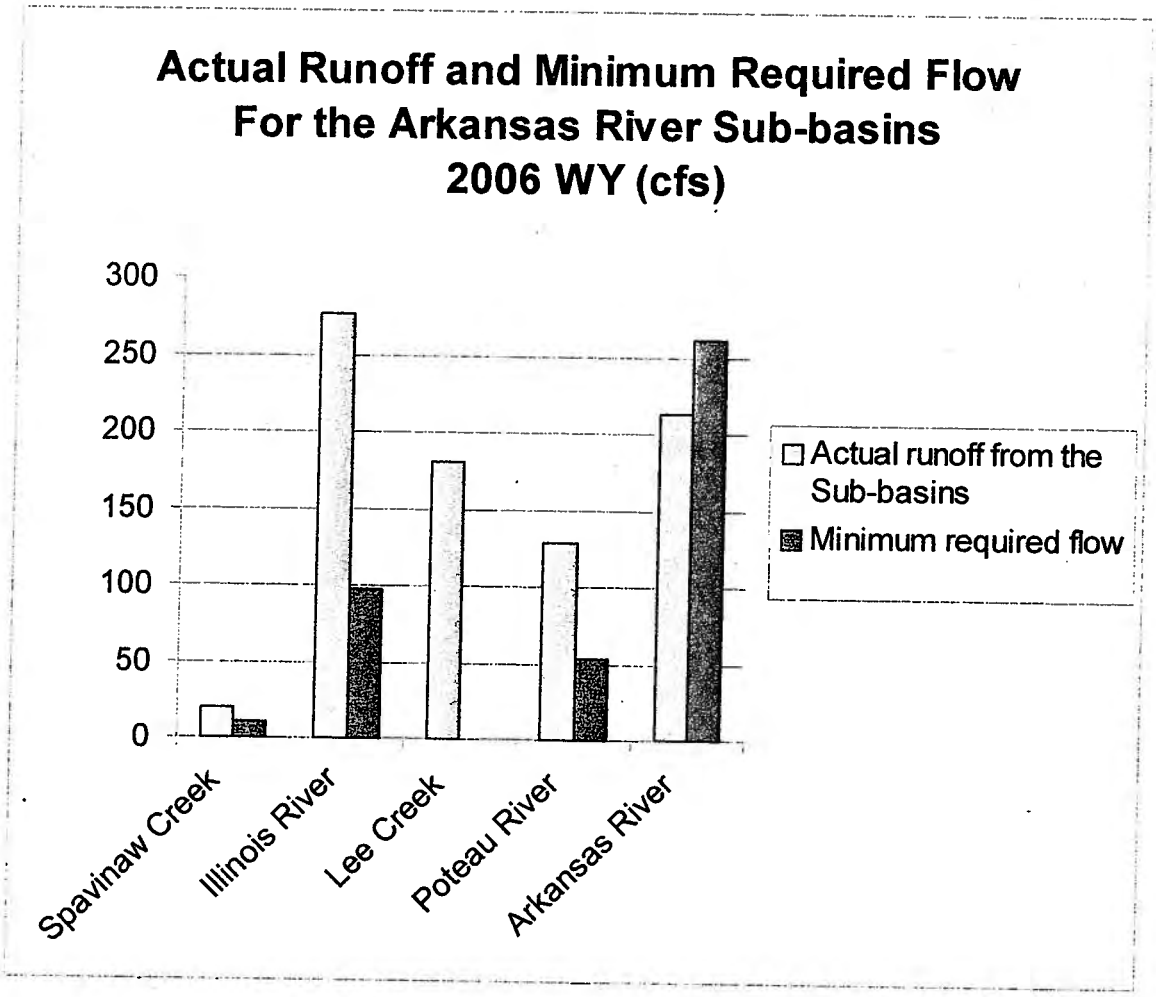
Actual Runoff and Minimum Required Flow
For the Arkansas River Sub-basins
2006 WY (cfs)
300
250
200
150
100
50
0
Spavinaw Creek
Illinois River
Lee Creek
Poteau River
Arkansas River
Actual runoff from the Sub-basins
Minimum required flow

Table 2.--Actual runoff from the sub-basins for the 2006 water year

[In cubic feet per second; D.A. = drainage area; mi^2 = square mile; acre-ft = acre-feet]

Month	Spavinaw Creek [a] D.A.=135 mi^2	Illinois River [b,e] D.A.=744 mi^2	Lee Creek D.A.=426 mi^2	Poteau River [c] D.A.=536 mi^2	Arkansas River [d] D.A.=4,591 mi^2
October	10.8	101	0.26	23.9	326
November	15.0	135	0.15	24.9	329
December	12.5	129	0.76	14.9	-195
January	12.3	138	2.07	44.2	341
February	12.3	132	2.98	22.9	199
March	15.8	200	148	625	1,104
April	16.2	250	388	306	138
May	66.9	711	1,184	432	243
June	17.5	215	166	18.6	220
July	5.36	109	8.52	4.25	189
August	11.1	286	0.97	2.93	434
September	30.5	917	244	2.42	-804
2006 water year	19.0	277	180	128	213
2006 water year (acre-ft)	13,674	200,533	130,294	92,704	154,276

a Includes 31 mi^2 ungaged.

b Includes 63 mi^2 ungaged

c Includes 125 mi^2 ungaged.

d Computed by subtracting drainage area at Arkansas River at Muskogee, Canadian River near Whitefield, Illinois River Sub-basin, Lee Creek Sub-basin, and Poteau River Sub-basin from drainage area at Arkansas River near Fort Smith, Arkansas.

e Includes 36.5 cfs discharged from Fayetteville, Rogers, and Springdale sewage treatment plants that was withdrawn from the White River Basin in Arkansas.

Annual depletion caused by major reservoirs was computed for the four major reservoirs in the basin as defined by the Arkansas River Compact Committee (1972). These depletions are shown in table 3 and summarized in table 1.

A compilation of withdrawals and returns of freshwater in the sub-basins was prepared using data from "Water Use In Arkansas, 2000" and "Water Use In Oklahoma, 2000". These depletions and accretions for each sub-basin are shown in Table 4 and summarized in Table 1. Information on depletions continues to be gathered in order to re-evaluate their present impact.

Streamflow data used in the computations are given in the Hydrologic Station Records section (p.11 to 68). The station description under "Remarks" states the degree of accuracy of the records. "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the actual discharge, "good" means within 10 percent, and "fair" means within 15 percent. "Poor" means that daily discharges have less than "fair" accuracy.

Table 3.--Annual depletion caused by major reservoirs for the 2006 water year

[acre-ft = acre-feet; ft^3/s = cubic feet per second]

Reservoir	Year-end contents (acre-feet)	Change in contents in water year (acre-feet)	[a]Precipitation on reservoir surface (inches)	[b]Evaporation from reservoir (inches)	[a]Diversions (acre-feet)	Depletion (acre-feet)	Depletion (ft^3/s)
Webbers Falls	168,628	1,932	25.09	52.75	0	31,161	43.0
Tenkiller Ferry	604,223	73,920	26.59	40.92	4,605	99,070	137
Robert S. Kerr	516,637	2,156	23.01	49.23	0	108,173	149
Wister	49,651	-603	36.57	39.83	12,542	18,255	25.2

[a] From U.S. Army Corps of Engineers, Tulsa District.

[b] Adjusted for pan coefficient of 0.70 (from Wisler and Brater, 1949).

Table 4.--Estimates of annual depletion for the sub-basins caused by withdrawals and returns for the 2006 water year

(Data is from 2000 WY water use reports)

Sub-basin	Withdrawals ac/ft	Returns ac/ft	Total Withdrawals or Returns (-) ac/ft	Total Withdrawals or Returns (-) cfs
Illinois River	3,229	26,425[2]	-23,196	-32.0
Lee Creek	441	0[1]	440	0.61
Poteau River	3,653	0[1]	3,652	5.04
Arkansas River	79,497[3]	19,076[3]	60,421	83.5

[1] No known returns for these sub-basins

[2] Includes estimate of returned flow transferred from the White River Basin

[3] Not including depletions from the 4 major reservoirs in the sub-basin

WATER QUALITY

Begining in October 1984, water-quality data for the Arkansas-Oklahoma Compact have been published in this report. These data are collected to monitor the water quality in the Arkansas-Oklahoma Compact area. Over the past several years, nutrients, major ions, and sediment data have been collected. Observed concentrations of these constituents are indications of general water quality in the subject area sub-basins. In freshwater, phosphorus is often the nutrient responsible for accelerated eutrophication. To control eutrophication, the Environmental Protection Agency makes the following recommendations:

A) Total phosphates should not exceed 0.05 mg/L (as phosphorus) in a stream at a point where it enters a lake or reservoir, and
B) Total phosphorus should not exceed 0.1 mg/L in streams that do not discharge directly into lakes or reservoirs.

Water-quality data collected at stations in the compact area in the 2006 water year are shown in tables in the Hydrologic Station Records section of this report.

SELECTED REFERENCES

Arkansas River Compact Committee, 1972, Arkansas River Basin Compact Arkansas-Oklahoma, 1972, with Supplemental Interpretive Comments, Supplement No. 1: Austin, Texas, 31 p.
Arkansas Soil and Water Conservation Commission, 1981, Arkansas State Water Plan - Lakes of Arkansas, 157 p.
Wisler, C.D., and Brater, E.F., 1949, Hydrology: New York, John Wiley & Sons, Inc., 150 p.

HYDROLOGIC STATION RECORDS

Daily Discharge records denoted by Q and Quality of Water records by QW.

Station Number	Station Name	Page
07191220	Spavinaw Creek nr Sycamore, OK (Q, QW)	12-14
07194500	Arkansas River nr Muskogee, OK (Q)	15
07194800	Illinois River at Savoy, AR (Q, QW)	16-18
07195000	Osage Creek nr Elm Springs, AR (Q, QW)	19-21
07195430	Illinois River South of Siloam Springs, AR (Q, QW)	22-24
07195500	Illinois River nr Watts, OK (Q, QW)	25-33
07195855	Flint Creek nr West Siloam Springs, OK (Q, QW)	34-36
07196900	Baron Fork at Dutch Mills, AR (Q, QW)	37-39
07245000	Canadian River nr Whitefield, OK (Q)	40
07247000	Poteau River at Cauthron, AR (Q, QW)	41-43
07247015	Poteau river nr Loving, OK (Q, QW)	44-46
07247250	Black Fork below Big Creek nr Page, OK (Q, QW)	47,48
07247345	Black Fork at Hodgen, OK (QW)	49,50
07247500	Fourche Maline nr Red Oak, OK (Q)	51
07247650	Fourche Maline nr LeFlore, OK (QW)	52-54
07247800	Holson Creek at Summerfield, OK (QW)	55,56
07249400	James Fork nr Hackett, AR (Q, QW)	57-59
07249455	Arkansas River at Fort Smith, AR (Q, QW)	60-62
07249985	Lee Creek nr Short, OK (Q, QW)	63-65
07250550	Arkansas River at James W. Trimble Lock and Dam nr Van Buren, AR (Q, QW)	66-68

07191220 SPAVINAW CREEK NEAR SYCAMORE, OK

LOCATION.–Lat 36°20'05", long 94°38'29" referenced to North American Datum of 1983, in NE ¼ NW ¼ sec.4, T.21 N., R.25 E., Delaware County, OK, Hydrologic Unit 11070209, on right bank 1.8 mi upstream from Cherokee Creek, 4.8 mi northeast of Row, 6.5 mi southeast of Sycamore, and at mile 35.0.

DRAINAGE AREA.–133 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–October 1961 to current year

REVISED RECORDS.–WSP 2121: 1965 (M).

GAGE.–Water-stage recorder. Datum of gage is 868.34 ft NAVD of 1988. Prior to Nov. 6, 2001, elevation published as 875 ft above NGVD of 1929, from topographic map.

REMARKS.–No estimated daily discharge. Records fair. U.S. Army Corps of Engineers' satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	10	13	13	13	14	12	13	96	18	11	2.6	57
2	10	14	12	13	13	12	13	113	20	9.8	2.3	47
3	10	16	12	12	13	13	14	89	26	9.0	2.2	42
4	9.6	17	12	12	13	13	14	78	29	8.0	2.1	37
5	9.6	17	13	12	13	13	14	81	30	7.0	2.0	33
6	9.5	17	13	12	13	12	15	94	29	6.4	2.2	28
7	9.6	17	12	12	12	12	16	84	27	6.0	2.9	22
8	10	16	12	12	12	11	16	72	25	5.7	4.0	18
9	10	15	12	12	11	12	18	64	24	5.5	4.4	15
10	11	14	11	12	12	13	20	114	23	5.5	4.3	13
11	11	14	11	12	12	14	20	176	22	5.3	4.4	14
12	10	14	11	12	12	15	20	157	19	5.4	4.8	14
13	10	14	11	13	11	17	19	115	17	5.8	4.7	13
14	10	15	11	13	11	20	17	89	15	6.0	5.3	12
15	10	15	11	14	11	22	16	74	13	6.4	5.1	12
16	11	15	12	14	11	23	16	64	12	6.5	4.7	11
17	11	15	12	13	11	24	15	56	12	6.3	4.2	12
18	12	15	12	12	12	23	14	50	11	5.6	4.2	15
19	11	15	13	12	12	21	13	46	11	4.7	4.1	26
20	10	15	13	12	12	20	12	42	10	4.1	3.9	47
21	11	15	13	12	12	18	12	38	9.7	3.9	3.6	65
22	11	15	13	12	12	17	11	35	10	3.8	3.1	57
23	11	15	13	12	12	16	11	31	9.5	3.6	2.7	50
24	11	14	13	11	12	15	11	29	11	3.5	3.0	45
25	11	14	13	10	12	15	12	27	13	3.1	3.8	40
26	11	14	13	10	12	15	14	26	15	2.7	4.5	37
27	11	14	13	11	13	15	16	24	15	2.6	5.5	34
28	11	14	13	11	13	14	19	22	14	2.5	18	31
29	12	14	12	12	---	13	26	21	13	2.7	47	28
30	12	13	12	13	---	12	32	19	12	2.7	100	25
31	12	---	13	13	---	13	---	18	---	2.7	73	---
Total	329.3	445	380	376	339	485	479	2,044	515.2	163.8	338.6	900
Mean	10.6	14.8	12.3	12.1	12.1	15.6	16.0	65.9	17.2	5.28	10.9	30.0
Max	12	17	13	14	14	24	32	176	30	11	100	65
Min	9.5	13	11	10	11	11	11	18	9.5	2.5	2.0	11

WATER-QUALITY RECORDS

PERIOD OF RECORD.–October 1972 to April 1988, December 2001 to current year.

REMARKS.–Samples collected periodically by the U.S. Geological Survey. All water-quality samples were analyzed at the City of Tulsa Quality Assurance Laboratory in Tulsa, Oklahoma. Suspended sediment samples were analyzed by U.S. Geological Survey. Specific conductance, pH, water temperature, air temperature, and dissolved oxygen were determined in the field.

COOPERATION.–All analytical records were furnished by City of Tulsa Quality Assurance Laboratory, Tulsa, Oklahoma.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

[Remark codes: <, less than.]

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbidity, IR LED light, det ang 90 deg, FNU (63680)	Barometric pressure, mm Hg (00025)	Carbon dioxide water, unfltrd mg/L (00405)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)
Apr	184										
29...	5	99999	27	--	731	6.3	9.9	101	7.6	354	15.0
May	151										
02...	5	99999	109	1.3	741	13	10.3	109	7.3	341	28.7
10...	133	99999	150	5.4	734	13	9.5	100	7.2	315	13.9
Jul	090										
13...	0	99999	5.8	--	738	32	7.4	82	7.0	369	31.2
Aug	114										
28...	5	99999	18	7.4	739	14	8.0	93	7.3	367	32.7

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

[Remark codes: <, less than.]

Date	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, unfltrd mg/L as N (00610)	Nitrate water unfltrd mg/L as N (00620)	Nitrite + nitrate water unfltrd mg/L as N (00630)	Nitrite water, unfltrd mg/L as N (00615)	Total nitrogen, water, unfltrd mg/L (00600)	Total nitrogen, water, unfltrd mg/L as NO3 (71887)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	Hydrogen ion, water, fltrd, calcd, mg/L (00191)	Suspnd. sediment, sieve diametr percent <.063mm (70331)
Apr													
29...	<.10	<.050	3.14	3.15	<.020	--	--	.300	.098	.110	.110	.00003	83
May													
02...	<.10	<.050	3.82	3.83	<.020	--	--	.300	.098	.085	.083	.00005	71
10...	<.10	<.050	3.52	3.52	<.020	--	--	.304	.099	.120	.130	.00006	78
Jul													
13...	<.10	<.050	3.17	3.18	<.020	--	--	.297	.097	.110	.100	.00011	--
Aug													
28...	.37	<.050	2.66	2.66	<.020	3.0	13.4	.399	.130	.150	.120	.00006	70

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005
TO SEPTEMBER 2006

Date	sediment concentration mg/L (80154)	sediment discharge, tons/d (80155)
Apr		
29...	3	.22
May		
02...	4	1.2
10...	9	3.6
Jul		
13...		
Aug		
28...	9	.44

07194500 ARKANSAS RIVER NEAR MUSKOGEE, OK

LOCATION.–Lat 35°46'10", long 95°17'55" referenced to North American Datum of 1927, Muskogee County, OK, Hydrologic Unit 11110102, on downstream side of left pier of bridge on U.S. Highway 62, 1.7 miles downstream from Neosho River, 3.5 miles northeast of Muskogee, and at mile 457.8.

DRAINAGE AREA.–96,674 mi² of which 12,541 mi² probably is noncontributing.

SURFACE-WATER RECORDS

PERIOD OF RECORD.–October 1926 to September 1970, July 2003 to current year. Published as "at Webbers Falls" October 1933 to February 1935. Monthly discharge only for some periods, published in WSP 1311.

GAGE.–Water-stage recorder. Datum of gage is 471.38 ft above NGVD of 1929.

REMARKS.–Records fair except for estimated periods and discharges less than 1000 ft³/s which are poor. Some regulation since 1940 by Grand Lake; further regulation since 1941 by Great Salt Plains Lake, and since 1951 by Hulah Lake. Flow regulated since 1953 by Fort Gibson Lake (station 07193000). Flow regulated since September 1964 by Keystone Lake (station 07164200). Flow regulated by Chouteau Lock and Dam upstream and Webbers Falls Lock and Dam downstream since 1970.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	3,910	3,760	2,890	703	1,290	1,890	821	18,400	9,820	3,260	8,500	4,090
2	4,410	2,850	3,760	1,800	3,470	2,000	2,530	20,300	13,100	2,640	12,800	3,660
3	6,910	4,160	2,760	1,010	3,710	2,530	3,070	22,700	4,250	4,550	8,640	2,780
4	6,630	5,120	2,150	1,650	2,650	e700	946	43,400	3,200	4,290	4,190	1,900
5	9,620	4,140	2,640	3,630	2,510	1,640	1,510	40,500	7,870	5,900	5,190	1,730
6	8,560	3,780	1,910	1,860	4,180	1,930	755	28,100	5,570	5,240	3,520	1,980
7	6,690	1,750	1,770	e700	2,970	e600	1,060	25,700	6,190	2,360	3,080	1,800
8	4,430	2,400	1,380	782	4,220	669	1,940	29,200	3,930	2,930	3,480	2,090
9	7,270	3,640	2,060	2,540	3,220	e2,000	e400	41,400	5,640	2,710	4,310	1,340
10	3,750	2,300	2,710	2,180	4,160	e1,600	469	63,800	4,590	1,210	5,180	1,800
11	4,410	1,670	2,940	1,160	2,140	1,210	e300	63,100	4,530	4,780	4,910	2,230
12	6,220	4,430	2,310	1,240	3,370	1,680	1,350	61,400	8,030	13,700	6,980	1,950
13	4,980	4,940	540	635	1,320	2,710	737	67,300	8,970	10,900	4,900	1,890
14	4,230	2,460	1,650	1,340	503	1,030	e400	64,400	6,700	6,850	4,650	1,960
15	7,280	3,840	3,360	782	1,750	e300	e400	63,300	8,830	6,650	5,660	4,150
16	2,840	5,100	3,820	2,000	2,980	1,970	2,910	61,500	9,590	6,770	3,140	1,860
17	1,240	6,130	1,260	1,120	3,190	2,630	2,700	58,000	4,940	7,950	3,790	3,690
18	2,850	3,260	2,610	282	2,580	1,270	5,000	50,400	5,050	3,300	2,740	5,320
19	5,770	3,250	1,930	1,930	2,380	2,420	895	37,500	6,180	4,490	1,560	4,270
20	6,180	2,930	3,120	3,260	1,400	4,630	3,070	19,900	8,410	3,430	3,130	1,970
21	6,410	2,400	2,000	2,090	2,100	3,850	1,720	22,100	5,760	7,570	2,470	1,540
22	2,380	1,020	1,340	2,090	5,130	4,160	815	17,800	6,300	3,710	4,110	2,880
23	2,410	2,510	1,620	1,810	6,190	1,720	417	19,100	5,100	3,040	3,140	5,340
24	2,400	2,580	1,460	2,470	5,070	3,090	2,000	18,000	4,500	2,720	2,780	3,750
25	3,390	3,600	855	2,070	5,200	2,860	7,870	17,700	5,310	2,610	3,240	2,540
26	3,850	1,020	1,580	1,990	2,910	388	6,040	18,900	2,190	3,430	2,600	2,600
27	4,830	1,360	366	1,820	1,580	1,180	3,920	16,400	4,500	3,630	7,460	5,080
28	6,160	1,760	1,930	3,180	1,860	1,530	1,230	12,800	4,320	4,690	4,220	1,290
29	1,180	1,750	785	3,550	---	743	12,900	14,500	3,580	5,000	2,540	847
30	1,730	2,720	612	2,760	---	e300	23,600	14,200	3,880	3,750	2,390	1,100
31	2,650	---	1,670	716	---	1,220	---	9,560	---	8,350	2,310	---
Total	145,570	92,630	61,788	55,150	84,033	56,450	91,775	1,061,360	180,830	152,410	137,610	79,427
Mean	4,696	3,088	1,993	1,779	3,001	1,821	3,059	34,240	6,028	4,916	4,439	2,648
Max	9,620	6,130	3,820	3,630	6,190	4,630	23,600	67,300	13,100	13,700	12,800	5,340
Min	1,180	1,020	366	282	503	300	300	9,560	2,190	1,210	1,560	847
Ac-ft	288,700	183,700	122,600	109,400	166,700	112,000	182,000	2,105,000	358,700	302,300	272,900	157,500

07194800 ILLINOIS RIVER AT SAVOY, AR

LOCATION.--Lat 36°06'11", long 94°20'40" referenced to North American Datum of 1927, in SE ¼ sec.36, T.17 N., R.32 W., Washington County, AR, Hydrologic Unit 11110103, on eastern boundary of Ozark National Forest, on left bank downstream end of State Highway 16 bridge, 0.3 mi downstream from tributary of Lake Weddington, 0.4 mi upstream from Clear Creek, and 0.9 mi southwest of Savoy.

DRAINAGE AREA.--167 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Jul 1979 to Dec 1981, Oct 1985 to Sep 1986, Aug 1995 to current year. Occasional low-flow discharge measurements 1957-63; occasional discharge measurements 1974-78, 1982-85, and 1990-95.

REVISED RECORDS.--WDR Ark. 2000: 1986 (M)(P), 1997-99 (M)

GAGE.--Water-stage recorder. Datum of gage is 1,017.90 ft above NGVD of 1929.

REMARKS.-- Water-discharge records good. No estimated daily discharges. Satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	6.6	14	8.9	8.0	10	13	25	128	27	8.1	6.1	18
2	6.0	11	9.1	8.1	10	12	57	96	20	7.9	5.7	15
3	5.8	9.5	8.7	7.8	9.8	11	55	79	15	7.8	5.8	13
4	5.6	8.8	8.8	7.7	9.8	10	26	1,100	13	7.6	6.5	12
5	5.4	8.8	12	7.7	9.5	9.8	18	1,050	12	7.7	8.0	11
6	5.5	9.5	11	7.5	9.3	9.8	20	377	21	7.4	9.7	10
7	6.1	10	11	7.4	9.1	10	40	249	44	7.2	8.5	9.9
8	5.6	12	11	7.7	9.0	10	25	175	18	7.1	7.5	9.6
9	5.6	12	11	7.6	9.4	22	18	205	13	7.1	7.3	9.0
10	5.5	11	11	8.7	11	21	14	594	11	7.2	6.7	8.6
11	5.3	11	11	8.9	12	16	13	381	10	7.6	7.1	12
12	5.4	11	11	8.0	12	15	11	217	9.9	12	7.3	31
13	5.4	11	11	8.7	12	60	10	147	9.5	12	7.0	14
14	5.4	11	12	8.3	12	38	9.5	96	8.9	9.2	6.9	12
15	5.4	13	11	8.1	12	17	8.9	64	8.3	8.8	7.4	10
16	6.0	12	11	8.2	12	12	8.5	46	8.0	8.2	16	9.4
17	5.4	12	11	7.7	12	11	8.0	35	8.3	7.9	9.6	741
18	5.6	11	11	7.4	13	9.8	7.4	27	8.7	7.5	7.3	663
19	5.6	12	10	7.4	13	9.7	7.0	22	8.2	7.2	6.3	259
20	6.4	11	10	7.6	13	13	6.8	18	8.0	6.9	6.7	120
21	6.2	11	11	7.4	13	44	6.7	16	7.7	6.7	124	69
22	6.5	10	10	7.4	14	30	6.7	14	64	6.3	45	127
23	6.7	10	10	7.4	14	19	6.4	13	76	6.2	860	2,820
24	6.5	9.9	11	7.4	14	15	6.6	12	27	5.9	152	658
25	6.4	9.2	11	7.3	13	12	41	12	19	6.2	37	325
26	6.6	9.2	11	7.3	13	11	28	11	14	6.0	22	217
27	6.8	9.7	11	7.4	13	13	15	11	11	6.0	44	156
28	7.4	9.8	10	14	13	9.9	13	10	10	6.1	116	119
29	8.3	9.1	10	24	---	8.3	297	9.4	9.1	6.2	75	94
30	7.6	8.9	9.8	13	---	8.3	214	9.0	8.5	6.1	42	79
31	9.8	---	8.3	11	---	10	---	11	---	6.0	24	---
Total	192.4	318.4	324.6	272.1	326.9	510.6	1,022.5	5,234.4	528.1	230.1	1,694.4	6,651.5
Mean	6.21	10.6	10.5	8.78	11.7	16.5	34.1	169	17.6	7.42	54.7	222
Max	9.8	14	12	24	14	60	297	1,100	76	12	860	2,820
Min	5.3	8.8	8.3	7.3	9.0	8.3	6.4	9.0	7.7	5.9	5.7	8.6
Ac-ft	382	632	644	540	648	1,010	2,030	10,380	1,050	456	3,360	13,190

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Apr 1974 to current year.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Color, water, fltrd, Pt-Co units (00080)	Sampling method, code (82398)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)
Oct													
26...	1400	80020	6.8	--	30	E2.4	750	7.8	74	8.1	334	12.5	140
Dec													
13...	1215	80020	11	--	30	2.7	751	13.0	98	8.0	350	3.1	160
Mar													
07...	0950	80020	10	15	30	3.1	747	8.6	78	7.7	303	10.2	130
May													
03...	0715	80020	88	25	30	12	745	6.6	74	7.5	249	19.8	110
05...	0715	80020	1,190	125	10	79	744	7.3	78	7.8	141	16.8	55
Jun													
22...	0840	80020	7.4	18	30	4.5	752	5.7	70	7.6	329	24.4	130
Aug													
16...	0800	80020	15	18	30	6.1	751	3.9	49	7.5	306	25.4	130
23...	1610	80020	1,840	312	10	930	750	4.2	50	7.7	202	23.8	71

Date	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia + org-N, water, fltrd, mg/L as N (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L as N (71851)	Nitrite + nitrate water, fltrd, mg/L as N (00618)	Nitrite water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (71856)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Orthophosphorus, water, fltrd, mg/L as P (00666)
Oct												
26...	.24	--	<.04	--	--	.59	--	<.008	--	.82	--	E.01	E.03
Dec												
13...	.24	--	<.04	--	--	1.23	--	<.008	--	1.5	--	<.02	<.04
Mar												
07...	.42	.08	.07	2.23	.50	.52	.053	.016	.36	.94	--	E.01	E.03
May												
03...	.54	.07	.05	5.50	1.24	1.27	.102	.031	.48	1.8	.209	.07	.09
05...	1.1	.05	.04	3.95	.89	.90	.033	.010	1.1	2.0	.316	.10	.13
Jun													
22...	.38	.04	.34	3.09	.70	.71	.030	.009	.34	1.1	.182	.059	.07
Aug													
16...	.54	.04	.35	.567	.13	.14	.023	.007	.51	.68	.157	.051	.05
23...	4.7	.14	.108	4.05	.91	.95	.104	.032	4.6	5.7	.157	.051	.08

WATER-QUALITY RECORDS

Date	Phosphorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/ 100 mL (31633)	Fecal coliform, M-FC 0.7u MF col/ 100 mL (31625)	Biomass phytoplankton, ashfree drymass mg/L (49953)	Biomass plankton, ash wgt mg/L (81353)	Biomass plankton, dry wgt mg/L (81354)	Chlorophyll a phytoplankton, fluoro, ug/L (70953)	Pheophytin a, phytoplankton, ug/L (62360)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)	Sampler type, code (84164)
Oct												
26...	.05	32	74	<3.2	138	140	.7	.7	90	55	1.0	8010
Dec												
13...	E.03	46	E15	<2.0	87.8	89.7	.8	.9	86	59	1.8	8010
Mar												
07...	.05	30	46	2.5	94.7	97.2	3.0	3.4	82	6	.16	8010
May												
03...	.14	680	580	4.8	172	177	1.8	4.6	80	19	4.5	8010
05...	.31	6,300	E3,300	22.5	733	755	5.5	9.0	85	118	379	3052
Jun												
22...	.10	E680	E720	3.7	168	172	E3.8	E5.6	76	7	.14	8010
Aug												
16...	.11	E660	E1,100	6.5	267	273	16.0	7.5	70	9	.36	8010
23...	1.61	21,000	37,000	143.8	3,920	4,070	29.1	56.8	93	1,480	7,350	3054

Date	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption (00931)	Sodium fraction of cations ratio (00932)	Sodium, percent (00930)	Sodium, fltrd, mg/L (00940)	Chloride, water, fltrd, mg/L (00950)	Fluoride, water, fltrd, mg/L (00945)	Sulfate water, fltrd, mg/L (70300)	Residue on evap. at 180degC wat flt mg/L (00540)	Residue fixed non-filterable, mg/L (00530)	Residue total at 105 deg. C, suspended, mg/L (00535)	Residue volatile, suspended, mg/L
Oct														
26...	51.0	2.53	3.49	.3	10	7.49	10.8	E.1	6.5	191	2	3	1	
Dec														
13...	59.4	2.49	3.06	.3	10	8.74	12.5	E.1	6.8	201	M	2	M	
Mar														
07...	48.6	2.17	2.69	.3	11	7.23	11.0	.1	8.4	178	M	.8	M	
May														
03...	38.9	2.74	3.35	.2	9	5.01	6.95	E.1	17.2	149	10	14	3	
05...	18.6	2.07	3.23	.2	10	2.98	4.62	.1	10.6	104	91	106	15	
Jun														
22...	47.4	2.76	3.77	.2	9	6.05	9.36	E.1	10.5	189	5	7	2	
Aug														
16...	46.3	2.69	4.33	.3	10	7.06	10.9	E.1	5.0	182	7	11	4	
23...	25.7	1.62	5.06	.2	8	3.21	4.87	.1	9.9	122	1,110	1,240	130	

07195000 OSAGE CREEK NEAR ELM SPRINGS, AR

LOCATION.–Lat 36°1 3c19s, long 94°1 7c18s referenced to North American Datum of 1983, in NE ¼ sec.21, T.1 8 N., R.31 W., Benton County, AR, Hydrologic Unit 11110103, on left bank 0.7 mi downstream from Little Osage Creek, and 3.2 mi northwest of Elm Springs.
DRAINAGE AREA.–130 mi².

