

# Memo

**Date:** December 6, 2013  
**To:** Kevin Stewart  
**From:** Markus Ritsch  
**Subject:** November 2013 ALERT Data Analysis

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## I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's NovaStar 5 base station were analyzed for the period November 1 through November 30, 2013.

## II. General System Analysis Summary

In 2013 the District upgraded the telemetry backbone from legacy ALERT (A1) to the new A2 protocol. As the season progresses, the A1 feed from outlying repeaters to the District base station at Diamond Hill will terminate and all data will be received as A2. The following table quantifies the data reception throughout the conversion of the telemetry system as the season progresses. As of January 29, 2013, the West Creek repeater in Douglas County processes both incoming data on A1 and A2 but passes on only A2 format messages to Diamond Hill.

**Table 1. Reception of A1/A2 Data at Diamond Hill**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Legacy	321,136	218,368	264,984	243,044	318,423	342,585	269,475	294,652	353,016	255,398	250,416	
Concentrator	304,067	319,089	379,891	381,523	571,616	686,278	538,090	430,404	374,351	430,291	421,986	
ALERT2	--	--	16,450	47,415	88,786	113,822	97,216	88,860	86,550	113,474	102,367	
<b>TOTAL</b>	<b>625,203</b>	<b>537,457</b>	<b>661,325</b>	<b>671,982</b>	<b>978,825</b>	<b>1,142,685</b>	<b>904,781</b>	<b>813,916</b>	<b>813,917</b>	<b>799,163</b>	<b>774,769</b>	<b>0</b>
Conc+A2	--	--	396,341	428,938	660,402	800,100	635,306	519,264	460,901	543,765	524,352	
Conc/Leg			1.43	1.57	1.80	2.00	2.00	1.46	1.06	1.68	1.68	

The daily ratio of ALERT2 reports received versus legacy ALERT is shown below.

