TECHNICAL MEMORANDUM

Upper Klamath Lake Tributary Sampling: 2013 Data Summary Report

Prepared By:

Jacob Kann, Ph.D.
Aquatic Ecosystem Sciences LLC
295 East Main St., Suite 7
Ashland, OR 97520

Prepared For:

Klamath Tribes Natural Resources Department
PO Box 436
Chiloquin, OR 97624

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INTRODUCTION

The Klamath Tribes have been monitoring nutrient concentration and loading in Upper Klamath Lake (UKL) tributaries since 1991. Data from 1991-1998 were summarized and incorporated into water and nutrient balances for UKL (Kann and Walker 1999). More recently the longer term 1991-2010 database was evaluated for seasonal and inter-annual dynamics, long term trends, and both water and nutrient balances were computed for UKL (Walker et al. 2012). This report serves as an annual update to the UKL tributary water quality database, including a summary of 2013 data (basic summary statistics and graphical analysis), and limited comparison of graphical time-series trends of tributary data collected for the 1991-2013 period. Included in this summary is an update of previous UKL tributary water quality databases with data collected during 2013, including appropriate quality assurance analyses (*see Excel spreadsheets: Klamath Tribes Inflow Nutrient Data 1991-2000.xls* and *Klamath Tribes Inflow Nutrient-Q Data 2001-2013.xls*).

METHODS

Methods followed the Klamath Tribes established procedures for field collection and laboratory analysis of water quality parameters (see Klamath Tribes QAPP and SOP; 2013 for a complete description of these methods). Beginning in 2008 for nutrient parameters, laboratory analyses transitioned from Aquatic Research, INC. in Seattle WA to the Sprague River Water Quality Laboratory (SRWQL) in Chiloquin OR. During the transition period duplicate samples were analyzed by both laboratories to confirm parameter reproducibility. Specific nutrient methodology and field collection protocol are contained in the SRWQL QAPP (Klamath Tribes 2013) and SOP (2013). Nutrient parameters (Table 1) were collected at seven tributary stations during the 2012 sampling season at an approximately biweekly frequency (Table 2; Figure 1; Figure 2). Specific computation of nutrient loading is outlined in Kann and Walker (1999) and Walker et al. (2012), but is briefly summarized here.

Table 1. Nutrient parameters collected in Upper Klamath Lake tributaries, 2013.

Parameter	Abbreviation/Unit	Grab [a]
Total Phosphorus	TP (µg/L)	X
Soluble Reactive Phosphorus	SRP or PO_4 (µg/L)	X
Total Nitrogen	TN (µg/L)	X
Ammonia Nitrogen	NH_4-N (µg/L)	X
Nitrate-Nitrite Nitrogen	NO_3+ NO_2-N (µg/L)	X
Silica	SiO_2 (µg/L)[1]	X

[a]Grab = integrated water column sample and x-sectional sample collected with a Van-Dorn sampler.

[1] Silica measurements were initiated in 2008 and are now included as a regularly measured parameter. The 2012 data report provides the first inclusion of tributary silica data.

Table 2. Station location and Site ID Code for data collected in Upper Klamath Lake tributaries, 2013.

Location	Site ID Code	Latitude/Longitude
Sprague R. @ Kirchers Bridge	WR1000	N42.567806° W121.864472°
Annie Ck @ Snow Park	WR2000	N42.763685° W122.058362°
Wood R @ Weed Rd	WR3000	N42.646461° W121.994959°
Wood R @ Dike Rd	WR4000	N42.581460° W121.941536°
7-mile canal @ Dike Rd	WR5000	N42.581970° W121.970898°
Williamson R @ Bridge on Modoc Pt. Road	WR6000	N42.514355° W121.916714°
Upper Klamath Lake @ Pelican Marina/Fremont Bridge (UKL Outflow)	KL0001/KL0002	N42.238472° W121.805557°

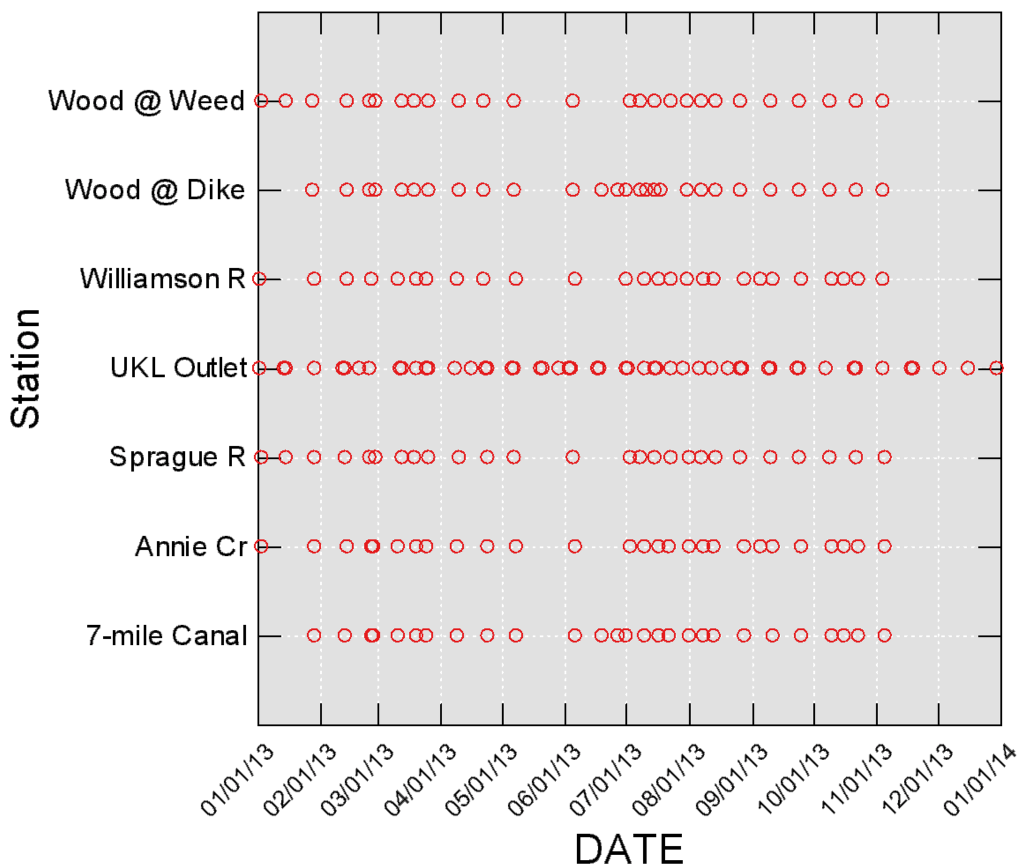

Figure 1. Spatial-temporal sampling matrix for Upper Klamath Lake tributaries, 2013.

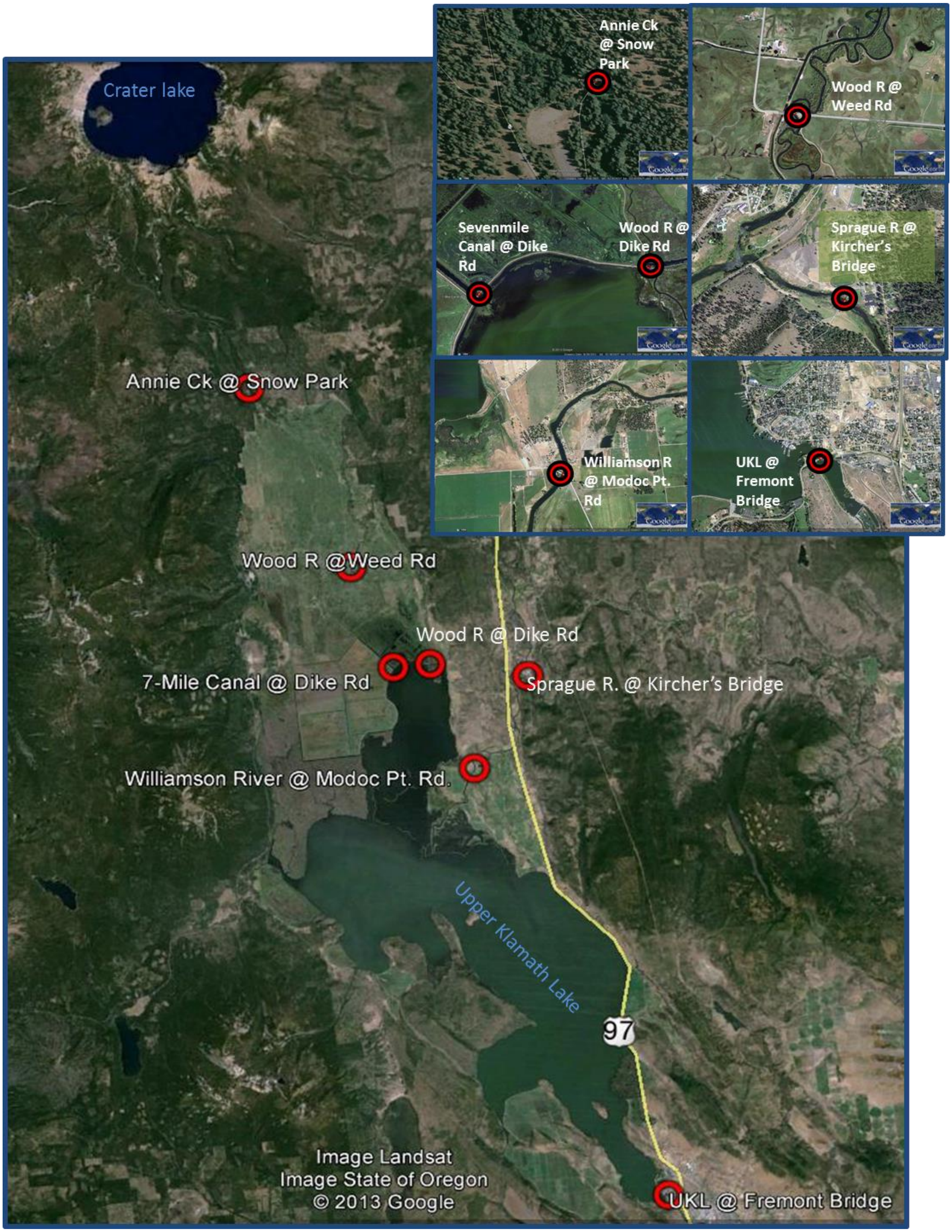

Figure 2. Location of Klamath Tribes Upper Klamath Lake tributary sampling stations.

Daily inflow volume for the Williamson and Sprague Rivers on a given sample date was extracted from continuous daily discharge data obtained from U.S. Geological Survey (USGS) stream-flow discharge stations. These data were obtained online– Williamson River Gage 11502500:http://waterdata.usgs.gov/nwis/dv/?site_no=11502500&agency_cd=USGS&referred_module=sw, and Sprague River Gage 11501000:
http://waterdata.usgs.gov/or/nwis/dv/?site_no=11501000&agency_cd=USGS&referred_module=sw).
Daily outflow volume for Upper Klamath Lake (UKL outflow) was computed from the sum of USGS discharge station at Link River 11507500:
http://waterdata.usgs.gov/or/nwis/dv/?site_no=11507500&agency_cd=USGS&referred_module=sw, and USBR A-Canal daily discharge measurements:
http://www.usbr.gov/mp/kbao/operations/water/korep1.cfm?lakeid=ukldata3.

For the Wood R. @ Weed and Wood R. @ Dike stations, continuous daily discharge measurements were generated by Graham Matthews and Associates (e.g., see GMA 2004) for 1992-2006, but these data were not available after 2006 for Dike Road. However, instantaneous discharge continued to be measured at Wood R. @ Weed, Wood R. @ Dike, 7-mile canal @ Dike Rd and Annie Cr. @ Snow Park stations by both the Klamath Tribes and GMA (2004a; 2011a). Flow measurements coinciding with nutrient sample collection dates are shown in Figure 3. Although additional nutrient concentration data were collected by GMA (e.g., 2004b; 2011b) and these data were incorporated into tributary loading calculations for the overall 1991-2010 analysis (Walker et al. 2012), only data collected by the Klamath Tribes are presented in this annual data update report.

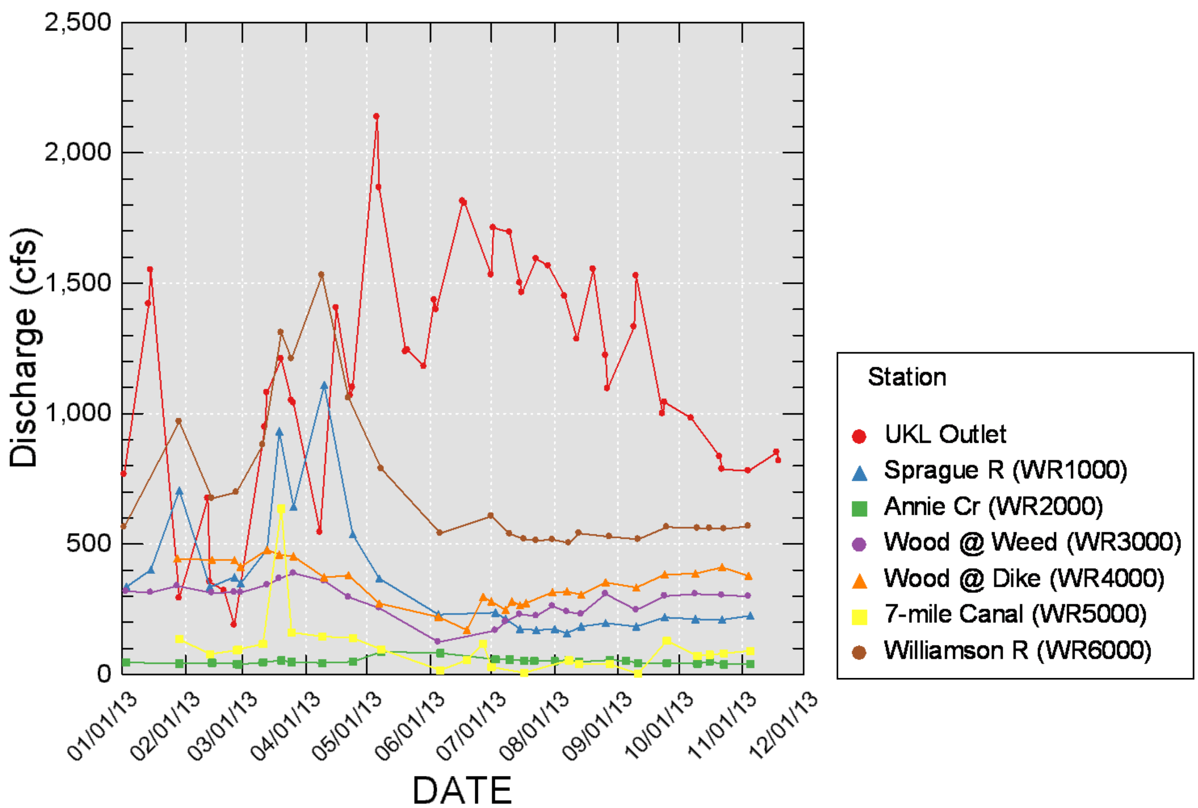

Figure 3. Flow (cfs) measurements coinciding with nutrient sample collection dates, 2013. Flow shown only for dates that nutrient data exist.

The total phosphorus (TP) and total nitrogen (TN) mass (kg/day) for each 2012 sample station and date were computed as the product of daily water volume and measured TP or TN concentration. Nutrient data collection at the UKL outflow station (Upper Klamath Lake @ Fremont Bridge) was discontinued by the Klamath Tribes during 2006-2011 due to funding reductions. Although the UKL sampling station PM is used as a surrogate for the UKL outflow for intervals when data for Upper Klamath Lake @ Fremont Bridge are not available, this caused data gaps for the October-March period during 2006 and 2007.

Beginning in 2008, the U.S. Bureau of Reclamation (USBOR) began monitoring nutrients during the winter months at Link River Dam and near the mouth of the Link River. These data were provided by USBOR along with limited data collected by PacifiCorp during the winter of 2009 and 2010 (Excel spreadsheets: *KRWQ2007-2010KLLD.xls* and *Pacificorpdata2009-2010.xlsx*). Outflow provided by USBOR for 2011 and 2012 also included additional data for 2009 and 2010 that had not been previously provided (Excel spreadsheets: *KRWQ2007-2012KLLD.xls*[2]*)* In addition, the Klamath Tribes again began sampling Upper Klamath Lake @ Fremont Bridge in 2012. Additional nutrient data were incorporated from data provided by both USGS and USBR in 2013 leading to higher frequency at this station. Station names for the various outflow stations were standardized by renaming them UKL-Out. When stations were sampled on the same date a mean was taken. Loading graphs and summaries are computed based on the October-September hydrologic water year (denoted HY in below plots).

RESULTS/DISCUSSION

Nutrient Concentration

The 2013 nutrient concentration pattern among inflow stations was similar to that of the 1991-2012 sampling period (Figure 4); total P and PO_4-P tended to be higher at the Wood River and Seven Mile stations (WR3000, WR4000, and WR5000); total N tended to be lower for the Wood River stations (WR3000 and WR4000) but higher for Seven Mile (WR5000); values for the Williamson River (WR6000) tended to be intermediate relative to other stations for most parameters, but values for the Sprague River (WR1000) tended to be lower for TP and PO_4-P, and second highest for TN after Seven Mile. In addition, Annie Creek at Snow Park (previously sampled from 2003-2012) showed consistently lower concentrations for all nutrient parameters except nitrate/nitrite among the inflow stations (Figure 4; Table 3).

With the exception of Seven Mile Canal, the UKL outlet (KL0001) tended to be higher than inflow stations for TP, lower for PO_4, and substantially higher for TN and ammonia (NH_4-N). Long-term upper quartile values for NO_3-N were also higher at the UKL Outlet station than for inflow stations, and were substantially higher in 2013. Outflow NO_3-N was notably higher than

[2]sources: http://www.kbmp.net/collaboration/klamath-hydroelectric-settlement-agreement-monitoring, and spreadsheet "UKL-FreemontBridge-WQ-2012-13-BOR.xlsx" provided by Rick Carlson, Physical Scientist, Bureau of Reclamation Klamath Basin Area Office, racarlson@usbr.gov. The latter file includes additional data collected at Fremont Bridge as part of a 3-year nutrient budget study of the Klamath Project.

inflow stations during 2012. Similar to 2010, NH_4-N at the UKL Outlet was substantially higher than Seven Mile Canal[3] (Figure 4; Table 3).

TP distribution in 2013 was noticeably lower for the Sprague River; Annie Creek showed lower inter-quartile range, and remaining stations were similar to the long-term 1991-2012 distribution, with fewer extreme values as well (Figure 4). Similar to 2011, the 2012 distribution of Sprague River PO_4-P concentration was noticeably lower when compared to the long-term distribution. The UKL-Outflow TP also showed a reduced inter-quartile range compared to the long-term distribution

All but Sprague River and Sevenmile were similar to their respective long-term PO_4-P distributions in 2013; the Sprague River showed a noticeably lower distribution, and Sevenmile a higher distribution. The UKL-Outflow PO_4-P distribution in 2012 was noticeably higher than the long-term distribution. Other notable departures from the long-term distributions include overall lower Outflow, Annie Cr., Wood-Dike, and Williamson TN, higher Outflow and Sevenmile NH_4-N, and higher Outflow, Wood-Weed, Wood-Dike and Sevenmile NO_3-N (Figure 4). Comparisons of inflow ammonia and nitrate-nitrite between 2013 and the long-term distribution are confounded by levels near method detection limits and by a change in detection limits when the SRWQL began processing samples in 2008[4]. However, Outflow, Williamson River, and Sevenmile values for these parameters are affected to a lesser degree because values tend to be above method detection limits. Higher Outflow nitrate values in 2013 may be due to the increased sampling frequency during winter months when NO_3-N is usually higher overall than other seasons. A plot of the June-October distributions shows that the Sprague River was lower for all parameters, and Sevenmile was higher (Appendix II)

Similar to 2012, time series plots of the 2013 concentration data show Seven Mile Canal (WR5000) to have among the highest values for TP, PO_4, PP (particulate P which equals TP minus PO_4), and TN (Figure 5). Although phosphorus values typically tend to seasonally peak during both the spring runoff period and the summer irrigation season, the peak was less pronounced in the spring than previous years, higher values generally occurred during the irrigation season in 2013. With respect to $PO_{4,}$ the Wood River stations also showed high values, followed by the Williamson and then the Sprague River; a pattern similar to other years. The typical pattern of Sprague River PP concentrations being among the highest in the spring, and declining during the low-flow summer period was not observed in 2013 (Figure 5). TP, PO_4, PP, and TN at the UKL Outflow station increased relative to the inflow stations during the summer algal growing season (primarily July-August).

