

Final Report

Chlordane levels in fish from Town Lake:
March-April 1994 Survey

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BACKGROUND

Chlordane is a pesticide used extensively between 1948 and 1988 for termite control around houses and buildings. Due to concerns over cancer risk, the Environmental Protection Agency (EPA) banned chlordane from use in the United States in 1988 (U.S. Department of Health and Human Services, 1993). Manufacture and export of chlordane continues.

Several studies conducted in the past ten years have shown elevated levels of chlordane in fish from Town Lake (Austin-Travis County Health Department, 1985; Clear Clean Colorado River Association, 1990; Lower Colorado River Authority, 1990; Texas Water Commission, 1992). As a result, in 1985 the Texas Department of Health (TDH) issued the first health advisory against human consumption of certain species of fish from Town Lake. In 1987, the TDH issued a second health bulletin which reinforced the 1985 advisory. The most recent warning was issued in 1990. It expanded the list of species to include all fish from Town Lake.

Normally, TDH monitors contaminated areas in the state every three years. However, since Town Lake is not a top priority area in the state, it has not been reexamined since early 1990. The Lower Colorado River Authority (LCRA) proposed and conducted a study to examine the distribution of chlordane in fish from Town Lake. The objectives of this study were to determine the concentrations of chlordane in fish from Town Lake and to provide the TDH supplemental data for reevaluation of the current Town Lake health advisory on fish consumption.

STUDY AREA

The boundaries of Town Lake, segment 1429, extend from Longhorn Dam to Tom Miller Dam in Travis County. The designated water uses of Town lake include contact recreation, high quality aquatic habitat, and source of public water supply. The table below describes some of the attributes of Town Lake:

Year Built	1960
Total Drainage Area (sq. mi.)	27600
Effective Drainage Area (sq. mi.)	157
Surface Area (acres)	477
Capacity (acre-ft)	6784
Channel Length (miles)	6
Mean Depth (feet)	14
Shoreline Length (miles)	17.6
Retention Time (days)	2

A map of the study area is shown in Figure 1. The sites selected for fish collection include:

- Site #1. Town Lake near Longhorn Dam: Area along the north bank between the dam and the Hollystreet Power Plant, including the plant discharge canal.
- Site #2. Town Lake between IH-35 bridge and Waller Creek: Area upstream IH-35 bridge and and Waller Creek confluence on both north and south banks.
- Site #3. Town Lake between Congress Ave bridge and the Seaholm Power Plant structure: Area upstream Congress bridge and Seaholm Power Plant structure on both north and south banks.
- Site #4. Town Lake upstream Mopac 1 bridge: Area between Mopac 1 bridge and approximately 1/4 mile upstream on both north and south banks.

These sites correspond to the Texas Natural Resource and Conservation Commission sites selected in their 1990 study (Texas Water Commission, 1992).

METHODS

The electrofishing technique was used to collect fish at all sites. A combined total of fifty-two fish were collected on 3/30/94 and 4/8/94. After capture, the fish were placed on ice in ice coolers labeled by site for transportation to the LCRA laboratory. The ice chests were previously washed with detergent and tap water and then rinsed with deionized water. Since electrofishing progressed into the night, the fish were kept on ice until they were filleted the next morning.

The fish were weighed and the total length measured. Fillets from the right side of each fish were cut out on a hard plastic cutting board with an electric fillet knife. The blade was rinsed with deionized water and reagent grade isopropyl alcohol between samples. Clean sheets of aluminum foil (dull side facing fish) were also used between fish. Efforts were made to cut out large fillets sufficient for analysis. The fillets were rinsed with deionized water, weighed, wrapped in heavy duty aluminum foil (dull side facing fish), tagged and placed into plastic freezer bags. Fillets from the left side were processed in similar fashion but placed into separate plastic freezer bags. Every sample was kept on ice until they could be submitted to the laboratory. After processing, a chain of custody form was filled out and all samples were submitted to the laboratory for EPA 8080 pesticide analysis, including chlordane. The left side portions of the fish will be kept frozen in case verification of right side data is deemed necessary. Before disposal, the fish were cut open and the sex determined.

