

Memo

Date: June 3, 2012
To: Kevin Stewart
From: Markus Ritsch
Subject: May 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 May 1 through May 31, 2012.

II. General System Analysis Summary

A total of 400,307 legacy ALERT data reports were analyzed. Meteorological sensors account for 74 percent, water level sensors 8 percent, and rain sensors 5 percent of the total monthly records.

The system-wide radio traffic loading was 12,913 reports per day with an average hourly loading of 538 reports. The peak hour of radio traffic loading was 1,032 reports, which occurred on May 7th, between 4:00 AM and 5:00 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
2230	Bear Cr below Cub	65%	95%	
2270	Cub Cr below Blue	118%	57%	Erratic data series for entire month
4870	SBC @ SB Road	71%	68%	
4470	Little Narrows	81%	72%	
2980	Dakan Road	94%	73%	
310	Guy Hill Ranch	94%	75%	
2280	Kinney Peak	90%	76%	
1710	Shop Creek	61%	79%	Poor performance
2271,2272 2274 2277 2278 4323				Many unknown sensor reports are coming from Kinney Peak (2280). Also, unknown ID 4323 is coming from the new Lee Hill rain gage.

B. Continuous Operation of Base Receiver/Decoder

The ALERT and ALERT2 data feeds on the NS5 base 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							
1460	1460	4870	1640	2230							
1520	4470	4790	2270	4870							
1440	1520	4850	2970	1900							
1000	1440	4570	4490	1660							
4520	140	4070	3010	4330							

*: 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	38.97	Only the 1-mm rain sensors were included in the analysis
Median	39	Only the 1-mm rain sensors were included in the analysis
Standard deviation	11.24	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	72.69	Only the 1-mm rain sensors were included in the analysis
Minimum total count	19	ID 4880 (Whispering Pines)
Maximum total count	84	ID 640 (Goldsmith Gulch)

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								

*- 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
Cub Creek below Blue	2270	Very erratic data series for entire month

D. Sensor-by-Sensor Incrementing Count Summary

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 95 percent. A total of 5,401 incrementing reports were received and a total of 5,692 reports were expected. The total loss of incrementing reports for the month was approximately 5 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							
1420	3030	4860	2980	4870							
4490	4240	2930	1660	4470							
2980	1520	3030	3010	2980							
1660	4490	2990	2320	310							
4090	1420	4050	4470	2280							

*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 700 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 700 reports was analyzed to quantify the number of missing rain reports for that hour.

Table 7. Heavy Radio Traffic Periods

Day	Hr	Expected Tips	Received Tips	Total Load	Loss
7	4	67	67	1031	0%
23	17	192	192	1011	0%
7	9	54	54	995	0%
7	8	20	20	976	0%
23	20	242	232	973	4.13%
7	10	43	43	970	0%
7	14	52	50	932	3.84%
7	11	43	43	927	0%
7	12	35	35	907	0%

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)	425
Total reports from unknown IDs	5,469
Unknown IDs with only a single received report (potential noise)	269
Total reports from all IDs – RecData Log entire month	400,307
Unknown reports as a fraction of total reports	1.37%

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							

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%							

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	Total Reports
2272	960
2271	934
2274	921
2277	909
2278	880
4323	57
2269	21

The “unknown” device reports are analyzed temporally to understand when they are received during the day (Table 12). The goal of this analysis is to determine a pattern of occurrence that may correspond to a source of noise in the system, such as the use of a wireless microphone nearby.

Table 12. Temporal Distribution of Received Reports

Hour (AM)	Reports	Hour (PM)	Reports
0:00-00:59	475	12:00-12:59	501
1:00-1:59	626	1:00-1:59	544
2:00-2:59	631	2:00-2:59	596
3:00-3:59	555	3:00-3:59	563
4:00-4:59	723	4:00-4:59	585
5:00-5:59	620	5:00-5:59	527
6:00-6:59	577	6:00-6:59	545
7:00-7:59	537	7:00-7:59	517
8:00-8:59	590	8:00-8:59	458
9:00-9:59	620	9:00-9:59	514
10:00-10:59	577	10:00-10:59	555
11:00-11:59	610	11:00-11:59	503

VII. 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
1643	SPR at Union Ave. (level)	43	16	8							
1383	Ferril Lake (level) – bad calibration		81	2							
123	West Woods (level) – fixed on 4/24/12		30	0							
1623	Slaughterhouse Gulch			32							
2813	Pine Cliff Road (level)		9	79							
2273	Cub Cr below Blue (level)			923							
2270	Cub Cr below Blue (Px)			46							
1530	Bear Cr @ Lowell (Px)			6							
4330	Hansen Rain (Px)			6							
4840	SBC@S Boulder Ditch (Px)	3	3	1							
900	Wx-Aurora Reservoir (Px) – bad decodes		8	5							
4090	Magnolia (Px)		4	1							
4310	Johnny Park (Px)		5	0							

