

Oklahoma

Water  
News

MONTHLY NEWSLETTER OF THE OKLAHOMA WATER RESOURCES BOARD

## Board Works on Groundwater Standards, Basin Classification

The environmental movement of the 1960s and early 70s stressed, among other issues, the importance of protecting America's surface waters from pollution. The widespread use of streams and lakes as open sewers seized the attention of the public, special interest groups and state and federal agencies. The Environmental Protection Agency was created in 1971 and subsequently charged with the monumental task of cleaning up the nation's air and water.

Comprehensive discharge permitting and enforcement programs were created to bring the point source pollution problem somewhat under control. Now, 20 years later, the nation's

environmental agenda has changed priorities to groundwater quality. Surface waters, especially running streams, are often capable of cleansing themselves following a pollution incident. Natural processes—the sun, air and assimilation with clean water—can remove contaminants. Groundwaters usually don't have such advantages.

The OWRB is currently working to develop more progressive groundwater quality standards to safeguard Oklahoma's 23 major underground water sources from an overwhelming arsenal of pollutants. Since 1983, the Water Board has monitored the quality of the state's major groundwater

basins through the annual well sampling program. Groundwater and Water Quality Division personnel have used much of the sampling data in an attempt to establish background (baseline) quality levels in major aquifers. According to Board Geologist Bob Fabian, the information garnered from hundreds of water samples should prove extremely beneficial in the development of comprehensive groundwater standards and in determining management policies and levels of cleanup needed in cases of groundwater pollution. He pointed out that deficiencies in the groundwater quality monitoring network were eliminated following a major reorganization of the program in 1986 and another evaluation last year.

***Accurate, long-term data are vital in determining seasonal variations in groundwater quality.***

"When we looked more closely at the wells included in the network, we found some lacking sufficient information on well construction and surrounding geology. Others were found to exist outside the major aquifer regions or were penetrating two or more basins. Construction of some wells was so poor that they allowed a pathway for contaminants to reach the water table, potentially skewing our sampling data. And in the northeast, where water use is primarily

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Duane Smith, Groundwater Division chief (seated left), and Fabian discuss the groundwater sampling network while Myers, Board planner, looks on.

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from surface sources, there are few wells from which to obtain representative data on quality. As a result, we dropped a number of wells and added others capable of providing more accurate and comprehensive information about underlying groundwater characteristics," he said.

For the first time, Fabian added, the OWRB has a valid data base for evaluation of Oklahoma's groundwater basins. Between 1986 and 1988, almost 500 samples were collected and analyzed for a variety of chemical parameters. Today, the groundwater quality monitoring network consists of 184 domestic, irrigation, stock and municipal water wells. By the end of 1990, the network will be expanded by approximately 100 wells to gain a more comprehensive understanding of the condition of Oklahoma's groundwaters, and thus a greater level of protection.

Through Oklahoma Water Quality Standards, the OWRB designates beneficial uses for the state's waters and insures attainment of those uses by imposing narrative and numerical criteria. The 1982 Standards were the first to address groundwater by assigning beneficial uses to the state's major groundwater basins. Today, Oklahoma has in place numeric standards for 36 organic compounds such as various hydrocarbons, pesticides and other toxics. While creation of those standards was a major step, significant work remains in developing fair and comprehensive quality criteria for Oklahoma groundwaters, according to Shon Simpson, assistant chief of the Water Quality Division.

"Due to a lack of available information on the quality of groundwater in specific basins, groundwater standards—in particular, beneficial use concepts—were gleaned from existing surface water standards," he said. "Standards for surface waters have been set at levels to protect fish and other aquatic organisms, but such organisms don't naturally occur in groundwater formations.

"To be fully protective, numerical criteria for groundwaters were set very low—most at levels barely detectable. In cases of aquifer cleanup,

meeting such stringent standards may be technically infeasible."

Plans for 1991 Water Quality Standards not only include development of aquifer specific standards, but will also consider the importance of aquifer recharge areas. More importantly, an aquifer classification system will be considered in order to set levels of protection and clearly defined cleanup levels for each major groundwater basin. Currently, that strategy is only recommended by EPA.



**Hydrologist Gary Glover draws a water sample from a municipal well at Noble.**

According to Fabian, "In nature, groundwater exists under a variety of conditions. Classification entails the grouping of groundwaters and the host geologic materials based on common properties. In addition, classification systems can help protect and restore vulnerable aquifers, coordinate groundwater management activities and insure that overlying land uses are not causing degradation of groundwater quality."

