

Memo

Date: January 14, 2014
To: Kevin Stewart
From: Markus Ritsch
Subject: December 2013 ALERT Data Analysis

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 December 1 through December 31, 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	228,769
Concentrator	304,067	319,089	379,891	381,523	571,616	686,278	538,090	430,404	374,351	430,291	421,986	423,972
ALERT2	--	--	16,450	47,415	88,786	113,822	97,216	88,860	86,550	113,474	102,367	106,380
TOTAL	625,203	537,457	661,325	671,982	978,825	1,142,685	904,781	813,916	813,917	799,163	774,769	759,121
Conc+A2	--	--	396,341	428,938	660,402	800,100	635,306	519,264	460,901	543,765	524,352	530,352
Conc/Leg			1.43	1.57	1.80	2.00	2.00	1.46	1.06	1.68	1.68	1.85

The daily ratio of ALERT2 reports received versus legacy ALERT is shown (Figure 1). Beginning on January 6, 2014 a significant decrease in received A2 reports occurred at Diamond Hill. This problem was only present at Diamond Hill as the Contrail base at OneRain was still collecting A2 data. In response to an inquiry from WET on Tuesday, January 7, 2014 Dave Leader wrote "I patched the ALERT/ALERT2 data collection software. For some reason after the restart, there were two versions of the ALERT2 receive data running that were competing. I fixed this at 16:30 today." The ALERT2 data collection again went down on Thursday, January 9, 2014. After a second inquiry by WET, Dave Leader wrote "Found the problem. I added more source address information in the receive data log and had a memory problem. Data collection is back up."

A. Specific Issues Identified this Month

Performance of the following sensors (Table 2) was questionable this month.

Table 2. Sensors with Poor Performance Characteristics

Sensor ID	Description	Timer	Event	Comments
4470	Little Narrows	11%	100%	
4510	Pinewood Springs	35%	100%	
4230	Golden Age	60%	67%	
4471/4472/4474	Little Narrows is sending unknown IDs.			
4477/4478	Little Narrows is sending unknown IDs.			

It was noticed this month that NS5 at Diamond Hill logs duplicate reports from A2 self-reporting sites (Maple Grove and Newlin Gulch). The NS5 data QA/QC logic filters out duplicate reports from legacy ALERT and A2 concentrator sites. Dave Leader was made aware of this issue on January 14, 2014.

