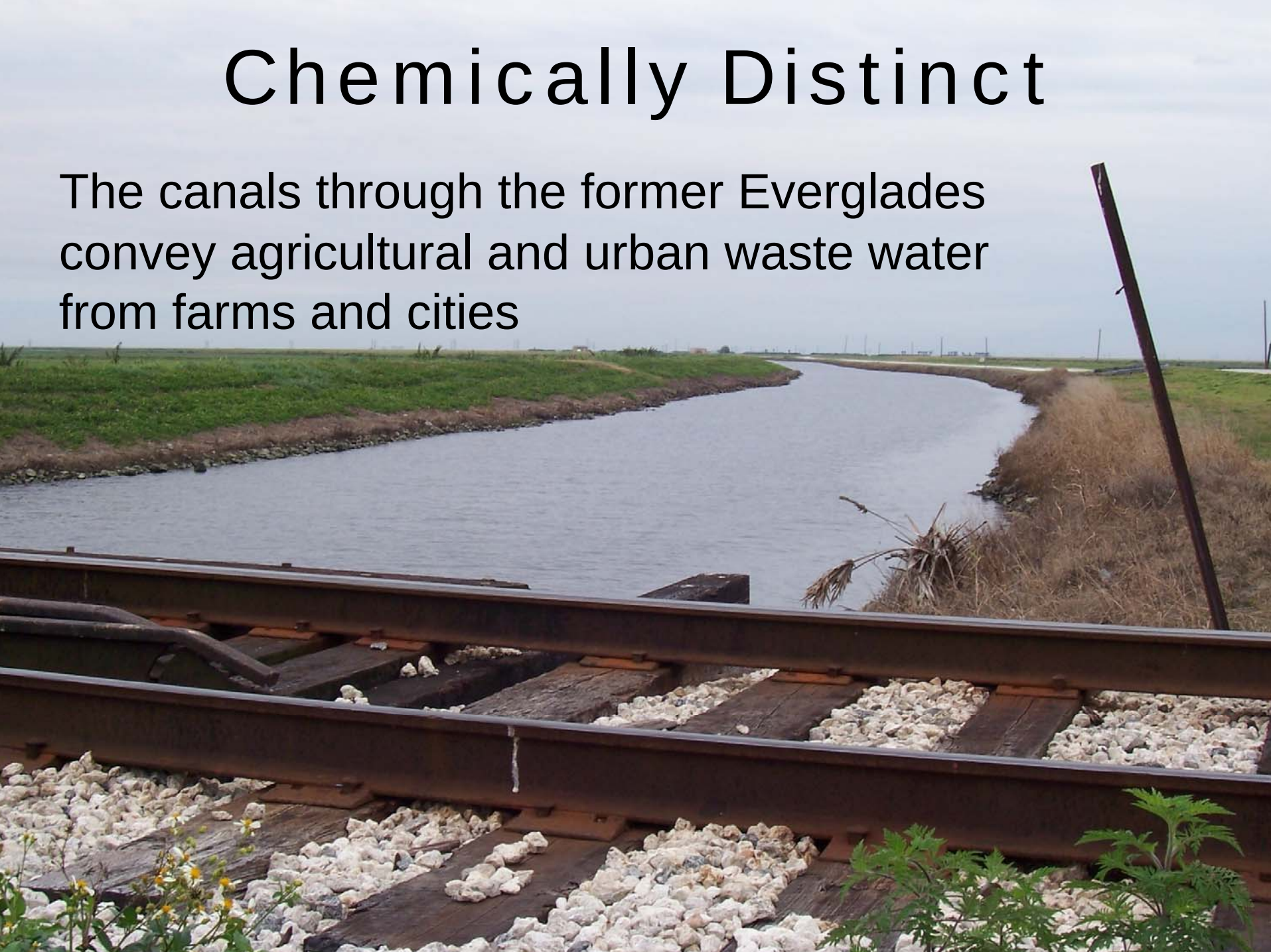
