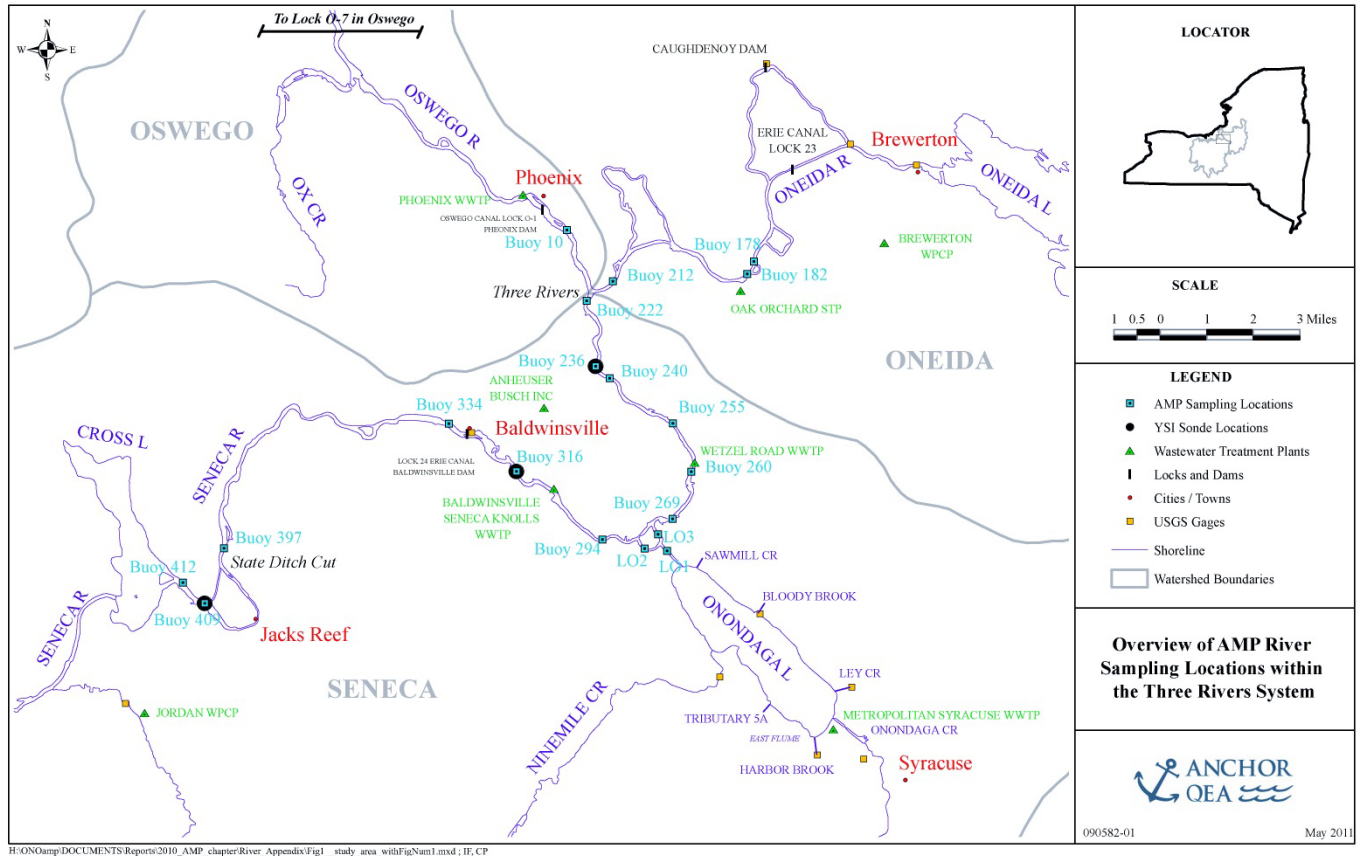
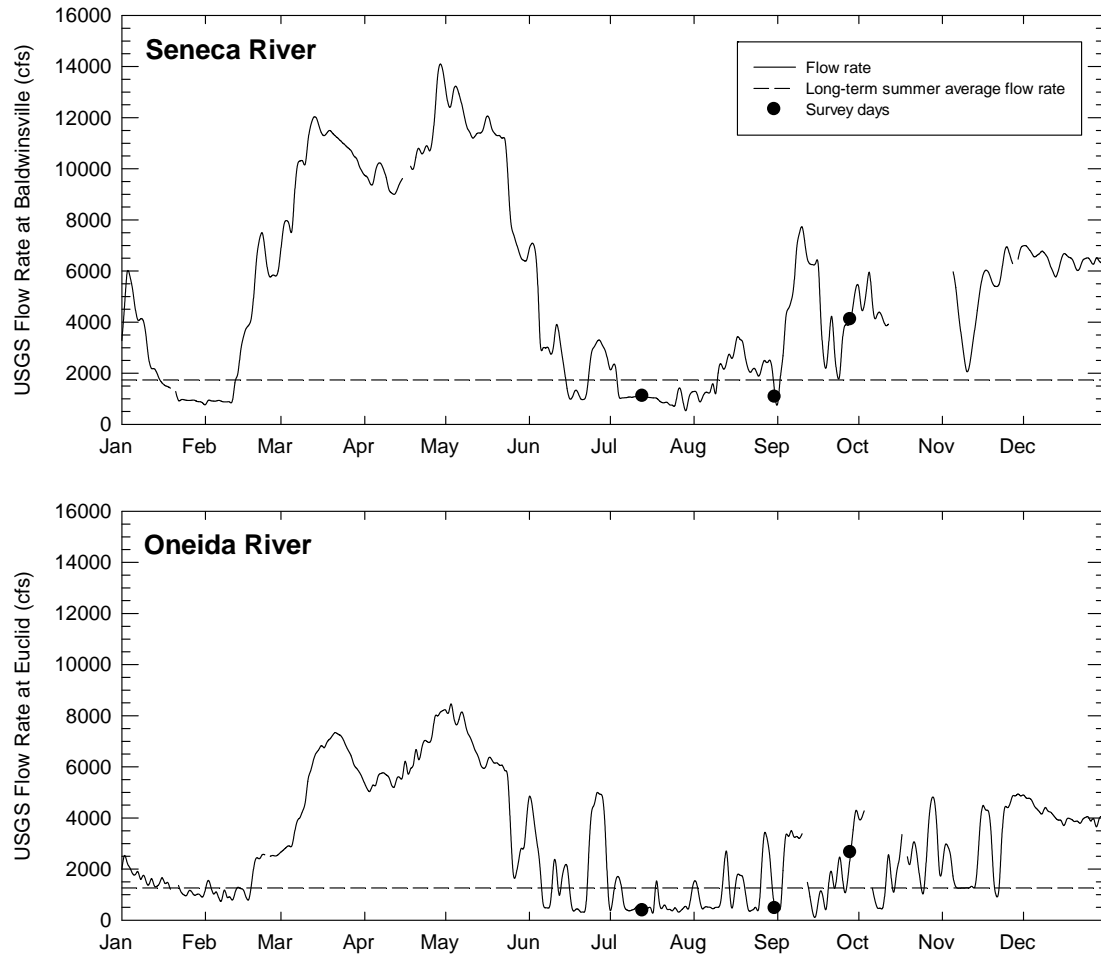


# GRAPHICAL ANALYSIS OF THE 2011 AMP DATA SET FOR THE THREE RIVERS SYSTEM

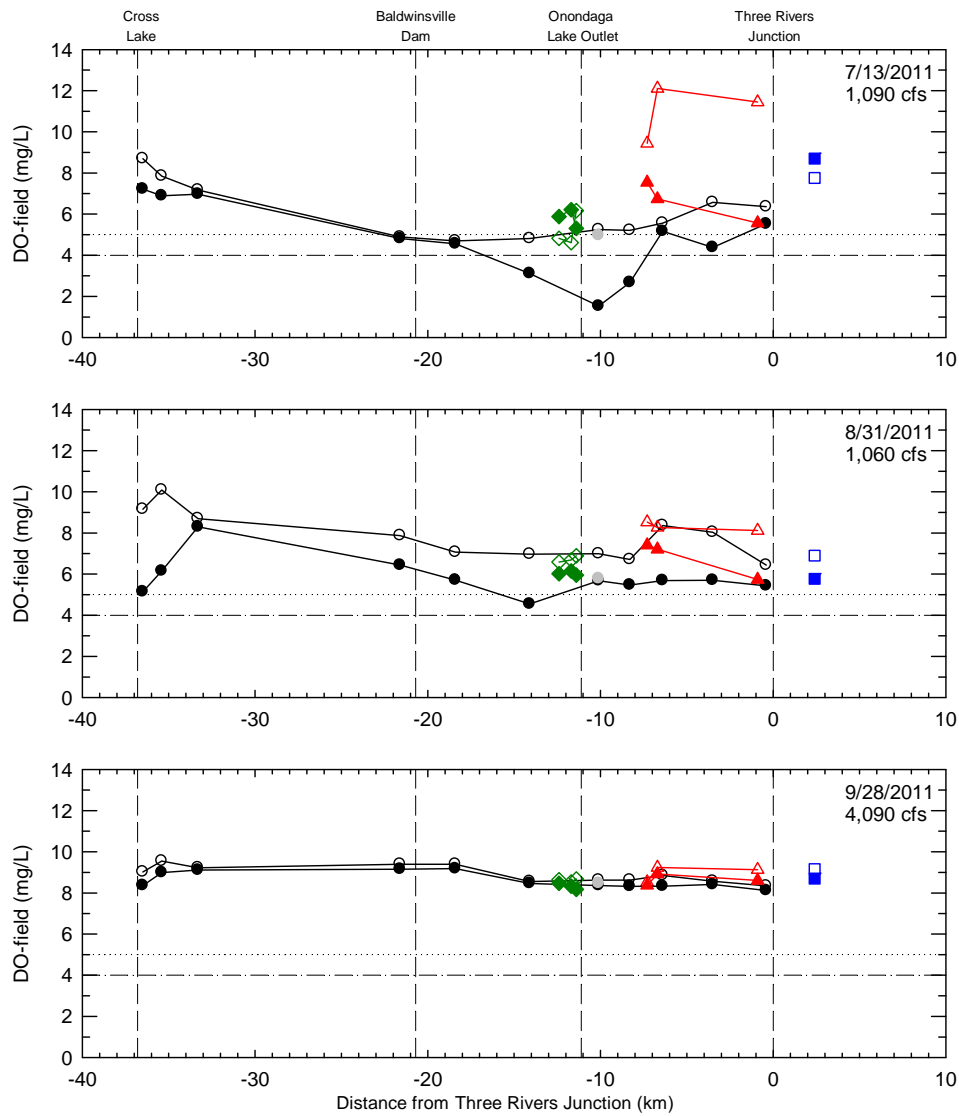


**Figure 1.** The Three River System, with AMP sampling locations and wastewater treatment plants identified.



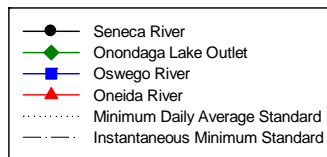
**Figure 2. Temporal Plot of USGS flows at Seneca River (Baldwinsville) and Oneida River (Euclid) as well as days that AMP river surveys were conducted during 2011.**

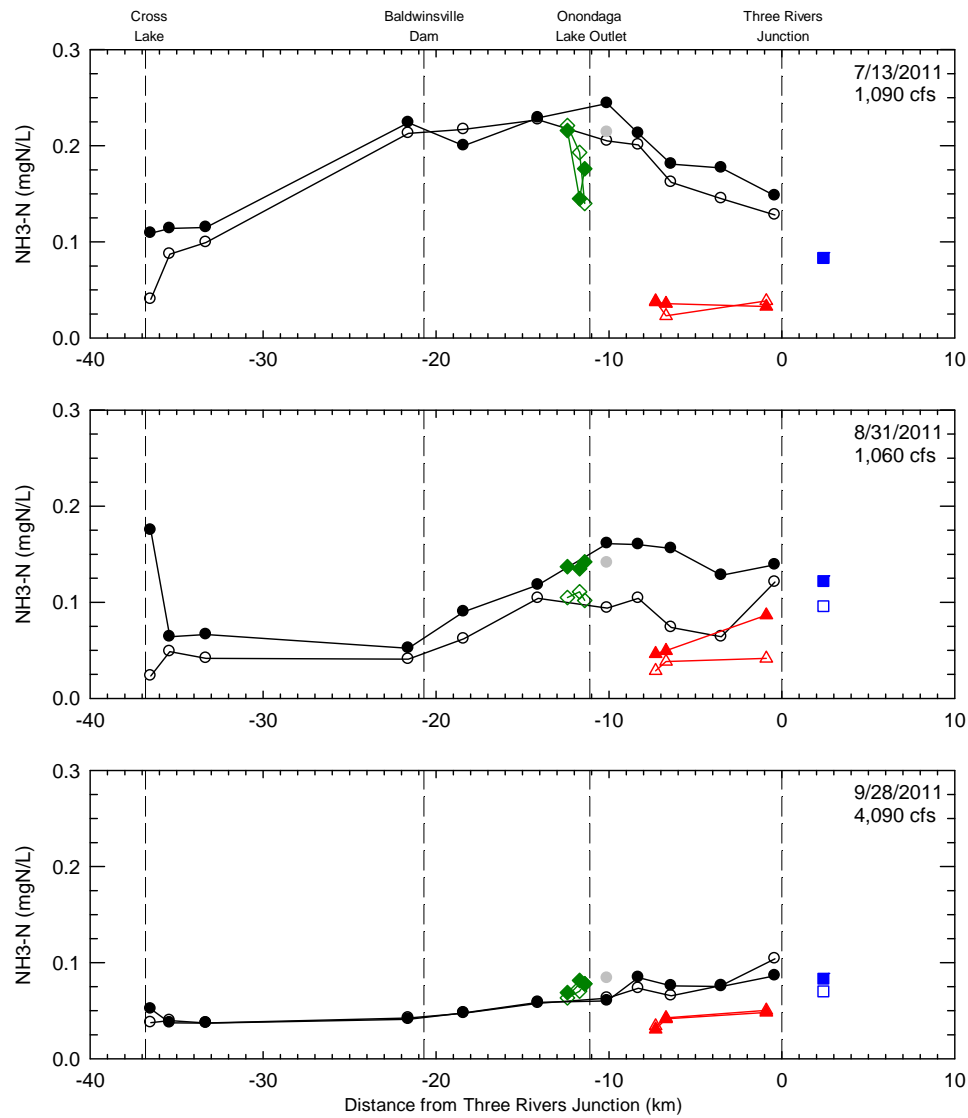
Notes: (1) Points represent OCDWEP water quality sampling dates; (2) Gaps correspond to days when USGS flows are unavailable.