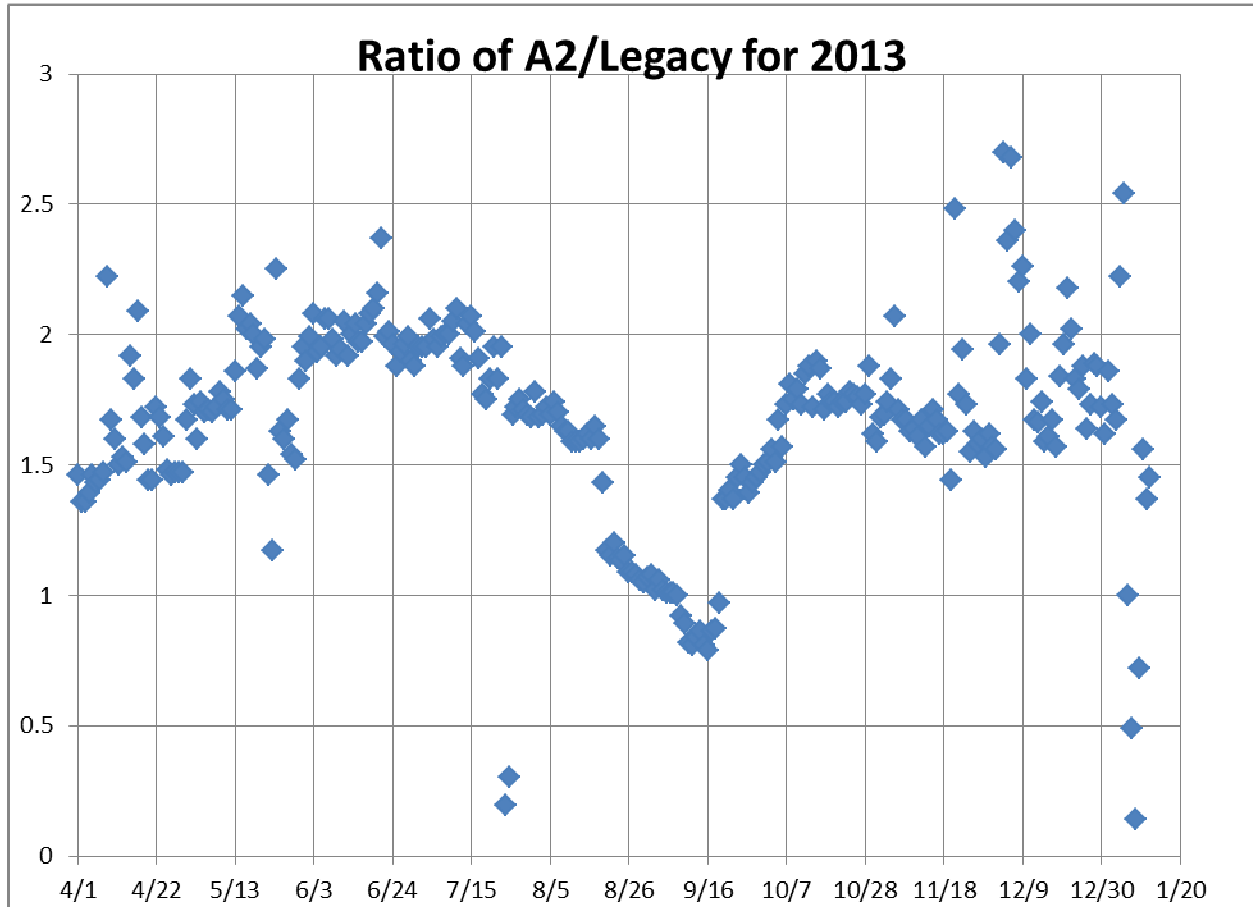


Figure 1. Daily Ratio of ALERT2/Legacy Reports

B. 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 3. Event Performance of New A2 Sites

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

Only two A2 self-reporting sites remain operational over the winter and they are Newlin Gulch and Maple Grove Reservoir.

C. Continuous Operation of Base Receiver/Decoder

The NS5 base station was in continuous operation for the entire month.

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	4470
3070	4550	4550	840	2800	840	2190	2790	2790	1200	2710	4510
1660	4870	2710	800	840	4350	840	2730	2730	920	4510	4790
2790	2790	4870	4330	1700	2790	1660	2910	2930	2710	2790	4520
4870	4490	4270	2360	2790	5940	3010	2230	2840	4510	4490	4550
2320	4510	4190	620	100100	1660	3090	2860	2880	4470	4870	920

*- 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	4.00	Only the 1-mm rain sensors were included in the analysis
Median	3	Only the 1-mm rain sensors were included in the analysis
Standard deviation	2.66	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	11.98	Only the 1-mm rain sensors were included in the analysis
Minimum total count	1	Numerous stations
Maximum total count	15	Apple Valley – Boulder County (4490)

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	4.00	42.46

*- 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
W. Cherry Creek - Wx	4790	Many jumps in count including 2047 and 255. Scheduled for field visit by WET in January.
W. Cherry Creek	4793	

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 98 percent. A total of 271 incrementing reports were received and a total of 276 reports were expected. The total loss of incrementing reports for the month was approximately 2 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	4230
2330	2930	4490	840	5900	4470	3070	4470	920	4870	4470	4070
2980	4470	4790	4330	2980	1000	2980	4330	4330	4180	4070	2330
1660	2980	4510	4100	2790	500	1700	2820	4470	2930	900	4490
--	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
24	13	1	1	986	0.00%
2	12	4	4	982	0.00%
2	13	1	1	952	0.00%
6	13	1	1	939	0.00%
2	14	1	1	928	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	ALERT2	Legacy
Total number of unknown IDs (IDs without a device definition)	240	264
Total reports from unknown IDs	1,213	1,127
Unknown IDs with only a single received report (potential noise)	135	177
Total reports from all IDs – RecData Log entire month	530,352	228,769
Unknown reports as a fraction of total reports	0.23%	0.49%