General System Analysis

Database Name

P:\A207-UDFCD-Data-Analysis\2012\05-2012\Novastar_extract_2012May.mdb

First Date in Database

5/1/12 12:00 AM

Total Days

31.0

Last Date in Database

5/31/12 11:59 PM

Total Hours

744.0

Total Records Analyzed

400,307

Records by Group

Temperature	66,959	17%
Wind Gust	63,455	16%
Relative Humidity	59,954	15%
Water Level	31,468	8%
Barometric Pressure	30,092	8%
Wind Speed Average & Azimuth	23,940	6%
Wind Direction	23,500	6%
Battery Voltage	22,376	6%
Wind Speed Average	20,526	5%
Precipitation	19,404	5%
Solar Radiation	9,769	2%
Fuel Temperature	5,925	1%
Fuel Moisture	5,917	1%
Unknown	5,469	1%
Soil Moisture	2,804	1%
Repeater Status Report	2,585	1%
Wind Speed Average & Az	2,292	1%
Wind ALERT	1,385	0%
Handar 585 ALARM Status	979	0%
Repeater Pass List	612	0%
12Hr Status Report	480	0%
Hayman Battery	391	0%
Wind Direction ALERT	13	0%
Solar Power	11	0%
ALERT/A2 Testing	1	0%
Total	400,307	

Records by Major Group

Meteorologic Sensors	298,195	74%
Water Level Sensors	31,468	8%
Rain Sensors	19,404	5%
Soil and Fuel Sensors	14,646	4%
Sensor Status Transmissions	4,667	1%
Total	368,380	

Records by Validation Type

Good	0	400,304	100%
Questionable	1	3	0%
Total		400,307	

Sensors With Most Invalid Data

Description	Sensor	Reports
Elbert	1441	1
Elbert	1442	1
Salisbury Park	2732	1

Traffic Loading Summary

Alert Reports	400,307	
Average Daily Traffic	12,913	
Average Hourly Traffic	538	
Median Hourly Traffic	523	hour beginning
Peak Hourly Traffic	1,032	May 7, 4:00 AM
2nd Max	1,011	May 23, 5:00 PM
3rd Max	995	May 7, 9:00 AM
4th Max	976	May 7, 8:00 AM
5th Max	973	May 23, 8:00 PM

Rain Timer Performance

Analyze Rain Sensors

Rain Sensors	Description	Rcv	Timer	Exp	Performance
4880	Whispering Pines	32	11:57	62	52%
4320	Lee Hill Rain 2012	36	11:58	62	58%
1710	Shop Creek	38	18:00	62	61%
2230	Bear Cr below Cub	40	19:08	62	65%
4870	SBC @ SB Road	44	16:00	62	71%
1900	Niver Detention	46	11:57	62	74%
1660	SPR at Henderson	48	14:20	62	77%
4330	Hansen Rain	48	14:29	62	77%
540	Parker/Mississippi	49	15:44	62	79%
4470	Little Narrows	50	13:40	62	81%
4490	Apple Valley	50	13:06	62	81%
2320	Choke Cherry Resvr	51	13:08	62	82%
2950	DC Public Works	51	14:43	62	82%
4820	Doudy Draw	52	12:46	62	84%
1110	Gunbarrel	53	12:42	62	85%
2240	Cold Sprg Glch conf	54	13:01	62	87%
2280	Kinney Peak	56	12:13	62	90%
4060	Lakeshore	56	12:46	62	90%
2350	Idledale	57	12:41	62	92%
2370	Red Rocks Park	57	11:58	62	92%
2820	Haskins Gulch Conf	57	12:58	62	92%
2940	Willow Creek - DougCnty	57	12:00	62	92%
3010	EPC at Hwy 105	57	12:00	62	92%
4150	Gold Hill	57	12:59	62	92%
4550	Boulder Jail	57	12:57	62	92%
4770	Wx-Cal-Wood Ranch	57	12:29	62	92%
4860	Fairview Peak	57	13:01	62	92%
310	Guy Hill Ranch	58	12:27	62	94%
410	Kelly Dam	58	12:27	62	94%
420	Expo Park	58	12:16	62	94%
860	Sand Cr at Colfax	58	12:14	62	94%
1350	Chatfield COE	58	12:29	62	94%
1400	Upper Sloan Det.	58	12:13	62	94%
2890	Spruce Mt - Douglas	58	12:43	62	94%
2980	Dakan Rd	58	12:46	62	94%
4090	Magnolia	58	12:42	62	94%
4180	Gold Lake	58	12:27	62	94%
4220	Fling's	58	12:46	62	94%
4290	Red Hill	58	12:13	62	94%
4340	Riverside	58	12:29	62	94%
4350	Conifer Hill	58	12:42	62	94%
4510	Pinewood Springs	58	11:43	62	94%
4570	St. Antons	58	12:44	62	94%
4750	Wx-Louisville Lake	58	12:14	62	94%
4790	Wx-Button Rock	58	12:30	62	94%
4850	Porphory Mtn	58	12:46	62	94%
520	Jewell Detention	59	12:28	62	95%
630	Temple Pond at DTC	59	11:58	62	95%
650	Iloff Pond	59	12:12	62	95%
720	Confluence Pond	59	12:13	62	95%
840	Fire Station 12	59	12:13	62	95%
1030	NREL/S. Table Mtn.	59	11:58	62	95%
1040	Lena @ U.S. Hwy 6	59	12:14	62	95%
1100	Louisville Rec Ctr	59	12:13	62	95%

