Onondaga Environmental Institute

102 West Division Street, 3rd Floor
Syracuse, New York 13204

Phone (315) 472-2150
Fax (315) 474-0537

Rationale for Moratorium on ACJ CSO Projects

Regional Treatment Facilities (RTF) will not bring Onondaga Lake tributaries into compliance with the NYS Standard for bacteria (200 colony forming units per 100 mL).

The RTFs were included in the Amended Consent Judgment (ACJ) for pathogen compliance in Onondaga Lake.

The City of Syracuse owns the street sewers, Onondaga County owns the intercepting sewer lines and combined sewer overflows (CSO). The ACJ remedies wet weather CSO discharges from Onondaga County's system.

RTFs were designed assuming minimal disturbance to city streets; plans date back to late 1970's (30 years old).

Onondaga County received state and federal aid for completion of ACJ projects (>$200 million)

OEI analyzed Onondaga County Ambient Monitoring Program data:

- Onondaga Lake currently is in compliance with NYS Standard for bacteria.
- Tributaries are significantly effected by bacteria.

After completion, RTFs will still discharge nutrients to the tributaries and Onondaga Lake (Phosphorus is a critical lake issue, TMDL analysis, METRO permit, etc.).

[See Graphs] Dry weather releases are significant, likely sources include:

- agricultural operations & septic facilities in rural stream segments (a seasonal pattern exists), and
- old decaying (red brick and clay tile) sewer pipes in the City (some dating back to civil war period).

Upon completion of the RTFs, the tributaries will still violate NYS Standard for bacteria (preliminary estimates suggest 60-75% of the time).

RTFs (Clinton St. & Harbor Brook) could cost over $200 million.

EPA and NYSDEC policy require sewer separation under the Clean Water Act (CWA) as first priority to remedy CSOs.

Sewer separation could remedy both dry weather & wet weather discharges (and nutrient inputs) and negate the need for RTFs.

A proposed moratorium would allow identification of bacterial sources and the development of effective remedies for pathogen releases to Onondaga Lake tributaries.

An analysis of Onondaga County bacteria monitoring data

Onondaga County collects biweekly samples at Dorwin Ave., upstream of the city of Syracuse, and at Kirkpatrick St., located where the creek empties into the Inner Harbor, downstream of downtown Syracuse. Additional samples are collected during five "high flow" events each year. These samples are analyzed for fecal coliforms, as an indicator of bacterial contamination.

To provide an overall perspective on the range of concentrations typical of each location, data from 1993-2004 were grouped by month and plotted on a logarithmic scale by quartiles (Figures 1 and 2). Fecal coliforms at Dorwin Ave. exhibit a distinctly seasonal pattern, with low concentrations in the cold-weather months, and highest concentrations in the summer. Data from Spencer and Kirkpatrick Streets follow a different pattern, with considerably high concentrations.

A more recent data set (January 1, 2000 through December 31, 2006) was used to compare with the NYS regulatory standard of 200 colony-forming units/100 ml (CFU/dl). *Compliance* could not be assessed since this requires computation of a monthly average based on a minimum of five samples, a requirement that the data did not meet. However, this comparison is still useful since it provides a gauge of how often compliance would be achieved if sufficient monitoring were performed.

Methods:

Data were processed as follows:

1. Censored values (i.e. "greater than" or "less than") were filtered out if they could not provide useful information with respect to the 200 CFU/dl standard. That is, samples reported as <N with N>200, and samples reported as >M with M<200, were rejected. Remaining censored data were used at the reported threshold (e.g. <5 was interpreted as 5; >1,200 as 1,200).

2. Precipitation data provided by Onondaga County are from a weather station located at the administration building of the Metro sewage treatment plant. Precipitation was collected at 10-minute intervals. Total precipitation was calculated from midnight of the day prior to sample collection, to 4pm on the day of sample collection, a period of 40 hours. In addition, the maximum 10-minute precipitation rate during this period was calculated.

3. According to Onondaga County personnel, the combined sewers begin to overflow when the rainfall rate exceeds 0.2"/hour (5.3 mm/hr) for a full hour. That is, when precipitation <5.3 mm/hr, CSOs would not be expected to overflow. To be conservative, this value was taken as a threshold for the activation of CSOs, even for a short duration.