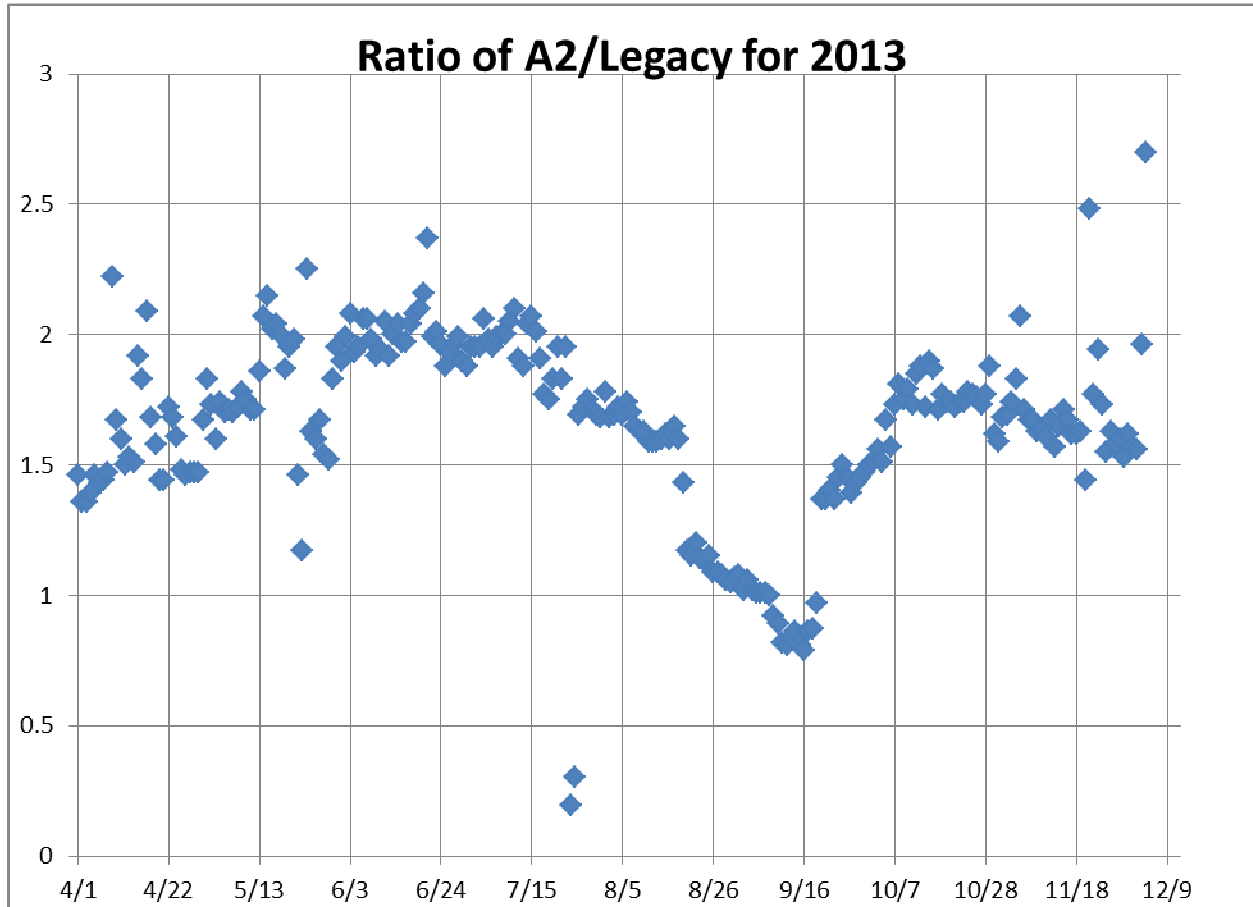


Figure 1. Daily Ratio of ALERT2/Legacy Reports

The number of A2 concentrator reports should be greater than the received legacy reports. Toward the end of September the ratio seems to have stabilized around 1.68. Note also that in cold weather the Blue Mountain repeater does not pass legacy ALERT reports so on very cold days the ratio goes above two.

### A. Performance of New A2 Sites

Currently there are only a handful of remote sites operating on the new A2 protocol. The “event” performance of these sites is tracked throughout the 2013 flood season in the table below.

Table 2. Event Performance of New A2 Sites

Description	ID	Install Date	Apr	May	Jun	Jul	Aug*	Sep*	Oct	Nov
Heritage Regional Park	3090	03/14/2013	100%	93%	100%	91%	81%	99%	100%	n/a
ETG @ Hampden	100110	05/01/2013	--	100%	100%	100%	100%	99%	100%	n/a
Blackstone	100100	05/03/2013	--	100%	100%	100%	100%	95%	100%	n/a
Newlin Gulch	3070	05/24/2013	--	--	51%	50%	45%	42%	100%	100%
Carr Street	100	05/31/2013	--	--	36%	85%	92%	88%	97%	n/a
Maple Grove	1000	05/20/2013	--	--	67%	95%	100%	89%	100%	100%

\*-ALERT2 data reception at Diamond Hill was deteriorating

Only two A2 self-reporting sites remain operational over the winter and they are Newlin Gulch and Maple Grove Reservoir. Timer reports from Maple Grove Reservoir were not received on November 5, 2013.....likely due to field maintenance.

## B. Specific Issues Identified this Month

Performance of the following sensors (Table 3) was questionable this month.

**Table 3. Sensors with Poor Performance Characteristics**

Sensor ID	Description	Timer	Event	Comments
2710	Highland Ranch WTP	57%	100%	
4230	Golden Age	47%	100%	
3010	EPC at Hwy 105	92%	78%	Need to look at Dakan Rd repeater
4471/4472/4474	Little Narrows is sending unknown IDs.			
4477/4478	Little Narrows is sending unknown IDs.			

## C. Continuous Operation of Base Receiver/Decoder

The NS5 base station was not continuous operation for the entire month. The base station was down on November 1 from 3:10 AM to 9:46 AM.

## D. Rain Sensor Timer Reporting Summary

The following analysis assumes that each rain sensor has a 12-hour timer-reporting interval. The worst performing rain sensors for the month are summarized (Table 4).