1460	Wx-Urban Farm	59	12:30	62	95%
1550	Lakewood CC	59	11:57	62	95%
2260	Brook Forest	59	11:28	62	95%
2880	Happy Canyon at N Surrey	59	12:00	62	95%
2910	East Cherry Cr-Douglas	59	12:28	62	95%
2990	Wx-Tomah Rd-DougCnty	59	12:29	62	95%
3030	WX-Bingham Lake Park	59	12:28	62	95%
3050	East/West Trailhead	59	12:15	62	95%
4040	Martin Gulch	59	12:12	62	95%
4110	Betasso	59	12:27	62	95%
4140	Logan Mill	59	12:27	62	95%
4240	Sunset	59	12:11	62	95%
4530	Winiger Ridge	59	11:58	62	95%
300	Van Bibber Park	60	11:58	62	97%
320	Sports Complex	60	11:58	62	97%
330	Van Bibber @ Hwy 93	60	11:58	62	97%
400	Montview Park	60	11:29	62	97%
530	Fire Station #19	60	12:12	62	97%
620	Quincy/Highline	60	11:57	62	97%
640	Goldsmith @ Eastman	60	11:58	62	97%
700	Toll Gate @ 6th	60	12:13	62	97%
730	No Name @ Quincy	60	11:57	62	97%
760	Mission Viejo Park	60	11:57	62	97%
970	Pump Sta 3	60	12:00	62	97%
1050	Jeffco Fairgrounds	60	12:13	62	97%
1340	Sanderson at Xavier	60	11:59	62	97%
1370	West Metro FS13	60	12:12	62	97%
1480	Third Creek at DIA	60	11:58	62	97%
1620	Slaughterhouse Glch	60	12:13	62	97%
1700	Cherry Cr @ Champa	60	12:00	62	97%
1810	Sand Creek at mouth	60	11:43	62	97%
2190	Wx-Squaw Mountain	60	12:12	62	97%
2310	Genesee Village	60	12:12	62	97%
2330	Morrison	60	12:13	62	97%
2800	Columbine Open Space	60	12:00	62	97%
2810	Pine Cliff Road	60	12:13	62	97%
2840	Sulphur Gulch	60	11:59	62	97%
2850	Cherry Cr bl Bayou Glch	60	12:00	62	97%
2860	CC at Stroh Rd	60	12:11	62	97%
2930	Spring Valley Rd-DougC	60	12:13	62	97%
2960	Indian Creek	60	12:13	62	97%
2970	Rampart Range Rd	60	12:14	62	97%
3040	C @ Prairie Canyon Ran	60	12:13	62	97%
3060	Fire Sta 47	60	12:13	62	97%
3080	Tallman Gulch	60	12:00	62	97%
3090	Highland Heritage Park	60	12:00	62	97%
4010	Crescent	60	11:58	62	97%
4100	Filter Plant	60	12:00	62	97%
4170	Pine Brook	60	12:13	62	97%
4360	Justice Center	60	12:12	62	97%
4730	Wx-Sugarloaf	60	12:14	62	97%
4840	SBC@S Boulder Ditch	60	11:44	62	97%
120	West Woods	61	11:57	62	98%
200	Leyden Reservoir	61	11:57	62	98%
430	Utah Park	61	11:57	62	98%
510	Virginia Court	61	11:41	62	98%
610	Harvard @ Jackson	61	11:42	62	98%
750	Wx-Quincy Reservoir	61	11:57	62	98%
800	Sable Ditch @ 18th	61	11:57	62	98%