**Figure 3. Dissolved Oxygen patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

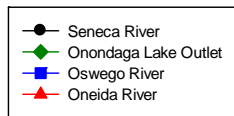
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

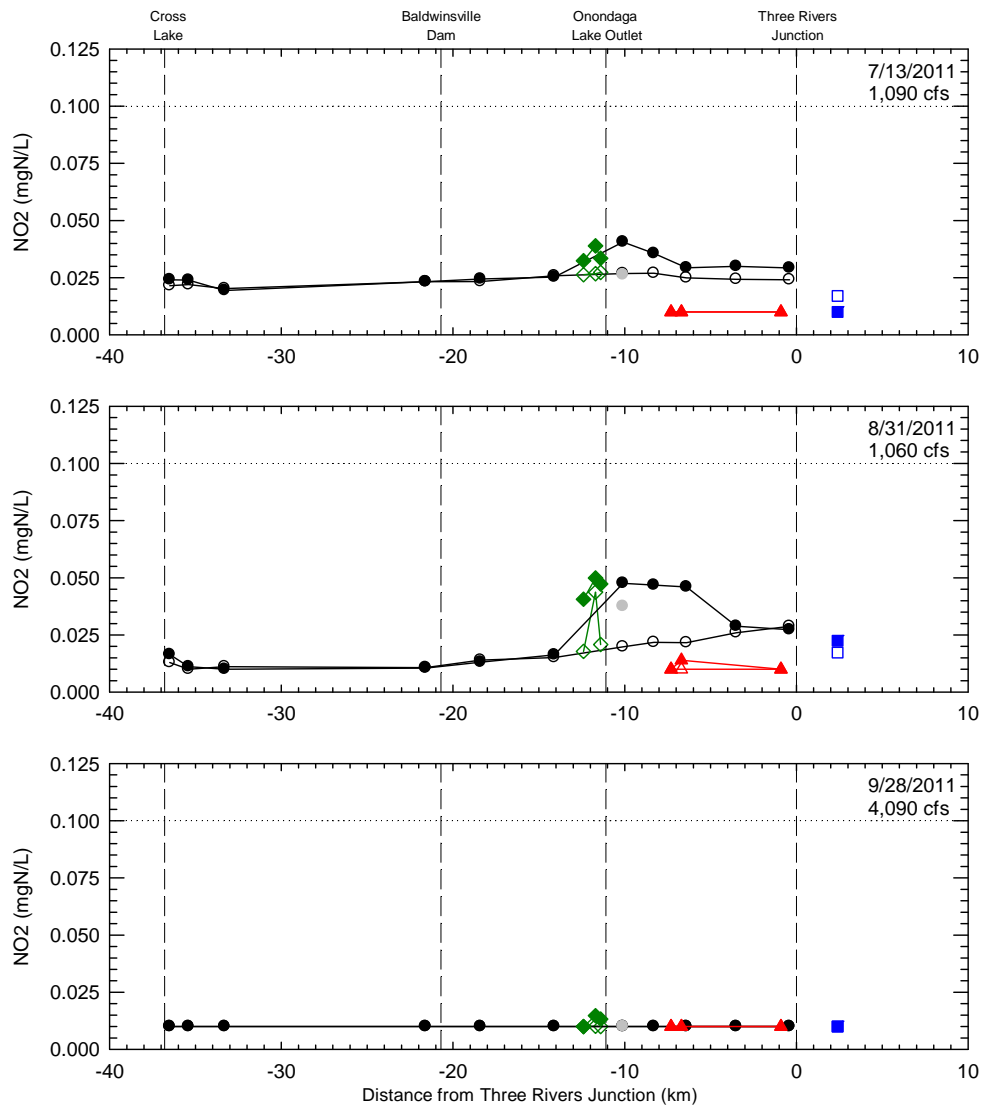




**Figure 4. Ammonia patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

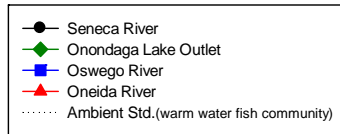
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

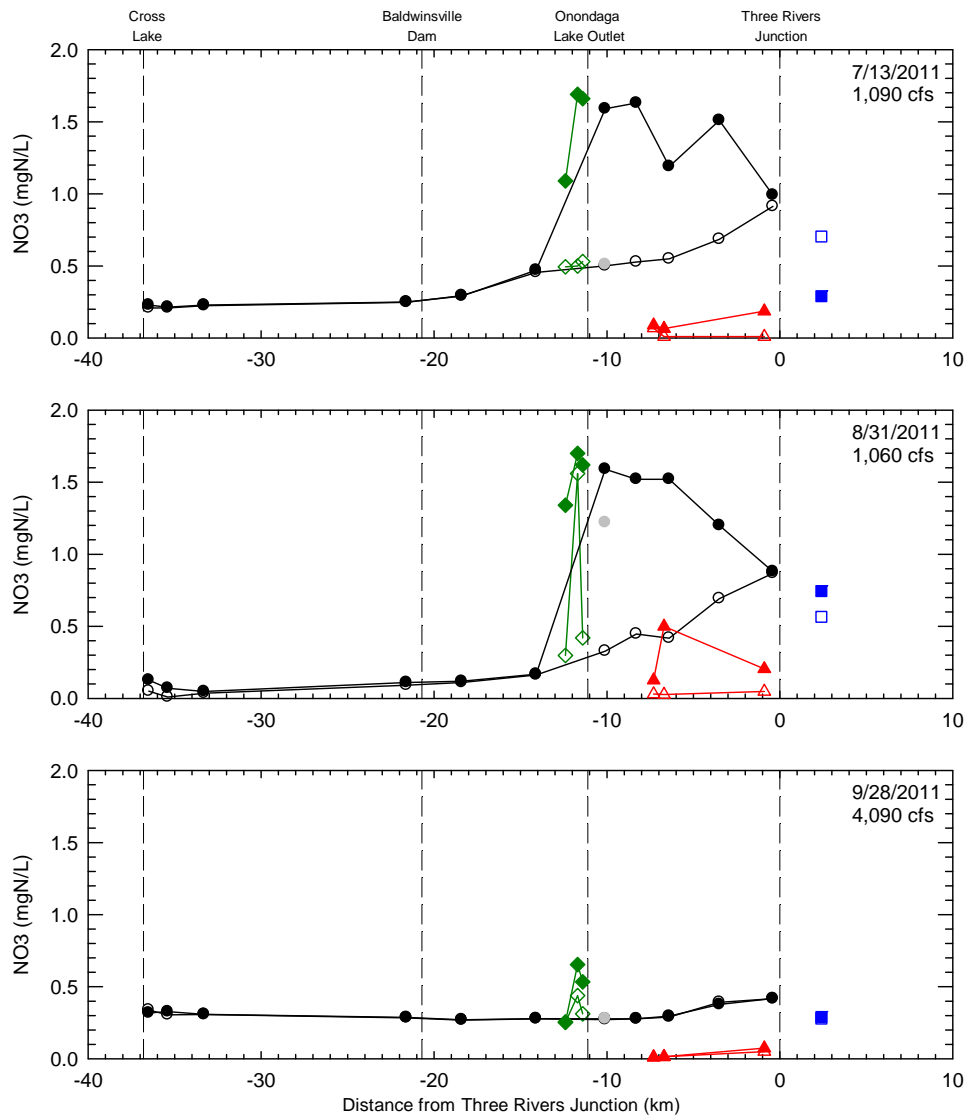




**Figure 5. Nitrite patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

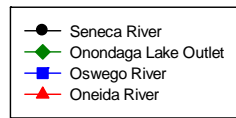
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

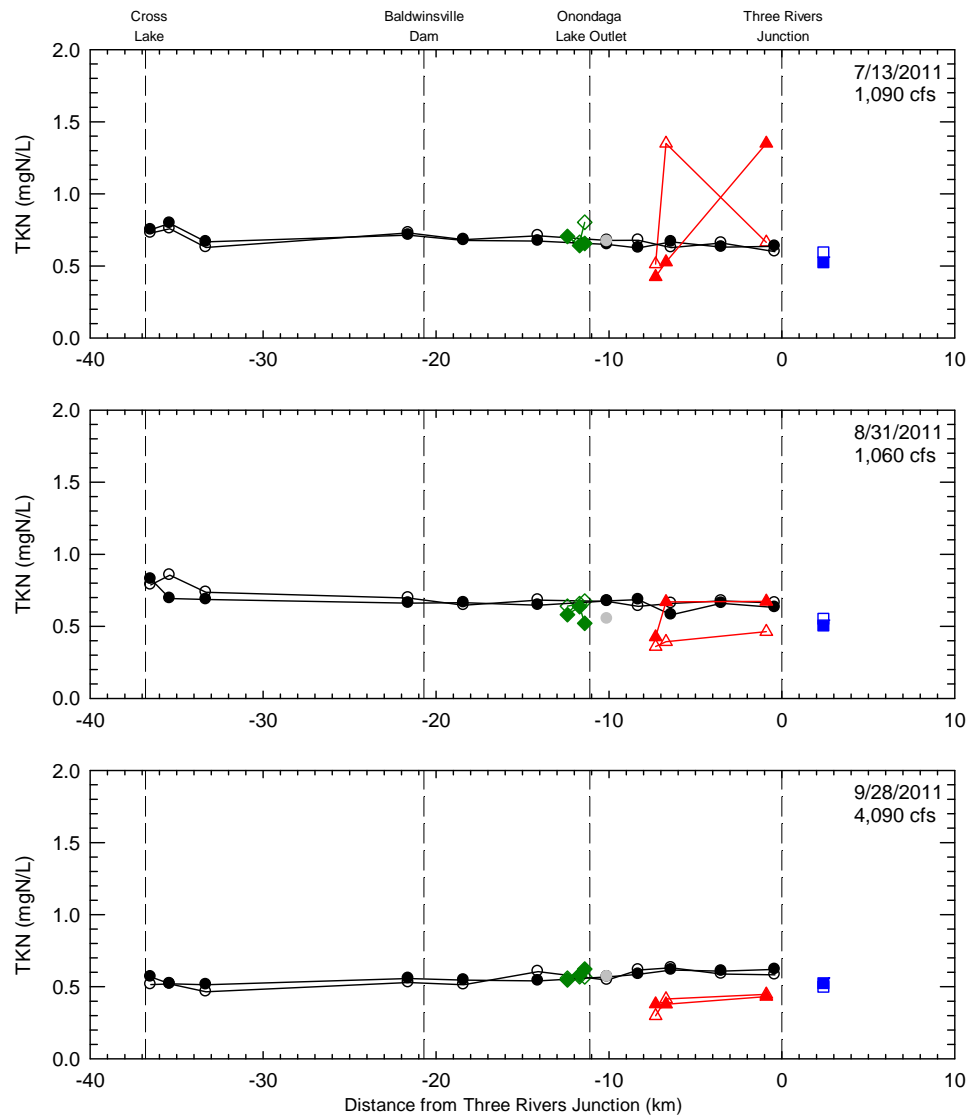




**Figure 6. Nitrate patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

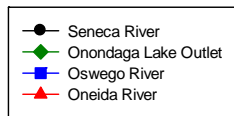
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

