

Oklahoma

Water
News

MONTHLY NEWSLETTER OF THE OKLAHOMA WATER RESOURCES BOARD

New Studies Examine Pollution of Grand Lake Water, Sediments

When Tar Creek was diagnosed as one of the nation's most severely polluted sites in 1981, federal and state agencies were faced with numerous challenges. Acidic waters, laced with heavy metals from abandoned lead and zinc mines in the Picher mining district in Oklahoma's northeast corner, had spilled to the surface. The sinister waters had damaged fish and wildlife populations and threatened to spread their deadly toxins to underground and surface water supplies.

For six years, the OWRB supervised the plugging and sealing of abandoned water wells and the construction of dikes and dams to divert flows around sinkholes and mine cave-ins at the Superfund site. Preliminary reports at project's end indicated that discharge of the metal-laden waters at Tar Creek had indeed been reduced. U.S. Congressman Mike Synar praised the \$5 million project as "one of the greatest environmental success stories in the nation."

Still, traces of heavy metals remain in the Neosho River system and health and water quality experts are concerned about the present and future deposition of dissolved lead, zinc, cadmium and iron on the bottom sediment of Grand Lake O' the Cherokees, downstream from Tar

Creek. The existence of a second Superfund site at Galena, Kansas (along with Tar Creek, part of the former Tri-State Mining District) has heightened awareness of the problem and its possible effect on the Grand Lake ecosystem and the public water supply and recreation potential of the popular reservoir. The problem posed by heavy metals, and possibly other pollutants, has spawned two separate studies aimed at protecting the reservoir.

Grand Lake is now undergoing a preliminary survey assisted by a \$100,000 Clean Lakes study which will suggest remedies for reducing pollution sources in its vast watershed. The OWRB, as the state agency which plays a major role in the Environmental Protection Agency's Clean Lakes Program in Oklahoma, will team up with Oklahoma State University on the effort which seeks to preserve all the recreational benefits of Grand Lake. Water quality experts and other specialists plan to identify toxicity and nutrient-loading problems in Grand Lake.

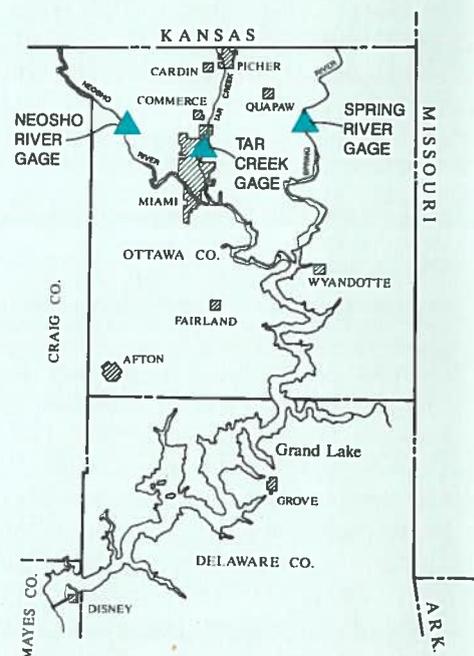
Grand Lake is one of the most popular recreational lakes in Oklahoma, serving an estimated five million visitors annually. The reservoir is located on the Neosho River which enters the lake's far north end. Tar Creek joins

the Neosho southeast of Miami, while the Spring River—which is suspected of being a heavy metal conduit from dissolved mine tailings at Galena—snakes into Grand near Wyandotte.

Researchers will have to contend with not only the enormity of Grand Lake but also its huge watershed which allows significant non-point contributions of pollutants and sediment, according to OWRB Hydrologist Jerry Black, who is coordinating Clean Lakes work.

"Information garnered from the two studies should help us discover if

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Three USGS stream gages will help researchers determine the volume of heavy metals entering Grand Lake from upstream sources.

Grand Lake, continued from page 1

heavy metals are having an impact on the ecosystem of Grand Lake. To do this, we must determine the concentrations of these metals and at what rate they are being deposited in the reservoir. Past studies have failed to answer these important questions," he said. Black, along with OSU toxicity expert Dr. Sterling (Bud) Burks and OWRB Environmental Specialist John Mott, are currently gathering water quality data on Grand Lake and its tributaries.

Sedimentation, or the "filling in," of Grand Lake through the Spring and Neosho Rivers threatens lake recreational interests. But, Black points out, it is this sediment which also binds with and carries untold quantities of metals down the arms of Grand Lake.

