JULY 1987

Oklahoma Water News

MONTHLY NEWSLETTER OF THE OKLAHOMA WATER RESOURCES BOARD

Garber-Wellington Aquifer Is Subject of Pilot Study

U.S. Geological Survey, Water Board Programs Gauge Health of National, State Groundwaters

Interest in the Garber-Wellington Aquifer, always high as one of the principal sources of drinking water for central Oklahoma, has intensified now that the groundwater basin is playing a major role in a federal program aimed at appraising the nation's water quality.

The National Water Quality Assessment (NAWQA) program, under the auspices of the US Geological Survey (USGS), is focusing on both ground and surface water sources through seven pilot water quality evaluation projects being conducted across the country. Besides the Garber-Wellington, two other groundwater studies are currently underway: the Carson Basin, underlying western Nevada and eastern California; and the Delmarva Peninsula, stretching across Delaware, eastern Maryland and eastern Virginia. According to USGS officials, the experience gained from these seven pilot projects will figure prominently in refining study techniques for future water quality studies.

"Oklahoma's four-year study will help us determine the nature and extent of groundwater quality in the Garber-Wellington," said Duane Smith, OWRB Groundwater Division Chief and a member of the NAWQA Liaison Committee. In all, representatives from 14 local, state and federal agencies and academia serve on the committee which provides an exchange of information between those who conduct the study and those impacted by it. Smith added that the central Oklahoma aquifer was chosen because of the large number of citizens that rely on it and the unique water quality problems associated with the formation.

"Although the Garber-Wellington serves as a prime source of generally good quality drinking water, a variety of problems exists," he said. "Some wells have yielded radium and trace metal levels in excess of public drinking water standards. Also, problems could result from widespread urban development – especially around the aquifer's critical recharge area – and from oil and gas exploration activities."

The USGS also will look closely at the occurrence, distribution and potential movement of toxic contaminants in the Garber-Wellington. Special emphasis will be on organic contaminants and naturally occurring

continued on page 2

David Parkhurst and Scott Christenson (sitting from left), project leaders for the Garber-Wellington Aquifer study, and Duane Smith (standing), OWRB Groundwater Division Chief, discuss aspects of the pilot groundwater project at a June 24 Liaison Committee meeting.

Pilot Study, continued from page 1

trace elements such as selenium, chromium, arsenic and lead. According to Scott Christenson, the USGS is in the process of developing a computer model of the Garber-Wellington. Christenson and David Parkhurst, both of the USGS' Water Resources Division, serve as project leaders for the study.

"The purpose of the model is to verify the USGS' conceptual theory of the groundwater flow system in the Garber-Wellington," Christenson pointed out. "Potentially, the model could be used to project pollution plumes, the maximum annual yield and other vital water quality and quantity data on the aquifer."

While the Garber-Wellington is receiving a great deal of attention due to the pilot study, 20 other major state groundwater basins are undergoing water quality assessments of their own. On July 1, the OWRB's Groundwater Division initiated its annual statewide groundwater sampling program with help from the USGS and the Oklahoma Geological Survey (OGS). The program, in its fourth year, will eventually sample between 200 and 250 wells from the groundwater-rich panhandle to the lush forests of southeastern Oklahoma. Results will help develop comprehensive groundwater standards for the state.

"Sampling is done in the summer when water use is at its peak and irrigation wells are flushed of stagnant water," said OWRB Hydrologist Gary Glover. "As usual, the State Department of Health will analyze the samples with an emphasis on metals and a wide range of chemicals."

Nitrates – often resulting from agricultural practices and septic tank contamination – are high on the testing priority list, according to Glover.

"Nitrates are a good indicator of man-induced pollution," he said. "Traces of sodium chloride, usually from oil and gas production, and heavy metals are also frequently found in problem areas."

Common sources of groundwater contamination include the prolific use of pesticides and fertilizers, abandoned or uncontrolled hazardous waste sites, landfills, sewage holding areas, faulty septic tanks and sewer lines, leaking underground storage tanks and oil field reserve pits.

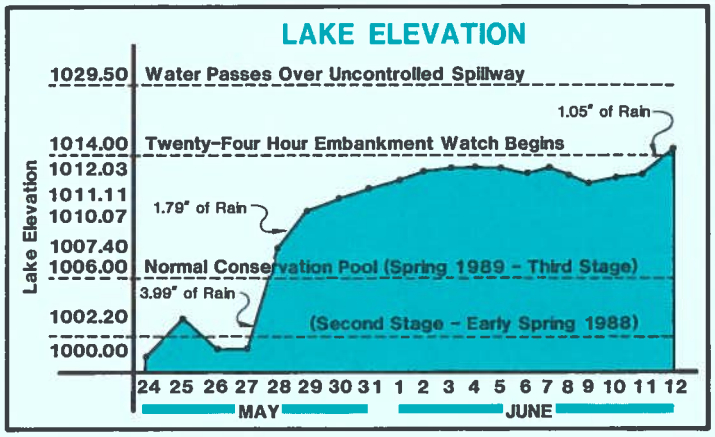
Ongoing hydrologic studies of the state's 21 major groundwater basins are also being conducted by the OWRB, USGS and OGS to monitor the state's groundwater. The Board is mandated by the State Legislature to determine maximum annual yields for those aquifers and update the findings at least every ten years.