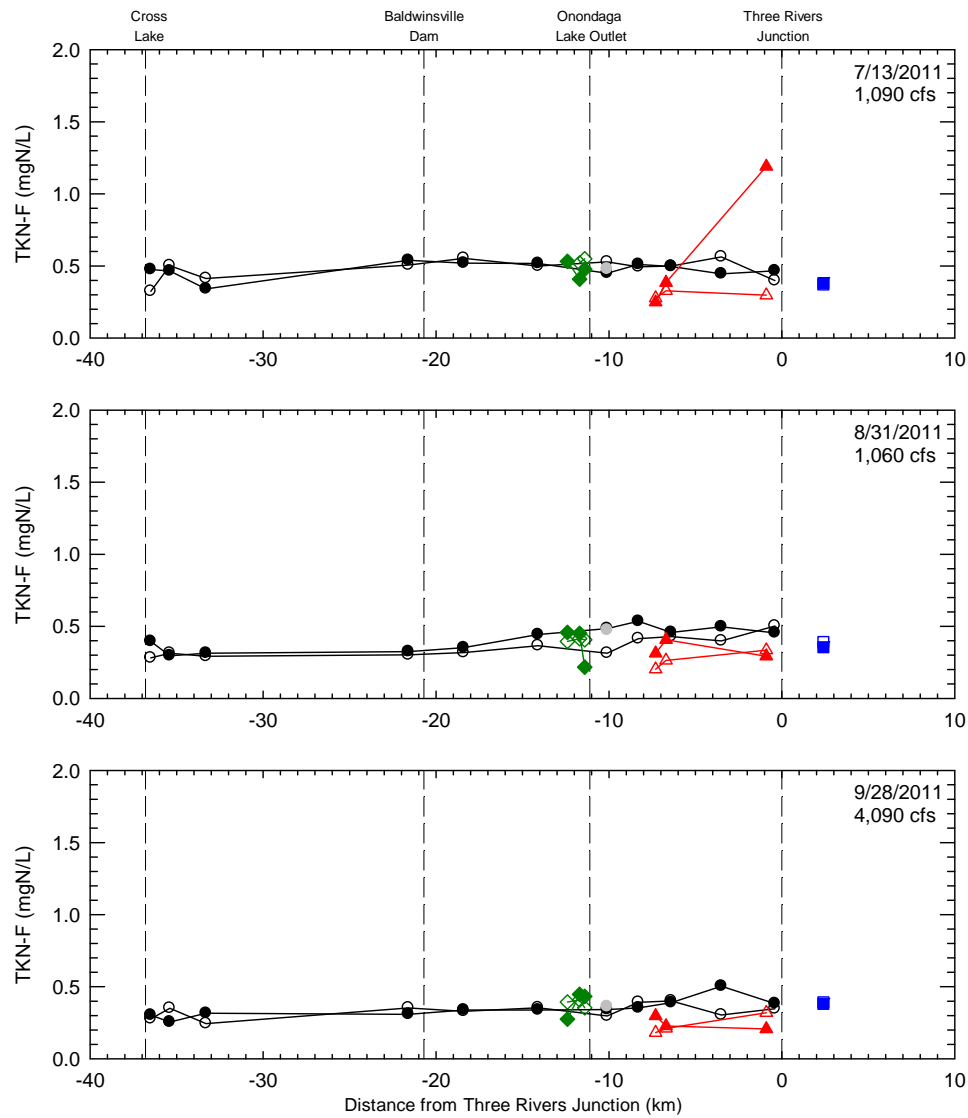




**Figure 7. TKN patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

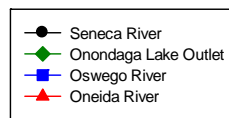
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.



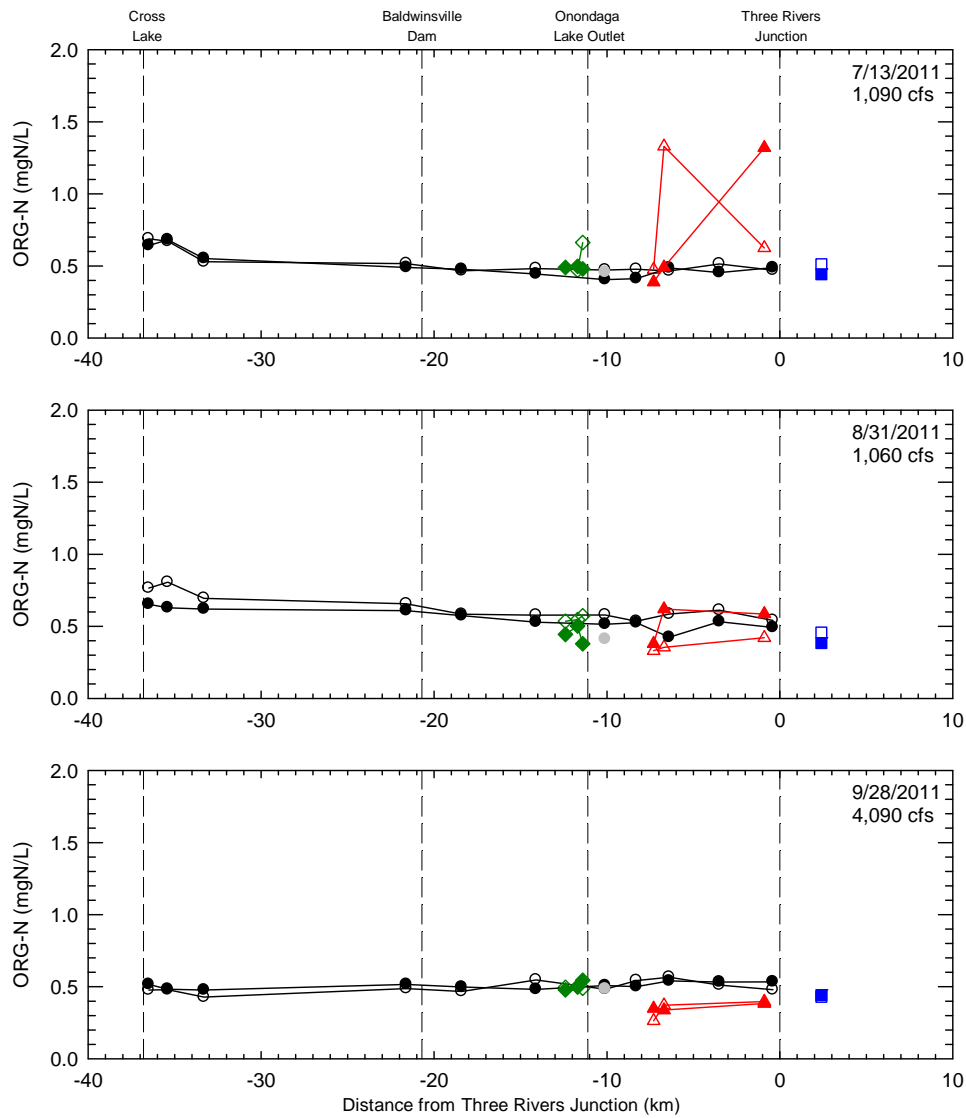


**Figure 8. TKN-F patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

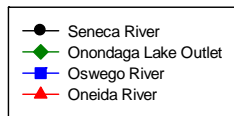


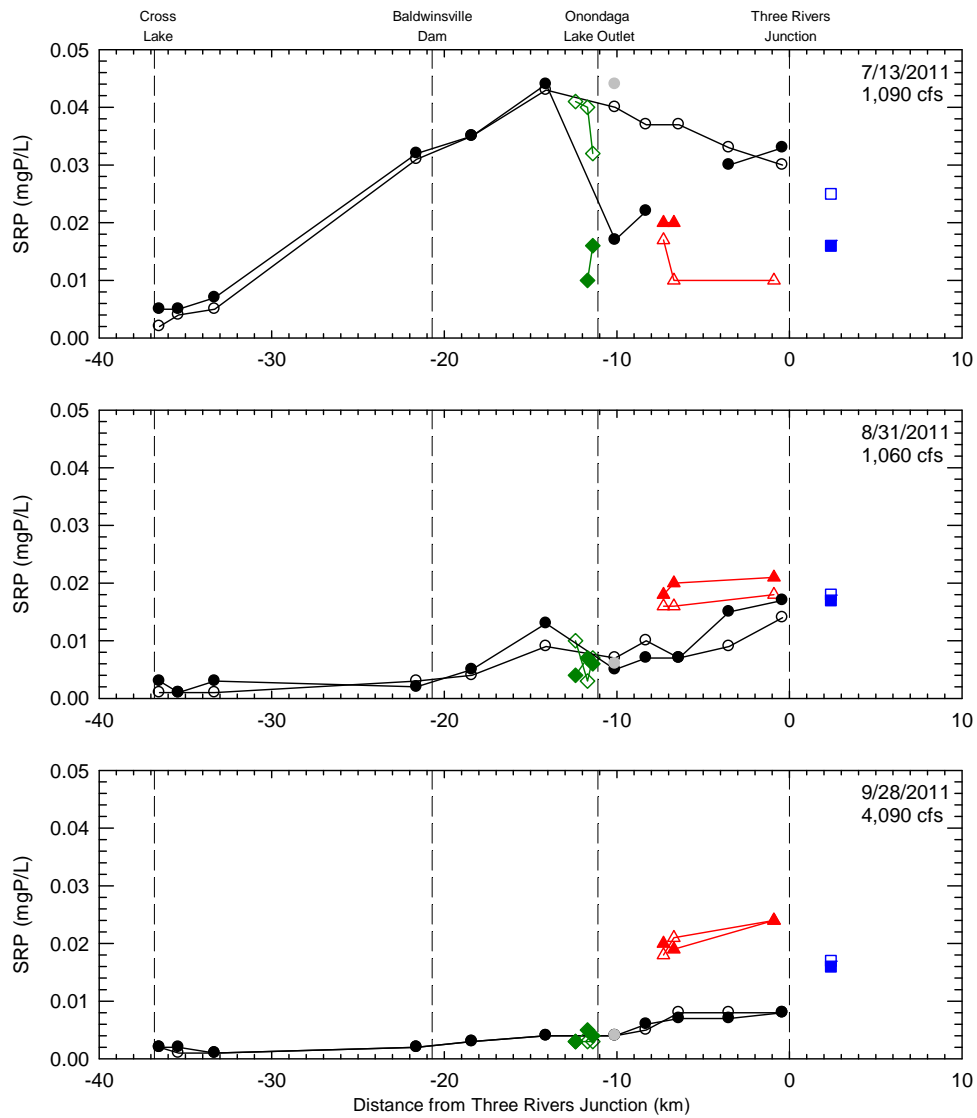




**Figure 9. ORG-N patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

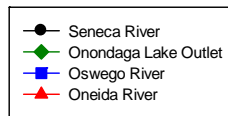
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

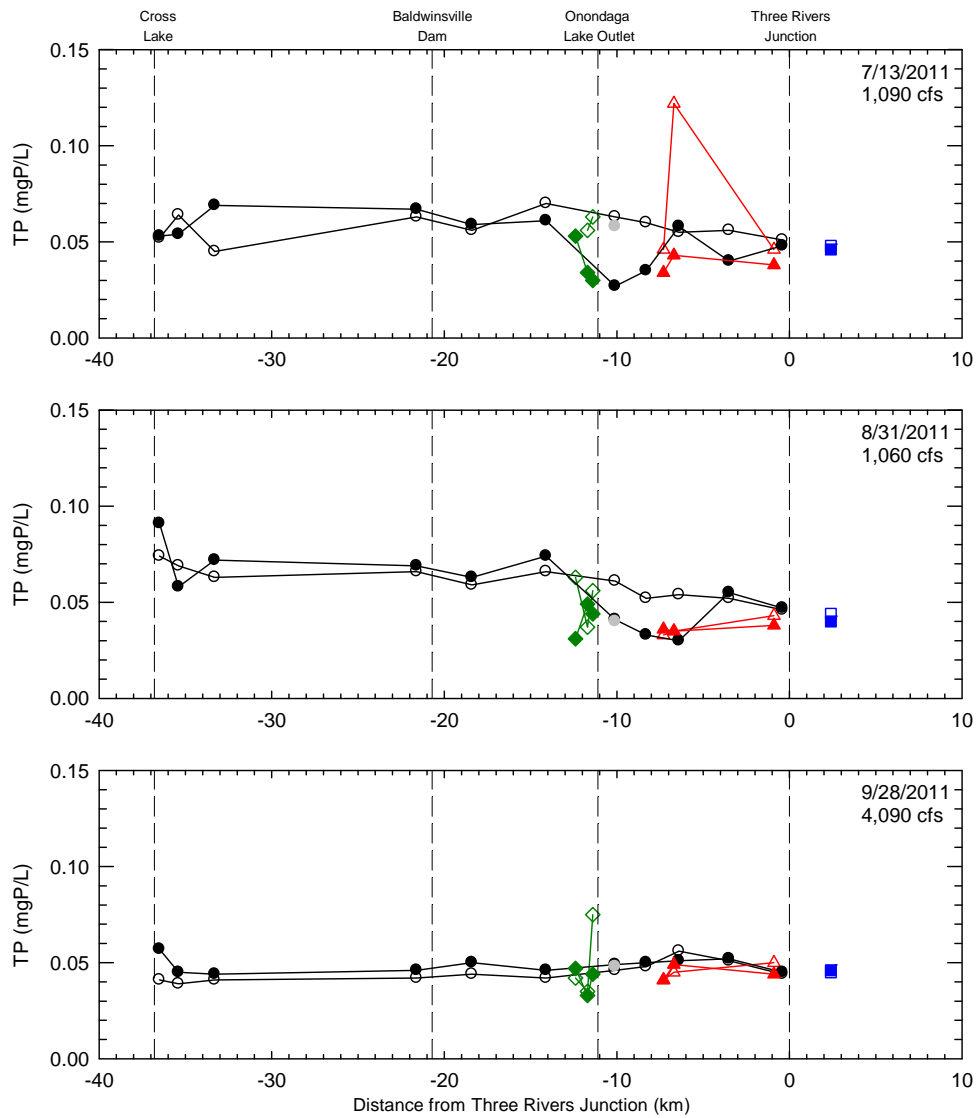




**Figure 10. SRP patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

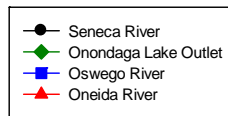
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