"Heavy metals commonly settle on the bottom of lakes and streams where they enter into the food chain through microscopic organisms and bottom-feeding fish, says Black. "Using toxicity tests, we hope to discover if heavy metals in the sediment have affected game and food fish and if metals suspended in water should be a concern to area residents who utilize the reservoir as a drinking water source."

Black and Burks have done substantial work together in refining toxicity testing procedures. Grand Lake, they agree, will be a prime location to put the methodology to use. OSU graduate students will assist them on site and in the laboratory.

"To see how lake life is affected by various contaminants, we'll introduce fish larvae to a simulated lake environment in the lab containing actual lake water, then monitor the hatchlings. Later, the larvae will be weighed and measured to determine toxicity levels," Black pointed out.

Researchers will take heed of an upcoming report aimed at evaluating Tar Creek remedial work. Since the project's completion in late 1986, monitoring of the site has been conducted in a cooperative program with the USGS and Kansas. The report, which will be submitted to the EPA in January 1990, will focus on how effectively workers sealed the vast laby-

rinth of mine workings and diverted surface flows around critical inflow points.

Also of major concern is the extent of mine water migration to the Roubidoux Aquifer, a major drinking water source for northeastern Oklahoma. Remedial action was expected to reduce significantly leakage from the mines into the aquifer.



Meibergen Attends Meeting

Lew Meibergen, Enid businessman, represented Oklahoma on the Kansas-Oklahoma Arkansas River Compact Commission in Wichita July 27, along with OWRB Executive Director James R. Barnett. This is the first annual meeting of the commission since Meibergen's appointment to the commission by Gov. Bellmon last Fall.

The Kansas-Oklahoma Arkansas River Compact apportions the interstate waters of the river and addresses future development and pollution abatement. At the twenty-fourth annual meeting of the commission Meibergen and other commissioners heard operations updates by members of federal water resources agencies—the Bureau of Reclamation, Soil Conservation Service, Corps of Engineers and U.S. Geological Survey.



Compact Commissioner Lew Meibergen

Soo-eee, It's Soda!

Carbonated water can protect pigs from heat stress, say researchers at the University of Illinois. When a pressurized tank bubbles CO₂ into the self-actuated watering system, this barnyard soda helps keep the pigs' body chemistry in balance.

Researchers point out that panting pigs exhale too much carbon dioxide, upsetting their mineral balance, blood-flow patterns and body-water distribution. And the pigs take readily to the bubbly.

Board Elects Officers

Robert S. Kerr, Jr., Oklahoma City attorney, was elected chairman of the Oklahoma Water Resources Board at the regular meeting on August 9. Named vice chairman by his colleagues was William E. (Bill) Secrest, Jr. of Broken Arrow, who is manager of Wagoner Rural Water District #4. R. G. Johnson, Clinton farmer and rancher, was elected secretary.

Kerr replaces as chairman Gerald E. Borelli, Kingfisher cattleman and independent oilman, who had presided since 1975. When Borelli was appointed to the Board in 1972, he was the youngest man ever to serve on the OWRB.

Mediterranean Sea Dying?

The days of the world's dirtiest sea could be numbered, says a United Nations report. The Mediterranean could be dead in 40 years, and the cause of death may be land-based pollutants—primarily Athens' raw sewage and the pesticides and fertilizers used on its southern shores.

Moslem populations of North Africa, expected to double by the next century, will continue to demand food and consumer products. Burgeoning populations will require greater use of polluting pesticides and fertilizers to grow food and stepped-up industry to meet consumer demands.

Added to these pollutants is sewage from Athens and other cities—90 percent of which is dumped into the sea without treatment. The U.N. report notes Athens and other cities still lack

municipal sewage treatment systems. As a result, one in five beaches is unsafe for swimming and only four percent of the shellfish are safe to eat.

United Nations experts point out the richer countries on the north and the poorer countries on the south must plan together if they want a better future. The U.N. estimates it will take \$30 billion and 10 years to clean up the Mediterranean.

Finish Line in Sight at Zoo

Filling of Oklahoma City's renovated Northeast (Zoo) Lake may run neck-and-neck with the first day of



racing at Remington Park, its neighbor to the north.

Dr. Jim Grimshaw of the OWRB coordinated the Clean Lakes Project with the EPA; Dr. Connie McCoy, zoo administrative services manager; and city and county officials. The Clean Lakes Program of the EPA sets its sights on restoring the recreational benefits of publicly owned lakes.

According to John Anglin, zoo purchasing supervisor, men and machines supplied by Oklahoma County moved 240,000 cubic yards of sediment from the old lakebed, deepening it to bedrock. The renovation also raised the track of the zoo's train, drained and filled the swamp and deepened the channel of the stream that feeds the lake. Anglin said the project will claim seven to ten acres of land for the zoo. He points out the new lake will be more like the old timers remember—smaller and deeper than the old one.