Ammonia (NH_4-N) and nitrate (NO_3-N) at the Outflow station also increased seasonally, ammonia in June-July and nitrate in August, with values tending to remain high through the fall and winter before declining in the spring (Figure 6). In general, ammonia in Sevenmile Cr. tends to be among the highest relative to other inflow stations. Silica concentration at the Wood River and Annie Cr. Stations tended to be higher than the Sevenmile, Sprague, and Williamson stations during the spring, with Annie Creek declining during May and June before increasing in July; the Sprague River tended to show the lowest silica concentrations (Figure 6). The UKL Outflow

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[3] During 2011 and 2009 the UKL Outlet was similar to Seven Mile Canal (Kann 2011)
[4] Aquatic Research Inc. indicated a reporting limit of 10 µg/L; the SRWQL utilizes a reporting limit of 12 µg/L.

station showed a clear seasonal pattern where silica values were depressed during the spring and early summer before increasing sharply in July to higher levels (Figure 6). The spring silica depression at the Outflow station coincides with diatom blooms occurring in Upper Klamath Lake.

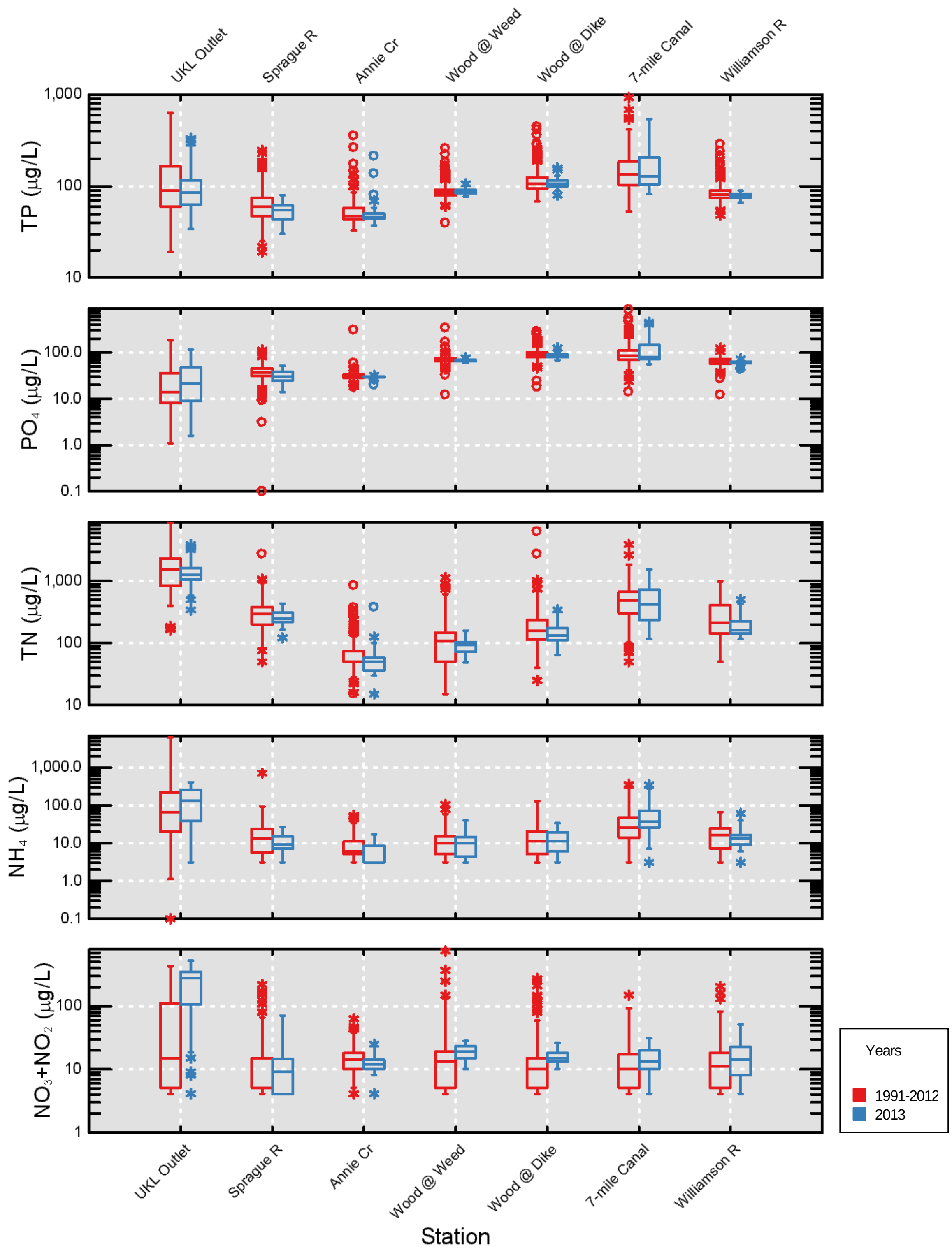

Figure 4. Station distributions of TP, SRP, TN, NH4-N, and NO3+ NO2-N concentration (µg/L) compared between 1991-2012 (red) and 2013(blue).

Table 3. Basic statistics by station for TP, SRP, TN, NH_4-N, NO_3+ NO_2-N and SiO_2 concentration, and TP and TN load, Water Year 2013.

Station Code	Station Name	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
UKL Out	UKL Outlet	N of Cases	56	48	56	52	48	25	56	56
UKL Out	UKL Outlet	Median	85	21	1270	134	281	38600	201	3038
UKL Out	UKL Outlet	Arithmetic Mean	115	31	1505	154	243	37060	354	4330
UKL Out	UKL Outlet	Coefficient of Variation	0.714	0.975	0.554	0.812	0.613	0.185	0.995	0.901
UKL Out	UKL Outlet	Pct25	63	9	1055	39	112	30950	117	1729
UKL Out	UKL Outlet	Pct75	117	48	1640	261	351	42400	382	4454
WR1000	Sprague R	N of Cases	27	27	27	27	27	27	26	26
WR1000	Sprague R	Median	55	30	246	9	9	28500	33	162
WR1000	Sprague R	Arithmetic Mean	53	31	263	11	16	28607	52	255
WR1000	Sprague R	Coefficient of Variation	0.253	0.322	0.272	0.600	1.277	0.100	0.912	0.983
WR1000	Sprague R	Pct25	43	24	215	7	4	26550	21	116
WR1000	Sprague R	Pct75	62	38	316	16	15	30450	57	222
WR2000	Annie Cr	N of Cases	26	27	27	27	27	27	26	27
WR2000	Annie Cr	Median	46	29	50	3	12	41600	6	6
WR2000	Annie Cr	Arithmetic Mean	58	29	63	5	12	40693	9	10
WR2000	Annie Cr	Coefficient of Variation	0.645	0.085	1.065	0.732	0.402	0.083	1.154	1.748
WR2000	Annie Cr	Pct25	44	29	36	3	10	40175	5	4
WR2000	Annie Cr	Pct75	50	30	58	9	14	42275	7	8
WR3000	Wood @ Weed	N of Cases	27	27	27	27	27	27	26	26
WR3000	Wood @ Weed	Median	86	67	93	10	19	38900	64	66
WR3000	Wood @ Weed	Arithmetic Mean	88	67	93	11	19	38689	62	68
WR3000	Wood @ Weed	Coefficient of Variation	0.073	0.058	0.331	0.757	0.278	0.023	0.267	0.493
WR3000	Wood @ Weed	Pct25	83	64	72	4	15	38425	49	37
WR3000	Wood @ Weed	Pct75	91	69	105	15	23	39200	72	85
WR4000	Wood @ Dike	N of Cases	27	28	28	28	28	28	26	27
WR4000	Wood @ Dike	Median	106	85	132	11	15	37600	100	120
WR4000	Wood @ Dike	Arithmetic Mean	110	86	149	13	16	37457	96	130
WR4000	Wood @ Dike	Coefficient of Variation	0.151	0.146	0.429	0.655	0.283	0.029	0.251	0.473
WR4000	Wood @ Dike	Pct25	100	79	112	6	13	36750	75	77
WR4000	Wood @ Dike	Pct75	116	91	175	20	18	38050	109	164
WR5000	7-mile Canal	N of Cases	28	28	28	28	28	28	28	28
WR5000	7-mile Canal	Median	128	81	424	37	13	33050	30	70
WR5000	7-mile Canal	Arithmetic Mean	198	144	537	71	16	32607	28	90
WR5000	7-mile Canal	Coefficient of Variation	0.715	0.817	0.723	1.225	0.450	0.093	1.602	2.152
WR5000	7-mile Canal	Pct25	104	73	234	26	10	31050	18	28
WR5000	7-mile Canal	Pct75	208	145	733	73	20	34500	42	106
WR6000	Williamson R	N of Cases	27	27	27	27	27	27	26	26
WR6000	Williamson R	Median	78	62	161	13	14	33700	115	234
WR6000	Williamson R	Arithmetic Mean	78	61	213	16	17	33419	137	448
WR6000	Williamson R	Coefficient of Variation	0.073	0.124	0.546	0.754	0.776	0.069	0.403	1.021
WR6000	Williamson R	Pct25	75	59	142	9	8	33025	102	196
WR6000	Williamson R	Pct75	83	64	234	17	23	34475	137	505

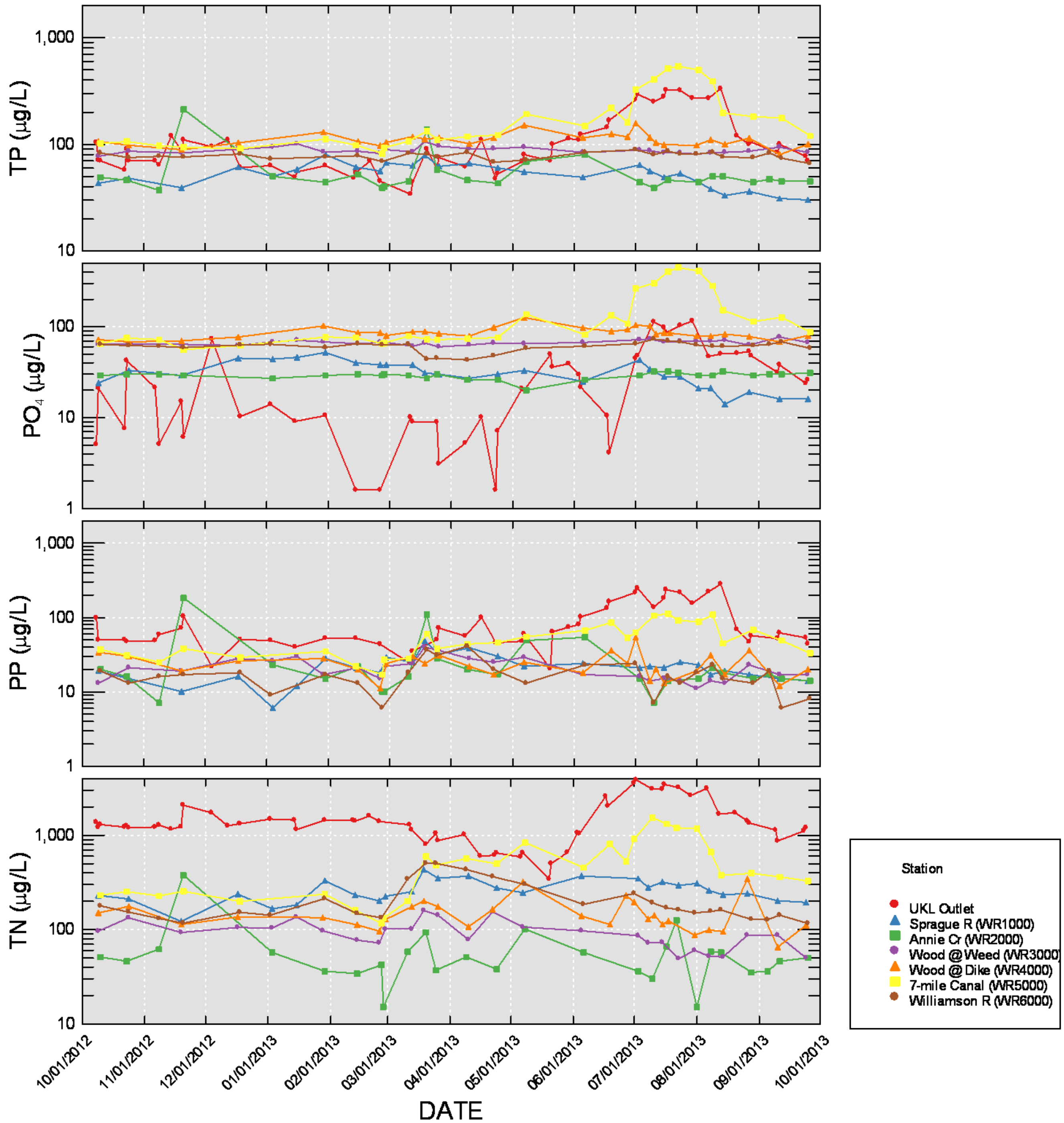

Figure 5. Time-series plot of TP, SRP, PP and TN concentrations for Upper Klamath Lake tributaries and outflow, HY 2013.

Figure 6. Time-series plot of NH_4-N, NO_3+ NO_2-N and SiO_2 concentrations for Upper Klamath Lake tributaries and outflow, HY 2013.

The TN:TP ratio at the UKL Outflow station was relatively high (TN:TP > ~15; approaching 30 in March) during the late fall and early winter (2012-2013), and similar to earlier years (see Kann 2012) ratios then remained mostly higher than tributary stations through the season (Figure 7). The lowest values of the year (~5) occurred during late-May and June. The overall pattern appears similar to earlier years when the TN:TP ratio at UKL Outflow was higher (TN:TP ≅ 10) than tributary stations in April, declined during May and June, increased during early summer UKL bloom development, and declined through the bloom decline period before increasing again in September (Figure 7). The TIN:SRP ratio in the Outflow decreased from peak values of ~450 during February to ~50 in April, and then to seasonal low values in July (~0.2), before increasing sharply into August and September (~10) (Figure 7). Both TN:TP and the majority of TIN:SRP values in the inflow tributary stations indicate nitrogen limiting conditions (<10 for TN:TP and <1 for TIN:SRP) that would tend to promote nitrogen-fixing algae such as the *Aphanizomenon* prevalent in UKL. The Wood River in particular showed very low TIN:SRP ratios (<0.3).

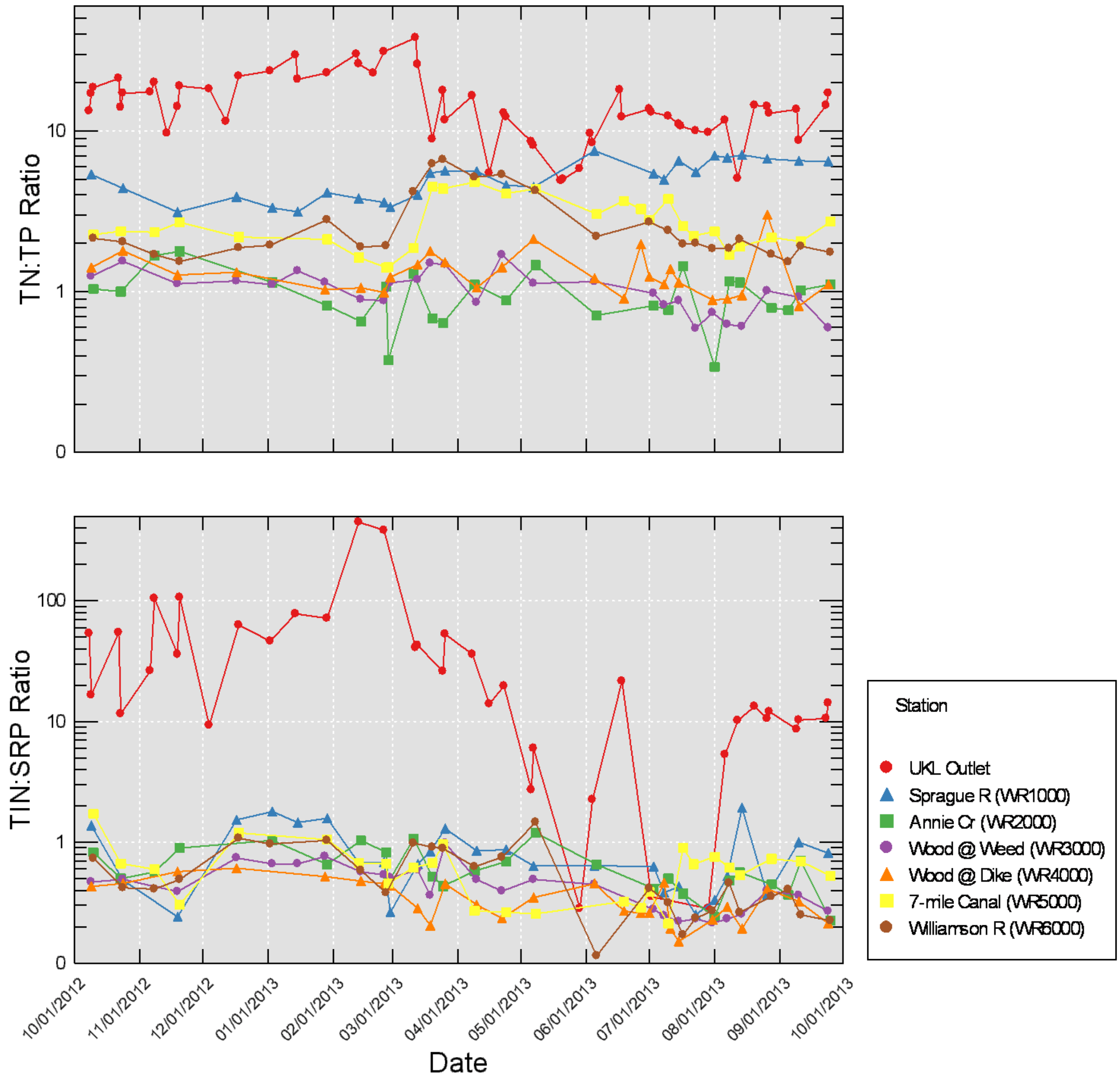

Figure 7. Total nitrogen to total phosphorus (TN:TP) and total inorganic nitrogen (NOx-N+NH_4-N) to PO_4 (TIN:SRP) ratios in Upper Klamath Lake tributaries and outflow stations, HY 2013.

Time-series plots of these ratio data comparing the Williamson River and UKL Outflow (summarized for the April-October period when data for both stations were consistently available) show that both ratios (TP:TN and TIN:SRP) were always higher leaving UKL than they were in the Williamson River inflow (Figure 8). Much of this increase is likely due to increases in UKL nitrogen due to both nitrogen-fixation by blue-green algae (particularly the dominant *Aphanizomenon flos-aquae*) and sediment regeneration of ammonia to the water column (although the ultimate source of the sediment nitrogen is also derived from settled algal biomass). Ratios rose in the outflow relative to inflow despite additional internal loading or sediment recycling of phosphorus (Walker et al. 2012), which would tend to drive ratios downward. There is also indication of cyclical sub-decadal trends, particularly for the TIN:SRP ratio, over the 1991-2013 period. Further analysis is required to explore these apparent trends.

