

Memo

Date: October 3, 2012
To: Kevin Stewart
From: Markus Ritsch
Subject: September 2012 ALERT Data Analysis

I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's NovaStar 5.0 base station were analyzed for the period September 1 through September 30, 2012.

II. General System Analysis Summary

A total of 383,168 legacy ALERT data reports were analyzed. Meteorological sensors account for 45 percent, water level sensors 7 percent, and rain sensors 5 percent of the total monthly records.

The system-wide radio traffic loading was 12,772 reports per day with an average hourly loading of 532 reports. The peak hour of radio traffic loading was 1,284 reports, which occurred on September 12th, between 5:00 AM and 6:00 AM. A plot of monthly average and peak hourly traffic loading is provided.

A. Specific Issues Identified this Month

Performance of the following sensors (Table 1) was questionable this month.

Table 1. Rain Sensors with Poor Performance Characteristics

Rain ID	Description	Timer	Event	Comments
110	Ralston Reservoir	92%	61%	
310	Guy Hill Ranch	87%	67%	
1640	SPR at Union Ave.	15%	100%	
2190	Wx-Squaw Mt	62%	100%	
2270	Cub Creek below Blue	52%	82%	
2900	Russelville Gulch – DC	50%	NA	
2980	Dakan Road	93%	63%	
3070	Newlin Gulch	93%	8%	
1801, 1802, 1804	Sand Creek Park (Site 1800) is sending reports on undefined sensors IDs			
4323	Lee Hill 2012 new rain gage is sending stage ID			

B. Continuous Operation of Base Receiver/Decoder

The ALERT and ALERT2 data feeds on the NS5 base station computer were in continuous operation for the entire month.

III. 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 2).

Table 2. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
2320	4550	4270	2890	1710	1660	1660	2270	1640			
1460	1460	4870	1640	2230	2950	2790	2320	2900			
1520	4470	4790	2270	4870	540	4330	3090	2270			
1440	1520	4850	2970	1900	1710	2270	4330	2190			
1000	1440	4570	4490	1660	4330	2320	870	2320			
4520	140	4070	3010	4330	2320	4870	4270	1660			

*. 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.

IV. 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 3). 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 3. District-Wide Total Tip/Count Statistical Summary

Statistical Parameter	Value	Comments
Mean	48.81	Only the 1-mm rain sensors were included in the analysis
Median	48	Only the 1-mm rain sensors were included in the analysis
Standard deviation	13.49	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	89.29	Only the 1-mm rain sensors were included in the analysis
Minimum total count	4	SPR at Union Avenue
Maximum total count	124	ID 3070 (Newlin Gulch – Douglas County)

B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 4).

Table 4. 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				

*. 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 5).

Table 5. Sensors with a Jump of 6 or More in Sequential Count

Sensor Description	Sensor ID	Comment
Newlin Gulch	3070	Numerous large jumps in count – CSI ALERT Transmitter
Ralston Reservoir	110	One large jump – Sept 12 at 5:00 am
Guy Hill Ranch	310	One large jump – Sept 12 at 8:00 am

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 94 percent. A total of 8,272 incrementing reports were received and a total of 8,786 reports were expected. The total loss of incrementing reports for the month was approximately 6 percent. Those sensors with the worst event transmission performance are summarized (Table 6).

Table 6. Monthly Summary of Sensors with the Most Missed Tips

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
1700	2980	2710	4490	2270	700	3070	3070	3070			
1420	3030	4860	2980	4870	2970	4470	4790	110			
4490	4240	2930	1660	4470	3070	4330	2860	2980			
2980	1520	3030	3010	2980	400	2980	4490	310			
1660	4490	2990	2320	310	2730	4870	2980	4490			
4090	1420	4050	4470	2280	4330	2870	620	2790			

*-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.

V. 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 7). Each hour exceeding 1,000 reports was analyzed to quantify the number of missing rain reports for that hour.

Table 7. Periods of Heavy Radio Traffic

Day	Hour	Expected	Received	Total Load	Loss
12	5	415	383	1,284	7.71 %
12	6	396	384	1,248	3.03 %
12	8	403	358	1,215	11.17 %
12	7	334	317	1,165	5.09 %
12	10	284	272	1,058	4.23 %
12	9	292	263	1,032	9.93 %
26	21	194	174	1,024	10.31 %
12	4	288	282	1,006	2.08 %

VI. 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 8).

Table 8. Summary of Unknown IDs

Description	Quantity
Total number of unknown IDs (IDs without a device definition)	283
Total reports from unknown IDs	774
Unknown IDs with only a single received report (potential noise)	223
Total reports from all IDs – RecData Log entire month	383,168
Unknown reports as a fraction of total reports	0.20%

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 9) are the total reports received from unknown sensor IDs for each month of the year.

Table 9. 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			

The fraction of reports from unknown sensors relative to the total number of reports is shown below (Table 10).

Table 10. 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%			

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 11).