One such study of the Blaine Gypsum Aquifer has been in progress for nearly two years. The Blaine – which is interspersed with beds of water-bearing gypsum, limestone and dolomite – is a valuable and productive source of irrigation water for extreme southwestern Oklahoma. About 40 test holes have been drilled by the USGS and OGS to assess the hydrogeology and water quality of the Blaine and recorders are in place to monitor water levels. The study will produce maps of the aquifer base, saturated thickness and depth to water.

New Lake Arcadia Controlled Flooding in Late May Deluge

Arcadia Lake, a U.S. Army Corps of Engineers flood control/water supply project northeast of Oklahoma City helped control flooding during heavy rains on May 28. Chief Ranger David Huffine said if excess water had not been contained in the reservoir, serious flooding would have occurred downstream. Runoff caused an average flow of water into the lake that measured 3000 cubic feet per second for a 24-hour period.

In mid-June, the water level was 14 feet higher than Corps engineers intended at this stage of filling and six feet higher than the normal level will be when the lake is completed. Excess waters are being released gradually over an 8-week period. According to Huffine, filling in stages allows the earthen dam to mature and respond properly to water forces, as well as to provide a better habitat for fish. Releases will continue until the first-stage level of 999 feet above sea level is reached. Upon completion, the lake's normal conservation pool will be



Shaded area indicates high water levels achieved as a result of heavy rains in late May and early June. Courtesy Edmond Evening Sun

Lake Arcadia visitors view lake from overlook near Highway 66.

1006 feet above sea level. Although the filled lake will cover 1820 acres, early in June it covered about 2252 acres, with shallow waters invading some picnic areas and asphalt roads.

Meanwhile, three of the six parks planned for the lake area are virtually complete, with openings scheduled by September. They are Edmond Park, off Highway 66 on Midwest Boulevard; Central State Park, between Midwest and Douglas Boulevards; and Spring Creek Park on South 15th Street.

Two of those parks – Spring Creek and Central State – have large pavilions equipped with an oversize barbecue grill, drinking fountains, security lights, electrical outlets and a woodburning fireplace. The parks also have sand beaches with roped-off swimming areas, rest rooms, dressing rooms, an outdoor shower and playgrounds. Construction on three other park areas will begin in the fall.

Ranger Huffine also said the Oklahoma Department of Wildlife Conservation has stocked the lake with bluegill, channel catfish, blue catfish and large-mouth bass.

mainstream

Cities Petition Supreme Court

Thirty-five cities and towns have joined the Oklahoma Municipal League (OML) in petitioning the Oklahoma Supreme Court to grant a rehearing on the court's recent water rights decision. The case involved the City of Ada and the Oklahoma Water Resources Board versus some downstream riparian water users who claim rights to the waters of Byrd's Mill Spring, a source of Ada's public water supply.

The OML and the cities' petition claimed, " in addition to creating widespread confusion about the state's water laws, the Court's ruling has virtually brought to a standstill water development for any use."

According to the OML petition, the ruling "results in instability of municipal water rights and renders cities and towns unable to:
(1) Finance water works;
(2) Responsibly plan, manage or provide for municipal water resources;
(3) Protect and conserve depletable ground water supplies; or
(4) Maintain groundwater quality."

Numerous other cities, farm groups, rural water districts and industries have filed similar "amicus" or "friend-of-the-court" briefs in support of the OWRB/City of Ada petition for rehearing.

Governors Guests at Meeting

Gov. Henry Bellmon of Oklahoma and Gov. Mike Hayden of Kansas will attend portions of the Kansas-Oklahoma Arkansas River Commission meeting on Friday and Saturday, July 17 and 18 in Ponca City. The announcement was made by Paul Thornbrugh of Tulsa, federal commissioner and chairman.

According to Jim Barnett, OWRB executive director and ex officio member of the commission, the meeting will convene at 1 p.m. on July 17 at the Conference Center on the grounds of the Marland Estate. A reception at the Marland Mansion Friday evening will honor Gov. and Mrs. Bellmon and Gov. and Mrs. Hayden.

The governors are invited to attend the Saturday session, at which time representatives of federal agencies – the Corps of Engineers, Bureau of Reclamation, Soil Conservation Service and Geological Survey – will report on projects in progress in compact areas of Kansas and Oklahoma. The meeting will adjourn with a luncheon at noon on Saturday.

