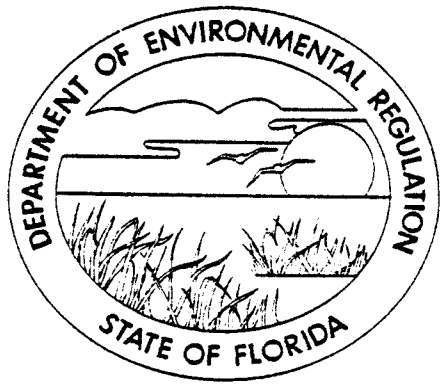


BIOASSAY OF FLORIDA DISTILLERS COMPANY

DIVISION OF TODD HUNTER INTERNATIONAL, INC.

LAKE ALFRED, POLK COUNTY, FLORIDA

NPDES #FL0029017

SAMPLED 2/23/82

Biological Section
Bureau of Water Analysis
March 23, 1982

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EXECUTIVE SUMMARY

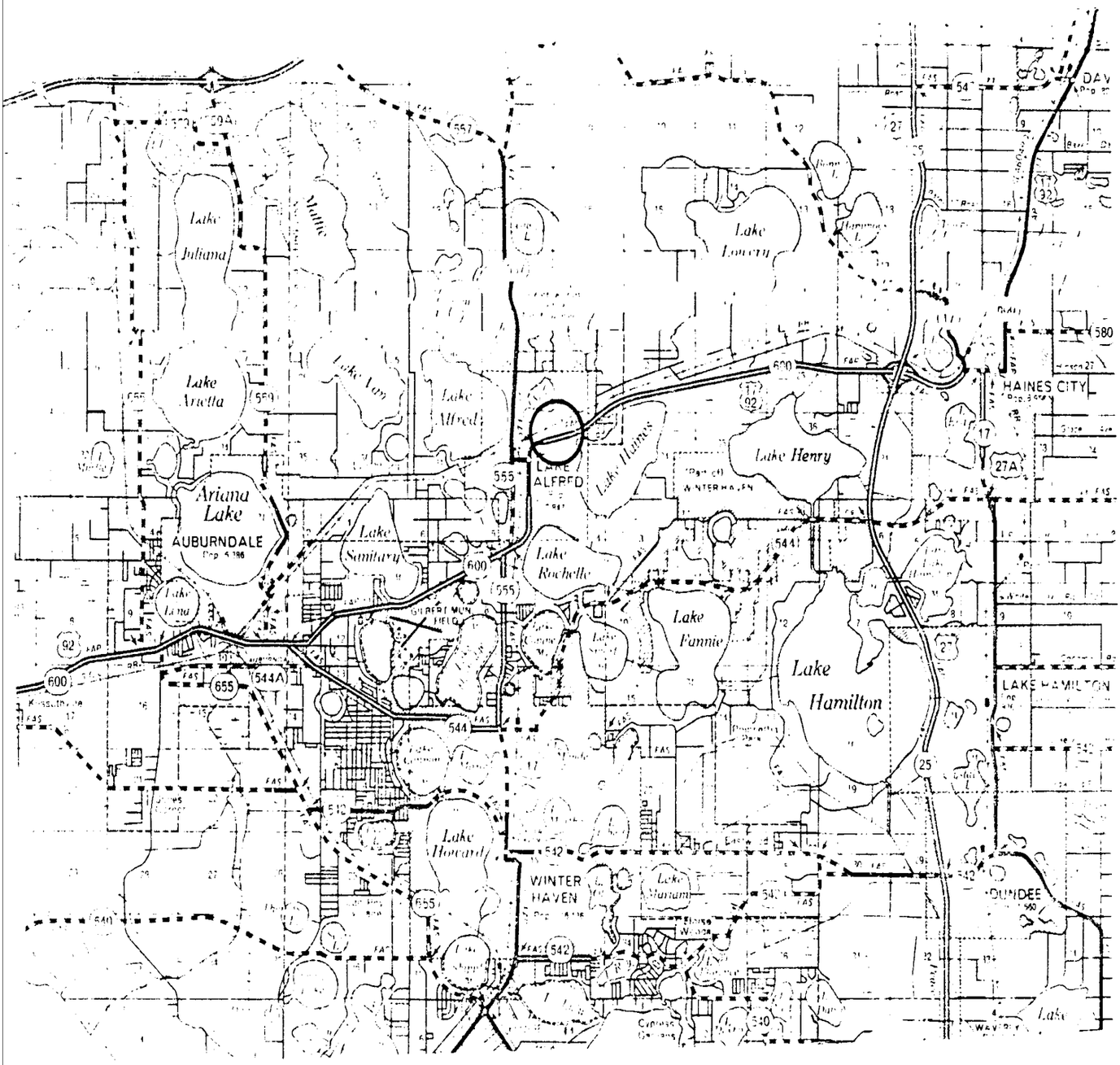
Florida Distillers Company, NPDES # FL0029017 on 24 to 26 February, 1982.