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	1,213

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%	0.23%

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

ALERT2		Legacy ALERT		Comment
Unknown ID	Reports	Unknown ID	Reports	
4280	165	4280	103	
4471	104	4471	101	
4472	99	4472	98	
4477	80	4477	80	
4474	78	4474	77	
4478	73	4478	72	
4285	46	4285	44	
4279	44	4279	42	

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
2793	W. Cherry Creek	958	Having cold weather issues with transmitter....WET to visit.
2790	W. Cherry Creek	49	Having cold weather issues with transmitter....WET to visit.
1383	Ferril Lake	287	

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.

No rainfall alarms recorded this month.

General System Analysis

Database Name P:\A207-UDFCD-Data-Analysis\2013\12-2013\Novastar_extract_2013Dec.mdb

First Date in Database	12/1/13 12:00 AM	Total Days	31.0
Last Date in Database	12/31/13 11:59 PM	Total Hours	744.0

Total Records Analyzed 530,352

Records by Group

Wind Data	228,872	43%
Temperature	83,123	16%
Relative Humidity	73,576	14%
Barometric Pressure	35,048	7%
Battery Voltage	26,392	5%
Water Level	12,828	2%
Dew Point Temperature	11,582	2%
Wind Chill	11,581	2%
Peak Wind	11,580	2%
Solar Radiation	10,884	2%
Fuel Moisture	6,002	1%
Fuel Temperature	5,979	1%
Precipitation	5,950	1%
Soil Moisture	2,990	1%
Repeater Status Report	2,098	0%
Unknown	1,213	0%
Flasher Status	357	0%
12Hr Status Report	195	0%
Repeater Pass List	80	0%
Solar Power	18	0%
ALERT/A2 Testing	2	0%
Handar 585 ALARM Status	2	0%
Total	530,352	

Records by Major Group

Meteorologic Sensors	202,631	38%
Soil and Fuel Sensors	14,971	3%
Water Level Sensors	12,828	2%
Rain Sensors	5,950	1%
Sensor Status Transmissions	2,393	0%
Total	238,773	

Traffic Loading Summary

	ALERT2			Legacy ALERT
Alert Reports	530,352			228,769
Average Daily Traffic	17,108			7,380
Average Hourly Traffic	713			307
Median Hourly Traffic	714	hour beginning		326
Peak Hourly Traffic	986	Dec 24, 1:00 PM		521
2nd Max	982	Dec 2, 12:00 PM		495
3rd Max	952	Dec 2, 1:00 PM		470
4th Max	939	Dec 6, 1:00 PM		469
5th Max	928	Dec 2, 2:00 PM		468
				Dec 1, 10:00 AM
				Dec 10, 10:00 AM
				Dec 24, 1:00 PM
				Dec 2, 12:00 PM
				Dec 2, 7:00 AM