Table 11. Reports Received by Unknown IDs

Unknown ID	Reports
1801	97
1802	96
1804	93
4323	56
1319	19
4503	17
2239	15
4505	11
1631	8
2393	6
3053	6
418	5
2736	5

VII. Rain Sensors with Invalid Reports

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

Sensor	Description	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
710	Horseshoe Park Drop					1,311	0	0			
900	Wx-Aurora Reservoir		8	5	16	9	1	2			
1640	SPR at Union Ave.							3			
2210	Wx-Hiwan G.C.					3	1	1			
2240	Cold Sprg Glch Conf							4			
2280	Kinney Peak					3	0	1			
2810	Pine Cliff Road					5	4	5			
3020	West Creek WX					0	4	0			
3090	Highland Heritage Park	0	0	0	16	0	0	0			
4330	Hansen Rain			4	3	4	3	0			

General System Analysis

Database Name

P:\A207-UDFCD-Data-Analysis\2012\09-2012\Novastar_extract_2012Sep.mdb

First Date in Database

9/1/12 12:00 AM

Total Days

30.0

Last Date in Database

9/30/12 11:59 PM

Total Hours

720.0

Total Records Analyzed

383,168

Records by Group

Wind Data	121,771	32%
Temperature	70,062	18%
Relative Humidity	60,101	16%
Barometric Pressure	32,205	8%
Water Level	27,769	7%
Battery Voltage	20,555	5%
Precipitation	20,076	5%
Solar Radiation	10,175	3%
Fuel Temperature	5,731	1%
Fuel Moisture	5,713	1%
Soil Moisture	2,811	1%
Repeater Status Report	2,319	1%
Flasher Status	1,571	0%
Unknown	774	0%
Repeater Pass List	607	0%
12Hr Status Report	485	0%
Hayman Battery	378	0%
Handar 585 ALARM Status	61	0%
Dewpoint Temperature	2	0%
Longmont Flow Gage	1	0%
Solar Power	1	0%
Total	383,168	

Records by Major Group

Meteorologic Sensors	172,543	45%
Water Level Sensors	27,770	7%
Rain Sensors	20,076	5%
Soil and Fuel Sensors	14,255	4%
Sensor Status Transmissions	3,473	1%
Total	238,117	

Traffic Loading Summary

Alert Reports	383,168	
Average Daily Traffic	12,772	
Average Hourly Traffic	532	
Median Hourly Traffic	517	hour beginning
Peak Hourly Traffic	1,284	Sep 12, 5:00 AM
2nd Max	1,248	Sep 12, 6:00 AM
3rd Max	1,215	Sep 12, 8:00 AM
4th Max	1,165	Sep 12, 7:00 AM
5th Max	1,058	Sep 12, 10:00 AM

Rain Timer Performance

Analyze Rain Sensors

Rain Sensors	Description	Rcv	Timer	Exp	Performance
1640	SPR at Union Ave.	9	11:57	60	15%
2900	Russelville Gulch-Douglas	30	18:40	60	50%
2270	Cub Cr below Blue	31	21:45	60	52%
2190	Wx-Squaw Mountain	37	12:23	60	62%
2320	Choke Cherry Resvr	42	15:52	60	70%
1660	SPR at Henderson	46	14:17	60	77%
4870	SBC @ SB Road	47	14:14	60	78%
2230	Bear Cr below Cub	49	15:10	60	82%
3050	East/West Trailhead	49	14:10	60	82%
2790	W. Cherry Creek Wx	50	13:25	60	83%
4330	Hansen Rain	50	14:43	60	83%
4490	Apple Valley	50	13:52	60	83%
4290	Red Hill	51	13:25	60	85%
4470	Little Narrows	51	13:52	60	85%
4510	Pinewood Springs	51	13:33	60	85%
310	Guy Hill Ranch	52	12:14	60	87%
1710	Shop Creek	52	13:47	60	87%
2240	Cold Sprg Glch conf	52	13:47	60	87%
4190	Slaughterhouse	53	13:38	60	88%
4270	Cannon Mountain	53	13:22	60	88%
4790	Wx-Button Rock	53	12:30	60	88%
540	Parker/Mississippi	54	13:14	60	90%
650	Iliff Pond	54	12:13	60	90%
110	Ralston Reservoir	55	12:12	60	92%
840	Fire Station 12	55	12:14	60	92%
1110	Gunbarrel	55	12:43	60	92%
1350	Chatfield COE	55	12:44	60	92%
2260	Brook Forest	55	13:15	60	92%
2800	Columbine Open Space	55	12:57	60	92%
2850	Cherry Cr bl Bayou Glch	55	12:58	60	92%
3080	Tallman Gulch	55	12:15	60	92%
870	Murphy Creek GC	56	12:14	60	93%
2250	Rosedale	56	12:13	60	93%
2340	El Rancho	56	12:42	60	93%
2840	Sulphur Gulch	56	12:42	60	93%
2880	Happy Canyon at N Surrey Dr	56	12:35	60	93%
2960	Indian Creek	56	12:28	60	93%
2980	Dakan Rd	56	12:41	60	93%
3070	Newlin Gulch	56	12:14	60	93%
4340	Riverside	56	12:28	60	93%
4520	Eagle Ridge	56	12:45	60	93%
210	Leyden Confluence	57	12:12	60	95%
300	Van Bibber Park	57	12:26	60	95%
420	Expo Park	57	12:14	60	95%
610	Harvard @ Jackson	57	12:25	60	95%
1620	Slaughterhouse Glch	57	12:26	60	95%
2210	Wx-Hiwan G.C.	57	12:16	60	95%
2280	Kinney Peak	57	12:11	60	95%
2350	Idledale	57	12:12	60	95%
2370	Red Rocks Park	57	11:58	60	95%
2810	Pine Cliff Road	57	12:27	60	95%
2890	Spruce Mt - Douglas	57	12:14	60	95%
2910	East Cherry Cr-Douglas	57	12:28	60	95%
2930	Wx-Spring Valley Rd-DougCnty	57	12:00	60	95%