Fabian and Scott Myers, of the Board's Planning and Development Division, have developed a proposed classification system for Oklahoma aquifers based on their existing quality, current and future uses and vulnerability to contamination. The system also recognizes the variability of water quality within an aquifer.

Class I, or Special Source Groundwaters, includes those aquifers where exceptional quality exists or are proven to be of ecological or environmental importance. Examples of Spe-

cial Source Groundwaters could include those underlying Boiling Springs State Park, Chickasaw National Recreation Area or "sole source" aquifers.

General Resource Groundwaters, the second proposed class, include those capable of being used as drinking water supply with only conventional treatment methods. These groundwaters also have the potential for being utilized for agricultural, industrial, recreational and other beneficial uses. Three sub-classes (A, B and C) are separated according to aquifer size (major/minor), geology (confined/unconfined) and total dissolved solids concentration.

Class III, Limited Use Groundwaters, are those of poor quality, requiring extensive treatment for use as drinking water.

Vulnerability mapping, which evaluates the potential for contaminants to infiltrate groundwater, will be an integral part of the classification system. The mapping strategy will be conducted in conjunction with the classification scheme to determine slightly, moderately or very sensitive aquifers.

After consideration of aquifer characteristics, groundwaters will receive a classification, such as Class II(A)(vs) for a general resource aquifer that is major, unconfined with a total dissolved solids content of less than 3,000 milligrams per liter and potentially very sensitive to contamination. If the system is implemented, standards may be applied to aquifers according to class. The sensitivity and value of specific groundwaters may also guide formulation of waste disposal permits.

Few states currently have comprehensive groundwater quality standards and Oklahoma is one of only a handful with a monitoring program sufficient with which to develop standards, Fabian said. "Many states that do have such protective criteria in place, use drinking water standards. While this seems like a quicker and easier way to solve the problem, we feel that using drinking water standards for groundwater is insufficient—it doesn't consider the natural variability between aquifers."

## Total River Flow Out of State Up 6 Million Acre-Feet Over Average

Six million more acre-feet of water flowed from Oklahoma into downstream states in 1989 than in average years, says J. A. Wood, OWRB Stream Water Division chief.

U.S. Geological Survey stream gages on the Arkansas, Little and Red Rivers recorded total flow out of the state through the three rivers at 40,907,000 acre-feet, compared to an average annual flow of 34,907,000 acre-feet. Gaged streamflow of the Arkansas River leaving the state was 25,330,000 acre-feet—1,890,000 acre-feet above normal. Streamflow of the Little River leaving the state was 3,537,000 acre-feet—800,000 acre-feet above normal. Water flowing by the Red River gage near the state line was 12,040,000 acre-feet—3,310,000 above normal.

Wood attributes the greater flow to rainfall amounts much above average in some sectors. In central Oklahoma, precipitation for 1989 was 10 inches above normal. And, although the state experienced prolonged dry spells in the early spring and late fall, rainfall amounts soared during the normally dry summer months of June, July and August.

The previous year (1988) had been exceptional also with flows out of the state through the three rivers totaling 42,116,000 acre-feet.

These figures were registered at USGS gages which continuously monitor flow on the state's major rivers. Streamflow totals reflect the collection of data by the USGS "water year"—the 12 months from October 1 through September 30. The Water Resources Board and the USGS have long been cooperators in a program to monitor streamflow in Oklahoma. The OWRB uses this information in hydrologic investigations to determine water availability, variations in streamflow, rainfall, and runoff and evaporation and to meet the terms of interstate stream compacts.

The USGS has maintained gages at the Oklahoma/Arkansas state line on the Arkansas River at Van Buren for 61 years; on the Little River at Horatio for 58 years; and on the Red River at Index for 52 years.

on the Legal Advisory Committee.

Wood also announced that the Red River Commission will meet on March 30 at the Arlington Hotel in Hot Springs, Arkansas. L. L. "Red" Males, Cheyenne, and Barnett are Oklahoma commissioners; Wood and Couch serve on the Engineering and Legal Advisory Committees, respectively.

In further compact business, Gov. Henry Bellmon recently appointed Jacob B. Miller, Cookson, to serve as a member of the Arkansas-Oklahoma Arkansas River Compact.

### EPA Plans Regional Awards

Region 6 U.S. Environmental Protection Agency officials announce that for the fifth year, EPA will recognize wastewater treatment plants for operational excellence. The region includes Arkansas, Louisiana, New Mexico, Oklahoma and Texas.

Robert E. Layton, Jr., EPA regional administrator, said that the deadline for nominations is March 1. He said in order to be recognized, a plant must excel in some or all of these areas: compliance, maintenance and financial management, innovative operation and maintenance practices, laboratory management, personnel training, pretreatment and industrial waste management, and sludge handling and disposal.