4. The data were sorted into three weather conditions:

	Total precip.(mm)	Intensity (mm/hr)	CSOs
a. Dry weather	<1.3	---	inactive
b. Light rain	>1.3	< 5.3	inactive
c. Heavy rain	>1.3	> 5.3	ACTIVE

Results:
The results of the analysis are shown in a series of pie charts in Figure 3. Data from Dorwin Ave. and Kirkpatrick St. were sorted into three conditions described above. At Dorwin Ave. fecal bacteria are below 200 CFU/dl between 81 and 84% of the time when precipitation is absent or of low intensity. In comparison, when precipitation exceeds 5.3 mm/hour, fecal coliform concentrations rise, and elevated (>200 CFU/dl) measurements increase from ~18% to 62% of the time. This indicates that upstream (i.e. rural sources) are contributing significant quantities of bacteria during storms.

At Kirkpatrick St., the potential for non-compliance with state coliform standards is much greater. Fecal bacteria are below 200 CFU/dl 24-25% of the time when precipitation is absent or of low intensity. This is equivalent to ~72 days per year. This indicates that non-CSO sources are contributing substantial quantities of bacteria to Onondaga Creek between Dorwin Ave. and Kirkpatrick St. When precipitation intensity exceeds 5.3 mm/hour, the data indicate that the 200 CFU/dl limit is met only 5% of the time. Based on the weather observations at the Metro STP, this translates to about four days per year.

It may be concluded that:
1) There are rural sources of bacteria which are present under all conditions, but which are significantly higher during wet weather. The seasonal distribution (Fig. 1) shows that bacteria at Dorwin Ave. are elevated during the summer months. This, together with the knowledge that upstream portions of the Onondaga Creek watershed are used for dairy and other farming suggests that agriculture may be a source. Elevated concentrations have been observed during storms (>10,000 CFU/dl), suggesting bacteria-contaminated runoff.

2) The high frequency of elevated bacteria concentrations at Kirkpatrick St. during dry-weather conditions demonstrates that sources other than storm water and CSOs exist. These sources could include leaking sewers, illicit discharges, bacteria-laden sediments, and contaminated groundwater.

3) The very low incidence of “compliance” at Kirkpatrick St.
during wet weather is likely the result of upstream sources, as observed at Dorwin Ave., CSOs, separated storm water, and the continuing influence of the dry weather sources noted above.