SURFACE-WATER RECORDS

REVISED PERIOD OF RECORD.–Oct 1950 to Sep 1975, Aug 1995 to current year. Oct 1976 to Sep 1979 a crest-stage partial-record station. Occasional discharge measurements 1977-79 and 1982-95. Monthly discharge only for some periods, published in WSP 1731.
RECORDS.–WDR Ark.1970: Drainage area. WDR Ark. 1974: 1969.
GAGE.–Water-stage recorder. Prior to Oct 1, 1979 water stage recorder about 400 ft downstream at present datum. Altitude of gage is 1,052 ft by barometer.
REMARKS.–Water-discharge records good except estimated daily discharges, which are poor. Low flow slightly regulated by operation of small lake at Cave Springs, and city of Rogers sewage treatment plant. Satellite telemeter at station.

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	83	106	52	e33	61	51	52	269	100	48	48	80
2	76	98	52	32	58	51	129	161	165	41	48	67
3	81	87	42	39	54	52	82	131	85	44	47	56
4	81	91	40	42	45	45	73	337	68	47	50	54
5	81	82	52	45	40	40	69	280	70	50	84	57
6	81	53	57	46	45	47	93	170	163	55	49	58
7	69	62	55	41	48	53	133	148	131	52	52	58
8	55	70	58	32	48	54	77	135	94	44	53	57
9	50	71	60	42	47	260	66	155	83	36	52	50
10	57	64	51	e45	46	128	66	344	70	46	50	47
11	65	70	45	e47	41	167	64	210	62	67	76	118
12	60	64	42	e74	34	235	e59	159	65	144	68	104
13	52	54	49	e133	40	135	e60	134	66	88	50	75
14	48	60	46	e88	43	98	e59	113	65	77	53	68
15	62	86	52	e79	44	88	e52	108	62	64	55	62
16	67	77	55	e69	44	80	e49	106	61	53	51	57
17	61	71	49	e60	46	74	e47	98	58	65	49	693
18	64	70	42	e50	43	66	e46	92	49	64	46	350
19	61	62	47	e41	39	58	45	85	55	64	41	164
20	63	57	52	e37	40	77	43	75	59	61	32	125
21	60	62	49	38	50	96	42	64	56	57	166	106
22	55	66	47	34	54	74	34	68	120	53	92	102
23	42	63	40	39	57	69	30	70	145	42	74	842
24	48	55	35	41	52	65	47	68	84	47	62	223
25	57	49	36	43	47	56	247	67	65	52	59	156
26	62	44	34	41	43	51	99	66	62	51	55	133
27	66	41	33	42	46	54	78	57	64	51	151	113
28	70	55	41	97	50	57	74	52	60	77	187	101
29	66	55	43	102	---	54	654	52	58	48	178	90
30	55	54	44	70	---	53	287	56	54	36	110	82
31	111	---	38	64	---	68	---	88	---	43	90	---
Total	2,009	1,999	1,438	1,686	1,305	2,556	2,956	4,018	2,399	1,767	2,278	4,348
Mean	64.8	66.6	46.4	54.4	46.6	82.5	98.5	130	80.0	57.0	73.5	145
Max	111	106	60	133	61	260	654	344	165	144	187	842
Min	42	41	33	32	34	40	30	52	49	36	32	47
Ac-ft	3,980	3,970	2,850	3,340	2,590	5,070	5,860	7,970	4,760	3,500	4,520	8,620

07195000 OSAGE CREEK NEAR ELM SPRINGS, AR—Continued
WATER-QUALITY RECORDS

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Sampling method, code (82398)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
Oct 26...	1030	80020	54	30	750	7.8	71	7.9	568	10.4	130	48.5	2.31
Dec 13...	1045	80020	48	30	750	12.5	100	8.7	551	5.3	150	56.4	2.11
Mar 07...	1215	80020	46	30	747	15.2	147	8.9	558	12.9	130	49.0	2.03
May 03...	1020	80020	127	10	744	8.1	88	7.3	395	18.2	130	48.0	2.23
Jun 21...	1300	80020	49	30	750	10.4	132	8.8	538	26.6	120	44.2	2.13
Aug 15...	0950	80020	52	30	754	5.9	73	7.8	527	25.4	120	44.1	1.83

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Sulfate water, fltrd, mg/L	Residue on evap. at 180degC wat flt mg/L (00945)	Ammonia + org-N, water, unfltrd mg/L as N (70300)	Ammonia water, fltrd, mg/L (00625)	Ammonia water, fltrd, mg/L as N (71846)	Nitrate water, fltrd, mg/L (00608)	Nitrate water, fltrd, mg/L as N (71851) (00618)
Oct 26...	11.9	2	41	45.8	47.5	.5	43.7	329	2.2	1.80	1.40		
Dec 13...	10.9	2	37	44.4	42.2	.4	42.8	309	.47	--	<.04		
Mar 07...	12.2	2	42	49.3	47.2	.6	61.2	342	.69	--	<.04	14.4	3.25
May 03...	5.86	.8	24	19.6	21.6	.2	29.7	237	.39	--	E.02	14.4	3.26
Jun 21...	10.4	2	41	42.0	52.2	.5	47.1	322	.46	.02	.013	16.3	3.67
Aug 15...	11.3	2	41	42.9	44.1	.6	47.1	312	.42	.02	.015	9.93	2.24

WATER-QUALITY DATA

Da	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitro-gen, water, unfltrd mg/L (00605)	Total nitro-gen, water, unfltrd mg/L (00600)	Ortho-phos-phate, water, fltrd, mg/L (00660)	Ortho-phos-phate, water, fltrd, mg/L as P (00671)	Phos-phorus, water, fltrd, mg/L (00666)	Phos-phorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/ 100 mL (31633)	Fecal coli-form, M-FC 0.7u MF col/ 100 mL (31625)	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)
Oct													
26...	4.32	--	E.004	.79	6.5	4.18	1.36	1.40	1.48	130	150	98	70
Dec													
13...	3.17	--	<.008	--	3.6	1.02	.33	.36	.34	E12	42	93	66
Mar													
07...	3.27	.039	.012	--	4.0	.616	.20	.23	.24	35	43	43	4
May													
03...	3.27	.026	.008	--	3.7	.941	.31	.32	.35	280	E210	94	24
Jun													
21...	3.68	.035	.011	.44	4.1	.636	.207	.23	.25	140	100	78	6
Aug													
15...	2.25	.028	.009	.40	2.7	1.20	.390	.40	.40	120	200	84	12

Date	Sus-pended sedi-ment dis-charge, tons/d (80155)	Sampler type, code (84164)
Oct		
26...	10	8010
Dec		
13...	8.6	8010
Mar		
07...	.50	8010
May		
03...	8.2	3052
Jun		
21...	.79	8010
Aug		
15...	1.7	8010

07195430 ILLINOIS RIVER SOUTH OF SILOAM SPRINGS, AR

LOCATION.–Lat 36°06'31", long 94°32'00" referenced to North American Datum of 1983, in SE ¼ NE ¼ sec.31, T.17 N., R.33 W., Benton County, AR, Hydrologic Unit 11110103, at bridge on State Highway 59, 5.0 mi south of Si loam Springs, and 0.6 mi downstream from mouth of Cincinnati Creek.
DRAINAGE AREA.–575 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Aug 1995 to current year. Occasional low-flow measurements in 1971.
REVISED RECORDS.–WDR Ark 1997: 1996.
GAGE.–Water-stage recorder.
REMARKS.–Water-discharge records good except estimated daily discharges, which are poor. Satellite telemeter at station.
EXTREMES OUTSIDE PERIOD OF RECORD.–Flood of May 3, 1990, reached a stage of 25.4 ft, from floodmarks, discharge 66,000 ft³/s from rating curve extended above 23,000 ft³/s on basis of contracted opening of peak flow.
EXTREMES FOR CURRENT YEAR.–Maximum discharge, 8,900 ft³/s, Sep 23, gage height, 12.55 ft; minimum discharge, 50 ft³/s, on several days, gage height, 2.76 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	121	188	114	106	140	112	125	513	158	65	50	144
2	115	163	114	103	133	114	173	411	194	61	51	120
3	110	134	114	103	129	112	273	306	179	58	51	104
4	110	123	113	106	124	111	179	496	135	57	52	93
5	109	117	108	107	118	108	150	2,570	118	60	56	85
6	109	113	109	107	113	105	157	821	133	59	70	80
7	112	112	112	109	112	107	205	475	180	59	58	76
8	113	113	111	109	111	110	199	372	163	58	60	75
9	108	114	111	109	109	e199	157	320	128	56	54	73
10	105	113	112	114	108	e342	137	787	110	55	52	69
11	108	110	113	120	108	199	128	967	98	65	56	100
12	109	114	111	129	108	265	122	486	91	122	58	123
13	107	114	109	135	104	264	116	356	87	153	61	118
14	103	109	113	139	105	254	108	284	84	105	55	88
15	102	113	115	125	106	179	103	241	81	85	54	78
16	106	134	114	120	107	155	98	224	78	76	54	73
17	109	125	112	118	105	138	93	206	78	70	56	263
18	105	120	110	118	115	133	94	190	76	68	54	2,360
19	105	119	108	117	117	127	92	172	73	65	51	698
20	104	116	109	116	114	127	90	157	71	63	50	254
21	104	113	112	113	112	178	89	143	69	61	90	175
22	105	113	112	111	115	187	87	132	119	58	774	168
23	103	115	111	109	118	159	85	127	196	56	1,290	4,060
24	99	115	112	110	120	140	88	121	146	54	1,030	3,020
25	100	111	111	112	116	129	246	117	110	53	194	1,030
26	100	109	108	112	110	119	313	112	89	54	149	667
27	103	107	106	112	106	113	209	108	81	53	142	499
28	107	103	107	131	107	113	180	103	76	54	345	398
29	109	111	108	243	---	108	689	98	71	61	307	335
30	108	114	108	198	---	103	966	95	68	56	219	308
31	113	---	108	156	---	103	---	138	---	51	166	---
Total	3,321	3,575	3,435	3,817	3,190	4,713	5,751	11,648	3,340	2,071	5,809	15,734
Mean	107	119	111	123	114	152	192	376	111	66.8	187	524
Max	121	188	115	243	140	342	966	2,570	196	153	1,290	4,060
Min	99	103	106	103	104	103	85	95	68	51	50	69
Ac-ft	6,590	7,090	6,810	7,570	6,330	9,350	11,410	23,100	6,620	4,110	11,520	31,210

WATER-QUALITY DATA

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Color, water, fltrd, Pt-Co units (00080)	Sampling method, code (82398)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)
Oct													
26...	0900	80020	100	--	30	E1.0	754	8.0	75	8.2	444	11.8	130
Dec													
13...	0915	80020	108	--	30	<2.0	751	12.5	96	8.3	450	3.7	150
Mar													
07...	1115	80020	106	8	30	<2.0	751	12.3	116	7.9	428	11.9	130
May													
03...	1115	80020	309	18	30	14	747	7.2	81	7.5	324	20.0	120
05...	0730	80020	3,660	150	10	180	752	6.6	70	7.0	192	17.4	72
Jun													
22...	0740	80020	67	12	30	5.7	755	5.8	71	7.6	420	25.2	140
Aug													
16...	0710	80020	54	10	30	6.0	754	4.3	55	7.8	429	26.8	120
23...	1655	80020	1,670	75	10	170	751	5.5	67	7.5	240	24.7	72

Date	Phosphorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/ 100 mL (31633)	Fecal coliform, M-FC 0.7u MF col/ 100 mL (31625)	Biomass phytoplankton, ashfree drymass mg/L (49953)	Biomass plankton, ash wgt mg/L (81353)	Biomass plankton, dry wgt mg/L (81354)	Chlorophyll a phytoplankton, fluoro, ug/L (70953)	Pheophytin a, phytoplankton, ug/L (62360)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)	Sampler type, code (84164)
Oct												
26...	.11	31	22	<3.2	143	145	.3	.6	99	80	22	8010
Dec												
13...	.14	E8	120	2.2	88.8	91.0	1.5	.9	94	49	14	8010
Mar												
07...	.08	20	27	1.7	73.2	74.9	2.2	3.0	67	3	.86	8010
May												
03...	.14	120	140	6.6	274	281	1.6	4.1	97	13	11	8010
05...	.48	--	--	41.4	1,550	1,590	8.6	18.3	92	276	2,730	3052
Jun												
22...	.13	62	50	6.5	301	308	E1.4	E3.5	72	12	2.2	8010
Aug												
16...	.15	74	E1,400	3.8	172	176	1.6	3.6	66	18	2.6	8010
23...	.54	3,300	3,800	37.7	1,520	1,560	4.8	11.0	94	256	1,150	3054

07195430 ILLINOIS RIVER SOUTH OF SILOAM SPRINGS, AR—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 2 of 4
[Remark codes: <, less than; E, estimated; M, presence verified but not quantified.]

Date	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 180degC wat flt mg/L (70300)	Residue fixed non-filterable, mg/L (00540)	Residue total at 105 deg. C, suspended, mg/L (00530)	Residue volatile, suspended, mg/L (00535)
Oct													
26...	47.6	2.08	6.62	1	32	28.9	31.3	.2	26.3	253	M	2	M
Dec													
13...	55.3	2.22	6.64	1	29	29.5	31.2	.2	28.3	258	M	.3	M
Mar													
07...	49.1	2.08	6.49	1	30	27.8	32.0	.3	27.9	246	M	.8	M
May													
03...	44.6	2.18	4.44	.5	18	12.6	14.2	.2	19.5	193	16	19	3
05...	25.6	1.93	3.94	.3	14	5.75	6.64	.1	12.8	134	145	167	22
Jun													
22...	50.6	2.12	6.17	.9	26	22.8	27.4	.2	25.7	242	8	10	2
Aug													
16...	43.9	1.98	7.44	1	33	28.5	32.2	.3	27.9	254	10	13	3
23...	26.4	1.41	5.84	.6	23	10.8	11.6	.1	12.2	144	200	230	30

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 3 of 4
[Remark codes: <, less than; E, estimated; M, presence verified but not quantified.]

Date	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)
Oct													
26...	.19	--	<.04	--	--	2.03	--	<.008	--	2.2	.288	.09	.10
Dec													
13...	.26	--	<.04	--	--	2.32	--	<.008	--	2.6	.423	.14	.14
Mar													
07...	.33	--	<.04	7.01	1.58	1.59	.036	.011	--	1.9	.218	.07	.08
May													
03...	.40	--	<.04	7.87	1.78	1.79	.026	.008	--	2.2	.288	.09	.11
05...	1.5	--	E.03	4.63	1.05	1.06	.039	.012	--	2.5	.396	.13	.15
Jun													
22...	.28	.01	.011	6.09	1.38	1.38	.018	.005	.27	1.7	.339	.110	.12
Aug													
16...	.31	.03	.023	3.49	.79	.79	.016	.005	.29	1.1	.424	.138	.14
23...	1.3	.03	.022	6.51	1.47	1.49	.065	.020	1.3	2.8	.768	.250	.29

07195500 ILLINOIS RIVER NEAR WATTS, OK

LOCATION.–Lat 36°07ᶜ48ˢ, long 94°34ᶜ19ˢ referenced to North American Datum of 1927, in NW ¼ NE ¼ sec.18, T.19 N., R.26 E., Adair County, OK, Hydrologic Unit 11110103, near right bank on downstream side of pier of bridge on U.S. Highway 59, 1.5 mi north of Watts, 4.5 mi downstream from Cincinnati Creek, and at mile 106.2.
DRAINAGE AREA.–635 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–August 1955 to current year.
GAGE.–Water-stage recorder. Datum of gage is 893.78 ft above NGVD of 1929.
REMARKS.–Records fair. Since July 2, 1957, small diversion for municipal water supply for the city of Siloam Springs, Ark., upstream from station. U.S. Army Corps of Engineers' satellite telemeter at station.
PEAK DISCHARGES FOR CURRENT YEAR.–Peak discharges greater than base discharge of 6,500 ft³/s and (or) maximum (*):

VIA SATELLITE, DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	127	185	128	121	166	132	174	700	242	105	56	246
2	118	199	128	116	158	133	207	583	302	98	57	209
3	110	158	130	112	152	132	373	433	311	90	56	181
4	107	143	129	115	148	132	274	774	217	87	64	162
5	107	130	123	117	139	129	223	2,900	186	94	73	145
6	107	126	123	117	133	123	216	1,260	191	86	107	136
7	109	124	129	119	129	123	287	753	302	90	83	130
8	111	125	130	123	130	129	317	567	281	86	82	127
9	106	126	130	119	127	178	241	495	214	82	71	121
10	100	126	131	125	126	463	206	1,100	184	76	65	121
11	101	121	132	134	129	299	190	1,450	163	96	72	133
12	105	127	133	139	130	333	178	813	149	160	80	210
13	101	127	128	146	122	364	169	571	143	275	90	217
14	97	121	134	162	123	361	155	460	139	181	75	166
15	95	126	138	148	126	269	147	373	134	146	71	148
16	99	151	136	135	126	230	142	324	127	125	69	136
17	103	145	134	132	122	204	131	289	129	108	74	151
18	99	137	131	131	138	192	128	260	129	105	72	2,390
19	98	137	129	130	142	184	126	235	124	98	64	1,130
20	98	132	128	129	137	181	121	215	120	92	60	553
21	98	129	132	124	135	233	119	194	117	86	78	397
22	99	127	132	121	141	284	117	177	138	82	861	322
23	99	131	131	117	146	234	113	169	414	75	987	3,500
24	94	132	132	117	153	208	110	162	314	70	1,470	3,790
25	93	129	132	121	146	187	213	155	217	67	398	1,340
26	92	124	126	121	138	172	420	148	170	67	257	860
27	96	123	122	120	129	160	252	145	148	66	215	617
28	102	116	123	136	126	158	202	137	136	67	468	488
29	104	121	121	247	---	152	589	131	121	83	510	408
30	106	126	123	252	---	146	1,360	124	112	73	430	357
31	110	---	120	189	---	142	---	171	---	62	310	---
Total	3,191	4,024	3,998	4,235	3,817	6,367	7,500	16,268	5,674	3,078	7,425	18,891
Mean	103	134	129	137	136	205	250	525	189	99.3	240	630
Max	127	199	138	252	166	463	1,360	2,900	414	275	1,470	3,790
Min	92	116	120	112	122	123	110	124	112	62	56	121
Ac-ft	6,330	7,980	7,930	8,400	7,570	12,630	14,880	32,270	11,250	6,110	14,730	37,470

WATER-QUALITY RECORDS

PERIOD OF RECORD.–October 1989 to July 1995, July 1996 to current year.
REMARKS.–Samples collected periodically. Specific conductance, pH, water temperature, dissolved oxygen, turbidity, and alkalinity were determined in the field.

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 1 of 8

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Turbidity, IR LED light, det ang 90 deg, FNU (63680)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)
Oct													
19...	1140	80020	96	6.7	--	744	9.5	108	7.8	418	34.0	20.3	--
Dec													
06...	1130	80020	122	<2.0	--	739	15.3	125	8.4	417	2.2	5.5	--
Feb													
01...	1140	80020	165	4.1	--	733	12.1	108	7.8	380	15.9	8.6	--
Mar													
09...	1300	80020	176	4.9	--	732	10.2	103	7.7	408	10.9	14.2	130
10...	1040	80020	541	10	--	731	10.3	100	7.4	423	18.8	12.3	130
Apr													
03...	1120	80020	416	8.9	--	743	9.7	104	8.0	388	15.4	17.3	120
12...	1145	80020	178	7.4	11	743	10.0	109	8.0	362	27.5	18.2	140
26...	1140	80020	413	18	18	740	8.9	95	7.4	399	11.6	17.1	130
30...	1350	80020	1,300	59	51	734	9.1	98	8.0	254	22.5	17.1	100
May													
05...	1145	80020	3,410	150	120	740	9.8	106	7.2	215	--	17.6	76
Jun													
14...	1110	80020	140	12	11	743	8.6	108	8.1	378	22.8	25.6	130
Aug													
09...	1045	80020	72	8.7	10	741	8.0	107	8.0	448	30.6	29.0	130
24...	1120	80020	1,220	--	--	736	7.8	96	7.7	210	29.0	23.8	83

Date	Noncarb hard-ness, wat flt field, mg/L as CaCO3 (00904)	Calcium water, fltrd, mg/L (00915)	Calcium water unfltrd recover-able, mg/L (00916)	Magnes-ium, water, fltrd, mg/L (00925)	Magnes-ium, water, unfltrd recover-able, mg/L (00927)	Potas-sium, water, fltrd, mg/L (00935)	Potas-sium, water, unfltrd recover-able, mg/L (00937)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Sodium, water, unfltrd recover-able, mg/L (00929)	Alka-linity, wat flt inc tit field, mg/L as CaCO3 (39086)	Bicar-bonate, wat flt incrm. titr., field, mg/L (00453)
Oct													
19...	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec													
06...	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb													
01...	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar													
09...	13	48.6	49.1	2.06	2.09	6.28	5.96	1	30	27.0	27.6	118	143
10...	18	50.1	48.4	2.11	2.10	7.13	6.64	1	31	29.8	29.8	117	141
Apr													
03...	.0	44.2	48.9	2.32	2.32	5.51	5.61	.9	29	23.3	24.3	121	146
12...	14	50.3	50.6	2.29	2.35	5.67	5.55	.8	24	21.1	20.6	121	146
26...	13	48.6	49.8	2.33	2.33	6.51	6.71	1	30	27.4	27.8	120	144
30...	19	36.8	37.0	1.91	1.89	4.67	4.68	.4	17	9.98	9.9	82	99
May													
05...	23	27.1	28.6	2.04	2.17	4.25	4.32	.3	14	6.00	6.0	53	64
Jun													
14...	--	48.9	49.4	2.23	2.19	6.09	5.85	.8	24	20.5	19.4	135	162
Aug													
09...	10	47.8	48.2	2.19	2.01	8.48	7.79	1	35	34.8	31.4	120	144
24...	11	30.5	29.6	1.75	1.83	5.56	5.38	.3	14	6.93	6.3	73	89

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 3 of 8

Date	Carbonate, wat flt incrm. titr., field, mg/L (00452)	Chloride, water, fltrd, mg/L (00940)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of constituents mg/L (70301)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, dissolved, tons/d (70302)	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)	Nitrite + nitrate water fltrd, mg/L as N (00631)
Oct													
19...	--	--	--	--	--	--	--	.25	.02	.015	7.27	1.64	1.65
Dec													
06...	--	--	--	--	--	--	--	.24	--	<.010	8.56	1.93	1.94
Feb													
01...	--	--	--	--	--	--	--	.33	.01	.011	7.59	1.72	1.72
Mar													
09...	<1	29.4	26.3	217	.29	103	--	.38	.06	.044	6.22	1.41	1.42
10...	<1	29.7	30.6	227	.31	332	--	.45	.05	.038	7.71	1.74	1.76
Apr													
03...	<1	25.9	27.1	205	.28	230	--	.46	.03	.022	4.77	1.08	1.09
12...	1	21.7	22.1	200	.27	96.3	--	.38	.04	.031	4.17	.94	.951
26...	<1	27.7	30.6	221	.33	274	246	.54	.09	.072	6.33	1.43	1.45
30...	<1	10.3	15.3	134	.21	542	154	.76	.08	.066	5.44	1.23	1.24
May													
05...	<1	6.84	13.0	100	.18	1,220	132	1.4	.05	.042	8.27	1.87	1.88
Jun													
14...	1	23.8	22.2	211	.31	86.9	230	.34	.03	.022	6.04	1.37	1.37
Aug													
09...	<1	35.1	31.4	238	.36	52.1	268	.37	.05	.042	7.06	1.60	1.60
24...	<1	7.36	11.2	114	.18	427	130	1.2	.05	.040	6.33	1.43	1.45

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 4 of 8

Date	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitro-gen, water, unfltrd mg/L (00605)	Total nitro-gen, water, unfltrd mg/L (00600)	Ortho-phos-phate, water, fltrd, mg/L (00660)	Ortho-phos-phate, water, fltrd, mg/L as P (00671)	Phos-phorus, water, fltrd, mg/L (00666)	Phos-phorus, water, unfltrd mg/L (00665)	Hydro-gen ion, water, fltrd, calcd, mg/L (00191)	Organic carbon, water, unfltrd mg/L (00680)	Alum-inum, water, fltrd, ug/L (01106)	Alum-inum, water, unfltrd recover-able, ug/L (01105)	Anti-mony, water, fltrd, ug/L (01095)
Oct													
19...	.016	.005	.23	1.9	.261	.085	.105	.126	.00001	–	–	–	–
Dec													
06...	.010	.003	–	2.2	.429	.140	.161	.166		–	–	–	–
Feb													
01...	.026	.008	.32	2.1	.178	.058	.079	.096	.00002	–	–	–	–
Mar													
09...	.046	.014	.34	1.8	.159	.052	.070	.098	.00002	4.2	1.7	106	<.20
10...	.049	.015	.42	2.2	.288	.094	.110	.138	.00004	6.5	1.8	130	E.10
Apr													
03...	.033	.010	.43	1.5	.163	.053	.064	.101	.00001	4.7	3.4	153	E. 12
12...	.030	.009	.35	1.3	.184	.060	.074	.099	.00001	2.8	4.0	211	<.20
26...	.062	.019	.46	2.0	.417	.136	.100	.150	.00004	4.2	3.8	235	E. 13
30...	.049	.015	.70	2.0	.374	.122	.107	.22	.00001	8.0	2.7	791	E. 14
May													
05...	.046	.014	1.4	3.3	.399	.130	.151	.39	.00007	13.4	8.6	1,820	E.11
Jun													
14...	.025	.008	.32	1.7	.383	.125	.129	.152	.00001	2.1	<1.6	285	<.20
Aug													
09...	.025	.008	.33	2.0	.373	.122	.134	.155	.00001	3.0	4.3	164	E.17
24...	.082	.025	1.1	2.6	.365	.119	.141	.35	.00002	10.2	4.9	2,830	E.14