**Table 4. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)**

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
4470	4470	2790	1200	3070	2710	1480	840	840	840	4230	
3070	4550	4550	840	2800	840	2190	2790	2790	1200	2710	
1660	4870	2710	800	840	4350	840	2730	2730	920	4510	
2790	2790	4870	4330	1700	2790	1660	2910	2930	2710	2790	
4870	4490	4270	2360	2790	5940	3010	2230	2840	4510	4490	
2320	4510	4190	620	100100	1660	3090	2860	2880	4470	4870	

\*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

Sensors identified as having poor timer performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

## III. Rain Sensor Event Reporting Summary

### A. District-Wide Total Tip/Count Statistics

The incrementing reports from all 1-mm rain sensors were analyzed to quantify the District-wide statistical total monthly tip summary (Table 5). For the months of January, February, March, October, November and December only the stations that operate year-round are included in the rain event analysis. These stations include all weather stations and the stations in Boulder County.

**Table 5. District-Wide Total Tip/Count Statistical Summary**

Statistical Parameter	Value	Comments
Mean	5.86	Only the 1-mm rain sensors were included in the analysis
Median	6	Only the 1-mm rain sensors were included in the analysis
Standard deviation	2.65	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	13.8	Only the 1-mm rain sensors were included in the analysis
Minimum total count	1	Numerous stations
Maximum total count	13	Riverside – Boulder County (4340)

## B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 6).

**Table 6. Monthly Summary of District-Wide Mean Total 1-mm Tip/Count**

Year	Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*	Ave
2006	4.62	5.92	18.39	20.47	19.44	13.75	74.03	46.89	24.17	41.13	5.04	16.45	24.19
2007	11.56	5.40	29.75	65.03	68.30	15.87	36.20	46.38	22.13	29.50	6.54	11.29	29.00
2008	4.05	7.38	12.26	20.57	54.82	26.06	16.43	90.20	37.54	19.59	2.82	9.24	25.08
2009	6.33	3.11	11.37	59.26	63.45	68.00	65.00	20.00	27.29	30.24	11.00	5.60	30.89
2010	5.97	11.90	32.54	70.57	39.63	56.04	50.23	31.01	4.18	18.31	8.30	3.31	27.67
2011	6.78	7.45	7.54	33.94	92.68	39.42	90.87	18.25	37.67	25.73	10.41	13.59	32.03
2012	4.89	13.57	2.35	30.17	38.97	19.35	73.03	11.31	48.81	22.32	2.98	4.18	22.66
2013	2.96	14.31	21.86	35.96	45.87	16.39	52.33	50.63	229.74	29.64	5.86		

\*- Only sensors that operate year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

## C. Sensors with a Jump of Six or More in the Sequential Count

Several sensors experienced a large jump in the sequential tip count (Table 7).

**Table 7. Sensors with a Jump of 6 or More in Sequential Count**

Sensor Description	Sensor ID	Comment
Diamond Hill	1420	Large jump noticed on November 11 around 10:30 AM likely due to field maintenance at Diamond Hill. Also some bad legacy decodes on ID 4850.
Porphory Mtn	4850	

## D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 96 percent. A total of 416 incrementing reports were received and a total of 433 reports were expected. The total loss of incrementing reports for the month was approximately 4 percent. Those sensors with the worst event transmission performance are summarized (Table 8).

**Table 8. Monthly Summary of Sensors with the Most Missed Tips**

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
4470	4510	4270	1200	4470	100	840	840	4570	2790	3010	
2330	2930	4490	840	5900	4470	3070	4470	920	4870	4470	
2980	4470	4790	4330	2980	1000	2980	4330	4330	4180	4070	
1660	2980	4510	4100	2790	500	1700	2820	4470	2930	900	
--	2730	4320	4270	840	1660	2790	1660	2790	2750	4320	
--	4790	4870	2980	4060	3070	2730	2790	2870	4710	4260	

\*-Only sensors that are operational year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

Sensors identified as having poor event performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

## IV. Heavy Radio Traffic Analysis

Periods exceeding 1,000 messages per hour are analyzed independently in an attempt to quantify data loss rates from rain sensors using their sequential tip count series.

