Summary of November 2012 Storm Event
North Truckee Drain at Orr Ditch (upstream)
and Kleppe Lane (downstream)

Hydrograph of Storm Event - November 16-18, 2012

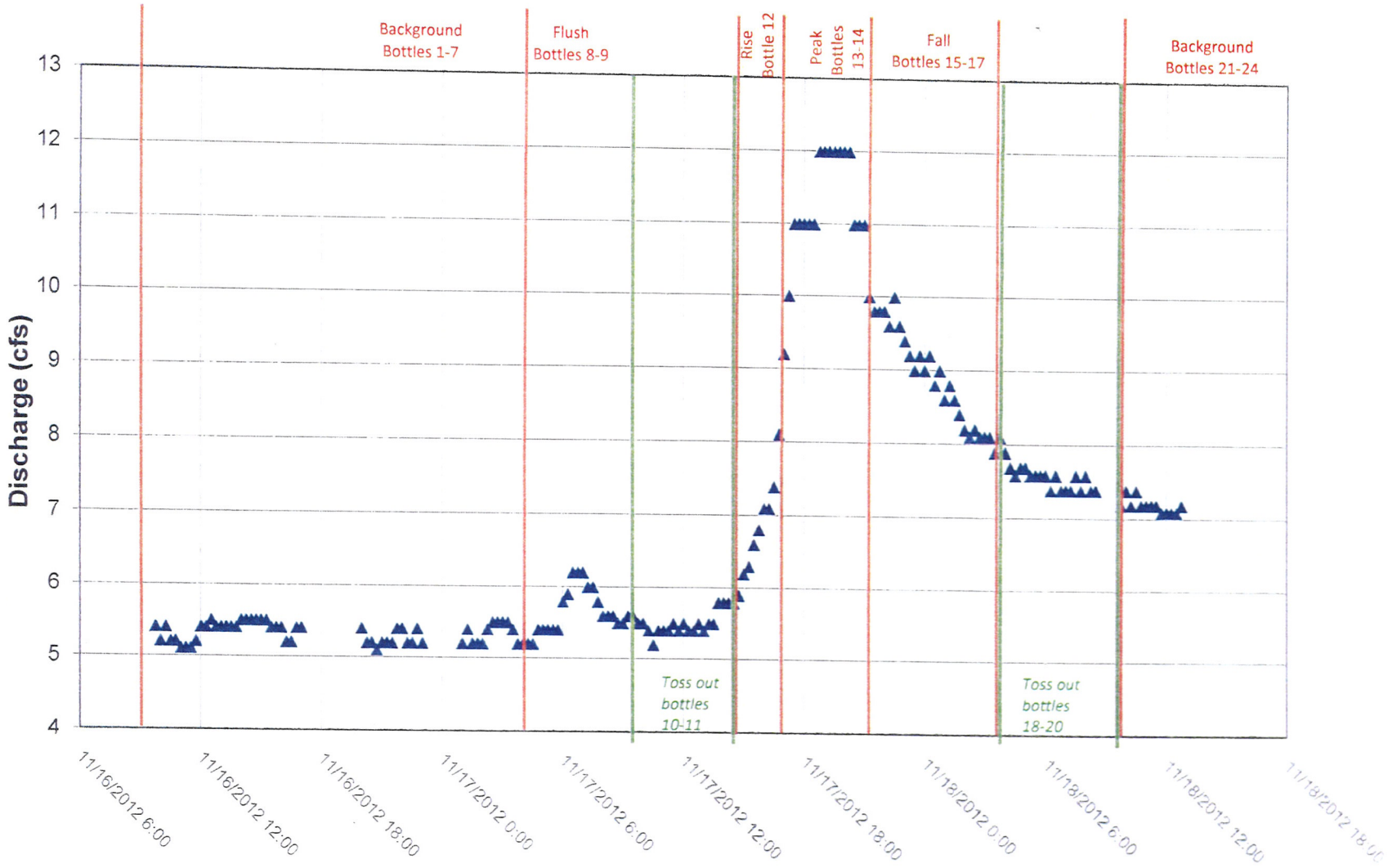
Sampling: upstream
The storm hit during early hours of Saturday November 17, 2012 and discharge started around 10:45 am, at the upstream station, near Orr Ditch, lasting until around midnight on November 18. Staff assessed composites and made decisions about splits for the following reasons.