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 5 of 8

Date	Anti-mony, water, unfltrd ug/L (01097)	Arsenic water, fltrd, ug/L (01000)	Arsenic water unfltrd ug/L (01002)	Barium, water, fltrd, ug/L (01005)	Barium, water, unfltrd recover -able, ug/L (01007)	Beryll-ium, water, fltrd, ug/L (01010)	Beryll-ium, water, unfltrd recover -able, ug/L (01012)	Cadmium water, fltrd, ug/L (01025)	Cadmium water, unfltrd ug/L (01027)	Chrom-ium, water, fltrd, ug/L (01030)	Chrom-ium, water, unfltrd recover -able, ug/L (01034)	Cobalt water, fltrd, ug/L (01035)	Cobalt water, unfltrd recover -able, ug/L (01037)
Oct													
19...	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec													
06...	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb													
01...	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar													
09...	E.1	.47	.63	47	46.6	E.04	<.06	.06	.05	<2	<2	.656	.812
10...	E.1	.45	.58	48	48.7	<.06	<.06	.04	.06	<2	<2	.729	.949
Apr													
03...	E.1	.60	.66	46	49.0	<.06	<.06	E.03	E.03	<2	<2	.664	.784
12...	<.2	.60	.75	42	48.2	<.06	<.06	E.02	E.03	<2	<2	.622	.757
26...	E.2	.87	.86	55	54.8	<.06	E.05	E.03	E.04	<2	<2	.875	1.03
30...	E.1	.91	1.4	43	52.0	<.06	.08	<.04	.08	<2	E1	.356	.970
May													
05...	E.1	1.1	2.1	34	69.0	<.06	.23	<.04	.11	<2	3	.315	2.60
Jun													
14...	E.2	<.12	1.1	M	51.4	<.06	<.06	E.02	E.03	<2	<2	<.04	.664
Aug													
09...	E.1	1.2	1.4	58	56.4	<.06	<.06	E.03	E.03	<2	<2	.53	.818
24...	E.1	1.3	2.3	39	74.3	<.06	.22	<.04	.10	<2	4	.15	2.28

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 6 of 8

Date	Copper, water, fltrd, ug/L (01040)	Copper, water, unfltrd recover -able, ug/L (01042)	Iron, water, fltrd, ug/L (01046)	Iron, water, unfltrd recover -able, ug/L (01045)	Lead, water, fltrd, ug/L (01049)	Lead, water, unfltrd recover -able, ug/L (01051)	Mangan- ese, water, fltrd, ug/L (01056)	Mangan- ese, water, unfltrd recover -able, ug/L (01055)	Mercury water, fltrd, ug/L (71890)	Mercury water, unfltrd recover -able, ug/L (71900)	Molyb- denum, water, fltrd, ug/L (01060)	Molyb- denum, water, unfltrd recover -able, ug/L (01062)	Nickel, water, fltrd, ug/L (01065)
Oct													
19...	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec													
06...	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb													
01...	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar													
09...	1.4	1.1	12	187	.09	.29	24.4	42.7	E.008	E.007	1.4	1.4	2.35
10...	1.6	1.2	12	208	.12	.37	17.3	38.4	E.006	E.008	1.5	1.5	2.41
Apr													
03...	1.0	1.2	13	234	E.06	.39	19.7	45.3	E.009	.013	1.3	1.3	3.12
12...	.8	1.4	16	308	E.04	.49	20.4	52.1	.011	.018	1.3	1.2	4.09
26...	2.0	1.4	12	400	.12	.60	24.5	60.9	<.010	E.007	1.7	1.6	4.82
30...	1.3	2.5	13	986	E.05	3.43	10.6	87.8	E.006	.021	.9	.7	3.11
May													
05...	3.9	4.8	73	2,840	.10	4.75	9.1	310	<.010	.016	.6	.4	3.59
Jun													
14...	<.40	1.1	E4	251	<.08	.41	.5	51.8	<.010	<.010	<.4	1.5	<.06
Aug													
09...	2.0	1.5	E4	220	E.05	.45	14.4	62.5	<.010	<.010	2.3	2.3	2.8
24...	1.1	4.6	15	2,820	E.06	5.23	2.1	196	<.010	.012	.9	.5	1.5

Date	Nickel, water, unfltrd recover -able, ug/L (01067)	Selen-ium, water, fltrd, ug/L (01145)	Selen-ium, water, unfltrd ug/L (01147)	Silver, water, fltrd, ug/L (01075)	Silver, water, unfltrd recover -able, ug/L (01077)	Thall-ium, water, fltrd, ug/L (01057)	Thall-ium, water, unfltrd ug/L (01059)	Vanad-ium, water, fltrd, ug/L (01085)	Vanad-ium, water, unfltrd ug/L (01087)	Zinc, water, fltrd, ug/L (01090)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)
Oct													
19...	--	--	--	--	--	--	--	--	--	--	--	85	16
Dec													
06...	--	--	--	--	--	--	--	--	--	--	--	94	4
Feb													
01...	--	--	--	--	--	--	--	--	--	--	--	85	6
Mar													
09...	1.96	.14	.14	<.2	<.16	<.04	<.18	.54	E1	4.8	5	91	12
10...	2.33	.11	.10	<.2	<.16	<.04	<.18	.62	E1	7.2	6	91	18
Apr													
03...	2.17	.13	.13	<.2	<.16	<.04	<.18	.71	E1	2.8	3	92	19
12...	1.82	.17	.19	<.2	<.16	<.04	<.18	.79	E1	1.5	3	85	21
26...	3.54	.15	.18	<.2	<.16	<.04	<.18	1.1	2	6.5	5	96	26
30...	3.17	.22	.28	<.2	<.16	<.04	<.18	1.1	4	3.5	24	98	68
May													
05...	5.69	.36	.50	<.2	<.16	<.04	<.18	1.3	6	2.2	15	95	241
Jun													
14...	2.39	<.08	.21	<.2	<.16	<.04	<.18	<.10	2	<.60	2	86	17
Aug													
09...	3.69	.17	.18	<.2	<.16	<.04	<.18	1.8	2	2.0	3	85	16
24...	5.23	.37	.44	<.2	<.16	<.04	<.18	1.6	8	2.2	18	99	195

WATER YEAR OCTOBER 2005 TOSEPTEMBER 2006

Part 8 of 8

Date	Suspended sediment discharge, tons/d (80155)
Oct	
19...	4.1
Dec	
06...	1.3
Feb	
01...	2.7
Mar	
09...	5.7
10...	26
Apr	
03...	21
12...	10
26...	29
30...	239
May	
05...	2,220
Jun	
14...	6.4
Aug	
09...	3.1
24...	642

07195855 FLINT CREEK NEAR WEST SILOAM SPRINGS, OK

LOCATION.–Lat 36°1 2c58s, long 94°36c15s referenced to North American Datum of 1927, in NE ¼ NE ¼ sec.1 4, T.20 N., R.25 E., Delaware County, OK, Hydrologic Unit 11110103, on left bank 800 ft downstream from county bridge, 1.4 mi upstream from Sagar Creek, 2.5 mi from Arkansas-Oklahoma State line, northwest of West Siloam Springs, OK.
DRAINAGE AREA.–59.8 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Oct 1979 to current year.
GAGE.–Water-stage recorder. Datum of gage is 958.00 ft above NGVD of 1929.
REMARKS.–Water-discharge records good except estimated daily discharges, which are poor. Flow is partially regulated by Lake Siloam Springs, 4.5 mi upstream, and sewage discharge into Flint Creek from City of Gentry. Satellite telemeter at station.
EXTREMES FOR CURRENT YEAR.–Maximum discharge, 80 ft³/s, May 31, gage height, 4.86 ft; minimum discharge, 0.42 ft³/s, Aug 4, gage height, 3.41 ft.

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	6.3	12	11	10	8.4	7.5	6.8	26	26	2.3	1.4	7.3
2	6.6	9.0	12	10	8.1	7.1	11	21	20	1.9	1.6	5.6
3	6.3	9.7	11	9.2	7.6	6.7	12	18	16	2.6	1.1	4.6
4	5.8	8.1	11	8.6	7.0	6.6	9.1	23	14	4.2	e1.3	4.7
5	5.8	7.7	11	8.1	6.8	6.7	7.7	36	13	6.4	4.6	5.9
6	7.2	8.2	11	8.0	6.6	6.9	8.8	34	14	6.8	5.2	5.2
7	6.8	8.7	11	8.1	6.4	6.7	11	27	14	6.0	4.9	3.7
8	6.8	16	9.5	8.1	6.5	6.9	8.6	22	12	5.6	3.4	2.6
9	6.8	17	10	8.3	6.4	13	6.5	22	10	5.6	1.9	3.0
10	7.2	14	11	11	6.4	12	5.7	42	8.9	6.5	1.5	3.2
11	7.0	13	11	11	6.2	12	5.0	50	8.2	9.8	2.6	5.6
12	6.9	13	11	9.7	6.2	13	4.6	41	8.1	16	5.1	4.9
13	7.0	14	11	9.0	6.2	12	4.4	31	7.7	12	3.3	4.3
14	6.8	13	11	8.4	6.3	10	4.3	24	7.1	9.2	4.4	4.8
15	6.8	14	10	8.3	6.6	8.9	4.2	21	6.5	7.1	3.6	4.4
16	6.7	13	10	8.2	6.3	8.1	5.3	18	5.9	5.5	2.5	5.3
17	6.4	13	9.9	8.2	6.0	7.6	6.6	16	6.0	4.6	3.5	11
18	5.8	14	10	7.9	7.9	8.0	7.0	14	6.5	5.7	4.3	28
19	5.9	14	9.9	7.8	7.4	8.7	6.3	13	5.9	4.5	4.4	17
20	6.8	14	10	7.8	7.5	9.2	4.7	12	5.3	4.4	4.4	12
21	6.9	15	11	7.5	7.5	8.9	6.8	11	4.4	4.6	20	9.2
22	7.2	14	11	7.4	8.1	8.2	10	10	4.9	3.4	23	7.3
23	7.5	13	11	7.5	8.3	8.0	8.8	9.3	8.2	3.2	16	12
24	7.2	15	12	7.4	8.1	7.8	7.9	8.5	6.0	3.3	17	14
25	7.0	15	12	7.3	7.6	7.4	16	7.8	6.7	3.1	10	11
26	7.4	15	12	7.2	7.4	7.3	12	7.5	5.1	2.2	6.8	8.6
27	7.7	15	12	7.1	7.3	6.9	8.8	7.0	4.0	3.3	10	6.6
28	7.7	14	11	11	7.5	6.4	8.2	7.1	3.5	4.0	12	5.1
29	8.1	12	11	14	---	6.5	26	8.5	3.0	3.0	15	4.1
30	8.1	12	11	11	---	6.6	32	8.6	2.5	2.1	14	3.3
31	13	---	10	9.3	---	7.1	---	45	---	2.6	10	---
Total	219.5	385.4	336.3	272.4	198.6	258.7	276.1	641.3	263.4	161.5	218.8	224.3
Mean	7.08	12.8	10.8	8.79	7.09	8.35	9.20	20.7	8.78	5.21	7.06	7.48
Max	13	17	12	14	8.4	13	32	50	26	16	23	28
Min	5.8	7.7	9.5	7.1	6.0	6.4	4.2	7.0	2.5	1.9	1.1	2.6
Ac-ft	435	764	667	540	394	513	548	1,270	522	320	434	445

07195855 FLINT CREEK NEAR WEST SILOAM SPRINGS, OK—Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.–Jun to Sep 1979, Oct 1983 to current year.

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 3

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Turbidity, IR LED light, det ang 90 deg, FNU (63680)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)
Oct 18...	1030	80020	5.7	<2.0	--	737	7.6	85	6.9	283	33.4	18.7	.11
Dec 12...	0940	80020	11	<2.0	--	738	11.7	98	7.4	289	12.0	6.2	.13
Feb 08...	1015	80020	6.4	<2.0	--	739	12.3	103	7.2	294	6.4	6.6	E.09
Apr 11...	1145	80020	5.2	<2.0	1.1	736	12.1	127	7.8	290	21.8	16.1	.43
Jun 15...	1135	80020	6.6	<2.0	1.3	739	9.0	106	7.6	314	26.1	22.2	.13
Aug 01...	0945	80020	1.4	<2.0	.8	737	7.2	90	6.9	326	32.3	25.0	.17

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 2 of 3

Date	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)
Oct 18...	--	E.009	--	--	.629	--	E.001	--	.74	.058	.019	.030	.028
Dec 12...	--	<.010	--	--	1.43	--	E.001	--	1.6	.037	.012	.018	.02
Feb 08...	--	E.005	--	--	1.38	--	E.001	--	--	--	E.004	.013	.014
Apr 11...	--	E.008	--	--	.641	--	E.002	--	1.1	.025	.008	.018	1.98
Jun 15...	.02	.018	--	--	.598	--	E.002	.11	.73	.076	.025	.032	.038
Aug 01...	.03	.020	1.50	.34	.341	.010	.003	.15	.51	.083	.027	.033	.039

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 3 of 3

Date	Hydrogen ion, water, fltrd, calcd, mg/L (00191)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)
Oct				
18...	.00014	67	3	.05
Dec				
12...	.00004	75	1	.03
Feb				
08...	.00006	67	4	.07
Apr				
11...	.00002	80	4	.05
Jun				
15...	.00002	75	2	.04
Aug				
01...	.00014	75	2	.01

07196900 BARON FORK AT DUTCH MILLS, AR

LOCATION.–Lat 35°52ᶜ48ˢ, long 94°29ᶜ11ˢ referenced to North American Datum of 1927, on line between secs. 21 and 22, T.1 4 N., R.33 W., Washington County, AR, Hydrologic Unit 11110103, near right bank on downstream side of bridge on State Highway 59 at Dutch Mills, 2.2 mi downstream from Fly Creek, and 2.9 mi upstream from Arkansas-Oklahoma State line.
DRAINAGE AREA.–40.6 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Apr 1958 to current year. Prior to Oct 1969, published as "Barren Fork at Dutch Mills."
REVISED RECORDS.–WDR Ark. 1970: Drainage area. WDR Ark. 1993: 1992 (m).
GAGE.–Water-stage recorder. Datum of gage is 986.47 ft above NGVD of 1929.
REMARKS.–Water-discharge records good except estimated daily discharges, which are poor. Satellite telemeter at station. EXTREMES FOR CURRENT YEAR.–Peak discharges greater than base discharge of 2,000 ft³/s and (or) maximum (*):

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.58	0.99	0.86	1.6	0.59	1.2	3.5	23	27	5.2	2.9	45
2	0.75	1.1	0.90	1.5	0.65	1.0	5.8	23	26	5.3	2.7	41
3	0.82	0.94	0.92	1.8	0.68	1.2	5.9	17	14	5.2	2.6	38
4	0.85	0.80	0.89	1.9	0.61	1.4	3.5	1,220	10	5.2	2.6	36
5	0.84	0.74	0.85	1.9	0.51	1.5	2.7	212	11	5.0	2.7	36
6	0.75	0.70	0.87	1.8	0.50	1.5	4.2	79	19	5.0	3.1	35
7	0.68	0.76	0.89	1.8	0.48	1.5	13	62	22	5.8	2.9	21
8	0.58	0.76	0.85	1.8	0.45	1.7	5.1	44	14	5.6	2.6	14
9	0.55	0.80	0.80	1.8	0.47	2.8	3.3	80	10	5.2	2.5	17
10	0.68	0.80	0.93	2.5	0.58	2.8	2.7	197	8.1	5.6	2.3	16
11	0.70	0.78	1.0	2.6	0.68	2.8	2.2	80	7.0	6.3	2.4	21
12	0.71	0.76	0.95	2.5	0.66	3.3	2.0	49	6.1	12	2.6	171
13	0.74	0.81	0.93	2.2	0.64	4.6	1.8	35	5.8	10	2.4	319
14	0.73	0.90	1.00	2.3	e0.67	3.0	1.9	26	5.3	7.4	2.6	116
15	0.72	0.86	0.97	2.5	e0.67	2.0	1.9	21	4.9	6.5	2.9	114
16	0.69	0.77	0.85	2.6	e0.68	1.7	1.7	18	4.7	5.6	2.9	116
17	0.68	0.87	0.84	2.5	0.73	1.3	1.8	16	5.1	5.3	2.7	144
18	0.70	0.81	0.83	2.4	1.1	1.4	1.6	14	5.4	4.8	2.4	215
19	0.77	0.74	0.80	2.5	1.2	e1.7	1.5	12	4.8	4.5	2.2	178
20	0.68	0.69	0.71	2.5	1.2	e7.3	1.4	11	4.5	4.4	2.6	157
21	0.54	0.78	0.59	2.4	1.2	5.6	1.4	9.7	4.2	4.1	5.3	148
22	0.59	0.74	0.73	2.3	1.4	3.3	1.3	9.1	6.9	3.7	9.4	149
23	0.52	0.63	0.94	2.2	1.3	2.2	1.3	8.3	67	3.5	122	392
24	0.36	0.79	0.99	2.2	1.4	1.9	1.5	7.6	34	3.4	56	190
25	0.19	0.86	1.1	2.2	1.5	1.7	4.1	6.9	14	3.5	38	156
26	0.22	0.94	1.2	2.2	1.4	1.6	3.8	6.6	10	3.5	32	140
27	0.29	0.91	1.3	2.1	1.3	1.5	2.7	6.3	7.9	3.4	86	131
28	0.25	0.87	1.2	3.1	1.1	1.4	2.4	5.9	7.9	3.5	73	125
29	0.30	0.90	1.3	2.5	---	1.6	43	5.3	7.4	3.5	79	121
30	0.30	0.90	1.4	1.2	---	1.7	31	5.4	5.3	3.3	63	119
31	0.73	---	1.4	0.81	---	4.6	---	18	---	3.2	52	---
Total	18.49	24.70	29.79	66.21	24.35	72.8	160.0	2,328.1	379.3	158.5	668.3	3,521
Mean	0.60	0.82	0.96	2.14	0.87	2.35	5.33	75.1	12.6	5.11	21.6	117
Max	0.85	1.1	1.4	3.1	1.5	7.3	43	1,220	67	12	122	392
Min	0.19	0.63	0.59	0.81	0.45	1.0	1.3	5.3	4.2	3.2	2.2	14
Ac-ft	37	49	59	131	48	144	317	4,620	752	314	1,330	6,980
Cfsm	0.01	0.02	0.02	0.05	0.02	0.06	0.13	1.85	0.31	0.13	0.53	2.89

PERIOD OF RECORD.–Oct 1960 to Sep 1961, Oct 1968 to current year.

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 1 of 4

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Sampling method, code (82398)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
Oct													
25...	0800	80020	.20	30	754	5.3	48	8.2	324	10.3	140	50.9	3.25
Dec													
13...	0815	80020	.90	30	750	10.3	80	7.5	368	3.8	170	64.2	3.52
Mar													
07...	1000	80020	1.5	30	750	7.7	71	7.0	372	10.6	160	58.8	3.22
May													
03...	0945	80020	18	30	745	6.7	75	7.4	318	19.6	130	47.3	3.38
Jun													
21...	0820	80020	4.3	30	751	7.4	92	8.7	319	25.5	140	52.7	2.98
Aug													
15...	0810	80020	2.8	30	751	3.1	40	7.3	300	27.3	130	49.7	2.56

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 2 of 4

[Remark codes: <, less than; E, estimated.]

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)
Oct													
25...	2.72	.3	10	7.31	10.4	.1	11.1	183	.12	--	<.04	--	--
Dec													
13...	2.72	.3	11	10.4	14.7	E.1	18.3	206	.15	--	<.04	--	--
Mar													
07...	3.01	.3	12	9.99	15.0	.1	26.8	214	.26	--	<.04	--	--
May													
03...	2.89	.2	8	5.47	7.21	.1	25.9	191	.33	--	<.04	3.22	.73
Jun													
21...	3.03	.2	8	5.74	8.80	.1	17.4	183	.34	.10	.081	1.66	.38
Aug													
15...	2.62	.2	8	5.17	7.58	.1	9.5	169	.78	.17	.129	.269	.06

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/100 mL (31633)	Fecal coliform, M-FC 0.7u MF col/100 mL (31625)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)
Oct													
25...	.07	--	<.008	--	.19	.098	.03	E.03	.04	11	10	94	30
Dec													
13...	.26	--	<.008	--	.41	--	E.01	E.02	E.02	E32	E27	87	76
Mar													
07...	.26	--	E.005	--	.52	--	<.02	<.04	E.02	23	27	56	5
May													
03...	.74	.033	.010	--	1.1	.239	.08	.09	.10	97	110	88	11
Jun													
21...	.38	.026	.008	.26	.73	.071	.023	E.03	.05	65	68	81	4
Aug													
15...	.06	.010	.003	.65	.85	.059	.019	E.02	.11	40	50	66	16

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 4 of 4

Date	Suspended sediment discharge, tons/d (80155)	Sampler type, code (84164)
Oct		
25...	.02	8010
Dec		
13...	.18	8010
Mar		
07...	.02	8010
May		
03...	.53	8010
Jun		
21...	.05	8010
Aug		
15...	.12	8010

07245000 CANADIAN RIVER NEAR WHITEFIELD, OK

LOCATION.–Lat 35°1 5ᶜ50ˢ, long 95°1 4ᶜ21ˢ referenced to North American Datum of 1927, in SE ¼ SE ¼ sec.12, T.9 N., R.1 9 E., Haskell County, OK, Hydrologic Unit 11090204, on right downstream bank at end of bridge on State Highway 2, 0.8 mi north of Whitefield, 5.5 mi upstream from Taloka (Snake) Creek, 8.2 mi downstream from Eufaula Dam, and at mile 18.8.
DRAINAGE AREA.–47,576 mi² of which 9,700 mi² probably is noncontributing.

SURFACE-WATER RECORDS

PERIOD OF RECORD.–July 1938 to current year. Monthly discharge only for some periods, published in WSP 1311.
GAGE.–Water-stage recorder. Datum of gage is 473.16 ft above NGVD of 1929.
REMARKS.– Records fair. Prior to February 1964, occasional slight regulation by Conchas Lake in New Mexico and, except for 54 mi² of intervening area, completely regulated thereafter by Eufaula Lake (station 07244800). U.S. Army Corps of Engineers' satellite telemeter at station.
EXTREMES OUTSIDE PERIOD OF RECORD.–Maximum stage since 1898, that of May 10, 1943, from information by local resident.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	714	394	3,300	56	147	49	55	74	67	67	968	81
2	2,040	1,320	855	62	451	46	54	273	859	60	811	81
3	3,960	115	588	51	762	48	44	132	879	59	110	79
4	3,100	61	562	58	375	44	43	505	103	61	106	316
5	3,260	54	554	58	70	49	57	227	1,630	95	98	89
6	1,310	215	579	53	60	45	81	273	1,320	350	92	77
7	1,020	612	853	53	220	42	71	157	1,050	951	89	79
8	665	750	2,250	55	103	52	54	105	1,160	85	90	78
9	169	101	3,020	52	53	96	46	101	489	66	88	78
10	473	222	596	60	54	50	48	95	102	311	86	80
11	712	62	572	162	56	50	48	70	88	327	e80	87
12	1,360	51	169	100	46	44	51	53	1,400	677	e78	86
13	1,060	49	91	67	43	58	51	51	3,520	985	e80	77
14	1,110	324	90	45	44	40	51	51	952	328	101	76
15	839	775	81	47	45	41	46	48	189	1,170	364	75
16	154	766	69	50	49	47	51	47	482	1,250	102	75
17	978	1,870	68	50	199	40	984	45	623	1,540	87	102
18	1,220	969	69	45	175	48	1,760	91	95	1,750	115	103
19	286	899	901	53	223	79	936	392	71	1,130	433	58
20	87	84	132	55	103	115	86	139	66	536	216	381
21	67	132	83	46	55	99	71	508	64	768	392	417
22	63	373	69	54	1,280	60	56	533	69	116	95	83
23	63	640	66	53	815	58	49	431	97	104	84	98
24	59	715	74	51	283	52	47	65	74	421	83	71
25	56	71	65	48	105	47	95	220	65	902	359	66
26	657	56	62	48	60	43	62	609	62	770	689	680
27	669	50	66	49	54	51	48	368	60	906	104	623
28	426	808	61	81	48	45	47	152	37	1,650	92	79
29	75	888	55	64	---	44	510	971	124	1,080	85	66
30	58	3,680	60	59	---	49	135	851	292	111	81	884
31	73	---	56	557	---	70	---	101	---	441	81	---
Total	26,783	17,106	16,116	2,342	5,978	1,701	5,737	7,738	16,089	19,067	6,339	5,225
Mean	864	570	520	75.5	214	54.9	191	250	536	615	204	174
Max	3,960	3,680	3,300	557	1,280	115	1,760	971	3,520	1,750	968	884
Min	56	49	55	45	43	40	43	45	37	59	78	58
Ac-ft	53,120	33,930	31,970	4,650	11,860	3,370	11,380	15,350	31,910	37,820	12,570	10,360

07247000 POTEAU RIVER AT CAUTHRON, AR

LOCATION.–Lat 34°55ᶜ08ˢ, long 94°17ᶜ58ˢ referenced to North American Datum of 1927, in NW ¼ SE ¼ sec.16, T.3 N., R.31 W., Scott County, AR, Hydrologic Unit 11110105, on right bank at downstream side of Scott County Road No. 56 bridge at Cauthron, 200 ft south of juncton with State Highway 28, 2.9 mi downstream from Cross Creek and 7.8 mi downstream from Jones Creek, at mile 109.0.
DRAINAGE AREA.–203 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Mar1939 to current year.
REVISED RECORDS.–WSP 1037: 1939(M). WDR Ark. 1970: Drainage area.
GAGE.–Water-stage recorder. Datum of gage is 569.53 ft above NGVD of 1929. Prior to May 2, 1939, nonrecording gage at present site and datum.
REMARKS.–Water-discharge records good. No estimated daily discharge. Satellite telemeter at station.
EXTREMES OUTSIDE PERIOD OF RECORD.–Flood in Jun 1935 reached a stage of 27.4 ft, from information by local resident.
EXTREMES FOR CURRENT YEAR.–Maximum discharge, 4,680 ft³/s, Mar 20, gage height, 12.13 ft; minimum discharge, 0.42 ft³/s, Sep 14, gage height, 3.30 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	87	10	4.1	3.1	36	5.3	55	742	14	3.5	1.3	1.4
2	51	18	5.1	2.8	25	4.5	54	415	12	3.2	1.4	1.2
3	30	11	4.4	12	18	4.2	49	334	12	2.9	1.2	0.94
4	19	6.8	4.8	7.4	15	4.3	40	427	11	2.7	1.4	0.82
5	13	5.9	5.8	4.2	12	4.7	33	674	9.2	2.6	1.2	0.81
6	11	6.9	6.6	3.2	9.6	4.6	31	371	9.0	2.3	1.2	0.77
7	9.5	7.1	9.6	2.4	8.4	4.2	82	292	10	2.0	1.5	0.65
8	9.7	6.8	16	1.6	7.6	3.9	78	228	13	2.0	2.0	0.60
9	9.1	8.2	24	1.6	7.0	208	52	186	11	1.8	2.3	0.65
10	7.4	8.1	29	2.5	7.1	226	40	1,030	8.8	1.8	1.9	0.65
11	6.3	13	20	2.2	7.3	198	34	648	7.4	1.8	1.6	0.69
12	5.5	21	3.9	2.2	6.9	156	30	338	6.4	1.9	1.4	1.0
13	5.0	18	4.0	2.7	7.3	542	26	244	5.3	2.3	1.3	0.59
14	4.6	3.6	4.8	4.1	6.9	270	23	186	4.9	2.4	1.8	0.51
15	4.3	5.6	4.4	4.1	6.2	143	20	145	4.7	3.0	2.0	0.63
16	3.9	9.3	4.2	4.0	6.0	102	17	117	4.3	3.6	1.6	0.69
17	3.9	13	6.8	3.6	5.9	78	15	96	5.6	2.9	1.3	1.0
18	4.0	23	7.3	3.4	6.2	62	13	79	7.5	2.7	1.1	1.4
19	4.4	23	4.8	3.3	6.0	889	12	64	15	2.3	1.1	1.2
20	4.4	7.4	3.9	3.2	6.0	2,860	16	54	13	2.0	1.5	1.3
21	3.7	4.9	3.4	7.2	6.0	972	26	45	10	1.8	2.0	1.5
22	3.6	3.6	3.0	14	6.2	508	28	37	7.5	2.0	2.6	2.8
23	3.7	2.5	3.1	32	6.1	305	19	30	8.7	2.1	2.3	4.0
24	3.7	1.9	3.4	49	5.7	248	15	24	32	2.2	2.0	4.6
25	3.8	2.7	3.9	23	6.1	191	37	20	17	1.9	1.7	5.4
26	3.9	3.7	5.1	13	5.9	153	86	17	8.5	1.7	1.8	2.7
27	4.4	4.5	7.5	8.9	5.6	123	50	16	6.5	1.8	2.4	1.5
28	4.5	5.0	6.5	17	5.6	100	35	13	5.2	1.5	2.3	1.00
29	4.5	5.3	5.5	244	---	82	1,780	11	4.6	1.1	2.2	0.69
30	4.8	3.0	5.0	110	---	69	1,750	25	4.1	0.96	1.9	0.58
31	6.7	---	4.1	59	---	61	---	26	---	1.0	1.6	---
Total	340.3	262.8	224.0	650.7	257.6	8,581.7	4,546	6,934	288.2	67.76	52.9	42.27
Mean	11.0	8.76	7.23	21.0	9.20	277	152	224	9.61	2.19	1.71	1.41
Max	87	23	29	244	36	2,860	1,780	1,030	32	3.6	2.6	5.4
Min	3.6	1.9	3.0	1.6	5.6	3.9	12	11	4.1	0.96	1.1	0.51
Ac-ft	675	521	444	1,290	511	17,020	9,020	13,750	572	134	105	84

07247000 POTEAU RIVER AT CAUTHRON, AR—Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.–Jun 1995 to current year.

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Sampling method, code (82398)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
Oct													
24...	1230	80020	3.7	30	768	6.7	67	7.4	92	16.1	17	2.60	2.58
Dec													
12...	1000	80020	3.8	30	761	9.5	73	7.5	129	4.1	24	4.29	3.31
Mar													
06...	1130	80020	4.6	30	765	9.5	92	7.5	138	14.2	22	4.21	2.86
May													
02...	1115	80020	391	30	755	7.0	76	7.5	60	19.0	13	2.24	1.69
Jun													
20...	1100	80020	14	30	763	6.2	79	8.2	160	27.6	19	3.09	2.74
Aug													
14...	1130	80020	1.8	30	761	5.3	72	7.3	254	30.6	23	3.37	3.65