Rain Timer Performance

Analyze Rain Sensors

Rain Sensors	Description	Rcv	Timer	Exp	Performance	Comment
4470	Little Narrows	7	5:53	62	11%	
4510	Pinewood Springs	22	12:40	62	35%	
4790	Wx-Button Rock	27	12:30	62	44%	
4520	Eagle Ridge	28	12:00	62	45%	
4550	Boulder Jail	33	16:12	62	53%	
920	Wx-Aurora Town Hall	35	18:48	62	56%	
4230	Golden Age	37	11:57	62	60%	
2330	Morrison	42	15:28	62	68%	
4490	Apple Valley	43	15:31	62	69%	
2710	←Highlands Ranch W	45	15:32	62	73%	
1660	SPR at Henderson	47	14:40	62	76%	
4330	Hansen Rain	50	12:28	62	81%	
4240	Sunset	53	13:50	62	85%	
2320	Choke Cherry Resvr	54	13:55	62	87%	
3010	WX-EPC at Hwy 105	54	13:12	62	87%	
4270	Cannon Mountain	54	12:54	62	87%	
4870	SBC @ SB Road	54	12:29	62	87%	
1640	SPR at Union Ave.	55	12:56	62	89%	
110	Ralston Reservoir	56	12:52	62	90%	
4850	Porphory Mtn	56	12:52	62	90%	
4030	Red Garden	57	12:13	62	92%	
4070	Bear Peak	57	12:10	62	92%	
4310	Johnny Park	57	11:57	62	92%	
700	Toll Gate @ 6th	58	12:39	62	94%	
1420	Wx-Diamond Hill	58	12:14	62	94%	
1440	Wx-Elbert	58	12:00	62	94%	
2930	Spring Valley Rd-Douç	58	12:26	62	94%	
4180	Gold Lake	58	12:10	62	94%	
4350	Conifer Hill	58	12:24	62	94%	
4530	Winiger Ridge	58	12:11	62	94%	
1700	Cherry Cr @ Champa	59	11:47	62	95%	
1920	Wx-Brighton	59	12:00	62	95%	
4010	Cresent	59	12:10	62	95%	
4080	Twin Sisters	59	12:23	62	95%	
4110	Betasso	59	12:27	62	95%	
4130	Swiss Peaks	59	12:13	62	95%	
4190	Slaughterhouse	59	12:37	62	95%	
4250	Geer Canyon	59	11:43	62	95%	
4260	Taylor Mountain	59	11:58	62	95%	
4710	Wx-Ward C-1	59	12:00	62	95%	
750	Wx-Quincy Reservoir	60	12:10	62	97%	
900	Wx-Aurora Reservoir	60	12:12	62	97%	
970	Pump Sta 3	60	12:12	62	97%	
1460	Wx-Urban Farm	60	12:00	62	97%	
2730	Wx-Salisbury Park	60	12:00	62	97%	
3020	Wx-West Creek WX	60	12:00	62	97%	
4040	Martin Gulch	60	12:11	62	97%	
4200	Lazy Acres	60	12:10	62	97%	
4220	Fling's	60	11:45	62	97%	
4290	Red Hill	60	11:16	62	97%	
4300	Big Elk Park	60	11:57	62	97%	
4320	Lee Hill Rain 2012	60	12:10	62	97%	
4360	Justice Center	60	12:11	62	97%	
4730	Wx-Sugarloaf	60	12:00	62	97%	

4750	Wx-Louisville Lake	60	12:12	62	97%
1570	Wx-Brighton Ditch	61	12:00	62	98%
2750	Wx-Castle Rock	61	12:00	62	98%
2990	Wx-Tomah Rd-DougCr	61	12:00	62	98%
3030	Wx-Bingham Lake Pai	61	12:00	62	98%
4020	Rio Grande	61	11:58	62	98%
4050	Walker Ranch	61	11:58	62	98%
4060	Lakeshore	61	11:58	62	98%
4090	Magnolia	61	11:58	62	98%
4100	Filter Plant	61	11:59	62	98%
4140	Logan Mill	61	11:58	62	98%
4150	Gold Hill	61	11:58	62	98%
4160	Sunshine	61	11:58	62	98%
4170	Pine Brook	61	11:57	62	98%
4340	Riverside	61	12:10	62	98%
4570	St. Antons	61	11:59	62	98%
4860	Fairview Peak	61	12:00	62	98%
140	Wx-Blue Mountain	62	11:47	62	100%
1520	Wx-Marston Lake Nort	62	12:09	62	100%
150	Nott Creek	63	11:45	62	102%
4770	Wx-Cal-Wood Ranch	63	11:35	62	102%
2790	Wx-W. Cherry Creek	75	8:14	62	121%
2210	Wx-Hiwan G.C.	81	8:57	62	131%
4830	SBC @ San Souci	87	8:04	62	140%
4820	Doudy Draw	93	7:06	62	150%
4810	Shanahan Ridge	97	7:23	62	156%
4840	SBC@S Boulder Ditch	97	7:21	62	156%
4880	Whispering Pines	118	6:00	62	190%
1000	W2-Maple Grove Resv	128		62	206%
3070	Newlin Gulch-A2	145		62	234%