Sampling crew had issues with the Isco distributor arm jamming while sampling at Orr. As a result, bottles 4 and 6 were excluded due to contamination and not knowing accurate volumes sampled during these composite fractions. The discharge receded the morning of November 18, and due to background levels being reached with bottles 17-19, the remainder were discarded for similar reasons.

Sampling: downstream
Discharge downstream, at Kleppe Lane, started around 3:45 am on 11/17/12 and lasted until approximately 11:00 pm on 11/18/12. Baseline levels were not fully reached with regards to flow, but according to contaminant concentrations, the system had flushed itself through.

Splits on the downstream site were made based on concentrating the first flush and having enough battery power to complete the sequence through until discharge had subsided.

Hydrograph: November 17, 2012 Storm on the North Truckee Drain at Kleppe Lane



Note: In striving for a clear picture of changing water quality, splits were determined as depicted. This includes: Bottles 10-11 were not analyzed, these fell between the first flush and rising limb. Also, bottles 18-20 removed and not analyzed. They fell between falling limb and background

NTD @ Kleppe Sample Times and Bottle Assignments
STORM MONITORING **DOWNSTREAM Site**
11/16/12 - 11/18/12

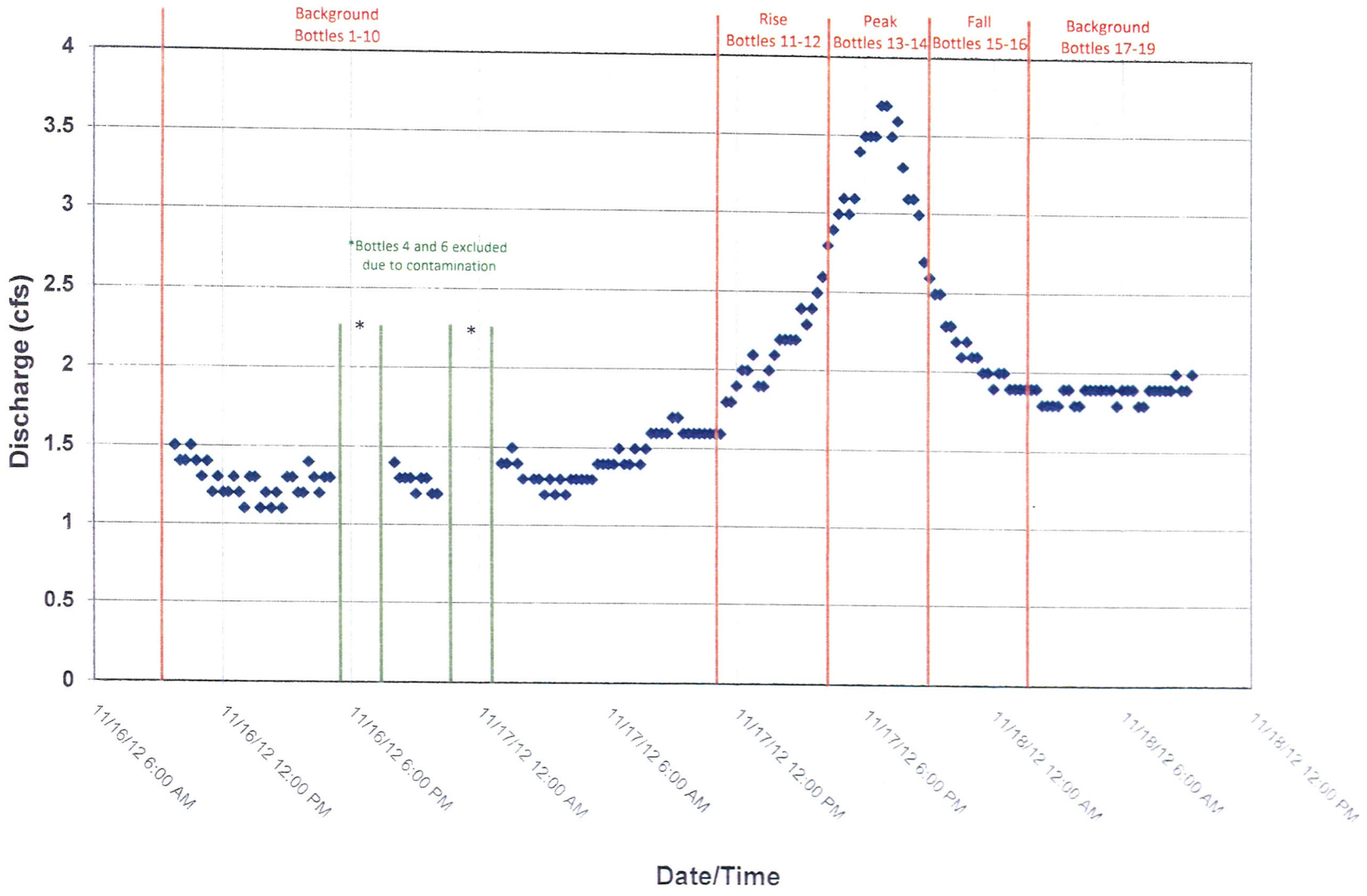
Lab Sample #	Hydrograph	Bottle #	Time Range	Day and Date	Notes
1	Background	1	10:20 am - 12:50 pm	Fri 11/16/12	
		2	12:50 pm - 3:20 pm		
		3	3:20 pm - 5:50 pm		
		4	5:50 pm - 8:20 pm		
		5	8:20 pm - 10:50 pm		
		6	10:50 pm - 1:20 am	Sat 11/17/12	
		7	1:20 am - 3:50 am		
2	Flush	8	3:50 am - 6:20 am		Pre-Peak Rise (First Flush - Assumed)
		9	6:20 am - 8:50 am		
	Not Analyzed	*10*	*8:50 am - 11:20 am*		*Not needed, as flows appear to be between flush and peak*
		11	*11:20 am - 1:50 pm*		
3	Rise	12	1:50 pm - 4:20 pm		
4	Peak	13	4:20 pm - 6:50 pm		
		14	6:50 pm - 9:20 pm		
5	Fall	15	9:20 pm - 11:50 pm		
		16	11:50 pm - 2:20 am	Sun 11/18/12	
		17	2:20 am - 4:50 am		
	Not Analyzed	*18*	*4:50 am - 7:20 am*		
		19	*7:20 am - 9:50 am*		*Not needed, as flows appear to be between fall and background*
		20	*9:50 am - 12:20 pm*		
6	Background 2	21	12:20 pm - 2:50 pm		
		22	2:50 pm - 5:20 pm		
		23	5:20 pm - 7:50 pm		
		24	7:50 pm - 10:20 pm		

