



OKLAHOMA

water news

MONTHLY NEWSLETTER OF THE OKLAHOMA
WATER RESOURCES BOARD

Gerald E. Borelli, Chairman

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Water Quality Staff Initiates Surveys on 89 State Streams

The Water Quality Division of the OWRB officially launched its summer stream study program in late June with a one-day survey of Coffee Creek, a small stream in central Oklahoma County. The statewide program will continue through October or until weather conditions preclude access to Oklahoma streams.

Coffee Creek, located north of Lake Arcadia near Edmond, was the first of 89 streams the Water Quality staff will survey in order to determine beneficial uses of state waters. The study includes 52 physical assessment and/or one-day fish and wildlife surveys, 35 primary body contact recreation surveys and two intensive fish and wildlife propagation studies.

The data gathered in the study will be incorporated in the Water Quality Standards which are revised every three years and dictate the best present and future uses of Oklahoma's waters. The standards set numerical and narrative criteria which serve as tangible guidelines for state water use. The OWRB, with input from other government agencies and the public, strives to clarify wording and improve enforcement



Mike Bastion and Shon Simpson of the OWRB seine for fish samples to use in measuring overall stream health and determining beneficial uses of the stream.

of existing standards with every revision.

"We attempt to set appropriate beneficial uses for streams then apply water quality criteria to protect those uses," says Shon Simpson, Water Quality biologist.

All Oklahoma streams are given beneficial use designations to determine how they may be best used and protected and also to maintain water quality in the state. Beneficial uses include primary and secondary warm water fisheries, public and private water supplies, agriculture, industrial and municipal cooling water, primary and secondary body contact recreation and aesthetics.

Simpson adds that the setting of numerical standards for toxicant and dissolved oxygen (DO) levels, which are of critical importance to stream life and water conditions, can be a difficult task for the OWRB staff. Also, the setting of numerical standards is a relatively recent procedure.

"There are conflicting data from lab experiments concerning what levels of DO are adequate to protect and

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First Phase of Cleanup Over With Tar Creek Well Plugging

The cleanup effort in northeastern Oklahoma's Tar Creek area took a giant step last month with completion of Phase One, the plugging of old water wells that channeled acid mine water from the long-abandoned mines into area drinking water supplies. Ron Jarman, OWRB Water Quality Division chief who oversees the effort on behalf of the Tar Creek Task Force, said the waters have in solution zinc, lead and other harmful substances from the mine workings.

The Task Force sought to seal billions of gallons of acid mine water from migrating to the underlying Roubidoux ground water formation. Jarman said 43 of the 66 wells in Oklahoma and Kansas had been sealed and all the sites restored. According to Jarman, seven of the old water wells were too shallow to endanger the Roubidoux and three remain in use, so those 10 were exempt from plugging. The three wells in use will be added to the list monitored by the OWRB in its ongoing program to note changes in ground water quality.

Consultants advised that it would be infeasible to drill to

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Stream Surveys, continued from page 1

sustain fish communities. Only limited field experiment data exist involving the relationship between DO and fishes," Simpson explains.

"We have difficulty setting limits on some toxic chemicals because they are so numerous and some can be extremely hazardous to a stream even in very small amounts," says Simpson.

Simpson says that various organizations have conflicting interests in regard to oxygen standards.

"In general, environmentalists and wildlife organizations would like to see higher oxygen standards, while those who discharge oxygen-demanding substances (sewage and other chemicals) want lower standards for DO," he remarks.

Simpson adds that treating sewage to a level which doesn't adversely affect instream DO is very expensive.

In the initial stage of the standards program, stream use in the conveyance of treated sewage was of primary concern. Beneficial uses were set primarily for effluent-dominated streams and the DO concentration was allowed to be relatively low. Today, the OWRB stresses reaching the physical potential of Oklahoma streams.

"Municipal discharges and DO content are among our greatest concerns in Water Quality," says Main Hutcheson, OWRB hydrologist. "The instream concentration of DO has a profound affect on fish and wildlife propagation, which is an important beneficial use."

According to Hutcheson, many factors determine which streams the division chooses for study.

"Streams which the EPA has requested studies on receive the highest priority. Statewide literature surveys indicate that certain streams may not be capable of achieving good beneficial uses. These also receive a high priority for study," he says.

Stream surveys also depend on stream size, volume and nature of municipal discharge and whether or not the waters may threaten endangered species.

In addition to being the initial stream surveyed in the program, Coffee Creek served as orientation for some of the seven seasonal employees assisting the Water Quality staff. The study conducted there was a typical one-day, 'on-site,' physical assessment survey.

"One of the reasons we surveyed Coffee Creek was the presence of a sewage treatment plant there," notes Simpson. "But it was also a good opportunity for our new employees to get some field experience."

