

Fox River Water Source Challenges

Kyla Jacobsen, Water Director, City of Elgin

Elgin Water History

- Elgin began using Fox River as community water source – mid 1880's
- Early 1900's people developing waterborne illnesses – typhoid, cholera
- 1904 – 1972 Elgin drilled 13 wells
- 1973 started looking back to the river
- September 1976 got the go ahead from IEPA to use Fox as source
- May 1979 broke ground for the Riverside WTP
- 1980 started pumping from the river

Fox River as a Water Source

- 35 years experience using Fox River Water
- Challenges off and on with algae/T&O
 - If literature says it will work, it typically doesn't work with Fox River water. (Chlorine dioxide, PAC, etc.)
- Severe challenge in 2012 with the drought and river water quality – severe T&O event 2016
 - Low flow conditions
 - Lots of algae
 - Lots of non-settleable, colloidal compounds
 - Turbidity carrying through plant
- Fox River impairment – recognized over 20 years ago
 - 2000 FRSG was formed to address impairment

The Riverside Water Treatment Plant



This facility was completed In 1982. It is situated on the West bank of the Fox River directly across from the Slade Avenue Booster Station. The plant was expanded to double the rated capacity in 2000 to 32 million gallons per day. It can utilize both the Fox River as a surface source water supply and deep wells that pull water from two aquifers as a ground source water supply. It employs a tertiary treatment process which includes coagulation, sedimentation, lime softening, chlorination, and filtration.

What we do at the Riverside Water Purification Facility



One gallon of Fox River water enters the treatment process along with 13 million other gallons on an average day.....

- Remove 50% of the hardness
- Remove 98% of the color
- Remove 99.5% of the particulate matter
- Remove 100% of the pathogenic organisms
- Finished water is pH adjusted, buffered, & stabilized
- Treat to remove Taste & Odor
- Provide an aesthetically pleasing product
- To your home, for about 1/3 of a penny per gallon

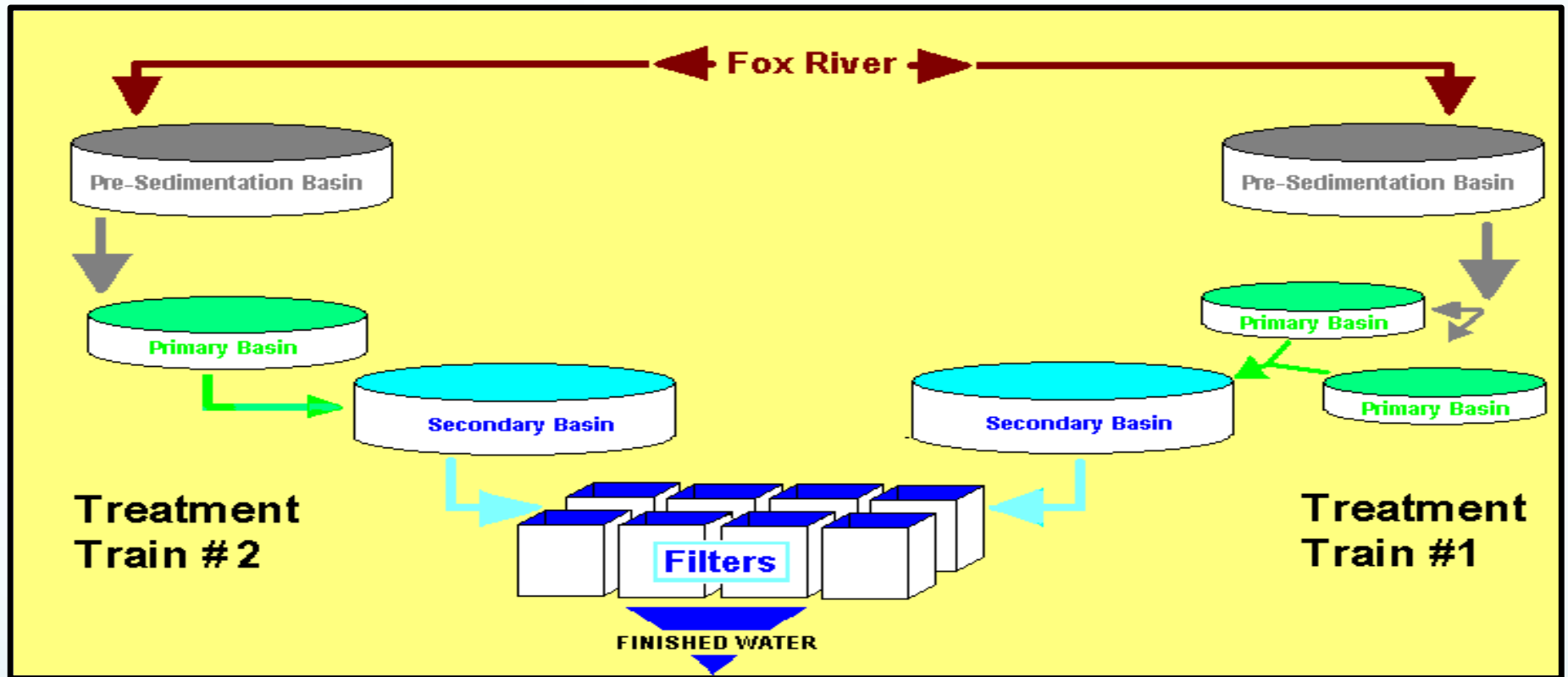


.....and about 24 hours later it completes the purification and conditioning treatment.