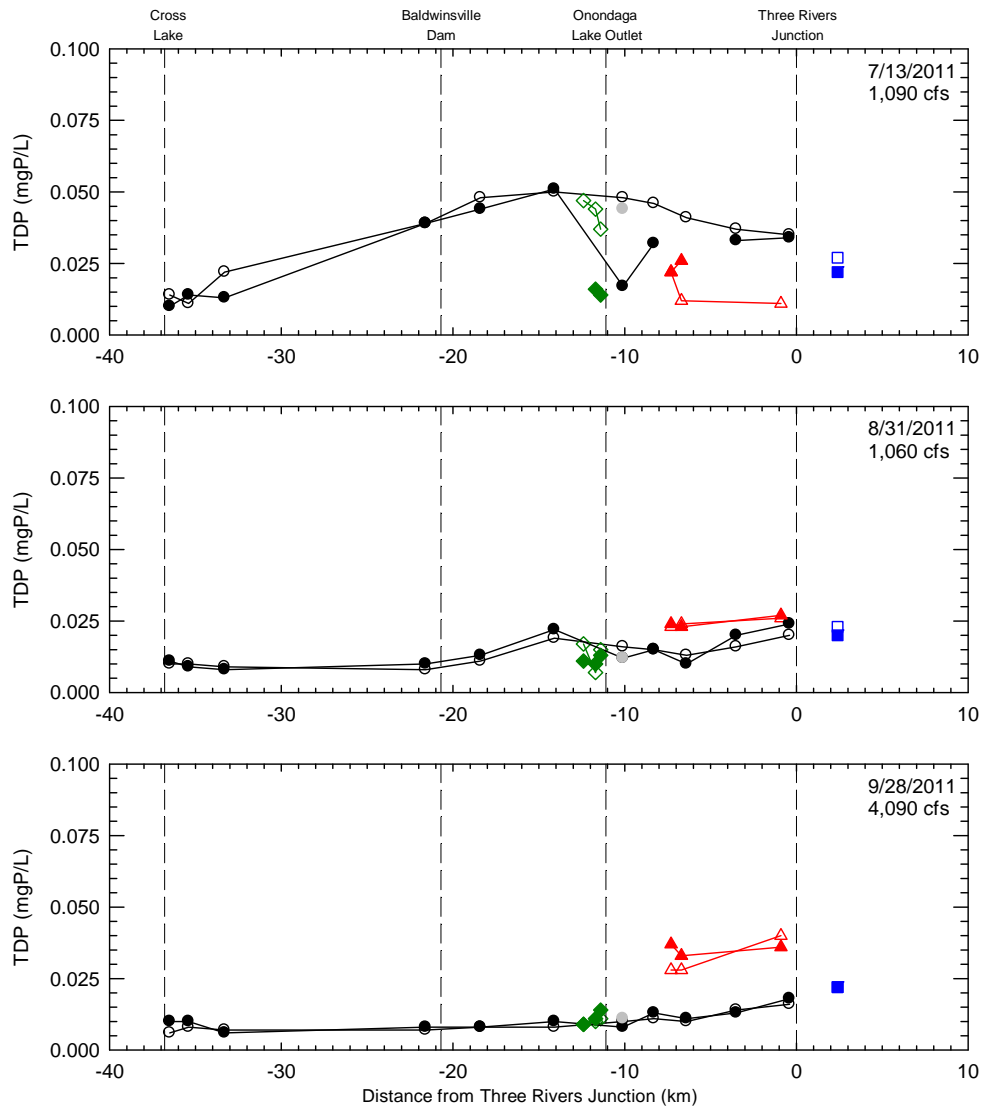




**Figure 11. TP patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

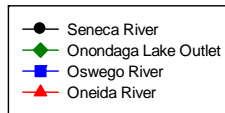
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

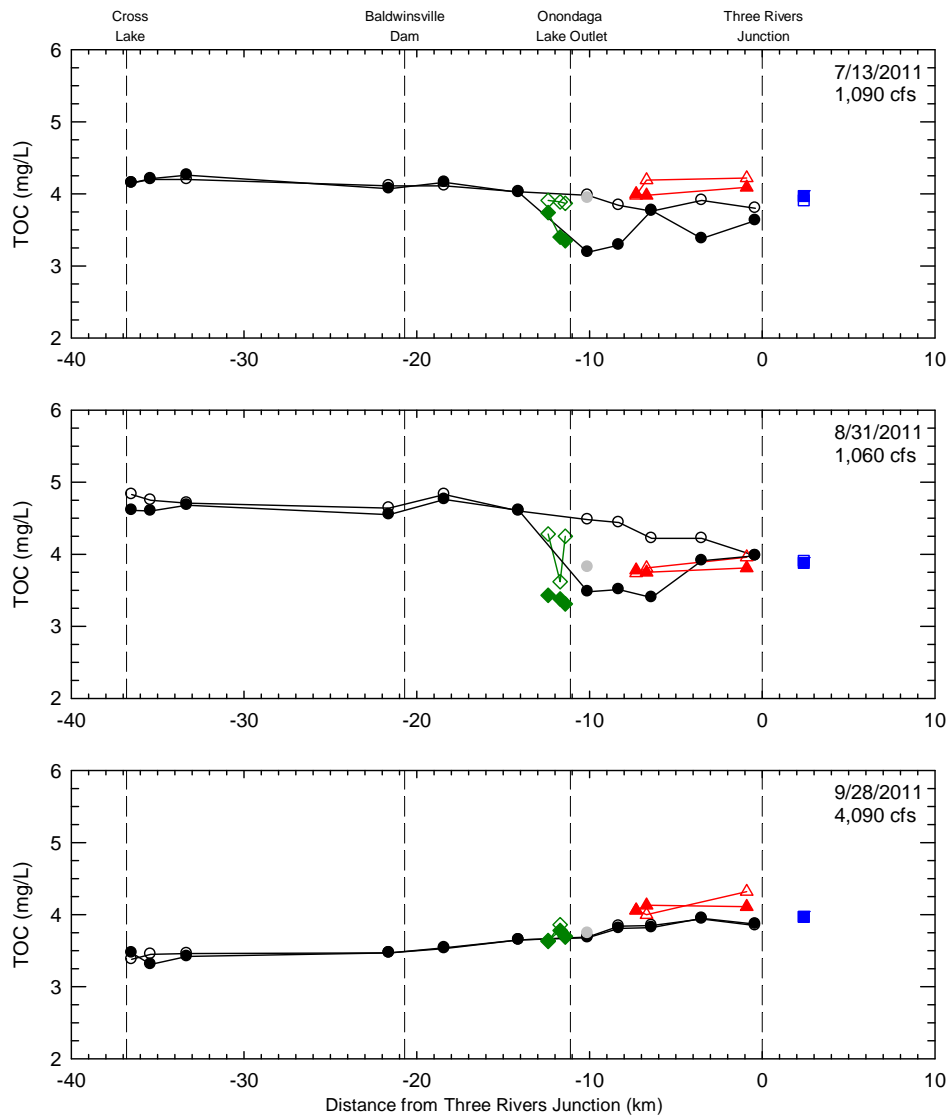




**Figure 12. TDP patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

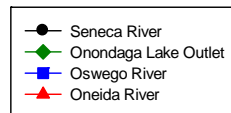
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

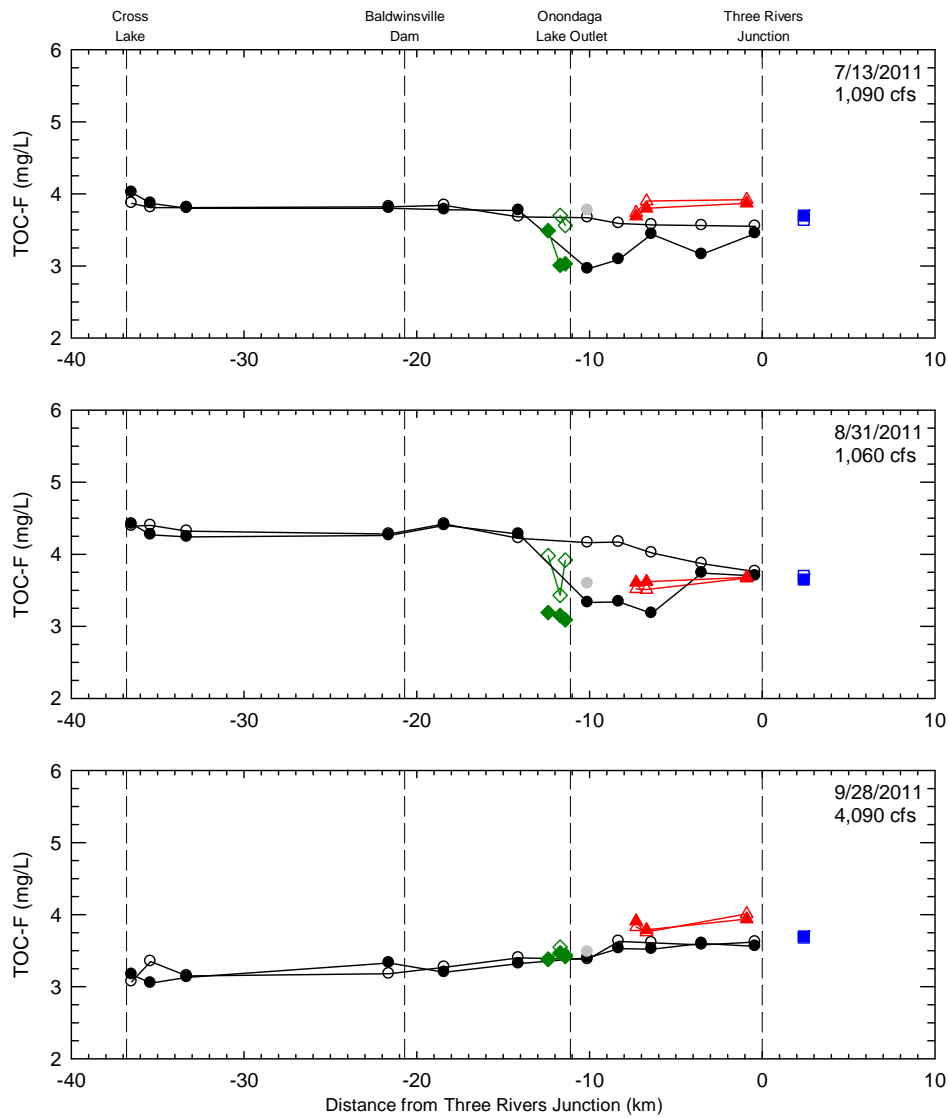




**Figure 13. TOC patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

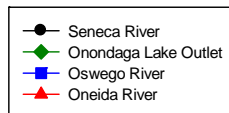
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