### A. The Heaviest Hourly Traffic Periods This Month

The hourly periods of highest radio traffic this month are shown (Table 9). The five heaviest hours of radio traffic are analyzed to quantify the number of missing rain reports for that hour.

**Table 9. Periods of Heavy Radio Traffic (total load includes legacy and A2 reports)**

Day	Hour	Expected	Received	Total Load	Loss
3	5	0	0	1,583	0.00%
25	4	0	0	1,043	0.00%
25	5	0	0	1,027	0.00%
29	8	0	0	1,000	0.00%
25	7	0	0	997	0.00%

## V. Unknown Device Analysis – Received Data Log

The ALERT IDs present in the audio signal received by the decoder are compared against a list of “active” device IDs that are defined within NovaStar. Those IDs received by the decoder that are not defined within NovaStar are considered to be “unknown” and may be the result of radio noise or problems with the telemetry system. The reception of “unknown” device reports for the month is summarized (Table 10).

**Table 10. Summary of Unknown IDs**

Description	Quantity
Total number of unknown IDs (IDs without a device definition)	282
Total reports from unknown IDs	13,459
Unknown IDs with only a single received report (potential noise)	163
Total reports from all IDs – RecData Log entire month	250,416
Unknown reports as a fraction of total reports	5.37%

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 11) are the total reports received from unknown sensor IDs for each month of the year.

**Table 11. Monthly Summary of Total Reports from Unknown IDs**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	1,220	1,474	1,276	1,174	721	5,707	610	1,738	442	533	2,857	6,396
2011	1,231	2,165	3,065	1,254	2,051	439	489	456	191	683	747	861
2012	692	750	1,575	977	5,469	11,016	453	683	774	2,657	3,854	5,466
2013	4,265	994	1,100	2,589	3,623	6,973	5,230	1,070	4,429	781	13,459	

The fraction of reports from unknown sensors relative to the total number of reports is shown below (Table 12).

**Table 12. Monthly Percent of Unknown Sensor Reports**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	0.42%	0.56%	0.38%	0.32%	0.20%	1.61%	0.17%	0.49%	0.13%	0.16%	0.93%	1.88%
2011	0.39%	0.73%	0.90%	0.37%	0.58%	0.12%	0.12%	0.05%	0.12%	0.18%	0.22%	0.26%
2012	0.30%	0.25%	0.43%	0.26%	1.37%	2.74%	0.11%	0.18%	0.20%	0.72%	1.15%	1.62%
2013	1.40%	0.31%	0.29%	0.60%	0.37%	0.61%	0.82%	0.21%	0.96%	0.31%	5.37%	

Any month shaded in yellow has an excessive number of reports from unknown sensors.

A number of “unknown” sensors had multiple reports, which may indicate the existence of a transmitter that is sending information on an ID that is not currently defined within NovaStar. The unknown IDs with multiple reports including the number of reports received by each are shown (Table 13).

**Table 13. Reports Received by Unknown IDs**

Unknown ID	Reports	Comment	
4471	2,717	Ids in the 4400 range are coming from Litte Narrows	
4472	2,693		
4477	2,415		
4474	2,398		
4478	2,245		
4280	86		
1423	79		
1424	76		

## VI. Sensors with Invalid Reports

The following sensors had a large number of invalid reports (bit flip/contention errors/random decode):

Sensor ID	Description	Invalid Reports	Comments
4473	Little Narrows.	81	The PT has been damaged by the Sept floods and is currently sending erroneous data.
2793	W. Cherry Creek	115	Having cold weather issues with transmitter....will visit in December.
4240	Sunset	3	Several invalid reports received on the A2 channel which were not present on the legacy ALERT channel.

## VII. Rainfall Alarms and Intensity Analysis

The following rainfall rate alarms from the Urban Drainage and Flood Control District NovaStar 5.0 Web Server were identified this month.

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No rainfall alarms recorded this month.