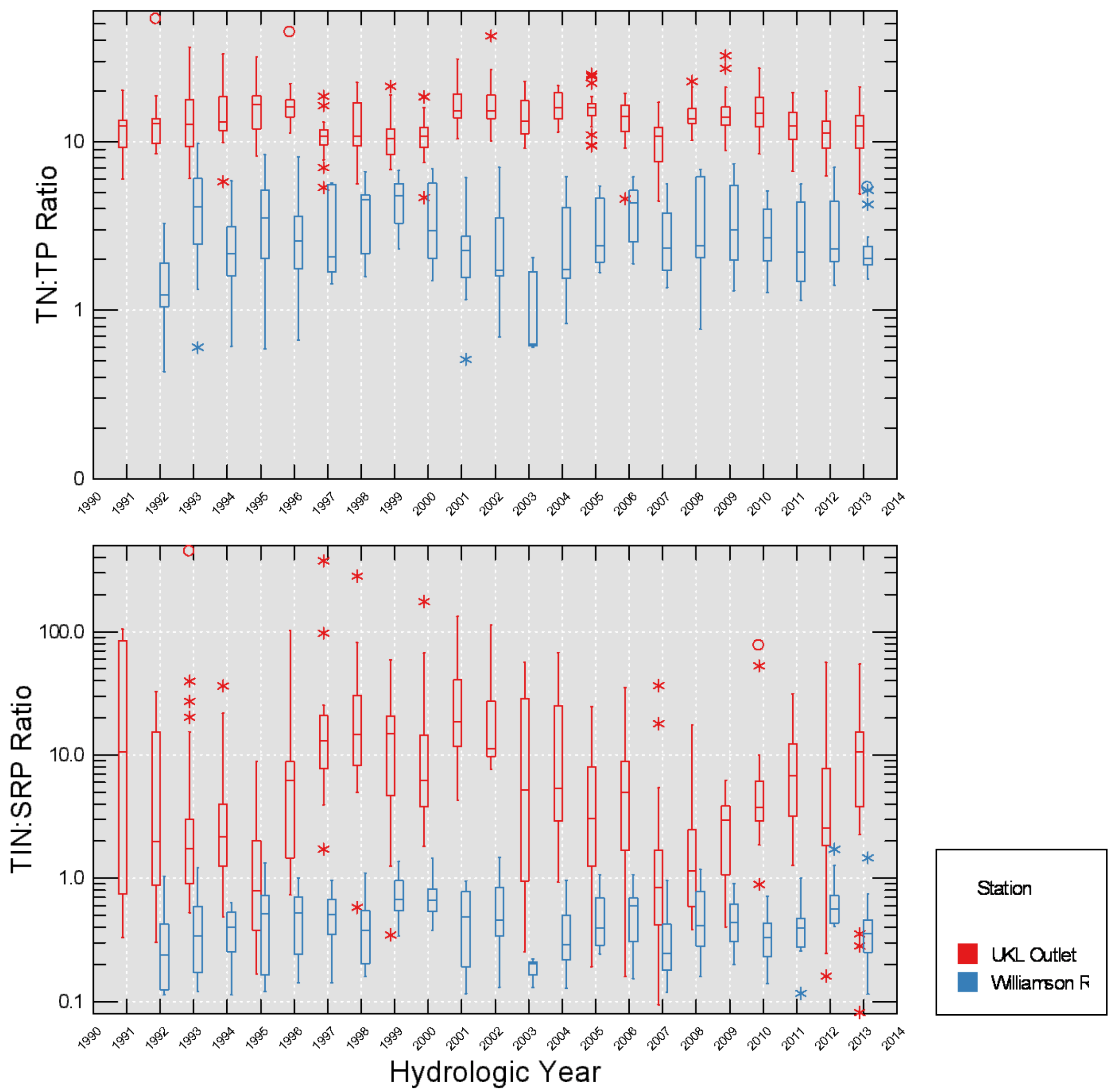

Figure 8. Total nitrogen to total phosphorus (TN:TP) and total inorganic nitrogen ($NOx-N+NH_4-N$) to PO_4 (TIN:SRP) ratios in the Williamson River and UKL outflow stations, April-October: 1991-2013.

TP and TN Loading

2013 Seasonal Pattern

The 2012 seasonal TP and TN tributary loading pattern showed a peak during the March-May period, generally coinciding with peak discharge (Figure 3; Figure 9). Loads then declined during the early-spring to early-summer period, generally remaining stable through the remainder of the season (although the Sprague R. continued to decline and Sevenmile fluctuated). An initial increase in UKL outflow loads of TP began in late-March, and for TN in late May, with a secondary and larger increase in early-July that is tied to internal nutrient recycling from sediments and nitrogen fixation in UKL (e.g., see Kann 1998; Kann and Walker 1999; Walker et al. 2012). Outflow TP loads were similar to or lower than Williamson River and Sprague River loading during the late-winter to early-spring spring period, but were then higher through the remainder of the year, while outflow TN loads generally remained higher than those for the Williamson River over this same period (Figure 9).

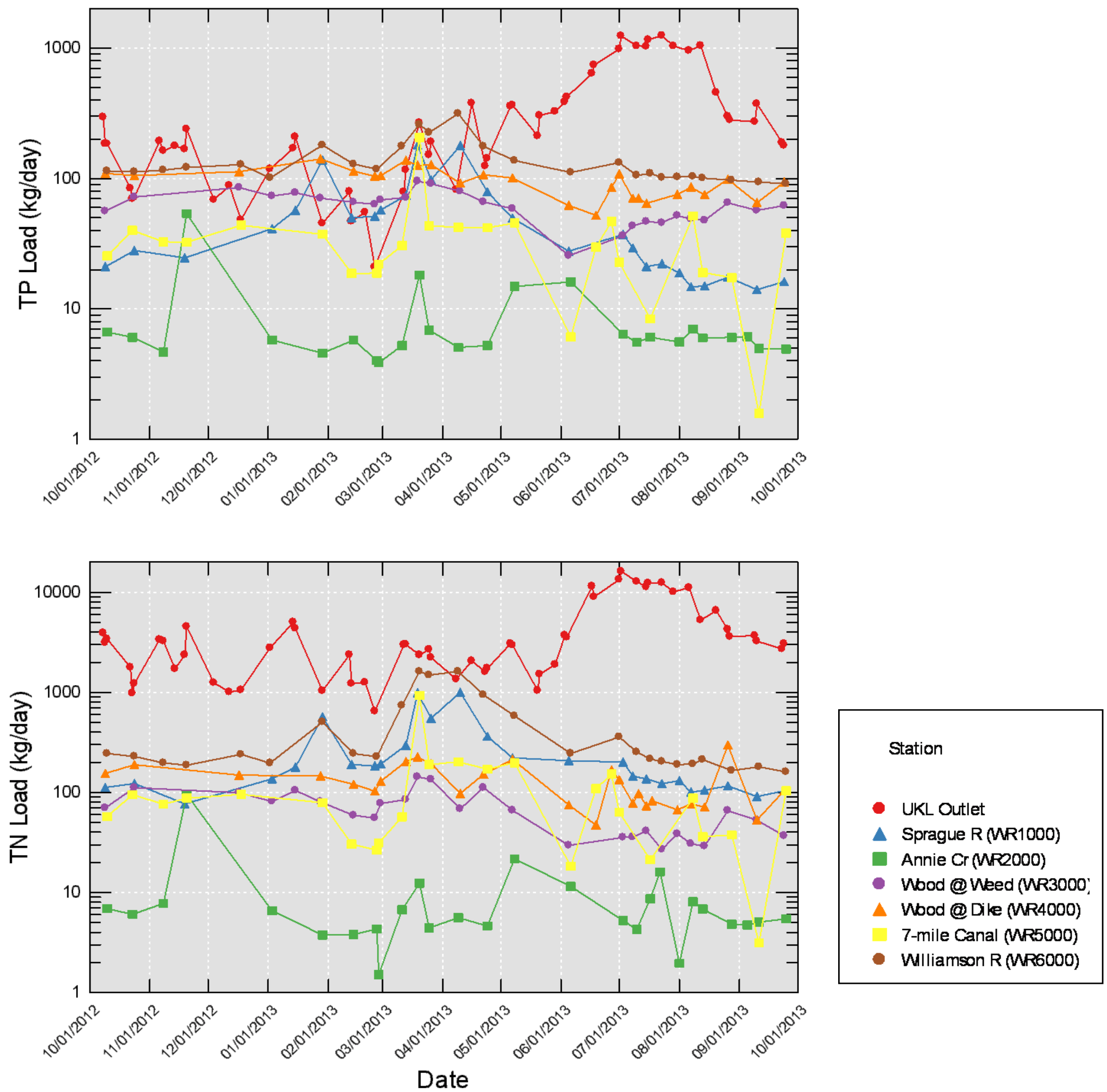

Figure 9. Seasonal TP and TN loading trends by station, HY 2013.

2013 Station Patterns

The 2013 nutrient loading pattern among stations was similar to that of the 1991-2012 sampling period (Figure 10). Also, as indicated above, TP and TN outflow loads tended to be higher than any individual inflow tributary loads during both 2013 and for the overall time period (1991-2012). Similar to 2010, when outflow TP and TN loads were lower overall than they were for the previous long-term period, 2013 outflow loads were also lower than the long term distribution. However, comparisons are somewhat confounded by the lack of winter data for the outflow during earlier years. As noted above, high UKL outlet loads reflect sediment regeneration and nitrogen fixation processes taking place in UKL.

Of the inflow tributaries, the Williamson River (WR6000) showed highest overall loading, with the 2013 TP and TN loading distributions somewhat lower than previous years. As with concentration, Annie Creek at Snow Park was consistently lower for both loading parameters (Figure 10). Sprague River TN load was more similar to the Williamson River TN load than it was for TP load (which was noticeably lower in the Sprague when compared to the Williamson), indicating that the Sprague River is contributing proportionally more nitrogen to the overall load. Both TP and TN loads in Sevenmile Canal were similar or somewhat lower (for TN) in 2013 than the long-term distribution, while Wood River TP and TN were similar to the long-term distribution (Figure 10). TP and TN loading patterns in both the Williamson and Sprague Rivers tended to follow the general pattern in discharge (although loading appears to be more closely linked to discharge in the Sprague River than in the Williamson River), and as noted above for Outflow concentration, there is indication of cyclical trending over the period of record (Figure 11).

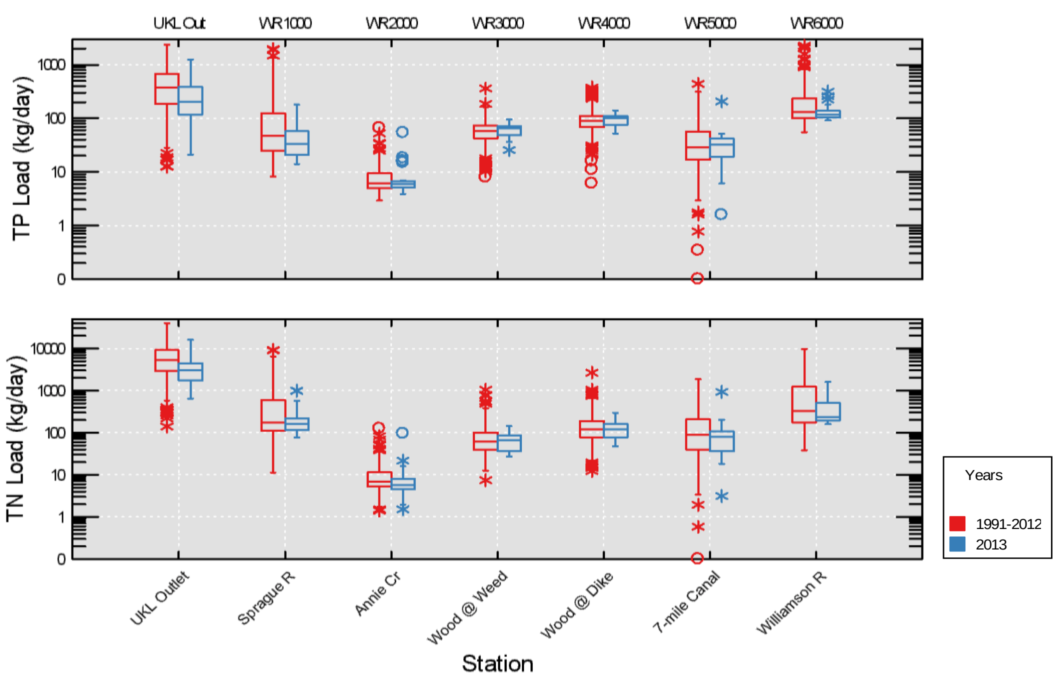

Figure 10. **Station distributions of TP and TN loading compared between 1991-2012 (red) and 2013 (blue). Note: for the outflow station KL0001 there are no samples from January to mid-April in HY2006, and for HY2007-2009 and HY2011 samples are missing between November and mid-April.**

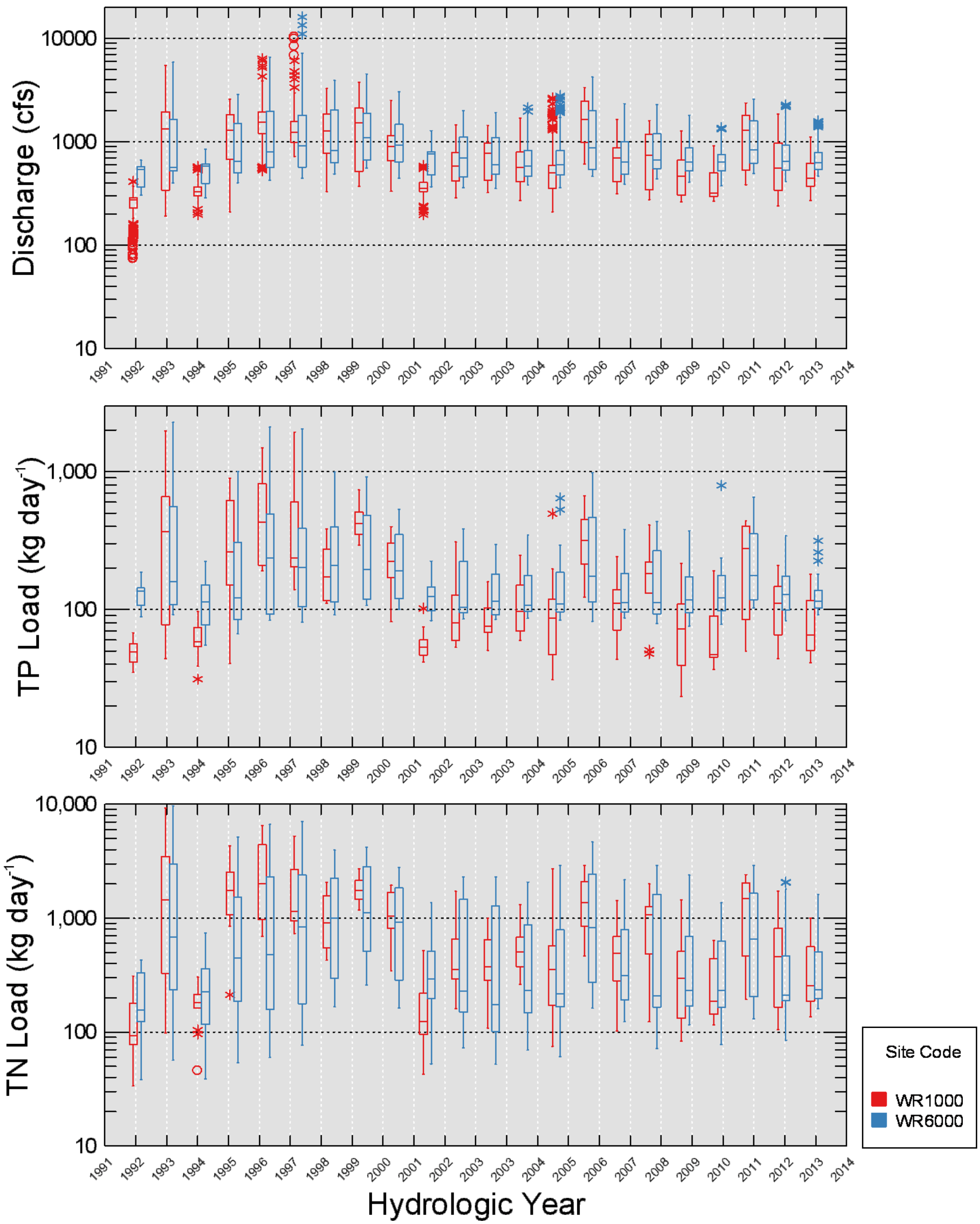

Figure 11. Distribution of Williamson River (WR6000) and Sprague River (WR1000) daily discharge (top panel), TP load (middle panel), and TN load (bottom panel) for the January-May inflow period, 1992-2013.

Inter-annual Patterns, 1991-2013

Although it is beyond the scope of this 2013 data summary report to analyze the inter-annual trends in detail, 1991-2013 comparisons for all sampling stations for three periods (all dates, the June-September period, and the Jan-May period) are shown for reference in Figures 11 to 24. Briefly, in 2013 the June -September UKL outflow TP loads were similar to 2011 but still generally lower than many previous years (Figure 12). Similarly, June-September TN loads were similar to 2011 but were also lower than many previous years (Figure 19). Note that for the UKL outlet station, the June-September period provides the most consistent inter-annual comparison due to changes in the winter and early spring sampling frequency over the period of record.

June-September and TP and TN loading distributions for the Sprague River in 2013 were higher than 2012, which was an exceptionally low year, but were still low relative to many other years (Figure 13 and Figure 20). Similarly Williamson River TP and TN loading distributions were among the lowest for the June-September period, but low to intermediate for the January through May period (Figure 18 and Figure 25). TN loading distributions for the Wood River stations during 2013 tended to be intermediate for the period of record, but was lower at both Weed and Dike Rd. during the June-September period (Figure 22 and Figure 23). The Wood River TP loading distribution for 2013 tended to be intermediate when compared to previous years (Figure 15 and Figure 16). Seven Mile Canal TP and TN loading during 2013 was similar to previous years (Figure 17 and Figure 24), and overall loads for Annie Creek during the Jan-May and Jun-Sep periods were lower compared to previous years (Figure 14 and Figure 21).

Inter-annual comparisons of nutrient concentration and loading at the various UKL inflow stations requires refined estimation of loading using multiple regression based-algorithms that represent concentration variations associated with flow (i.e., magnitude as well as ascending/descending limb of hydrograph), season (i.e., Julian day), and year (e.g., Walker and Havens 2003). A comprehensive analysis of time-series trends as well as hydrologic and nutrient budgets for UKL has been completed through 2010 (Walker et al. 2012).

SUMMARY

With the addition of 2013 data, the UKL tributary nutrient and loading database now includes 23 years of data and includes the years 1991-2013. As with the UKL water quality database, such a long-term monitoring program is essential for assessing change relative to management programs, as well as for understanding inter-annual dynamics. Also similar to recommendations for the UKL water quality database, continued monitoring is recommended to accommodate the restoration time-frame for Klamath Basin activities and to increase statistical power (sample size) for inter-variable analyses. While this data summary report is intended to provide an update of the long-term data base with 2013 tributary and outflow data, Walker et al. (2012) provide a more detailed and comprehensive analysis of the long-term UKL tributary database including statistical trend analyses and construction of hydrologic and nutrient budgets for UKL using the 1991-2010 dataset (Walker et al. 2012). A similar comprehensive treatment of the data is recommended at five year intervals.

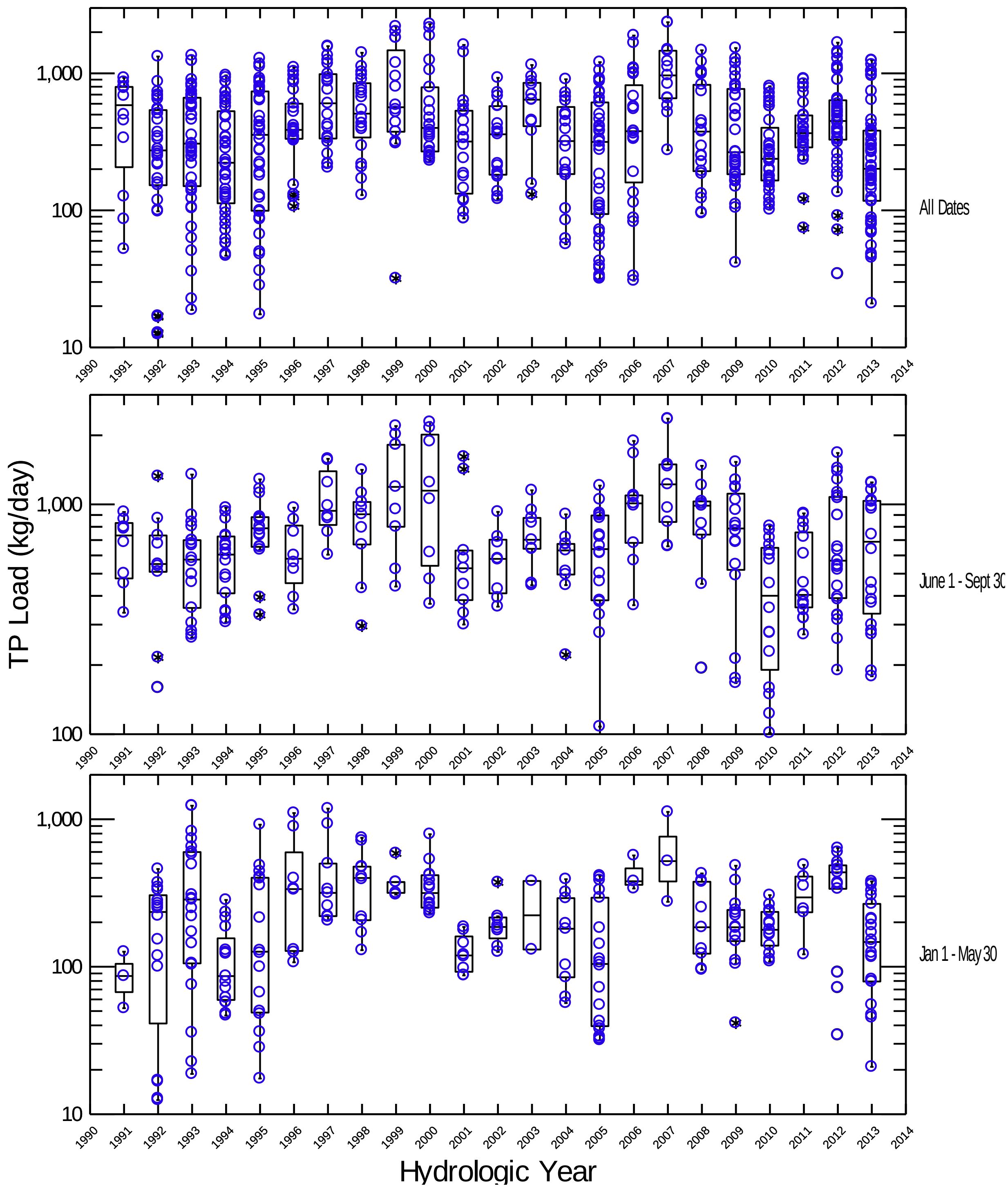

Figure 12. Annual and seasonal distributions of UKL Outlet TP loading, 1991-2013. Note: in HY2006, there are no samples from January to mid-April and in HY2007-2008 and 2011 there are no samples from November to mid-April.