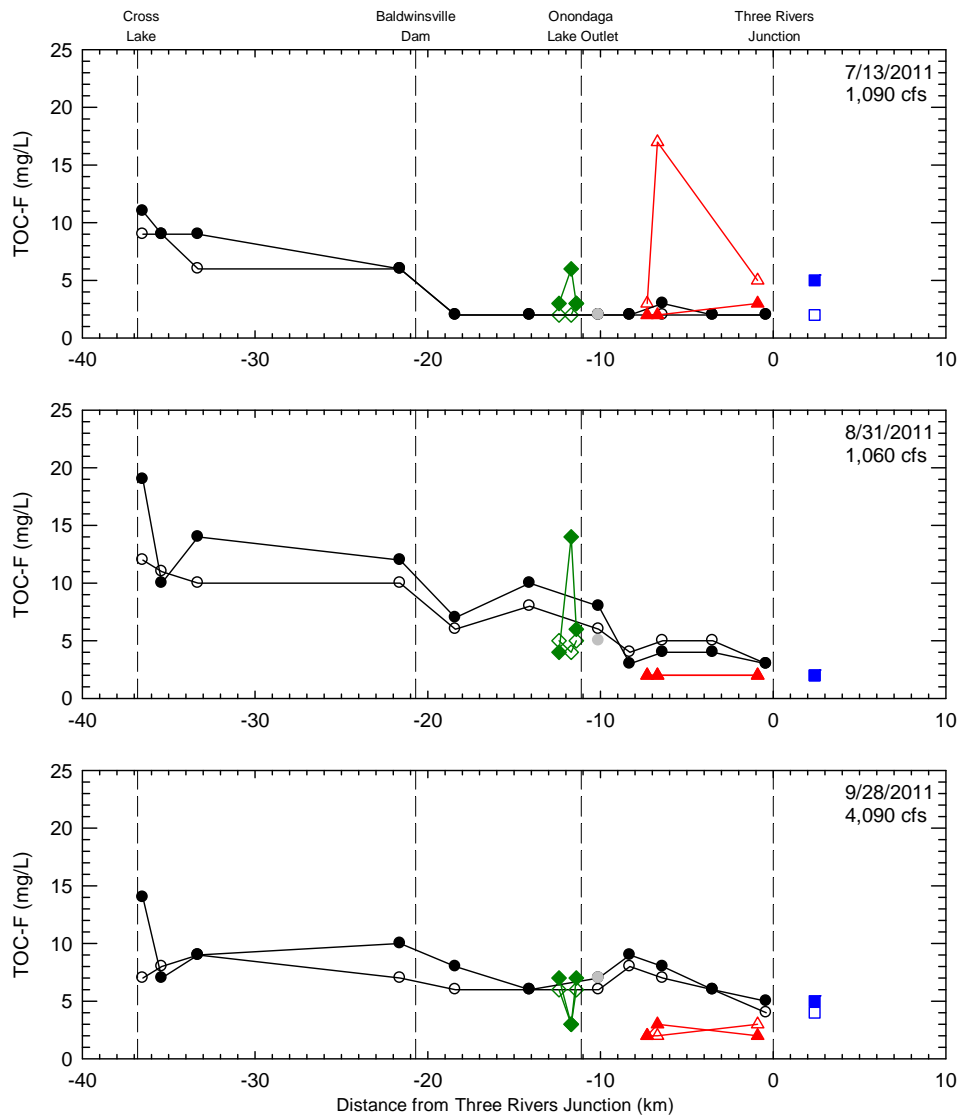




**Figure 14. TOC-F patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

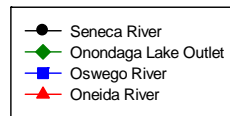
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

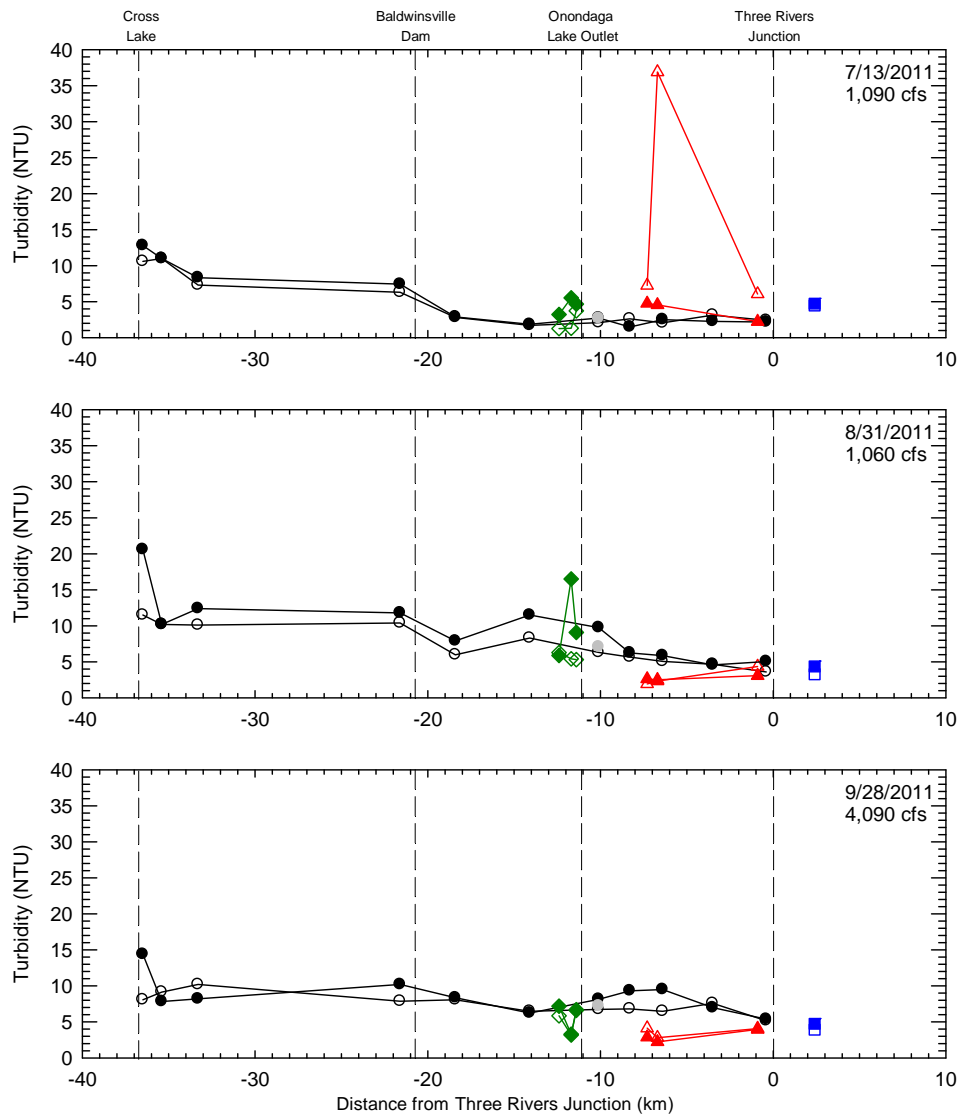




**Figure 15. TSS patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

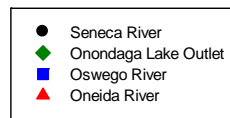
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.



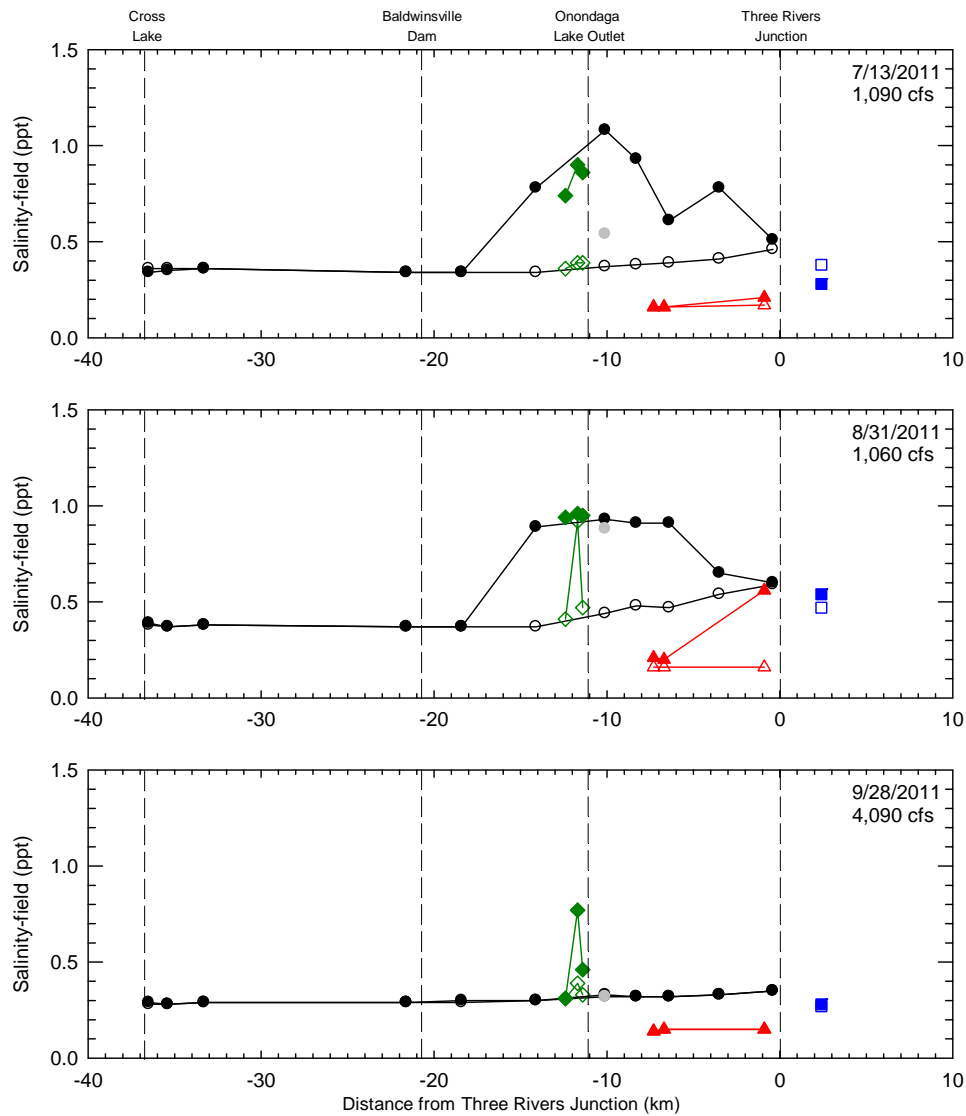


**Figure 16. Turbidity patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

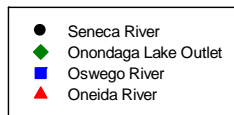


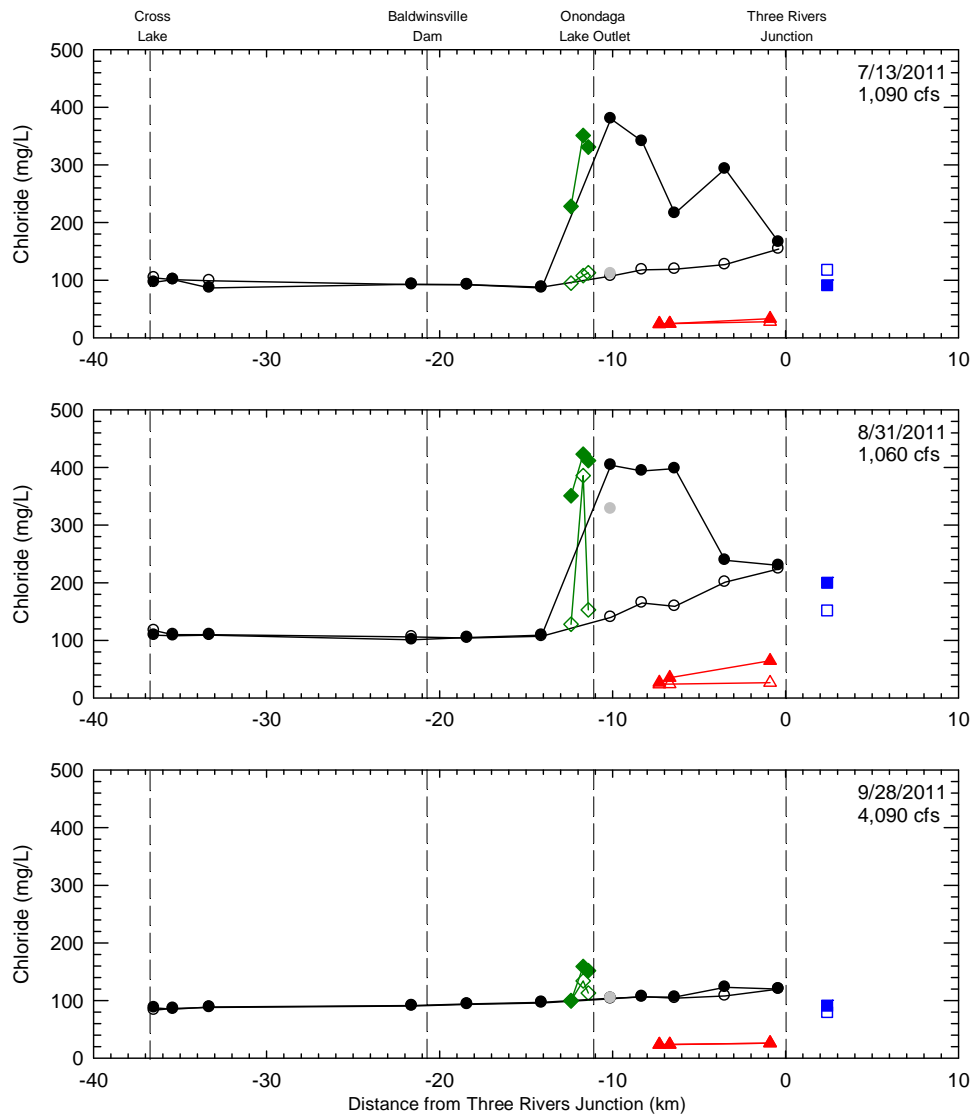




**Figure 17. Salinity patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

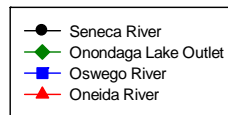
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