# General System Analysis

**Database Name** P:\A207-UDFCD-Data-Analysis\2013\11-2013\Novastar\_extract\_2013Nov.mdb

<b>First Date in Database</b>	11/1/13 12:00 AM	<b>Total Days</b>	30.0
<b>Last Date in Database</b>	11/30/13 11:59 PM	<b>Total Hours</b>	720.0

**Total Records Analyzed** 524,352

**Records by Group**

Wind Data	217,136	41%
Temperature	78,498	15%
Relative Humidity	70,178	13%
Barometric Pressure	34,954	7%
Battery Voltage	29,019	6%
Unknown	13,459	3%
Water Level	13,067	2%
Dew Point Temperature	11,106	2%
Peak Wind	11,106	2%
Wind Chill	11,106	2%
Solar Radiation	10,487	2%
Precipitation	7,218	1%
Fuel Moisture	5,768	1%
Fuel Temperature	5,755	1%
Soil Moisture	2,923	1%
Repeater Status Report	1,773	0%
Flasher Status	437	0%
12Hr Status Report	229	0%
Repeater Pass List	96	0%
Solar Power	32	0%
Handar 585 ALARM Status	4	0%
ALERT/A2 Testing	1	0%
<b>Total</b>	<b>524,352</b>	

**Records by Major Group**

Meteorologic Sensors	194,117	37%
Soil and Fuel Sensors	14,446	3%
Water Level Sensors	13,067	2%
Rain Sensors	7,218	1%
Sensor Status Transmissions	2,134	0%
<b>Total</b>	<b>230,982</b>	

**Traffic Loading Summary**

	<b>ALERT2</b>	<b>Duplicate A2</b>	<b>Legacy</b>	
Alert Reports	524,352	reports received	250,416	Note that legacy reports drop off in cold weather at Blue Mt. hour beginning Nov 3, 1:00 AM Nov 20, 11:00 AM Nov 20, 2:00 PM Nov 20, 12:00 PM Nov 20, 10:00 AM
Average Daily Traffic	17,478	from multiple	8,347	
Average Hourly Traffic	728	repeaters	348	
Median Hourly Traffic	718	hour beginning	345	
Peak Hourly Traffic	1,583	Nov 3, 5:00 AM	696	
2nd Max	1,043	Nov 25, 4:00 AM	642	
3rd Max	1,027	Nov 25, 5:00 AM	613	
4th Max	1,000	Nov 29, 8:00 AM	606	
5th Max	997	Nov 25, 7:00 AM	598	