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
Oct													
24...	3.89	.9	46	8.63	6.53	E.1	8.9	57	.51	--	<.04	<.06	<.008
Dec													
12...	4.36	1	46	11.8	9.63	E.1	11.3	81	.54	--	<.04	<.06	<.008
Mar													
06...	5.18	1	48	12.4	11.0	E.1	12.7	80	.63	--	<.04	<.06	<.008
May													
02...	1.88	.5	37	3.97	3.77	<.1	6.6	42	.59	--	E.03	.12	<.008
Jun													
20...	4.89	2	61	17.8	13.1	E.1	13.0	85	.67	--	E.005	<.06	<.002
Aug													
14...	8.18	3	69	35.1	27.0	E.1	15.1	137	.75	.02	.013	<.06	<.002

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/ 100 mL (31633)	Fecal coliform, M-FC 0.7u MF col/ 100 mL (31625)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)	Sampler type, code (84164)
Oct												
24...	--	--	--	E.01	<.04	.06	30	26	100	13	.13	8010
Dec												
12...	--	--	--	<.02	<.04	.07	E5	E2	91	21	.22	8010
Mar												
06...	--	--	--	<.02	<.04	.09	E13	20	79	10	.12	8010
May												
02...	--	.71	.095	.03	.06	.11	540	600	79	22	23	8010
Jun												
20...	--	--	.061	.020	E.03	.10	64	E64	76	25	.95	8010
Aug												
14...	.74	--	.033	.011	E.03	.08	42	46	53	11	.05	8010

07247015 POTEAU RIVER NEAR LOVING, OK

LOCATION.–Lat 34°52ᶜ47ˢ, long 94°29ᶜ02ˢ referenced to North American Datum of 1927, in SW ¼ NW ¼ sec.29, T.5 N., R.27 E., Le Flore County, OK, Hydrologic Unit 11110105, on right downstream bank of county road bridge, 0.6 mi northwest of Loving, 1.0 mi above Loving Creek, and at mile 93.6.
DRAINAGE AREA.–269 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–April 1992 to current year.
REVISED RECORDS.–OK-2000-1: 1999.
GAGE.–Water-stage recorder. Datum of gage is 507.76 ft above NGVD of 1929.
REMARKS.–Records poor. Some regulation by small flood-retarding structures. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	109	e13	e6.5	e5.2	41	e8.0	60	813	35	5.0	0.03	2.0
2	63	e22	e7.0	e4.8	29	e7.7	55	493	24	4.0	0.00	2.2
3	42	e16	e6.5	e4.5	21	e7.5	53	413	19	3.1	0.00	2.2
4	30	e11	e6.8	e14	16	e7.5	49	357	17	3.1	0.17	2.2
5	23	e10	e8.5	e12	13	e7.7	42	752	17	7.6	0.23	2.0
6	17	e11	e10	e9.9	11	e7.4	40	487	17	6.8	0.04	1.6
7	14	e11	e14	e7.2	11	e7.2	47	351	15	4.4	0.03	1.5
8	12	e11	e20	e4.5	11	e7.0	96	273	14	3.7	0.04	1.4
9	11	e12	e29	e3.8	e10	129	66	209	14	3.5	0.07	1.3
10	11	e13	e35	e3.6	e10	331	50	651	14	2.8	0.12	1.3
11	10	e18	e24	e3.4	e11	278	41	799	13	2.7	0.16	1.5
12	8.9	e30	e16	e3.2	e10	178	37	410	11	2.2	0.20	1.4
13	8.5	e25	e10	e3.0	e11	e450	32	284	9.4	2.1	0.18	1.3
14	7.4	e18	e7.0	e3.2	e10	e580	29	210	7.7	2.1	0.14	1.1
15	6.3	e10	e6.5	e4.5	e9.5	e175	28	160	6.8	2.3	0.11	1.0
16	5.8	e14	e6.2	e4.4	e9.2	e130	25	124	4.8	2.6	0.10	0.89
17	4.7	e18	e6.1	e4.2	e9.1	e85	23	100	6.5	2.4	0.11	1.2
18	4.9	e27	e7.0	e4.0	e9.1	e75	20	82	12	2.4	0.12	1.4
19	5.1	e30	e7.0	e3.9	e9.0	594	19	67	13	3.2	0.10	1.2
20	4.9	e22	e6.5	e3.8	e9.0	3,140	20	56	12	2.9	0.10	1.0
21	4.9	e12	e4.5	e4.5	e8.8	1,180	25	47	16	2.3	0.32	0.92
22	5.3	e7.0	e4.2	e16	e8.8	658	30	40	14	1.9	0.53	0.92
23	5.6	e6.0	e4.2	e35	e8.7	416	32	35	15	1.7	0.61	1.5
24	6.2	e5.0	e4.3	e55	e8.5	327	26	30	15	1.3	0.88	1.3
25	6.8	e3.5	e4.5	e60	e8.5	257	26	27	25	1.3	0.93	1.2
26	7.1	e4.5	e4.6	e45	e8.4	196	55	23	28	0.64	1.1	1.6
27	6.9	e6.0	e4.9	e32	e8.2	154	71	21	15	0.53	1.2	5.3
28	6.6	e8.0	e6.8	e28	e8.2	122	47	19	10	0.51	1.1	6.2
29	6.1	e8.1	e6.4	219	---	97	808	19	8.0	0.41	1.3	3.9
30	5.3	e6.5	e6.1	148	---	80	2,210	21	6.4	0.20	1.4	2.5
31	e10	---	e6.0	70	---	69	---	23	---	0.10	1.8	---
Total	469.3	408.6	296.1	819.6	338.0	9,761.0	4,162	7,396	434.6	79.79	13.22	55.03
Mean	15.1	13.6	9.55	26.4	12.1	315	139	239	14.5	2.57	0.43	1.83
Max	109	30	35	219	41	3,140	2,210	813	35	7.6	1.8	6.2
Min	4.7	3.5	4.2	3.0	8.2	7.0	19	19	4.8	0.10	0.00	0.89
Ac-ft	931	810	587	1,630	670	19,360	8,260	14,670	862	158	26	109

WATER-QUALITY RECORDS

PERIOD OF RECORD.--December 1991 to current year.

REMARKS.--Samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 3

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)
Oct 11...	1440	80020	10	10	744	8.3	94	6.9	92	25.0	20.1	.79	.01
Dec 13...	1000	80020	E10	3.4	750	8.0	62	6.7	126	.6	4.5	.42	--
Feb 07...	1610	80020	11	12	752	14.8	131	8.2	277	14.1	9.3	1.1	--
Apr 20...	1400	80020	22	9.7	745	6.1	74	7.8	131	22.0	23.7	.65	.02
Jun 06...	1630	80020	17	7.3	745	6.1	76	7.3	.106	20.5	25.0	.52	.04
Aug 07...	1100	80020	.03	4.9	753	4.6	60	6.3	386	32.0	27.9	.62	.02

Date	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	Hydrogen ion, water, fltrd, calcd, mg/L (00191)
Oct 11...	.010	.996	.23	.229	.013	.004	.78	1.0	--	<.006	.025	.082	.00013
Dec 13...	<.010	--	--	<.016	--	<.002	--	--	--	<.006	.018	.043	.00020
Feb 07...	<.010	2.47	.56	.571	.043	.013	--	1.6	--	<.006	.023	.116	.00001
Apr 20...	.015	--	--	<.016	--	<.004	.64	--	.058	.019	.046	.114	.00002
Jun 06...	.031	--	--	.040	--	<.002	.49	.56	.027	.009	.023	.059	.00005
Aug 07...	.012	--	--	<.016	--	<.002	.61	--	.025	.008	.021	.061	.00054

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO
SEPTEMBER 2006
Part 3 of 3

Date	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment dis-charge, tons/d (80155)
Oct			
11...	40	10	.27
Dec			
13...	77	3	--
Feb			
07...	100	10	.30
Apr			
20...	91	14	.83
Jun			
06...	84	8	.37
Aug			
07...	69	9	.00

07247250 BLACK FORK BELOW BIG CREEK NEAR PAGE, OK

LOCATION.--Lat 34°46'25", long 94°30'43" referenced to North American Datum of 1927, in NE ¼ SW ¼ sec.31, T.4 N., R.27 E., Le Flore County, OK, Hydrologic Unit 11110105, on downstream side of bridge pier of county road bridge, 2.2 mi above Haw Creek, 5.0 mi north of Page, and at mile 24.6.
DRAINAGE AREA.--74.4 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--March 1992 to current year.
REVISED RECORDS.--WDR OK-96-1: 1993(M), 1995(M).
GAGE.--Water-stage recorder. Datum of gage is 684.00 ft above NGVD of 1929, from topographic map.
REMARKS.--No estimated daily discharge. Records good. U.S. Army Corps of Engineers' satellite telemeter at station. PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft³/s and (or) maximum (*):

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	2.5	0.26	0.36	0.82	17	10	34	194	1.7	0.30	0.00	0.00
2	2.6	0.36	0.37	0.74	14	11	31	156	1.4	0.14	0.00	0.00
3	2.3	0.73	0.39	0.70	13	11	30	143	1.3	0.05	0.00	0.00
4	1.8	0.53	0.35	0.65	10	11	26	166	0.91	0.05	0.00	0.00
5	1.4	0.42	0.34	0.64	9.0	10	27	221	0.81	0.23	0.00	0.00
6	1.1	0.34	0.33	0.60	9.7	10	30	163	1.2	0.07	0.00	0.00
7	0.88	0.30	0.31	0.55	8.9	10	51	134	1.3	0.00	0.00	0.00
8	0.77	0.26	0.37	0.50	8.2	11	36	106	0.94	0.00	0.00	0.00
9	0.70	0.23	0.34	0.51	7.8	27	30	90	0.74	0.00	0.00	0.00
10	0.63	0.18	0.38	0.75	8.5	42	27	567	0.54	0.00	0.00	0.00
11	0.55	0.10	0.38	0.73	8.6	36	25	331	0.41	0.00	0.00	0.00
12	0.52	0.06	0.39	0.74	8.7	35	25	161	0.26	0.00	0.00	0.00
13	0.46	0.09	0.41	1.0	8.1	38	23	94	0.20	0.00	0.00	0.00
14	0.40	0.07	0.50	1.2	7.9	32	22	58	0.12	0.00	0.00	0.00
15	0.34	0.05	0.45	1.2	7.7	27	20	37	0.05	0.00	0.00	0.00
16	0.29	0.00	0.43	1.1	7.7	23	19	26	0.07	0.00	0.00	0.00
17	0.23	0.00	0.43	1.1	7.3	19	18	18	0.71	0.00	0.00	0.00
18	0.17	0.00	0.40	1.1	7.3	19	19	12	4.3	0.00	0.00	0.00
19	0.13	0.00	0.40	1.1	7.2	290	18	8.1	5.6	0.00	0.00	0.00
20	0.06	0.01	0.43	1.0	7.4	1,350	18	5.6	2.4	0.00	0.00	0.00
21	0.00	0.10	0.45	1.0	7.3	381	21	4.1	1.2	0.00	0.00	0.00
22	0.00	0.18	0.46	2.7	7.8	211	19	3.3	0.79	0.00	0.00	0.00
23	0.00	0.26	0.50	10	8.1	143	17	2.6	1.9	0.00	0.00	0.00
24	0.00	0.30	0.61	11	8.6	107	15	2.3	1.9	0.00	0.00	0.00
25	0.00	0.32	0.74	6.8	9.8	85	17	1.9	1.6	0.00	0.00	0.00
26	0.00	0.37	0.73	5.4	9.9	68	19	1.5	1.7	0.00	0.00	0.00
27	0.00	0.50	0.75	4.8	10	57	18	1.1	1.2	0.00	0.00	0.00
28	0.00	0.49	0.76	20	10	49	17	0.78	0.80	0.00	0.00	0.00
29	0.00	0.43	0.75	82	---	43	357	0.80	0.64	0.00	0.00	0.00
30	0.00	0.37	0.75	33	---	39	432	0.97	0.45	0.00	0.00	0.00
31	0.31	---	0.82	23	---	36	---	1.3	---	0.00	0.00	---
Total	18.14	7.31	15.08	216.43	255.5	3,241	1,461	2,711.35	37.14	0.84	0.00	0.00
Mean	0.59	0.24	0.49	6.98	9.12	105	48.7	87.5	1.24	0.03	0.00	0.00
Max	2.6	0.73	0.82	82	17	1,350	432	567	5.6	0.30	0.00	0.00
Min	0.00	0.00	0.31	0.50	7.2	10	15	0.78	0.05	0.00	0.00	0.00
Ac-ft	36	14	30	429	507	6,430	2,900	5,380	74	1.7	0.00	0.00

07247250 BLACK FORK BELOW BIG CREEK NEAR PAGE, OK—Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.–December 1991 to current year.
REMARKS.–Samples were collected bi-monthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field. No flow October 20 to November 2, 14- 20, July 3- 4, July 7 to September 30.

WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 2

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)
Oct 11...	1630	80020	.55	4.1	744	7.7	93	6.8	45	25.2	23.9	.48	.02
Dec 12...	1525	80020	.40	3.4	750	9.6	80	7.0	45	--	6.8	.42	--
Feb 07...	1450	80020	9.0	7.0	749	11.3	97	6.5	32	12.5	8.0	.17	--
Apr 20...	1230	80020	18	3.0	742	5.8	70	7.2	42	22.0	23.2	.27	.03
Jun 06...	1455	80020	15	3.7	742	7.0	87	7.4	41	22.6	25.3	.40	--

Part 2 of 2

Date	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	Hydrogen ion, water, fltrd, calcd, mg/L (00191)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)
Oct 11...	.013	<.016	<.002	.46	--	<.006	.011	.042	.00016	94	4	.01
Dec 12...	<.010	<.016	<.002	--	--	<.006	.008	.033	.00010	100	7	.01
Feb 07...	<.010	.042	<.002	--	.21	<.012	<.004	.014	.00035	100	2	.05
Apr 20...	.021	.039	<.008	.25	.31	<.012	.009	.024	.00006	83	3	.15
Jun 06...	<.010	.024	<.002	--	.42	<.006	.006	.023	.00004	71	6	.24

07247345 BLACK FORK AT HODGEN, OK

LOCATION.–Lat 34°50ᶜ35ˢ, long 94°37ᶜ28ˢ referenced to North American Datum of 1927, in SE ¼ SE ¼ sec.1, T.4 N., R.25 E., Le Flore County, OK, Hydrologic Unit 11110105, at county road bridge 0.4 mi east of Hodgen, OK.
DRAINAGE AREA.–179 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Discharge measurements only: 1992 to current year.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Discharge, in ft³/s
Oct 12,2005	0.368
Feb 8,2006	13.4
Apr 20,2006	20.8
Jun 6,2006	9.94
Aug 7,2006	0.507

07247345 BLACK FORK AT HODGEN, OK—Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.–December 1991 to current year.

REMARKS.–Samples were collected bi-monthly. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field. No flow December 12.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 1 of 2

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)
Oct 12...	1512	80020	.37	6.3	750	6.9	81	6.8	64	25.0	22.0	.82	.04
Feb 08...	1458	80020	13	3.8	751	11.0	110	7.1	59	16.0	14.5	.48	--
Apr 20...	1040	80020	21	2.9	742	8.2	99	6.9	50	19.0	23.3	.30	--
Jun 06...	1310	80020	10	3.2	748	7.8	99	6.9	46	21.6	26.0	.41	.01
Aug 07...	1415	80020	.51	4.8	753	6.7	93	7.2	56	32.3	32.2	.54	.05

Part 2 of 2

Date	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	Hydrogen ion, water, fltrd, calcd, mg/L (00191)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)
Oct 12...	.028	.030	<.002	.79	.85	<.006	.013	.068	.00018	72	13	.01
Feb 08...	<.010	<.016	<.002	--	--	<.006	.010	.025	.00007	100	3	.11
Apr 20...	<.010	<.016	<.004	--	--	<.006	.010	.028	.00014	81	4	.22
Jun 06...	.010	<.016	<.002	.40	--	<.006	.016	.033	.00014	68	5	.14
Aug 07...	.037	.028	<.002	.51	.57	<.006	.011	.047	.00007	65	4	.01

07247500 FOURCHE MALINE NEAR RED OAK, OK

LOCATION.–Lat 34°54ᶜ45ˢ, long 95°09ᶜ20ˢ referenced to North American Datum of 1927, in NW ¼ NW ¼ sec.13, T.5 N., R.20 E., Latimer County, OK, Hydrologic Unit 11110105, on downstream side of left abutment of county road bridge, 0.1 mi downstream from Little Fourche Maline, 5.0 mi southwest of Red Oak, and at mile 41.2.
DRAINAGE AREA.–122 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–October 1938 to April 1991, October 1991 to current year. Monthly discharges only October 1938 to February 1939. REVISED RECORDS.–WSP 1117: Drainage area. WSP 1631: 1940.
GAGE.–Water-stage recorder. Datum of gage is 540.80 ft above NGVD of 1929. Prior to April 25, 1939, nonrecording gage at same site and datum.
REMARKS.– Records poor due to debris buildup on control. Some regulation by several flood-retarding structures. U.S. Army Corps of Engineers satellite telemeter at station.
EXTREMES OUTSIDE PERIOD OF RECORD.–Flood in June 1935 reached a stage of 25.4 ft, from floodmarks.
PEAK DISCHARGES FOR CURRENT YEAR.–Peak discharges greater than base discharge of 3,000 ft³/s and (or) maximum (*):

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.26	0.04	0.06	e0.01	1.5	23	13	326	29	7.1	0.06	0.15
2	0.25	0.06	0.06	e0.01	12	29	12	156	16	5.5	0.05	0.13
3	0.28	0.11	0.06	e0.01	45	32	9.4	222	9.3	4.5	0.04	0.12
4	0.28	0.07	0.06	e0.01	20	33	7.9	410	6.2	3.6	0.06	0.11
5	0.23	0.03	0.07	e0.01	15	31	7.4	829	4.3	3.6	0.05	0.10
6	0.24	0.00	e0.07	e0.01	10	29	8.0	851	3.3	3.8	0.05	0.10
7	2.4	0.00	e0.07	e0.01	5.5	26	15	951	2.7	2.3	0.16	0.09
8	3.1	0.00	e0.07	e0.01	2.5	26	11	580	2.3	1.9	0.60	0.08
9	1.9	0.00	e0.07	e0.00	1.3	41	8.3	364	2.4	1.9	0.75	0.07
10	1.2	0.00	e0.06	e0.00	0.66	76	8.1	369	2.1	1.7	0.62	0.07
11	0.96	0.00	e0.06	e0.00	0.94	119	7.4	220	1.7	1.5	0.46	0.12
12	0.91	0.00	e0.06	e0.00	2.4	75	7.7	127	1.5	1.7	0.43	0.19
13	0.85	0.00	e0.05	e0.00	3.6	72	6.7	94	1.3	3.4	0.64	0.13
14	0.90	0.02	e0.05	e0.00	4.7	42	5.8	71	1.3	54	1.3	0.13
15	0.84	0.04	e0.05	e0.00	3.6	23	4.7	55	0.99	38	1.3	0.13
16	0.73	0.04	e0.04	e0.00	1.5	13	3.8	44	0.81	14	1.0	0.11
17	0.44	0.05	e0.04	e0.00	1.1	7.0	4.2	36	509	7.3	0.88	0.09
18	0.37	0.05	e0.04	e0.00	2.6	6.0	5.0	29	397	4.4	0.81	0.10
19	0.65	0.06	e0.04	e0.00	4.8	236	5.1	23	105	2.8	0.80	0.07
20	0.60	0.07	e0.04	e0.00	4.6	863	6.1	19	38	1.9	1.5	0.07
21	0.37	0.07	e0.04	e0.00	3.2	440	6.3	15	14	1.4	2.2	0.16
22	0.31	0.07	e0.03	e0.00	4.9	132	6.0	13	10	1.0	1.4	0.62
23	0.24	0.10	e0.03	e0.00	12	77	5.8	11	283	0.65	1.4	4.1
24	0.20	0.13	e0.03	e8.0	14	56	5.6	9.2	457	0.42	1.1	10
25	0.17	0.13	e0.03	45	13	43	6.0	7.6	153	0.39	0.88	3.5
26	0.14	0.12	e0.03	41	12	33	6.3	5.9	62	0.34	1.3	1.6
27	0.11	0.12	e0.03	36	12	26	6.8	4.6	31	0.24	2.2	2.5
28	0.10	0.09	e0.03	52	14	21	6.5	3.7	19	0.19	70	2.4
29	0.08	0.07	e0.02	16	---	17	608	2.8	13	0.15	7.5	1.7
30	0.07	0.06	e0.02	8.1	---	15	657	6.7	9.5	0.12	0.76	1.8
31	0.12	---	e0.02	3.3	---	15	---	22	---	0.08	0.25	---
Total	19.30	1.60	1.43	209.48	228.40	2,677.0	1,470.9	5,877.5	2,185.70	169.88	100.55	30.54
Mean	0.62	0.05	0.05	6.76	8.16	86.4	49.0	190	72.9	5.48	3.24	1.02
Max	3.1	0.13	0.07	52	45	863	657	951	509	54	70	10
Min	0.07	0.00	0.02	0.00	0.66	6.0	3.8	2.8	0.81	0.08	0.04	0.07
Ac-ft	38	3.2	2.8	416	453	5,310	2,920	11,660	4,340	337	199	61

07247650 FOURCHE MALINE NEAR LEFLORE, OK

LOCATION.–Lat 34°55'11", long 94°56'43" referenced to North American Datum of 1927, in NE ¼ SE ¼ sec.1 1, T.5 N., R.22 E., Le Flore County, OK, Hydrologic Unit 11110105, at county road bridge 1.6 mi east of Leflore, OK.
DRAINAGE AREA.–270 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Discharge measurements only: 1992 to current year.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Discharge, in ft³/s
Oct 12,2005	0.070
Dec 12,2005	0.055
Feb 8,2006	8.57
Apr 19,2006	3.77
Jun 7,2006	6.85
Aug 8,2006	0.064

WATER-QUALITY RECORDS

PERIOD OF RECORD.–December 1991 to current year.
REMARKS.–Samples were collected bimonthly. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 1 of 3

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)
Oct 12...	1111	80020	.07	12	750	5.7	63	7.0	172	23.0	18.7	.52	.06
Dec 12...	1210	80020	.06	5.6	752	9.3	83	7.0	177	14.5	9.8	.37	.06
Feb 08...	1110	80020	8.6	31	751	10.5	87	7.8	318	1.7	6.4	.73	--
Apr 19...	1535	80020	3.8	13	746	5.8	71	7.2	160	22.5	23.9	.46	.02
Jun 07...	1210	80020	6.8	24	748	5.6	69	7.1	134	21.5	24.9	.59	--
Aug 08...	0915	80020	.06	8.3	754	2.1	28	7.0	168	28.0	28.6	.64	.11

Part 2 of 3

Date	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	Hydrogen ion, water, fltrd, calcd, mg/L (00191)
Oct 12...	.050	--	--	.018	--	E.001	.47	.54	--	<.006	.018	.037	.00011
Dec 12...	.043	--	--	.021	--	E.001	.33	.39	--	<.006	.015	.026	.00011
Feb 08...	<.010	--	--	<.016	--	<.002	--	--	--	<.006	.012	.065	.00002
Apr 19...	.014	--	--	<.016	--	<.004	.45	--	--	<.006	.010	.046	.00007
Jun 07...	E.010	.312	.07	.073	.008	.003	--	.66	--	E.004	.009	.073	.00008
Aug 08...	.082	.145	.03	.035	.007	.002	.55	.67	.030	.010	.023	.043	.00010

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO
SEPTEMBER 2006
Part 3 of 3

Date	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment dis-charge, tons/d (80155)
Oct			
12...	85	11	.00
Dec			
12...	100	9	.00
Feb			
08...	98	21	.49
Apr			
19...	95	18	.18
Jun			
07...	91	24	.44
Aug			
08...	92	7	.00

07247800 HOLSON CREEK AT SUMMERFIELD, OK

LOCATION.–Lat 34°52'46", long 94°51'11" referenced to North American Datum of 1927, in SW ¼ NW ¼ sec.26, T.5 N., R.23 E., Le Flore County, OK, Hydrologic Unit 11110105, at county road bridge, 1.4 mi east of Summerfield, OK.
DRAINAGE AREA.–71.6 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Discharge measurements only: 1992 to current year.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Discharge, in ft³/s
Apr 19, 2006	4.43
Jun 7, 2006	2.10

07247800 HOLSON CREEK AT SUMMERFIELD, OK—Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.–December 1991 to current year.

REMARKS.–Samples were collected periodically. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field. No flow October 12, December 12, February 8, and August 7.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 2

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)
Apr 19...	1810	80020	4.4	4.2	745	7.9	95	7.2	61	--	23.3	.20	--
Jun 07...	1030	80020	2.1	2.7	748	6.3	77	6.7	55	20.7	24.2	.23	.02

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 2 of 2

[Remark codes: <, less than.]