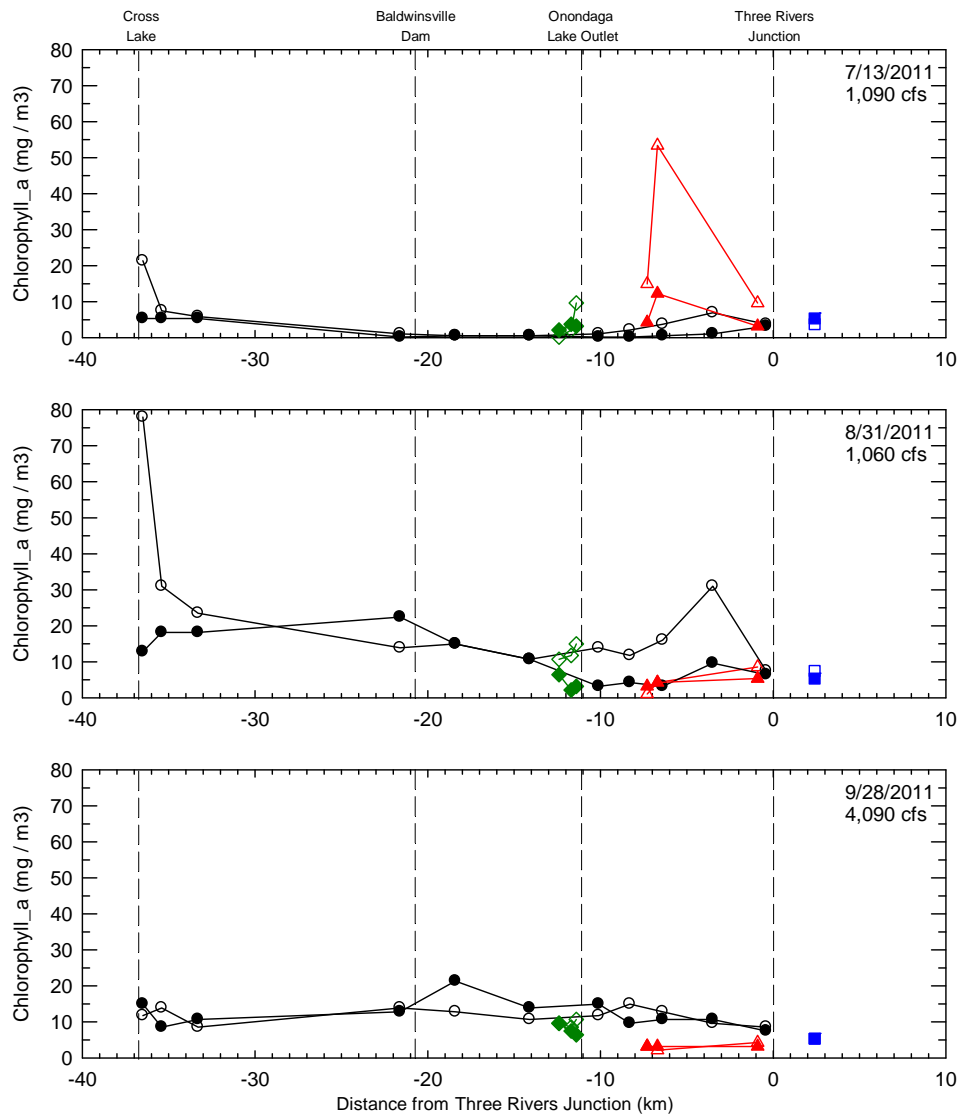




**Figure 18. Chloride patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

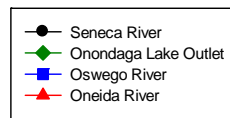
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

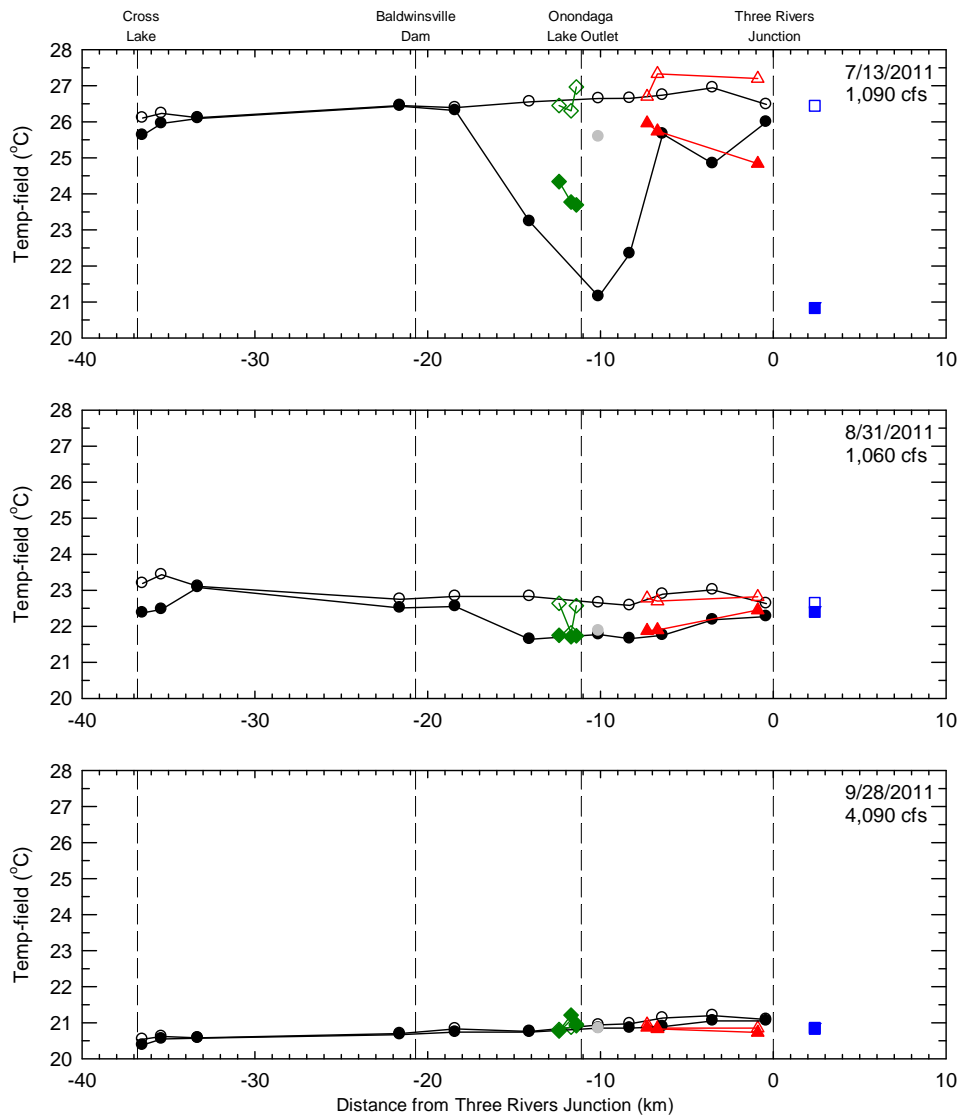




**Figure 19. Chlorophyll\_a patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

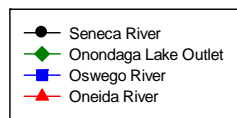
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

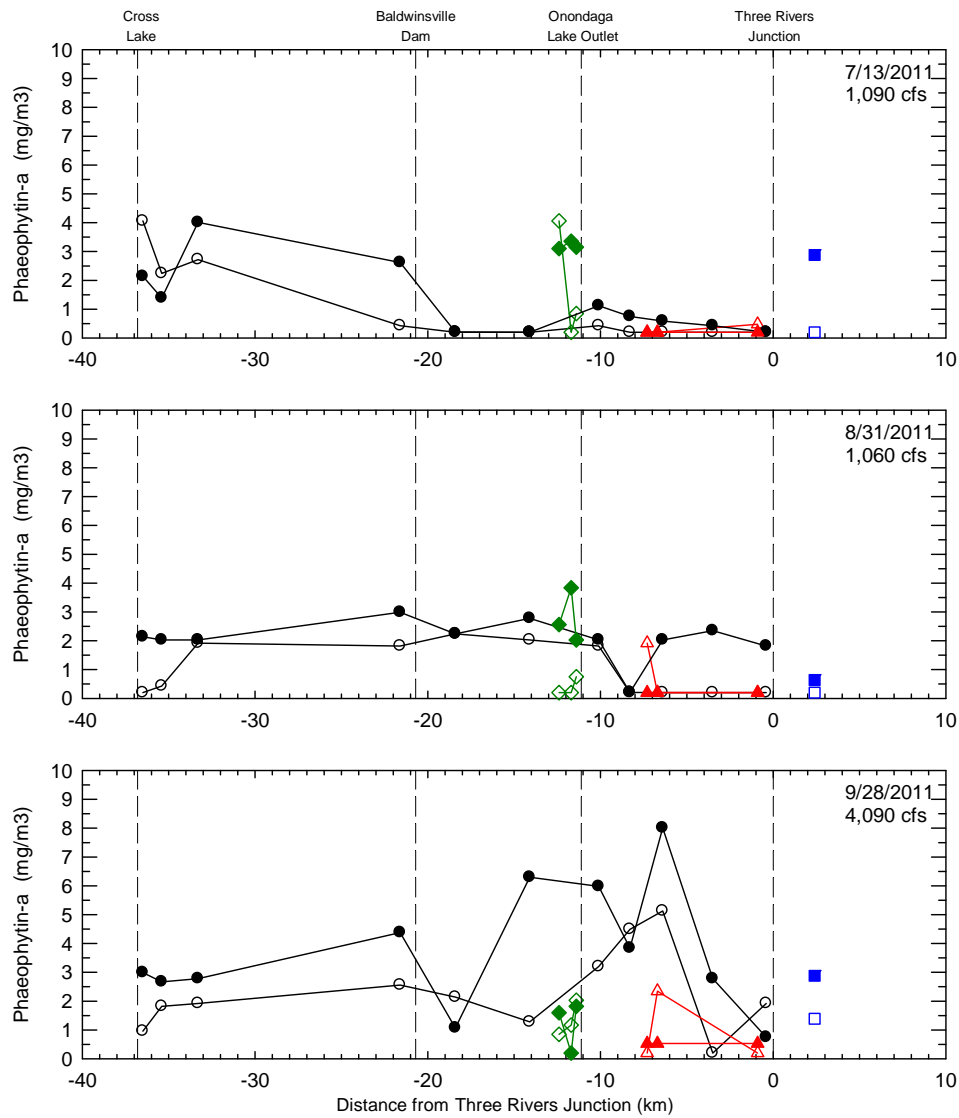




**Figure 20. Temperature (°C) patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

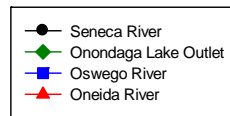
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