# Rain Timer Performance

Analyze Rain Sensors

Rain Sensors	Description	Rcv	Timer	Exp	Performance	Comment
4230	Golden Age	28	12:22	60	47%	
2710	Wx-Highlands Ranch WTP	34	18:23	60	57%	
4510	Pinewood Springs	45	14:59	60	75%	
2790	Wx-W. Cherry Creek	48	14:06	60	80%	
4490	Apple Valley	51	13:45	60	85%	
4870	SBC @ SB Road	52	13:10	60	87%	
4470	Little Narrows	52	13:09	60	87%	
4790	Wx-Button Rock	53	12:42	60	88%	
4340	Riverside	53	12:41	60	88%	
4330	Hansen Rain	53	12:39	60	88%	
2930	Wx-Spring Valley Rd-DougCnty	54	12:54	60	90%	
4550	Boulder Jail	54	12:38	60	90%	
4270	Cannon Mountain	54	12:40	60	90%	
4710	Wx-Ward C-1	55	12:43	60	92%	
2730	Wx-Salisbury Park	55	12:52	60	92%	
3010	WX-EPC at Hwy 105	55	12:43	60	92%	
920	Wx-Aurora Town Hall	55	13:05	60	92%	
1520	Wx-Marston Lake North	56	12:26	60	93%	
4310	Johnny Park	56	12:22	60	93%	
4190	Slaughterhouse	56	12:11	60	93%	
4040	Martin Gulch	56	12:11	60	93%	
4030	Red Garden	56	12:11	60	93%	
3020	Wx-West Creek WX	57	12:25	60	95%	
2990	Wx-Tomah Rd-DougCnty	57	12:26	60	95%	
4840	SBC@S Boulder Ditch	57	11:56	60	95%	
4320	Lee Hill Rain 2012	57	12:09	60	95%	
4300	Big Elk Park	57	12:09	60	95%	
4250	Geer Canyon	57	12:09	60	95%	
4240	Sunset	57	12:10	60	95%	
4220	Fling's	57	12:24	60	95%	
4180	Gold Lake	57	12:09	60	95%	
4060	Lakeshore	57	12:24	60	95%	
4730	Wx-Sugarloaf	58	11:58	60	97%	
750	Wx-Quincy Reservoir	58	12:10	60	97%	
2210	Wx-Hiwan G.C.	58	11:58	60	97%	
2750	Wx-Castle Rock	58	12:11	60	97%	
140	Wx-Blue Mountain	58	11:58	60	97%	
3030	WX-Bingham Lake Park	58	12:25	60	97%	
4850	Porphory Mtn	58	11:19	60	97%	
4820	Doudy Draw	58	11:56	60	97%	
4810	Shanahan Ridge	58	12:24	60	97%	
4570	St. Antons	58	12:12	60	97%	
4290	Red Hill	58	11:55	60	97%	
4260	Taylor Mountain	58	11:56	60	97%	
4150	Gold Hill	58	12:10	60	97%	
4110	Betasso	58	11:45	60	97%	
4090	Magnolia	58	11:57	60	97%	
4070	Bear Peak	58	12:09	60	97%	
4050	Walker Ranch	58	12:10	60	97%	
4020	Rio Grande	58	12:09	60	97%	
1920	Wx-Brighton	59	11:58	60	98%	
4830	SBC @ San Souci	59	12:09	60	98%	
4360	Justice Center	59	11:57	60	98%	
4200	Lazy Acres	59	11:56	60	98%	



4170	Pine Brook	59	11:56	60	98%
4160	Sunshine	59	11:56	60	98%
4130	Swiss Peaks	59	11:58	60	98%
4100	Filter Plant	59	11:45	60	98%
4080	Twin Sisters	59	11:57	60	98%
4010	Crescent	59	11:56	60	98%
1460	Wx-Urban Farm	60	11:46	60	100%
4750	Wx-Louisville Lake	60	11:46	60	100%
1440	Wx-Elbert	60	11:46	60	100%
4770	Wx-Cal-Wood Ranch	60	11:38	60	100%
4530	Winiger Ridge	60	11:56	60	100%
4880	Whispering Pines	60	11:56	60	100%
4520	Eagle Ridge	60	11:58	60	100%
4350	Conifer Hill	60	11:42	60	100%
4140	Logan Mill	60	11:56	60	100%
4860	Fairview Peak	61	11:44	60	102%
1420	Wx-Diamond Hill	63	11:01	60	105%
1570	Wx-Brighton Ditch	63	11:11	60	105%
900	Wx-Aurora Reservoir	63	11:02	60	105%
3070	Newlin Gulch-A2	117	6:02	60	195%