Dr. Connie McCoy, zoo administrator, said the dredging had unearthed some 20,000 golf balls lost to the lake over the years since the golf course was opened in 1921.

LEFT: John Anglin, zoo purchasing supervisor, praised Oklahoma County Commissioner Shirley Darrell for her effort in making Northeast Lake a reality. Andy Sweets of Oklahoma County supervises all dirt moving activities and operates the big bulldozer.

BELOW: Oklahoma County grader, dump trucks and front-loader work at removing 240,000 cubic yards of dirt to deepen the lake.



Northeast Lake was built in 1908 to provide metro residents with opportunities for fishing, boating and swimming. So successful was the spring-fed lake that it attracted as neighbors the golf course, housing developments and the zoo complex.

According to Grimshaw, who represented the OWRB in the cleanup, pollution had been contributed by stormwater runoff from the zoo, golf course and streets, animal fecal material and raw sewage from clogged and broken sewer lines. Added to that were heavy loads of sediment from the hooved animal pens.

Trivia for River Watchers

Four streams form Oklahoma's borders with other states. Surprised? Of course, the Red River on the south springs to mind readily.

But can you name the other three stateline streams? Clue: they're on the eastern border.

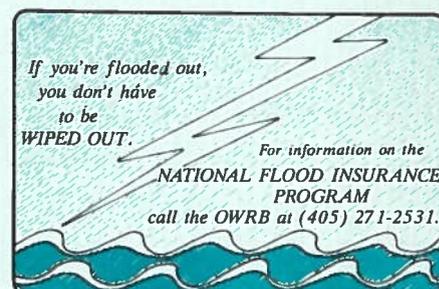
If you're an expert in river trivia, you probably know that 1.6 miles of the Poteau River, .5 mile of the Arkansas River and .12 mile of Mill Creek form the state's eastern border with Arkansas. All three of these border segments are near Ft. Smith, Arkansas.

Old Oil Sites New Again

Oil field contamination has been a troublesome problem in Oklahoma lakes and streams, as well as on the land. But now, an oil and gas exploration firm is doing its part by reclaiming old oil field sites and making them safe and useful again.

Tenneco Oil Exploration and Production, in conjunction with the

Continued on page 4



Mainstream, continued from page 3

Oklahoma State University Agronomy Department and the Oklahoma Wildlife Federation, restored such areas on the Lexington Wildlife Management Area south of Norman. To clean up four abandoned well sites

and storage facilities, Tenneco removed contaminated soil and reseeded the eight acres with suitable materials for regrowth.

Tenneco also took the opportunity to study other oilfield land reclamation methods. Working with soil and

wildlife experts, they tested plots of land with various chemicals to determine which is the most effective in neutralizing chlorides, the most common oilfield waste. Results of the project are expected late in 1988.

**ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS
AS OF JULY 21, 1988**

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY	PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
SOUTHEAST			Wister	37,171	58.8 ⁴
Atoka	100,226	81.2	Sardis	295,404	97.7
Broken Bow	877,391	95.6	NORTHEAST		
Pine Creek	77,040	99.2	Eucha	74,000	93.0
Hugo	157,195	99.7	Grand	1,386,720	93.0
McGee Creek	104,587	95.3	Oologah	465,052	85.4
CENTRAL			Hulah	29,799	97.4
Thunderbird	100,165	94.6	Fort Gibson	365,200	100.0
Hefner	64,738	85.9	Heyburn	5,783	87.6
Overholser	10,908	68.5	Birch	19,200	100.0
Draper	80,990	81.0	Hudson	200,300	100.0
Arcadia	27,284	99.6	Spavinaw	29,000	96.7
SOUTH CENTRAL			Copan	41,238	95.0
Arbuckle	60,646	96.9	Skiatook	300,795	94.2
Texoma	2,432,200	92.2	NORTH CENTRAL		
Waurika	199,668	98.3	Kaw	428,600	100.0
SOUTHWEST			Keystone	592,832	96.2
Altus	110,411	83.1	NORTHWEST		
Fort Cobb	76,597	97.7	Canton	84,253	86.4
Foss	168,639	69.2 ²	Optima	3,000	— ¹
Tom Steed	78,895	88.7	Fort Supply	13,900	100.0
EAST CENTRAL			Great Salt Plains	31,400	100.0
Eufaula	2,207,897	94.8			
Tenkiller	614,793	98.0			
			STATE TOTALS	11,950,917	93.3³

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.

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