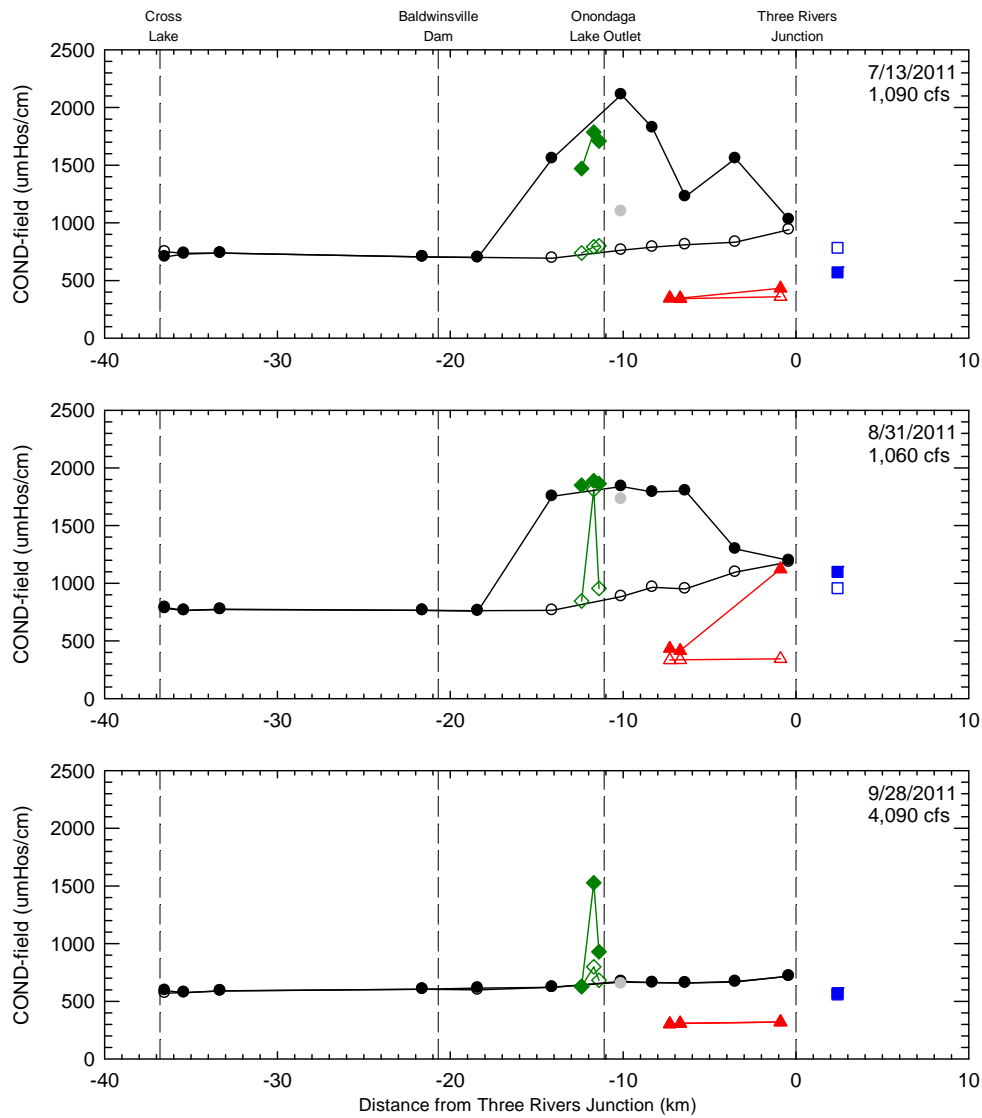




**Figure 21. Phaeophytin-a patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

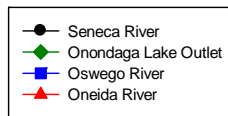
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

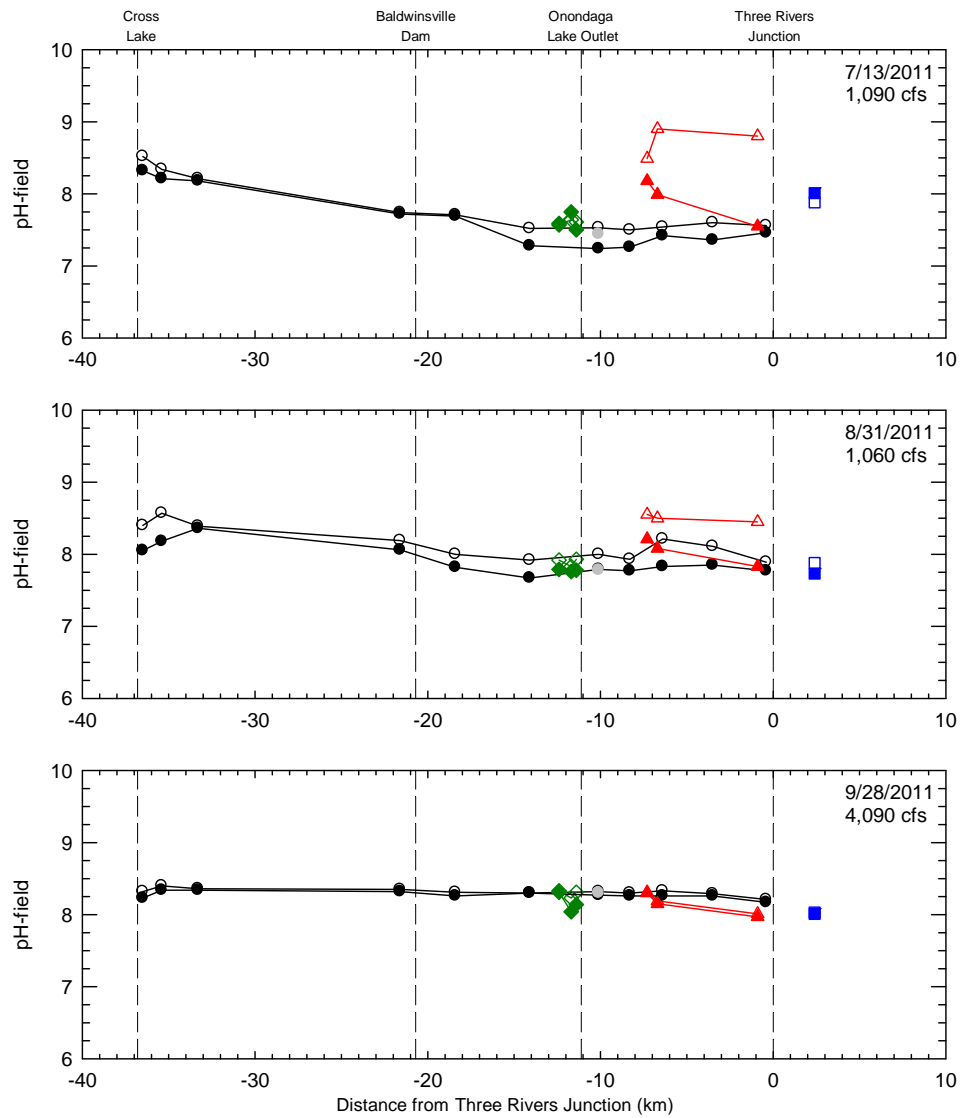




**Figure 22. COND-field patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

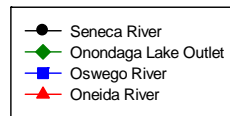
Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.



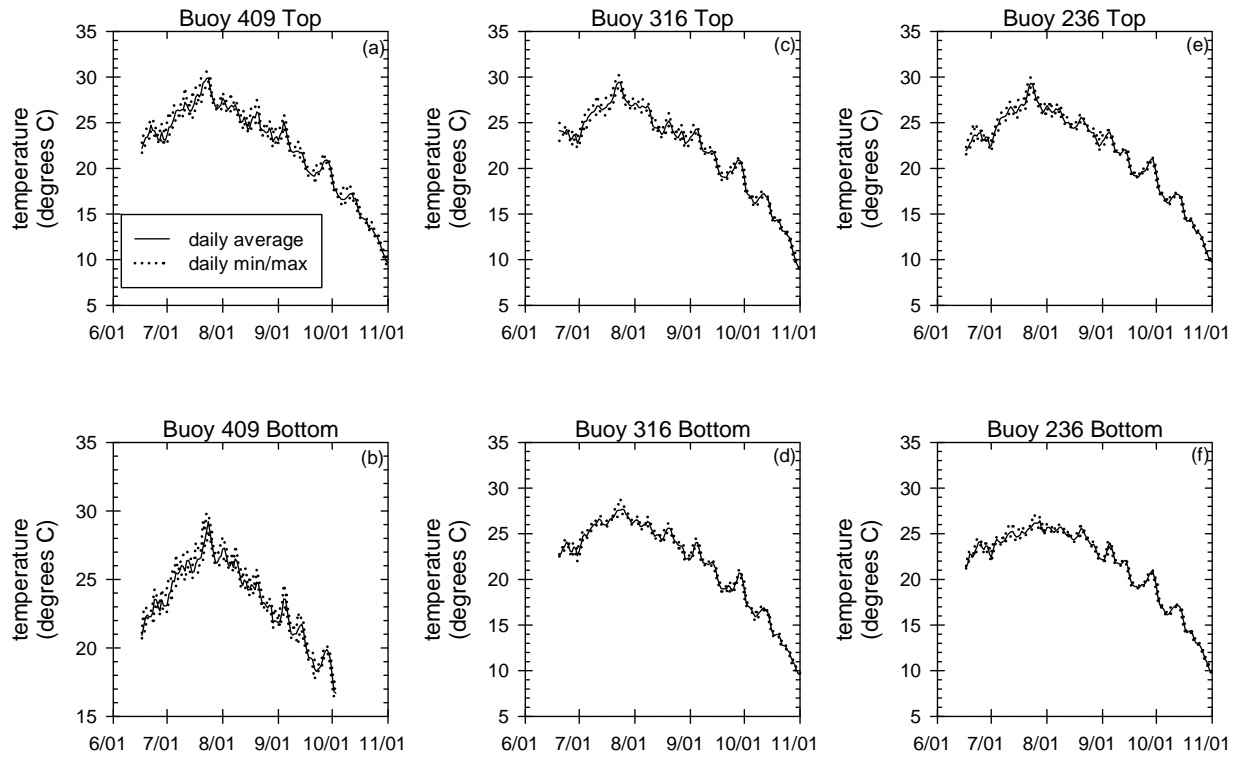


**Figure 23. pH-field patterns in the Three Rivers System on 7/13/11, 8/31/11, and 9/28/11.**

Notes: (1) River km measured from Three Rivers Junction, upstream (-) for Seneca and Oneida and downstream (+) for Oswego; (2) Open symbols represent surface samples, filled symbols represent bottom samples, gray circles represent mid-depth samples; (3) Daily average flows at Baldwinsville are shown in each panel.

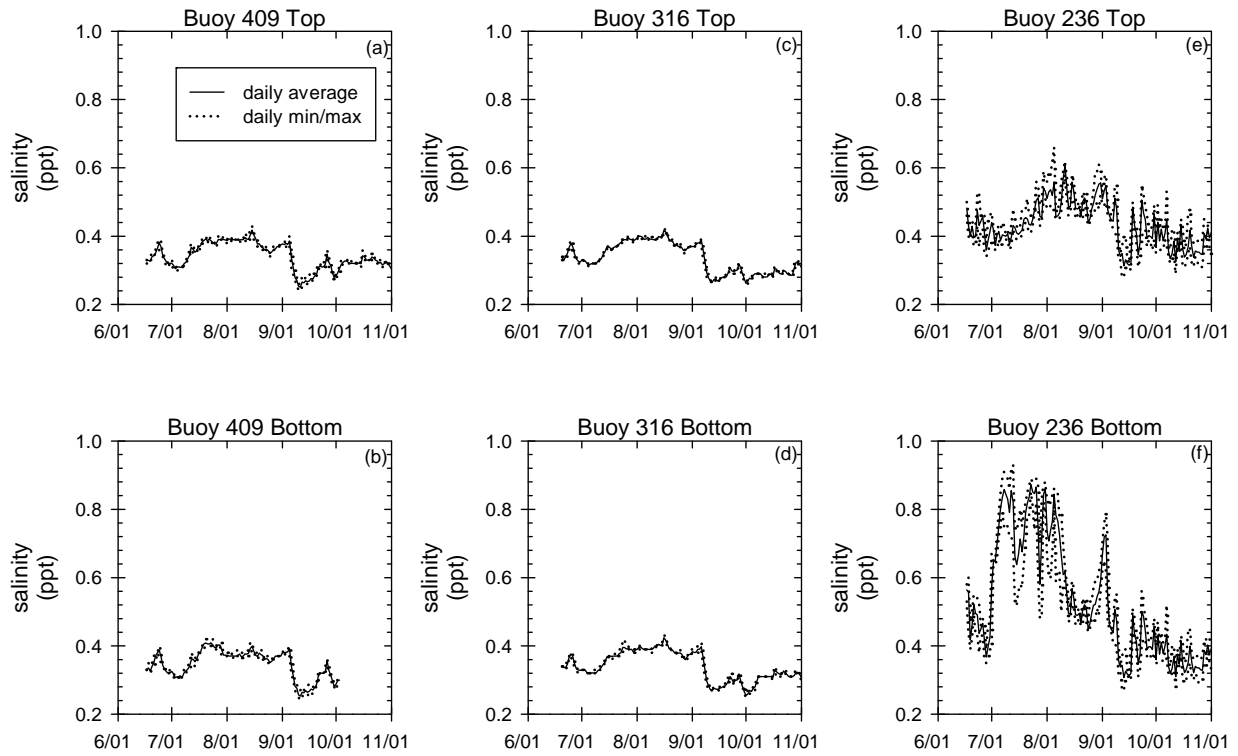


**Figure 24. Daily average temperature from 2011 YSI sonde deployments in Seneca River, with daily minimum and maximum values identified. Averages were calculated from 15-minute measurements.**