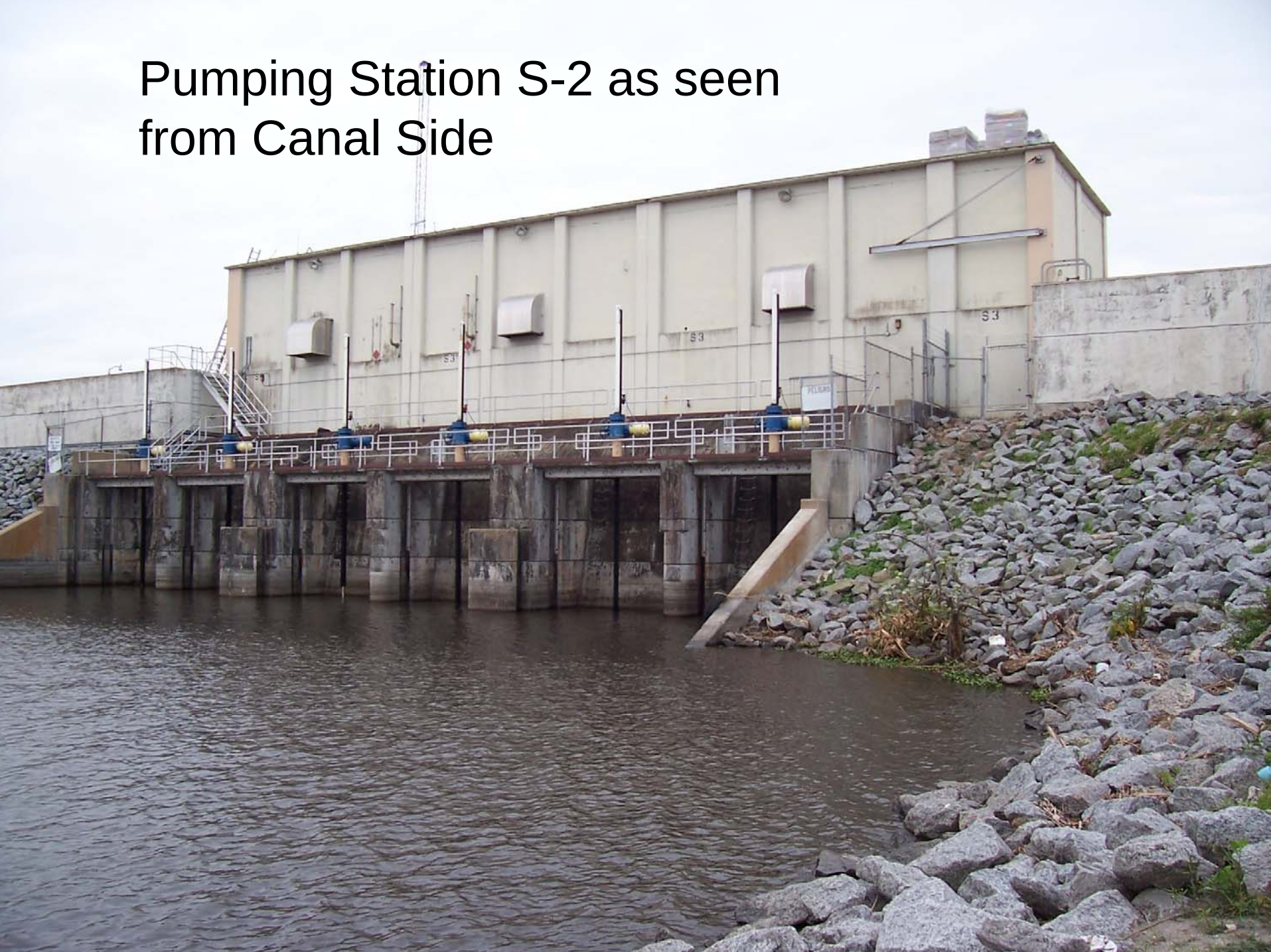
Chemically Distinct