830	Side Creek Park	61	11:57	62	98%
850	Flying J	61	12:00	62	98%
870	Murphy Creek GC	61	12:00	62	98%
940	Sampson Gulch	61	11:44	62	98%
1000	Maple Grove Resv.	61	11:57	62	98%
1060	Heritage Square	61	11:42	62	98%
1200	Broomfield 3207	61	11:58	62	98%
1300	Hidden Lake	61	12:12	62	98%
1310	LDC at 64th	61	11:58	62	98%
1320	SPR at 3rd Ave	61	11:57	62	98%
1330	Roslyn	61	12:00	62	98%
1360	Denver Zoo	61	12:00	62	98%
1420	Wx-Diamond Hill	61	12:00	62	98%
1500	Powers Park	61	11:20	62	98%
1530	Bear Creek @ Lowell	61	11:57	62	98%
1570	Wx-Brighton Ditch	61	12:00	62	98%
1720	Cherry Cr @ Steele	61	11:57	62	98%
1920	Wx-Brighton	61	11:46	62	98%
2250	Rosedale	61	11:43	62	98%
2730	Wx-Salisbury Park	61	12:00	62	98%
2750	Wx-Castle Rock	61	12:00	62	98%
2920	st Cherry Head-Douglas C	61	12:00	62	98%
3020	Wx-West Creek WX	61	12:00	62	98%
3070	Newlin Gulch	61	12:00	62	98%
4050	Walker Ranch	61	12:12	62	98%
4070	Bear Peak	61	12:12	62	98%
4130	Swiss Peaks	61	12:14	62	98%
4160	Sunshine	61	11:44	62	98%
4200	Lazy Acres	61	12:13	62	98%
4300	Big Elk Park	61	11:57	62	98%
4310	Johnny Park	61	12:12	62	98%
4520	Eagle Ridge	61	12:00	62	98%
4710	Wx-Ward C-1	61	12:32	62	98%
4810	Shanahan Ridge	61	12:12	62	98%
4830	SBC @ San Souci	61	12:12	62	98%
140	Wx-Blue Mountain	62	12:14	62	100%
210	Leyden Confluence	62	11:58	62	100%
220	Upper Leyden	62	11:46	62	100%
440	Fire Station #7	62	11:44	62	100%
500	Havana Park	62	11:43	62	100%
600	Harvard Gulch Park	62	11:43	62	100%
820	ETG @ Buckley	62	11:44	62	100%
920	Wx-Aurora Town Hall	62	11:51	62	100%
950	Piney at Liverpool	62	11:10	62	100%
1010	Denver West	62	11:28	62	100%
1440	Wx-Elbert	62	11:46	62	100%
2210	Wx-Hiwan G.C.	62	12:00	62	100%
2340	El Rancho	62	11:57	62	100%
2360	Indian Hills	62	11:44	62	100%
2710	Wx-Highlands Ranch WTF	62	11:46	62	100%
2870	Cottonwood (Apache)	62	11:33	62	100%
2900	Russelville Gulch-Douglas	62	12:00	62	100%
4020	Rio Grande	62	11:58	62	100%
4030	Red Garden	62	12:13	62	100%
4080	Twin Sisters	62	11:30	62	100%
4190	Slaughterhouse	62	12:12	62	100%
4270	Cannon Mountain	62	11:57	62	100%
110	Ralston Reservoir	63	11:18	62	102%
150	Nott Creek	63	11:55	62	102%

810	Granby Ditch @ 6th	63	11:30	62	102%
1600	Englewood Dam	63	11:31	62	102%
1800	Sand Creek Park	63	11:31	62	102%
4230	Golden Age	63	11:45	62	102%
4250	Geer Canyon	63	11:43	62	102%
4260	Taylor Mountain	63	11:29	62	102%
2270	Cub Cr below Blue	73	8:52	62	118%
710	Horseshoe Park Drop	74	9:35	62	119%
1520	Wx-Marston Lake North	74	8:16	62	119%
900	Wx-Aurora Reservoir	78	9:06	62	126%
5720	Four Mile Creek	30	19:05	62	48%
5730	West Creek	61	12:00	62	98%
5740	Trail Creek	60	12:15	62	97%
5810	Stump Bump	61	12:00	62	98%
5860	Cedar Mountain	61	12:00	62	98%
5880	Hackett Mountain	61	12:00	62	98%
5940	Log Jumper	53	13:13	62	85%