NTD @ Kleppe Sample Results
11/16/12 - 11/18/12

Analytical Results

Lab Sample #	Hydro Limb		Day and Date	TP (mg/L)	NO2-N (mg/L)	NO3-N (mg/L)	TKN (mg/L)	TN (mg/L)	OP (mg/L)	TDS (mg/L)
1	Background		11/16-11/17/12	0.12	<0.25	0.86	0.8	1.7	<0.50	610
2	Flush		11/17/2012	0.15	<0.25	0.8	0.83	1.6	<0.50	570
3	Rise		11/17/2012	0.13	<0.25	0.73	0.78	1.5	<0.50	570
4	Peak		11/17/2012	0.27	<0.25	1.1	1.4	2.5	<0.50	580
5	Fall		11/17-11/18/12	0.17	<0.25	0.91	0.91	1.8	<0.50	610
6	Background 2		11/18/2012	0.18	<0.25	0.51	0.81	1.3	<0.50	540

Hydrograph: November 17, 2012 Storm on the North Truckee Drain at Orr Springs Road



NTD @ Orr Sample Times and Bottle Assignments
STORM MONITORING UPSTREAM Site
11/16/12 - 11/18/12

Lab Sample #	Hydrograph	Bottle #	Time Range	Day and Date	Notes
1	Background	1	9:45 am - 12:15 pm	Fri 11/16/12	
		2	12:15 pm - 2:45 pm		
		3	2:45 pm - 5:15 pm		
		4	*5:15 pm - 7:45 pm*		*Excluding bottle due to contamination from jammed Distributor Arm*
		5	7:45 pm - 10:15 pm		
		6	*10:15 pm - 12:45 am*		*Excluding bottle due to contamination from jammed Distributor Arm*
		7	12:45 am - 3:15 am	Sat 11/17/12	
		8	3:15 am - 5:45 am		
		9	5:45 am - 8:15 am		
		10	8:15 am - 10:45 am		
2	Rise	11	10:45 am - 1:15 pm		
		12	1:15 pm - 3:45 pm		
3	Peak	13	3:45 pm - 6:15 pm		
		14	6:15 pm - 8:45 pm		
4	Fall	15	8:45 pm - 11:15 pm		
		16	11:15 pm - 1:45 am	Sun 11/18/12	
5	Background 2	17	1:45 am - 4:15 am		
		18	4:15 am - 6:45 am		
		19	6:45 am - 9:15 am		
	Not Collected	*20*	*9:15 am - 11:45 am*		*Not collected due to ISCO malfunction - not distributing samples correctly*
		21	*11:45 am - 2:15 pm*		
		22	*2:15 pm - 4:45 pm*		
		23	*4:45 pm - 7:15 pm*		
		24	*7:15 pm - 9:45 pm*		