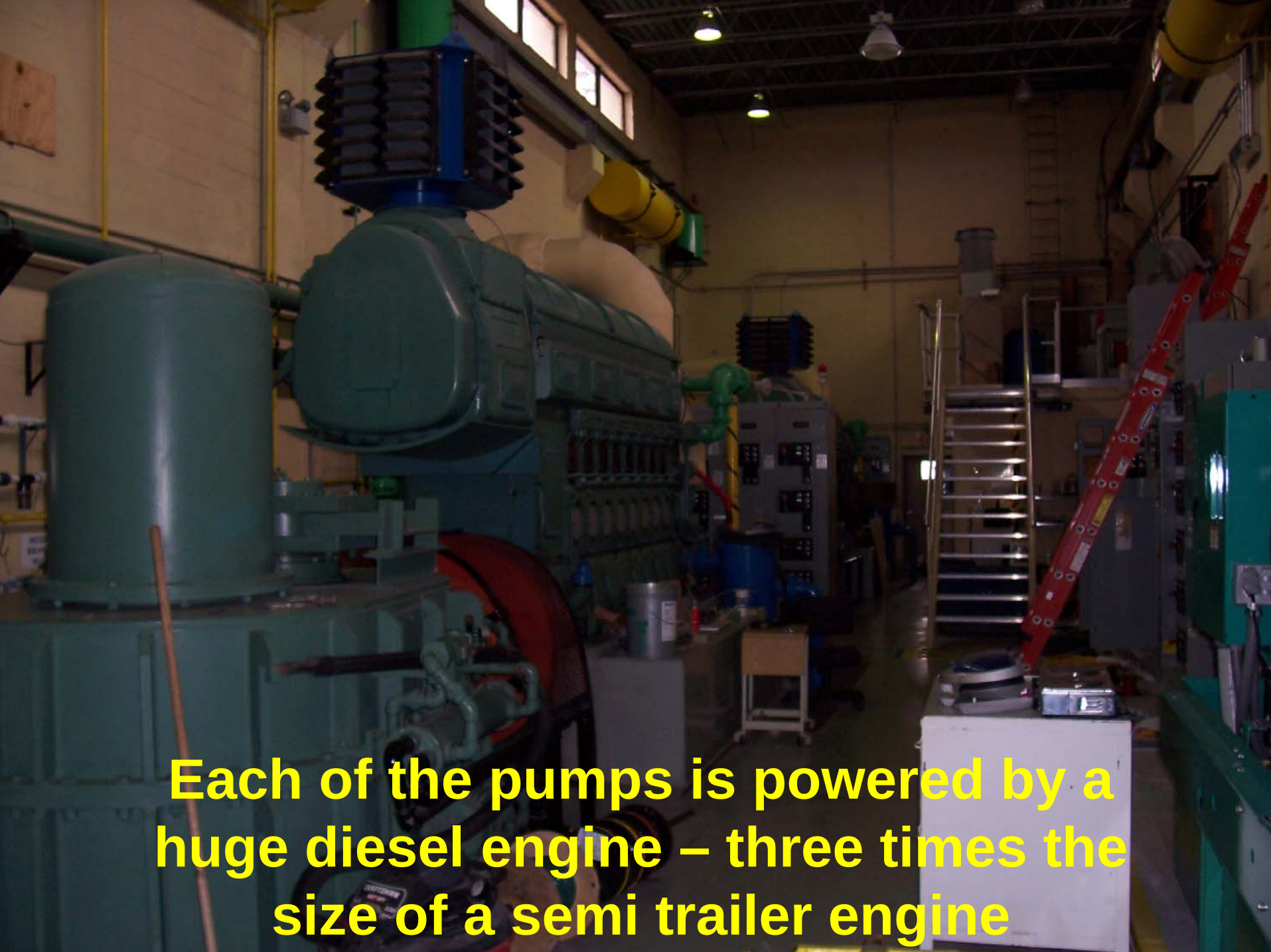
The canals through the former Everglades convey agricultural and urban waste water from farms and cities