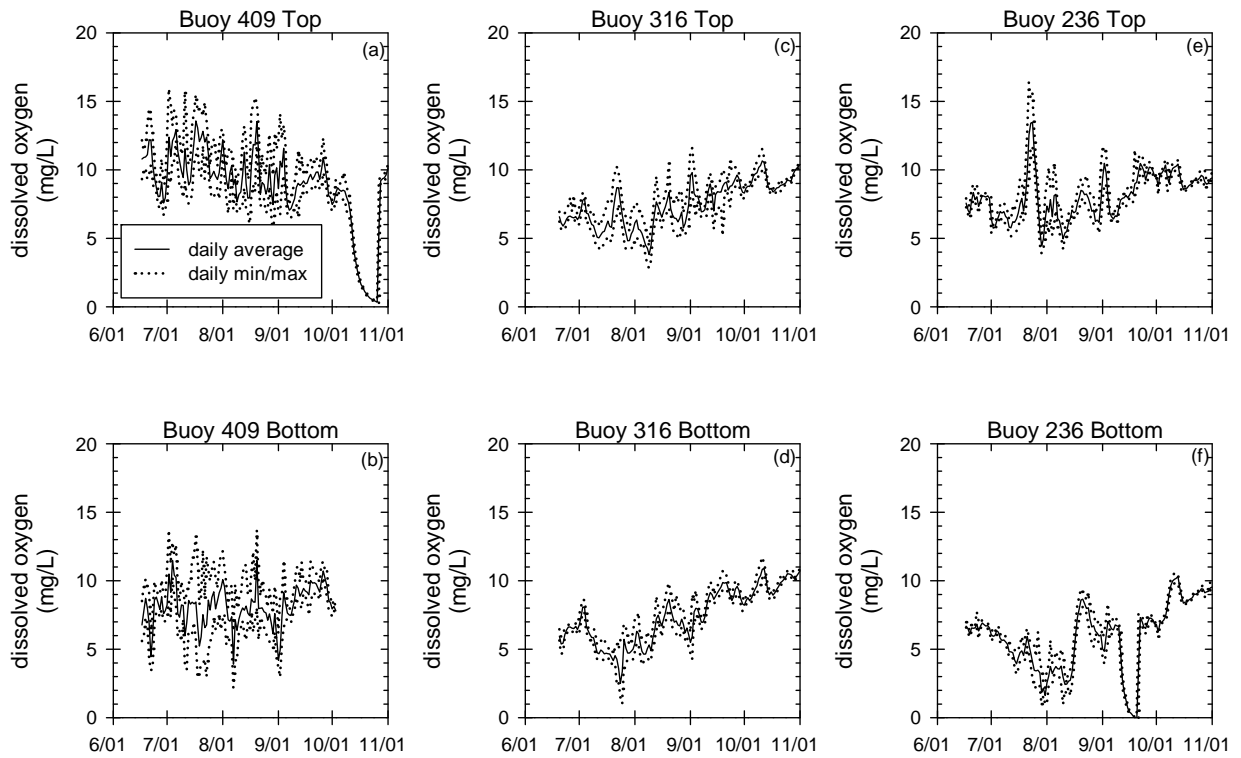




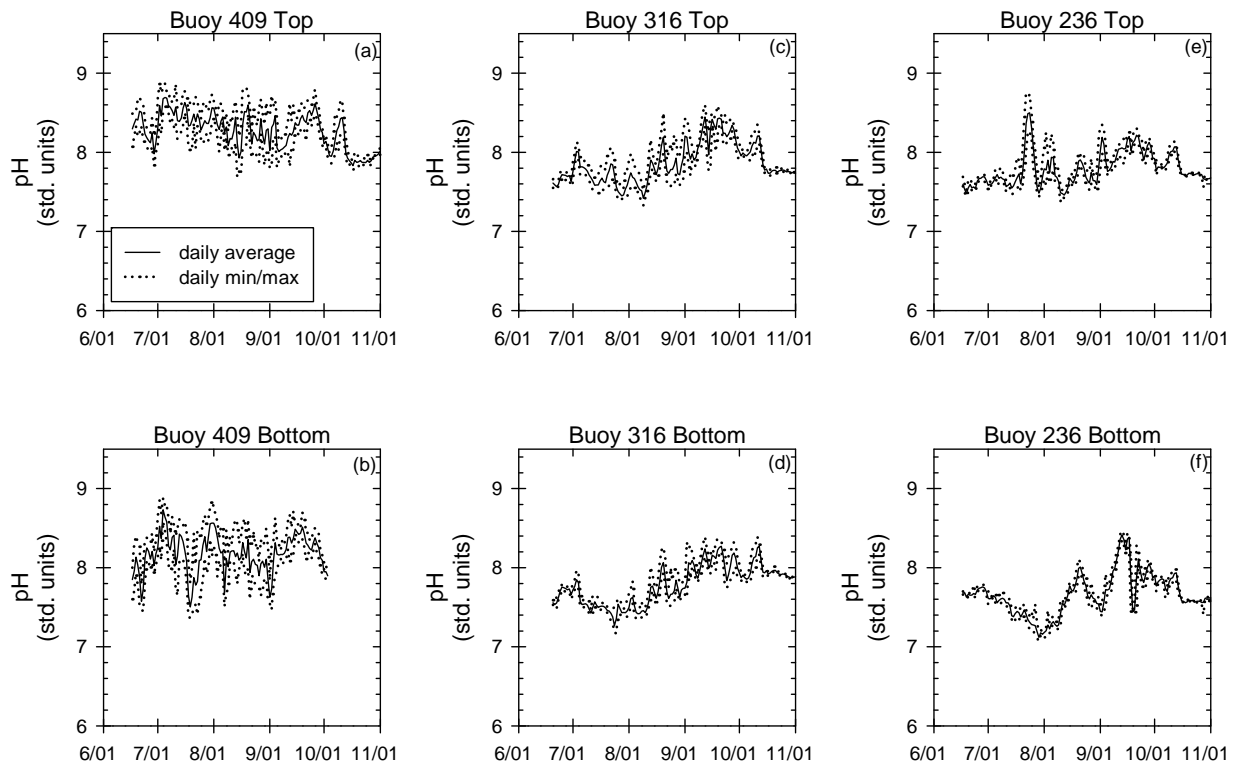
**Figure 25. Daily average salinity from 2011 YSI sonde deployments in Seneca River, with daily minimum and maximum values identified. Averages were calculated from 15-minute measurements.**



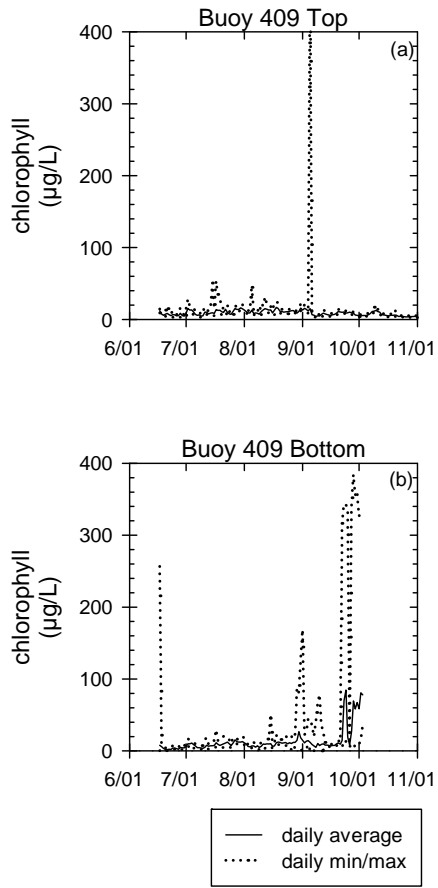
**Figure 26. Daily average dissolved oxygen concentrations from 2011 YSI sonde deployments in Seneca River, with daily minimum and maximum values identified. Averages were calculated from 15-minute measurements.**



**Figure 27. Daily average pH values from 2011 YSI sonde deployments in Seneca River, with daily minimum and maximum values identified. Averages were calculated from 15-minute measurements.**



**Figure 28. Daily average chlorophyll concentrations from 2011 YSI sonde deployments in Seneca River, with daily minimum and maximum values identified. Averages were calculated from 15-minute measurements.**



**Table 1. Summary of AMP river sampling locations and total numbers of samples<sup>1</sup> collected in 2011.**

Buoy	412	409	397	334	316	294	269	260	255	240	222	LO2	LO1	LO3	10	178	182	212
River	Seneca	Seneca	Seneca	Seneca	Seneca	Seneca	Seneca	Seneca	Seneca	Seneca	Seneca	Outlet	Outlet	Outlet	Oswego	Oneida	Oneida	Oneida
Kilometer <sup>2</sup>	-36.5	-35.4	-33.3	-21.6	-18.4	-14.1	-10.1	-8.3	-6.4	-3.5	-0.4	-12.4	-11.7	-11.4	2.4	-7.3	-6.7	-0.9
Turbidity	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
TSS	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
TP	6	6	6	6	6	6	9	6	6	6	6	5	6	6	6	6	6	6
TOC-F	6	6	6	6	6	6	9	6	6	6	6	5	6	6	6	6	6	6
TOC	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
TKN-F	6	6	6	6	6	6	9	6	6	6	6	5	6	6	6	6	6	6
TKN	6	6	6	6	6	6	9	6	6	6	6	5	6	6	6	6	6	6
Temp-field	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
TDP	6	6	6	6	6	6	9	6	5	6	6	5	6	6	6	6	6	5
SRP	6	6	6	6	6	6	9	6	5	6	6	5	6	6	6	6	6	5
Salinity-field	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
pH-field	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
Phaeophytin-a	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ORG-N	6	6	6	6	6	6	9	6	6	6	6	5	6	6	6	6	6	6
NO3	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
NO2	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
NH3-N	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
DO-field	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
COND-field	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6
Chlorophyll-a	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Chloride	6	6	6	6	6	6	9	6	6	6	6	6	6	6	6	6	6	6

Note:

<sup>1</sup> Sample counts do not include samples with result flag = 2

<sup>2</sup> River kilometers measured from Three Rivers Junction, upstream (-) for Seneca and Oneida / downstream (+) for Oswego.

**Table 2. Summary of Seneca and Oneida River flow conditions between 2002 and 2011.**

Seneca Year	Average summer flow rate (CFS)	Days below 7Q10 <sup>1</sup>
2002	842	7
2003	2028	0
2004	4518	0
2005	1052	8
2006	4607	3
2007	774	4
2008	4197	0
2009	1606	2
2010	2410	0
2011	2528	0

Oneida Year	Average summer flow rate (CFS)	Days below 7Q10 <sup>1</sup>
2002	618	0
2003	1,162	0
2004	2,937	0
2005	947	0
2006	2,584	0
2007	569	0
2008	1,476	0
2009	1,177	0
2010	1,897	0
2011	1,237	1

<sup>1</sup> Summer data only, July 1<sup>st</sup> - September 30<sup>th</sup>

<sup>2</sup> Based on provisional data; less complete accepted data is currently posted on the USGS website.

**Table 3. Summary of non-compliance with ambient water quality standards for dissolved oxygen, nitrite, and total ammonia in Three Rivers System on discrete sampling dates of 7/13/2011, 8/31/2011 and 9/28/2011.**

Parameter	Sampling Date	Location	Depth	Value (mg/L)
Dissolved Oxygen (Instantaneous Compliance Criteria = 4 mg/L)	7/13/2011	Buoy #269	bottom	1.53
	7/13/2011	Buoy #260	bottom	2.68
	7/13/2011	Buoy #294	bottom	3.11
NO2-N (Compliance Criteria = 0.1 mgN/L)	None	None	None	--
Total NH3-N (NYSDEC Criteria Calculated from pH and Temperature)	None	None	None	--

**Table 4. Summary of 15-minute dissolved oxygen (DO) data<sup>1</sup> collected by the YSI sondes in 2011.**

Sonde Location	Deployment Dates <sup>2</sup>		Operation (days) <sup>3</sup>	DO < 5 mg/L (days) <sup>4</sup>	DO < 4 mg/L (days) <sup>5</sup>
	Start	End			
Buoy 409 (TOP)	6/17/11	11/7/11	143	15	14
Buoy 409 (Bottom)	6/17/11	10/3/11	107	12	4
Buoy 409 (TOP or BOTTOM)	6/17/11	11/7/11	143	27	18
Buoy 316 (TOP)	6/20/11	11/2/11	135	7	4
Buoy 316 (Bottom)	6/20/11	11/2/11	132	23	10
Buoy 316 (TOP or BOTTOM)	6/20/11	11/2/11	135	25	13
Buoy 236 (TOP)	6/17/11	11/9/11	144	3	1
Buoy 236 (Bottom)	6/17/11	11/9/11	144	46	40
Buoy 236 (TOP or BOTTOM)	6/17/11	11/9/11	144	46	40

*Notes:*

<sup>1</sup> Blank and negative DO values were excluded from analysis.

<sup>2</sup> Not all parameters may have been measured during the deployment dates.

<sup>3</sup> DO measured at least half of the time within one day.

<sup>4</sup> NYSDEC minimum daily average DO standard. Reported value represents number of days in which the daily average calculated from the 15-minute data was below the standard.

<sup>5</sup> NYSDEC instantaneous minimum DO standard. Reported value represents the number of days in which one or more of the 15-minute readings was below the standard.