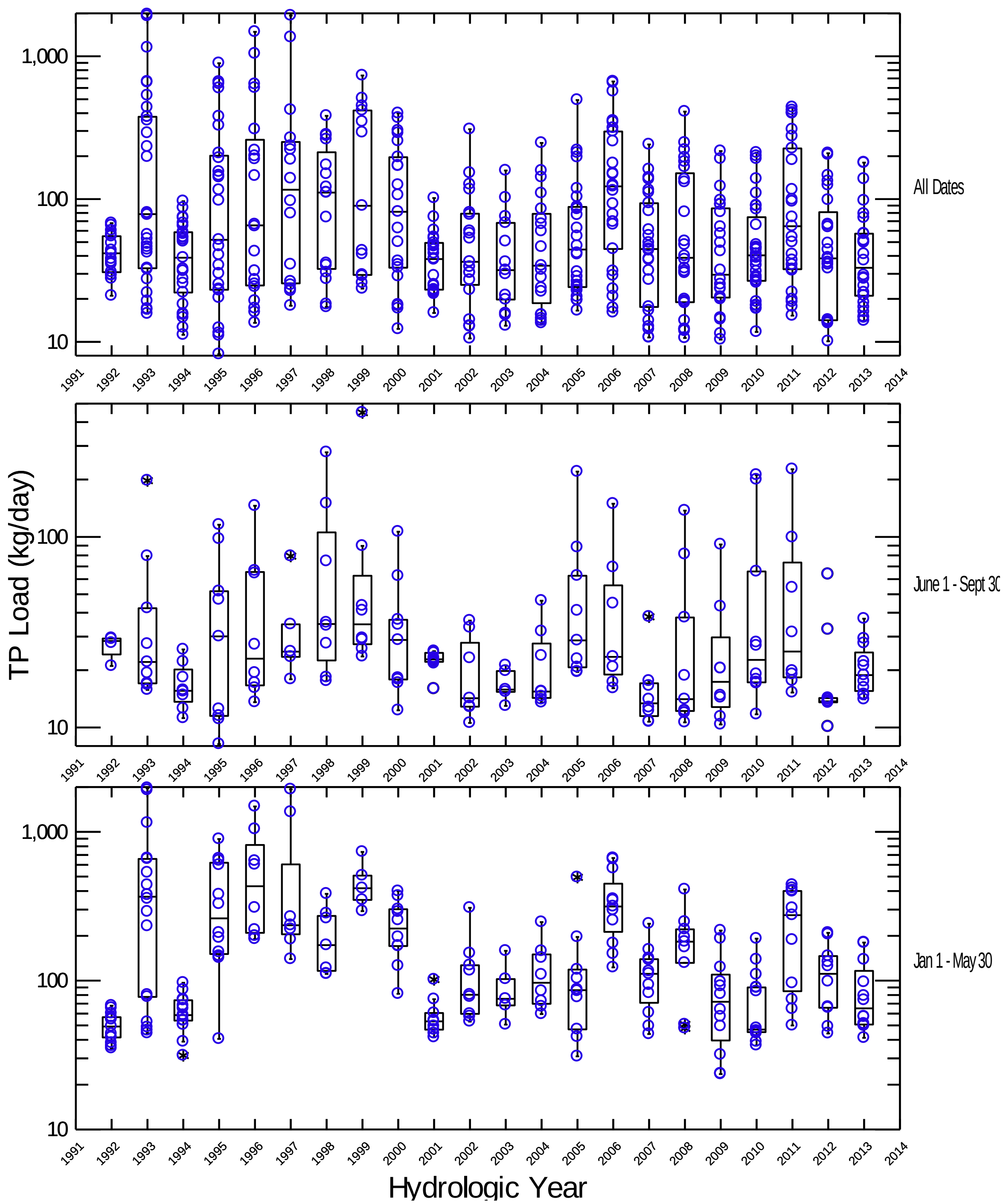

Figure 13. Annual and seasonal distributions of Sprague River TP loading, 1992-2013.

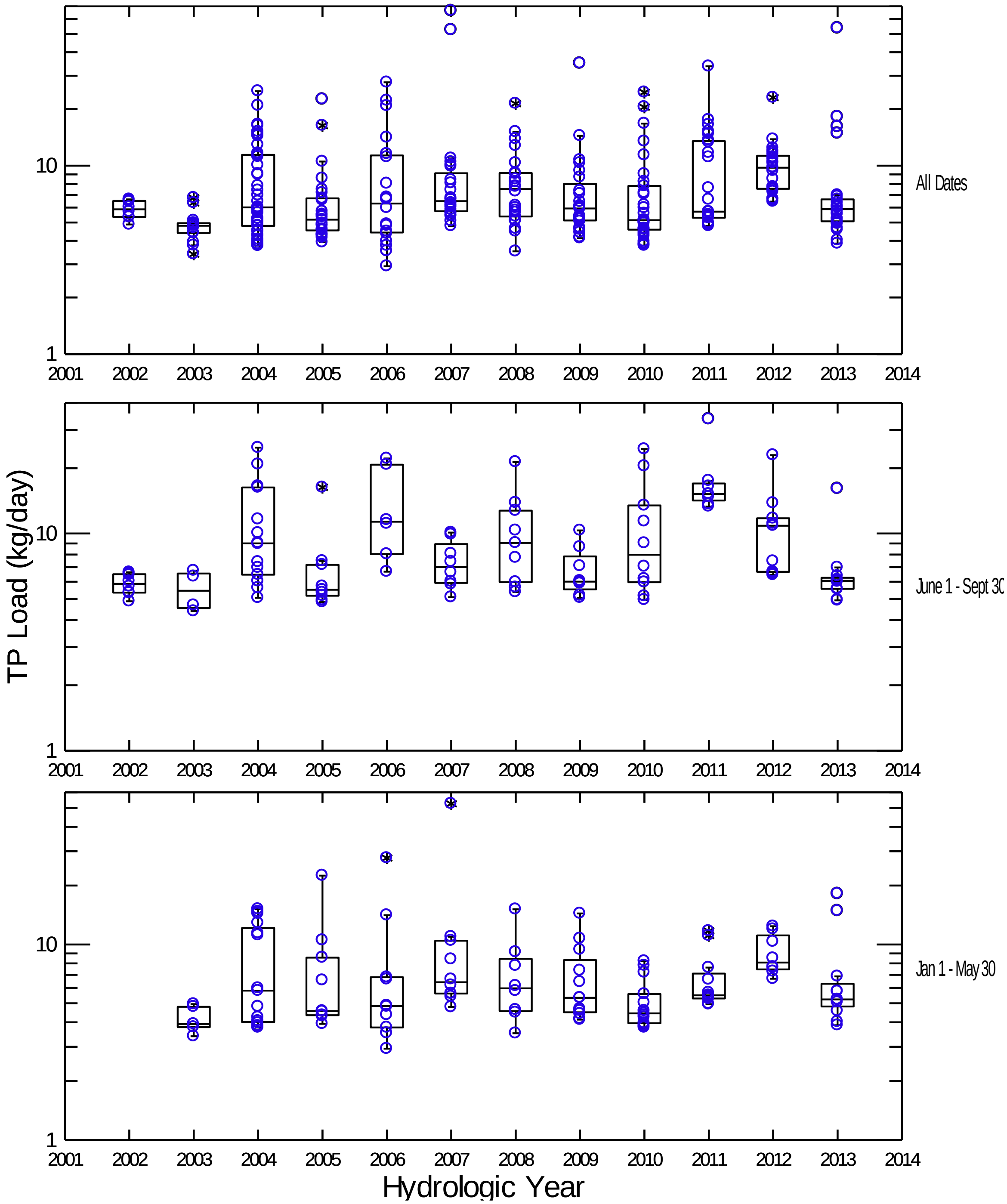

Figure 14. Annual and seasonal distributions of Annie Creek TP loading, 2002-2013.

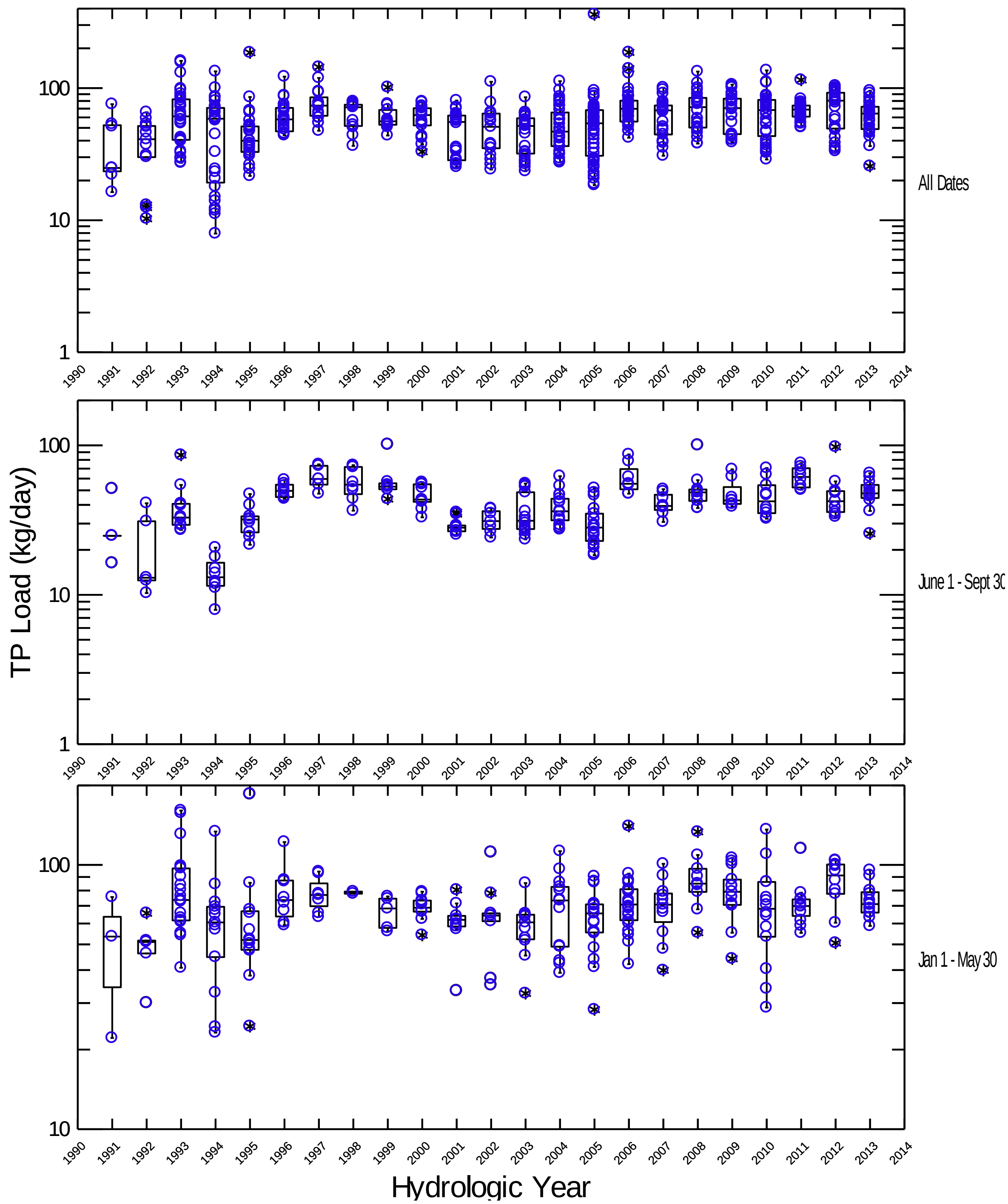

Figure 15. Annual and seasonal distributions of Wood River at Weed Rd. TP loading, 1991-2013.

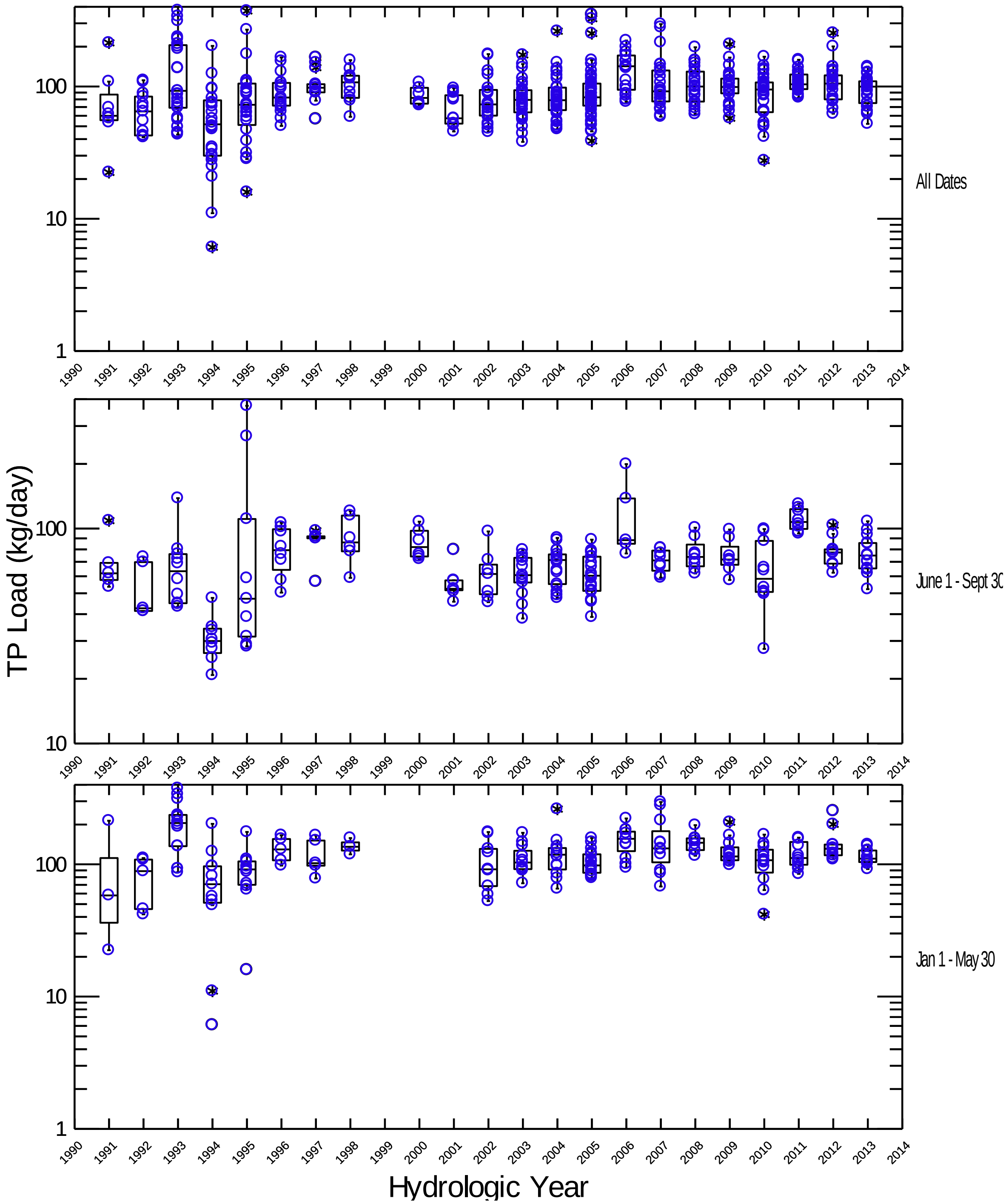

Figure 16. Annual and seasonal distributions of Wood River at Dike Rd. TP loading, 1991-2013.

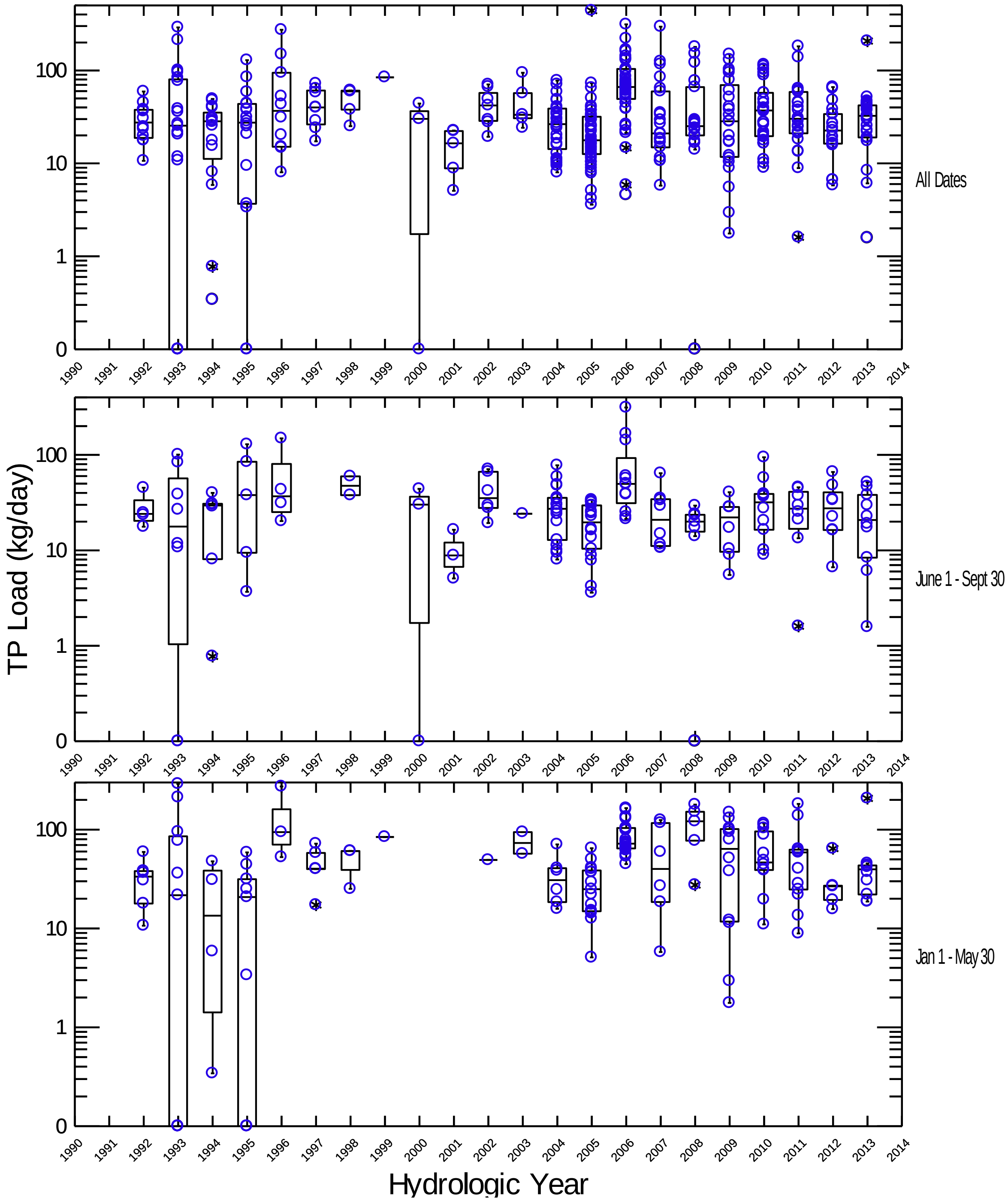

Figure 17. Annual and seasonal distributions of Seven Mile Canal TP loading, 1992-2013. Note that occurrences of zero load are due to lake-backwater effects when no flow is measured at the sampling location

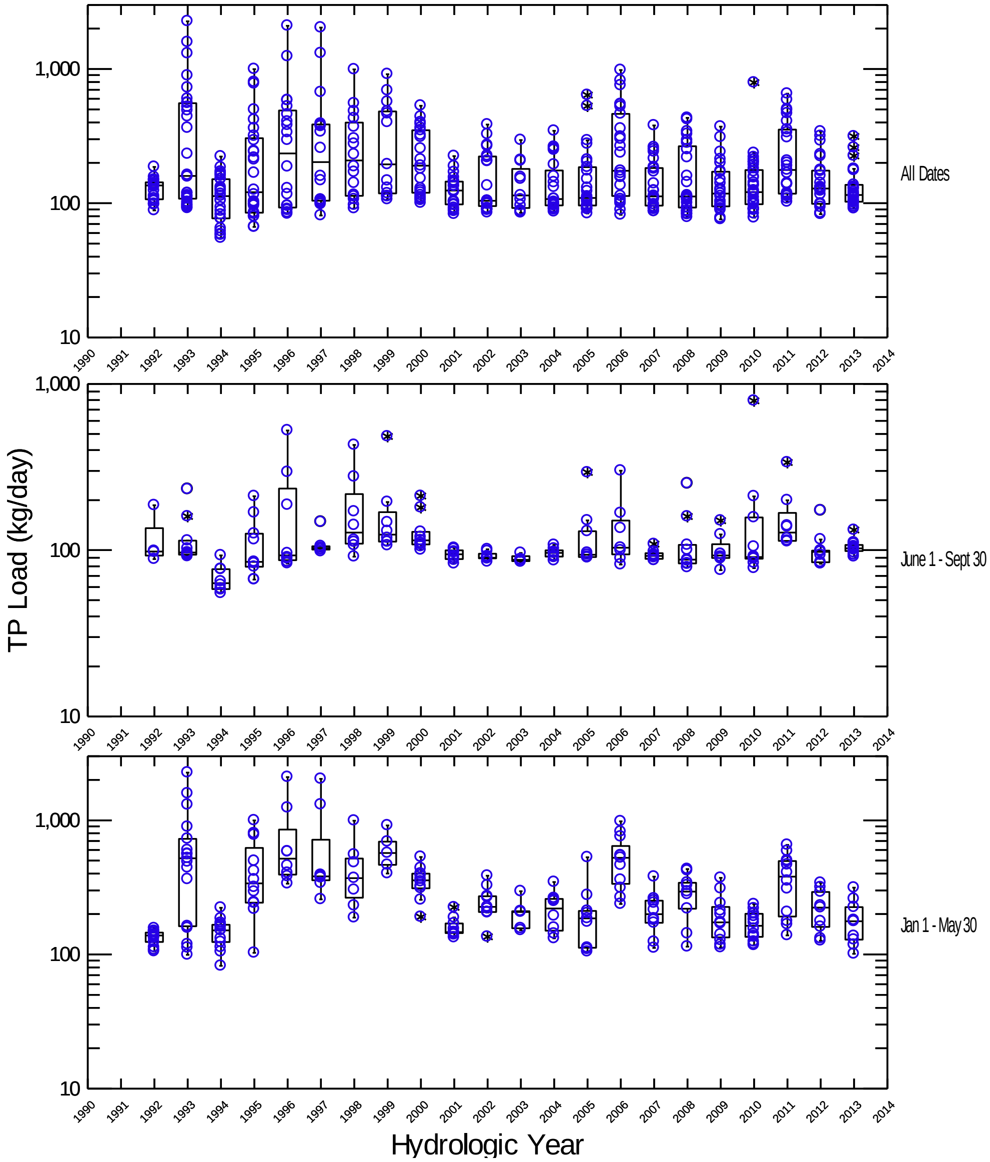

Figure 18. Annual and seasonal distributions of Williamson River TP loading, 1992-2013.