A tertiary purification process consists of:

1. Coagulation, Flocculation, & Sedimentation
2. Lime softening
3. Secondary sedimentation
4. Filtration

The Dual Treatment Train System

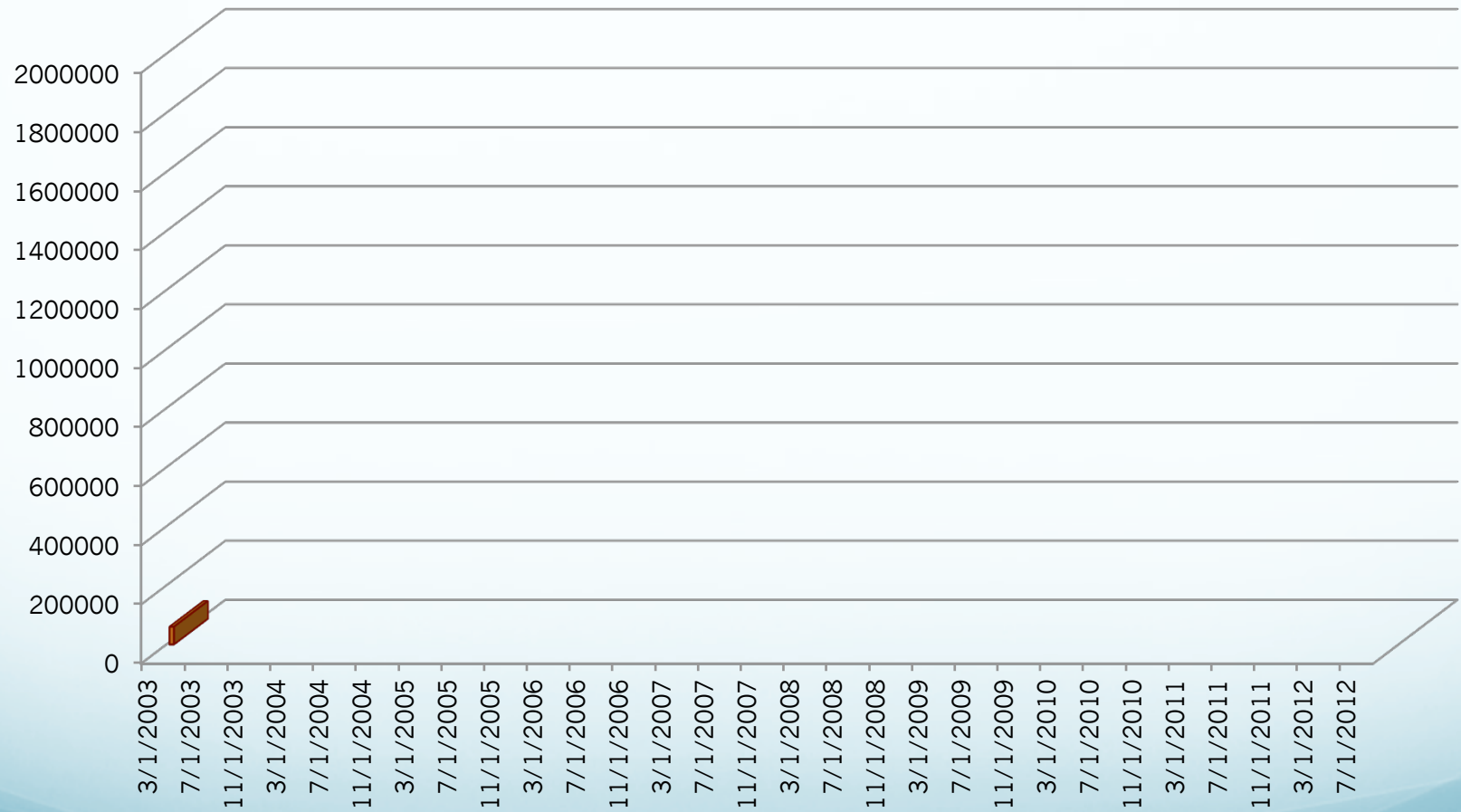


The Riverside WTP is designed as two almost identical treatment trains. The seven basins, out in the yard, are arranged as two treatment process systems that mirror each other and can handle the same volume of water. The raw pumps lift the water up about 30 feet from the river through underground water mains that direct the water to either one or both trains. From then on the water flows by gravity through each basin as it is being purified.