Rain Event Performance																			
		Reports Received	419	Analyze Rain Sensors															
	Systemwide Avg	Total Tips	433																
	96.77%	Data Loss	3.23%																
Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket					
WX-EPC at Hwy 105	3010	78%	5	2	0	0	0	0	0	7	9	2	0	0.01					
Little Narrows	4470	83%	4	1	0	0	0	0	0	5	6	1	0	0.03937	Mean		5.9848		
Bear Peak	4070	83%	4	1	0	0	0	0	0	5	6	1	0	0.03937	Median		6		
Wx-Aurora Reservoir	900	83%	4	1	0	0	0	0	0	5	6	1	0	0.03937	St. Dev		2.8257		
Lee Hill Rain 2012	4320	86%	5	1	0	0	0	0	0	6	7	1	0	0.03937	Mean plus 3 SD		14.462		
Taylor Mountain	4260	86%	5	1	0	0	0	0	0	6	7	1	0	0.03937	Min		1		
Hansen Rain	4330	88%	6	1	0	0	0	0	0	7	8	1	0	0.03937	Max		14		
Johnny Park	4310	88%	6	1	0	0	0	0	0	7	8	1	0	0.03937					
Red Garden	4030	90%	8	1	0	0	0	0	0	9	10	1	0	0.03937					
Slaughterhouse	4190	91%	9	1	0	0	0	0	0	10	11	1	0	0.03937					
Wx-Ward C-1	4710	92%	10	1	0	0	0	0	0	11	12	1	0	0.03937					
Riverside	4340	92%	11	1	0	0	0	0	0	12	13	1	0	0.03937					
Porphory Mtn	4850	93%	12	1	0	0	0	0	1	13	14	1	1	0.01					
Newlin Gulch-A2	3070	100%	6	0	0	0	0	0	0	6	6	0	0	0.019685					
Wx-West Creek WX	3020	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Wx-W. Cherry Creek	2790	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Wx-Urban Farm	1460	100%	3	0	0	0	0	0	0	3	3	0	1	0.03937					
Wx-Tomah Rd-DougCnty	2990	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Wx-Sugarloaf	4730	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Wx-Spring Valley Rd-DougCnty	2930	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
Wx-Quincy Reservoir	750	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Wx-Marston Lake North	1520	100%	5	0	0	0	0	0	0	5	5	0	3	0.03937					
Wx-Louisville Lake	4750	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Wx-Hiwan G.C.	2210	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Wx-Highlands Ranch WTP	2710	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
Wx-Elbert	1440	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Wx-Diamond Hill	1420	100%	8	0	0	0	0	0	1	8	8	0	0	0.03937					
Wx-Cal-Wood Ranch	4770	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937					
Wx-Button Rock	4790	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937					
Wx-Brighton Ditch	1570	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
Wx-Brighton	1920	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Wx-Blue Mountain	140	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
WX-Bingham Lake Park	3030	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Winiger Ridge	4530	100%	10	0	0	0	0	0	0	10	10	0	0	0.03937					
Whispering Pines	4880	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937					
SBC @ SB Road	4870	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
SBC@S Boulder Ditch	4840	100%	10	0	0	0	0	0	0	10	10	0	0	0.03937					
SBC @ San Souci	4830	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Doudy Draw	4820	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Shanahan Ridge	4810	100%	9	0	0	0	0	0	0	9	9	0	0	0.03937					
St. Antons	4570	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Boulder Jail	4550	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Eagle Ridge	4520	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Pinewood Springs	4510	100%	8	0	0	0	0	0	0	8	8	0	0	0.03937					
Apple Valley	4490	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937					
Justice Center	4360	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Conifer Hill	4350	100%	9	0	0	0	0	0	0	9	9	0	0	0.03937					
Big Elk Park	4300	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Red Hill	4290	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937					
Cannon Mountain	4270	100%	8	0	0	0	0	0	0	8	8	0	0	0.03937					

Geer Canyon	4250	100%	8	0	0	0	0	0	0	8	8	0	0	0.03937
Sunset	4240	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937
Fling's	4220	100%	8	0	0	0	0	0	0	8	8	0	0	0.03937
Lazy Acres	4200	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937
Gold Lake	4180	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937
Pine Brook	4170	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937
Sunshine	4160	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937
Gold Hill	4150	100%	8	0	0	0	0	0	0	8	8	0	0	0.03937
Logan Mill	4140	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937
Swiss Peaks	4130	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937
Betasso	4110	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937
Filter Plant	4100	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937
Magnolia	4090	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937
Twin Sisters	4080	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937
Lakeshore	4060	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937
Walker Ranch	4050	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937
Martin Gulch	4040	100%	9	0	0	0	0	0	0	9	9	0	0	0.03937
Rio Grande	4020	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937
Crescent	4010	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937
Fairview Peak	4860	100%	17	0	0	0	0	0	0	17	17	0	1	0.01
<b>TOTALS</b>										<b>419</b>	<b>433</b>	<b>14</b>	<b>6</b>	

## 2013 Monthly ALERT Radio Traffic Summary