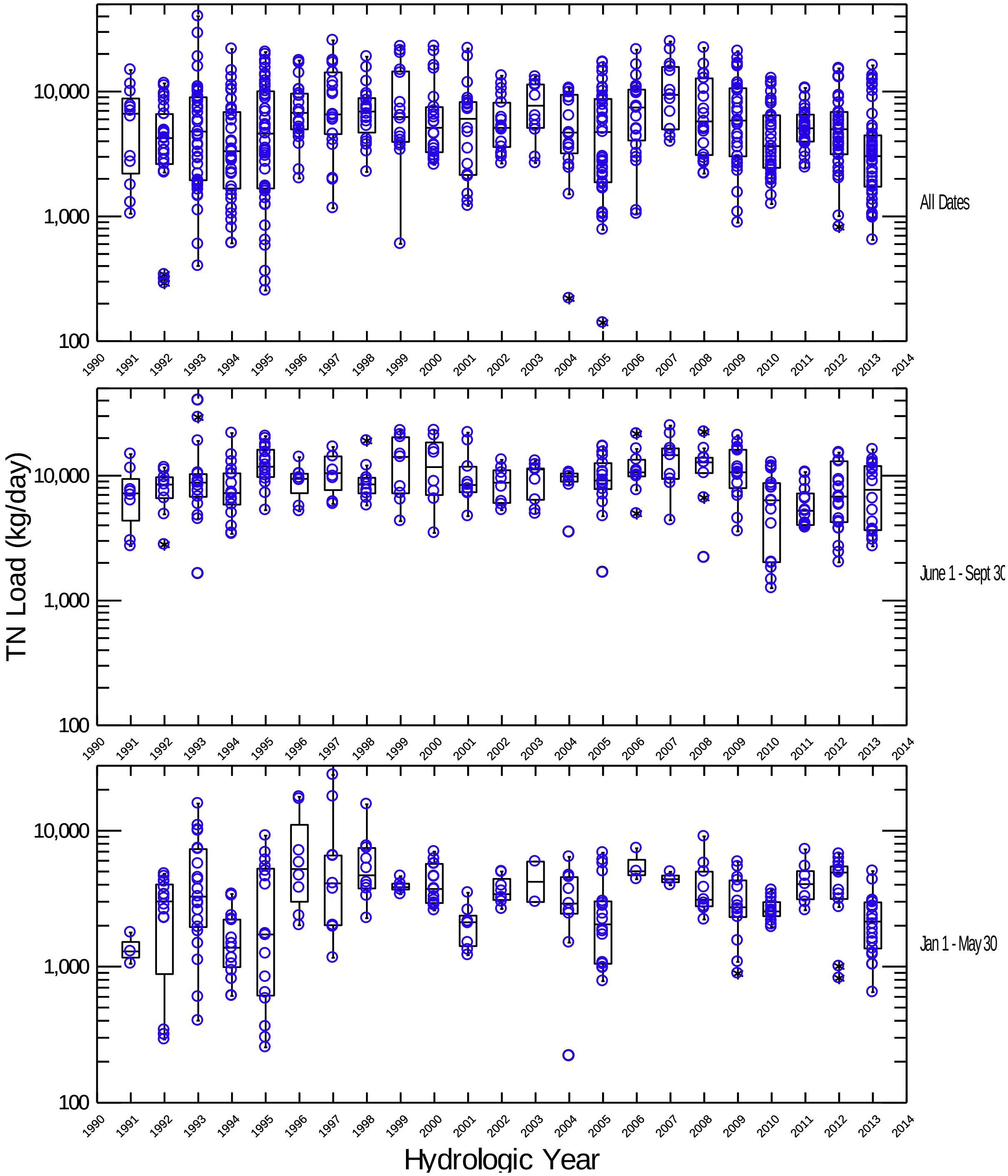

Figure 19. Annual and seasonal distributions of UKL Outlet TN loading, 1991-2013. Note: in HY2006, there are no samples from January to mid-April and in HY2007-2008 and 2011 there are no samples from November to mid-April.

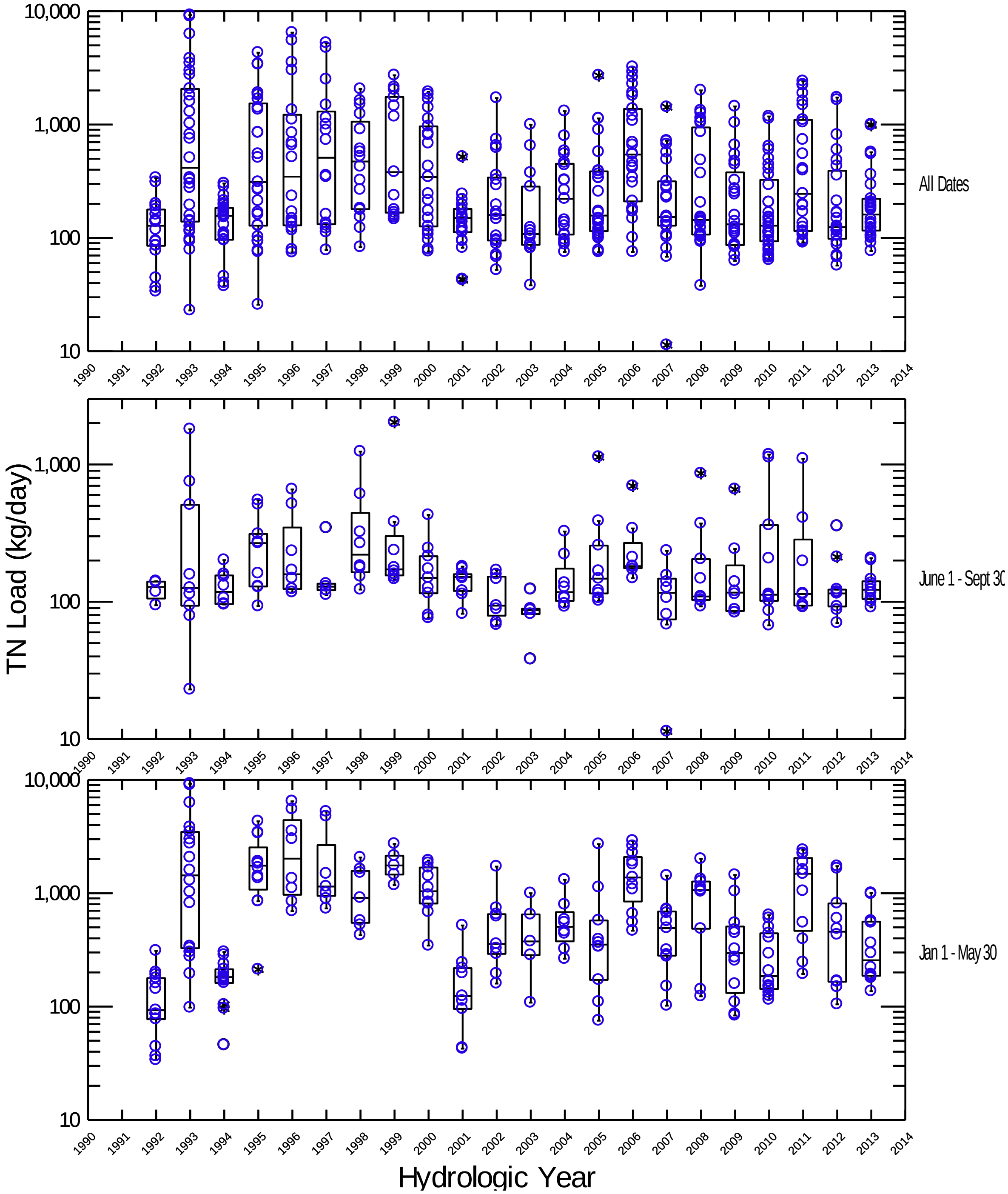

Figure 20. Annual and seasonal distributions of Sprague River TN loading, 1992-2013.

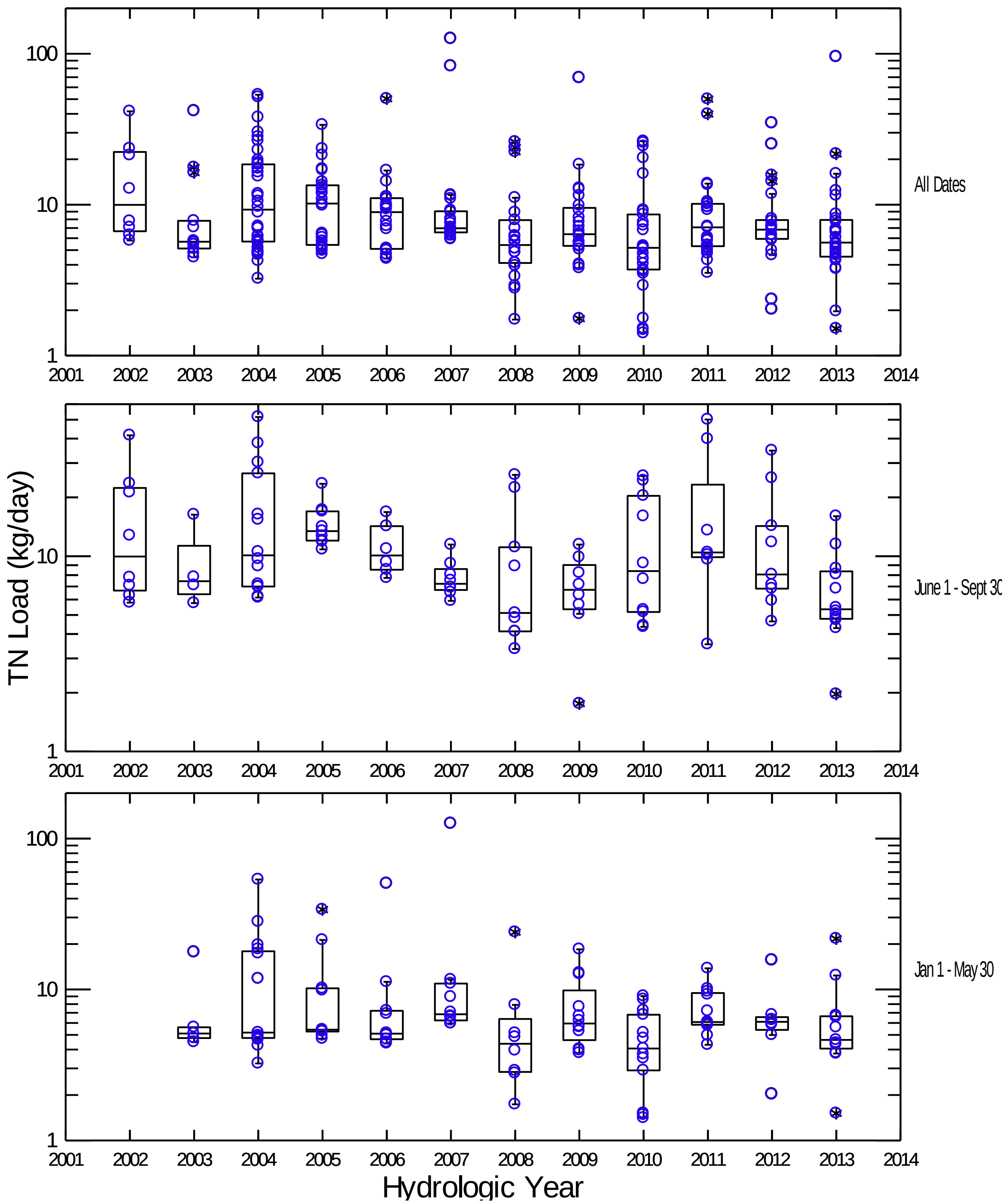

Figure 21. Annual and seasonal distributions of Annie Creek TN loading, 2002-2013.

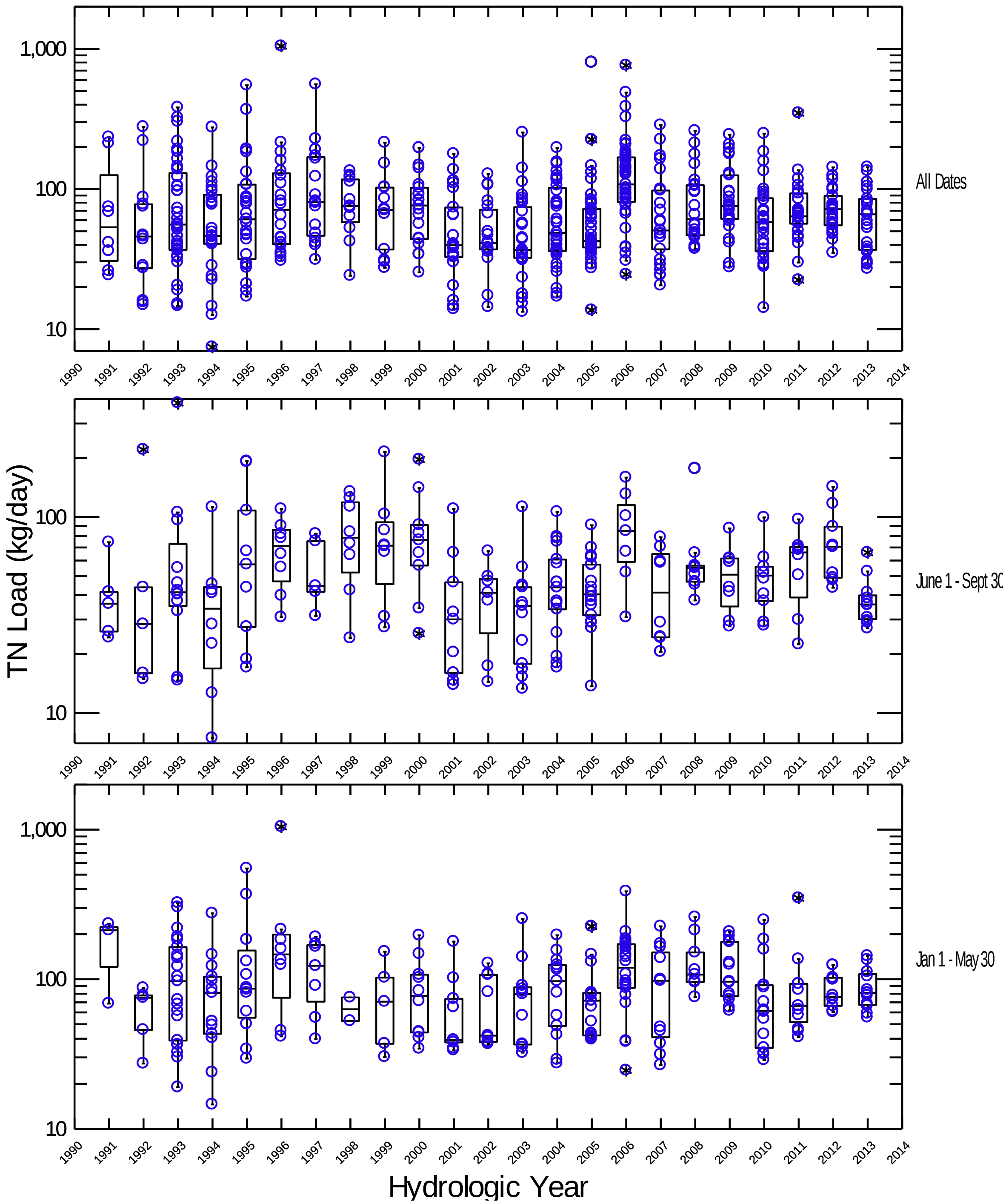

Figure 22. Annual and seasonal distributions of Wood River at Weed Rd. TN loading, 1991-2013.

TN Loads at Wood River at Dike Rd (WR4000) HY1991-2013

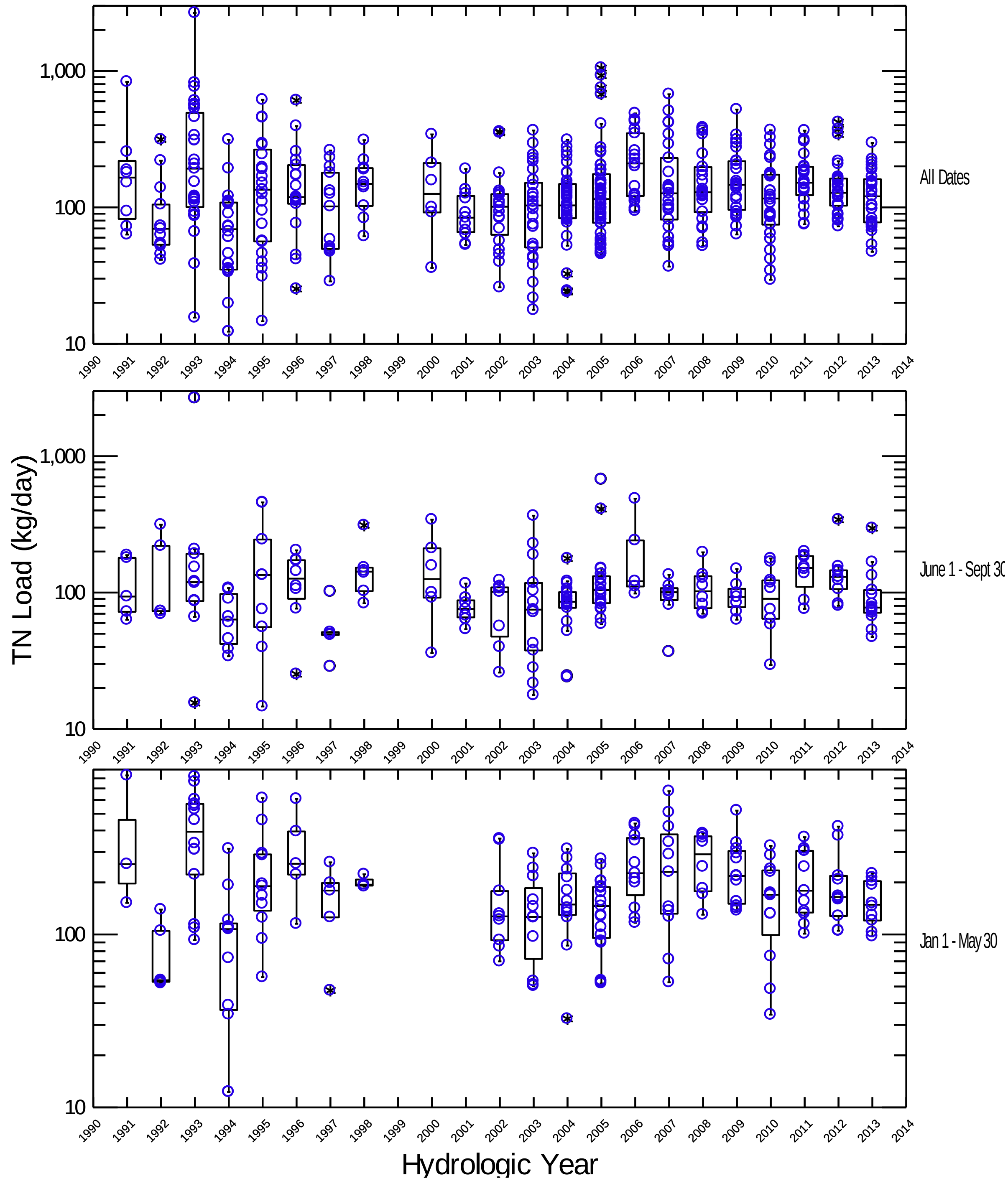

Figure 23. Annual and seasonal distributions of Wood River at Dike Rd. TN loading, 1991-2013.