Rain Event Performance					Analyze Rain Sensors									
			Reports Received	6,594										
			Systemwide Avg	Total Tips										
			95.59%	Data Loss										
Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket
Cub Cr below Blue	2270	57%	135	36	26	15	5	2	29	219	382	163	1	0.0393701
SBC @ SB Road	4870	68%	18	7	1	0	1	0	0	27	40	13	0	0.0393701
Little Narrows	4470	72%	22	7	1	1	0	0	0	31	43	12	0	0.0393701
Dakan Rd	2980	73%	23	11	1	0	0	0	0	35	48	13	0	0.0393701
Guy Hill Ranch	310	75%	32	3	3	0	1	0	0	39	52	13	0	0.0393701
Kinney Peak	2280	76%	43	9	2	0	1	0	0	55	72	17	3	0.0393701
Shop Creek	1710	79%	18	0	0	0	0	1	0	19	24	5	0	0.0393701
Doudy Draw	4820	81%	31	5	2	0	0	0	0	38	47	9	0	0.0393701
SPR at Henderson	1660	82%	19	3	1	0	0	0	0	23	28	5	0	0.0393701
Pinewood Springs	4510	84%	37	5	0	1	0	0	0	43	51	8	0	0.0393701
Newlin Gulch	3070	84%	22	5	0	0	0	0	0	27	32	5	0	0.0393701
Wx-Marston Lake North	1520	87%	37	1	0	0	0	1	0	39	45	6	1	0.0393701
Hansen Rain	4330	88%	40	2	0	0	1	0	0	43	49	6	0	0.0393701
Apple Valley	4490	88%	26	2	1	0	0	0	0	29	33	4	0	0.0393701
Toll Gate @ 6th	700	89%	21	3	0	0	0	0	0	24	27	3	0	0.0393701
Louisville Rec Ctr	1100	89%	28	4	0	0	0	0	0	32	36	4	0	0.0393701
Rampart Range Rd	2970	89%	39	0	0	0	0	1	0	40	45	5	0	0.0393701
Swiss Peaks	4130	89%	30	4	0	0	0	0	0	34	38	4	0	0.0393701
Slaughterhouse Glch	1620	90%	31	4	0	0	0	0	0	35	39	4	0	0.0393701
St. Antons	4570	90%	31	4	0	0	0	0	0	35	39	4	0	0.0393701
Lee Hill Rain 2012	4320	90%	16	2	0	0	0	0	0	18	20	2	0	0.0393701
Flying J	850	90%	33	4	0	0	0	0	0	37	41	4	2	0.0393701
Highland Heritage Park	3090	90%	33	4	0	0	0	0	0	37	41	4	0	0.0393701
Eagle Ridge	4520	91%	27	1	1	0	0	0	0	29	32	3	0	0.0393701
Haskins Gulch Conf	2820	91%	35	4	0	0	0	0	0	39	43	4	0	0.0393701
Magnolia	4090	91%	35	4	0	0	0	0	0	39	43	4	0	0.0393701
Gold Hill	4150	91%	35	4	0	0	0	0	0	39	43	4	0	0.0393701
Boulder Jail	4550	91%	27	3	0	0	0	0	0	30	33	3	0	0.0393701
Shanahan Ridge	4810	91%	37	4	0	0	0	0	0	41	45	4	0	0.0393701
SBC @ San Souci	4830	91%	37	4	0	0	0	0	0	41	45	4	0	0.0393701
Van Bibber @ Hwy 93	330	91%	39	2	1	0	0	0	0	42	46	4	0	0.0393701
Ralston Reservoir	110	91%	39	4	0	0	0	0	0	43	47	4	0	0.0393701
Red Rocks Park	2370	92%	42	4	0	0	0	0	0	46	50	4	0	0.0393701
Golden Age	4230	93%	34	3	0	0	0	0	0	37	40	3	0	0.0393701
Wx-Salisbury Park	2730	93%	23	2	0	0	0	0	0	25	27	2	0	0.0393701
Sampson Gulch	940	93%	25	2	0	0	0	0	0	27	29	2	0	0.0393699
Wx-Button Rock	4790	93%	38	3	0	0	0	0	0	41	44	3	0	0.0393701
Montview Park	400	93%	26	2	0	0	0	0	0	28	30	2	0	0.0393701
Indian Creek	2960	94%	41	3	0	0	0	0	0	44	47	3	0	0.0393701
Upper Leyden	220	94%	44	1	1	0	0	0	0	46	49	3	0	0.0393701
Gold Lake	4180	94%	46	3	0	0	0	0	0	49	52	3	0	0.0393701
Pine Cliff Road	2810	94%	33	0	1	0	0	0	0	34	36	2	0	0.0393701
Brook Forest	2260	95%	52	1	1	0	0	0	0	54	57	3	0	0.0393701
ETG @ Buckley	820	95%	18	1	0	0	0	0	0	19	20	1	0	0.0393701
Bear Cr below Cub	2230	95%	37	2	0	0	0	0	0	39	41	2	0	0.0393701
Winiger Ridge	4530	95%	37	2	0	0	0	0	0	39	41	2	0	0.0393701
Fire Station 12	840	95%	19	1	0	0	0	0	0	20	21	1	0	0.0393701
Lakeshore	4060	95%	39	2	0	0	0	0	0	41	43	2	0	0.0393701
Bear Peak	4070	95%	39	2	0	0	0	0	0	41	43	2	0	0.0393701
Cold Sprg Glch conf	2240	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
Cresent	4010	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
East/West Trailhead	3050	96%	41	2	0	0	0	0	0	43	45	2	0	0.0393701
Van Bibber Park	300	96%	42	2	0	0	0	0	0	44	46	2	0	0.0393701
Rio Grande	4020	96%	43	2	0	0	0	0	0	45	47	2	0	0.0393701
Maple Grove Resv.	1000	96%	44	2	0	0	0	0	0	46	48	2	0	0.0393701
Spruce Mt - Douglas	2890	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701
NREL/S. Table Mtn.	1030	96%	45	2	0	0	0	0	0	47	49	2	0	0.0393701
Lena @ U.S. Hwy 6	1040	96%	45	2	0	0	0	0	0	47	49	2	0	0.0393701
Slaughterhouse	4190	96%	47	2	0	0	0	0	0	49	51	2	0	0.0393701
Johnny Park	4310	96%	47	2	0	0	0	0	0	49	51	2	0	0.0393701
Fire Station #19	530	96%	24	1	0	0	0	0	0	25	26	1	0	0.0393701
Sable Ditch @ 18th	800	96%	24	1	0	0	0	0	0	25	26	1	0	0.0393701
Wx-Brighton	1920	96%	24	1	0	0	0	0	0	25	26	1	0	0.0393701
Fire Sta 47	3060	96%	24	1	0	0	0	0	0	25	26	1	0	0.0393701
Piney at Liverpool	950	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
Roslyn	1330	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
Cottonwood (Apache)	2870	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
CC @ Prairie Canyon Ranch	3040	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
Wx-Ward C-1	4710	96%	52	2	0	0	0	0	0	54	56	2	0	0.0393701
Wx-Urban Farm	1460	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
Iliff Pond	650	97%	28	1	0	0	0	0	0	29	30	1	0	0.0393701
Justice Center	4360	97%	28	1	0	0	0	0	0	29	30	1	0	0.0393701
Wx-Quincy Reservoir	750	97%	29	1	0	0	0	0	0	30	31	1	0	0.0393701
Kelly Dam	410	97%	30	1	0	0	0	0	0	31	32	1	0	0.0393701
Harvard Gulch Park	600	97%	31	1	0	0	0	0	0	32	33	1	0	0.0393701

