LAKE OSCEOLA

LAKE OSCEOLA ALUM TREATMENT SYSTEM UPDATE

Date: August 18, 1993

The following is a summary of key events that have occurred to date:

1. The alum treatment system was placed into operation in February of this year.

2. Improvements in water clarity were observed at the treated stormsewer outfalls in March and April of this year. The improvement was noticed by the boat operators and others.

3. The month of May was hot, with very little rain. Water quality in most Central Florida lakes declined.

4. June, July and early August were also hot, with very little rain. The alum treatment system operates only during rainfall events to treat the stormwater runoff.

5. The stormsewer outfall at Alexander Place presently discharges a constant baseflow of approximately 1.0 ft^3/sec. This baseflow originates in the downtown area and appears to be of groundwater origin with high nutrient levels as shown on the attached table. One ft^3/sec of baseflow equates to 650,000 gallons of nutrient-rich water entering Lake Osceola from the Alexander Place outfall each day. Previously, the baseflow was only a fraction of this amount. The alum treatment system was adjusted in July to begin to treat the baseflow from Alexander Place.

Some individuals have noticed there has not been a substantial increase in water clarity in Lake Osceola since the initiation of the alum treatment facility. The following is a list of several items that are primary reasons for this observation:

1. The baseflow at Alexander Place entered the lake untreated until alum addition to this source was begun in July.

2. At this point, only three of the original four stormsewer outfalls identified for retrofit on the west side of Lake Osceola are being treated. Treatment of the fourth pipe cannot be instituted until one year following the initial three pipes per the St. Johns River Water Management District permit.

3. There is still a significant source of nutrients coming from Lake Virginia through the Fern Canal into Lake Osceola. A portion of this source will be treated with the addition of the Lake Virginia alum treatment system.

City of WP
Work session minutes 9/13/93

4. It takes approximately three times the phosphorus retention time, which is slightly greater than the hydraulic residence time, for a lake to reach a new water quality equilibrium following a change in phosphorus loading. The hydraulic residence time of the south lobe of Lake Osceola is approximately 4-6 months which means that the time for the lake to reach final equilibrium will be approximately 12-18 months.

5. The alum treatment system removes nutrients, heavy metals and bacteria from the stormwater runoff that it treats. The alum treatment system does not treat the lake water directly. Due to below-average rainfall during the period of May through mid-August, the alum treatment system has not operated as much as anticipated. Hopefully, with increased rain in August, the system will have a chance to operate for longer periods of time.

   Attached is a copy of water quality data at three locations in Lake Osceola before and after installation of the alum treatment system. The results indicate a 16% reduction in total phosphorus, 15% reduction in total nitrogen, a 61% reduction in fecal coliform, and a 24% reduction in chlorophyll-a. All of these parameters indicate that water quality is improving, although equilibrium will not occur for a period of approximately 12-18 months.

RESULTS OF LABORATORY JAR TESTS CONDUCTED ON STORMSEWER BASEFLOW COLLECTED AT ALEXANDER PLACE ON JUNE 4, 1993

SAMPLE	pH	ORTHO-P (μg/l)	TOTAL P (μg/l)
Raw	7.43	77	109
5 mg/l Alum	7.12	6	8
10 mg/l Alum	6.85	5	6
15 mg/l Alum	6.68	3	4
20 mg/l Alum	6.51	4	4
25 mg/l Alum	6.27	2	3
30 mg/l Alum	6.14	2	2

COMPARISON OF WATER QUALITY IN LAKE OSCEOLA BEFORE AND AFTER ALUM TREATMENT OF STORMWATER RUNOFF

PARAMETER	UNITS	BEFORE ALUM TREATMENT (6/91-6/92)			AFTER ALUM TREATMENT (2/93-7/93)			PERCENT CHANGE[1] (%)	PREDICTED EQUILIBRIUM CHANGE (%)
		SITE 1	SITE 2	SITE 3	SITE 1	SITE 2	SITE 3		
Total N	µg/l	892	847	861	758	745	765	-15	--
Total P	µg/l	37	33	35	31	28	28	-16	-26
BOD	mg/l	4.7	4.3	4.2	4.2	4.2	4.2	-11	--
Chlorophyll-a	mg/m^3	24.8	24.5	25.3	18.9	20.5	21.7	-24	-51
Fecal Coliform	No./100 ml	33	25	27	13	16	11	-61	--
Secchi Disk Depth	m	1.1	1.1	1.1	1.1	1.1	1.0	No Change	+110
Average Florida Trophic State Index		60.2 (Eutrophic)			58.3 (Mesotrophic)			-3	-22

1. Based on values measured at Site 1.