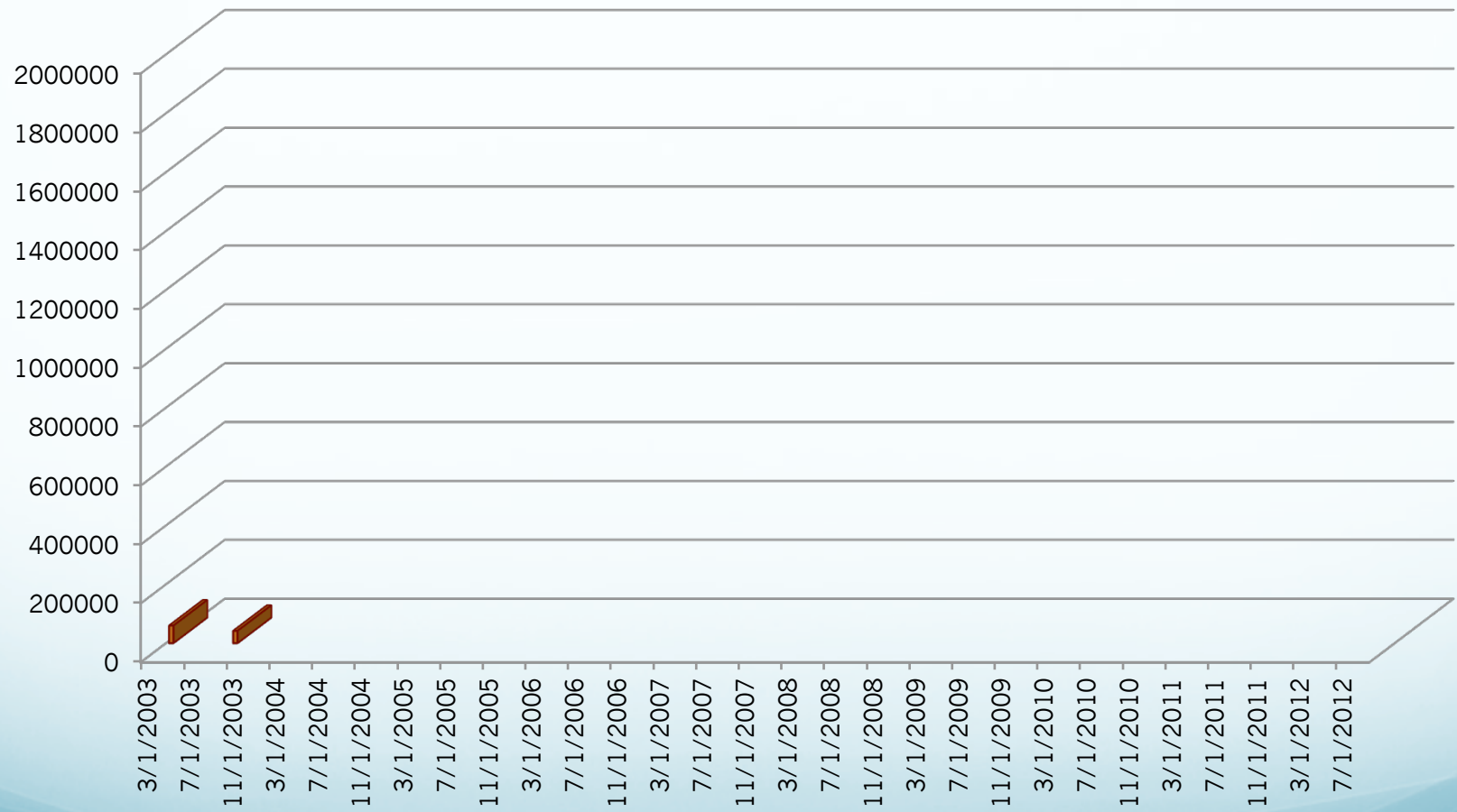
What happened?

- June 2017 -
 - Noted changes in the T&O at the treatment plant
 - Thought it was a quick event – chlorinated the basins – turns out that was WRONG
- Called Aurora – asked them about their experiences
- Presed spun turbidities were rising – knew this was a long term algae issue