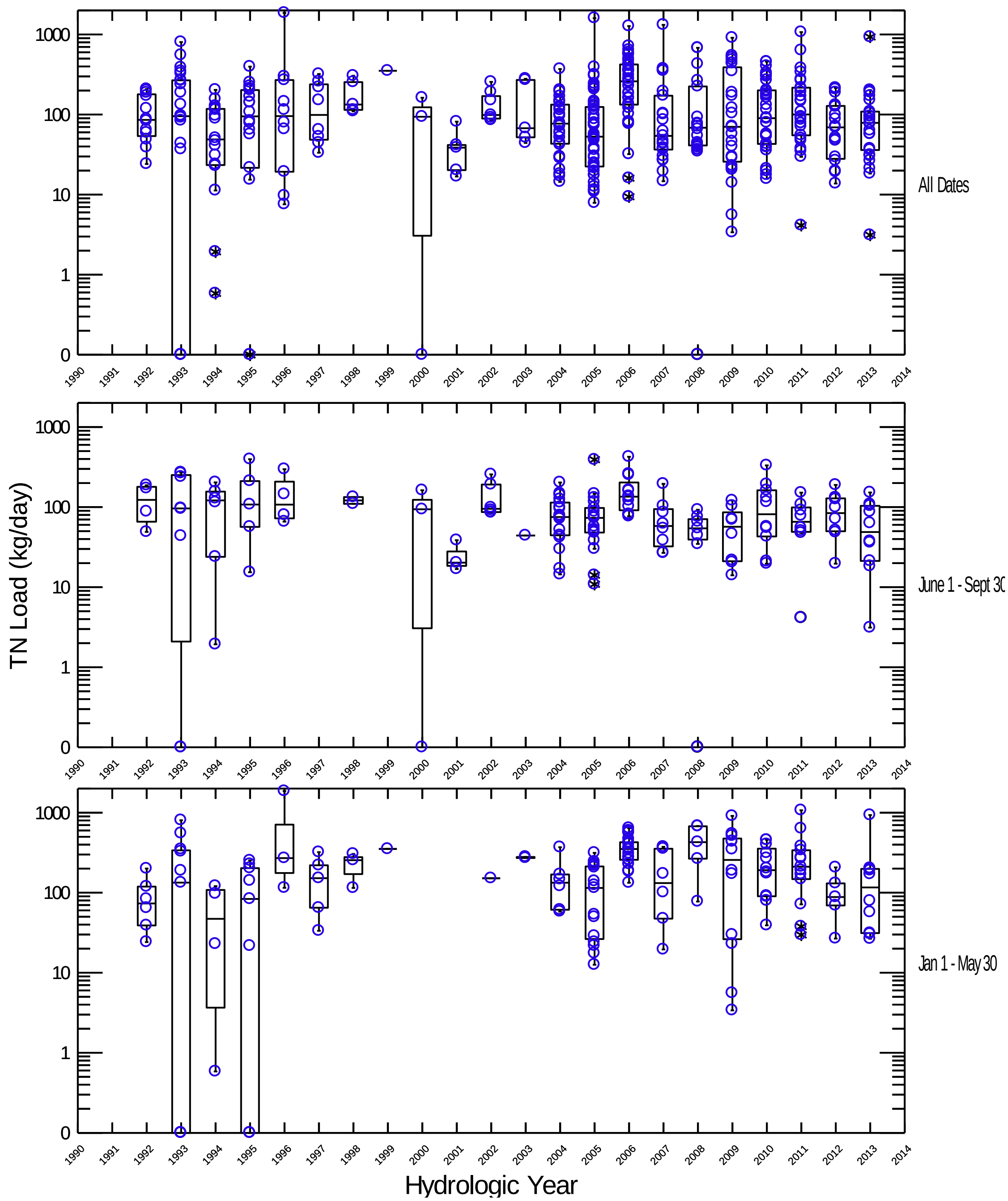

Figure 24. Annual and seasonal distributions of Seven Mile Canal TN loading, 1992-2013. Note that occurrences of zero load are due to lake-backwater effects when no flow is measured at the sampling location.

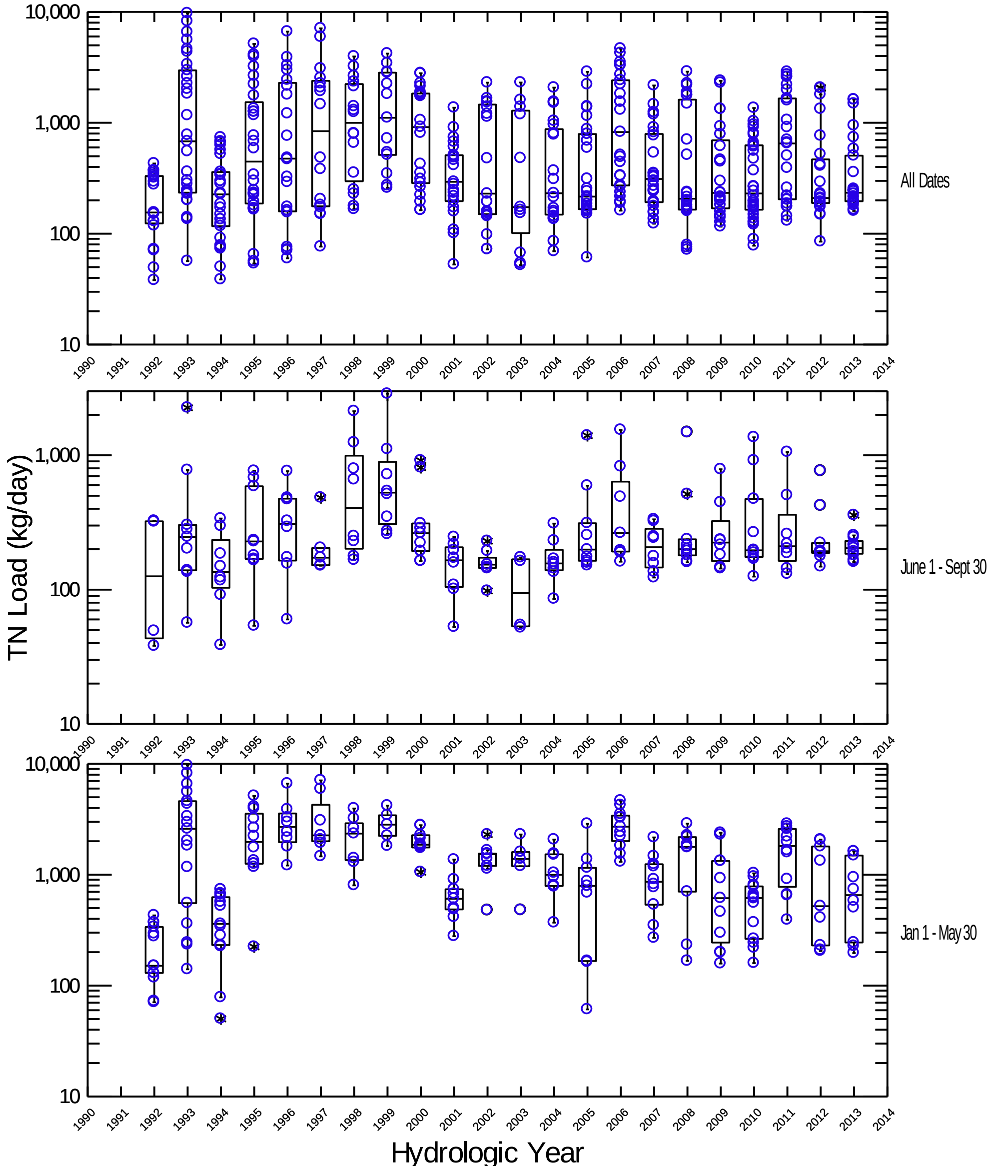

Figure 25. Annual and seasonal distributions of Williamson River TN loading, 1992-2013.

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APPENDIX I: Basic monthly statistics by station for TP, SRP, TN, NH_4-N, NO_3+ NO_2-N, SiO_2 concentration, and TP and TN load, Water Year 2013.

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
UKL Out	UKL Outlet	10	N of Cases	6	4	6	6	6	2	6	6
UKL Out	UKL Outlet	10	Median	71	14	1240	145	245	43025	134	2459
UKL Out	UKL Outlet	10	Arithmetic Mean	77	19	1261	156	244	43025	148	2411
UKL Out	UKL Outlet	10	Coefficient of Variation	0.216	0.902	0.053	0.323	0.202	0.030	0.607	0.514
UKL Out	UKL Outlet	10	Pct25	70	6	1210	129	210	42100	72	1227
UKL Out	UKL Outlet	10	Pct75	90	32	1300	210	281	43950	184	3423
UKL Out	UKL Outlet	11	N of Cases	5	4	5	5	5	2	5	5
UKL Out	UKL Outlet	11	Median	87	11	1230	260	310	40550	178	3257
UKL Out	UKL Outlet	11	Arithmetic Mean	90	12	1396	268	321	40550	188	3053
UKL Out	UKL Outlet	11	Coefficient of Variation	0.271	0.656	0.280	0.144	0.096	0.026	0.164	0.352
UKL Out	UKL Outlet	11	Pct25	69	6	1205	234	297	39800	166	2206
UKL Out	UKL Outlet	11	Pct75	113	18	1483	300	350	41300	205	3667
UKL Out	UKL Outlet	12	N of Cases	3	2	3	3	3	1	3	3
UKL Out	UKL Outlet	12	Median	95	42	1325	350	379	38600	69	1054
UKL Out	UKL Outlet	12	Arithmetic Mean	89	42	1438	335	383	38600	68	1104
UKL Out	UKL Outlet	12	Coefficient of Variation	0.287	1.068	0.177	0.193	0.144	1.000	0.292	0.116
UKL Out	UKL Outlet	12	Pct25	69	10	1276	285	342		53	1020
UKL Out	UKL Outlet	12	Pct75	106	73	1629	380	425		83	1200
UKL Out	UKL Outlet	1	N of Cases	4	3	4	4	4	3	4	4
UKL Out	UKL Outlet	1	Median	59	10	1448	339	365	37800	144	3574
UKL Out	UKL Outlet	1	Arithmetic Mean	58	11	1383	327	374	37967	136	3306
UKL Out	UKL Outlet	1	Coefficient of Variation	0.118	0.226	0.113	0.091	0.067	0.025	0.522	0.539
UKL Out	UKL Outlet	1	Pct25	52	9	1298	310	358	37275	82	1911
UKL Out	UKL Outlet	1	Pct75	63	13	1468	344	390	38700	189	4700

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
UKL Out	UKL Outlet	2	N of Cases	4	2	4	4	4	2	4	4
UKL Out	UKL Outlet	2	Median	51	2	1425	347	349	39350	51	1241
UKL Out	UKL Outlet	2	Arithmetic Mean	54	2	1463	342	358	39350	50	1377
UKL Out	UKL Outlet	2	Coefficient of Variation	0.205	0.000	0.064	0.195	0.127	0.016	0.477	0.526
UKL Out	UKL Outlet	2	Pct25	47	2	1405	288	327	38900	34	936
UKL Out	UKL Outlet	2	Pct75	62	2	1520	395	389	39800	67	1818
UKL Out	UKL Outlet	3	N of Cases	5	4	5	5	5	2	5	5
UKL Out	UKL Outlet	3	Median	59	9	1050	65	312	34900	152	2698
UKL Out	UKL Outlet	3	Arithmetic Mean	60	8	1031	72	263	34900	161	2660
UKL Out	UKL Outlet	3	Coefficient of Variation	0.375	0.412	0.192	0.898	0.308	0.146	0.449	0.134
UKL Out	UKL Outlet	3	Pct25	42	6	857	15	198	31300	107	2334
UKL Out	UKL Outlet	3	Pct75	79	9	1178	115	320	38500	210	2997
UKL Out	UKL Outlet	4	N of Cases	4	4	4	3	4	2	4	4
UKL Out	UKL Outlet	4	Median	57	6	630	11	49	29925	133	1672
UKL Out	UKL Outlet	4	Arithmetic Mean	68	6	720	27	72	29925	182	1691
UKL Out	UKL Outlet	4	Coefficient of Variation	0.420	0.601	0.278	1.053	1.038	0.093	0.734	0.174
UKL Out	UKL Outlet	4	Pct25	50	3	607	10	17	27950	103	1481
UKL Out	UKL Outlet	4	Pct75	86	9	833	48	128	31900	260	1902
UKL Out	UKL Outlet	5	N of Cases	5	5	5	3	3	2	5	5
UKL Out	UKL Outlet	5	Median	80	36	588	16	40	28300	326	1897
UKL Out	UKL Outlet	5	Arithmetic Mean	86	33	548	26	36	28300	313	2100
UKL Out	UKL Outlet	5	Coefficient of Variation	0.226	0.382	0.238	1.127	0.729	0.050	0.197	0.427
UKL Out	UKL Outlet	5	Pct25	70	21	461	6	16	27300	281	1400
UKL Out	UKL Outlet	5	Pct75	103	42	652	49	55	29300	361	2994
UKL Out	UKL Outlet	6	N of Cases	4	4	4	3	2	2	4	4
UKL Out	UKL Outlet	6	Median	134	16	1550	45	6	24450	531	6368

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
UKL Out	UKL Outlet	6	Arithmetic Mean	136	16	1683	45	6	24450	547	6948
UKL Out	UKL Outlet	6	Coefficient of Variation	0.184	0.696	0.454	0.757	0.471	0.003	0.312	0.569
UKL Out	UKL Outlet	6	Pct25	117	7	1050	19	4	24400	404	3640
UKL Out	UKL Outlet	6	Pct75	156	26	2315	70	8	24500	690	10256
UKL Out	UKL Outlet	7	N of Cases	7	7	7	7	3	3	7	7
UKL Out	UKL Outlet	7	Median	280	98	3200	24	4	37600	1037	12473
UKL Out	UKL Outlet	7	Arithmetic Mean	286	87	3274	48	6	36933	1104	12676
UKL Out	UKL Outlet	7	Coefficient of Variation	0.099	0.337	0.122	1.177	0.509	0.182	0.099	0.150
UKL Out	UKL Outlet	7	Pct25	264	58	3083	16	4	31825	1030	11583
UKL Out	UKL Outlet	7	Pct75	314	111	3550	74	8	41875	1219	13262
UKL Out	UKL Outlet	8	N of Cases	5	5	5	5	5	2	5	5
UKL Out	UKL Outlet	8	Median	120	50	1680	170	469	47100	456	5282
UKL Out	UKL Outlet	8	Arithmetic Mean	185	50	1864	147	370	47100	608	6173
UKL Out	UKL Outlet	8	Coefficient of Variation	0.583	0.050	0.393	0.515	0.516	0.021	0.603	0.485
UKL Out	UKL Outlet	8	Pct25	104	48	1403	83	224	46400	295	4091
UKL Out	UKL Outlet	8	Pct75	286	52	2083	195	508	47800	979	7716
UKL Out	UKL Outlet	9	N of Cases	4	4	4	4	4	2	4	4
UKL Out	UKL Outlet	9	Median	80	29	1123	85	230	44000	230	3158
UKL Out	UKL Outlet	9	Arithmetic Mean	83	30	1079	88	232	44000	253	3182
UKL Out	UKL Outlet	9	Coefficient of Variation	0.155	0.214	0.134	0.629	0.068	0.022	0.358	0.129
UKL Out	UKL Outlet	9	Pct25	74	25	990	42	219	43300	183	2888
UKL Out	UKL Outlet	9	Pct75	92	35	1168	135	245	44700	323	3476
WR1000	Sprague R	10	N of Cases	2	2	2	2	2	2	2	2
WR1000	Sprague R	10	Median	46	29	221	18	7	30000	24	117
WR1000	Sprague R	10	Arithmetic Mean	46	29	221	18	7	30000	24	117
WR1000	Sprague R	10	Coefficient of Variation	0.078	0.223	0.061	0.471	0.544	0.024	0.203	0.066

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR1000	Sprague R	10	Pct25	43	24	211	12	4	29500	21	112
WR1000	Sprague R	10	Pct75	48	33	230	24	9	30500	28	123
WR1000	Sprague R	11	N of Cases	1	1	1	1	1	1	1	1
WR1000	Sprague R	11	Median	39	29	122	3	4	30300	25	77
WR1000	Sprague R	11	Arithmetic Mean	39	29	122	3	4	30300	25	77
WR1000	Sprague R	11	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR1000	Sprague R	11	Pct25								
WR1000	Sprague R	11	Pct75								
WR1000	Sprague R	12	N of Cases	1	1	1	1	1	1	0	0
WR1000	Sprague R	12	Median	61	45	237	14	55	30600		
WR1000	Sprague R	12	Arithmetic Mean	61	45	237	14	55	30600		
WR1000	Sprague R	12	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000		
WR1000	Sprague R	12	Pct25								
WR1000	Sprague R	12	Pct75								
WR1000	Sprague R	1	N of Cases	3	3	3	3	3	3	3	3
WR1000	Sprague R	1	Median	58	46	182	9	66	34600	57	179
WR1000	Sprague R	1	Arithmetic Mean	63	47	226	11	65	32733	79	295
WR1000	Sprague R	1	Coefficient of Variation	0.248	0.088	0.400	0.396	0.101	0.112	0.662	0.810
WR1000	Sprague R	1	Pct25	52	45	170	8	60	30025	45	147
WR1000	Sprague R	1	Pct75	75	51	293	14	70	34975	118	472
WR1000	Sprague R	2	N of Cases	3	3	3	3	3	3	3	3
WR1000	Sprague R	2	Median	61	38	225	7	12	30700	51	190
WR1000	Sprague R	2	Arithmetic Mean	61	39	219	9	12	30667	53	189
WR1000	Sprague R	2	Coefficient of Variation	0.090	0.030	0.074	0.484	0.667	0.015	0.074	0.024
WR1000	Sprague R	2	Pct25	57	38	207	6	6	30325	50	185
WR1000	Sprague R	2	Pct75	66	40	230	12	18	31000	56	192

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR1000	Sprague R	3	N of Cases	3	3	3	3	3	3	3	3
WR1000	Sprague R	3	Median	63	31	350	12	13	27400	98	551
WR1000	Sprague R	3	Arithmetic Mean	68	33	345	15	15	26867	117	610
WR1000	Sprague R	3	Coefficient of Variation	0.140	0.132	0.261	0.679	0.258	0.128	0.476	0.571
WR1000	Sprague R	3	Pct25	62	30	277	8	12	24250	80	359
WR1000	Sprague R	3	Pct75	75	36	412	23	18	29350	160	877
WR1000	Sprague R	4	N of Cases	2	2	2	2	2	2	2	2
WR1000	Sprague R	4	Median	63	29	323	12	13	28450	129	682
WR1000	Sprague R	4	Arithmetic Mean	63	29	323	12	13	28450	129	682
WR1000	Sprague R	4	Coefficient of Variation	0.067	0.074	0.204	0.589	0.396	0.047	0.550	0.663
WR1000	Sprague R	4	Pct25	60	27	276	7	9	27500	79	363
WR1000	Sprague R	4	Pct75	66	30	369	17	16	29400	179	1002
WR1000	Sprague R	5	N of Cases	1	1	1	1	1	1	1	1
WR1000	Sprague R	5	Median	55	33	246	17	4	29300	50	222
WR1000	Sprague R	5	Arithmetic Mean	55	33	246	17	4	29300	50	222
WR1000	Sprague R	5	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR1000	Sprague R	5	Pct25								
WR1000	Sprague R	5	Pct75								
WR1000	Sprague R	6	N of Cases	1	1	1	1	1	1	1	1
WR1000	Sprague R	6	Median	49	25	369	12	4	31700	28	208
WR1000	Sprague R	6	Arithmetic Mean	49	25	369	12	4	31700	28	208
WR1000	Sprague R	6	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR1000	Sprague R	6	Pct25								
WR1000	Sprague R	6	Pct75								
WR1000	Sprague R	7	N of Cases	4	4	4	4	4	4	4	4
WR1000	Sprague R	7	Median	55	31	307	6	7	26950	26	141