2940	Willow Creek - DougCnty	57	12:27	60	95%
3010	EPC at Hwy 105	57	12:00	60	95%
3040	CC @ Prairie Canyon Ranch	57	12:14	60	95%
3060	Fire Sta 47	57	12:27	60	95%
4040	Martin Gulch	57	11:57	60	95%
4070	Bear Peak	57	11:58	60	95%
4100	Filter Plant	57	11:59	60	95%
4110	Betasso	57	12:31	60	95%
4160	Sunshine	57	12:28	60	95%
4350	Conifer Hill	57	12:29	60	95%
4360	Justice Center	57	12:28	60	95%
4570	St. Antons	57	12:12	60	95%
4730	Wx-Sugarloaf	57	12:00	60	95%
4850	Porphory Mtn	57	12:48	60	95%
4860	Fairview Peak	57	12:16	60	95%
410	Kelly Dam	58	12:13	60	97%
530	Fire Station #19	58	11:57	60	97%
620	Quincy/Highline	58	11:57	60	97%
630	Temple Pond at DTC	58	12:16	60	97%
700	Toll Gate @ 6th	58	12:00	60	97%
720	Confluence Pond	58	12:12	60	97%
810	Granby Ditch @ 6th	58	12:11	60	97%
850	Flying J	58	12:00	60	97%
940	Sampson Gulch	58	12:12	60	97%
1000	Maple Grove Resv.	58	11:57	60	97%
1050	Jeffco Fairgrounds	58	11:57	60	97%
1060	Heritage Square	58	12:12	60	97%
1300	Hidden Lake	58	12:13	60	97%
1360	Denver Zoo	58	12:14	60	97%
1370	West Metro FS13	58	12:11	60	97%
1420	Wx-Diamond Hill	58	12:00	60	97%
1440	Wx-Elbert	58	12:14	60	97%
1520	Wx-Marston Lake North	58	12:00	60	97%
1550	Lakewood CC	58	11:57	60	97%
1600	Englewood Dam	58	11:58	60	97%
1900	Niver Detention	58	11:57	60	97%
1920	Wx-Brighton	58	12:14	60	97%
2310	Genesee Village	58	12:12	60	97%
2750	Wx-Castle Rock	58	12:00	60	97%
2820	Haskins Gulch Conf	58	12:00	60	97%
2920	West Cherry Head-Douglas Cnty	58	12:13	60	97%
2950	DC Public Works	58	12:13	60	97%
3030	WX-Bingham Lake Park	58	12:14	60	97%
3090	Highland Heritage Park	58	12:08	60	97%
4030	Red Garden	58	12:13	60	97%
4050	Walker Ranch	58	11:58	60	97%
4060	Lakeshore	58	12:13	60	97%
4080	Twin Sisters	58	11:57	60	97%
4140	Logan Mill	58	12:13	60	97%
4180	Gold Lake	58	12:13	60	97%
4200	Lazy Acres	58	11:59	60	97%
4250	Geer Canyon	58	12:13	60	97%
4550	Boulder Jail	58	12:11	60	97%
4810	Shanahan Ridge	58	12:12	60	97%
4880	Whispering Pines	58	12:13	60	97%
140	Wx-Blue Mountain	59	12:00	60	98%
200	Leyden Reservoir	59	12:11	60	98%
220	Upper Leyden	59	12:00	60	98%
320	Sports Complex	59	11:57	60	98%