Layton encourages any Oklahoman who wants to recognize an outstanding plant to contact Dr. William R. Roach, state nominating official. Roach, director of the Oklahoma Environmental Training Center, receives nominations at Rose State College, 6420 S.E. 15th Street, Midwest City, OK 73110. For more information, call Roach at (405) 733-7364.

### Water Erosion Down

Sheet and rill erosion by water declined while wind erosion increased between 1982 and 1987, according to a recent Soil Conservation Service report.

A summary of the SCS National Resources Inventory says that average annual water erosion of the nation's

*Continued on page 4*



### EPA Approves Standards

The U.S. Environmental Protection Agency has approved the 1988 Oklahoma Water Quality Standards, according to Dave Dillon, chief of the OWRB's Water Quality Division. This most recent—and last—step in the Standards review process follows certification by the State Attorney General, Legislative review and approval by the nine-member Water Board.

The next (1991) triennial revision of the Standards will begin late this year with consideration of written and oral comments and scheduling of informal public meetings and hearings. Those who wish to be placed on

the mailing list to receive Water Quality Standards updates and related information should call (405) 271-2541.

### Two Compacts Meet in March

Commissioners representing Texas, New Mexico and Oklahoma in the Canadian River Commission will meet March 5 at the High Plains Area Vo-Tech School, 3921 34th Street, in Woodward.

Lewis Kamas, Freedom, represents Oklahoma on the compact. Also attending will be James R. Barnett, OWRB executive director; J. A. Wood, Stream Water Division chief, who serves on the Engineering Advisory and Budget Committees; and Dean Couch, general counsel, who serves

*Mainstream, continued from page 3*

croplands dropped to 3.8 tons per acre from 1982-87 compared to 4.3 tons during the previous five-year period. However, wind erosion increased slightly (0.1 ton) to 3.3 tons per acre annually. Most wind erosion

of croplands occurs in the Great Plains states, including Oklahoma.

Total sheet and rill erosion across the nation was reported at 1.6 billion tons per year and wind erosion at nearly 1.4 billion tons.

Also during the five-year period,

4 million acres of rural non-federal land was converted to urban and transportation uses, including roads and airports. Cropland increased 1.4 million acres while pasture and rangeland declined 2.3 and 6 million acres, respectively.

**ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS  
AS OF JANUARY 29, 1990**

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY	PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
SOUTHEAST			Wister	63,250	100.0 <sup>2</sup>
Atoka	113,712	91.6	Sardis	302,500	100.0
Broken Bow	918,100	100.0	NORTHEAST		
Pine Creek	77,700	100.0 <sup>2</sup>	Eucha	79,567	100.0
Hugo	157,600	100.0 <sup>2</sup>	Grand	1,483,980	99.4
McGee Creek	109,800	100.0	Oologah	544,240	100.0
CENTRAL			Hulah	30,594	100.0
Thunderbird	105,925	100.0	Fort Gibson	365,200	100.0
Hefner	53,824	71.4	Heyburn	6,600	100.0
Overholser	15,935	100.0	Birch	19,200	100.0
Draper	76,870	76.9	Hudson	200,300	100.0
Arcadia	27,390	100.0	Spavinaw	25,000	83.3
SOUTH CENTRAL			Copan	43,400	100.0
Arbuckle	62,571	100.0	Skiatook	308,517	96.5
Texoma	2,600,505	98.5	NORTH CENTRAL		
Waurika	198,836	98.0	Kaw	427,584	99.8 <sup>2</sup>
SOUTHWEST			Keystone	616,000	100.0
Altus	112,203	84.4	NORTHWEST		
Fort Cobb	78,423	100.0	Canton	97,500	100.0
Foss	171,233	70.2 <sup>1</sup>	Fort Supply	13,900	100.0
Tom Steed	73,127	82.1	Great Salt Plains	31,400	100.0
EAST CENTRAL			<b>STATE TOTALS</b>	<b>12,569,686</b>	<b>99.2</b>
Eufaula	2,329,700	100.0			
Tenkiller	627,500	100.0			

1. Conservation storage lowered for project modification  
2. Seasonal pool operation

Data courtesy of U.S. Army Corps of Engineers, Bureau of Reclamation, Oklahoma City Water Resources Department, and City of Tulsa Water Superintendent's Office.

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**OKLAHOMA WATER NEWS**

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Homecoming '90*

... a year to rekindle pride, celebrate excellence in education and our communities and invite all former Oklahomans back for a visit.