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OKLAHOMA water news

MONTHLY NEWSLETTER OF THE OKLAHOMA WATER RESOURCES BOARD

Low Interest Bid at Bond Sale Enhances Board Loan Program

The exceptional interest rate bid on the Board's $50 million offering of revenue bonds January 31 will enable the OWRB financial assistance program to make loans to qualified applicants at a rate of approximately 9.5 percent. Prudential-Bache securities won the bid from a field of four financial institutions vying for the bond package.

"We are extremely pleased with the response and the interest rate," said Executive Director James R. Barnett. "This is the first time in the nation such a program has been offered in the financing of water resources. We can offer Oklahoma cities, towns and rural water or sewer districts loans at an affordable interest rate in improving water and sewer facilities."

The Board's loan program is the type referred to in the financial community as a "pass through plan," in which the OWRB will use the proceeds to purchase water and sewer revenue bonds issued by the municipalities. The bond package was a "blind pool" offering, which means that the entities receiving the loans are yet unknown.

Rick Smith, coordinator of the OWRB financial assistance program, said the blind pool concept allows smaller communities and rural water districts to receive loans and interest rates they might be denied under conventional programs.

The sale was undoubtedly enhanced by the AAA rating given the issue by Standard & Poor's, a firm that assigns ratings to bond issues according to the security of the investment. Smith said the rating was remarkable. "This is the first state water financing program with enough security provisions to achieve this high a rating."

Contributing also to its security is the $25 million water development fund, which will be used as collateral on the bonds sold by the OWRB on behalf of qualified applicants.

The Board currently has 60 applications awaiting approval on loans totaling $43 million. Barnett projects statewide water development and sewer facility needs over the next two years to be more than $247 million, and he said the Board will consider additional bond offerings as necessary.

There is a limit of $12.5 million on the loan amount for any single project, and applicants must qualify under Oklahoma Statutes and water board rules and regulations in order to obtain loan assistance. Revenues earned by the completed water or sewer project or local taxes will be pledged as security.

A Small OWRB Section Tackles a Giant—Bathymetric Mapping

Determining the volume of water in an 8-inch square pan two inches deep is much simpler than calculating the amount of water in a lake, although a somewhat similar mathematical formula applies. More difficult still is mapping the lake bottom, indicating depths at one-foot intervals across the lake. Nevertheless, these were the assignments given OWRB drafters James Leewright, Gladys Haywood and Mike McGaugh, who were asked to provide bathymetric maps of Lakes Atoka, Overholser and Lawtonka.

Such data were required by the Clean Lakes program in which the OWRB Water Quality Division participates with

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Draftsman Mike McGaugh measures the area of a contour on the bathymetric map of Lake Lawtonka, one of the three prepared by the drafters for the Board's Water Quality division as a requirement in EPA Clean Lakes studies. Looking on are James Leewright and Gladys Haywood.

Bathymetric mapping, continued from page 1

the Environmental Protection Agency in developing strategies for the cleanup of certain Oklahoma lakes. Atoka, Overholser and Lawtonka met the EPA guidelines for inclusion in the program by being publicly owned lakes within a 25-mile radius of a city and having their recreational benefits limited by pollution.

One task required in the diagnostic studies which lay the groundwork for restoration is determining to what extent the capacity of the lake had been diminished by sedimentation. It is by comparison of the bathymetric map to earlier maps or design data on the lake which shows the effects of sedimentation over the lake's lifetime. Although the volume was tallied accurately in all three cases, each lake presented a challenge of a different nature in the data gathering phase.

Much simplified, the procedure consists of establishing transects across the lake, then crossing the lake along the route of each transect in a boat equipped with a sonar depth-sounding device. The sonar translates continuous depth readings onto a profile print of bottom features. The course of the boat along the transect is confirmed by another person viewing through a transit on the shore who remains in constant radio contact with the boat.

Environmental specialists who were collecting the information at the lake collaborated with the drafters throughout the field investigations to be sure their data could be plotted accurately to the map on the drawing board in Oklahoma City.

Data from the field — the sonar's printed profiles of the lake bottom — were translated into depth readings by the drafters. They made vertical projections at one-foot intervals from points along the bottom profile to the line representing the water surface. From the point of intersection, a foreshortened or extended line was further projected onto a representative transect line on a scaled map of the lake. This placed the depth readings at their respective points along the transect — precisely as if the hundreds of depths plotted along any single transect had been measured by hand.

Although Lakes Atoka and Overholser fell within bathymetric mapping procedures considered ordinary, Lake Lawtonka presented a unique situation. The lake's geographic location and configuration made establishing those 60 transects a one-in-a-million situation, according to James Leewright, chief drafter.

"The lake is flanked on the west-southwest by Mount Scott, rising 1,064 feet above the lake surface and providing an overview of the entire body of water. The lake curves around the north and east sides of the mountain in an arc with a radius consistent throughout its length," said Leewright.