The sample of cooling water effluent from Florida Distillers Company, a processor of alcoholic beverages from citrus molasses located in Lake Alfred, was not toxic to the test organism Daphnia pulex. No Daphnia died during the 48 hour static test.

INTRODUCTION

The Florida Distillers Company, a Division of Todd Hunter International, Inc., is located at 530 Dakota Ave., next to the Seaboard Coast Railroad Line in northeast Lake Alfred, Polk County, Florida (Fig. 1). This facility purchases citrus molasses from local citrus processing plants and processes alcoholic beverages through distillation and refining. Approximately 13,000 gallons of alcohol per day are produced. Strong wastewater from this operation is disposed of via sprayfield, while strong waste sludges are likewise disposed of by land spreading. Non-contact cooling water is discharged through Outfall #003 to ditches which flow to either Lake Swoope or to Lake Haines. The amount discharged is approximately 0.86 MGD.

~~To evaluate the existence and extent of toxicity of this cooling water effluent to the biota of the receiving waters,~~ The Biological Section performed a static acute toxicity bioassay on a grab sample on 24 to 26 February, 1982. The results of this test are presented in this report.



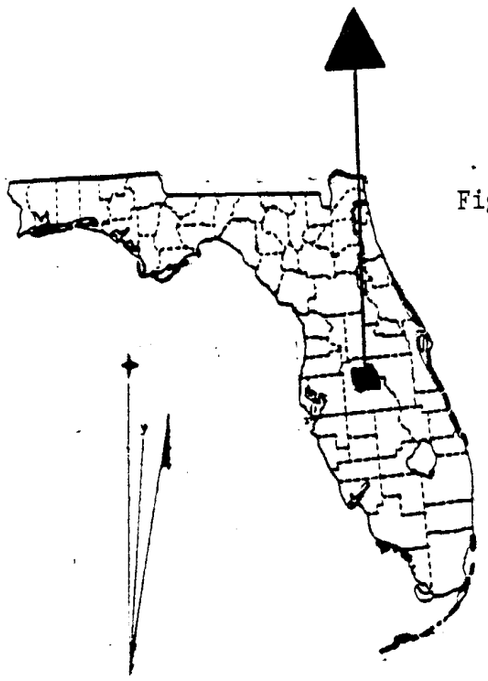


Figure 1. Portions of Polk County, Florida, including City of Lake Alfred and study area.

METHODS AND MATERIALS

Test methods used to conduct this static bioassay are extensively described by Peltier (1978). The organism selected for this study is among those recommended by Peltier (1978) and the U.S.EPA (1978). The life history and maintenance procedures used to culture the organism are detailed below.

History and Maintenance of Bioassay Organisms

Daphnia pulex (water flea) - A breeding culture of Daphnia pulex was obtained from the EPA laboratory in Athens, Georgia, in March, 1979. This culture has been maintained since its arrival in 2 1/2 gallon all glass aquaria filled with unchlorinated DER well water, under a 16:8 hour light-dark cycle. Organisms are fed a liquified blend of Purina Trout Chow® and Cerophyl® twice daily, and are kept at a constant temperature of 22° plus or minus 1°C. The aquaria are cleaned weekly by siphoning off half the water along with the detritus and excess organisms. They are then refilled with fresh aerated well water. Additional measures are taken and/or new cultures started in the event of abnormal circumstances such as: declining populations, ephippia formation, or excessive fungal or bacterial growth.

To ensure the uniform sensitivity of these test organisms to toxic substances, the Biological Section conducts monthly standard reference toxicant bioassays using sodium lauryl sulfate as the reference toxicant.

Test Methods

A 48 hour static acute toxicity bioassay was performed on a grab sample of Florida Distillers Company's cooling water effluent. The test was performed from 1020 hours on 24 February to 1030 hours on 26 February, 1982.

The sample was collected by Mr. Randy Giwer of DER's Southwest District at 1036 hours on 23 February, 1982 using standard wastewater sampling procedures. The sample was iced and transported to the DER laboratory in Tallahassee for analysis within 24 hours of collection.

Freshwater for dilution of the effluent sample was obtained from the same DER deep well that is used to culture the test organisms. The concentration series selected for this study (Table 1) is that recommended by APHA (1980).