Side Creek Park	830	97%	31	1	0	0	0	0	0	0	32	33	1	0	0.0393701
Broomfield 3207	1200	97%	31	1	0	0	0	0	0	0	32	33	1	0	0.0393701
Denver Zoo	1360	97%	31	1	0	0	0	0	0	0	32	33	1	0	0.0393701
Filter Plant	4100	97%	31	1	0	0	0	0	0	0	32	33	1	0	0.0393701
Sunset	4240	97%	31	1	0	0	0	0	0	0	32	33	1	0	0.0393701
Murphy Creek GC	870	97%	32	1	0	0	0	0	0	0	33	34	1	0	0.0393701
Willow Creek - DougCnty	2940	97%	32	1	0	0	0	0	0	0	33	34	1	0	0.0393701
Wx-Louisville Lake	4750	97%	32	1	0	0	0	0	0	0	33	34	1	0	0.0393701
DC Public Works	2950	97%	33	1	0	0	0	0	0	0	34	35	1	0	0.0393701
Confluence Pond	720	97%	34	1	0	0	0	0	0	0	35	36	1	0	0.0393701
Powers Park	1500	97%	69	2	0	0	0	0	0	0	71	73	2	0	0.0393701
Virginia Court	510	97%	35	1	0	0	0	0	0	0	36	37	1	0	0.0393701
WX-Bingham Lake Park	3030	97%	35	1	0	0	0	0	0	0	36	37	1	0	0.0393701
Betasso	4110	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.0393701
Leyden Confluence	210	97%	37	1	0	0	0	0	0	0	38	39	1	0	0.0393701
Logan Mill	4140	97%	37	1	0	0	0	0	0	0	38	39	1	0	0.0393701
Lazy Acres	4200	97%	37	1	0	0	0	0	0	0	38	39	1	0	0.0393701
Mission Viejo Park	760	98%	38	1	0	0	0	0	0	0	39	40	1	0	0.0393701
Temple Pond at DTC	630	98%	77	2	0	0	0	0	0	0	79	81	2	0	0.0393701
SBC@S Boulder Ditch	4840	98%	39	1	0	0	0	0	0	0	40	41	1	0	0.0393701
Cherry Cr bl Bayou Glch	2850	98%	40	1	0	0	0	0	0	0	41	42	1	0	0.0393701
Sunshine	4160	98%	41	1	0	0	0	0	0	0	42	43	1	0	0.0393701
Red Hill	4290	98%	41	1	0	0	0	0	0	0	42	43	1	0	0.0393701
Leyden Reservoir	200	98%	42	1	0	0	0	0	0	0	43	44	1	0	0.0393701
Hidden Lake	1300	98%	42	1	0	0	0	0	0	0	43	44	1	0	0.0393701
Martin Gulch	4040	98%	42	1	0	0	0	0	0	0	43	44	1	0	0.0393701
Morrison	2330	98%	43	1	0	0	0	0	0	0	44	45	1	0	0.0393701
Idledale	2350	98%	43	1	0	0	0	0	0	0	44	45	1	0	0.0393701
Indian Hills	2360	98%	44	1	0	0	0	0	0	0	45	46	1	0	0.0393701
Upper Sloan Det.	1400	98%	45	1	0	0	0	0	0	0	46	47	1	0	0.0393701
El Rancho	2340	98%	45	1	0	0	0	0	0	0	46	47	1	0	0.0393701
Cannon Mountain	4270	98%	45	1	0	0	0	0	0	0	46	47	1	0	0.0393701
Wx-Brighton Ditch	1570	98%	46	1	0	0	0	0	0	0	47	48	1	0	0.0393701
Wx-Blue Mountain	140	98%	47	1	0	0	0	0	0	0	48	49	1	0	0.0393701
Jeffco Fairgrounds	1050	98%	47	1	0	0	0	0	0	0	48	49	1	0	0.0393701
Red Garden	4030	98%	47	1	0	0	0	0	0	0	48	49	1	0	0.0393701
Denver West	1010	98%	50	1	0	0	0	0	0	0	51	52	1	0	0.0393701
Rosedale	2250	98%	52	1	0	0	0	0	0	0	53	54	1	0	0.0393701
Choke Cherry Resvr	2320	98%	52	1	0	0	0	0	0	0	53	54	1	0	0.0393701
Lakewood CC	1550	98%	55	1	0	0	0	0	0	0	56	57	1	0	0.0393701
Goldsmith @ Eastman	640	99%	82	1	0	0	0	0	0	0	83	84	1	0	0.0393701