Date	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	Hydrogen ion, water, fltrd, calcd, mg/L (00191)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)
Apr 19...	<.010	<.016	<.004	--	<.006	.005	.016	.00007	93	4	.05
Jun 07...	.013	<.016	<.002	.22	<.006	.005	.014	.00020	72	5	.03

07249400 JAMES FORK NEAR HACKETT, AR

LOCATION.--Lat 35°09'45", long 94°24'25" referenced to North American Datum of 1927, in NW ¼ NW ¼ sec.34, T.6 N., R.32 W., Sebastian County, AR, Hydrologic Unit 11110105, near left bank on downstream side of bridge on State Highway 45, 1.7 mi south of Hackett, 2.0 mi downstream from Elder Branch, 2.0 mi upstream from small tributary, and 3.6 mi upstream from Arkansas-Oklahoma State line.
DRAINAGE AREA.--147 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Apr 1958 to current year.
REVISED RECORDS.--WDR Ark. 1970: Drainage area.
GAGE.--Water-stage recorder. Datum of gage is 457.71 ft above NGVD of 1929. Prior to Oct 1, 1990, at datum 2.00 ft higher.
REMARKS.--Water-discharge records good except estimated daily discharges, which are fair, and Oct 25 through Dec 12, which were fair, due to ice effect. Satellite telemeter at station.
EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and (or) maximum (*):

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	e17	9.7	1.1	0.52	24	2.0	51	146	2.0	1.6	0.02	0.00
2	e8.1	12	2.2	0.62	18	2.9	44	92	1.5	1.3	0.02	0.00
3	e3.6	8.9	2.3	e0.25	15	4.3	48	94	1.1	1.5	0.02	0.00
4	e2.1	1.1	1.9	e0.18	12	6.4	36	109	1.1	1.2	e0.02	0.00
5	1.1	1.4	4.9	e0.23	9.3	8.1	30	198	0.89	0.30	0.02	0.00
6	1.2	2.7	6.7	0.26	7.1	9.0	27	131	0.75	0.32	0.02	0.00
7	1.5	5.0	6.8	0.32	6.0	12	37	95	0.73	0.34	0.01	0.03
8	1.7	6.2	e7.0	0.36	4.7	17	34	72	0.75	0.36	0.00	0.04
9	2.2	7.2	e6.3	0.38	3.8	23	25	57	0.65	0.37	0.00	0.02
10	2.7	8.0	5.8	0.42	3.7	41	e19	62	0.54	0.38	0.00	0.02
11	3.6	8.8	5.4	0.44	3.4	45	14	53	0.49	0.40	0.00	0.02
12	3.0	9.2	3.3	0.44	3.6	71	12	38	0.57	0.45	0.00	0.00
13	2.2	9.5	0.35	0.41	3.3	93	11	28	0.64	0.94	0.00	0.00
14	2.0	11	0.36	0.34	3.1	103	11	20	0.72	e0.44	0.00	0.00
15	2.5	14	0.40	0.34	2.7	54	8.6	15	0.86	e0.40	0.00	0.00
16	3.7	14	0.92	0.36	2.1	39	6.7	11	0.93	e0.40	0.01	0.00
17	4.7	17	1.1	0.38	1.7	31	5.6	8.1	1.3	e0.40	0.02	0.00
18	4.4	19	0.49	0.39	1.7	26	4.4	6.2	1.3	e0.35	0.03	0.00
19	4.3	19	0.39	0.42	2.6	349	4.6	4.8	1.5	0.34	0.03	0.00
20	4.4	19	0.35	0.50	3.5	1,300	4.2	3.6	2.2	0.32	0.04	0.00
21	e4.4	15	0.33	0.65	3.1	397	4.7	2.5	2.4	0.29	0.05	0.00
22	e4.4	6.3	0.28	1.4	3.1	223	5.1	1.8	2.6	0.12	0.06	0.00
23	e4.4	1.7	0.27	1.3	3.1	156	5.2	1.4	3.3	0.07	0.07	0.01
24	e4.4	0.58	0.30	0.57	3.5	134	4.2	1.3	3.1	0.05	0.07	0.03
25	4.5	0.49	0.30	0.47	3.4	108	4.5	1.1	3.0	0.04	0.06	0.10
26	4.5	0.52	0.26	0.44	3.1	95	5.0	1.0	4.7	0.05	0.05	0.10
27	5.0	0.49	0.32	0.58	2.8	86	6.6	0.90	4.6	0.05	0.04	0.14
28	5.6	0.46	0.39	3.1	2.3	77	6.8	0.83	3.5	0.05	0.05	0.14
29	5.4	0.53	0.43	90	---	63	291	e0.76	2.8	0.05	0.08	0.14
30	1.7	0.76	0.45	64	---	58	348	e1.2	2.3	0.05	0.01	0.12
31	4.6	---	0.49	36	---	56	---	1.2	---	0.03	0.00	---
Total	124.9	229.53	61.88	206.07	155.7	3,689.7	1,114.2	1,257.69	52.82	12.96	0.80	0.91
Mean	4.03	7.65	2.00	6.65	5.56	119	37.1	40.6	1.76	0.42	0.03	0.03
Max	17	19	7.0	90	24	1,300	348	198	4.7	1.6	0.08	0.14
Min	1.1	0.46	0.26	0.18	1.7	2.0	4.2	0.76	0.49	0.03	0.00	0.00
Ac-ft	248	455	123	409	309	7,320	2,210	2,490	105	26	1.6	1.8

PERIOD OF RECORD.--Oct 1960 to Sep 1971, Oct 1975 to Sep 1978, Oct 1983 to current year.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 3

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Sampling method, code (82398)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
Oct													
24...	1430	80020	E4.4	30	768	5.6	55	7.6	247	14.6	67	9.74	10.3
Dec													
12...	1230	80020	5.3	30	761	6.0	50	7.5	422	7.4	87	15.3	11.9
Mar													
06...	1330	80020	9.3	30	767	7.9	79	7.0	695	15.3	180	32.1	25.0
May													
02...	1415	80020	90	30	759	5.8	65	7.5	205	20.5	48	8.43	6.48
Jun													
20...	1330	80020	2.2	30	767	6.3	82	7.8	421	29.1	120	18.8	18.7
Aug													
14...	1320	80020	.00	30	763	2.5	33	7.3	406	28.5	98	13.4	15.8

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 2 of 3

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
Oct													
24...	2.08	1	42	23.4	8.21	.2	34.4	147	.34	--	<.04	<.06	<.008
Dec													
12...	2.38	3	57	55.8	13.8	.2	26.3	237	.38	--	<.04	<.06	<.008
Mar													
06...	3.14	2	39	54.4	107	.2	81.6	383	.26	--	<.04	<.06	<.008
May													
02...	2.31	1	40	15.2	24.2	.1	23.8	123	.62	.08	.07	.17	E.006
Jun													
20...	2.43	1	37	33.7	26.3	.2	50.4	236	.68	.02	.017	<.06	E.002
Aug													
14...	3.71	2	46	40.1	23.9	.3	24.2	229	.59	.03	.022	<.06	<.002

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 3 of 3

Date	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/ 100 mL (31633)	Fecal coliform, M-FC 0.7u MF col/ 100 mL (31625)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)	Sampler type, code (84164)
Oct												
24...	--	--	--	<.02	<.04	E.02	E8	E16	100	29	--	8010
Dec												
12...	--	--	--	<.02	<.04	<.04	40	54	95	53	.76	8010
Mar												
06...	--	--	--	<.02	<.04	<.04	98	120	90	7	.18	8010
May												
02...	.55	.79	--	<.02	<.04	.08	190	E200	92	27	6.6	8010
Jun												
20...	.66	--	--	E.005	<.04	.12	270	E190	81	10	.06	8010
Aug												
14...	.57	--	.025	.008	E.02	.05	48	72	76	6	--	8010

07249455 ARKANSAS RIVER NEAR FORT SMITH, AR

LOCATION.–Lat 35°23ᶜ30ˢ, long 94°25ᶜ56ˢ referenced to North American Datum of 1927, in NW ¼ SW ¼ sec.8, T.8 N., R.32 E., Sebastian County, AR, Hydrologic Unit 11110104, at U.S. Highway 64 bridge at Oklahoma and Arkansas state line, .7 mi downstream from Poteau River, 6.6 mi upstream from Lee Creek, 8.0 mi upstream from Arkansas River at Van Buren, and at mile 324.5.
DRAINAGE AREA.–149,977 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–May 1997 to current year. Some data collected prior to period of record and are available in the district office. GAGE.–Water-stage recorder. Datum of gage is 380.24 ft above NGVD of 1929.
REMARKS.–Records fair, except for estimated daily discharges and discharges less than 1000 cfs which are rated poor. Flow regulated by W.D. Mayo Lock and Dam 14 upstream and J.W. Trimble Lock and Dam 13 downstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	8,080	931	2,040	632	814	3,540	1,290	24,000	4,970	402	9,230	3,470
2	4,130	5,130	4,280	2,190	4,260	348	1,330	28,800	18,200	e300	14,400	3,270
3	10,600	4,040	2,640	3,780	6,090	e250	3,060	32,500	5,720	3,380	13,000	1,160
4	10,500	4,770	2,520	660	3,570	753	1,910	40,600	1,840	5,330	3,590	557
5	13,900	3,230	6,520	1,920	669	e300	e400	65,200	4,240	1,560	3,320	1,650
6	14,100	3,590	4,560	3,120	5,890	1,140	4,510	44,600	7,630	6,130	1,660	e300
7	8,270	2,720	5,880	619	3,360	852	1,140	23,200	9,430	6,490	4,950	1,780
8	4,150	9,930	4,020	878	3,750	514	524	37,700	10,700	2,340	5,330	1,450
9	4,550	4,690	2,740	3,850	4,030	8,570	546	41,600	7,520	1,740	5,530	1,770
10	9,470	3,110	830	3,370	5,760	3,080	2,020	58,400	3,710	2,160	5,100	398
11	6,820	2,650	686	5,110	1,650	1,110	1,620	67,500	519	4,600	2,110	2,480
12	7,750	543	3,530	936	4,470	1,230	1,760	57,600	8,200	11,900	5,590	2,840
13	5,700	2,420	2,600	315	3,500	7,900	800	67,200	15,300	19,100	10,200	1,880
14	7,760	8,380	3,640	450	1,930	5,690	6,150	67,300	8,220	11,600	2,720	2,010
15	5,800	5,590	1,500	662	347	810	699	64,800	6,490	3,930	3,010	3,660
16	2,660	8,430	3,250	881	2,050	545	2,460	59,600	14,000	7,820	4,850	2,080
17	3,640	7,070	2,080	7,770	3,270	2,760	2,280	57,500	5,930	13,500	4,240	7,120
18	1,870	5,720	1,710	531	2,020	2,400	1,570	55,800	4,570	8,560	6,390	8,890
19	7,680	4,680	1,780	e300	6,030	4,940	2,030	43,600	9,950	13,900	1,880	11,100
20	2,810	559	5,760	e250	1,740	8,400	5,920	31,900	7,060	9,620	2,530	289
21	6,110	5,620	2,280	2,980	728	16,000	508	8,930	4,840	6,740	4,690	1,250
22	2,470	4,020	605	1,690	7,960	3,750	2,570	23,700	7,940	1,680	9,400	2,850
23	1,010	4,090	1,970	2,830	4,880	8,540	765	13,200	8,930	e300	231	10,800
24	7,190	403	395	602	3,110	7,140	4,870	24,300	9,520	1,100	3,780	4,990
25	6,060	3,640	1,190	2,890	4,770	5,260	7,690	12,000	2,560	1,940	4,450	1,260
26	3,190	884	741	1,210	1,970	3,960	5,230	24,100	1,950	797	3,990	2,110
27	6,060	2,610	774	1,440	9,550	5,290	4,720	15,200	7,440	4,840	8,440	7,630
28	2,890	9,640	1,320	5,720	1,860	4,300	12,300	14,400	4,780	12,000	9,830	3,430
29	832	4,440	576	10,300	---	4,490	23,000	14,300	5,740	8,250	5,090	1,470
30	2,520	891	1,610	4,030	---	3,800	26,300	16,300	7,620	7,870	4,240	1,510
31	7,760	---	2,330	1,850	---	4,840	---	13,000	---	1,230	2,620	---
Total	186,332	124,421	76,357	73,766	100,028	122,502	129,972	1,148,830	215,519	181,109	166,391	95,454
Mean	6,011	4,147	2,463	2,380	3,572	3,952	4,332	37,060	7,184	5,842	5,367	3,182
Max	14,100	9,930	6,520	10,300	9,550	16,000	26,300	67,500	18,200	19,100	14,400	11,100
Min	832	403	395	250	347	250	400	8,930	519	300	231	289
Ac-ft	369,600	246,800	151,500	146,300	198,400	243,000	257,800	2,279,000	427,500	359,200	330,000	189,300

PERIOD OF RECORD.–July 1996 to current year.

REMARKS.–Samples collected bimonthly. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 3

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)
Oct 13...	1220	80020	4,260	16	753	9.6	110	7.9	684	24.0	21.7	.45	.02
Dec 21...	1145	80020	936	9.4	756	14.0	112	8.1	927	5.7	5.4	.41	.01
Feb 09...	1321	80020	1,070	9.4	759	14.0	121	8.3	817	8.0	8.6	.42	--
Apr 19...	1136	80020	425	13	749	9.7	114	7.8	1,690	22.0	22.1	.43	--
Jun 28...	1330	80020	4,580	52	757	9.7	133	8.6	311	32.0	31.9	.64	.03
Aug 30...	1300	80020	105	9.3	753	9.2	122	8.6	974	--	29.3	.56	.02

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 2 of 3

Date	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	Hydrogen ion, water, fltrd, calcd, mg/L (001 91)
Oct 13...	.017	1.35	.30	.309	.013	.004	.43	.76	.251	.082	.105	.141	.00001
Dec 21...	.011	1.13	.26	.258	.007	.002	.40	.67	.129	.042	.065	.089	.00001
Feb 09...	<.010	--	--	<.016	--	<.002	--	--	--	E.005	.016	.052	.00001
Apr 19...	<.010	--	--	<.016	--	<.004	--	--	.040	.013	.030	.069	.00002
Jun 28...	.021	.415	.09	.097	.011	.003	.61	.73	.081	.027	.044	.143	
Aug 30...	.017	.394	.09	.114	.082	.025	.55	.68	.332	.108	.138	.174	

WATER-QUALITY DATA, WATER YEAR OCTOBER 2005 TO, SEPTEMBER 2006
Part 3 of 3

Date	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment dis-charge, tons/d (80155)
Oct			
13...	87	14	161
Dec			
21...	79	10	25
Feb			
09...	92	9	26
Apr			
19...	85	19	22
Jun			
28...	86	45	556
Aug			
30...	76	11	3.1

07249985 LEE CREEK NEAR SHORT, OK

LOCATION.–Lat 35°31'02", long 94°27'51" referenced to North American Datum of 1927, in NW ¼ NE ¼ sec.17, T.12 N., R.27 E., Sequoyah County, OK, Hydrologic Unit 11110104, on left bank 0.5 mi west of Arkansas-Oklahoma State line, 500 ft downstream from Webbers Creek, 4.1 mi south of Short, OK, and 7.5 mi southwest of Uniontown, AR, at mile 11.0.
DRAINAGE AREA.–420 mi², (measured from USGS maps).

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Oct 1930 to Jun 1937, Oct 1950 to current year. Prior to Oct 1992, published as "07250000 Lee Creek near Van Buren".
REVISED RECORDS.–WSP 1211: 1931(M). WSP 1441: 1935(M). WDR Ark. 1970: Drainage area.
GAGE.–Water-stage recorder. Datum of gage is 429.44 ft above NGVD of 1929. Prior to Oct 1992 recording gage 3.2 mi downstream at datum 21.40 ft lower. Sep 1930 to Jun 1937, nonrecording gage at former site and datum.
REMARKS.–Water-discharge records fair except estimated daily discharges, which are poor. Satellite telemeter at station.
EXTREMES OUTSIDE PERIOD OF RECORD.–Flood of Apr 15, 1945, reached a stage of about 35.0 ft, from floodmarks at former site and datum, discharge about 112,000 ft³/s.
EXTREMES FOR CURRENT YEAR.–Peak discharges greater than base discharge of 13,000 ft³/s and (or) maximum (*):

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.57	1.2	0.27	1.2	3.1	3.5	178	1,260	48	13	1.9	0.52
2	0.52	1.7	0.27	1.2	2.9	3.4	259	918	60	11	1.7	0.21
3	0.47	e0.63	0.27	1.3	2.7	3.2	269	658	43	11	1.6	0.01
4	0.46	0.01	0.30	1.3	2.6	3.1	258	8,440	52	9.6	1.9	0.00
5	0.36	0.00	0.35	1.3	2.6	2.9	201	7,170	50	8.4	2.3	0.00
6	0.48	0.00	0.39	1.3	2.6	2.9	246	3,000	1,350	7.7	1.8	0.00
7	0.45	0.00	0.46	1.3	2.7	2.8	806	1,930	1,410	7.6	1.5	0.00
8	0.58	0.00	0.46	1.3	2.7	3.0	775	1,340	520	7.0	1.3	0.00
9	0.70	0.00	0.49	1.3	2.7	8.0	482	1,440	279	6.5	1.2	0.00
10	0.86	0.00	0.50	1.8	2.7	18	343	3,090	182	6.4	1.0	0.00
11	0.47	0.00	0.55	2.0	2.7	20	262	1,970	133	6.4	1.3	0.00
12	0.04	0.00	0.63	1.8	2.6	52	212	1,240	102	7.4	1.3	0.57
13	0.76	0.00	0.64	e2.0	2.5	74	175	845	83	28	1.1	2.7
14	0.42	0.00	0.73	e1.9	2.5	185	147	597	68	27	0.86	3.1
15	0.17	0.01	0.74	e1.8	2.5	123	126	436	57	19	0.80	2.9
16	0.22	0.02	0.78	e2.0	2.5	76	110	334	49	14	0.53	2.8
17	0.29	0.00	0.87	e2.2	2.6	53	96	265	49	11	0.22	6.7
18	0.17	0.00	0.87	e2.0	2.8	45	84	213	50	9.7	0.01	1,110
19	0.06	0.00	0.87	1.7	2.8	61	72	175	43	7.9	0.00	658
20	0.05	0.00	0.87	1.7	2.8	630	64	145	37	6.5	0.00	245
21	0.03	0.00	0.90	1.7	3.1	906	98	122	31	5.6	0.00	142
22	0.00	0.00	0.96	2.0	3.7	629	96	104	28	4.7	0.00	105
23	0.00	0.00	0.97	2.3	4.1	393	72	89	40	3.8	0.00	2,030
24	0.00	0.00	1.0	2.1	4.0	274	61	76	37	3.4	0.03	1,600
25	0.00	0.01	1.1	2.0	3.7	207	150	66	27	3.1	0.63	554
26	0.00	0.09	1.2	2.1	3.4	165	159	58	22	2.8	0.90	292
27	0.00	0.19	1.2	2.0	3.2	135	129	51	19	2.6	1.0	179
28	0.00	0.22	1.1	3.4	3.5	114	110	45	17	2.6	1.4	125
29	0.00	0.19	1.2	4.3	---	97	2,820	40	15	2.4	1.4	94
30	0.00	0.22	1.2	5.0	---	86	2,640	36	14	2.2	1.2	75
31	0.00	---	1.2	3.9	---	139	---	36	---	2.0	0.87	---
Total	8.13	4.49	23.34	63.2	82.3	4,514.8	11,500	36,189	4,915	260.3	29.75	7,228.51
Mean	0.26	0.15	0.75	2.04	2.94	146	383	1,167	164	8.40	0.96	241
Max	0.86	1.7	1.2	5.0	4.1	906	2,820	8,440	1,410	28	2.3	2,030
Min	0.00	0.00	0.27	1.2	2.5	2.8	61	36	14	2.0	0.00	0.00
Ac-ft	16	8.9	46	125	163	8,960	22,810	71,780	9,750	516	59	14,340

07249985 LEE CREEK NEAR SHORT, OK—Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.–Oct 1992 to current year.

REMARKS.–Water-quality data for this station for the period Oct 1995 to Sep 1997 published under station number 07250085.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 3

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Sampling method, code (82398)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
Oct													
25...	1330	80020	.00	30	744	7.0	70	8.2	101	14.7	35	10.6	2.10
Dec													
12...	1400	80020	.63	30	761	11.4	90	7.9	112	5.4	45	14.3	2.31
Mar													
07...	0800	80020	2.8	30	767	9.6	87	8.0	112	11.2	41	13.4	1.76
May													
03...	0730	80020	699	30	758	8.5	90	8.1	54	18.1	15	3.56	1.40
Jun													
21...	0700	80020	32	30	767	6.8	87	8.6	108	28.6	42	14.1	1.64
Aug													
15...	0645	80020	.87	30	765	3.8	50	7.6	112	30.2	41	13.4	1.94

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 2 of 3

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)
Oct													
25...	1.59	.3	18	3.77	4.78	E.1	4.1	--	.24	--	<.04	<.06	<.008
Dec													
12...	1.51	.3	15	3.89	4.99	E.1	4.7	62	.22	--	<.04	<.06	<.008
Mar													
07...	.94	.2	15	3.34	6.86	E.1	7.0	60	.14	--	<.04	<.06	<.008
May													
03...	1.11	.4	30	3.12	3.90	E.1	5.5	--	.15	--	<.04	.23	<.008
Jun													
21...	1.26	.2	14	3.18	3.84	<.1	4.7	67	.15	.02	.015	<.06	E.002
Aug													
15...	1.60	.3	16	3.78	4.89	E.1	4.3	71	.28	.04	.029	<.06	E.001

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Date	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/100 mL (31633)	Fecal coliform, M-FC 0.7u MF col/100 mL (31625)	Chlorophyll a phytoplankton, fluoro, ug/L (70953)	Pheophytin a, phytoplankton, ug/L (62360)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)	Sampler type, code (84164)
Oct													
25...	--	--	<.02	<.04	<.04	E3	E4	.8	.5	99	16	--	8010
Dec													
12...	--	--	<.02	<.04	<.04	<1	E2	2.0	.6	88	21	.04	8010
Mar													
07...	--	--	<.02	<.04	<.04	E5	3	.9	.6	90	7	.05	8010
May													
03...	--	.37	<.02	<.04	<.04	68	74	.6	1.0	84	5	9.4	8010
Jun													
21...	.14	--	<.006	<.04	<.04	E18	E14	1.3	1.3	81	5	.43	8010
Aug													
15...	.25	--	E.004	<.04	<.04	44	110	1.7	2.3	68	11	.03	8010

07250550 ARKANSAS RIVER AT JAMES W. TRIMBLE LOCK AND DAM NEAR VAN BUREN, AR

LOCATION.–Lat 35°20ᶜ56ˢ, long 94°1 7ᶜ54ˢ referenced to North American Datum of 1927, in NE ¼ NE ¼ sec.28, T.8 N., R.31 W., Sebastian County, AR, Hydrologic Unit 11110104, in metal shelter on dam at mile 308.9.
DRAINAGE AREA.–150,547 mi², of which 22,241 mi² is probably noncontributing.

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Oct 1927 to current year. Prior to Oct 1969, published as "07250500 Arkansas River at Van Buren", and Oct 1969 to Sep 1988, published as "at Dam No. 13", near Van Buren. Gage height records collected from 1879 to Dec 1955 at Fort Smith, 16.3 mi upstream.
GAGE.–Water-stage and gate position recorder. Datum of gage is at NGVD of 1929 (levels by the U.S. Army Corps of Engineers). Prior to Oct 1, 1934, nonrecording gage, and Oct 1, 1934, to Dec 20, 1969, recording gage at site 7.9 mi upstream at datum 372.36 ft higher.
REMARKS.–Water-discharge records fair except estimated daily discharges, which are poor. Beginning Apr 26, 1970, daily discharge computed from relation between discharge, head, and gate openings. Flow regulated upstream by many locks, dams, and reservoirs. On Oct 19, 1988, the Arkansas Electric Cooperative Corp. hydroplant began operation, and discharges at the hydroplant are added to flows from the lock and dam. Satellite telemeter at station.
EXTREMES FOR CURRENT YEAR.–Maximum daily discharge, 89,700 ft³/s, May 4, gage height, 380.98 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	7,280	e50	1,700	e916	e666	3,570	2,220	24,600	5,850	e170	7,940	3,300
2	4,540	4,130	3,010	1,940	3,250	e50	1,830	29,800	17,300	e744	14,300	2,930
3	8,300	2,980	2,650	4,280	6,390	e170	3,120	30,900	6,240	2,790	12,800	1,690
4	10,600	4,940	2,450	e273	3,760	e170	1,460	49,000	1,470	5,550	4,810	e170
5	12,900	1,990	6,120	2,330	e54	e170	e170	74,800	3,280	2,000	3,500	1,710
6	13,000	4,000	3,060	3,130	5,210	e170	5,890	43,800	9,020	5,340	1,030	e170
7	8,430	2,120	5,050	e459	3,270	e928	1,600	25,100	9,590	6,450	4,970	1,880
8	4,680	8,600	3,630	1,490	3,120	e267	1,650	38,600	11,200	1,570	5,700	e475
9	3,400	4,210	2,300	2,920	3,760	9,410	1,680	41,300	7,060	1,520	5,190	1,540
10	9,580	3,390	1,560	3,550	5,820	3,980	2,280	61,800	3,670	2,150	4,090	e170
11	6,010	2,440	e50	4,710	2,000	e590	1,250	70,600	e984	4,430	1,520	1,750
12	7,990	e50	3,300	1,080	4,060	e928	1,750	57,700	7,320	10,400	5,220	3,290
13	5,360	1,940	1,630	e702	3,360	7,960	1,610	68,500	16,500	18,600	9,620	1,490
14	7,420	7,090	3,410	e528	1,620	6,190	6,890	68,600	7,830	11,200	3,590	1,470
15	6,580	6,040	1,210	1,230	e50	e170	e207	65,900	6,200	4,190	2,460	3,520
16	1,930	7,280	3,270	e955	2,360	1,930	1,680	59,600	13,500	6,760	4,620	1,740
17	4,170	6,430	1,560	7,660	3,340	2,120	2,630	56,400	e334	11,900	3,890	5,530
18	1,020	5,420	1,490	e359	1,380	1,880	1,440	55,700	e170	9,600	5,210	9,720
19	6,150	5,030	1,800	e50	4,680	4,860	1,850	43,400	e170	12,700	3,400	9,870
20	3,610	e355	4,830	e50	2,780	10,800	5,730	30,900	6,030	10,200	2,210	1,780
21	5,680	5,070	2,280	2,890	e50	16,500	e933	9,430	5,420	6,750	4,510	e729
22	1,700	5,360	e50	1,880	7,270	2,970	2,900	22,500	7,440	1,280	7,840	3,600
23	e915	7,080	2,630	1,810	4,340	8,500	e949	15,100	8,720	e170	e170	12,000
24	6,970	7,080	e106	e334	3,580	8,970	5,100	22,800	10,100	e661	4,300	7,700
25	5,940	7,080	e879	2,640	4,210	5,260	8,790	13,300	2,830	1,790	4,110	2,170
26	3,270	7,080	e165	e791	1,440	3,020	4,490	23,800	1,700	e240	3,030	1,540
27	4,580	7,080	1,730	e851	9,380	5,360	5,010	15,800	6,340	4,400	6,960	7,160
28	4,000	11,900	1,500	5,120	1,930	3,020	12,400	12,500	5,280	10,200	6,900	4,390
29	e50	6,160	e60	10,100	---	4,470	25,900	15,200	4,730	8,780	5,190	e1,110
30	1,260	1,360	1,270	5,650	---	4,270	28,900	15,000	7,530	8,050	3,960	1,610
31	8,330	---	1,720	e917	---	5,450	---	12,500	---	e661	1,860	---
Total	175,645	143,735	66,470	71,595	93,130	124,103	142,309	1,174,930	193,808	171,246	154,900	96,204
Mean	5,666	4,791	2,144	2,310	3,326	4,003	4,744	37,900	6,460	5,524	4,997	3,207
Max	13,000	11,900	6,120	10,100	9,380	16,500	28,900	74,800	17,300	18,600	14,300	12,000
Min	50	50	50	50	50	50	170	9,430	170	170	170	170
Ac-ft	348,400	285,100	131,800	142,000	184,700	246,200	282,300	2,330,000	384,400	339,700	307,200	190,800

07250550 ARKANSAS RIVER AT JAMES W. TRIMBLE LOCK AND DAM NEAR VAN BUREN, AR—Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.–Oct 1927 to current year. Prior to Oct 1969, published as "07250500 Arkansas River at Van Buren", and Oct 1969 to Sep 1988, published as "at Dam No. 13", near Van Buren.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 1 of 4

Date	Time	Agency analyzing sample, code (00028)	Instantaneous discharge, cfs (00061)	Sampling method, code (82398)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)
Oct													
25...	1500	80020	E50	30	769	6.9	74	8.3	693	19.0	150	41.5	10.4
Dec													
12...	1500	80020	7,120	30	761	11.0	91	8.0	858	6.8	180	52.7	12.2
Mar													
08...	0830	80020	E170	30	757	11.1	103	7.8	1,210	11.2	170	48.2	12.2
May													
02...	1545	80020	27,000	30	760	7.7	86	7.7	1,530	20.6	190	50.9	14.5
Jun													
20...	1440	80020	14,200	30	769	6.6	84	8.0	586	28.4	110	32.4	7.68
Aug													
14...	1445	80020	E170	30	765	9.6	133	8.7	675	32.7	120	32.5	9.13

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 2 of 4

Date	Potassium, water, fltrd, mg/L (00935)	Sodium adsorption ratio (00931)	Sodium fraction of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L (71846)	Ammonia water, fltrd, mg/L as N (00608)	Nitrate water, fltrd, mg/L (71851)	Nitrate water, fltrd, mg/L as N (00618)
Oct													
25...	4.43	3	51	72.5	114	.2	47.7	387	.47	.07	.05	--	--
Dec													
12...	4.82	3	53	98.1	145	.2	56.7	470	.50	.06	.05	--	--
Mar													
08...	4.25	4	61	129	241	.3	76.3	659	.53	.08	.06	--	--
May													
02...	4.47	7	70	205	354	.3	88.4	839	.56	.07	.05	--	--
Jun													
20...	3.70	2	50	53.2	88.1	.2	35.5	323	.42	.07	.057	.620	.14
Aug													
14...	4.56	3	57	74.7	118	.2	44.5	370	.92	.02	.013	--	--

07250550 ARKANSAS RIVER AT JAMES W. TRIMBLE LOCK AND DAM NEAR VAN BUREN, AR—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 3 of 4

Date	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L (71856)	Nitrite water, fltrd, mg/L as N (00613)	Organic nitrogen, water, unfltrd mg/L (00605)	Total nitrogen, water, unfltrd mg/L (00600)	Orthophosphate, water, fltrd, mg/L (00660)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)	Phosphorus, water, unfltrd mg/L (00665)	E coli, m-TEC MF, water, col/100 mL (31633)	Fecal coliform, M-FC 0.7u MF col/100 mL (31625)	Chlorophyll a phytoplankton, fluoro, ug/L (70953)	Pheophytin a, phytoplankton, ug/L (62360)
Oct 25...	.30	--	<.008	.42	.77	.316	.10	.12	.14	E13	E12	E3.2	E2.3
Dec 12...	.31	--	E.007	.46	.81	.291	.10	.11	.12	120	510	5.2	2.3
Mar 08...	<.06	--	E.007	.47	--	.058	.02	<.04	.06	<1	<1	4.2	2.6
May 02...	.15	--	E.005	.51	.71	.098	.03	.05	.09	170	E190	4.4	3.8
Jun 20...	.16	.056	.017	.36	.58	.249	.081	.10	.11	E2	E2	1.3	2.0
Aug 14...	E.04	.009	.003	.91	--	.237	.077	.11	.22	50	42	23.9	9.4

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
Part 4 of 4

Date	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)	Sampler type, code (84164)
Oct 25...	99	82	--	8010
Dec 12...	98	79	1,520	8010
Mar 08...	65	4	--	8010
May 02...	93	33	2,410	8010
Jun 20...	81	3	115	8010
Aug 14...	61	9	--	8010

ILLINOIS RIVER
2006
WATER QUALITY ASSESSMENT
At The Arkansas Highway 59 Bridge

Submitted to the
Arkansas Natural Resources Commission
And
Rogers Water Utilities
By

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Fayetteville, Arkansas

June, 2007

SUMMARY

Results for Illinois River at AR59 for calendar year **2006**.

Pollutant	Total Discharge (m^3/yr) **256,585,770**	Total Load (kg/yr)	Average Discharge (m^3/s) **8.10**	Mean Concentrations (mg/l)
NO_3-N		513,847		2.00
T-P		96,596		0.38
NH_4-N		29,870		0.12
TN		575,412		2.24
PO_4-P		33,837		0.13
TSS		33,054,951		128

2006 Loads and Concentrations during storm and base-flows.

	Storm Loads (kg)	Base Loads (kg)	Storm Concentrations (mg/l)	Base Concentrations (mg/l)
Discharge (m^3/yr)	107,602,614	148,983,156		
NO_3-N	195,226	318,621	1.81	2.14
T-P	77,314	19,282	0.72	0.13
NH_4-N	21,657	8,214	0.20	0.06
TN	244,722	330,691	2.27	2.22
PO_4-P	20,114	13,723	0.19	0.09
TSS	31,752,053	1,302,898	295	9

INTRODUCTION

Automatic water sampler and a U. S. Geological Survey gauging station were established in 1995 on the main stem of the Illinois River at the Arkansas Highway 59 Bridge. Since that time, continuous stage and discharge measurements and water quality sampling have been used to determine pollutant concentrations and loads in the Arkansas portion of the Illinois River. This report represents the results from the measurement and sampling by the Arkansas Water Resources Center -Water Quality Lab for January 1, 2006 to December 31, 2006.