All data obtained in the stream study program will be documented on comprehensive evaluation sheets. These sheets are used primarily to compare physical and habitat characteristics in order to set appropriate beneficial uses.

Six sites along Coffee Creek were targeted by the staff. Each site was evaluated according to various beneficial use criteria. Sites one and two were channeled sections with good flow but possessing poor habitat characteristics for fishes and other instream wildlife. Channelization is the man-altered straightening of a stream which may physically limit stream conditions. Flow is the volume of water passing a given point in a set period of time.

The other four sites were progressively better in regard to

aesthetics, habitat and physical characteristics. At several of the locations, flow measurements were taken using manually-operated and electric flow meters. A seine used to take fish samples from the stream revealed several species of sunfish (bluegill, green, longear and hybrids) and some species of minnows.

The staff also observed some small pools and many good riffles which included a waterfall area, a rare sight in central Oklahoma. The presence of riffles indicates swift water velocity and good re-aeration which contributes to the DO content. The group also noticed characteristics (lack of aquatic macrophytes and algae) which indicated that Coffee Creek probably received a treated sewage discharge which was over chlorinated. These characteristics were observed downstream of the sewage plant but not upstream.

The final draft of the 1985 Water Quality Standards will go to the EPA for approval late this year. Proposed changes will be suggested and the Board will discuss final confirmation in January, 1986.

Well Plugging, continued from page 1

pluggable depth on four of the remaining wells, so they were capped at the mine floor to reduce migration of the contaminated water to the aquifer. Two of the old wells were found to be properly sealed by others; two more were judged too costly to plug; and one well was excluded by the landowner's refusal to grant an easement. Jarman said four of the 66 well sites identified from outdated mining maps could not be located; one of them lying beneath a church structure and another beneath a mountain of chat.

According to Vahan Hoonanian, OWRB senior environmental specialist who has coordinated Tar Creek activities, clearing and plugging the abandoned wells was incredibly difficult. "It is the first time such a project has been undertaken anywhere in the world," Hoonanian points out. "We had no similar experience to draw on, and it required constant innovation. Old tools were put to new uses and new combinations of tools were tried out."

Hoonanian said that the cable tool rigs widely in use in the mining days, drilled by pounding and breaking through



Trucks at the Tar Creek site pump a special mix of acid resistant concrete down the shaft of an abandoned water well in an effort to seal the Roubidoux Ground Water Formation from contamination from the mines and surface runoff.

layers of rock and earth, wobbling down the shaft and often boring a hole that veered off at an angle. He said after reopening the old hole at the surface, project engineers advanced new casing to guide the drill bit of the rotary rig.

"Once the well shaft broke through to the mines, the hole usually was lost and drillers used core samples to find it," Hoonanian said. "If the sample was solid rock, it indicated they were off target. If the core sample was crumbly, dried material, it showed them that they had located the old well, collapsed and filled with debris."

To seal the abandoned wells from further contamination by acid mine waters, acid-resistant cement was poured from bottom to top, and a bridge plug set in place through the mined zone to isolate the pollution from the Roubidoux aquifer. Hilyard Drilling Company, with direction by engineers of the IT Corporation, carried out the well plugging strategies under contract with the Governor's Tar Creek Task Force.

Ron Jarman of the OWRB reported in the process of locating and plugging the 66 wells, 17 others were discovered that also allow mine waters access to the Roubidoux. He said the Task Force already has requested additional funding from the Environmental Protection Agency to plug the new discoveries along with the two of the 66 which were originally judged too costly.

Phase Two of the Tar Creek restoration prescribes the diversion of surface runoff away from mine shafts and subsidences which carry it into the mines. Earlier studies identified 18 such inflow points, with two of them in Kansas contributing more than 70 percent of the total inflow.



Kay County Springs Flow 40 Years

A letter to the OWRB Ground Water Division from Kay County resident Walter Mounce recently invited the OWRB to visit four artesian wells in the area that have been flowing at the rate of 20 gallons a minute for 40 years or more. According to Mounce, the springs, discovered by an oil company taking core samples, produce mineral water which varies little from a refreshing 51 or 52 degrees Fahrenheit. Mounce says some believe the mineral waters to be therapeutic and come to drink from the springs.

"I talked a friend of mine into casing and cementing one and putting an 8-ft. overhead pipe and valve control on it so our fire trucks can fill there and farmers can use it," Mounce said.

When Hydrologist Dannie Spiser traveled Kay County on the Board's ground water sampling program in June, he visited Mounce and the artesian springs. Spiser believes the springs two miles north and two miles west of Newkirk originate in the Garber Wellington Formation or in the terrace deposits of the Arkansas River. All flow into Bois de Arc Creek which flows south into the Salt Fork of the Arkansas River. Spiser requested the USGS to officially name the spring nearest the road "Mounce Spring."

ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS AS OF JULY 24, 1985

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
SOUTHEAST		
Atoka	118,300	95.3
Broken Bow	902,440	98.2
Pine Creek	77,700	100.0
Hugo	157,600	100.0
CENTRAL		
Thunderbird	105,758	99.8
Hefner	71,000	94.2
Overholser	13,900	87.4
Draper	75,100	75.1
SOUTH CENTRAL		
Arbuckle	62,331	99.6
Texoma	2,558,900	97.0
Waurika	199,600	98.0
SOUTHWEST		
Altus	26,286	19.8
Fort Cobb	70,307	89.6
Foss	130,426	53.5 ²
Tom Steed	67,794	76.0
EAST CENTRAL		
Eufaula	2,289,350	98.0
Tenkiller	627,500	100.0
Wister	17,930	66.0
Sardis	300,600	99.0
NORTHEAST		
Eucha	71,300	89.6
Grand	1,408,900	94.0
Oologah	527,540	96.9
Hulah	30,594	100.0
Fort Gibson	365,200	100.0
Heyburn	6,245	94.6
Birch	19,200	100.0
Hudson	200,300	100.0
Spavinaw	30,000	100.0
Copan	43,400	100.0
Skiatook	—	— ¹
NORTH CENTRAL		
Kaw	427,800	99.8
Keystone	616,000	100.0
NORTHWEST		
Canton	85,225	87.4
Optima	3,000	— ¹
Fort Supply	12,920	92.0
Great Salt Plains	31,400	100.0
STATE TOTALS		11,751,846¹
		93.0¹

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.

Manitou Springs Water Instead of Perrier?

A Coloradan hopes to snare from a French bottler a share of the market for effervescent spring water by bottling the water near Manitou Springs, Colorado. The water he markets bubbles from a spring at the base of Pikes Peak and rests in a limestone aquifer some 6000 feet below Manitou

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Springs.

As Richard Sajbel, the mathematician-turned-bottler, explains, as the snow melted on the summit of Pikes Peak some 25,000 years ago, it percolated through limestone and dolomite, dissolving minerals and freeing carbon dioxide along its course to the aquifer. The unique flavor and natural sparkle convinced Sajbel that it could compete successfully with Perrier, Vichy, Evian and other luxury labels.

The "Manitou" label may flow into the mainstream of success propelled by plugs in *Food and Wine* magazine and culinary author Julia Child.

Nigh Reinstates Summer Heat Task Force

In an effort to more efficiently handle this summer's heat and water problems, Governor George Nigh has announced the reformation of the "State Heat Emergency Task Force."

The Task Force, which has been implemented the last two summers, is composed of representatives of appropriate state agencies and private organizations.

"We want to avoid any possible crisis regarding human life and comfort where the state has a responsibility," Nigh said.

State agencies assigned to the Task Force include the State Water Resources Board, State Health Department, Department of Mental Health, State Civil Defense, Department of Human Services and the Department of Economic and Community Affairs (DECA).

Board Now Offers 8.94 Percent Loans

As a result of the closing on the OWRB bond sale in New York July 23, the Board's financial assistance program offers an interest rate of 8.94 percent on loans of 25-year maximum term for sewer and water improvements. James R. Barnett, executive director, and Board officers Earl Walker and Ernest R. Tucker delivered to Merrill Lynch \$50 million in state revenue bonds in exchange for funds to back the

program. Barnett said the closing marked another enormous step toward addressing the state's long-term water supply and sewage treatment problems.

Loans are available to cities, towns, rural water and sewer districts and other entities. Barnett said the exceptional interest rate is possible because Wall Street viewed the issue as very secure due to the collateral provided by Oklahoma's Statewide Water Development Revolving Fund.

With the closing of this bond sale, the OWRB saw an effort completed that began in 1979 to establish a state loan program. The Board has on hand 65 loan applications, and the Planning and Development Division will continue to process new applications as they are received.

According to Walid Maher, chief of the Planning and Development Division, the Board's emergency grant program, originally conceived as a companion to the loan program, has awarded \$4,034,886 in grants to 63 communities since inception of the grant program in 1979.

JULY CROP AND WEATHER SUMMARY

Summer crops were in good condition despite continued hot, dry weather. As a result, irrigation activity was up in many areas of the state. Wheat stubble has been plowed at least once on 85 percent of the state's wheat acreage. Row crops, alfalfa hay, peaches and pecans were in good-to-fair condition for this time of year while pastures and livestock were both in good condition. Dryland crops, however, are beginning to show signs of moisture stress and rain is needed soon for sustained crop development.

Statewide temperatures averaged one to three degrees above normal during the week ending July 19. Precipitation totals ranged from 0.04 inches in the west central to 0.84 inches in the southeast. Wilburton reported 3.17 inches for the largest amount of the week.

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