In addition to Barnett of the OWRB, Oklahoma Commissioners Jacques Cunningham of Tulsa and Dr. Tracy Norwood of Tahlequah will represent the state's interests at the stream compact meeting. Other Oklahomans attending will be Dean Couch, OWRB general counsel who serves on the Legal Committee, and J.A. Wood, OWRB Stream Water Division chief who serves on the Engineering and Budget and Finance Committees.

Wood pointed out that it is the mission of this compact and others to which Oklahoma is a party to provide a forum for the amicable solution of interstate water problems and set out guidelines for the equitable division of interstate waters.

Fiber Optic Monitors Used

A computerized system of monitoring groundwater contamination by planting fiber optic "roots" around landfills and hazardous waste disposal sites is being developed by University of Alabama engineers.

The system uses remote fiber spectroscopy to identify contaminants. Chemical sensors connected to the surface by fiber optics would reflect light signals for analysis by the computer to show the nature and concentration of the pollutant. Dr. John Gilbert, who heads the research team, says the fibers could be used to check the spread of industrial chemicals, agricultural runoff, chemical spills, as well as leach from landfills, storage ponds and leaking underground storage tanks. According to Gilbert, several fibers could be put into a single bore hole or test well, with each looking for a specific compound.

Researchers claim the system is cost-effective and say they intend to have a system in place to monitor a test site within two years.

Scientists Note Drought Pattern

Weather scientists agree that despite the Dustbowl and droughts in the mid-1950s and in 1974, the 60 years between 1915 and 1975 held the most continuously favorable farming weather in the past eight centuries.

Oklahoma and Kansas observers note 22-year recurrences while an Iowa researcher traces a 20-year drought cycle for his state.

Meteorologists at the U.S. Department of Agriculture have discovered that the nation is experiencing higher highs and lower lows, with wider variations in temperature and precipitation than in the past several decades; more temperature extremes were recorded in the late 1970s and the 80s than during the 1950s, 60s and 70s.

Continued on page 4

Mainstream, continued from page 3

These changes are speculated to be caused by:

(1) a gradual warming of the earth's climate, with year-to-year changes remaining unexplainable;

(2) emission of ozone, methane and other trace gases may cause a warming effect;

(3) energy exchange between ocean surfaces and the atmosphere may explain why recent winters have been colder;

(4) increase in volcanic activity propelled tons of debris into the atmosphere, blocking some sunlight from crops in the fields.

The drought of 1986 in the southeastern U.S. was the most devastating in 100 years. Conversely, Florida's citrus industry has been hit by four freezes in the last five years – something that had not happened in the previous 85 years.

ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS
AS OF JUNE 24, 1987

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
SOUTHEAST		
Atoka	123,475	99.5
Broken Bow	882,076	96.0
Pine Creek	77,700	100.0
Hugo	157,600	100.0
CENTRAL		
Thunderbird	105,925	100.0
Hefner	75,355	100.0
Overholser	15,782	99.3
Draper	100,000	100.0
SOUTH CENTRAL		
Arbuckle	62,571	100.0
Texoma	2,637,700	100.0
Waurika	203,100	100.0
SOUTHWEST		
Altus	132,886	100.0
Fort Cobb	78,423	100.0
Foss	186,901	76.6[2]
Tom Steed	88,971	100.0
EAST CENTRAL		
Eufaula	2,329,700	100.0
Tenkiller	625,273	99.6
Wister	27,100	100.0
Sardis	299,153	98.9
NORTHEAST		
Eucha	79,567	100.0
Grand	1,408,450	94.0
Oologah	544,240	100.0
Hulah	30,594	100.0
Fort Gibson	365,200	100.0
Heyburn	6,600	100.0
Birch	19,200	100.0
Hudson	200,300	100.0
Spavinaw	28,000	93.3
Copan	43,400	100.0
Skiatook	295,900	100.0
NORTH CENTRAL		
Kaw	428,600	100.0
Keystone	616,000	100.0
NORTHWEST		
Canton	97,500	100.0
Optima	3,000	——[1]
Fort Supply	13,900	100.0
Great Salt Plains	31,400	100.0
STATE TOTALS	**12,418,542**	**96.0[3]**

1. In initial filling stage
2. Temporarily lowered for maintenance
3. Conservation storage for Lake Optima not included in state total

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.

This monthly newsletter, printed by the Central Printing Division of the Office of Public Affairs, Oklahoma City, Oklahoma, is published by the Oklahoma Water Resources Board as authorized by James R. Barnett, executive director. Ten thousand copies are printed and distributed monthly at an approximate cost of 20 cents each.

MARY E. WHITLOW, Editor **BRIAN VANCE, Writer** **BARRY FOGERTY, Photographer** **MARIE WELTZHEIMER, Design**

OKLAHOMA WATER NEWS
Monthly Newsletter of the
Oklahoma Water Resources Board
1000 N.E. Tenth, P.O. Box 53585
Oklahoma City, Okla. 73152

BULK RATE
U.S. POSTAGE
PAID
Oklahoma City, Okla.
Permit No. 310