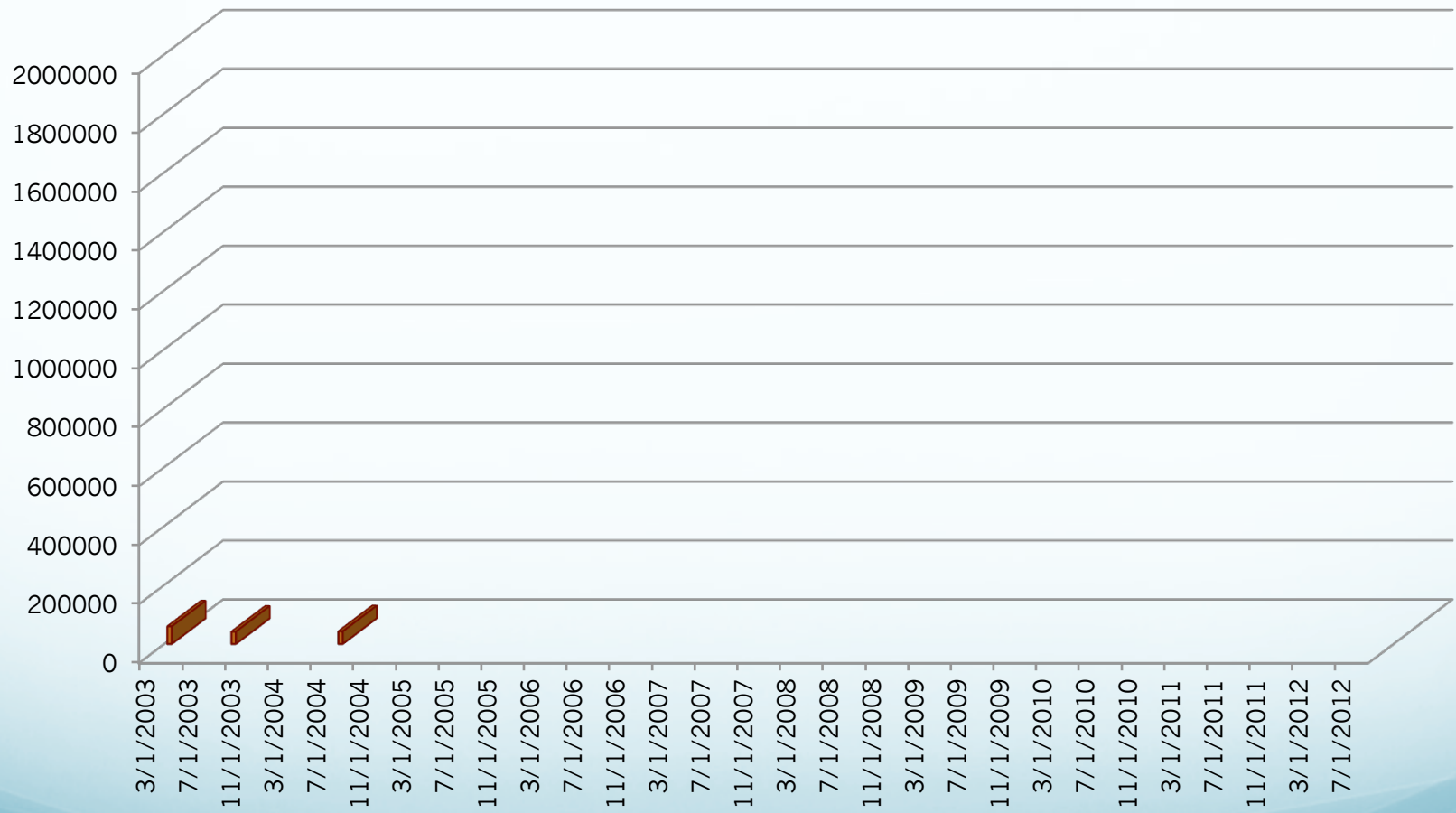
Algal counts



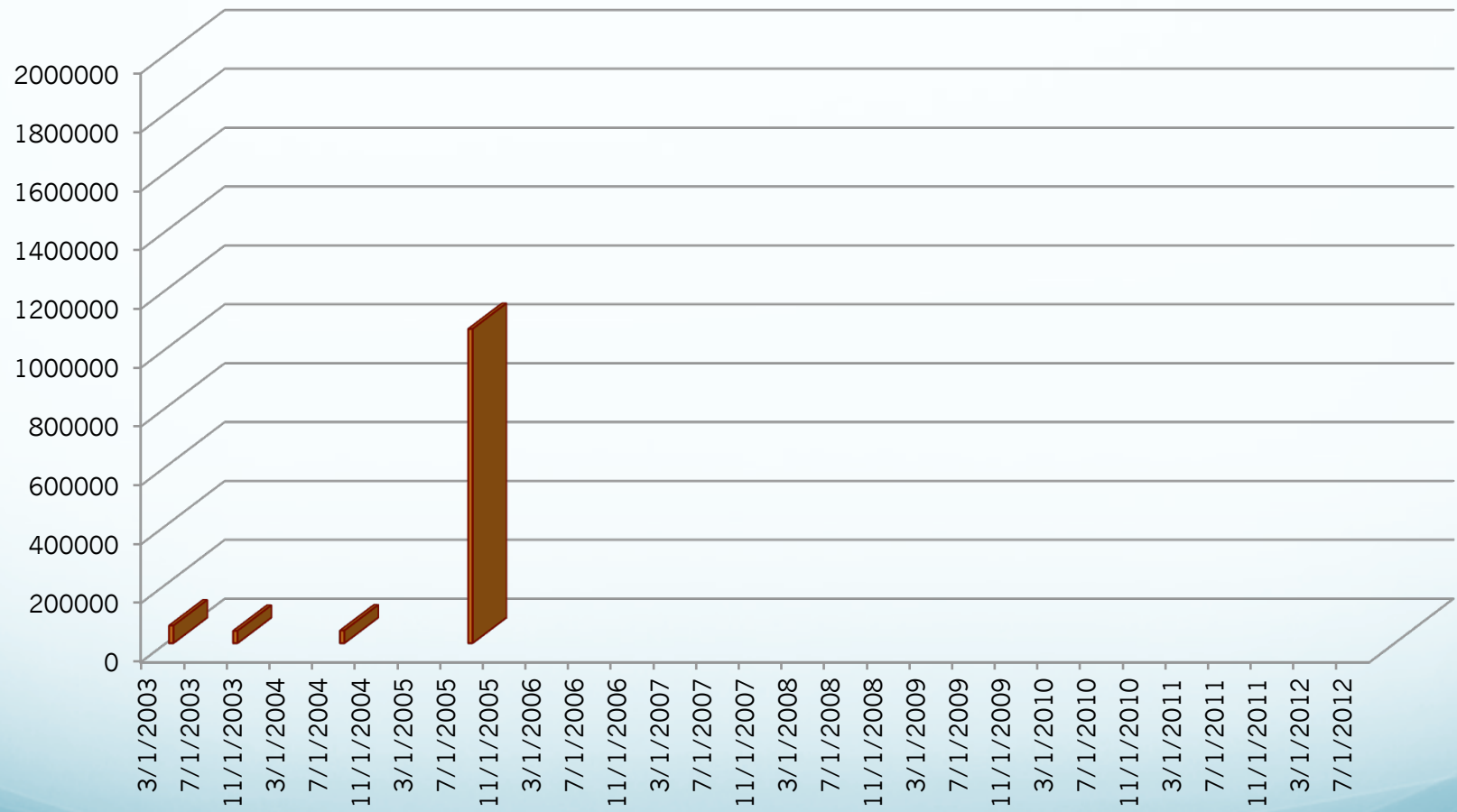
Algal counts



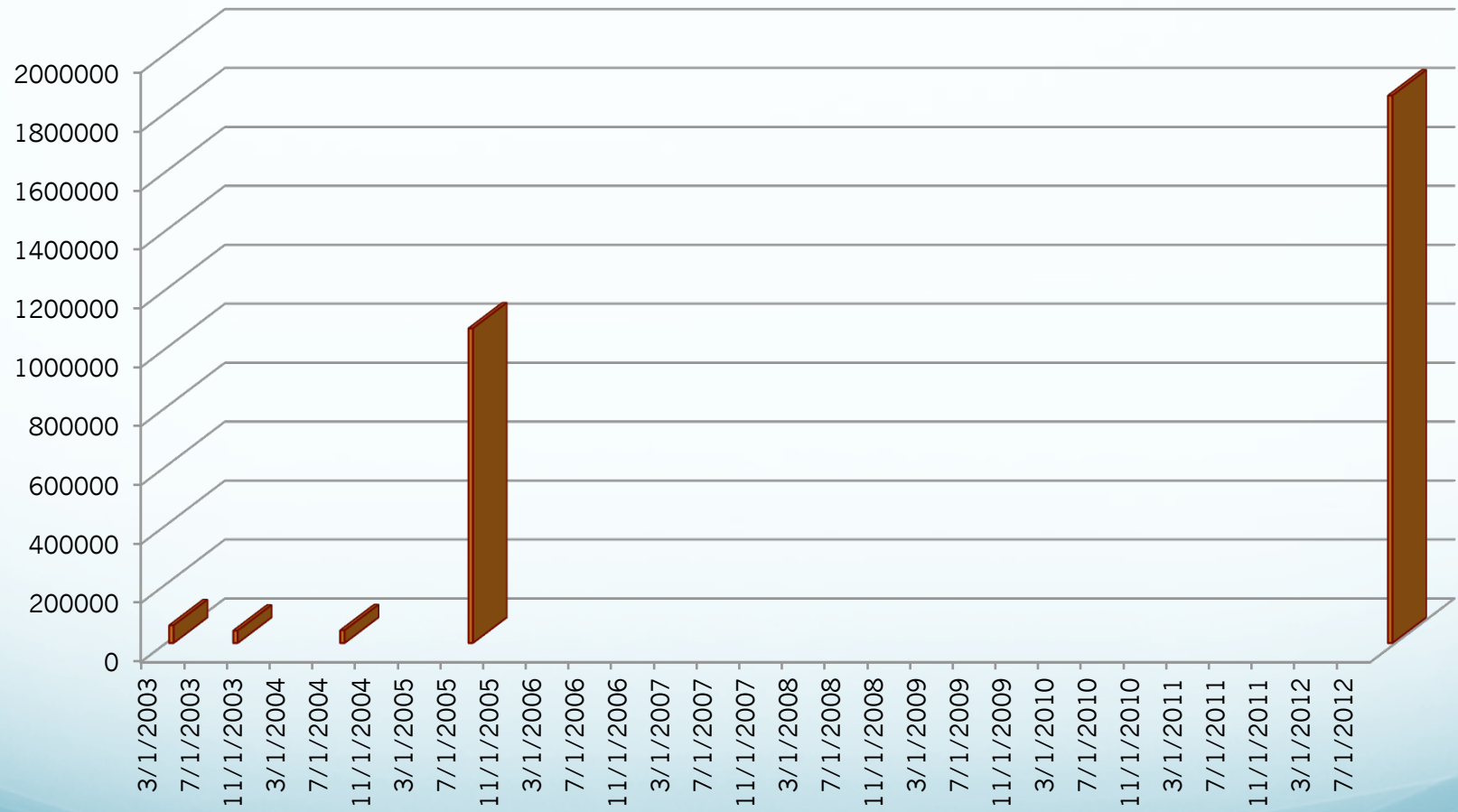
Algal counts



Algal counts



Algal counts



Normal Operations

- River Intake - KMnO_4 2-3 mg/L
- Pre-sedimentation basin
 - Alum 5-10 mg/L
 - PAC 10-20 mg/L
- Primary Softening Basin
 - Lime 200 mg/L
 - Soda Ash 40 mg/L
- Secondary
 - CO_2 5-10 mg/L
 - Ferric 2-5 mg/L
- Filter influent Cationic polymer 0.0 - 0.2 mg/L







Treatment Added

- RI - High Molecular Weight Polymer 0.5 mg/L
- Pre-Sedimentation DADMAC 4-6 mg/L
- Secondary/Filter Influent 0.4 - 0.6 mg/L