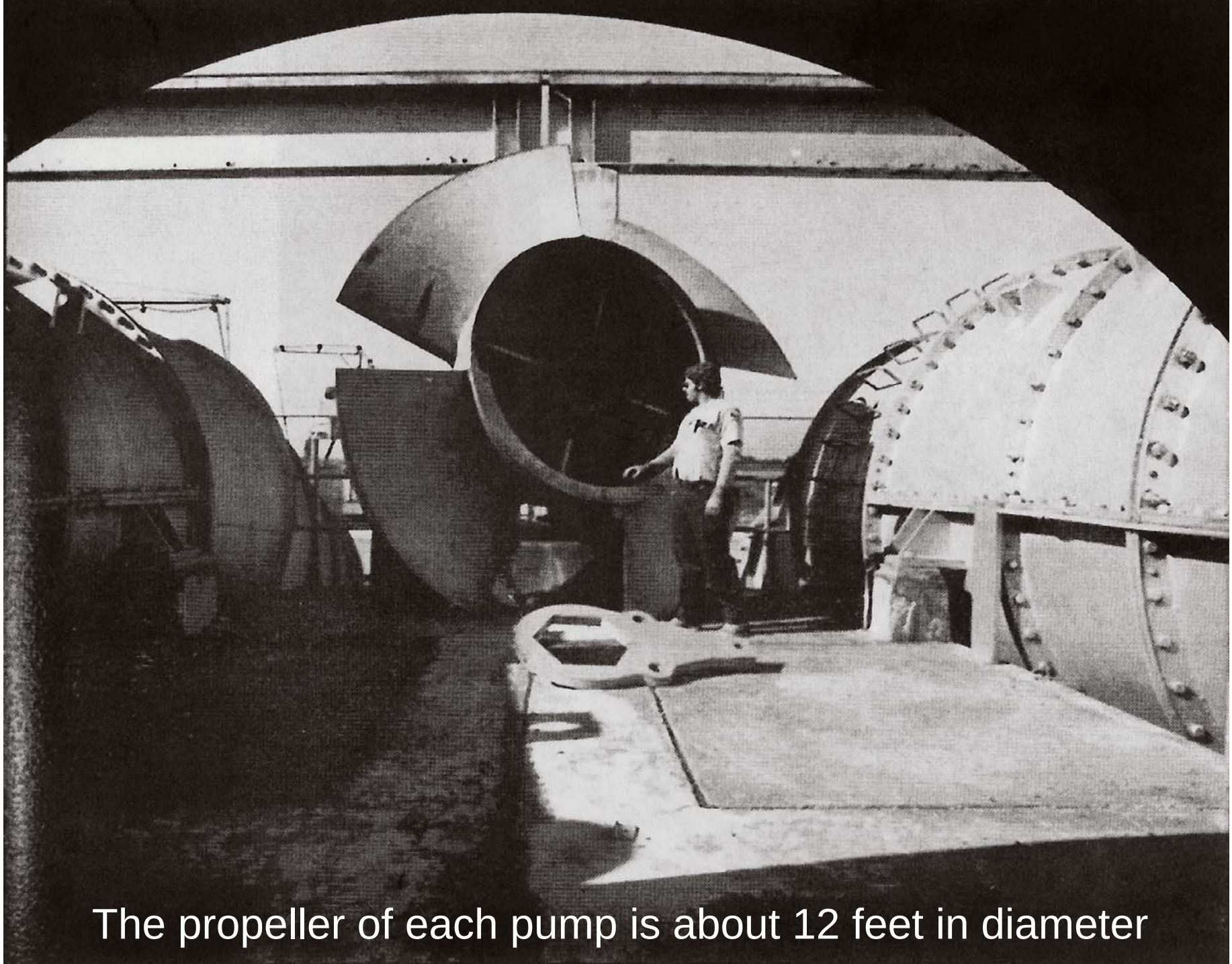


Pumping stations pump these wastes from the canals several feet up into Lake Okeechobee


Pumping Station S-2 as seen
from Lake Okeechobee Side


Pumping Station S-2 as seen
from Canal Side


Each of the pumps is powered by a huge diesel engine – three times the size of a semi trailer engine

