



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Texas

## Removing Legacy Pollutants Restores Fish Consumption Use

### Waterbody Improved

The Texas Department of State Health Services (DSHS) banned people from possessing fish taken from Lake Como because the tissues of these fish contained high concentrations of potentially harmful chemicals. The fish possession ban prompted the Texas Commission on Environmental Quality (TCEQ) to include Lake Como on the state's 1996 Clean Water Act section 303(d) list of impaired waters. In response to the water quality problem, local, state and federal agencies implemented a range of best management practices (BMPs) in the city of Fort Worth. Recent risk analyses by the DSHS have shown that fish tissue pollutant levels have diminished sufficiently to rescind the fish possession ban. The TCEQ determined that Lake Como is fully supporting its fish consumption use and removed the lake from the 2008 303(d) impaired waters list.

### Problem

Lake Como is a 10-acre impoundment of an unnamed tributary to the Clear Fork Trinity River in Fort Worth (Figure 1). The lake drains a 743-acre watershed that is 65 percent residential. DSHS issued a ban on the possession of all fish species from Lake Como in 1995 because of elevated levels of several legacy pollutants including polychlorinated biphenyls (PCBs) and the pesticides chlordane, DDT and dieldrin. In 1996, TCEQ added the lake to the state's 303(d) list of impaired waters due to impairment of its designated fish consumption use.

Legacy pollutants are those pollutants that have been banned or had their uses restricted, yet remain in the environment. These materials were widely used in the past in products such as pesticides, coolants and lubricants. Area soils were contaminated through direct application, leaks and spills. Extensive urban development in the watershed caused contaminated soils to erode and accumulate in Lake Como. The pollutants then entered the food chain and became concentrated in fish tissue.

In 2001 TCEQ and EPA approved a total maximum daily load (TMDL) for Lake Como for legacy pollutants in fish tissue. The endpoint of the TMDL was to restore the fish consumption use by meeting the DSHS' criteria for contaminant levels. The DSHS procedures specify that the additive risk of all contaminants cannot exceed either the cancer risk level or a non-carcinogenic hazard index.

### Project Highlights

Fort Worth's Environmental Management Department (FWEMD) operates the



Figure 1. Lake Como in Fort Worth, Texas.

Environmental Collection Center (ECC), a permanent, year-round facility that accepts household hazardous waste from residents of Fort Worth and other areas. The ECC modified its record keeping to track the amounts of legacy pollutants collected. The city used the information as a measure for evaluating its pollution prevention program and targeting its educational efforts.

Fort Worth educates residents about local watersheds and the inherent problems associated with the use of pesticides. The city holds Lake Festivals and cleanup events. In 2004, the event included more than 30 information booths and educational activities. The city also installed a message board at the lake to provide water quality information. FWEMD produced a stormwater pollution prevention public service advertisement shown at local movie theaters. To reach a wider audience, FWEMD staff made presentations about water quality issues to numerous groups in the Fort Worth area.

The U.S. Geological Survey (USGS) conducted sediment and runoff sampling and analysis to

evaluate loading of legacy pollutants, trends and sources of pollutants. The DSHS collected fish tissue samples for developing a quantitative risk characterization that was the basis of a revised health risk assessment that DSHS adopted in 2008.

## Results

Sampling of sediments in the reservoir detected all four legacy pollutants responsible for the fish consumption bans. However, concentrations of DDE, PCBs and chlordane have declined in Lake Como sediment since the 1960s. Results of core samples taken in the lake show a decrease over time in the pollutants of concern, with the exception of dieldrin. Sampling of residential stormwater outfalls showed that legacy pollutants were present and being transported in urban runoff.

Pollution prevention and source control practices helped reduce legacy pollutant levels. Fort Worth's educational program led to a 21 percent increase in the number of citizens using its permanent household hazardous waste facility. As of 2006, ECC collected and logged more than 8,000 pounds of materials containing legacy pollutants.

The combination of these investigations, management activities and the natural attenuation of the pollutants proved to be effective for Lake Como. Recent fish tissue monitoring shows that concentrations of legacy pollutants comply with the endpoint target in the TMDL (Figure 2). For example, chlordane fish tissue data collected in 1994 show a mean value of 1.78 milligrams per kilogram (mg/kg) and a range of values from 1.00 to 2.90 mg/kg. By 2008, data showed that chlordane concentrations in fish tissue had declined to mean of 0.036 mg/kg, with a range of values from 0.013 to 0.086 mg/kg.

The final risk assessment by DSHS found that "no single contaminant in fish from Lake Como increased the likelihood of systemic or carcinogenic health outcomes in people who eat fish from this lake." Additionally, DSHS risk assessors found no increase in the lifetime excess cancer risk with simultaneous exposure to more than one contaminant. This exposure scenario also does not increase the risk of systemic adverse health outcomes in those who would regularly consume fish from Lake Como.

These findings demonstrate that historical contamination has attenuated, resulting in reduced fish tissue concentrations. Because of the actions taken to restore Lake Como, and since PCBs and the pesticides bioaccumulating in fish tissue are all banned, TCEQ believes levels in fish tissue will continue to decline. On the basis of the DSHS findings, TCEQ determined that Lake Como is fully supporting its fish consumption use and removed the lake from the state's 2008 303(d) impaired waters list. Periodic monitoring of fish tissue in the future will serve to confirm that concentrations remain below levels of concern.

## Partners and Funding

Fort Worth contributed to the project by educating the public and collecting hazardous household waste. USGS investigated legacy pollutants in sediments. TCEQ and USGS each contributed \$39,000 for the joint investigation. TCEQ contributed approximately \$25,000 in EPA section 319 funds to cover the DSHS's analytical expenses. DSHS matched the grant with salaries and in-kind services to collect the samples and develop the risk characterizations.

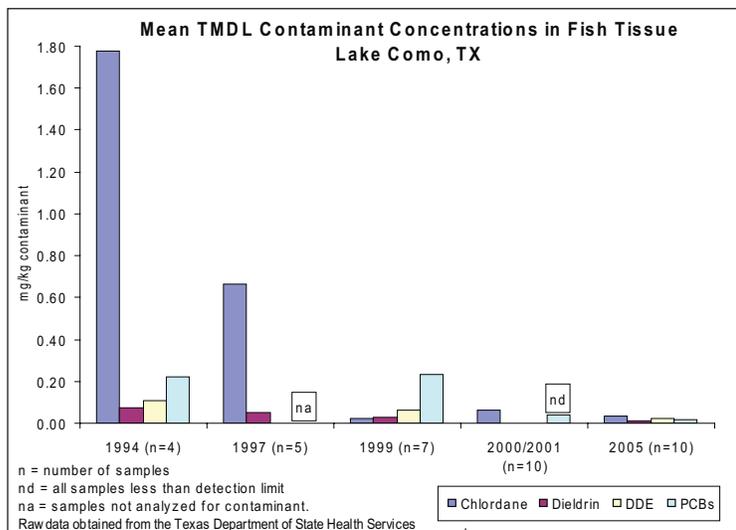


Figure 2. Trends of chlorinated hydrocarbons in Lake Como core sediment and Lake Como inflow suspended sediment. Kendall's tau rank correlation test was used to indicate whether there was a statistically significant relation between concentration and time, from 1965 to top of the core.



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