Rain Event Performance																			
		Reports Received	271	Analyze Rain Sensors															
	Systemwide Avg	Total Tips	276																
	98.19%	Data Loss	1.81%																
Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket					
Golden Age	4230	67%	1	1	0	0	0	0	0	2	3	1	0	0.03937					
Bear Peak	4070	75%	2	1	0	0	0	0	0	3	4	1	0	0.03937	Mean		4.00		
Morrison	2330	83%	4	1	0	0	0	0	0	5	6	1	0	0.03937	Median		3		
Apple Valley	4490	87%	11	2	0	0	0	0	0	13	15	2	0	0.03937	St. Dev		2.6624		
Ralston Reservoir	110	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937	Mean plus 3 SD		11.987		
Wx-Blue Mountain	140	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937	Min		1		
Nott Creek	150	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937	Max		15		
Toll Gate @ 6th	700	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Pump Sta 3	970	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
A2-Maple Grove Resv.	1000	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937					
Wx-Diamond Hill	1420	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937					
Wx-Urban Farm	1460	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	0	0.03937					
SPR at Union Ave.	1640	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Wx-Hiwan G.C.	2210	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
Choke Cherry Resvr	2320	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Wx-Highlands Ranch WTP	2710	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Wx-Salisbury Park	2730	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
Wx-W. Cherry Creek	2790	100%	1	0	0	0	0	0	18	1	1	0	1	0.03937					
Wx-Spring Valley Rd-DougCnty	2930	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
Wx-Tomah Rd-DougCnty	2990	100%	10	0	0	0	0	0	0	10	10	0	0	0.03937					
Wx-West Creek WX	3020	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
WX-Bingham Lake Park	3030	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Crescent	4010	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Rio Grande	4020	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Red Garden	4030	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Martin Gulch	4040	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937					
Walker Ranch	4050	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Lakeshore	4060	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Twin Sisters	4080	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Magnolia	4090	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Filter Plant	4100	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Betasso	4110	100%	10	0	0	0	0	0	0	10	10	0	0	0.03937					
Swiss Peaks	4130	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Logan Mill	4140	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Gold Hill	4150	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937					
Sunshine	4160	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937					
Pine Brook	4170	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Slaughterhouse	4190	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Lazy Acres	4200	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937					
Fling's	4220	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					
Sunset	4240	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Geer Canyon	4250	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937					
Taylor Mountain	4260	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937					
Cannon Mountain	4270	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937					
Red Hill	4290	100%	8	0	0	0	0	0	0	8	8	0	0	0.03937					
Big Elk Park	4300	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937					
Johnny Park	4310	100%	11	0	0	0	0	0	0	11	11	0	0	0.03937					
Lee Hill Rain 2012	4320	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937					
Hansen Rain	4330	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937					

Riverside	4340	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937
Conifer Hill	4350	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937
Justice Center	4360	100%	7	0	0	0	0	0	0	7	7	0	0	0.03937
Little Narrows	4470	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937
Pinewood Springs	4510	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937
Eagle Ridge	4520	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937
Winiger Ridge	4530	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937
Boulder Jail	4550	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937
St. Antons	4570	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937
Wx-Ward C-1	4710	100%	6	0	0	0	0	0	0	6	6	0	0	0.03937
Wx-Sugarloaf	4730	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937
Wx-Cal-Wood Ranch	4770	100%	5	0	0	0	0	0	0	5	5	0	0	0.03937
Wx-Button Rock	4790	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937
Shanahan Ridge	4810	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937
Doudy Draw	4820	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937
SBC @ San Souci	4830	100%	3	0	0	0	0	0	0	3	3	0	0	0.03937
SBC@S Boulder Ditch	4840	100%	4	0	0	0	0	0	0	4	4	0	0	0.03937
SBC @ SB Road	4870	100%	1	0	0	0	0	0	0	1	1	0	0	0.03937
Whispering Pines	4880	100%	2	0	0	0	0	0	0	2	2	0	0	0.03937
		Total Tips	266	5	0	0	0	0	18	271	276	5	1	
Newlin Gulch-A2	3070	50%	0	3	0	0	0	0	0	3	6	3	0	0.019685
WX-EPC at Hwy 105	3010	100%	9	0	0	0	0	0	0	9	9	0	0	0.01

2013 Monthly ALERT Radio Traffic Summary