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR1000	Sprague R	7	Arithmetic Mean	56	33	310	8	7	26950	27	151
WR1000	Sprague R	7	Coefficient of Variation	0.114	0.213	0.096	0.818	0.521	0.016	0.273	0.228
WR1000	Sprague R	7	Pct25	51	28	287	3	4	26600	22	129
WR1000	Sprague R	7	Pct75	60	39	333	12	11	27300	33	173
WR1000	Sprague R	8	N of Cases	4	4	4	4	4	4	4	4
WR1000	Sprague R	8	Median	37	20	250	5	4	26000	16	111
WR1000	Sprague R	8	Arithmetic Mean	38	19	261	9	4	26200	16	113
WR1000	Sprague R	8	Coefficient of Variation	0.123	0.176	0.128	1.058	0.000	0.034	0.120	0.121
WR1000	Sprague R	8	Pct25	35	17	238	3	4	25550	15	103
WR1000	Sprague R	8	Pct75	41	21	284	15	4	26850	18	124
WR1000	Sprague R	9	N of Cases	2	2	2	2	2	2	2	2
WR1000	Sprague R	9	Median	31	16	198	11	4	25100	15	97
WR1000	Sprague R	9	Arithmetic Mean	31	16	198	11	4	25100	15	97
WR1000	Sprague R	9	Coefficient of Variation	0.023	0.000	0.029	0.202	0.000	0.068	0.100	0.094
WR1000	Sprague R	9	Pct25	30	16	194	9	4	23900	14	91
WR1000	Sprague R	9	Pct75	31	16	202	12	4	26300	16	104
WR2000	Annie Cr	10	N of Cases	2	2	2	2	2	2	2	2
WR2000	Annie Cr	10	Median	48	30	49	7	13	40450	6	6
WR2000	Annie Cr	10	Arithmetic Mean	48	30	49	7	13	40450	6	6
WR2000	Annie Cr	10	Coefficient of Variation	0.045	0.024	0.073	0.761	0.109	0.054	0.065	0.094
WR2000	Annie Cr	10	Pct25	46	29	46	3	12	38900	6	6
WR2000	Annie Cr	10	Pct75	49	30	51	10	14	42000	7	7
WR2000	Annie Cr	11	N of Cases	2	2	2	2	2	2	2	2
WR2000	Annie Cr	11	Median	125	30	221	5	17	38400	29	52
WR2000	Annie Cr	11	Arithmetic Mean	125	30	221	5	17	38400	29	52
WR2000	Annie Cr	11	Coefficient of Variation	0.996	0.024	1.017	0.471	0.499	0.118	1.192	1.204

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR2000	Annie Cr	11	Pct25	37	29	62	3	11	35200	5	8
WR2000	Annie Cr	11	Pct75	213	30	379	6	23	41600	54	95
WR2000	Annie Cr	1	N of Cases	2	2	2	2	2	2	2	2
WR2000	Annie Cr	1	Median	47	28	47	3	21	41450	5	5
WR2000	Annie Cr	1	Arithmetic Mean	47	28	47	3	21	41450	5	5
WR2000	Annie Cr	1	Coefficient of Variation	0.090	0.051	0.319	0.000	0.310	0.026	0.166	0.391
WR2000	Annie Cr	1	Pct25	44	27	36	3	16	40700	4	4
WR2000	Annie Cr	1	Pct75	50	29	57	3	25	42200	6	6
WR2000	Annie Cr	2	N of Cases	3	3	3	3	3	3	3	3
WR2000	Annie Cr	2	Median	40	30	34	9	15	42300	4	4
WR2000	Annie Cr	2	Arithmetic Mean	44	30	30	9	14	42300	4	3
WR2000	Annie Cr	2	Coefficient of Variation	0.166	0.019	0.457	0.635	0.213	0.012	0.236	0.481
WR2000	Annie Cr	2	Pct25	39	29	20	5	12	41925	4	2
WR2000	Annie Cr	2	Pct75	49	30	40	13	17	42675	5	4
WR2000	Annie Cr	3	N of Cases	3	3	3	3	3	3	3	3
WR2000	Annie Cr	3	Median	58	29	58	3	11	41100	7	7
WR2000	Annie Cr	3	Arithmetic Mean	80	29	63	8	12	41000	10	8
WR2000	Annie Cr	3	Coefficient of Variation	0.622	0.053	0.451	1.054	0.178	0.048	0.705	0.529
WR2000	Annie Cr	3	Pct25	48	28	42	3	10	39525	6	5
WR2000	Annie Cr	3	Pct75	117	30	84	14	13	42450	15	11
WR2000	Annie Cr	4	N of Cases	2	2	2	2	2	2	2	2
WR2000	Annie Cr	4	Median	45	26	45	3	14	38650	5	5
WR2000	Annie Cr	4	Arithmetic Mean	45	26	45	3	14	38650	5	5
WR2000	Annie Cr	4	Coefficient of Variation	0.048	0.000	0.207	0.000	0.157	0.049	0.022	0.138
WR2000	Annie Cr	4	Pct25	43	26	38	3	12	37300	5	5
WR2000	Annie Cr	4	Pct75	46	26	51	3	15	40000	5	6

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR2000	Annie Cr	5	N of Cases	1	1	1	1	1	1	1	1
WR2000	Annie Cr	5	Median	69	20	101	11	13	30300	15	22
WR2000	Annie Cr	5	Arithmetic Mean	69	20	101	11	13	30300	15	22
WR2000	Annie Cr	5	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR2000	Annie Cr	5	Pct25								
WR2000	Annie Cr	5	Pct75								
WR2000	Annie Cr	6	N of Cases	1	1	1	1	1	1	1	1
WR2000	Annie Cr	6	Median	80	26	57	3	14	34100	16	11
WR2000	Annie Cr	6	Arithmetic Mean	80	26	57	3	14	34100	16	11
WR2000	Annie Cr	6	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR2000	Annie Cr	6	Pct25								
WR2000	Annie Cr	6	Pct75								
WR2000	Annie Cr	7	N of Cases	3	4	4	4	4	4	3	4
WR2000	Annie Cr	7	Median	44	32	51	3	10	41200	6	7
WR2000	Annie Cr	7	Arithmetic Mean	43	31	64	4	9	41175	6	8
WR2000	Annie Cr	7	Coefficient of Variation	0.084	0.046	0.676	0.588	0.416	0.003	0.072	0.631
WR2000	Annie Cr	7	Pct25	40	30	33	3	7	41100	6	5
WR2000	Annie Cr	7	Pct75	46	32	96	6	12	41250	6	12
WR2000	Annie Cr	8	N of Cases	4	4	4	4	4	4	4	4
WR2000	Annie Cr	8	Median	47	29	46	3	9	42100	6	6
WR2000	Annie Cr	8	Arithmetic Mean	47	30	41	5	8	43625	6	5
WR2000	Annie Cr	8	Coefficient of Variation	0.074	0.050	0.496	0.737	0.375	0.073	0.098	0.501
WR2000	Annie Cr	8	Pct25	44	29	25	3	6	41900	6	3
WR2000	Annie Cr	8	Pct75	50	31	58	7	11	45350	6	7
WR2000	Annie Cr	9	N of Cases	3	3	3	3	3	3	3	3
WR2000	Annie Cr	9	Median	45	30	46	3	8	42300	5	5

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR2000	Annie Cr	9	Arithmetic Mean	46	30	44	5	8	42433	5	5
WR2000	Annie Cr	9	Coefficient of Variation	0.025	0.019	0.164	0.693	0.500	0.014	0.132	0.074
WR2000	Annie Cr	9	Pct25	45	30	39	3	5	42000	5	5
WR2000	Annie Cr	9	Pct75	47	31	49	8	11	42900	6	5
WR3000	Wood @ Weed	10	N of Cases	2	2	2	2	2	2	2	2
WR3000	Wood @ Weed	10	Median	82	65	115	14	17	38700	64	91
WR3000	Wood @ Weed	10	Arithmetic Mean	82	65	115	14	17	38700	64	91
WR3000	Wood @ Weed	10	Coefficient of Variation	0.078	0.011	0.228	0.303	0.166	0.004	0.176	0.324
WR3000	Wood @ Weed	10	Pct25	77	64	96	11	15	38600	56	70
WR3000	Wood @ Weed	10	Pct75	86	65	133	17	19	38800	72	111
WR3000	Wood @ Weed	11	N of Cases	1	1	1	1	1	1	0	0
WR3000	Wood @ Weed	11	Median	83	64	93	6	19	39200		
WR3000	Wood @ Weed	11	Arithmetic Mean	83	64	93	6	19	39200		
WR3000	Wood @ Weed	11	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000		
WR3000	Wood @ Weed	11	Pct25								
WR3000	Wood @ Weed	11	Pct75								
WR3000	Wood @ Weed	12	N of Cases	1	1	1	1	1	1	1	1
WR3000	Wood @ Weed	12	Median	90	62	105	19	27	37200	85	99
WR3000	Wood @ Weed	12	Arithmetic Mean	90	62	105	19	27	37200	85	99
WR3000	Wood @ Weed	12	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR3000	Wood @ Weed	12	Pct25								
WR3000	Wood @ Weed	12	Pct75								
WR3000	Wood @ Weed	1	N of Cases	3	3	3	3	3	3	3	3
WR3000	Wood @ Weed	1	Median	94	68	104	22	26	39500	73	81
WR3000	Wood @ Weed	1	Arithmetic Mean	93	69	112	22	26	39433	74	89
WR3000	Wood @ Weed	1	Coefficient of Variation	0.086	0.025	0.185	0.208	0.058	0.005	0.048	0.154

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR3000	Wood @ Weed	1	Pct25	87	68	99	18	25	39275	71	81
WR3000	Wood @ Weed	1	Pct75	99	70	128	25	28	39575	77	99
WR3000	Wood @ Weed	2	N of Cases	3	3	3	3	3	3	3	3
WR3000	Wood @ Weed	2	Median	86	67	77	12	24	39100	66	59
WR3000	Wood @ Weed	2	Arithmetic Mean	86	66	83	12	24	38900	66	64
WR3000	Wood @ Weed	2	Coefficient of Variation	0.041	0.017	0.186	0.049	0.042	0.009	0.039	0.186
WR3000	Wood @ Weed	2	Pct25	83	66	73	11	23	38650	64	56
WR3000	Wood @ Weed	2	Pct75	88	67	95	12	25	39100	68	73
WR3000	Wood @ Weed	3	N of Cases	3	3	3	3	3	3	3	3
WR3000	Wood @ Weed	3	Median	96	61	142	15	19	37100	91	135
WR3000	Wood @ Weed	3	Arithmetic Mean	96	62	134	20	19	37700	86	121
WR3000	Wood @ Weed	3	Coefficient of Variation	0.110	0.052	0.223	0.866	0.079	0.055	0.149	0.261
WR3000	Wood @ Weed	3	Pct25	88	60	111	8	18	36275	76	97
WR3000	Wood @ Weed	3	Pct75	104	65	155	34	21	39275	94	141
WR3000	Wood @ Weed	4	N of Cases	2	2	2	2	2	2	2	2
WR3000	Wood @ Weed	4	Median	91	65	116	8	21	38750	73	90
WR3000	Wood @ Weed	4	Arithmetic Mean	91	65	116	8	21	38750	73	90
WR3000	Wood @ Weed	4	Coefficient of Variation	0.000	0.033	0.463	0.094	0.135	0.005	0.135	0.339
WR3000	Wood @ Weed	4	Pct25	91	63	78	7	19	38600	66	68
WR3000	Wood @ Weed	4	Pct75	91	66	154	8	23	38900	80	112
WR3000	Wood @ Weed	5	N of Cases	1	1	1	1	1	1	1	1
WR3000	Wood @ Weed	5	Median	94	65	106	13	19	37600	59	66
WR3000	Wood @ Weed	5	Arithmetic Mean	94	65	106	13	19	37600	59	66
WR3000	Wood @ Weed	5	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR3000	Wood @ Weed	5	Pct25								
WR3000	Wood @ Weed	5	Pct75								

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR3000	Wood @ Weed	6	N of Cases	1	1	1	1	1	1	1	1
WR3000	Wood @ Weed	6	Median	84	67	97	14	16	38400	26	29
WR3000	Wood @ Weed	6	Arithmetic Mean	84	67	97	14	16	38400	26	29
WR3000	Wood @ Weed	6	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR3000	Wood @ Weed	6	Pct25								
WR3000	Wood @ Weed	6	Pct75								
WR3000	Wood @ Weed	7	N of Cases	5	5	5	5	5	5	5	5
WR3000	Wood @ Weed	7	Median	83	70	72	3	12	38700	46	36
WR3000	Wood @ Weed	7	Arithmetic Mean	84	70	68	5	12	38700	45	36
WR3000	Wood @ Weed	7	Coefficient of Variation	0.035	0.029	0.207	0.583	0.098	0.010	0.127	0.150
WR3000	Wood @ Weed	7	Pct25	83	69	57	3	11	38475	41	33
WR3000	Wood @ Weed	7	Pct75	87	72	76	8	12	38975	48	39
WR3000	Wood @ Weed	8	N of Cases	3	3	3	3	3	3	3	3
WR3000	Wood @ Weed	8	Median	84	69	52	3	15	39000	49	31
WR3000	Wood @ Weed	8	Arithmetic Mean	84	68	63	3	17	38867	54	42
WR3000	Wood @ Weed	8	Coefficient of Variation	0.018	0.062	0.324	0.000	0.284	0.013	0.180	0.498
WR3000	Wood @ Weed	8	Pct25	83	65	51	3	14	38475	48	29
WR3000	Wood @ Weed	8	Pct75	86	71	78	3	20	39225	61	57
WR3000	Wood @ Weed	9	N of Cases	2	2	2	2	2	2	2	2
WR3000	Wood @ Weed	9	Median	89	72	69	7	17	39550	59	45
WR3000	Wood @ Weed	9	Arithmetic Mean	89	72	69	7	17	39550	59	45
WR3000	Wood @ Weed	9	Coefficient of Variation	0.079	0.098	0.382	0.761	0.129	0.023	0.058	0.251
WR3000	Wood @ Weed	9	Pct25	84	67	50	3	15	38900	57	37
WR3000	Wood @ Weed	9	Pct75	94	77	87	10	18	40200	62	53
WR4000	Wood @ Dike	10	N of Cases	2	2	2	2	2	2	2	2
WR4000	Wood @ Dike	10	Median	102	70	163	15	16	37800	107	172

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR4000	Wood @ Dike	10	Arithmetic Mean	102	70	163	15	16	37800	107	172
WR4000	Wood @ Dike	10	Coefficient of Variation	0.055	0.040	0.113	0.094	0.088	0.011	0.027	0.141
WR4000	Wood @ Dike	10	Pct25	98	68	150	14	15	37500	105	155
WR4000	Wood @ Dike	10	Pct75	106	72	176	16	17	38100	109	189
WR4000	Wood @ Dike	11	N of Cases	1	1	1	1	1	1	0	0
WR4000	Wood @ Dike	11	Median	89	70	113	22	18	38300		
WR4000	Wood @ Dike	11	Arithmetic Mean	89	70	113	22	18	38300		
WR4000	Wood @ Dike	11	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000		
WR4000	Wood @ Dike	11	Pct25								
WR4000	Wood @ Dike	11	Pct75								
WR4000	Wood @ Dike	12	N of Cases	1	1	1	1	1	1	1	1
WR4000	Wood @ Dike	12	Median	103	77	136	22	25	36800	113	149
WR4000	Wood @ Dike	12	Arithmetic Mean	103	77	136	22	25	36800	113	149
WR4000	Wood @ Dike	12	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR4000	Wood @ Dike	12	Pct25								
WR4000	Wood @ Dike	12	Pct75								
WR4000	Wood @ Dike	1	N of Cases	1	1	1	1	1	1	1	1
WR4000	Wood @ Dike	1	Median	130	102	134	27	26	38500	141	146
WR4000	Wood @ Dike	1	Arithmetic Mean	130	102	134	27	26	38500	141	146
WR4000	Wood @ Dike	1	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR4000	Wood @ Dike	1	Pct25								
WR4000	Wood @ Dike	1	Pct75								
WR4000	Wood @ Dike	2	N of Cases	3	3	3	3	3	3	3	3
WR4000	Wood @ Dike	2	Median	104	86	112	14	24	38400	105	120
WR4000	Wood @ Dike	2	Arithmetic Mean	102	84	112	14	24	38300	108	117
WR4000	Wood @ Dike	2	Coefficient of Variation	0.046	0.041	0.143	0.214	0.024	0.007	0.051	0.114

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR4000	Wood @ Dike	2	Pct25	99	82	100	12	24	38100	104	107
WR4000	Wood @ Dike	2	Pct75	106	86	124	16	25	38475	112	127
WR4000	Wood @ Dike	3	N of Cases	3	3	3	3	3	3	3	3
WR4000	Wood @ Dike	3	Median	115	88	175	7	15	35900	127	203
WR4000	Wood @ Dike	3	Arithmetic Mean	115	87	183	12	15	36333	130	207
WR4000	Wood @ Dike	3	Coefficient of Variation	0.026	0.027	0.080	0.795	0.200	0.039	0.050	0.076
WR4000	Wood @ Dike	3	Pct25	113	85	174	6	13	35375	126	196
WR4000	Wood @ Dike	3	Pct75	117	88	194	19	17	37400	135	219
WR4000	Wood @ Dike	4	N of Cases	2	2	2	2	2	2	2	2
WR4000	Wood @ Dike	4	Median	108	89	135	8	16	37100	99	124
WR4000	Wood @ Dike	4	Arithmetic Mean	108	89	135	8	16	37100	99	124
WR4000	Wood @ Dike	4	Coefficient of Variation	0.092	0.152	0.293	0.283	0.177	0.034	0.106	0.307
WR4000	Wood @ Dike	4	Pct25	101	79	107	6	14	36200	92	97
WR4000	Wood @ Dike	4	Pct75	115	98	163	9	18	38000	107	151
WR4000	Wood @ Dike	5	N of Cases	1	1	1	1	1	1	1	1
WR4000	Wood @ Dike	5	Median	151	126	320	28	16	35800	101	213
WR4000	Wood @ Dike	5	Arithmetic Mean	151	126	320	28	16	35800	101	213
WR4000	Wood @ Dike	5	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR4000	Wood @ Dike	5	Pct25								
WR4000	Wood @ Dike	5	Pct75								
WR4000	Wood @ Dike	6	N of Cases	3	3	3	3	3	3	3	3
WR4000	Wood @ Dike	6	Median	117	93	139	9	15	36400	62	75
WR4000	Wood @ Dike	6	Arithmetic Mean	119	93	161	15	16	36333	66	96
WR4000	Wood @ Dike	6	Coefficient of Variation	0.044	0.043	0.382	0.669	0.108	0.011	0.255	0.652
WR4000	Wood @ Dike	6	Pct25	116	90	120	9	15	36025	55	54
WR4000	Wood @ Dike	6	Pct75	123	96	207	22	17	36625	79	144

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR4000	Wood @ Dike	7	N of Cases	5	6	6	6	6	6	5	6
WR4000	Wood @ Dike	7	Median	103	86	126	7	12	37550	70	80
WR4000	Wood @ Dike	7	Arithmetic Mean	115	90	132	11	12	37417	78	89
WR4000	Wood @ Dike	7	Coefficient of Variation	0.219	0.117	0.275	1.069	0.167	0.009	0.224	0.273
WR4000	Wood @ Dike	7	Pct25	99	83	113	3	10	37100	69	73
WR4000	Wood @ Dike	7	Pct75	127	102	142	12	13	37600	84	97
WR4000	Wood @ Dike	8	N of Cases	3	3	3	3	3	3	3	3
WR4000	Wood @ Dike	8	Median	110	79	99	11	13	37800	86	77
WR4000	Wood @ Dike	8	Arithmetic Mean	108	80	179	10	13	37933	86	148
WR4000	Wood @ Dike	8	Coefficient of Variation	0.067	0.033	0.794	0.680	0.115	0.011	0.138	0.867
WR4000	Wood @ Dike	8	Pct25	103	78	96	5	12	37650	78	73
WR4000	Wood @ Dike	8	Pct75	113	82	282	16	15	38250	95	242
WR4000	Wood @ Dike	9	N of Cases	2	2	2	2	2	2	2	2
WR4000	Wood @ Dike	9	Median	90	74	88	5	15	39200	79	79
WR4000	Wood @ Dike	9	Arithmetic Mean	90	74	88	5	15	39200	79	79
WR4000	Wood @ Dike	9	Coefficient of Variation	0.157	0.115	0.370	0.471	0.094	0.043	0.254	0.460
WR4000	Wood @ Dike	9	Pct25	80	68	65	3	14	38000	65	53
WR4000	Wood @ Dike	9	Pct75	100	80	111	6	16	40400	94	104
WR5000	7-mile Canal	10	N of Cases	2	2	2	2	2	2	2	2
WR5000	7-mile Canal	10	Median	104	70	242	67	14	33250	33	76
WR5000	7-mile Canal	10	Arithmetic Mean	104	70	242	67	14	33250	33	76
WR5000	7-mile Canal	10	Coefficient of Variation	0.027	0.101	0.061	0.633	0.101	0.057	0.315	0.347
WR5000	7-mile Canal	10	Pct25	102	65	231	37	13	31900	25	57
WR5000	7-mile Canal	10	Pct75	106	75	252	97	15	34600	40	95
WR5000	7-mile Canal	11	N of Cases	2	2	2	2	2	2	2	2
WR5000	7-mile Canal	11	Median	96	64	241	20	10	34250	33	82