RESULTS AND DISCUSSION

The data collected was compared to the chlordane Food and Drug Administration (FDA) action level of 0.3 mg/kg and to the Oklahoma State Department of Health (OSDH) level of concern (75% of the FDA action level). The table on the following pages contains the pertinent field notes, fish metrics, and laboratory results (wet weight) for this study:

Species	Field ID#	Date Collected	Sex	Length (mm)	Weight (g)	Chlordane (mg/kg)
Largemouth Bass (<u>Micropterus salmoides</u>)						
1	1LMBR	3/30/94	F	450	1361	<0.02
2	2LMBR	3/30/94	M	500	1588	<0.02
3	3LMBR	3/30/94	F	410	794	<0.02
4	4LMBR	3/30/94	F	480	1361	<0.02
5	5LMBR	3/30/94	F	400	794	<0.02
6	6LMBR	3/30/94	F	410	794	<0.02
7	11LMBR	3/30/94	F	480	1815	<0.02
8	12LMBR	3/30/94	M	435	1248	<0.02
9	13LMBR	3/30/94	M	430	1361	<0.02
10	14LMBR	3/30/94	F	480	1815	<0.02
11	15LMBR	3/30/94	F	450	1702	<0.02
12	16LMBR	3/30/94	F	460	1815	<0.02
13	21LMBR	3/30/94	F	500	1815	<0.02
14	22LMBR	3/30/94	F	510	1815	<0.02
15	23LMBR	3/30/94	F	475	1588	<0.02
16	24LMBR	3/30/94	M	480	1588	<0.02
17	25LMBR	3/30/94	F	440	1588	<0.02
18	26LMBR	3/30/94	F	450	1361	<0.02
19	31LMBR	3/30/94	F	450	1134	<0.02
20	32LMBR	3/30/94	F	435	1497	<0.02
21	33LMBR	3/30/94	M	425	1134	<0.02
22	34LMBR	3/30/94	F	425	1134	<0.02
23	35LMBR	3/30/94	F	420	1021	<0.02
Grey Redhorse Sucker (<u>Moxostoma congestum</u>)						
1	7MCR	3/30/94	M	580	2723	<0.02
2	8MCR	3/30/94	M	520	1929	<0.02
3	9MCR	3/30/94	M	485	1702	<0.02
4	10MCR	3/30/94	F	480	1588	<0.02
5	17MCR	3/30/94	F	500	1588	<0.02
6	18MCR	3/30/94	M	550	2496	<0.02
7	19MCR	3/30/94	M	490	1815	<0.02
8	20MCR	3/30/94	M	500	1815	<0.02
9	27MCR	3/30/94	F	530	2269	<0.02
10	28MCR	3/30/94	M	540	2042	<0.02
11	29MCR	3/30/94	F	490	1588	<0.02
12	36MCR	3/30/94	F	525	2042	<0.02
13	37MCR	3/30/94	F	490	1702	<0.02
14	38MCR	3/30/94	M	490	1702	<0.02

Species	Field ID#	Date Collected	Sex	Length (mm)	Weight (g)	Chlordane (mg/kg)
Common Carp (<u>Cyprinus carpio</u>)						
1	30CCR	3/30/94	F	770	6695	<0.02
2	39CCR	3/30/94	M	725	5787	<0.02
3	40CCR	3/30/94	M	835	6364	<0.02
4	1CCR	4/7/94	F	565	3631	<0.02
5	5CCR	4/7/94	M	770	7716	<0.02
6	6CCR	4/7/94	M	765	6922	<0.02
Gizzard Shad (<u>Dorosoma cepedianum</u>)						
1	2GSR	4/7/94	F	410	734	<0.02
2	3GSR	4/7/94	F	410	705	<0.02
3	7GSR	4/7/94	F	400	733	<0.02
4	9GSR	4/8/94	F	420	923	<0.02
5	10GSR	4/8/94	F	380	707	<0.02
6	12GSR	4/8/94	M	430	661	<0.02
Redear Sunfish (<u>Lepomis microlophus</u>)						
1	4LMR	4/7/94	F	350	1068	<0.02
2	11LMR	4/8/94	M	320	812	<0.02
Redbreast Sunfish (<u>Lepomis auritas</u>)						
1	8LAL	4/7/94	M	290	356	<0.02