440	Fire Station #7	59	11:57	60	98%
520	Jewell Detention	59	12:13	60	98%
600	Harvard Gulch Park	59	11:31	60	98%
710	Horseshoe Park Drop	59	11:59	60	98%
860	Sand Cr at Colfax	59	12:00	60	98%
970	Pump Sta 3	59	12:00	60	98%
1010	Denver West	59	11:57	60	98%
1030	NREL/S. Table Mtn.	59	11:58	60	98%
1040	Lena @ U.S. Hwy 6	59	11:59	60	98%
1100	Louisville Rec Ctr	59	11:59	60	98%
1310	LDC at 64th	59	11:58	60	98%
1330	Roslyn	59	12:00	60	98%
1340	Sanderson at Xavier	59	11:59	60	98%
1400	Upper Sloan Det.	59	11:57	60	98%
1460	Wx-Urban Farm	59	12:00	60	98%
1480	Third Creek at DIA	59	12:11	60	98%
1570	Wx-Brighton Ditch	59	12:00	60	98%
1700	Cherry Cr @ Champa	59	12:00	60	98%
1720	Cherry Cr @ Steele	59	11:57	60	98%
1800	Sand Creek Park	59	11:58	60	98%
1810	Sand Creek at mouth	59	11:44	60	98%
2330	Morrison	59	11:57	60	98%
2360	Indian Hills	59	12:11	60	98%
2730	Wx-Salisbury Park	59	12:14	60	98%
2990	Wx-Tomah Rd-DougCnty	59	11:47	60	98%
3020	Wx-West Creek WX	59	12:00	60	98%
4010	Crescent	59	12:12	60	98%
4020	Rio Grande	59	12:12	60	98%
4170	Pine Brook	59	11:59	60	98%
4220	Fling's	59	11:57	60	98%
4240	Sunset	59	11:58	60	98%
4320	Lee Hill Rain 2012	59	12:13	60	98%
4710	Wx-Ward C-1	59	12:00	60	98%
4750	Wx-Louisville Lake	59	12:00	60	98%
4770	Wx-Cal-Wood Ranch	59	12:00	60	98%
4820	Doudy Draw	59	12:11	60	98%
4830	SBC @ San Souci	59	11:58	60	98%
4840	SBC@S Boulder Ditch	59	12:12	60	98%
330	Van Bibber @ Hwy 93	60	11:58	60	100%
400	Montview Park	60	11:58	60	100%
430	Utah Park	60	11:56	60	100%
640	Goldsmith @ Eastman	60	11:57	60	100%
730	No Name @ Quincy	60	12:11	60	100%
750	Wx-Quincy Reservoir	60	11:57	60	100%
760	Mission Viejo Park	60	11:57	60	100%
800	Sable Ditch @ 18th	60	11:44	60	100%
820	ETG @ Buckley	60	12:11	60	100%
830	Side Creek Park	60	11:57	60	100%
900	Wx-Aurora Reservoir	60	9:45	60	100%
920	Wx-Aurora Town Hall	60	12:00	60	100%
1200	Broomfield 3207	60	11:58	60	100%
1530	Bear Creek @ Lowell	60	11:30	60	100%
2710	Wx-Highlands Ranch WTP	60	11:34	60	100%
2860	CC at Stroh Rd	60	11:57	60	100%
2870	Cottonwood (Apache)	60	12:00	60	100%
2970	Rampart Range Rd-Satellite	60	12:00	60	100%
4090	Magnolia	60	11:57	60	100%
4130	Swiss Peaks	60	11:59	60	100%
4150	Gold Hill	60	11:57	60	100%

4260	Taylor Mountain	60	12:12	60	100%
4300	Big Elk Park	60	12:03	60	100%
4310	Johnny Park	60	11:57	60	100%
4530	Winiger Ridge	60	11:57	60	100%
120	West Woods	61	11:57	60	102%
150	Nott Creek	61	11:43	60	102%
500	Havana Park	61	11:41	60	102%
1500	Powers Park	61	11:21	60	102%
4230	Golden Age	61	11:49	60	102%
510	Virginia Court	62	11:57	60	103%
950	Piney at Liverpool	62	11:17	60	103%
1320	SPR at 3rd Ave	75	9:11	60	125%
5720	Four Mile Creek	28	21:23	60	47%
5730	West Creek	57	12:14	60	95%
5740	Trail Creek	58	12:13	60	97%
5810	Stump Bump	59	12:00	60	98%
5860	Cedar Mountain	58	12:00	60	97%
5880	Hackett Mountain	58	12:14	60	97%
5940	Log Jumper	55	12:45	60	92%