Jim Grimshaw and Gary Shapiro, environmental specialists assigned the field work, and Leewright, overseeing the mapping in the office, devised a radiating transect method using a transit stationed on top of Mount Scott. "We established 60 transects, with the first at zero degrees north and rotating clockwise, setting transects every two degrees throughout the length of the lake."

At the Lawtonka site, the sonar-equipped boat crossed the lake 60 times, once along each transect, and each time the man in the boat steered the course directed by radio by the man at the transit on Mount Scott. Back at the drawing board, it was the job of the drafters to translate the sonar reading into a contour map.

Contouring consists of drawing a line connecting all points of equal elevation, so one can detect shallows and depths at a glance. With the contours inked in, the drafters began the task of computing the capacity of the lake.

According to Leewright, this is accomplished most accurately by determining stratographic volumes — that is the amount of water in any single "layer" at any selected contour. Measuring the stratum is not unlike calculating the amount of water in an 8-inch pan, two inches deep. The areas of any two adjacent depth contours are added together, then multiplied by four feet—the depth the drafters assigned to each layer. These areas are determined by using an electronic measuring device that makes allowances for graded banks, irregular boundaries and bottom features.

"The total volume is the sum of all these strata," Leewright points out.

These figures are compared to those of the original design to measure to what extent sedimentation has taken its toll. In the case of Lawtonka, built in 1905, sediment had displaced 6500 acre-feet of water supply.

Not only was the assignment a giant for three drafters, the size of their products was giant. Atoka, the largest of the lakes, produced a map more than nine feet across—covering Mike McGaugh's 6-foot drawing board, then overhanging like a tablecloth. The Overholser and Lawtonka maps were of more manageable size, approximately three feet by four.

New SYMAP Computer Program Targets Water Quality Problems

The Oklahoma Water Resources Board is using a new technology to solve an old problem. The problem is showing at a glance information gathered over many square miles. The old solution was information in number form which is tedious to compile and interpret.

The new solution, called "SYMAP" or synagraphic mapping, was first used at the water board by Jim Gopal, senior water resources engineer of the Board's Water Quality division. He and Laura McMahon, an environmental specialist, have been the prime users of the technique earlier used elsewhere in the nation for air pollution and demographic studies.

SYMAP uses the computer to translate pollution concentration data gathered from field water samples within an area to show where the pollution is least and most concentrated.

Gopal has successfully used SYMAP to show the spread of nitrate waste spilled into an aquifer, as well as to locate the source of the spill.

In Woodward County 56 water wells, used as

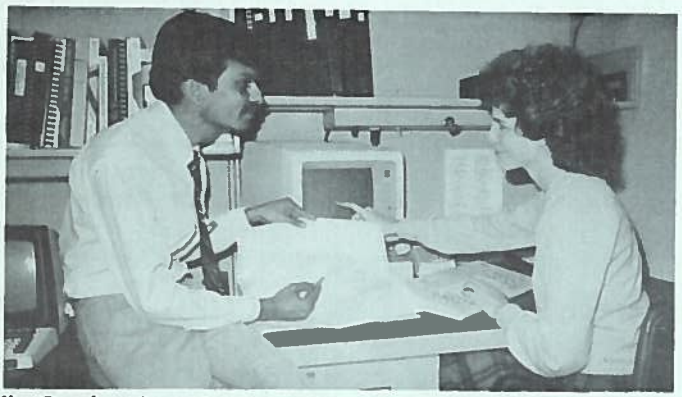
reference wells, were tested for nitrate concentrations in an area encompassing 312 square miles. The area was used by Gopal in March of 1982 to test SYMAP's applicabilty to enforcement activities of the OWRB.

Results of water quality analyses done periodically over an eight-month span and translated via SYMAP showed how concentrations of nitrates spread within the aquifer and how the concentrations eventually diffused into the aquifer or were pumped out during heavy irrigation periods. The OWRB and the Environmental Protection Agency evaluated the results and declared it valid for scientific documentation of where pollution entered an aquifer and how it spreads.

SYMAP was used in evaluating the effects of agricultural fertilizer inflow on algae growth in Lake Lawtonka, near Lawton. Concentration patterns were gathered in numerical form using a device called a fluorometer, which takes continuous readings from its probes set at four depth levels. It measures the amount of activity, called fluorescence, recorded when a special light in the probe shines on the water.

The numbers recorded by the fluorometer are then fed into an OWRB computer programmed with SYMAP generating information. The resulting chronological SYMAPs showed where algae concentrations are highest and lowest throughout the lake at a given time.

Algae concentrations were found to be highest in lake areas that received the most runoff from farmland around Lawtonka. The SYMAP information also showed Lawton city water treatment plant workers where to withdraw water with the least algae, which often requires less treatment.