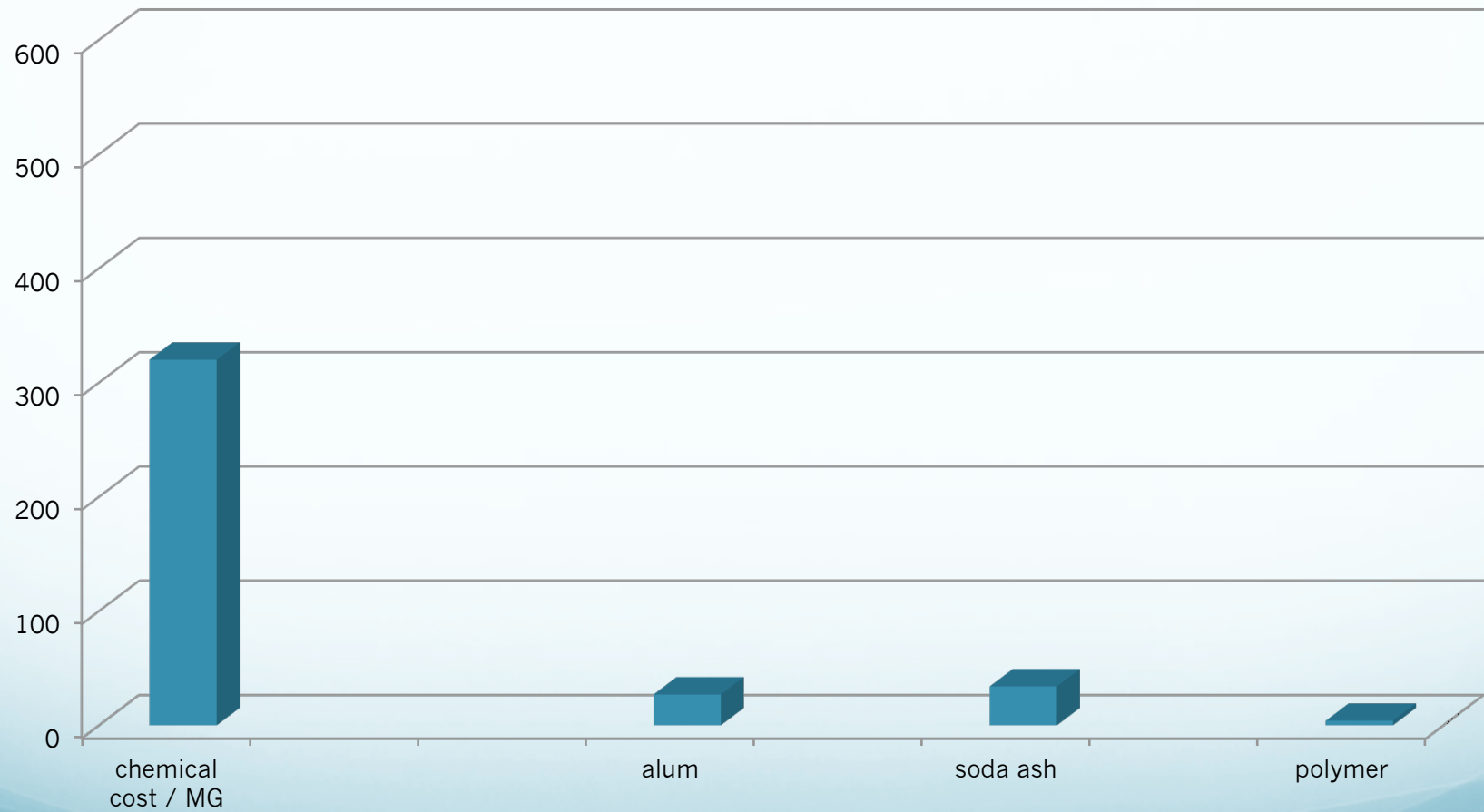
Effects of Rapid Mix



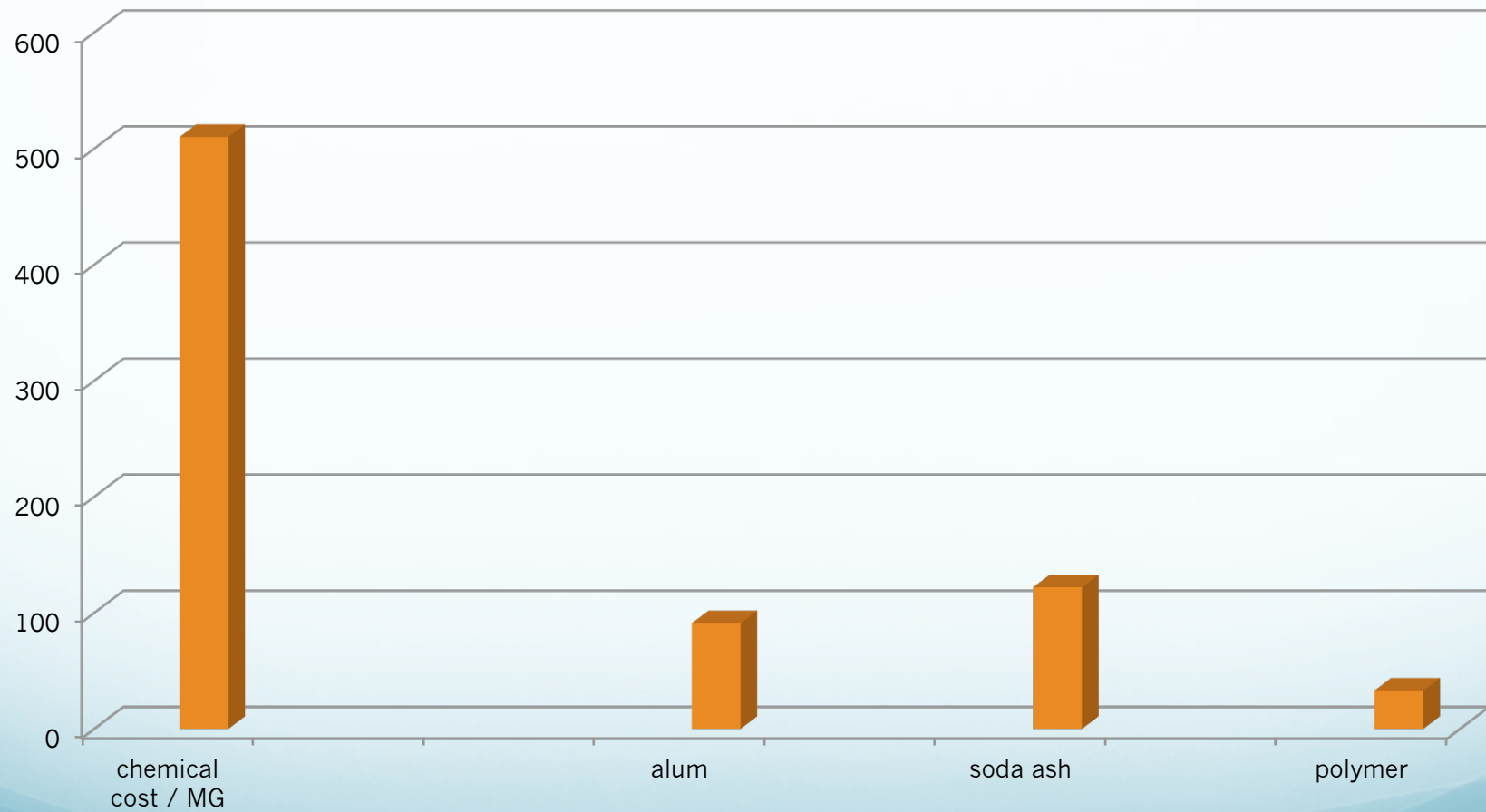
To Maintain Control

- Intake
 - KMnO_4 2-3 mg/L
 - Polymer 0.5 mg/L
- Pre-sedimentation-
 - Alum 120 mg/L