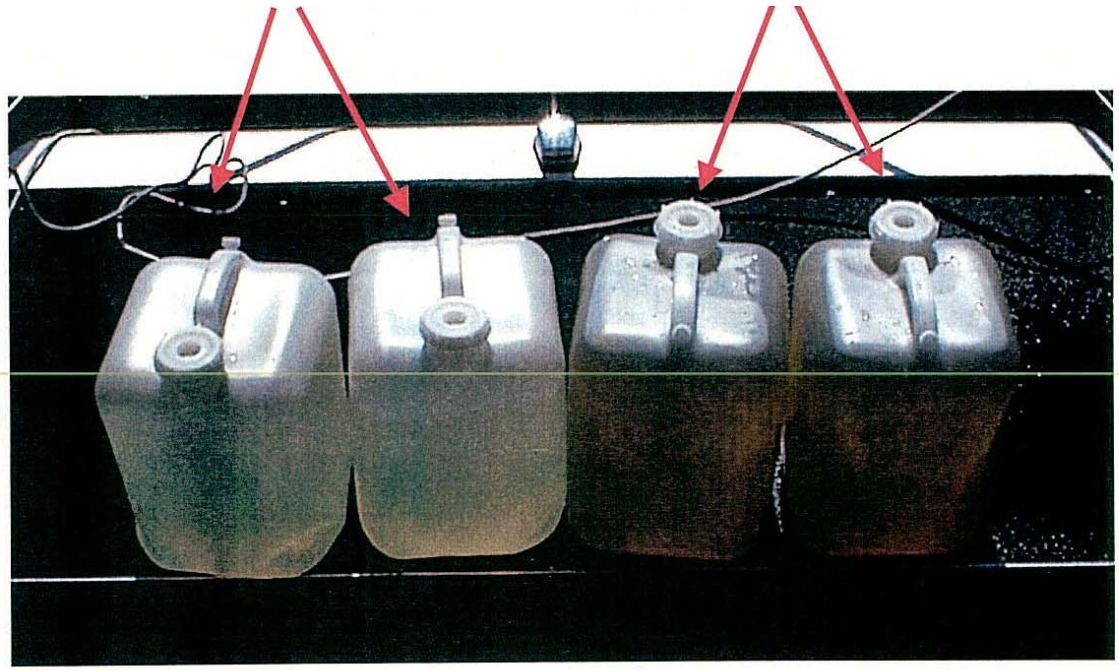


The propeller of each pump is about 12 feet in diameter

Chemically Distinct

Lake water is much clearer

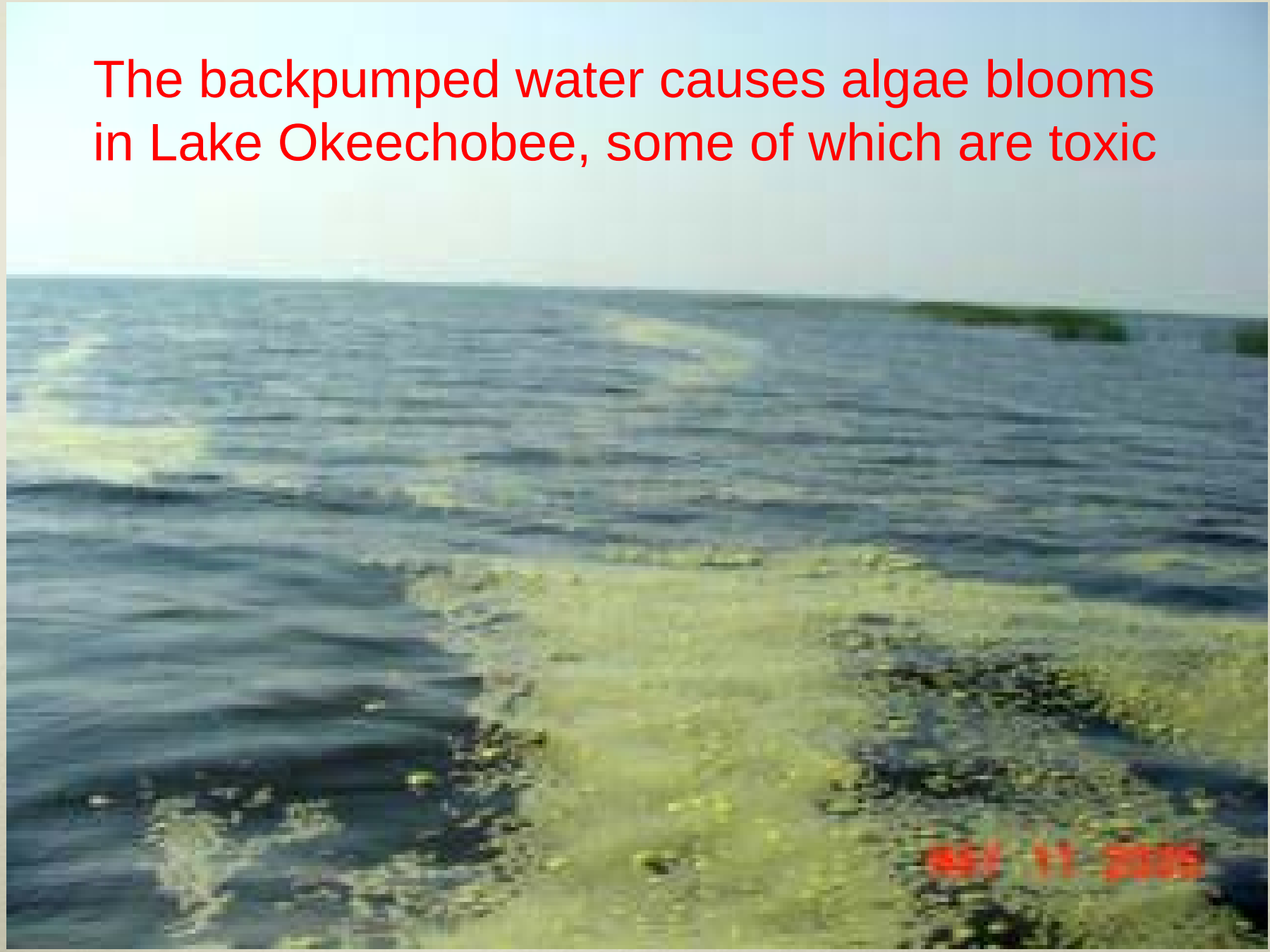
Water from canals is dark from pollution caused by urban agricultural wastes