West Woods	120	100%	46	0	0	0	0	0	0	0	46	46	0	0	0.0393701
Nott Creek	150	100%	52	0	0	0	0	0	0	0	52	52	0	0	0.0393701
Sports Complex	320	100%	39	0	0	0	0	0	0	0	39	39	0	0	0.0393701
Expo Park	420	100%	38	0	0	0	0	0	0	0	38	38	0	0	0.0393701
Utah Park	430	100%	75	0	0	0	0	0	0	0	75	75	0	0	0.0393701
Fire Station #7	440	100%	24	0	0	0	0	0	0	0	24	24	0	0	0.0393701
Havana Park	500	100%	27	0	0	0	0	0	0	0	27	27	0	0	0.0393701
Jewell Detention	520	100%	26	0	0	0	0	0	0	0	26	26	0	0	0.0393701
Parker/Mississippi	540	100%	27	0	0	0	0	0	0	0	27	27	0	0	0.0393701
Harvard @ Jackson	610	100%	31	0	0	0	0	0	0	0	31	31	0	0	0.0393701
Quincy/Highline	620	100%	33	0	0	0	0	0	0	0	33	33	0	0	0.0393701
Horseshoe Park Drop	710	100%	28	0	0	0	0	0	0	0	28	28	0	0	0.0393701
No Name @ Quincy	730	100%	29	0	0	0	0	0	0	0	29	29	0	0	0.0393701
Granby Ditch @ 6th	810	100%	24	0	0	0	0	0	0	0	24	24	0	0	0.0393701
Sand Cr at Colfax	860	100%	25	0	0	0	0	0	0	0	25	25	0	0	0.0393701
Wx-Aurora Town Hall	920	100%	35	0	0	0	0	0	0	0	35	35	0	0	0.0393701
Pump Sta 3	970	100%	30	0	0	0	0	0	0	0	30	30	0	0	0.0393701
Heritage Square	1060	100%	42	0	0	0	0	0	0	0	42	42	0	0	0.0393701
Gunbarrel	1110	100%	21	0	0	0	0	0	0	0	21	21	0	0	0.0393701
LDC at 64th	1310	100%	39	0	0	0	0	0	0	0	39	39	0	0	0.0393701
SPR at 3rd Ave	1320	100%	38	0	0	0	0	0	0	0	38	38	0	0	0.0393701
Sanderson at Xavier	1340	100%	47	0	0	0	0	0	0	0	47	47	0	0	0.0393701
Chatfield COE	1350	100%	43	0	0	0	0	0	0	0	43	43	0	0	0.0393701
West Metro FS13	1370	100%	42	0	0	0	0	0	0	0	42	42	0	0	0.0393701
Wx-Diamond Hill	1420	100%	46	0	0	0	0	0	0	0	46	46	0	0	0.0393701
Wx-Elbert	1440	100%	25	0	0	0	0	0	0	0	25	25	0	0	0.0393701
Third Creek at DIA	1480	100%	24	0	0	0	0	0	0	0	24	24	0	0	0.0393701
Bear Creek @ Lowell	1530	100%	40	0	0	0	0	0	0	0	40	40	0	0	0.0393701
Englewood Dam	1600	100%	28	0	0	0	0	0	0	0	28	28	0	0	0.0393701
Cherry Cr @ Champa	1700	100%	37	0	0	0	0	0	0	0	37	37	0	0	0.0393701
Cherry Cr @ Steele	1720	100%	30	0	0	0	0	0	0	0	30	30	0	0	0.0393701
Sand Creek Park	1800	100%	26	0	0	0	0	0	0	0	26	26	0	0	0.0393701
Sand Creek at mouth	1810	100%	36	0	0	0	0	0	0	0	36	36	0	0	0.0393701
Niver Detention	1900	100%	22	0	0	0	0	0	0	0	22	22	0	0	0.0393701
Wx-Hiwan G.C.	2210	100%	47	0	0	0	0	0	0	0	47	47	0	0	0.0393701
Genesee Village	2310	100%	58	0	0	0	0	0	0	0	58	58	0	0	0.0393701
Wx-Highlands Ranch WTP	2710	100%	40	0	0	0	0	0	0	0	40	40	0	0	0.0393701
Wx-Castle Rock	2750	100%	29	0	0	0	0	0	0	0	29	29	0	0	0.0393701
Columbine Open Space	2800	100%	36	0	0	0	0	0	0	0	36	36	0	0	0.0393701
Sulphur Gulch	2840	100%	28	0	0	0	0	0	0	0	28	28	0	0	0.0393701