Two replicates, each with six concentrations and a control, were used to test with the water flea, Daphnia pulex. Flint glass jars of 250 ml capacity were used as test chambers, and 200 ml of the appropriate test concentration was placed in each chamber. Daphnia were siphoned into a large culture dish to isolate the proper size and age organisms (neonates). To accomplish this, the Daphnia were siphoned through a stainless steel screen. The trapped adults were then discarded. These neonates were then transferred by glass pipette, examined for injury, and were loaded 10 per chamber, resulting in 20 per test concentration. Water fleas were not fed during this test.

Dissolved oxygen, pH, temperature, and the number of live organisms were recorded for each test chamber at 0 hours, 24 hours, and 48 hours. Total alkalinity and total hardness were recorded at the beginning of the test for the control and the 100% effluent concentration. The specific conductance of each test concentration was recorded at the beginning and end of the test. Ammonia concentrations, including total and unionized fractions (expressed in mg/l as N and as NH_3, respectively), were recorded in the control and the 100% effluent test concentration at the beginning of the test. Total ammonia concentrations were determined using a Orion® specific ion probe and an Ionanlyzer®. The unionized fraction was then determined based on the total ammonia concentration, and the pH, temperature, and salinity of the sample. These values were recorded on the bioassay data form and are presented in Table 2.

Table 2. Data recorded during 48 hour, Daphnia pulex, static acute toxicity bioassay of Florida Distillers Company, cooling water discharge, Lake Alfred, Polk County, Florida, NPDES #FL0029017 on 24 to 26 February, 1982.

Conc. or %	Number of Live Organisms			Dissolved Oxygen (mg/ℓ)			pH			Total Alkalinity (mg/ℓ as $CaCO_3$)		Total Hardness (mg/ℓ as $CaCO_3$)		Temperature (°C)			NH_3/NH_3+NH_4 (mg/ℓ)		Conductivity (μmhos)	
	0	24	48	0	24	48	0	24	48	0	48	0	48	0	24	48	0	48	0	48
Control	10	10	10	8.6	9.2	8.1	7.8	8.2	8.1	113		113		20.7	20.3	19.5	.01/.34	--		
Control	10	10	10	8.6	9.2	8.0	7.8	8.2	8.1										198	205
5.6%	10	10	10	8.6	9.2	8.0	7.8	8.2	8.1					20.7	20.2	19.5				
5.6%	10	10	10	8.5	9.2	8.0	7.8	8.2	8.1										202	210
10.0%	10	10	10	8.3	9.1	8.0	7.7	8.2	8.1					20.7	20.2	19.5				
10.0%	10	10	10	8.3	9.1	8.0	7.7	8.2	8.1										210	220
18.0%	10	10	10	8.0	9.1	8.0	7.6	8.2	8.1					20.7	20.1	19.5				
18.0%	10	10	10	8.0	9.1	8.0	7.6	8.2	8.1										220	235
32.0%	10	10	10	7.5	9.0	7.8	7.5	8.1	8.1					20.7	20.1	19.5				
32.0%	10	10	10	7.5	9.0	7.7	7.5	8.1	8.1										230	255
56.0%	10	10	10	6.3	8.9	7.8	7.3	8.1	8.1					20.7	20.0	19.5				
56.0%	10	10	10	6.3	8.9	7.9	7.3	8.1	8.1										250	255
100.0%	10	10	10	4.9[b]	8.7	7.9	7.3	8.1	8.1	142		130		20.9	20.1	19.5	.01/.42	--		
100.0%	11[a]	11	11	4.7[b]	8.7	8.0	7.4	8.1	8.1										295	300

Remarks:

[a] Extra organism loaded by mistake, allowed to remain.

[b] Chambers aerated to 7.1 mg/l and 7.2 mg/l, respectively. Values recorded prior to aeration and prior to loading the organisms.

Table 1. Concentration Series and Volumes Used for This Static Bioassay

Daphnia pulex (water flea)

Concentration	Dilution Water	Effluent	Total Volume
Control	200 ml	---	200 ml
5.6%	188.8 ml	11.2 ml	200 ml
10.0%	180 ml	20 ml	200 ml
18.0%	164 ml	36 ml	200 ml
32.0%	136 ml	64 ml	200 ml
56.0%	88 ml	112 ml	200 ml
100.0%	--	200 ml	200 ml

RESULTS AND DISCUSSION

The grab sample of cooling water effluent from the Florida Distillers Company was not toxic to *Daphnia pulex*. No *Daphnia* died during the 48 hour test.

LITERATURE CITED

American Public Health Association. 1980. Standard Methods for the Examination of Water and Wastewater. 15th ed. 1134 p.

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U.S. Environmental Protection Agency. 1978. Bioassay procedures for the Ocean Disposal Permit Program. Environmental Research Laboratory. Gulf Breeze, Florida. EPA-600/9-78-010. 121 p.