NTD @ Orr Sample Results
11/16/12 - 11/18/12

Analytical Results

Lab Sample #	Hydro Limb		Day and Date	TP (mg/L)	NO2-N (mg/L)	NO3-N (mg/L)	TKN (mg/L)	TN (mg/L)	OP (mg/L)	TDS (mg/L)
1	Background		11/16/12-11/17/12	0.16	<0.25	3.3	0.98	4.3	<0.50	1300
2	Rise		11/17/2012	0.23	<0.25	3.1	1.6	4.7	<0.50	1300
3	Peak		11/17/2012	0.35	<0.25	2.1	1.8	3.9	<0.50	820
4	Fall		11/17/12-11/18/12	0.26	<0.25	1.8	1.5	3.3	<0.50	760
5	Background 2		11/18/2012	0.21	<0.25	2.8	1.1	3.9	<0.50	1100

Total Dissolved Solids (TDS)

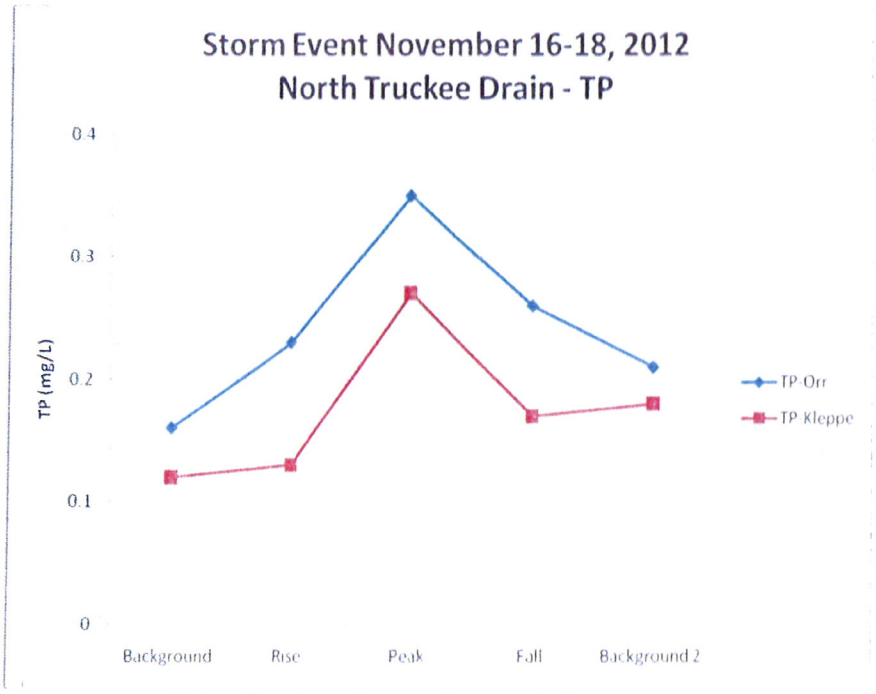
Upstream at Orr, TDS background was much higher and became diluted with stormwater discharge. This is presumably due to salts in the water coming from native soils on the Orr Ditch, and groundwater levels in the Spanish Springs area. Downstream, flows from nuisance water make up a higher percentage of the flow, which appeared to dilute the surface water. TDS levels remained more constant during the storm discharge measured at Kleppe Lane.



Note: Orr is upstream; Kleppe is downstream.

Total Phosphorous (TP)