PREVIOUS RESULTS

In the fall of 1995, a gauge was installed at the Highway 59 Bridge by the USGS and automatic sampling equipment was installed by the Arkansas Water Resource Center. In September 1995, sampling was begun on the Illinois River. Grab samples were taken every week and storms were sampled using an automatic sampler set to take samples every 4 hours. During the period from September 13, 1995 to September 15, 1996 one hundred thirty seven grab samples and discrete storm samples were collected and analyzed. Table 1 summarizes the results from that study (Parker et al, 1997).

Table 1. Results from **1996** study period (Parker et al, 1997)

Nutrients	Total Discharge (m^3/yr) 300,775,680	Total Load (kg/yr)	Average Discharge (m^3/s) 9.5	Average Flow Weighted Concentrations (mg/l)
N03-N		550,000		2.0
NH3-N		8,530		0.031
TKN		201,000		0.74
TP		89,900		0.29
TSS		27,000,000		89
TOC		1,130,000		4.2

Sampling was discontinued on September 15, 1996 and no water quality samples were taken between September 15, 1996 and November 1, 1996. Stage and discharge was still recorded for this period, however, no loads were calculated. Water quality sampling was resumed on November 1, 1996. The sampling protocol was changed to collection of grab samples every two weeks and flow-weighted storm composite samples. Between November 1, 1996 and December 31, 1996 a total of four grab samples and one storm composite sample were collected and analyzed. Stage and discharge were recorded.

During the period from January 1, 1997 to October 15, 1997, there were twenty-six grab samples and twenty-five storm composite samples collected and analyzed using the same protocol. During the period from October 15, 1997 to December 31, 1997, the sampling protocol was changed to taking grab samples every two or three days and taking discrete storm samples every thirty or sixty minutes. In this period, there were twenty-four grab samples and one hundred and forty storm discrete samples collected and analyzed. The loads and mean concentrations for 1997 calculated using these samples are summarized in Table 2.

Table 2. Results from **1997**-study period (Nelson and Soerens, 1998).

Pollutant	Total Discharge (m^3/yr) 458,460,000	Total Load (kg/yr)	Average Discharge (m^3/s) 14.5	Mean Concentrations (mg/l)
N03-N		1,020,000		2.24
TKN		301,000		0.66
TP		127,000		0.28
TSS		18,400,000		40.2

In the periods from January 1, 1998 to May 15, 1998 and November 1, 1998 to December 31, 1998, the Illinois River sampling was supplemented by sampling from another research project. That project, sponsored by the USGS Water Resource Institute Program, was titled "Investigation of Optimum Sample Interval for Determining Storm Water Pollutant Loads" by Marc Nelson, Thomas Soerens and Jean Spooner. The sampling protocol for that project consisted of taking grab samples every two days and discrete storm water samples at thirty-minute intervals on the rising limb and sixty-minute intervals on the falling limb of storm hydrographs. Storm water sampling was begun at a variable trigger level set to the current stage plus ten percent and adjusted every two days. After the first thirty-six hours of each storm, sample times were increased to from four to twenty-four hours until the stage fell below the initial trigger. All samples were collected within twenty-four hours. All samples were analyzed for nitrate nitrogen (NO3-N), ammonia nitrogen (NH4-N), total Kjeldahl nitrogen (TKN), total phosphorus (TP), ortho phosphate (O-P) and total suspended solids (TSS). AWRC Field Services personnel collected all samples and all samples were analyzed by the AWRC Water Quality Lab using standard field and laboratory QA/QC procedures.

In the period from May 16, 1998 to October 31, 1998, the sampling protocol was changed back to the collection of grab samples every two weeks and flow-weighted composite samples during storms. Storms were defined as all flows above a five-foot trigger level. Once stage had risen above the trigger, a USGS programmable data logger began summing the volume of water discharged. Once a determined amount of water had been discharged, the data logger sent a signal to an automatic water sampler that filled one of twenty-four one-liter bottles. The total was then reset to zero and discharge was again summed for the next sample. In this fashion up to twenty-four samples, each representing an equal volume of storm water was collected. The volume of water represented by each individual sample was eight million cubic feet. These samples were retrieved before all twenty-four bottles were filled, or within 48 hours after being taken. The individual samples were composited into a flow-weighted composite storm sample by combining equal volumes of each. Samples were taken as long as the stage remained above the trigger level. All samples were analyzed for nitrate nitrogen (NO3-N), total Kjeldahl nitrogen (TKN), total phosphorus (TP) and total suspended solids (TSS). AWRC Field Services personnel collected all samples and all samples were analyzed by the AWRC Water Quality Lab using standard field and laboratory QA/QC procedures.

In the period from January 1, 1998 to December 31, 1998, there were four hundred and forty nine samples collected and analyzed. These results are summarized in Table 3.

Table 3. Results from **1998**-study period (Nelson and Soerens, 1999).

Pollutant	Total Discharge (m^3/yr)	Total Load (kg/yr)	Average Discharge (m^3/s)	Mean Concentrations (mg/l)
	588,000,000		18.6	
N03-N		1,390,000		2.37
TKN		481,000		0.82
TP		232,000		0.39
TSS		72,600,000		123.5

In the period from January 1, 1999 to December 31, 1999, there were three hundred and sixty nine samples collected and analyzed. These results are summarized in Table 4.

Table 4. Results from the **1999** study period (Nelson and Soerens, 2000)

Pollutant	Total Discharge (m^3/yr) 635,000,000	Total Load (kg/yr)	Average Discharge (m^3/s) 20.0	Mean Concentrations (mg/l)
N03-N		1,560,000		2.45
TKN		514,000		0.81
TP		267,000		0.42
TSS		77,100,000		121

In the period from January 1, 2000 to December 31, 2000, there were fifty-one samples collected and analyzed. These results are summarized in Table 5.

Table 5. Results for Illinois River at AR59 for Calendar Year **2000**. (Nelson and Soerens, 2001).

Pollutant	Total Discharge (m^3/yr) 536,000,000	Total Load (kg/yr)	Average Discharge (m^3/s) 17	Mean Concentrations (mg/l)
N03-N		1,100,000		2.06
TKN		462,000		0.86
TP		283,000		0.53
TSS		63,600,000		118

In the period from January 1, 2001 to December 31, 2001, there were forty-nine samples collected and analyzed. These results are summarized in Table 6.

Table 6. Results for Illinois River at AR59 for Calendar Year **2001**. (Nelson and Soerens, 2002).

Pollutant	Total Discharge (m^3/yr) 532,000,000	Total Load (kg/yr)	Average Discharge (m^3/s) 16.9	Mean Concentrations (mg/l)
N03-N		1,520,000		2.86
TKN		447,000		0.84
TP		256,000		0.48
TSS		70,800,000		133

In the period from January 1, 2002 to December 31, 2002, there were Fifty-six samples collected and analyzed. These results are summarized in Table 7.

Table 7.Results for Illinois River at AR59 for calendar year **2002**. (Nelson and Cash, 2003).

Pollutant	Total Discharge (m^3/yr) 531,000,000	Total Load (kg/yr)	Average Discharge (m^3/s) 16.8	Mean Concentrations (mg/l)
N03-N		1,340,000		2.52
TKN		294,000		0.55
TP		218,000		0.41
TSS		38,900,000		73

Table 8 Results for Illinois River at AR59 for calendar year **2003**(Nelson and Cash, 2004)..

Pollutant	Total Discharge (m^3/yr) 289,188,131	Total Load (kg/yr)	Average Discharge (m^3/s) 9.1	Mean Concentrations (mg/l)
N03-N		590,943		2.04
TKN		144,041		0.50
TP		64,854		0.22
TSS		11,845,136		41

Table 9. Results for Illinois River at AR59 for calendar year **2004**. (Nelson, et. al.)

Pollutant	Total Discharge (m^3/yr) 565,760,474	Total Load (kg/yr)	Average Discharge (m^3/s) 17.8	Mean Concentrations (mg/l)
N03-N		1,207,335		2.13
TKN		512,358		0.91
TP		281,425		0.5
TSS		92,080,737		163

Table 9. Results for Illinois River at AR59 for calendar year **2005**. (Nelson, et. al.)

Pollutant	Total Discharge (m^3/yr)	Total Load (kg/yr)	Average Discharge (m^3/s)	Mean Concentrations (mg/l)
	390,894,159		12.3	
NO3-N		1,018,744		2.61
T-P		106,979		0.27
NH4		20,602		0.05
TN		1,170,851		3.00
PO4		44,213		0.11
TSS		33,560,475		85.86

Table 10. Summary of previous years load results.

Para meter	**1997** Loads	**1998** Loads	**1999** Loads	**2000** Loads	**2001** Loads	**2002** Loads	**2003** Loads	**2004** Loads	**2005** Loads
Discharge 10^6(m^3)	458	588	635	536	532	531	289	566	391
N03-N 10^3 (kg/yr)	1,020	1,390	1,560	1,100	1,520	1,340	591	1,207	1,018
TkN 10^3 (kg/yr)	301	481	514	462	447	294	144	512	153
TP 10^3 (kg/yr)	127	232	267	283	256	218	64	281	107
TSS 10^3 (kg/yr)	18,400	72,600	77,100	63,600	70,800	39,000	11,845	92,080	33,560

METHODS

In the period from January 1, 2006 to December 31, 2006, the Illinois River sampling followed the following protocol. Base flow grab samples were taken every two weeks using the automatic sampler. Discrete storm samples were collected during all storm events (herein defined as when the stage was above five feet for more than 12 hours). Samples were collected every 30 minutes during the first 12 hours of a storm and every 60 minutes during the rest of the storm. All samples were analyzed for nitrate nitrogen (NO3-N), ammonia nitrogen (NH4-N), total nitrogen (TN), total phosphorus (TP), ortho-phosphate (O-P) and total suspended solids (TSS). AWRC Field Services personnel collected all samples and all samples were analyzed by the AWRC Water Quality Lab using standard field and laboratory QA/QC procedures. Calendar year pollutants loads and mean concentrations were calculated from the collected data. USGS stage and discharge data in thirty-minute intervals was used to calculate thirty-minute total volumes. Each volume was assigned a pollutant concentration. The pollutant concentrations were assigned by applying the results of grab samples between storm trigger levels and the results of storm water samples above trigger levels. All concentration data were assigned to the time periods from half way to the previous sample to half way to the subsequent sample except the first and last of a storm or base flow period which were assigned to the start or end of the period. Thirty-minute loads were calculated by multiplying thirty-minute volumes by their assigned concentrations. The yearly loads were calculated by summing the thirty-minute loads during the calendar year. Yearly mean concentrations were calculated by dividing the yearly load by the yearly volume.

RESULTS

In the period from January 1, 2006 to December 31, 2006, there were a total of 57 samples consisting of 19 composite storm samples, 26 base-flow grab samples, 4 field blank samples, 4 sampler duplicate samples and 4 bank replicate samples collected, analyzed and used to calculate loads. These results are summarized in Tables 11and 12 and Figure 1.

Table 11. Results for Illinois River at AR59 for calendar year **2006**.

Pollutant	Total Discharge (m^3/yr)	Total Load (kg/yr)	Average Discharge (m^3/s)	Mean Concentrations (mg/l)
	256,585,770		**8.10**	
NO_3-N		513,847		2.00
T-P		96,596		0.38
NH_4-N		29,870		0.12
TN		575,412		2.24
PO_4-P		33,837		0.13
TSS		33,054,951		128

Figure 1. Recorded stage and measured concentrations for **2006**.

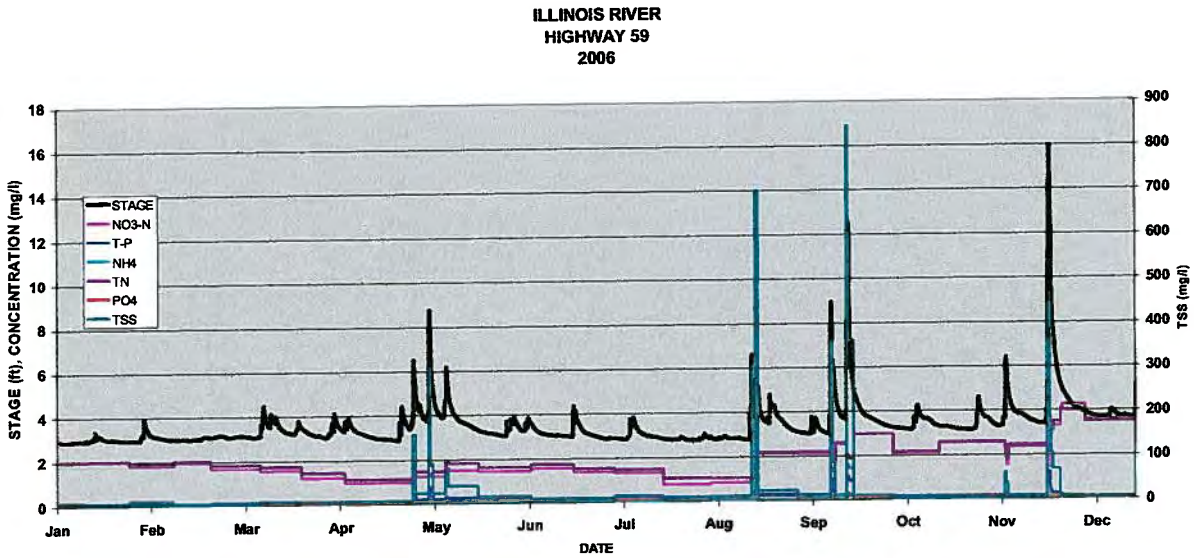


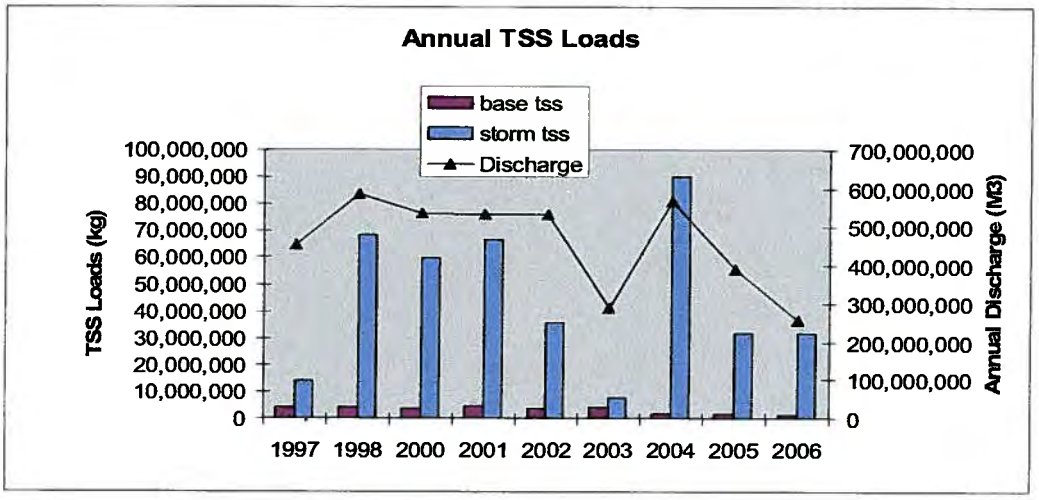
Table 12. **2006** Loads and Concentrations during storm and base-flows.

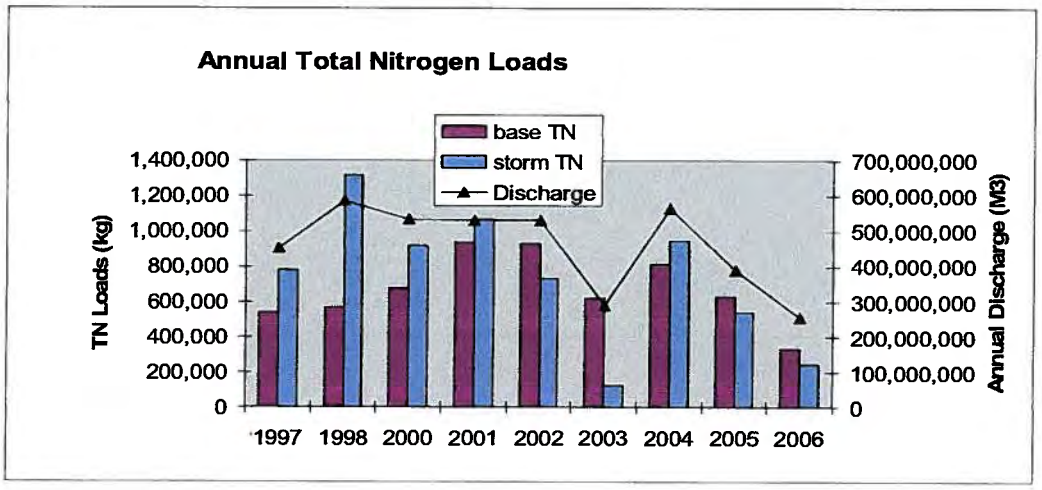
	Storm Loads (kg)	**Base Loads (kg)**	**Storm Concentrations (mg/l)**	**Base Concentrations (mg/l)**
Discharge (m^3/yr)	107,602,614	148,983,156		
NO_3-N	195,226	318,621	1.81	2.14
T-P	77,314	19,282	0.72	0.13
NH_4-N	21,657	8,214	0.20	0.06
TN	244,722	330,691	2.27	2.22
PO_4-P	20,114	13,723	0.19	0.09
TSS	31,752,053	1,302,898	295	9

DISCUSSION

Results from nine years of water quality monitoring for total phosphorus are summarized in Figures 2 to 4. The mean concentrations were determined by dividing the annual load by the annual discharge. The trends in base and storm-flow loads and total discharge are shown in figure 2. Base-flow loads represent the phosphorus load determined when the river stage was below five feet. These results show a decreasing trend in base-flow loads in the last four years. Figure 3 shows that the reduction in T-P base-flow loads measured at the 59 Bridge correlates well with the reduction of T-P discharged by the municipal WWTPs into the river.

Figure 2 trends in discharge and annual loads.





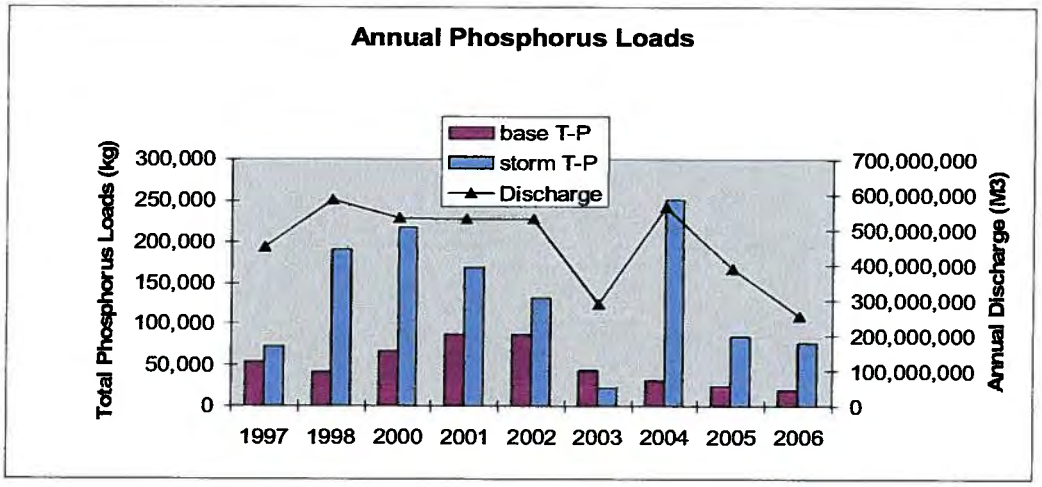
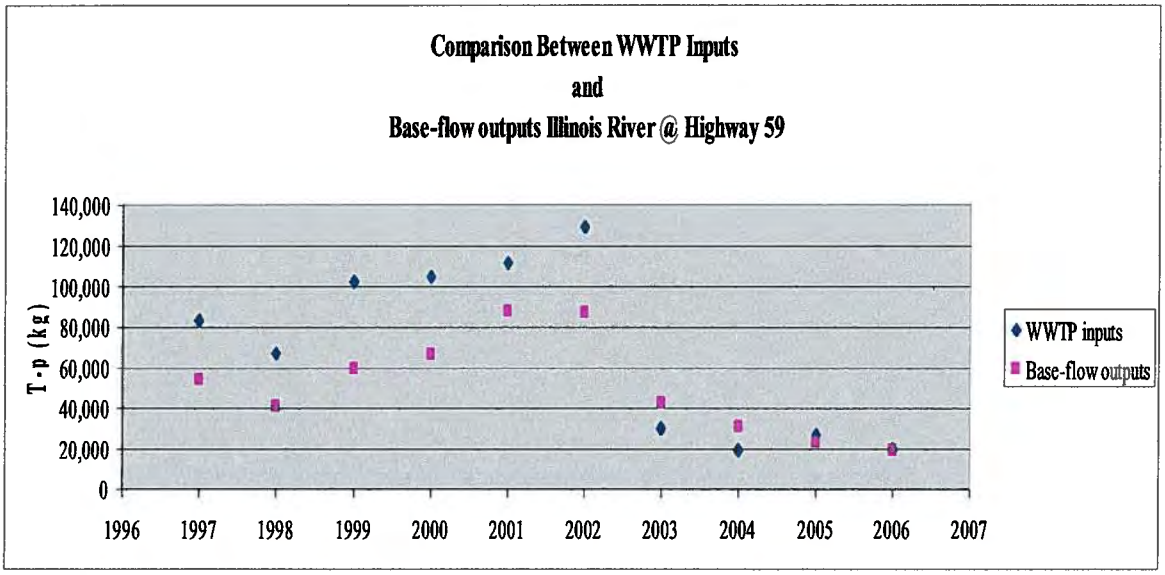
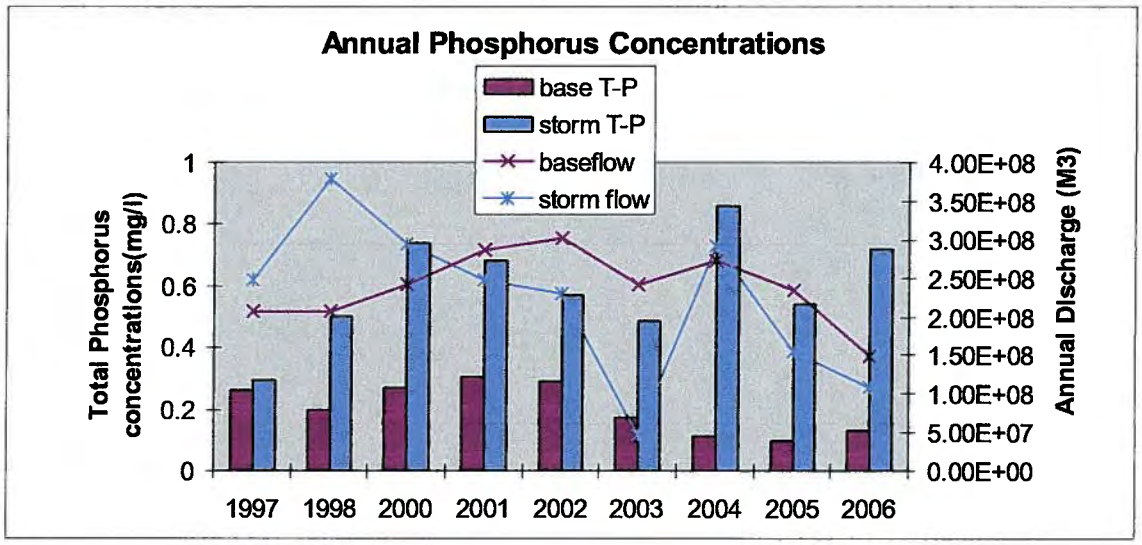


Figure 3 Comparison of measured base-flow T-P load to WWTP T-P discharge.



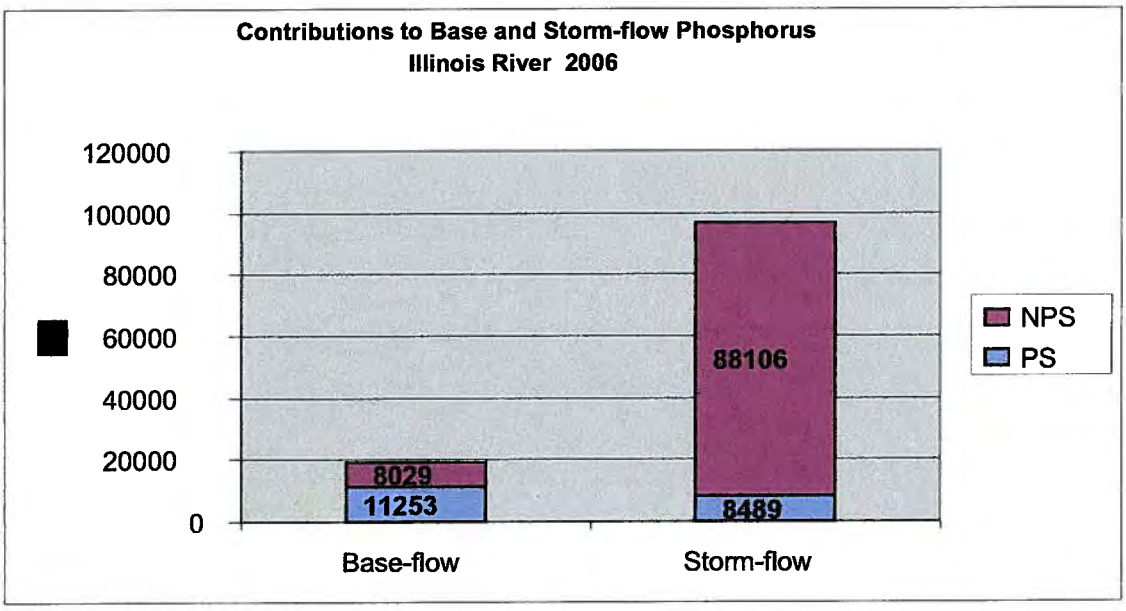
Storm –flow loads are highly correlated to discharge. Storm events usually have higher concentrations and with the higher discharges, have much greater loads. Higher total annual discharge usually implies higher mean storm concentrations and storm loads. Figures 2 and 4 show that the total and storm discharge has declined in the last two years. The total nitrogen storm load has followed this trend. However, the loads for TSS and P have not decreased as much as expected and figure 4 shows that P concentrations during storm events have increased in 2006. This could imply either that the storms that did occur had greater intensity or the watershed had more disturbed soils containing phosphorus to be washed into the rivers during storm events. It is less likely that the increased P was from increased application of P in the watershed since it is listed as a nutrient surplus watershed and P application rates are limited. Figure 4 shows that base-flow P concentrations increased slightly from 0.10 to 0.13 mg/l due to decreased base- flow discharge.

Figure 4 Trends in phosphorus concentrations.



Previous studies for the period from 1997 to 2001 estimated that 57% of the WWTP discharged P was measured in the base-flow and 43% was measured in the storm-flows (Nelson and White, 2002). Using this relationship, Figure 5 shows the contributions of point sources and non-point sources to measured base and storm-flows for 2006.

Figure 5 Point source and non-point source contributions to base and storm-flow phosphorus.



The Illinois River @ 59 Bridge during 2006 can be compared to loads and concentrations developed in other watersheds in Northwest Arkansas for 2006. Five other watersheds have been monitored using the same monitoring and load calculation protocols. The only differences between the protocols are that trigger levels and storm composite sample volumes are different for each site. This means that the distinction between storm and base flows (defined here as the trigger level) may be relatively different at each site.

The results for the six watersheds are summarized in Table 13 and Figure 6. The table and figure show TSS, total phosphorus and total nitrogen as total annual storm-flow loads per watershed hectare, as base-flow loads per watershed hectare and as base-flow concentrations. Normalizing storm and base-flow loads to a per hectare basis allows comparison between watersheds of differing sizes. The total loads indicate the mass of TSS or P that are being transported to a receiving water body. Storm loads per hectare may be used to represent relative impacts from non-point sources. The Illinois River watershed had lower TSS loads per hectare compared to the other watersheds during both base-flows and storm-flows (Kings River had lower base-flow TSS). Most of the TSS was transported during storm events. The P load for the Illinois River was lower compared to the other watersheds (except the Kings) during storm-flows. The P load during base-flow conditions was the lowest in the Illinois River watershed. Most of the phosphorus was transported during storm events. There is a strong correlation between base-flow phosphorus loads and the phosphorus discharged by the 4 WWTPs discharging in the watershed (see figure 3). Total nitrogen loads per hectare were higher than the others except Ballard Creek and in general higher than in the White River Basin.