* Exceeds FDA action level of 0.3 mg/kg

** Exceeds OSDH level of concern (75 % of FDA action level)

<dl Less than detectable level (0.02 mg/kg)

The fillets analyzed contained below quantifiable levels of chlordane in all 52 fish. Even the more undesirable species (shad and carp) which have been historically elevated with chlordane were below detection levels (Clear Clean Colorado River Association, 1990; Lower Colorado River Authority, 1990; Texas Water Commission, 1992). These studies also reported as much as 14% of the total samples analyzed exceeded the FDA action level for chlordane.

A representative number of fish species normally caught and consumed by the public were analyzed. The number of different species totaled six. Regrettably, catfish were the only species originally targeted for but not captured using the electrofishing technique.

These data suggest that between 1990 and 1994 the concentrations of chlordane in fish from Town Lake have decreased dramatically to below quantifiable amounts. There is speculation that

the flood of 1991 has affected chlordane levels both in sediment and fish in Town Lake. Perhaps the flood redistributed contaminated sediment and fish further downstream. This would explain the lower levels of chlordane found in fish. Newly deposited sediment may not be as contaminated as before and thus absent in fish. If so, how long will it take newly deposited sediment and subsequently fish to build up sufficient levels of chlordane to cause problems in the future. The City of Austin Environmental and Conservation Division is currently analyzing sediment samples collected in May 1994 and results should be available in July. Hopefully, there results will clarify the current status of Town Lake.

Since TDH's procedure for sample preparation is different than previous TDH methodology, direct comparisons with previous data may be questioned. Further study may be necessary to verify lower levels of chlordane in fish from Town Lake.

Data for the other pesticide analysis is attached.