shows typical highly colored nature of water from S2

Lake Okeechobee is classed for drinking water

The backpumped water causes algae blooms in Lake Okeechobee, some of which are toxic




In 2005 the toxic algae bloom in Lake Okeechobee produced microcystin toxin levels at least three times higher than the safe drinking water level

Health Consultation

Public Comment Release

Total Trihalomethanes

PAHOKEE AND SOUTH BAY MUNICIPAL WATER SYSTEMS
(a/k/a PAHOKEE/SOUTH BAY)

WEST PALM BEACH/SOUTH BAY, PALM BEACH COUNTY, FLORIDA

MARCH 24, 2004

Comment Period End Date: May 21, 2004

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Several epidemiology studies suggest an association between adverse birth outcomes (developmental/reproductive) and exposure to total THMs at levels (<0.100 mg/L) well below those reported (approximately 0.400 mg/L) in Pahokee and South Bay water systems prior to 2002. Epidemiological studies were conducted in populations assuming multiple routes of exposure (ingestion, inhalation, and dermal), but relative proportions of individual routes were unknown. Also, exposure included other DBPs in addition to THMs, but the specific chemical composition was unknown. Specific exposure routes may be important in the secondary prenatal exposure from internal dose and pharmacokinetic considerations.

Historically, exposure levels in epidemiological studies have not been well characterized. The location of residence, distance from treatment plant, chlorination use, and public water source were often used as indicators of exposure in the early studies. However, studies of adverse pregnancy outcomes within the last 15 years have used quarterly average THM levels to estimate exposures during specific trimesters of pregnancy. Studies of adult cancers within the last 15 years have estimated exposures based on annual averages of total THM in the water system. Sampling may have been performed at locations not representative of worst-case exposure. Peak levels may not have been considered, but may occur during critical developmental periods that could result in adverse developmental outcomes. A well-conducted health study with an emphasis on exposure assessment may clarify the relationship between adverse health outcomes and low dose exposure.

The potential effect of chemical mixtures cannot be adequately addressed because there are hundreds of disinfection by-products in drinking water but only a few are routinely monitored. The scientific literature reports no clear conclusion from results of laboratory animal studies of THM mixtures, whereas epidemiological studies are suggestive of potential associations and reflect an exposure to chemical mixtures in chlorinated drinking water.