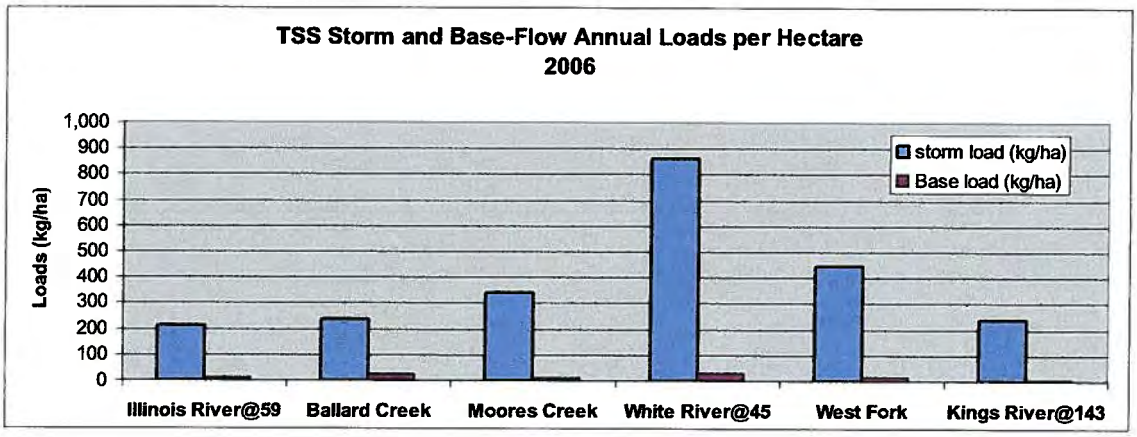
The base-flow concentrations show relative levels of TSS, T-P and TN that are impacting in-stream biological activity during most of the year. These are the values that are of greatest interest for determining impacts to in-stream biological habitat and nuisance algae production. The base-flow concentration of TSS was average. The T-P concentration was 0.13 mg/l which was greatly reduced from the peak of 0.3 mg/l in 2002. However, the concentration was up from 0.1 mg/l in 2005 due to the dry weather. The nitrate concentration of 2.41 mg/l was high compared to the others, but down slightly from 2.57 mg/l in 2005. This is a possible result of the combination of high groundwater levels and discharges by the 4 WWTPs discharging in the watershed.

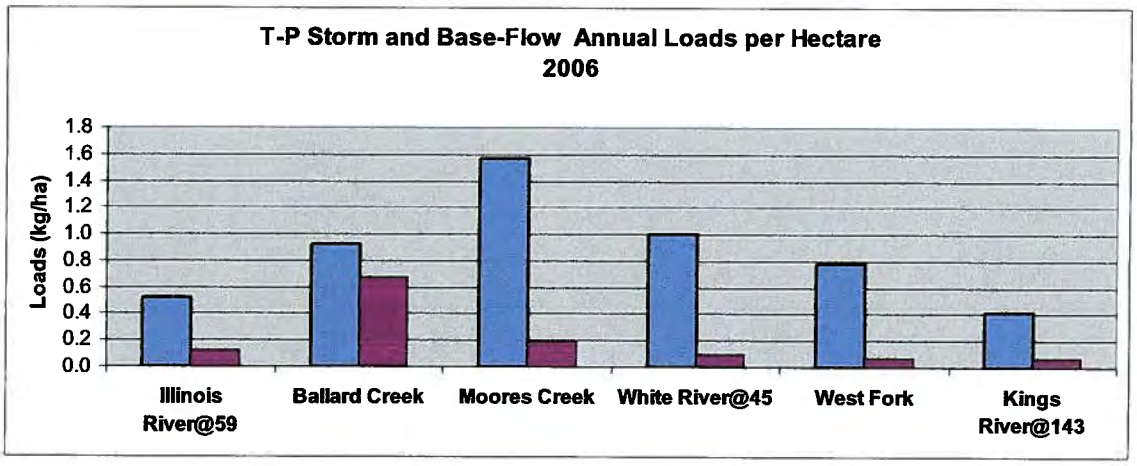
2006 was a very dry year. It was particularly dry in the Illinois River watershed which had an average discharge of 287 cfs compared to a long term average of 594 cfs: less than 50%. The other watersheds showed less of an impact from the dry weather. The dry weather means less stormwater runoff (and loads) and higher concentrations during the base-flows.

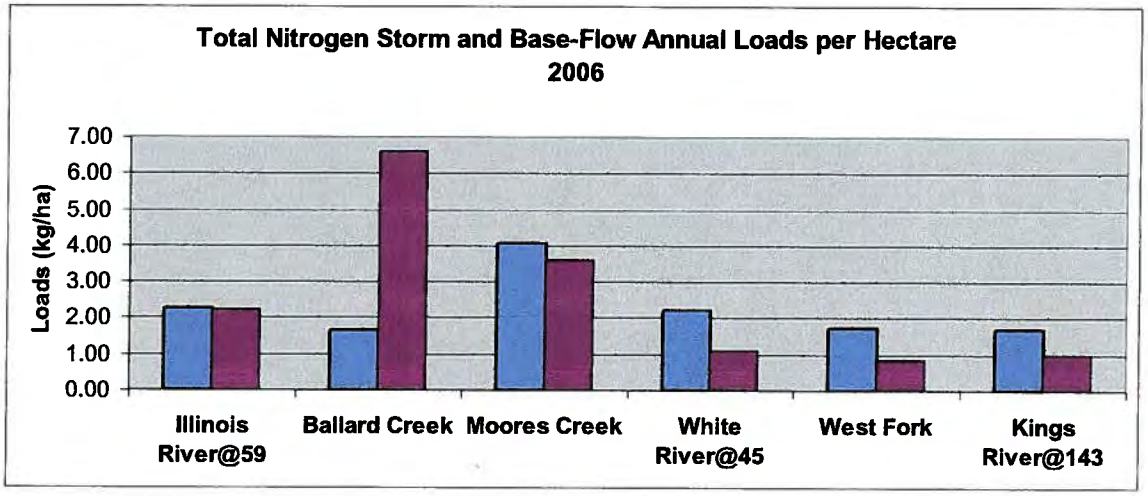
Table 13 Comparison of six watersheds 2006.

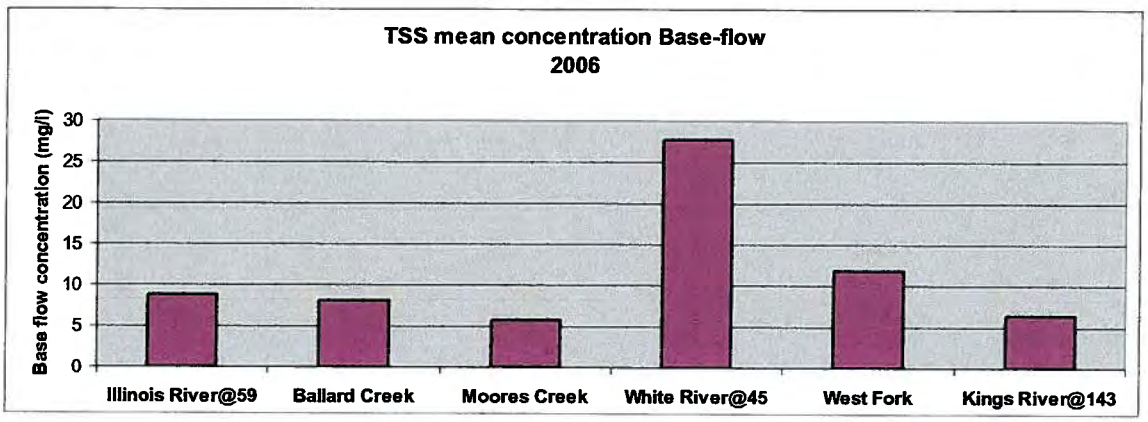
2006	Illinois River@59	Ballard Creek	Moores Creek	White River@45	West Fork	Kings River@143
Hectares	148,930	7,106	1,000	106,711	30,563	136,497
Years of data	2006	2006	2006	2006	2006	2006
TSS yield (kg/ha)	222	261	352	889	460	245
TSS storm yield (kg/ha)	213	235	341	860	444	237
TSS base yield (kg/ha)	9	26	11	29	16	7
TSS conc. base (mg/l)	9	8	6	28	12	6
P yield (kg/ha)	0.65	1.60	1.77	1.10	0.85	0.48
P storm yield (kg/ha)	0.52	0.93	1.57	1.00	0.78	0.41
P base yield (kg/ha)	0.13	0.67	0.20	0.10	0.06	0.07
P base conc. (mg/l)	0.13	0.21	0.10	0.10	0.05	0.06
Total Nitrogen yield (kg/ha)	3.86	8.27	5.73	3.34	2.58	2.69
Total Nitrogen storm yield (kg/ha)	2.27	1.66	4.08	2.24	1.74	1.71
Total Nitrogen base yield (kg/ha)	2.22	6.62	3.61	1.10	0.84	0.98
NO3-N base conc. (mg/l)	2.14	1.68	1.58	0.90	0.43	0.73
Discharge (m^3)	256,585,770	28,532,395	3,845,410	385,860,012	103,028,696	310,839,767
Discharge/area (m^3/ha)	1,722.87	4,015	3,845	3,616	3,371	2,047

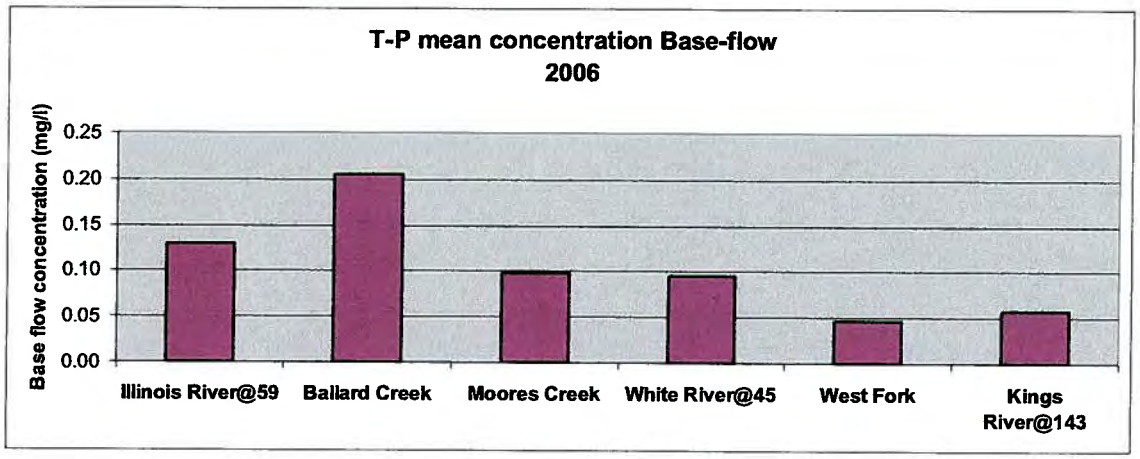
Figure 6 Comparison of six watersheds

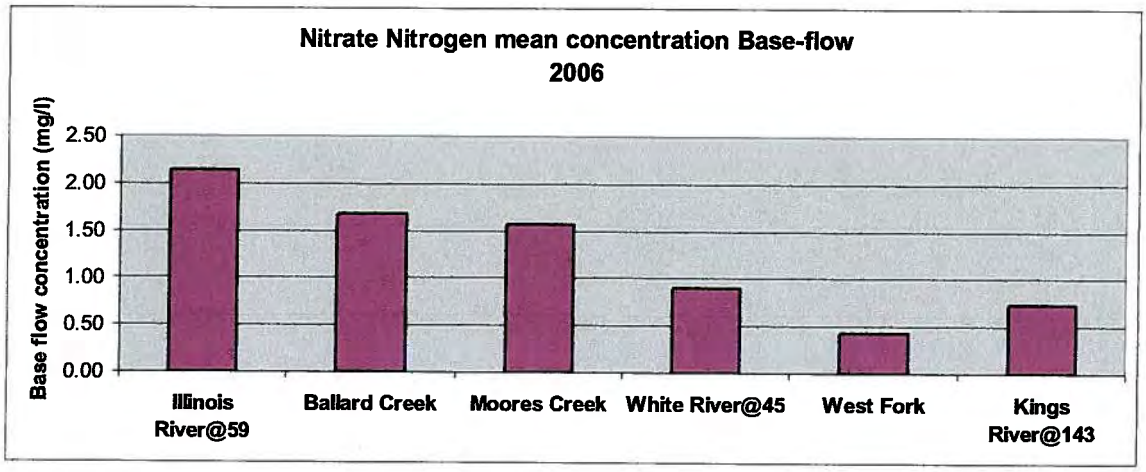







TSS mean concentration Base-flow
2006
Base flow concentration (mg/l)
30
25
20
15
10
5
0
Illinois River@59
Ballard Creek
Moores Creek
White River@45
West Fork
Kings River@143


T-P mean concentration Base-flow
2006
Base flow concentration (mg/l)
0.25
0.20
0.15
0.10
0.05
0.00
Illinois River@59
Ballard Creek
Moores Creek
White River@45
West Fork
Kings River@143


Nitrate Nitrogen mean concentration Base-flow
2006
Base flow concentration (mg/l)
2.50
2.00
1.50
1.00
0.50
0.00
Illinois River@59
Ballard Creek
Moores Creek
White River@45
West Fork
Kings River@143

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U.S. GEOLOGICAL SURVEY SUMMARY SHEET
ARKANSAS DISTRICT
OKLAHOMA DISTRICT

ANNUAL ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION MEETING

Arkansas Oil and Gas Commission, Fort Smith, Arkansas
September 13, 2007

	PEAK DISCHARGE (ft^3/s) MAXIMUM	WY 06	AVERAGE DISCHARGE (ft^3/s) PERIOD OF RECORD	WY 06
ARKANSAS RIVER BASIN				
07165570 ARKANSAS RIVER NR HASKELL, OK	259,000 10-5-86	29,700 5-10-06	10,490 34 YRS	2,942
07176000 VERDRIGRIS R NR CLAREMORE, OK	182,000 5-21-43	14,000 5-10-06	*4,494 42 YRS	1,003
07178200 BIRD CREEK AT ST HWY 266 NR CATOOSA, OK	27,400 5-11-93	[e]9,000 4-30-06	984 18 YRS	306
07193000 FT GIBSON LK NR FT GIBSON , OK	#223,000 5-26-57		**8,403 39 YRS	+1,572
07194500 ARKANSAS RIVER NR MUSKOGEE, OK	700,000 5-21-43	70,900 5-10-06	##19,520 45 YRS	++6,025
07245000 CANADIAN R NR WHITEFIELD, OK	281,000 5-10-43	10,000 11-30-05	*6,371 39 YRS	357
07250550 ARKANSAS RIVER AT J W TRIMBLE L&D NR VAN BUREN, AR	850,000 5-12-43	89,700 5-4-06	*38,390 37 YRS	7,145

[e] Estimated discharge.

07193500, Neosho River blw Ft. Gibson Lake.

Average discharge for water years 1926-70.

* Average discharge since regulation by upstream lake(s).

** Average discharge thru 1989, 07193500, Neosho River blw Ft. Gibson Lake (discontinued).

+ Estimated from Corps of Engineers' records for current year.

++Determined by accoustic velocity meter gaging equipment installed July 2003.

Discharges for 1970-2003 estimated by combining 07165571, 07176000, 07178200, 07193000.

U.S. GEOLOGICAL SURVEY SUMMARY SHEET
ARKANSAS DISTRICT
OKLAHOMA DISTRICT

ANNUAL ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION MEETING

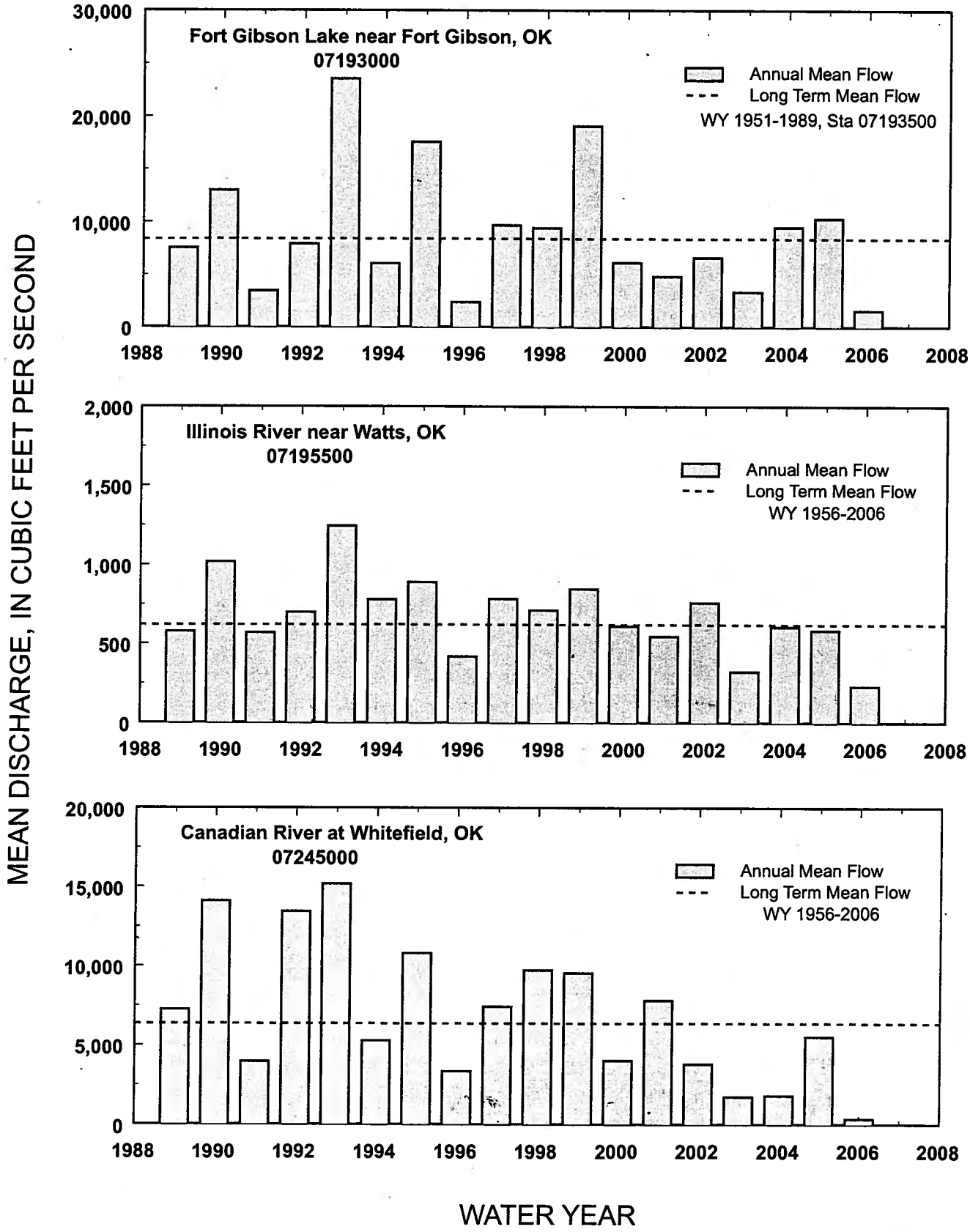
Arkansas Oil and Gas Commission, Fort Smith, Arkansas
September 13, 2007

	PEAK DISCHARGE (ft^3/s) MAXIMUM	WY 06	AVERAGE DISCHARGE (ft^3/s) PERIOD OF RECORD	WY 06
SPAVINAW CREEK SUBBASIN				
07191220 SPAVINAW CREEK NR SYCAMORE,OK	39,800 7-27-75	192 5-11-06	112 45 YRS	18.6
ILLINOIS RIVER SUBBASIN				
07195500 ILLINOIS RIVER NR WATTS, OK	68,000 7-25-60	8,060 9-24-06	622 51 YRS	231
07195855 FLINT CK NR WEST SILOAM SPRINGS, OK	8,750 6-21-00	80 5-31-06	46.9 27 YRS	9.47
07196900 BARON FORK AT DUTCH MILLS, AR	20,900 11-18-85	3,490 5-4-06	44.0 48 YRS	20.4
LEE CREEK SUBBASIN				
07249985 * LEE CREEK NR SHORT, OK	80,600 5-6-60	19,700 5-4-06	536 62 YRS	178
POTEAU RIVER SUBBASIN				
07247000 POTEAU RIVER AT CAUTHRON, AR	32,200 5-20-60	4,680 3-20-06	**238 32 YRS	61.0
07249400 JAMES FORK NR HACKETT, AR	30,000 5-14-68	2,200 3-20-06	143 48 YRS	18.9

* Formerly published as 07250000 Lee Creek nr Van Buren, AR.

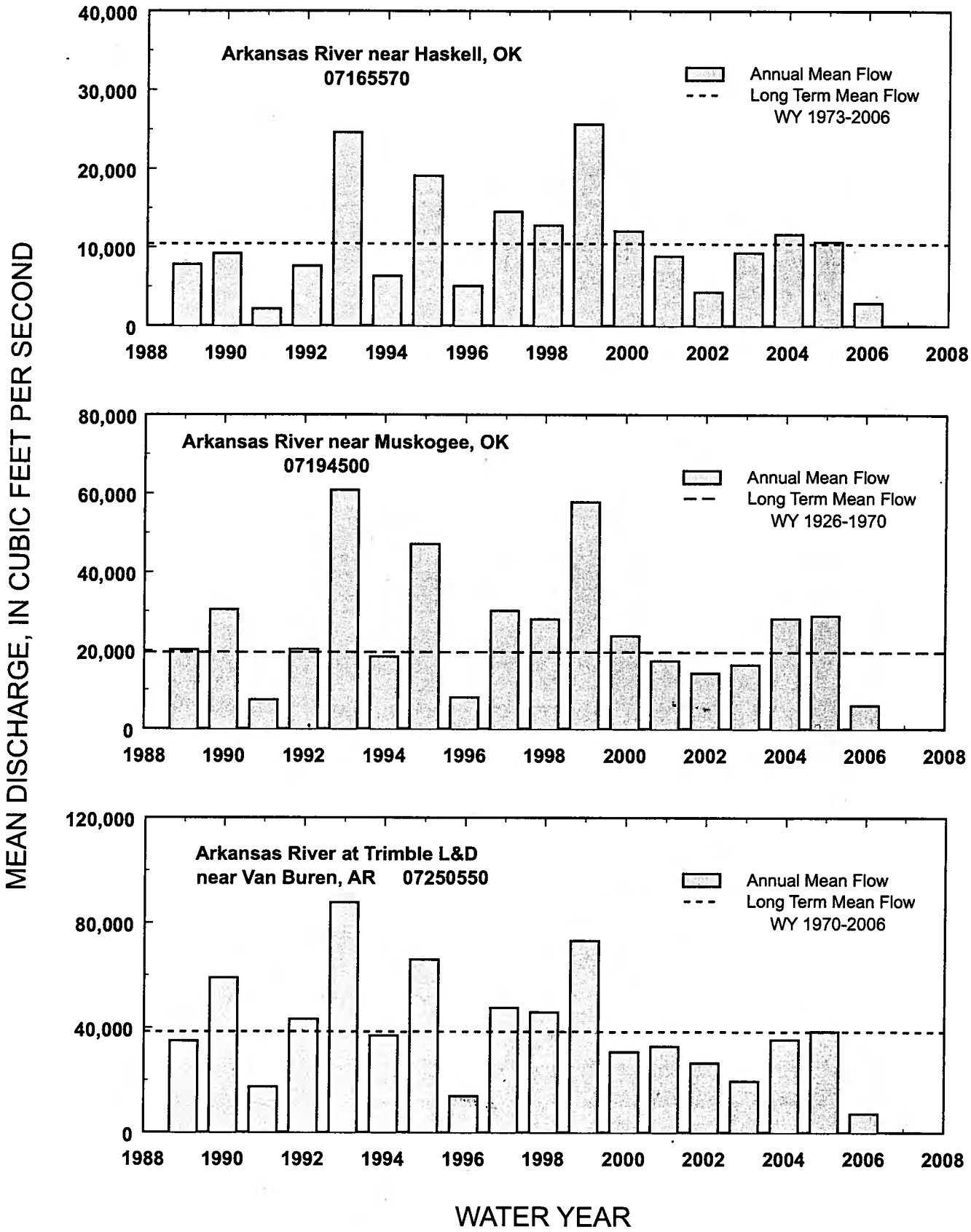
** Average discharge since regulation by upstream lake(s).

ARKANSAS RIVER BASIN TRENDS IN STEAMFLOW



Prepared by US Geological Survey

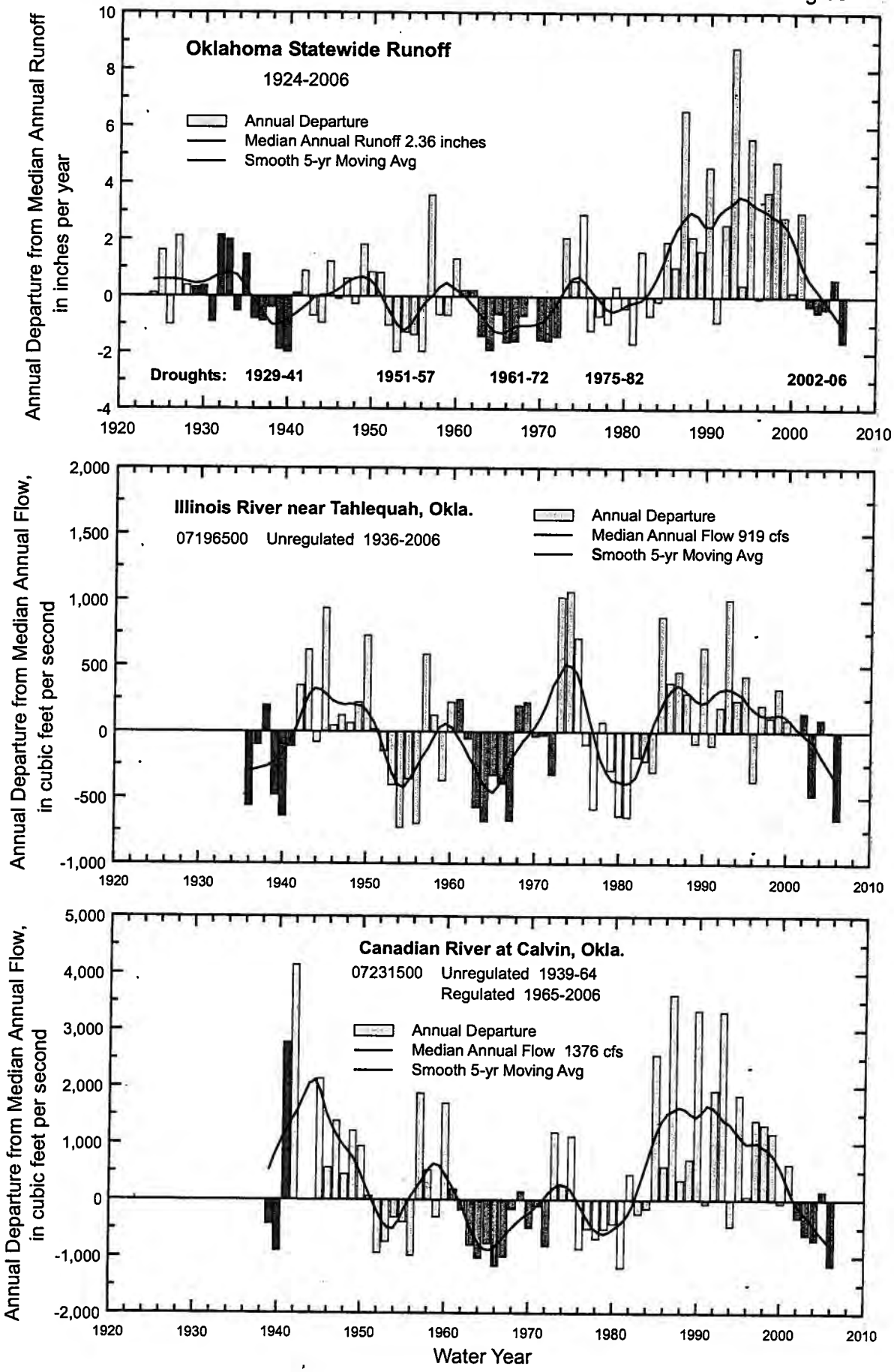
ARKANSAS RIVER BASIN TRENDS IN STEAMFLOW



Prepared by US Geological Survey

LONG-TERM ARKANSAS RIVER BASIN TRENDS IN STREAMFLOW

NOTE: WY 2006 Values based on first 11 months of flow Oct 05 - Aug 06



US Geological Survey **PROVISIONAL DATA** **Subject to Revision**

RECLAMATION

Managing Water in the West

Activity Report

Oklahoma-Texas Area Office
Kansas, Oklahoma, and Texas

U.S. Department of the Interior
Bureau of Reclamation

September 2007

Mission Statements

The mission of the *Department of the Interior* is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the *Bureau of Reclamation* is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Ongoing and Recently Completed Activities
- PLANNING PROGRAM
  - General Investigations
    - Arbuckle-Simpson Aquifer (OK), Water Resources Management Study
    - Fort Cobb Reservoir (OK), Alternatives for Conveyance System Expansion
    - Lake Altus (OK), Water Supply Augmentation
    - Lake Thunderbird (OK), Water Supply Augmentation and Enhancement
    - McPherson (KS), Water Availability Study
    - Walnut and Lower Arkansas River Basins (KS), Water Supply Special Study
  - Native American Technical Assistance
    - Chickasaw Nation (OK), Study of Water Treatment Alternatives
    - Delaware Nation (OK), Needs Assessment
    - Seminole Nation (OK), Replacement of Pump House and Control System
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Contacts

Introduction

The Oklahoma-Texas Area Office (OTAO) of the Bureau of Reclamation (Reclamation) is responsible for administering eleven reservoir projects and associated water distribution systems in southern Kansas, Oklahoma, and Texas. Reclamation works in conjunction with other Federal, state, Indian tribes, and local entities in performing these responsibilities. Significant areas of activity include providing oversight of operations and maintenance of existing facilities and water resources planning assistance.

The purpose of this Activity Report is to provide a selected summary of current and recent activities of the Area Office.