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR5000	7-mile Canal	11	Arithmetic Mean	96	64	241	20	10	34250	33	82
WR5000	7-mile Canal	11	Coefficient of Variation	0.022	0.177	0.079	0.919	0.000	0.027	0.005	0.097
WR5000	7-mile Canal	11	Pct25	94	56	227	7	10	33600	32	76
WR5000	7-mile Canal	11	Pct75	97	72	254	33	10	34900	33	88
WR5000	7-mile Canal	12	N of Cases	1	1	1	1	1	1	1	1
WR5000	7-mile Canal	12	Median	91	62	199	50	24	33100	44	96
WR5000	7-mile Canal	12	Arithmetic Mean	91	62	199	50	24	33100	44	96
WR5000	7-mile Canal	12	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR5000	7-mile Canal	12	Pct25								
WR5000	7-mile Canal	12	Pct75								
WR5000	7-mile Canal	1	N of Cases	1	1	1	1	1	1	1	1
WR5000	7-mile Canal	1	Median	112	77	237	59	22	34000	37	79
WR5000	7-mile Canal	1	Arithmetic Mean	112	77	237	59	22	34000	37	79
WR5000	7-mile Canal	1	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR5000	7-mile Canal	1	Pct25								
WR5000	7-mile Canal	1	Pct75								
WR5000	7-mile Canal	2	N of Cases	3	3	3	3	3	3	3	3
WR5000	7-mile Canal	2	Median	93	66	132	27	16	34100	19	30
WR5000	7-mile Canal	2	Arithmetic Mean	91	69	136	24	17	34267	20	29
WR5000	7-mile Canal	2	Coefficient of Variation	0.090	0.088	0.164	0.226	0.328	0.022	0.097	0.086
WR5000	7-mile Canal	2	Pct25	85	65	120	20	13	33725	19	27
WR5000	7-mile Canal	2	Pct75	97	74	153	28	21	34850	21	31
WR5000	7-mile Canal	3	N of Cases	3	3	3	3	3	3	3	3
WR5000	7-mile Canal	3	Median	110	73	481	32	22	28200	43	189
WR5000	7-mile Canal	3	Arithmetic Mean	117	75	427	33	23	28967	94	393
WR5000	7-mile Canal	3	Coefficient of Variation	0.122	0.051	0.481	0.199	0.266	0.207	1.051	1.201

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR5000	7-mile Canal	3	Pct25	108	72	270	28	18	24600	34	90
WR5000	7-mile Canal	3	Pct75	127	78	570	38	27	33525	166	748
WR5000	7-mile Canal	4	N of Cases	2	2	2	2	2	2	2	2
WR5000	7-mile Canal	4	Median	120	75	533	9	12	31400	42	186
WR5000	7-mile Canal	4	Arithmetic Mean	120	75	533	9	12	31400	42	186
WR5000	7-mile Canal	4	Coefficient of Variation	0.024	0.019	0.092	0.083	0.061	0.032	0.004	0.119
WR5000	7-mile Canal	4	Pct25	118	74	498	8	11	30700	42	171
WR5000	7-mile Canal	4	Pct75	122	76	567	9	12	32100	42	202
WR5000	7-mile Canal	5	N of Cases	1	1	1	1	1	1	1	1
WR5000	7-mile Canal	5	Median	192	137	837	25	10	31900	45	198
WR5000	7-mile Canal	5	Arithmetic Mean	192	137	837	25	10	31900	45	198
WR5000	7-mile Canal	5	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR5000	7-mile Canal	5	Pct25								
WR5000	7-mile Canal	5	Pct75								
WR5000	7-mile Canal	6	N of Cases	3	3	3	3	3	3	3	3
WR5000	7-mile Canal	6	Median	161	108	526	22	9	33000	30	109
WR5000	7-mile Canal	6	Arithmetic Mean	176	108	595	20	7	32600	27	93
WR5000	7-mile Canal	6	Coefficient of Variation	0.212	0.237	0.312	0.795	0.394	0.062	0.744	0.734
WR5000	7-mile Canal	6	Pct25	152	89	471	8	5	31050	12	41
WR5000	7-mile Canal	6	Pct75	205	127	735	31	9	34050	42	141
WR5000	7-mile Canal	7	N of Cases	4	4	4	4	4	4	4	4
WR5000	7-mile Canal	7	Median	463	353	1260	174	15	33450	-9	-20
WR5000	7-mile Canal	7	Arithmetic Mean	448	354	1243	188	17	33725	-22	-80
WR5000	7-mile Canal	7	Coefficient of Variation	0.222	0.243	0.211	0.751	0.582	0.053	-2.322	-2.291
WR5000	7-mile Canal	7	Pct25	367	283	1055	70	10	32450	-59	-202
WR5000	7-mile Canal	7	Pct75	528	426	1430	307	25	35000	15	42

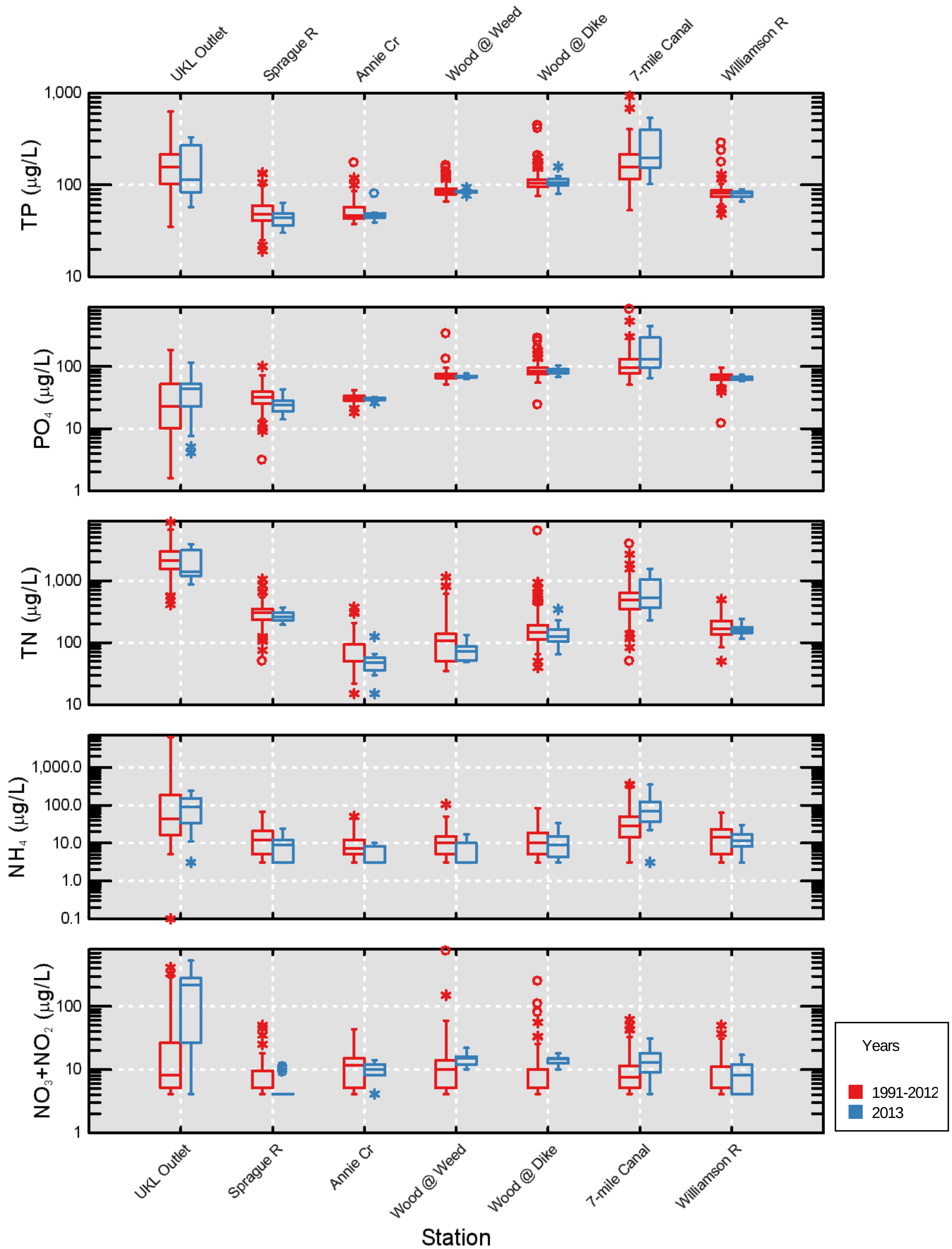
Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR5000	7-mile Canal	8	N of Cases	4	4	4	4	4	4	4	4
WR5000	7-mile Canal	8	Median	294	217	528	113	18	32000	18	37
WR5000	7-mile Canal	8	Arithmetic Mean	317	239	653	143	20	33000	19	33
WR5000	7-mile Canal	8	Coefficient of Variation	0.485	0.562	0.574	0.715	0.347	0.156	1.352	1.405
WR5000	7-mile Canal	8	Pct25	190	133	385	67	16	28850	3	4
WR5000	7-mile Canal	8	Pct75	444	346	921	219	24	37150	35	62
WR5000	7-mile Canal	9	N of Cases	2	2	2	2	2	2	2	2
WR5000	7-mile Canal	9	Median	148	107	344	57	11	30900	20	53
WR5000	7-mile Canal	9	Arithmetic Mean	148	107	344	57	11	30900	20	53
WR5000	7-mile Canal	9	Coefficient of Variation	0.268	0.264	0.070	0.488	0.202	0.023	1.308	1.334
WR5000	7-mile Canal	9	Pct25	120	87	327	37	9	30400	1	3
WR5000	7-mile Canal	9	Pct75	176	127	361	76	12	31400	38	104
WR6000	Williamson R	10	N of Cases	2	2	2	2	2	2	2	2
WR6000	Williamson R	10	Median	79	63	166	22	15	34550	113	237
WR6000	Williamson R	10	Arithmetic Mean	79	63	166	22	15	34550	113	237
WR6000	Williamson R	10	Coefficient of Variation	0.072	0.022	0.107	0.514	0.244	0.010	0.013	0.048
WR6000	Williamson R	10	Pct25	75	62	153	14	12	34300	112	229
WR6000	Williamson R	10	Pct75	83	64	178	30	17	34800	114	245
WR6000	Williamson R	11	N of Cases	2	2	2	2	2	2	2	2
WR6000	Williamson R	11	Median	77	60	124	12	16	34500	119	192
WR6000	Williamson R	11	Arithmetic Mean	77	60	124	12	16	34500	119	192
WR6000	Williamson R	11	Coefficient of Variation	0.009	0.024	0.080	0.061	0.137	0.008	0.033	0.038
WR6000	Williamson R	11	Pct25	76	59	117	11	14	34300	116	187
WR6000	Williamson R	11	Pct75	77	61	131	12	17	34700	121	197
WR6000	Williamson R	12	N of Cases	1	1	1	1	1	1	1	1
WR6000	Williamson R	12	Median	81	63	152	21	47	34000	128	240

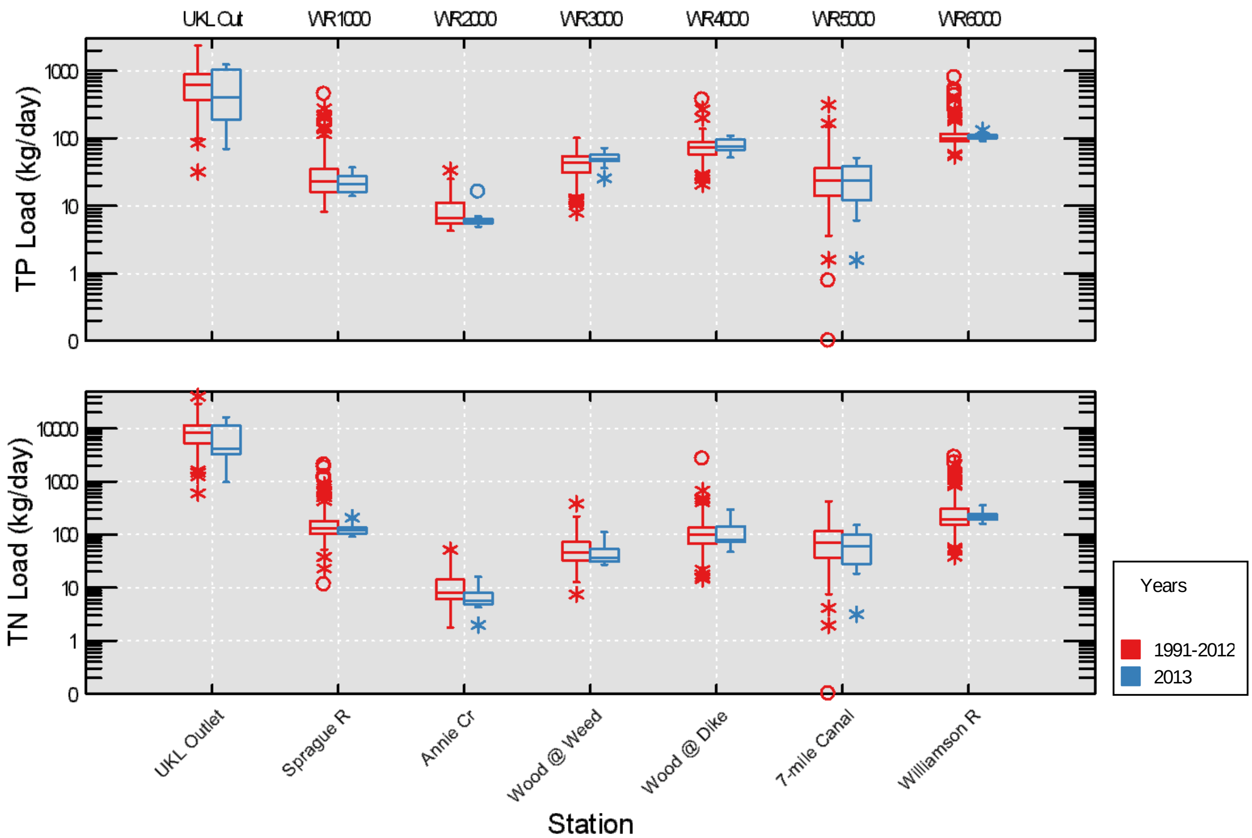
Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR6000	Williamson R	12	Arithmetic Mean	81	63	152	21	47	34000	128	240
WR6000	Williamson R	12	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR6000	Williamson R	12	Pct25								
WR6000	Williamson R	12	Pct75								
WR6000	Williamson R	1	N of Cases	2	2	2	2	2	2	2	2
WR6000	Williamson R	1	Median	75	62	178	12	50	34100	141	351
WR6000	Williamson R	1	Arithmetic Mean	75	62	178	12	50	34100	141	351
WR6000	Williamson R	1	Coefficient of Variation	0.028	0.057	0.283	0.061	0.028	0.108	0.399	0.623
WR6000	Williamson R	1	Pct25	73	59	142	11	49	31500	101	196
WR6000	Williamson R	1	Pct75	76	64	213	12	51	36700	180	505
WR6000	Williamson R	2	N of Cases	2	2	2	2	2	2	2	2
WR6000	Williamson R	2	Median	74	64	141	12	20	34850	123	236
WR6000	Williamson R	2	Arithmetic Mean	74	64	141	12	20	34850	123	236
WR6000	Williamson R	2	Coefficient of Variation	0.087	0.022	0.075	0.553	0.181	0.014	0.063	0.052
WR6000	Williamson R	2	Pct25	69	63	133	7	17	34500	118	227
WR6000	Williamson R	2	Pct75	78	65	148	16	22	35200	129	244
WR6000	Williamson R	3	N of Cases	3	3	3	3	3	3	3	3
WR6000	Williamson R	3	Median	81	45	503	14	26	28900	225	1489
WR6000	Williamson R	3	Arithmetic Mean	80	51	450	22	25	29900	220	1282
WR6000	Williamson R	3	Coefficient of Variation	0.040	0.221	0.206	0.685	0.082	0.101	0.189	0.370
WR6000	Williamson R	3	Pct25	77	44	383	13	24	27850	189	927
WR6000	Williamson R	3	Pct75	82	59	505	34	27	32200	251	1586
WR6000	Williamson R	4	N of Cases	2	2	2	2	2	2	2	2
WR6000	Williamson R	4	Median	76	46	399	11	21	30650	245	1283
WR6000	Williamson R	4	Arithmetic Mean	76	46	399	11	21	30650	245	1283
WR6000	Williamson R	4	Coefficient of Variation	0.149	0.078	0.122	0.643	0.034	0.012	0.398	0.373

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR6000	Williamson R	4	Pct25	68	43	364	6	20	30400	176	944
WR6000	Williamson R	4	Pct75	84	48	433	16	21	30900	314	1621
WR6000	Williamson R	5	N of Cases	1	1	1	1	1	1	1	1
WR6000	Williamson R	5	Median	71	58	301	61	24	33700	137	581
WR6000	Williamson R	5	Arithmetic Mean	71	58	301	61	24	33700	137	581
WR6000	Williamson R	5	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR6000	Williamson R	5	Pct25								
WR6000	Williamson R	5	Pct75								
WR6000	Williamson R	6	N of Cases	1	1	1	1	1	1	1	1
WR6000	Williamson R	6	Median	84	61	185	3	4	34400	111	245
WR6000	Williamson R	6	Arithmetic Mean	84	61	185	3	4	34400	111	245
WR6000	Williamson R	6	Coefficient of Variation	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
WR6000	Williamson R	6	Pct25								
WR6000	Williamson R	6	Pct75								
WR6000	Williamson R	7	N of Cases	5	5	5	5	5	5	5	5
WR6000	Williamson R	7	Median	81	68	170	10	8	33200	106	216
WR6000	Williamson R	7	Arithmetic Mean	83	68	183	11	8	33120	110	244
WR6000	Williamson R	7	Coefficient of Variation	0.047	0.058	0.196	0.342	0.500	0.024	0.115	0.278
WR6000	Williamson R	7	Pct25	81	65	159	8	4	32775	102	200
WR6000	Williamson R	7	Pct75	87	71	204	14	11	33675	115	279
WR6000	Williamson R	8	N of Cases	3	3	3	3	3	3	3	3
WR6000	Williamson R	8	Median	76	61	156	15	8	33400	101	192
WR6000	Williamson R	8	Arithmetic Mean	78	61	148	14	8	35333	100	190
WR6000	Williamson R	8	Coefficient of Variation	0.063	0.009	0.120	0.375	0.541	0.105	0.033	0.126
WR6000	Williamson R	8	Pct25	75	61	135	10	5	33100	98	172
WR6000	Williamson R	8	Pct75	82	62	160	17	12	38050	103	208

Station Code	Station Name	Month	Parameter	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)	Total Nitrogen (µg/L)	NH4 Nitrogen (µg/L)	NO3+NO2 Nitrogen (µg/L)	Silica (µg/L)	Total Phosphorus Load (kg/d)	Total Nitrogen Load (kg/d)
WR6000	Williamson R	9	N of Cases	3	3	3	3	3	3	2	2
WR6000	Williamson R	9	Median	74	64	127	9	4	33700	93	170
WR6000	Williamson R	9	Arithmetic Mean	74	63	128	13	5	33867	93	170
WR6000	Williamson R	9	Coefficient of Variation	0.114	0.079	0.102	0.563	0.433	0.017	0.019	0.082
WR6000	Williamson R	9	Pct25	68	60	119	9	4	33475	91	160
WR6000	Williamson R	9	Pct75	81	67	138	19	7	34300	94	180

APPENDIX II: Station distributions of TP, SRP, TN, NH4-N, NO3+ NO2-N concentrations (µg/L) and TP and TN loading (kg/day) during the irrigation season of June-October




UKL Out
WR1000
WR2000
WR3000
WR4000
WR5000
WR6000
TP Load (kg/day)
TN Load (kg/day)
1000
100
10
1
0
10000
Years
1991-2012
2013
UKL Outlet
Sprague R
Annie Cr
Wood @ Weed
Wood @ Dike
7-mile Canal
Williamson R
Station