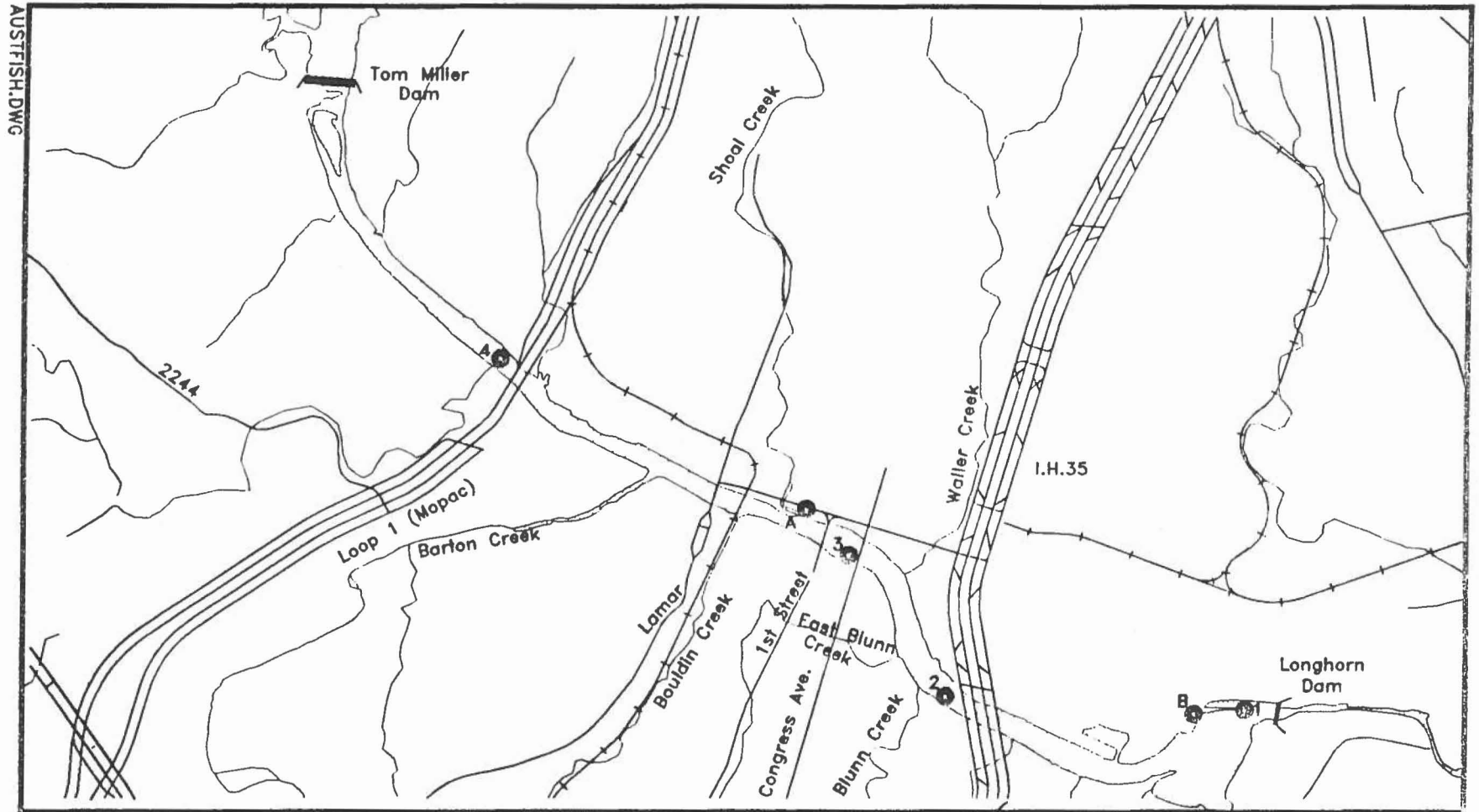
RECOMMENDATIONS

LCRA recommends that the TDH reexamine chlordane distributions in fish from Town Lake and reevaluate the fish consumption advisory if necessary.

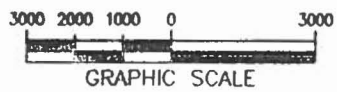
LITERATURE CITED

- Austin-Travis County Health Department. 1985. A study of fish toxicology in Austin's Town Lake. Austin, Texas. Unpublished report. Travis County Health Department, Austin, Texas.
- Clear Clean Colorado River Association. 1990. Pesticides and other contaminants in water, sediments, and fish tissues in the Lower Colorado River of Texas. An Inter-Agency Study. Unpublished Report. Available through the Texas Parks and Wildlife Department, Austin, Texas.
- Lower Colorado River Authority. 1990. Fish tissue analyses from Lake Austin and Town Lake. Unpublished data. Lower Colorado River Authority, Austin, Texas.
- Texas Water Commission. 1992. Distribution, concentrations, and sources of chlordane, other organics, and heavy metals in Town Lake, Austin, Texas. Publication # SR 92-03. Texas Water Commission, Austin, Texas.
- United States Department of Health and Human Services. 1993. Toxicological profile for chlordane. Draft document for public comment. Subcontract work by Syracuse Research Corporation. Washington, D.C.

FIGURE 1
STUDY AREA



AUSTFISH.DWG



KEY

- 1-Site No.1
- 2-Site No.2
- 3-Site No.3
- 4-Site No.4
- A-Seaholm Power Plant
- B-Holly Street Power Plant