Rain Event Performance			Reports Received		Analyze Rain Sensors									
			Total Tips	8,786										
			Data Loss	5.85%										
Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket
Newlin Gulch	3070	8%	0	1	0	4	0	5	7	10	124	38	0	0.0393701
Ralston Reservoir	110	61%	24	1	0	0	0	0	1	25	41	1	1	0.0393701
Dakan Rd	2980	63%	19	10	5	0	0	0	0	34	54	20	0	0.0393701
Guy Hill Ranch	310	67%	26	1	1	0	1	0	1	29	43	7	0	0.0393701
Apple Valley	4490	75%	12	1	2	0	0	0	0	15	20	5	0	0.0393701
W. Cherry Creek Wx	2790	76%	29	6	1	0	1	0	0	37	49	12	0	0.0393701
SPR at Henderson	1660	76%	25	7	2	0	0	0	0	34	45	11	0	0.0393701
SBC @ SB Road	4870	78%	31	5	3	0	0	0	0	39	50	11	0	0.0393701
Cub Cr below Blue	2270	82%	30	6	1	0	0	0	0	37	45	8	0	0.0393701
Kinney Peak	2280	84%	27	2	2	0	0	0	0	31	37	6	0	0.0393701
Little Narrows	4470	84%	22	3	1	0	0	0	0	26	31	5	0	0.0393701
Cherry Cr @ Steele	1720	86%	15	3	0	0	0	0	0	18	21	3	0	0.0393701
Highland Heritage Park	3090	87%	43	4	0	1	0	0	0	48	55	7	0	0.0393701
Bear Cr below Cub	2230	88%	41	2	2	0	0	0	0	45	51	6	0	0.0393701
El Rancho	2340	88%	41	4	1	0	0	0	0	46	52	6	0	0.0393701
Wx-Salisbury Park	2730	89%	35	5	0	0	0	0	0	40	45	5	0	0.0393701
Montview Park	400	89%	44	4	1	0	0	0	0	49	55	6	0	0.0393701
Spruce Mt - Douglas	2890	89%	36	5	0	0	0	0	0	41	46	5	0	0.0393701
Shop Creek	1710	89%	29	4	0	0	0	0	0	33	37	4	0	0.0393701
Wx-Aurora Reservoir	900	89%	31	1	0	1	0	0	0	33	37	4	0	0.0393699
Eagle Ridge	4520	90%	23	3	0	0	0	0	0	26	29	3	0	0.0393701
Red Garden	4030	90%	33	4	0	0	0	0	0	37	41	4	0	0.0393701
Pinewood Springs	4510	90%	33	4	0	0	0	0	0	37	41	4	0	0.0393701
Red Hill	4290	91%	46	1	2	0	0	0	0	49	54	5	0	0.0393701
Bear Creek @ Lowell	1530	91%	18	2	0	0	0	0	0	20	22	2	0	0.0393701
Toll Gate @ 6th	700	91%	37	4	0	0	0	0	0	41	45	4	1	0.0393701
Cherry Cr @ Champa	1700	91%	39	1	0	1	0	0	0	41	45	4	0	0.0393701
Columbine Open Space	2800	91%	29	3	0	0	0	0	0	32	35	3	0	0.0393701
Tallman Gulch	3080	91%	39	4	0	0	0	0	0	43	47	4	0	0.0393701
Parker/Mississippi	540	92%	40	4	0	0	0	0	0	44	48	4	0	0.0393701
Sable Ditch @ 18th	800	92%	40	4	0	0	0	0	0	44	48	4	0	0.0393701
Pine Cliff Road	2810	92%	43	1	0	1	0	0	0	45	49	4	0	0.0393701
Choke Cherry Resvr	2320	92%	32	1	1	0	0	0	0	34	37	3	0	0.0393701
Walker Ranch	4050	92%	31	3	0	0	0	0	0	34	37	3	0	0.0393701
Virginia Court	510	92%	54	3	1	0	0	0	0	58	63	5	0	0.0393701
Sampson Gulch	940	92%	64	6	0	0	0	0	0	70	76	6	0	0.0393699
Martin Gulch	4040	92%	46	2	1	0	0	0	0	49	53	4	0	0.0393701
Doudy Draw	4820	93%	34	3	0	0	0	0	0	37	40	3	0	0.0393701
Red Rocks Park	2370	93%	38	3	0	0	0	0	0	41	44	3	0	0.0393701
Cottonwood (Apache)	2870	93%	52	2	1	0	0	0	0	55	59	4	0	0.0393701
Gold Lake	4180	93%	53	4	0	0	0	0	0	57	61	4	0	0.0393701
Morrison	2330	93%	40	3	0	0	0	0	0	43	46	3	0	0.0393701
Granby Ditch @ 6th	810	94%	41	3	0	0	0	0	0	44	47	3	0	0.0393701
Idledale	2350	94%	29	2	0	0	0	0	0	31	33	2	0	0.0393701
Indian Creek	2960	94%	58	4	0	0	0	0	0	62	66	4	0	0.0393701
Sand Cr at Colfax	860	94%	44	3	0	0	0	0	0	47	50	3	1	0.0393701
Rio Grande	4020	94%	44	3	0	0	0	0	0	47	50	3	0	0.0393701
Flying J	850	94%	45	3	0	0	0	0	0	48	51	3	0	0.0393701
Denver Zoo	1360	94%	60	4	0	0	0	0	0	64	68	4	0	0.0393701
Cherry Cr bl Bayou Glch	2850	94%	45	3	0	0	0	0	0	48	51	3	0	0.0393701
Slaughterhouse	4190	94%	45	3	0	0	0	0	0	48	51	3	0	0.0393701
Harvard @ Jackson	610	94%	46	3	0	0	0	0	0	49	52	3	0	0.0393701
Wx-Castle Rock	2750	94%	49	0	1	0	0	0	1	50	53	2	0	0.0393701
Fire Station #19	530	94%	47	3	0	0	0	0	0	50	53	3	0	0.0393701
Wx-Elbert	1440	94%	47	3	0	0	0	0	0	50	53	3	0	0.0393701
Hansen Rain	4330	94%	47	3	0	0	0	0	0	50	53	3	0	0.0393701
Haskins Gulch Conf	2820	94%	48	3	0	0	0	0	0	51	54	3	0	0.0393701
Wx-Marston Lake North	1520	95%	49	3	0	0	0	0	0	52	55	3	1	0.0393701
Sports Complex	320	95%	34	0	1	0	0	0	0	35	37	2	0	0.0393701
Justice Center	4360	95%	33	2	0	0	0	0	0	35	37	2	0	0.0393701
Kelly Dam	410	95%	50	3	0	0	0	0	0	53	56	3	0	0.0393701
Wx-Brighton Ditch	1570	95%	53	1	1	0	0	0	0	55	58	3	1	0.0393701
Wx-Button Rock	4790	95%	35	2	0	0	0	0	0	37	39	2	0	0.0393701
West Woods	120	95%	36	2	0	0	0	0	0	38	40	2	0	0.0393701
Wx-Tomah Rd-DougCnty	2990	95%	36	2	0	0	0	0	0	38	40	2	0	0.0393701
Third Creek at DIA	1480	95%	57	3	0	0	0	0	0	60	63	3	1	0.0393701
Swiss Peaks	4130	95%	38	2	0	0	0	0	0	40	42	2	0	0.0393701
Riverside	4340	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
Wx-Cal-Wood Ranch	4770	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
Brook Forest	2260	96%	41	2	0	0	0	0	0	43	45	2	0	0.0393701
West Cherry Head-Douglas C	2920	96%	41	2	0	0	0	0	0	43	45	2	0	0.0393701
Confluence Pond	720	96%	42	2	0	0	0	0	0	44	46	2	0	0.0393701
NREL/S. Table Mtn.	1030	96%	42	2	0	0	0	0	0	44	46	2	0	0.0393701
Sand Creek at mouth	1810	96%	42	2	0	0	0	0	0	44	46	2	0	0.0393701
Bear Peak	4070	96%	44	2	0	0	0	0	0	46	48	2	0	0.0393701
Harvard Gulch Park	600	96%	45	2	0	0	0	0	0	47	49	2	0	0.0393701
Boulder Jail	4550	96%	45	2	0	0	0	0	0	47	49	2	0	0.0393701