 - PAC 80 mg/L
 - DADMAC 4 mg/L
- Primary
 - Lime 200 mg/L
 - Soda Ash 70 mg/L
- Secondary
 - CO_2 5-10 mg/L
 - Ferric 2-5 mg/L
 - Polymer 0.5 mg/L
- Filter influent Cationic polymer 0.2 - 0.3 mg/L

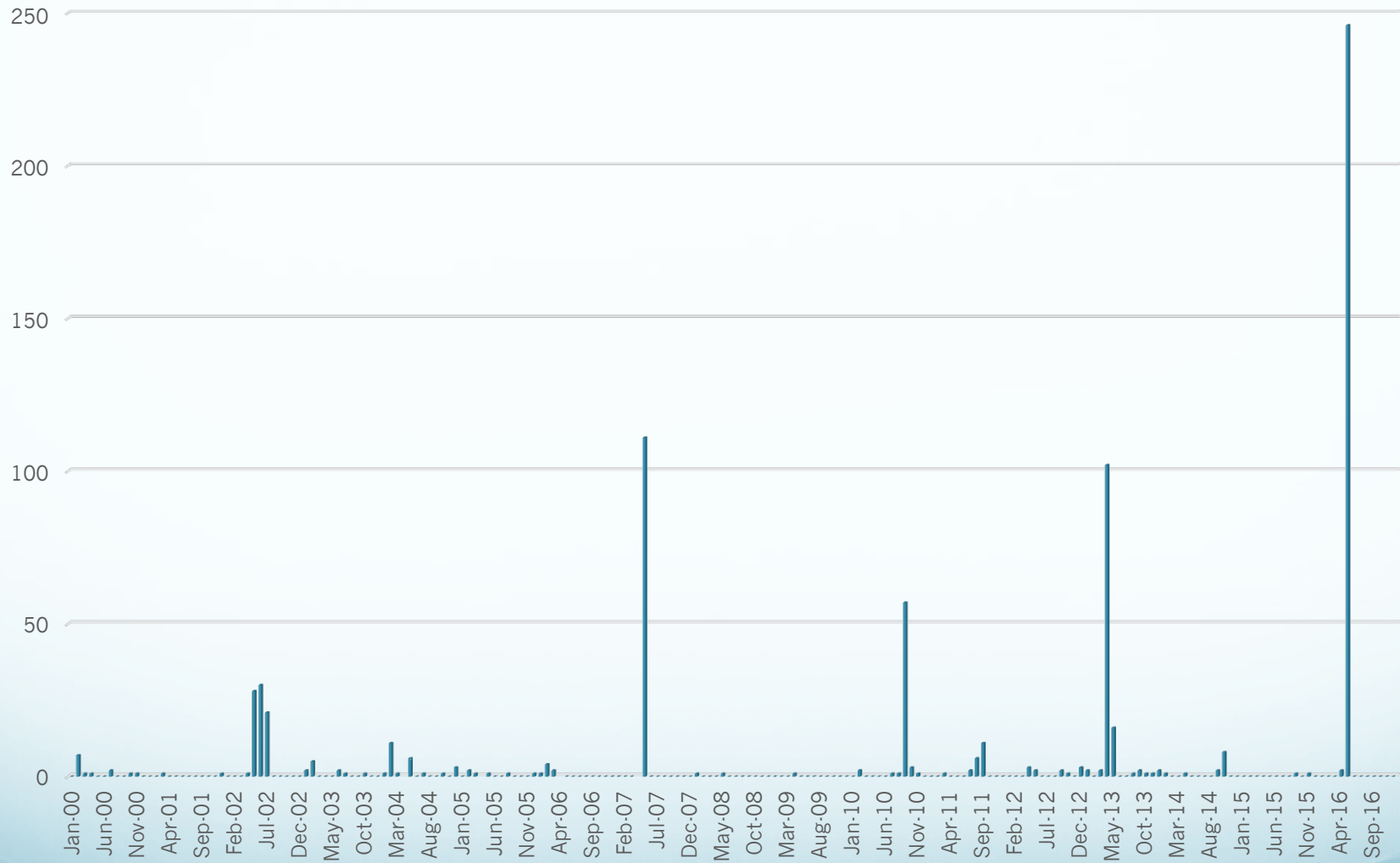
Normal Operations



During the crisis



Water Quality Complaints



- Contact information:

Kyla Jacobsen, Utility Director
City of Elgin

Jacobsen_K@cityofelgin.org

847-931-6160 office direct