prepared by Donald J. Hughes
Onondaga Environmental Institute

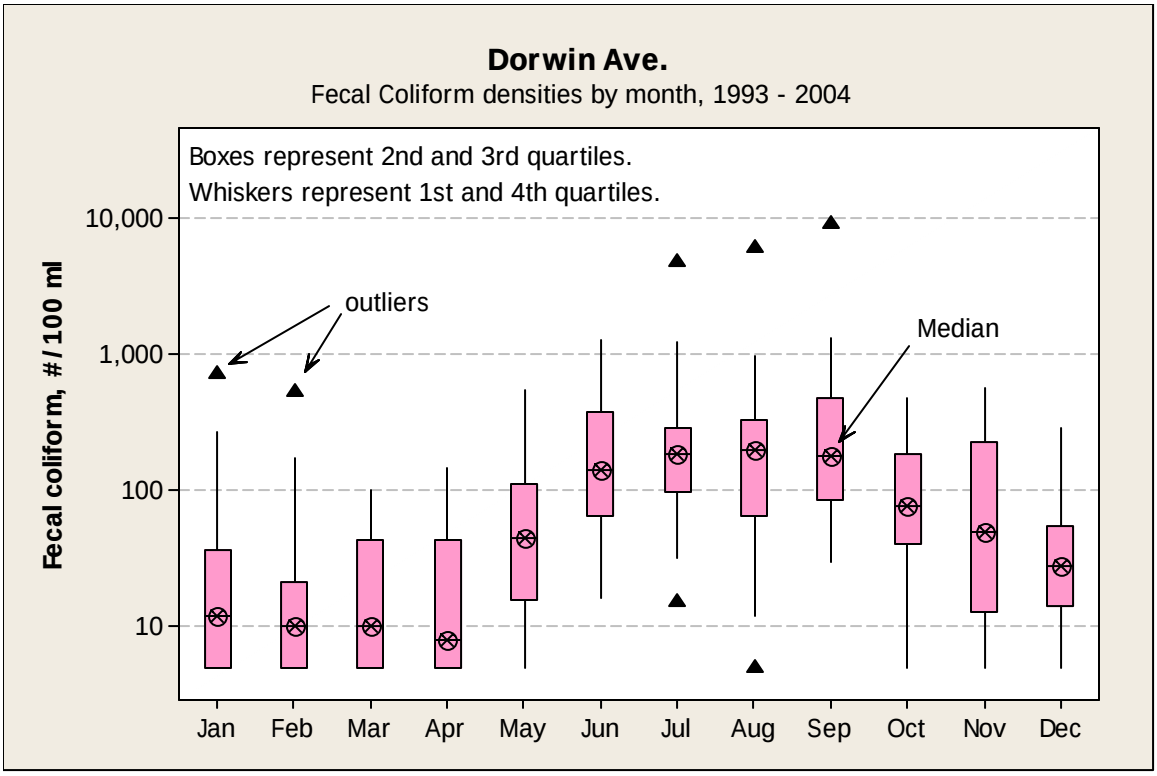


Figure 1. Fecal coliform bacteria at Dorwin Ave., monitored by Onondaga County, 1998-2004. 5 CFU/100 ml represents the lowest quantification limit.