Powers Park	1500	96%	70	3	0	0	0	0	0	0	73	76	3	0	0.0393701
Lena @ U.S. Hwy 6	1040	96%	47	2	0	0	0	0	0	0	49	51	2	0	0.0393701
Lakewood CC	1550	96%	47	2	0	0	0	0	0	0	49	51	2	0	0.0393701
Sulphur Gulch	2840	96%	47	2	0	0	0	0	0	0	49	51	2	0	0.0393701
Shanahan Ridge	4810	96%	47	2	0	0	0	0	0	0	49	51	2	0	0.0393701
East/West Trailhead	3050	96%	48	2	0	0	0	0	0	0	50	52	2	0	0.0393701
Expo Park	420	96%	50	2	0	0	0	0	0	0	52	54	2	0	0.0393701
DC Public Works	2950	96%	50	2	0	0	0	0	0	0	52	54	2	0	0.0393701
Wx-Highlands Ranch WTP	2710	96%	51	2	0	0	0	0	0	0	53	55	2	0	0.0393701
CC at Stroh Rd	2860	96%	51	2	0	0	0	0	0	0	53	55	2	0	0.0393701
Quincy/Highline	620	96%	52	2	0	0	0	0	0	0	54	56	2	0	0.0393701
Rosedale	2250	96%	52	2	0	0	0	0	0	0	54	56	2	0	0.0393701
Fire Sta 47	3060	96%	52	2	0	0	0	0	0	0	54	56	2	0	0.0393701
Murphy Creek GC	870	97%	57	2	0	0	0	0	0	0	59	61	2	1	0.0393701
Temple Pond at DTC	630	97%	120	4	0	0	0	0	0	0	124	128	4	0	0.0393701
Piney at Liverpool	950	97%	62	2	0	0	0	0	0	0	64	66	2	1	0.0393701
Indian Hills	2360	97%	31	1	0	0	0	0	0	0	32	33	1	0	0.0393701
Chatfield COE	1350	97%	66	2	0	0	0	0	0	0	68	70	2	0	0.0393701
Sunset	4240	97%	33	1	0	0	0	0	0	0	34	35	1	0	0.0393701
Utah Park	430	97%	68	2	0	0	0	0	0	0	70	72	2	0	0.0393701
Logan Mill	4140	97%	37	1	0	0	0	0	0	0	38	39	1	0	0.0393701
Fire Station 12	840	98%	40	1	0	0	0	0	0	0	41	42	1	0	0.0393701
Genesee Village	2310	98%	40	1	0	0	0	0	0	0	41	42	1	0	0.0393701
Louisville Rec Ctr	1100	98%	41	1	0	0	0	0	0	0	42	43	1	1	0.0393701
Crezent	4010	98%	41	1	0	0	0	0	0	0	42	43	1	0	0.0393701
Winiger Ridge	4530	98%	41	1	0	0	0	0	0	0	42	43	1	0	0.0393701
Golden Age	4230	98%	42	1	0	0	0	0	0	0	43	44	1	0	0.0393701
Leyden Reservoir	200	98%	43	1	0	0	0	0	0	0	44	45	1	0	0.0393701
Wx-Blue Mountain	140	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701
Horseshoe Park Drop	710	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701
Jeffco Fairgrounds	1050	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701
SBC @ San Souci	4830	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701
Upper Sloan Det.	1400	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.0393701
Niver Detention	1900	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.0393701
Wx-Spring Valley Rd-DougCr	2930	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.0393701
Sunshine	4160	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.0393701
Conifer Hill	4350	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.0393701
Wx-Diamond Hill	1420	98%	47	1	0	0	0	0	0	0	48	49	1	0	0.0393701
Sand Creek Park	1800	98%	48	1	0	0	0	0	0	0	49	50	1	0	0.0393701
ETG @ Buckley	820	98%	49	1	0	0	0	0	0	0	50	51	1	0	0.0393701