Jim Gopal, senior water resources engineer, instructs Laura McMahon, environmental specialist, in translating information gathered by field study into SYMAP form. The numerical data entered in the computer will generate a SYMAP, an overview of the study waters showing pollution concentrations.

ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS AS OF JANUARY 30, 1984

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
SOUTHEAST		
Atoka	80,300	64.7
Broken Bow	767,955	83.6
Pine Creek	77,700	100.0
Hugo	157,600	100.0
CENTRAL		
Thunderbird	105,925	100.0
Hefner	68,600	91.0
Overholser	10,900	68.6
Draper	78,400	78.4
SOUTH CENTRAL		
Arbuckle	59,431	95.0
Texoma	2,585,790	98.0
Waurika	203,100	100.0
SOUTHWEST		
Altus	57,488	43.3
Fort Cobb	78,423	100.0
Foss	149,919	61.5[2]
Tom Steed	86,430	97.1
EAST CENTRAL		
Eufaula	1,955,688	83.9
Tenkiller	552,240	88.0
Wister	26,304	97.1
Sardis	253,472	83.8
NORTHEAST		
Eucha	55,000	69.1
Grand	1,350,350	90.5
Oologah	544,240	100.0
Hulah	30,594	100.0
Fort Gibson	365,200	100.0
Heyburn	6,600	100.0
Birch	19,087	99.4
Hudson	200,300	100.0
Spavinaw	29,200	97.3
Copan	39,169	90.3
NORTH CENTRAL		
Kaw	428,600	100.0
Keystone	616,000	100.0
NORTHWEST		
Canton	95,040	97.5
Optima	99	—[1]
Fort Supply	13,900	100.0
Great Salt Plains	31,400	100.0
STATE TOTALS	**11,180,345**[3]	**90.8**[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.

mainstream

Annual Well Measurement in Progress

Members of the OWRB Ground Water Division continue to carry out the Board's annual well measurement program which began January 9 in the Panhandle counties. More than 1000 wells will provide information on ground water levels throughout Oklahoma, amount of ground water in storage and trends which affect water availability.

The annual program, conducted in cooperation with the U.S. Geological Survey, will be completed in late March, then data collected in the survey will be published in long-term continuous records.

Water Awareness Day at Capitol March 20

Gov. George Nigh has proclaimed the third annual Water Awareness Day be held on Tuesday, March 20 from 10 a.m. to 3 p.m. on the fourth floor rotunda of the State Capitol. This year the event was scheduled to occur within "National Wildlife Week" March 18-24, which has "water" as its 1984 theme.

The event, which will feature an opening address by Governor Nigh at 10:45 a.m., is a forum for those interested in water conservation to come together to explore water conservation ideas, new water-saving devices and everyday practices that save our limited supply of water. State agencies, businesses, and manufacturers will offer displays and exhibits showing water conservation technology.

If your organization is interested in participating in Water Awareness Day, please call Art Cotton, Water Awareness Day coordinator, at (405) 271-2599.

OWWA to Meet in Elk City February 15-17

Roy Burson, president of the Oklahoma Water Well Association, announced the association's annual meeting to be held at the Holiday Inn in Elk City February 15-17.

Activities open on Wednesday with registration and an opportunity to visit exhibits. Thursday's agenda includes a luncheon address by OWRB Executive Director James R. Barnett, four workshops, board of directors meeting, general session and banquet.

On Thursday representatives of the Ground Water Division of the OWRB will test applicants for Oklahoma water well drillers licenses from 9 a.m. to 5 p.m. State law requires that all drillers who are paid for their work—commercial drillers—be licensed by the state.

A board of directors meeting on Friday morning closes out convention activities.

Board Grants to Boswell, Billings, PCPWA

At the special Board meeting January 31, three more Oklahoma communities were awarded grants from the OWRB financial assistance program. Billings, in Noble County received $19,455 for a new well, pumps, mains, booster pump station and surge tank. The $60,000 grant to Boswell in Choctaw County will finance a water treatment facility and partial costs of a water storage tank and sewage lagoon. The Pittsburg County Public Works Authority received $100,000 for expansion of water treatment and pumping facilities.

To qualify, the entity must demonstrate that the life, health or property of its citizens is endangered.

Tourism Conference Set February 26-28

Gov. George Nigh has issued an invitation to the public and members of the tourism and recreation industry to attend the 12th Annual Conference on Tourism and Recreation to be held February 26-28 at Oklahoma City's Lincoln Plaza. This year's theme is "Tourism — Get Your Fair $hare!"

Conference registration for two days of workshops and one Governor's Luncheon is $30, with tickets to the Legislative Reception/Dinner available at $25. Student registration (two days, one lunch) costs $10.

For more information, call Joyce Campbell at the Tourism and Recreation Department (405) 521-3411.

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