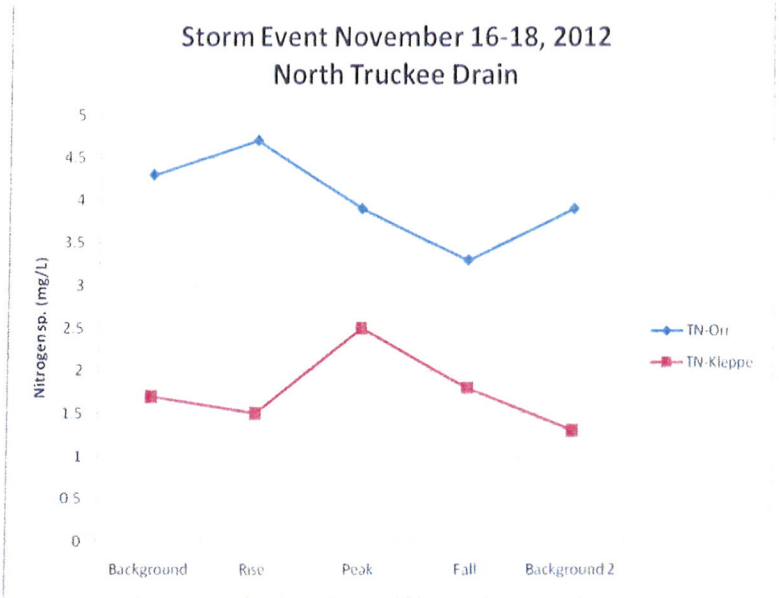
Background phosphorous levels were measurable at both sites before the storm began. Storm discharge mobilizes dirt on land surfaces and causes elevated levels. TP followed the hydrograph (see attachments 1 and 2) likely because phosphorous adsorbed to soil particles and traveled with soil as it was flushed by higher streamflow.



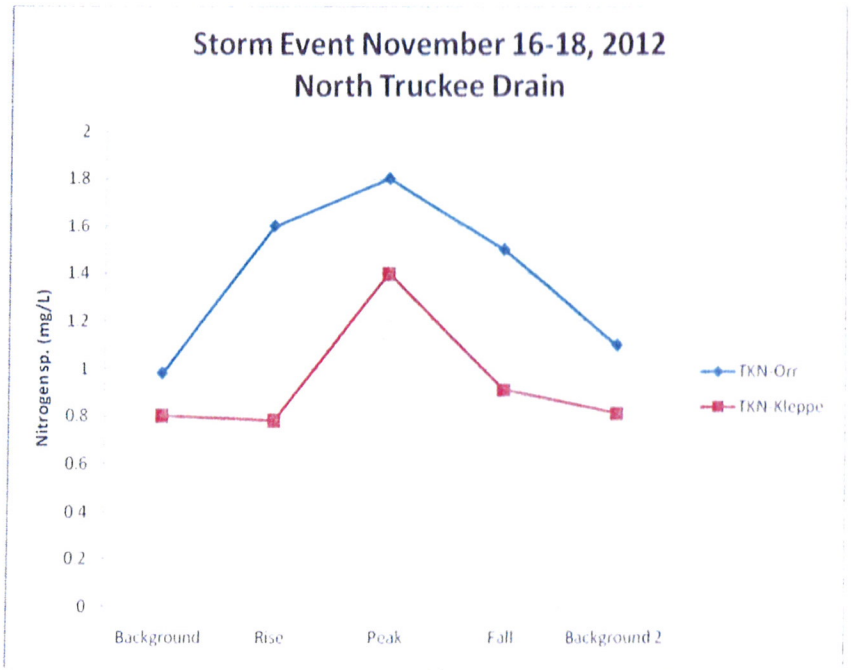
Note: Orr is upstream; Kleppe is downstream.

Nitrogen

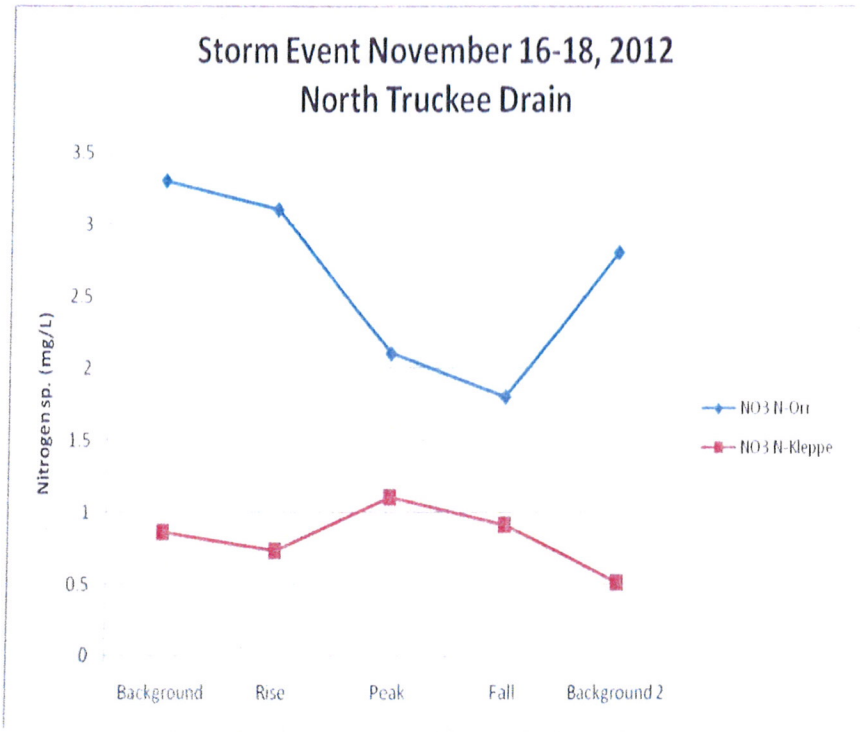
Elevated levels of nitrogen have been documented in Spanish Springs from underground septic tanks (Rosen et al., 2006). There remains some acreage of agricultural land use in the upstream areas, as well. A cattle ranch is located just upstream of the Orr sampling site, possibly contributing nitrogen (Watershed Assessment for Tributaries to the Truckee River, 2012). Golf courses, sports fields and urban stormwater runoff from residential and commercial land uses contribute nutrients to both sampling sites. Background levels of nitrogen, particularly nitrates, were much higher upstream, suggesting groundwater influence.