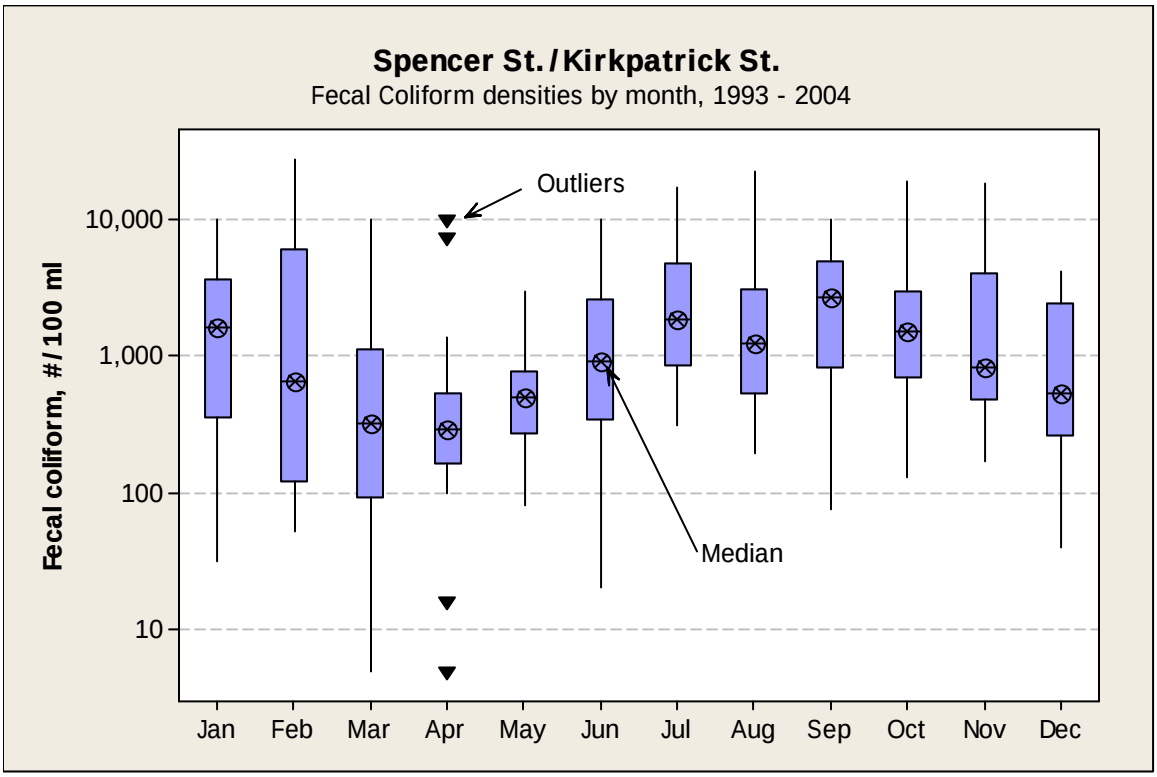
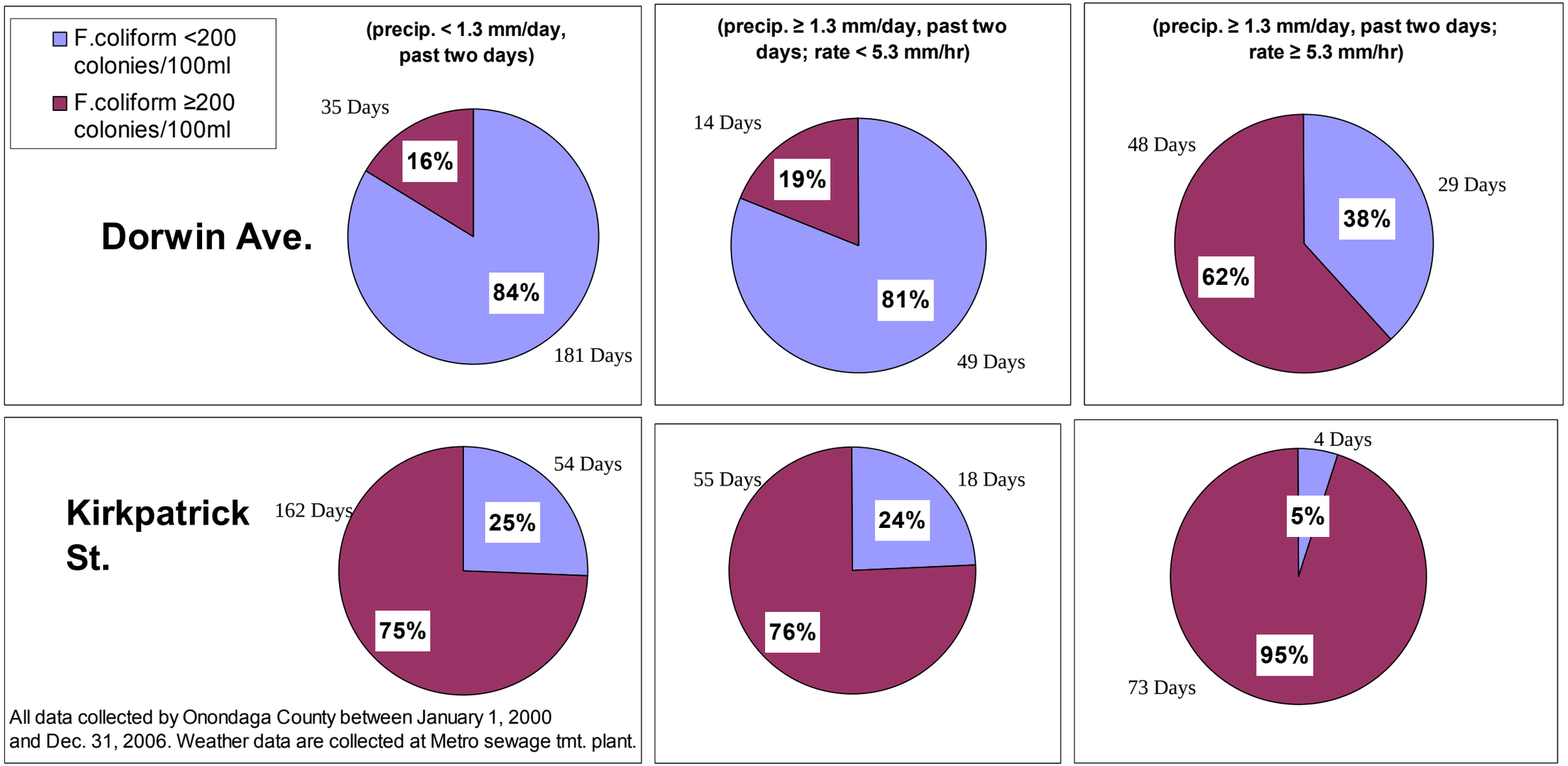


Figure 2. Fecal coliform bacteria at Spencer St. (1993-1998) and Kirkpatrick St (1998-2004)., monitored by Onondaga County. 5 CFU/100 ml represents the lowest quantification limit.

Figure 3. An analysis of Onondaga County bacteria monitoring data collected for years 2000-2006 in Onondaga Creek.

Weather condition:	Dry weather	Light precipitation	Heavy precipitation
No. of days per year	216	73	77



All data collected by Onondaga County between January 1, 2000 and Dec. 31, 2006. Weather data are collected at Metro sewage tmt. plant.