CC at Stroh Rd	2860	100%	32	0	0	0	0	0	0	0	32	32	0	0	0.0393701
Happy Canyon at N Surrey Dr	2880	100%	44	0	0	0	0	0	0	0	44	44	0	0	0.0393701
Russelville Gulch-Douglas	2900	100%	30	0	0	0	0	0	0	0	30	30	0	0	0.0393701
East Cherry Cr-Douglas	2910	100%	26	0	0	0	0	0	0	0	26	26	0	0	0.0393701
West Cherry Head-Douglas Cnty	2920	100%	21	0	0	0	0	0	0	0	21	21	0	0	0.0393701
Wx-Spring Valley Rd-DougCnty	2930	100%	23	0	0	0	0	0	0	0	23	23	0	0	0.0393701
Wx-Tomah Rd-DougCnty	2990	100%	34	0	0	0	0	0	0	0	34	34	0	0	0.0393701
Wx-West Creek WX	3020	100%	36	0	0	0	0	0	0	0	36	36	0	0	0.0393701
Tallman Gulch	3080	100%	22	0	0	0	0	0	0	0	22	22	0	0	0.0393701
Walker Ranch	4050	100%	34	0	0	0	0	0	0	0	34	34	0	0	0.0393701
Twin Sisters	4080	100%	33	0	0	0	0	0	0	0	33	33	0	0	0.0393701
Pine Brook	4170	100%	33	0	0	0	0	0	0	0	33	33	0	0	0.0393701
Fling's	4220	100%	51	0	0	0	0	0	0	0	51	51	0	0	0.0393701
Geer Canyon	4250	100%	43	0	0	0	0	0	0	0	43	43	0	0	0.0393701
Taylor Mountain	4260	100%	46	0	0	0	0	0	0	0	46	46	0	0	0.0393701
Big Elk Park	4300	100%	39	0	0	0	0	0	0	0	39	39	0	0	0.0393701
Riverside	4340	100%	45	0	0	0	0	0	0	0	45	45	0	0	0.0393701
Conifer Hill	4350	100%	43	0	0	0	0	0	0	0	43	43	0	0	0.0393701
Wx-Sugarloaf	4730	100%	38	0	0	0	0	0	0	0	38	38	0	0	0.0393701
Wx-Cal-Wood Ranch	4770	100%	43	0	0	0	0	0	0	0	43	43	0	0	0.0393701
Whispering Pines	4880	100%	19	0	0	0	0	0	0	0	19	19	0	0	0.0393701
Wx-Aurora Reservoir	900	100%	23	0	0	0	0	0	0	0	23	23	0	0	0.0393699
		Total Tips	6335	233	17	2	4	3	0	0	6594	6898			
EPC at Hwy 105	3010	94%	132	9	0	0	0	0	0	0	141	150	9	0	0.01
Porphory Mtn	4850	95%	183	9	1	0	0	0	0	0	193	204	11	1	0.01
Fairview Peak	4860	93%	146	10	1	0	0	0	0	0	157	169	12	0	0.01
Four Mile Creek	5720	61%	16	5	2	1	1	0	0	0	25	41	16	0	0.0393701
West Creek	5730	97%	27	1	0	0	0	0	0	0	28	29	1	0	0.0393701
Trail Creek	5740	95%	37	2	0	0	0	0	0	0	39	41	2	0	0.0393701
Stump Bump	5810	97%	36	1	0	0	0	0	0	0	37	38	1	0	0.0393701
Cedar Mountain	5860	95%	37	2	0	0	0	0	0	0	39	41	2	0	0.0393701
Hackett Mountain	5880	97%	30	1	0	0	0	0	0	0	31	32	1	0	0.0393701
Log Jumper	5940	94%	31	2	0	0	0	0	0	0	33	35	2	0	0.0393701

2012 Monthly ALERT Radio Traffic Summary