Note: Orr is upstream; Kleppe is downstream.

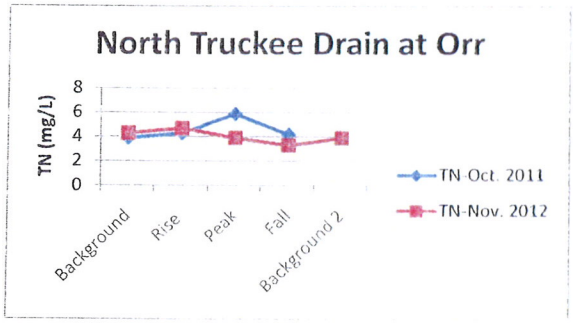


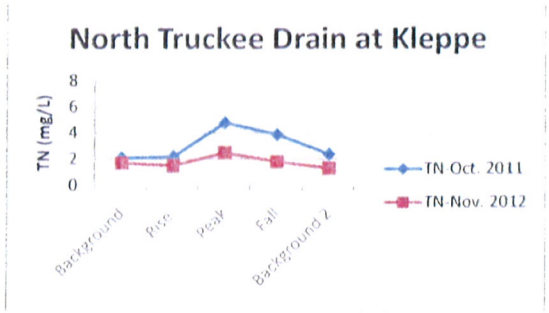
Note: Orr is upstream; Kleppe is downstream.

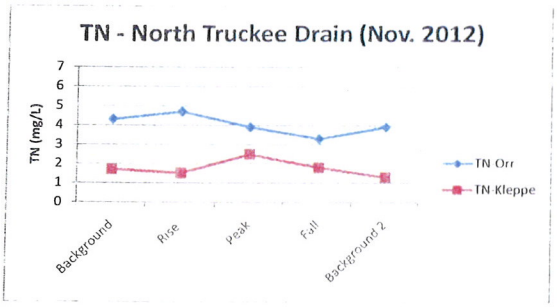


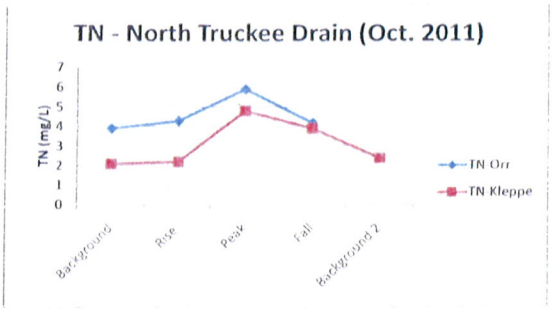
Note: Orr is upstream; Kleppe is downstream.

Background levels of total nitrogen have remained fairly similar between storm events in October, 2011 and November, 2012 in the North Truckee Drain.









Source: TMWRF results 12/3/12 and Table 2-7 Annual Report 01/15/13

References

- Rosen, M.R., C. Kropf, and K.A. Thomas. (2006). "Quantification of the Contribution of Nitrogen from Septic Tanks to Ground Water in Spanish Springs Valley, Nevada." *USGS Scientific Investigations Report* 2006-5206. p. 1-12.
- Hillside Design, LLC. (2012). "Watershed Assessment for Tributaries to the Truckee River 2012 Final Report." Prepared for the Truckee Meadows Storm Water Permit Coordinating Committee.