Ongoing and Recently Completed Activities

PLANNING PROGRAM

General Investigations

Arbuckle-Simpson Aquifer (OK), Water Resources Management Study
Status Ongoing
Description The Arbuckle-Simpson Aquifer has been designated a sole source aquifer by EPA. The health and economic future of a large number of Oklahoma residents is dependent on protecting the quantity and quality of water in the aquifer. The Arbuckle-Simpson is an important source of water supply for the citizens of Ada, Sulphur, Mill Creek and Roff; the Chickasaw National Recreational Area; and many farmers and ranchers owning land overlying the aquifer. Contributions from the aquifer also provide the perennial flow for many streams and natural springs in the area.

During recent years, a number of issues have emerged which have caused concern about the utilization and continued health of the aquifer. These issues include concern over water use, competition for water, pumping water to areas beyond the recharge zones for the aquifer, and water quality. In order to assure the future well-being of the aquifer, the Oklahoma Water Resources Board entered into a cost-sharing agreement with the Bureau of Reclamation to undertake a 5-year study of the hydrology within the aquifer to include detailed assessments of the formation hydrogeology, water quality and vulnerability, as well as groundwater-surface water interactions. The results of this study will provide information that is intended for use in the development of best management practices which will protect the integrity of the aquifer, change land use and diminish related impacts, and assist in Tribal and State water rights issues. The study is scheduled to be completed in 2008.

Fort Cobb Reservoir (OK), Alternatives for Conveyance System Expansion
Status Complete
Description Fort Cobb Reservoir serves the municipal and industrial water supply needs of several communities in west-central Oklahoma. The Fort Cobb Master Conservancy District has begun to experience periods of difficulty in delivering sufficient water through the Anadarko Aqueduct to meet the peak demands of the service population. The total demand has not yet exceeded the amount contracted to the member cities and other water user entities, the actual total deliveries requested during the summer months are approaching the physical limitations of the existing aqueduct. The Appraisal Report developed and evaluated sixteen alternatives as to the estimated construction and operation costs. The most economically alternative appeared to be the construction of a new pipeline from Fort Cobb Reservoir to supplement the existing Anadarko and Chickasha Aqueducts. However the Appraisal Report concluded that modification to the conveyance system would be premature without viable options to supplement the existing water supply.

Lake Thunderbird (OK), Water Supply Augmentation and Enhancement
Status Completed August 2005
Description Lake Thunderbird, located on the Little River in central Oklahoma, was constructed as part of the Norman Project during the mid 1960's for municipal and industrial (M&I) water supply, flood control, recreation, and fish & wildlife purposes. The Central Oklahoma Master Conservancy District (District), which provides M&I water to Norman, Midwest City, and Del City holds the project water rights. The Oklahoma Water Resources Board (OWRB), the District, the cities, and Reclamation have been working together to evaluate alternatives to augment the water supplies of the district, the member cities, and other potential water customers within the district's service area.

An appraisal report was completed in August 2005, and it concluded that an M&I water need exists and that there are a range of alternatives available to meet that need. The OWRB proposed that a Feasibility Study be conducted by Reclamation in partnership with the OWRB, the District, and its three member cities. In FY 2006, Reclamation received a write-in appropriation of $144,000 to initiate the feasibility study, but Congress did not provide the necessary authorization. A portion of those funds were utilized to develop a draft Plan of Study and cost-sharing agreements. Reclamation has met with the District numerous times in 2007 to discuss draft Plan of Study, as well as an action plan for FY 2007. The District is currently seeking legislation to authorize the Feasibility Study.

Walnut and Lower Arkansas River Basins (KS), Water Supply Special Study
Status Ongoing
Description The purpose of this Special Study is to assist the State of Kansas and the South Central Kansas Water Coalition counties to address public water supply problems and opportunities in a comprehensive manner. The Walnut and Lower Arkansas River Basins of Kansas have experienced growth at an increasingly high rate over the last few years, resulting in increasing demands being placed on existing water supplies. While surface and groundwater supplies are available to meet current and future (2050) demands in the area, they are generally of poor quality, or are not located in the immediate area of demand. The primary objective of this study is to formulate alternative plans to meet the future municipal and industrial demands within the study

area by investigating various supply sources and associated water treatment and distribution alternatives.

Native American Technical Assistance

Chickasaw Nation (OK), Study of Water Treatment Alternatives
Status Ongoing
Description The Chickasaw Nation of Oklahoma has asked Reclamation to provide an appraisal-level evaluation of alternatives to treat and/or blend brackish surface water in Lake Texoma to meet regional needs in the southern portion of the Chickasaw Nation. The water quality of Lake Texoma varies by location, depth, and season, usually ranging from 500 (Washita River Arm) to 1,700 (Red River Arm) ppm of TDS. The Tribe is interested in developing additional water supplies to meet anticipated future demands in this area. Current water needs are met by the local groundwater aquifer, but this resource may not be adequate, or cost-effective, in meeting projected future water needs. The study is expected to be concluded late in 2007.

Delaware Nation (OK), Demands and Water Treatment Proposals
Status Ongoing
Description The Delaware Nation of Oklahoma requested Reclamation assistance with forecasting current and future water demands and Water treatment options associated with two parcels of Tribal land near Anadarko and Hinton, Oklahoma.

BUREAU-WIDE PROGRAMS

Water 2025 Challenge Grant Program

Through the Water 2025 Challenge Grant Program, Reclamation provides 50/50 cost-share funding to irrigation and water districts and states for projects focused on water conservation, efficiency, and water marketing. Projects are selected through a competitive process, based on their ability to meet the goals identified in *Water 2025: Preventing Crises and Conflict in the West.* The focus is on projects that can be completed within 24 months that will help to prevent crises over water. More information about the Water 2025 initiative may be found on-line at http://www.doi.gov/water2025.

Recipients of ongoing Water 2025 projects within OTAO include:

- Harlingen Irrigation District (TX)
- City of McAllen (TX)
- Cameron County Irrigation District No. 2 (TX)
- Brownsville Irrigation District No. 2 (TX)
- Lugert-Altus Irrigation District (OK)
- Texas Water Development Board (TX)

Fiscal Year 2007 Water 2025 project has been awarded to:

- Cameron County Irrigation District No. 2 (TX)

Contacts

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Oklahoma Water Resources Bulletin
& Summary of Current Conditions

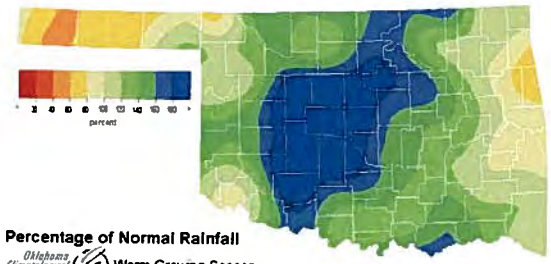
State of Oklahoma OWRB Water Resources Board the water agency

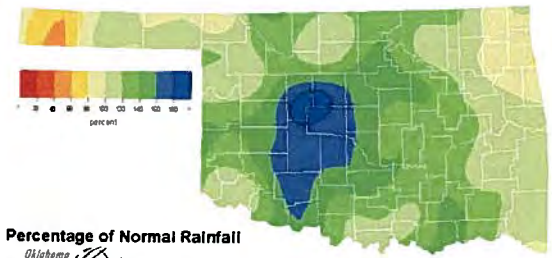
September 5, 2007

PRECIPITATION

Preliminary Statewide Precipitation

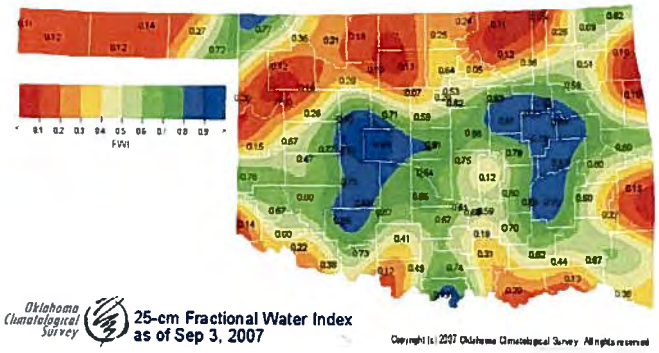
Climate Division (#)	Warm Growing Season March 1— September 3, 2007				Water Year October 1, 2006—September 3, 2007			
	Total Rainfall (inches)	Departure From Normal (inches)	Percent Of Normal	Rank Since 1921	Total Rainfall (inches)	Departure From Normal (inches)	Percent Of Normal	Rank Since 1921
Panhandle	12.83"	-2.17"	86%	34th driest	18.13"	-1.28"	93%	42nd driest
North Central	30.00"	+9.35"	145%	2nd wettest	35.60"	+6.77"	123%	6th wettest
Northeast	31.23"	+6.65"	127%	10th wettest	41.91"	+4.24"	111%	18th wettest
West Central	28.86"	+9.94"	153%	1st wettest	36.66"	+10.30"	139%	1st wettest
Central	40.95"	+18.36"	181%	1st wettest	50.82"	+16.53"	148%	1st wettest
East Central	27.87"	+2.36"	109%	21st wettest	46.76"	+5.13"	112%	14th wettest
Southwest	30.70"	+11.43"	159%	1st wettest	40.68"	+12.93"	147%	1st wettest
South Central	32.78"	+9.72"	142%	4th wettest	47.91"	+10.86"	129%	6th wettest
Southeast	30.32"	+3.54"	113%	23rd wettest	53.65"	+6.83"	115%	16th wettest
Statewide	29.90"	+8.07"	137%	2nd wettest	41.47"	+8.21"	125%	4th wettest





SOIL MOISTURE

Fractional Water Index[1]
September 3, 2007
25 CM (~10 INCHES)



[1] The Fractional Water Index ranges from very dry soil having a value of 0 to soil at field capacity illustrated by a value of 1. Specifically, 1.0 to 0.8 equals Enhanced Growth, 0.8 to 0.5 equals Limited Growth, 0.5 to 0.3 equals Plants Wilting, 0.3 to 0.1 equals Plants Dying, and less than 0.1 equals Barren Soil.

DROUGHT INDICES

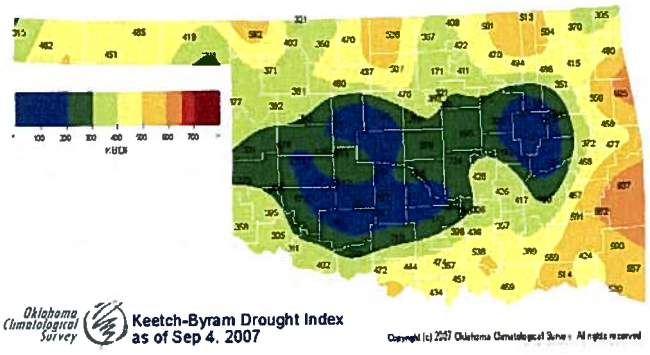
Palmer Drought Severity Index[1]					Standardized Precipitation Index[2] Through August 2007			
Climate Division (#)	Current Status 9/1/2007	Value 9/1	Value 8/4	Change In Value	3-Month	6-Month	9-Month	12-Month
Northwest (1)	MOIST SPELL	1.39	3.38	**-1.99**	NEAR NORMAL	NEAR NORMAL	VERY WET	MODERATELY WET
North Central (2)	VERY MOIST SPELL	3.39	4.21	**-0.82**	MODERATELY WET	EXTREMELY WET	EXTREMELY WET	MODERATELY WET
Northeast (3)	MOIST SPELL	1.11	1.81	**-0.70**	VERY WET	VERY WET	VERY WET	MODERATELY WET
West Central (4)	EXTREME MOIST SPELL	4.92	4.54	**0.38**	EXTREMELY WET	EXCEPTIONALLY WET	EXCEPTIONALLY WET	EXTREMELY WET
Central (5)	EXTREME MOIST SPELL	5.54	4.62	**0.92**	EXTREMELY WET	EXCEPTIONALLY WET	EXTREMELY WET	EXTREMELY WET
East Central (6)	MOIST SPELL	1.99	1.46	**0.53**	EXTREMELY WET	VERY WET	VERY WET	VERY WET
Southwest (7)	EXTREME MOIST SPELL	5.73	4.96	**0.77**	VERY WET	EXTREMELY WET	VERY WET	VERY WET
South Central (8)	VERY MOIST SPELL	3.80	4.03	**-0.23**	MODERATELY WET	VERY WET	VERY WET	VERY WET
Southeast (9)	MOIST SPELL	1.36	2.19	**-0.83**	MODERATELY WET	NEAR NORMAL	MODERATELY WET	VERY WET

- No climate divisions are currently experiencing drought conditions, according to the PDSI.
- Five climate divisions have undergone PDSI moisture decreases since August 4.

Keetch-Byram Drought Fire Index[3]

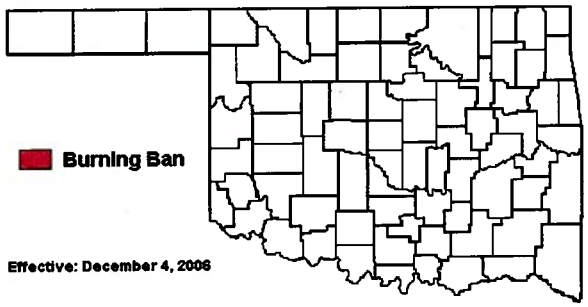
Mesonet Station	County	Climate Division	Current Value 9/4/2007
Wister	LeFlore	Southeast	649
Westville	Adair	East Central	639
Mt Herman	McCurtain	Southeast	599

- Stations currently above 600 (September 4) = 2
- Stations above 600 on August 6 = 0



Statewide Wildfire Preparedness

There is no ban on outdoor burning for any counties in Oklahoma. However, citizens are encouraged to use caution. Dry, grassy fuels will ignite easily when the humidity is low and the temperature and winds are high.

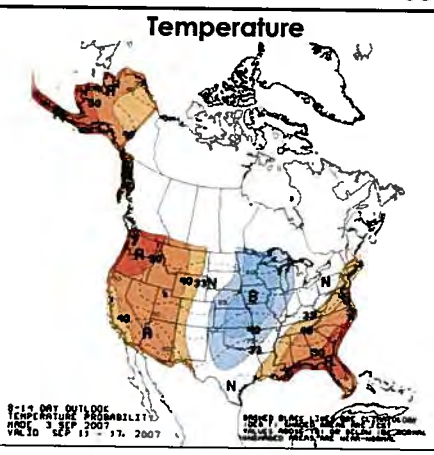


[1] The Palmer Drought Severity Index, the first comprehensive drought index developed in the United States, is calculated based on precipitation, temperature, and soil moisture. Though widely used by government agencies and states to trigger drought relief programs, the PDSI may underestimate or overestimate the severity of ongoing dry periods.
[2] The Standardized Precipitation Index, more sensitive than the PDSI, provides a comparison of precipitation over a specified period with precipitation totals from that same period for all years included in the historical record. The 3-month SPI provides a seasonal estimation of precipitation while the 6-month SPI can be very effective in showing precipitation over distinct seasons.
[3] The Keetch-Byram Drought Index measures the state of near-surface soil moisture (within the uppermost eight inches of soil) as well as the amount of fuel available for fires. KBDI values of 600 and above are often associated with more severe drought and increased wildfire occurrence.

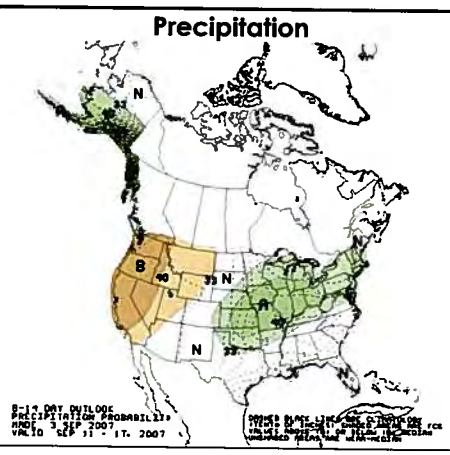
WEATHER/DROUGHT FORECAST

8- to 14-Day Outlook
September 11-17, 2007

Temperature



Precipitation

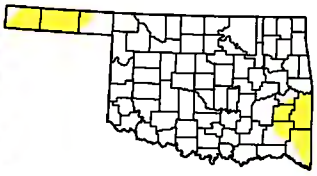


U.S. Drought Monitor
Oklahoma

September 4, 2007
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	87.5	12.5	0.0	0.0	0.0	0.0
Last Week (08/28/2007 map)	87.0	13.0	0.0	0.0	0.0	0.0
3 Months Ago (06/12/2007 map)	100.0	0.0	0.0	0.0	0.0	0.0
Start of Calendar Year (01/02/2007 map)	31.3	68.7	39.8	24.5	18.2	0.0
Start of Water Year (10/03/2006 map)	2.7	97.3	92.7	46.2	16.6	0.0
One Year Ago (09/05/2006 map)	1.1	98.9	96.2	48.9	22.6	0.0



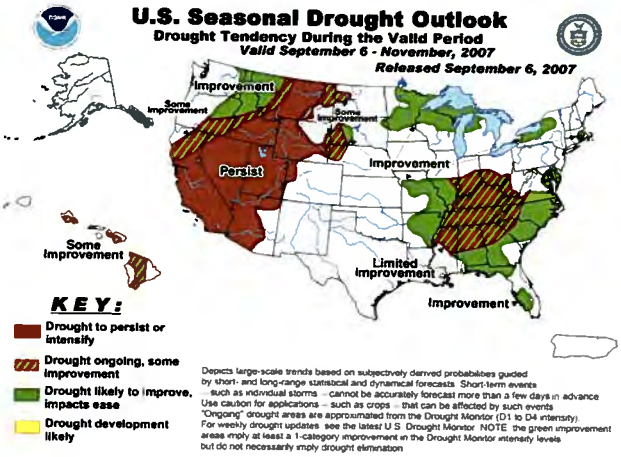
Intensity

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, September 6, 2007
Author: Thomas Heddinghaus, CPC/NOAA



Drought Summary & Outlook:

September 4—Mainly dry weather in the Ohio Valley allowed drought to creep northward in southern portions of Illinois, Indiana, and Ohio. A lingering cold front helped to focus widespread shower activity across the southeastern drought region, resulting in improvement over many areas. Temperatures also turned more seasonable following the previous week's record heat, although weekly average temperatures remained at least 4 degrees F above normal in Tennessee and Kentucky, where rainfall was spotty and improvement was minimal. Amounts of 1 to 2 inches, with locally over 3 inches, spread from Mississippi into Alabama and Georgia, resulting in shrinkage of D3 and D4 drought. Weekly average streamflows, responding to recent downpours, neared median levels at many locations in northern and western Alabama. In Mississippi, topsoil moisture ratings improved from 76 percent short or worse to 59 percent short in the past week.

According to the latest Drought Outlook, forecasts from 5 days to 3 months call for near- or above-normal precipitation in much of the middle Mississippi Valley, areas near the Gulf and Atlantic Coasts, and the Great Lakes region. Limited improvement is also likely across the lower Ohio Valley and interior South. To the south and east, in a large area stretching from interior Montana southward and westward through the central and southern Rockies, Great Basin, most of California, and the desert Southwest, most forecasts on all time scales call for enhanced chances for below-normal precipitation as the monsoon season winds down.

CROP REPORT

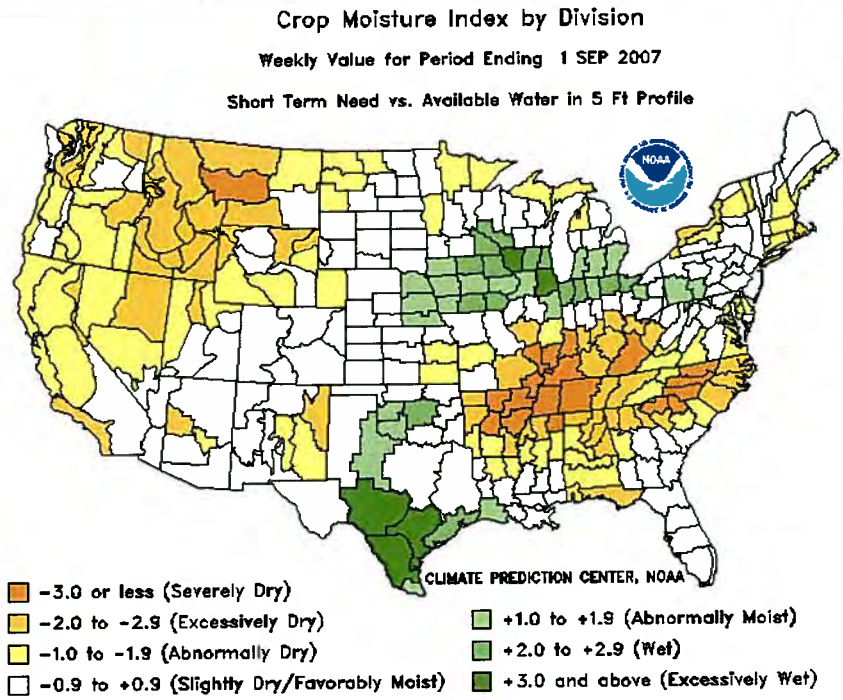
September 4—Weather conditions were very nice last week with very little precipitation and average temperatures in the mid- to high- 70's. Both topsoil and subsoil moisture levels dropped slightly this past week but were still much better than this time last year. Reduced soil moisture levels in some areas had farmers concerned as they continued making preparations for fall plantings. There were 6.1 days suitable for fieldwork.

Producers in areas affected by Hurricane Erin spent part of last week repairing flood damaged fields. As of Sunday, 55 percent of wheat seedbed preparation was complete, 7 points behind the five-year average. Wheat had been planted in a few isolated areas. Rye and oat seedbed preparation was 49 and 44 percent complete, respectively, both behind normal. Producers in many areas were hoping for additional moisture before planting small grains.

Producers in some areas were turning off irrigation systems to crops that have reached maturity. Eighty-one percent of soybeans were blooming and 62 percent were setting pods, both well behind normal. Soybean harvest has begun on a limited scale. Nearly the entire corn crop was in the doughing stage and 59 percent of the state's acreage had reached maturity. Producers made good progress harvesting corn this past week with 28 percent of the crop harvested by week's end, a jump of 16 points from the previous week. Grain sorghum was 91 percent headed and 35 percent of the crop had reached maturity. Ninety-six percent of cotton was setting bolls, slightly behind normal. Nearly half of peanuts were mature, with the majority of the crop condition rated as good to fair.

Clear skies and mild temperatures allowed producers to cut and bale hay the entire week in most areas. Growers had 59 percent of other hay second cuttings completed by the end of the week, 10 points behind the five-year average. Eighty percent of the fourth cutting of alfalfa was complete and producers had completed 22 percent of the fifth cutting. Alfalfa and other hay conditions remained mostly in the good to fair range. Watermelon harvest increased 2 points from the previous week to reach 93 percent, but was running 4 points behind normal. Producers had the majority of the state's peach acreage harvested by the end of the week.

Livestock conditions were still rated mostly in the excellent to good range. Livestock marketings remained average last week. Pasture and range conditions were rated mostly in the good to fair range.



RESERVOIR STORAGE

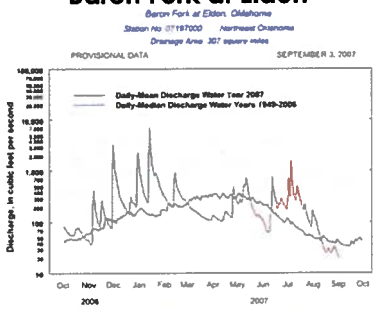
- 1.7 percent decrease in total storage (98.1%) from that recorded on August 7 (99.8%)
- 28 reservoirs have experienced lake level decreases
- 5 reservoirs are currently operating at less than full capacity (compared to 2 four weeks ago)
- 1 reservoir—Lugert-Altus—is below 80 percent of total conservation storage

Storage in Selected Oklahoma Lakes & Reservoirs
September 4, 2007

Climate Division Lake or Reservoir	*Conservation Storage (acre-feet)*	*Present Storage (acre-feet)*	*Percent of Conservation Storage*
North Central			
Fort Supply	13,900	13,900	100.0
Great Salt Plains	31,420	31,420	100.0
Kaw*	375,160	375,160	100.0
Regional Totals/Averages	**420,480**	**420,480**	**100.0**
Northeast			
Birch	19,225	18,870	98.2
Copan	34,634	34,634	100.0
Fort Gibson	365,200	365,200	100.0
Grand	1,672,000	1,541,399	92.2
Hudson	200,300	200,300	100.0
Hulah	22,565	22,565	100.0
Keystone	510,059	510,059	100.0
Oologah	552,219	552,219	100.0
Skiatook	322,700	322,700	100.0
Regional Totals/Averages	**3,698,902**	**3,567,946**	**96.5**
West Central			
Canton	111,310	111,310	100.0
Foss	165,480	163,476	98.8
Regional Totals/Averages	**276,790**	**274,786**	**99.3**
Central			
Arcadia	27,520	27,520	100.0
Heyburn	7,105	7,105	100.0
Thunderbird	119,600	119,600	100.0
Regional Totals/Averages	**154,225**	**154,225**	**100.0**
East Central			
Eufaula*	2,314,583	2,314,583	100.0
Tenkiller	654,100	654,100	100.0
Regional Totals/Averages	**2,968,683**	**2,968,683**	**100.0**
Southwest			
Fort Cobb	80,010	80,010	100.0
Lugert-Altus	132,830	82,251	61.9
Tom Steed	88,970	88,970	100.0
Regional Totals/Averages	**301,810**	**251,231**	**83.2**
South Central			
Arbuckle	72,400	72,400	100.0
McGee Creek	113,930	113,930	100.0
Texoma*	2,548,034	2,548,034	100.0
Waurika*	190,200	190,200	100.0
Regional Totals/Averages	**2,924,564**	**2,924,564**	**100.0**
Southeast			
Broken Bow*	958,180	883,539	92.2
Hugo*	158,617	179,657	113.3
Pine Creek*	61,570	63,862	103.7
Sardis	274,330	274,330	100.0
Wister	60,162	60,162	100.0
Regional Totals/Averages	**1,512,859**	**1,461,550**	**96.6**
State Totals	**12,258,313**	**12,023,465**	**98.1**

STREAMFLOW CONDITIONS

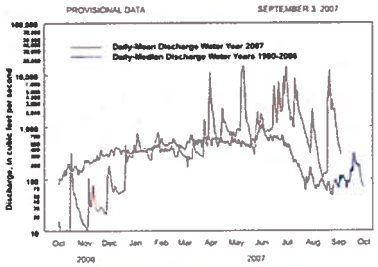
Baron Fork at Eldon



Comparison of daily discharges for water year 2007 and period of record

Data from U.S. Geological Survey

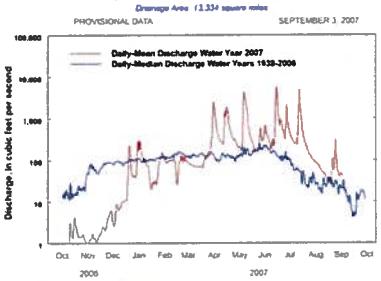
Canadian River at Purcell



Comparison of daily discharges for water year 2007 and period of record

Data from U.S. Geological Survey

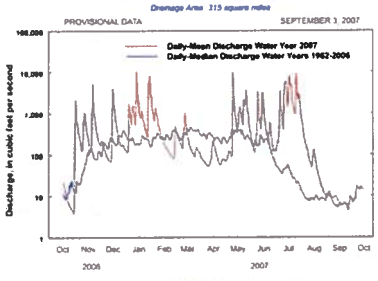
Cimarron River near Waynoka



Comparison of daily discharges for water year 2007 and period of record

Data from U.S. Geological Survey

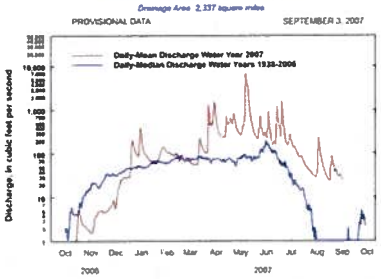
Glover River near Glover



Comparison of daily discharges for water year 2007 and period of record

Data from U.S. Geological Survey

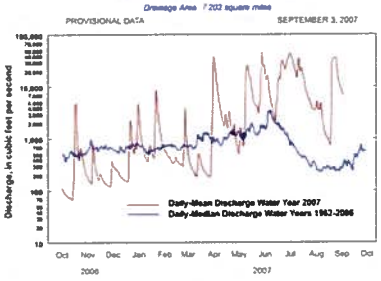
North Fork of the Red River near Carter



Comparison of daily discharges for water year 2007 and period of record

Data from U.S. Geological Survey

Washita River near Dickson



Comparison of daily discharges for water year 2007 and period of record

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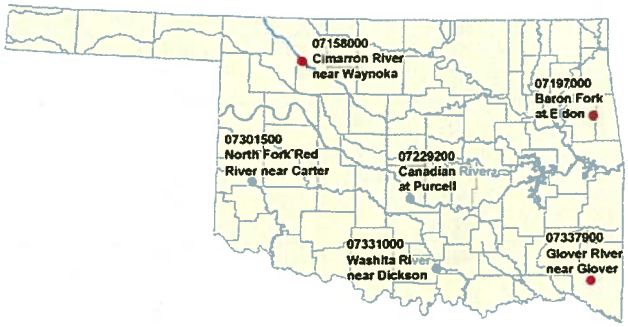

Water Bulletin information/data courtesy of National Weather Service, Climate Prediction Center, Oklahoma Climatological Survey, State Department of Agriculture, Food, and Forestry, Agricultural Statistics Service, U.S. Army Corps of Engineers, U.S. Department of Agriculture/Forest Service, U.S. Geological Survey, Western Drought Coordination Council, and National Drought Mitigation Center.
For more information, visit www.owrb.state.ok.us and http://www.mesonet.ou.edu/public.