In conclusion, while the results of laboratory animal studies suggest that the levels of total THMs detected in Pahokee and South Bay would not result in adverse health effects, laboratory animal studies are conducted by only one route of exposure to usually only one chemical. Human exposure to DBPs, including THMs, occurs by multiple routes to more than one chemical. Therefore, animal and human studies do not have equivalent study designs in that chemical exposure and routes of exposure are not the same. Human studies are not conclusive but suggestive of a potential association between adverse birth outcomes (developmental /reproductive) and DBP levels below those reported to have been common in Pahokee and South Bay communities. Concern is greatest for the prenate, which may be exposed to peak levels during critical developmental periods. Because of the uncertainty surrounding chlorinated drinking water exposure and adverse birth outcomes, ATSDR recommends appropriate public health activities to reduce exposure to potentially susceptible populations if peak THM levels result in violations of the Environmental Protection Agency's Maximum Contaminant Level (MCL).

Excerpt from 2003 City of South Bay Drinking Water Quality Report

Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	MCL Violation Y/N	Level Detected	Range of Results	MCLG or MRDLG	MCL or MRDL	Likely Source of Contamination
Haloacetic Acids (five) (HAA5) (ppb)	2002	N	50PPB	30-67	NA	MCL = 60	By-product of drinking water disinfection
TTHM [Total trihalomethanes] (ppb)	2002	Y	300	46-560	NA	MCL = 80/100	By-product of drinking water disinfection

Lead and Copper (Tap Water)

Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	AL Violation Y/N	90th Percentile Result	No. of sampling sites exceeding the AL	MCLG	AL (Action Level)	Likely Source of Contamination
Copper (tap water) (ppm)	10-02	N	.0054	NONE	1.3	1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead (tap water) (ppb)	10-02	N	ND	NONE	0	15	Corrosion of household plumbing systems, erosion of natural deposits

Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	MCL Violation Y/N	Highest Result	Range of Results	MCLG	MCL	Likely Source of Contamination
Chloride (ppm)						250	Natural occurrence from soil leaching

MCL = Maximum Contaminant Level

allowable under the Safe Drinking Water Act

EXPLANATION OF TABLE RESULTS

Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system. High turbidity can hinder the effectiveness of disinfectants.

TTHMs [Total Trihalomethanes]. Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

The City of South Bay is currently making improvements to the water treatment plant which will implement the use of chloramines (combined chlorine and ammonia) and carbonic acid (pH reducer) to reduce the total trihalomethanes.

As authorized and approved by EPA, the State has reduced monitoring requirements for certain contaminants to less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Some of our data, though representative, is more than one year old.

Excerpts from a 2006 SFWMD legislative funding request

Community Budget Issue Requests - Tracking Id #343
Lake Region Water Treatment Plant

Requester:	Carol Ann Wehle, Executive Dir	**Organization:**	South Florida Water Management District
Project Title:	Lake Region Water Treatment Plant	**Date Submitted**	1/12/2006 5:05:27 PM
Sponsors:	Aronberg		

Statewide Interest:
This project is regional in scope, is intended to meet a documented need of statewide interest, is intended to produce a measurable result and has tangible community support.

Recipient:	South Florida Management District 3301 Gun Club Road, MSC 1160 West Palm Beach 33406	**Contact:** **Contact Phone:** **Contact email:**	Ernie Barnett, Policy Director (561) 951-2840 ebarnett@sfwmd.gov

Project Description:

South Florida Water Management District is requesting $5 million as partial funding for a new Lake Region Water Treatment Plant to serve the existing and future needs of Belle Glade, Pahokee and South Bay. These three cities have been designated as Rural Areas of Critical Economic Concern under Governor Jeb Bush's Executive Order Number 01-26. The new Lake Region Water Treatment Plant will produce a high quality treated water from deep groundwater and will eliminate the drinking water quality problems, particularly trihalomethanes, associated with using surface water from Lake Okeechobee as a source of drinking water

* * * *

Measurable Outcome Anticipated:

Public health and water availability concerns are the major reasons for proceeding with the Lake Region Water Treatment Plant. Belle Glade, Pahokee and South Bay all use Lake Okeechobee as a source of raw water for drinking water. Lake Okeechobee receives stormwater inflows from major agricultural areas including dairy farms, livestock pastures, sugar cane fields, small vegetable farms, and sod farms and is heavily nutrient enriched as well as highly colored. Organic material in the water gives rise to trihalomethanes (THM) in the water upon treatment with chlorine; THM are cancer-causing chemicals according to the U S. EPA. Blue-green algal blooms, potentially toxic, are becoming more frequent.

* * * *

Total cost of the project: $48,988,000