West Metro FS13	1370	98%	50	1	0	0	0	0	0	0	51	52	1	0	0.0393701
WX-Bingham Lake Park	3030	98%	51	1	0	0	0	0	0	0	52	53	1	0	0.0393701
Slaughterhouse Glch	1620	98%	54	1	0	0	0	0	0	0	55	56	1	0	0.0393701
Fling's	4220	98%	54	1	0	0	0	0	0	0	55	56	1	0	0.0393701
Gold Hill	4150	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.0393701
Happy Canyon at N Surrey D	2880	98%	58	1	0	0	0	0	0	0	59	60	1	0	0.0393701
Hidden Lake	1300	98%	60	1	0	0	0	0	0	0	61	62	1	0	0.0393701
Englewood Dam	1600	98%	60	1	0	0	0	0	0	0	61	62	1	0	0.0393701
Wx-Ward C-1	4710	98%	61	1	0	0	0	0	0	0	62	63	1	0	0.0393701
LDC at 64th	1310	98%	62	1	0	0	0	0	0	0	63	64	1	0	0.0393701
East Cherry Cr-Douglas	2910	99%	66	1	0	0	0	0	0	0	67	68	1	0	0.0393701
Havana Park	500	99%	79	1	0	0	0	0	0	0	80	81	1	0	0.0393701
Nott Creek	150	100%	46	0	0	0	0	0	0	0	46	46	0	0	0.0393701
Leyden Confluence	210	100%	34	0	0	0	0	0	0	0	34	34	0	0	0.0393701
Upper Leyden	220	100%	40	0	0	0	0	0	0	0	40	40	0	1	0.0393701
Van Bibber Park	300	100%	31	0	0	0	0	0	0	0	31	31	0	0	0.0393701
Van Bibber @ Hwy 93	330	100%	38	0	0	0	0	0	0	0	38	38	0	1	0.0393701
Fire Station #7	440	100%	44	0	0	0	0	0	0	0	44	44	0	0	0.0393701
Jewell Detention	520	100%	59	0	0	0	0	0	0	0	59	59	0	0	0.0393701
Goldsmith @ Eastman	640	100%	68	0	0	0	0	0	0	0	68	68	0	0	0.0393701
Iliff Pond	650	100%	47	0	0	0	0	0	0	0	47	47	0	0	0.0393701
No Name @ Quincy	730	100%	55	0	0	0	0	0	0	0	55	55	0	0	0.0393701
Wx-Quincy Reservoir	750	100%	47	0	0	0	0	0	0	0	47	47	0	0	0.0393701
Mission Viejo Park	760	100%	46	0	0	0	0	0	0	0	46	46	0	0	0.0393701
Side Creek Park	830	100%	48	0	0	0	0	0	0	0	48	48	0	0	0.0393701
Wx-Aurora Town Hall	920	100%	65	0	0	0	0	0	0	0	65	65	0	0	0.0393701
Pump Sta 3	970	100%	50	0	0	0	0	0	0	0	50	50	0	0	0.0393701
Maple Grove Resv.	1000	100%	44	0	0	0	0	0	0	0	44	44	0	1	0.0393701
Denver West	1010	100%	50	0	0	0	0	0	0	0	50	50	0	0	0.0393701
Heritage Square	1060	100%	49	0	0	0	0	0	0	0	49	49	0	0	0.0393701
Gunbarrel	1110	100%	37	0	0	0	0	0	0	0	37	37	0	0	0.0393701
Broomfield 3207	1200	100%	40	0	0	0	0	0	0	0	40	40	0	0	0.0393701
SPR at 3rd Ave	1320	100%	44	0	0	0	0	0	0	0	44	44	0	0	0.0393701
Roslyn	1330	100%	46	0	0	0	0	0	0	0	46	46	0	0	0.0393701
Sanderson at Xavier	1340	100%	50	0	0	0	0	0	0	0	50	50	0	0	0.0393701
Wx-Urban Farm	1460	100%	58	0	0	0	0	0	0	0	58	58	0	1	0.0393701
SPR at Union Ave.	1640	100%	4	0	0	0	0	0	0	0	4	4	0	0	0.0393701
Wx-Brighton	1920	100%	40	0	0	0	0	0	0	0	40	40	0	0	0.0393701
Wx-Squaw Mountain	2190	100%	7	0	0	0	0	0	0	0	7	7	0	0	0.0393701
Wx-Hiwan G.C.	2210	100%	42	0	0	0	0	0	0	0	42	42	0	0	0.0393701
Cold Sprg Glch conf	2240	100%	38	0	0	0	0	0	0	0	38	38	0	0	0.0393701
Willow Creek - DougCnty	2940	100%	37	0	0	0	0	0	0	0	37	37	0	0	0.0393701

Rampart Range Rd-Satellite	2970	100%	50	0	0	0	0	0	0	50	50	0	0	0.0393701
Wx-West Creek WX	3020	100%	51	0	0	0	0	0	0	51	51	0	0	0.0393701
CC @ Prairie Canyon Ranch	3040	100%	53	0	0	0	0	0	0	53	53	0	0	0.0393701
Lakeshore	4060	100%	46	0	0	0	0	0	0	46	46	0	0	0.0393701
Twin Sisters	4080	100%	36	0	0	0	0	0	0	36	36	0	0	0.0393701
Magnolia	4090	100%	40	0	0	0	0	0	0	40	40	0	0	0.0393701
Filter Plant	4100	100%	39	0	0	0	0	0	0	39	39	0	0	0.0393701
Betasso	4110	100%	42	0	0	0	0	0	0	42	42	0	0	0.0393701
Pine Brook	4170	100%	46	0	0	0	0	0	0	46	46	0	0	0.0393701
Lazy Acres	4200	100%	54	0	0	0	0	0	0	54	54	0	0	0.0393701
Geer Canyon	4250	100%	67	0	0	0	0	0	0	67	67	0	0	0.0393701
Taylor Mountain	4260	100%	45	0	0	0	0	0	0	45	45	0	0	0.0393701
Cannon Mountain	4270	100%	45	0	0	0	0	0	0	45	45	0	0	0.0393701
Big Elk Park	4300	100%	45	0	0	0	0	0	0	45	45	0	0	0.0393701
Johnny Park	4310	100%	43	0	0	0	0	0	0	43	43	0	0	0.0393701
Lee Hill Rain 2012	4320	100%	52	0	0	0	0	0	0	52	52	0	0	0.0393701
St. Antons	4570	100%	43	0	0	0	0	0	0	43	43	0	0	0.0393701
Wx-Sugarloaf	4730	100%	45	0	0	0	0	0	0	45	45	0	0	0.0393701
Wx-Louisville Lake	4750	100%	39	0	0	0	0	0	0	39	39	0	0	0.0393701
SBC@S Boulder Ditch	4840	100%	50	0	0	0	0	0	0	50	50	0	0	0.0393701
Whispering Pines	4880	100%	46	0	0	0	0	0	0	46	46	0	0	0.0393701
		Total Tips	7930	296	31	8	2	5	10	8272	8786	415	13	
Four Mile Creek	5720	63%	3	1	1	0	0	0	1	5	8	3	0	0.0393701
West Creek	5730	98%	44	1	0	0	0	0	0	45	46	1	0	0.0393701
Trail Creek	5740	100%	44	0	0	0	0	0	0	44	44	0	0	0.0393701
Stump Bump	5810	100%	52	0	0	0	0	0	0	52	52	0	0	0.0393701
Cedar Mountain	5860	100%	32	0	0	0	0	0	0	32	32	0	0	0.0393701
Hackett Mountain	5880	98%	43	1	0	0	0	0	0	44	45	1	0	0.0393701
Horse Creek-Satellite	5900	91%	29	3	0	0	0	0	1	32	35	3	0	0.0393701
Log Jumper	5940	95%	51	1	1	0	0	0	0	53	56	3	0	0.0393701
EPC at Hwy 105	3010	85%	139	16	2	1	1	0	3	159	186	27	0	0.01
Porphory Mtn	4850	95%	178	7	0	1	0	0	0	186	196	10	2	0.01
Fairview Peak	4860	97%	186	5	0	0	0	0	0	191	196	5	5	0.01

2012 Monthly ALERT Radio Traffic Summary

