

# Memo



**Date:** May 4, 2011  
**To:** Kevin Stewart  
**From:** Markus Ritsch  
**Subject:** April 2011 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 base station were analyzed for the period April 1 through April 30, 2011.

## II. General System Analysis Summary

A total of 342,575 ALERT (legacy) data reports were analyzed. Meteorological sensors account for 76 percent, water level sensors 7 percent, and rain sensors 5 percent of the total monthly records.

The system-wide radio traffic loading was 11,419 reports per day with an average hourly loading of 476 reports. The peak hourly traffic loading was 892 reports, which occurred on April 13, between 10:00 PM and 11:00 PM. 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 Unacceptable Performance Characteristics**

Rain ID	Description	Timer	Event	Comments
1620	Slaughterhouse Gulch	68%	61%	Poor event performance
2930	Spring Valley Road	60%	67%	Poor event performance
1660	SPR at Henderson	82%	74%	Poor event performance
2990	Tomah Road	62%	70%	Poor event performance
2950	DC Public Works	75%	72%	Poor event performance
4330	Hansen Rain	68%	70%	Poor event performance
1700	Cherry Creek at Champa	32%	18%	Poor timer and event performance, Large data gap between 4/9 and 4/28
3060	Fire Sta 47	33%	75%	Poor timer performance
3030	Bingham Lake Park	40%	80%	Poor timer performance
700	Toll Gate @ 6 <sup>th</sup>	47%	90%	Poor timer performance
3090	Highland Heritage Park	48%	100%	Poor timer performance
2970	Rampart Range Road	48%	86%	Poor timer performance

The West Creek repeater was down numerous times during the month. Also the base station had a period where its receiver was set to direct input rather than listening to the repeater output. These circumstances both contributed to the poor reporting performance this month. The West Creek repeater issues have been resolved. The performance should increase for all stations beginning in May.

### 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*
1520	4710	4490	1700								
1440	1440	4270	3060								
4470	4470	4330	3030								
1460	1460	4510	700								
140	140	1440	3090								
1570	4490	4810	2970								

\*- 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).

**Table 3. District-Wide Total Tip/Count Statistical Summary**

Statistical Parameter	Value	Comments
Mean	33.94	Only the 1-mm rain sensors were included in the analysis
Median	33	Only the 1-mm rain sensors were included in the analysis
Standard deviation	13.59	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	74.71	Only the 1-mm rain sensors were included in the analysis
Minimum total count	10	ID 2730 (Salisbury Park)
Maximum total count	72	ID 4790 (Button Rock Weather)

#### 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									

\*- 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
Cherry Creek at Champa	1700	Large data gap between the 9 <sup>th</sup> and the 28 <sup>th</sup>

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

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 89.49 percent. A total of 5,136 incrementing reports were received and a total of 5,739 reports were expected. The total loss of incrementing reports for the month was approximately 10.51 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*
1420	1350	2820	1700								
1460	950	2970	1620								
4470	1320	710	2930								
4330	1330	4330	2990								
2710	840	870	4330								
1640	1720	1200	2950								

\*-Only sensors that are operational year-round (weather stations and stations in Boulder County) are included for the analysis in these months. \*\*-Due to Spring start-up/Fall shut-down the performance values in these months are not accurate.

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 were analyzed independently in an attempt to quantify data loss rates from rain sensors using the 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	Hour	Expected Tips	Received	Reports/Hour	Percent Loss
13	22	87	87	892	0
13	21	91	91	803	0
18	23	96	96	781	0
18	22	103	103	777	0
13	23	45	45	776	0
3	13	38	38	755	0
3	14	12	11	744	8.3%
19	0	20	20	736	0
24	22	9	9	727	0
24	21	9	9	701	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)	508
Total reports from unknown IDs	1,254
Unknown IDs with only a single received report (potential noise)	307
Total reports from all IDs – RecData Log entire month	342,575
Unknown reports as a fraction of total reports	0.37%

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								

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%								

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**

Sensor ID	Total Reports
1470	32
1423	24
1446	17
1918	17
2869	16
1934	15
1953	14
2716	14
2811	14
207	13
1949	13
1933	12
1415	11
1453	11
1631	11
2239	11
2748	11
1454	10
1486	10
1534	10
1919	10
1923	10
1954	10
2768	10
1433	9
1449	9
1458	9
2705	9
2877	9
2878	9
1419	8
1443	8
1528	8
1926	8
1951	8
2714	8
2871	8
2872	8
2876	8
1529	7
1531	7
1929	7
2775	7
2874	7
153	6
154	6
1339	6
1447	6
1915	6
1938	6
2746	6
2754	6
2756	6
4509	6
152	5
1502	5
1930	5

1950	5
2706	5
2753	5
2771	5
2828	5
4299	5
201	4
206	4
794	4
898	4
1089	4
1430	4
1457	4
1481	4
1496	4
1647	4
1966	4
2224	4
2708	4
2784	4
2812	4
2814	4
4591	4
4735	4
4839	4

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	84	12:00-12:59	79
1:00-1:59	94	1:00-1:59	67
2:00-2:59	63	2:00-2:59	21
3:00-3:59	45	3:00-3:59	16
4:00-4:59	44	4:00-4:59	17
5:00-5:59	33	5:00-5:59	23
6:00-6:59	39	6:00-6:59	13
7:00-7:59	38	7:00-7:59	21
8:00-8:59	44	8:00-8:59	55
9:00-9:59	41	9:00-9:59	82
10:00-10:59	43	10:00-10:59	128
11:00-11:59	59	11:00-11:59	105

## VII. Sensors with Invalid Reports

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

Sensor ID	Description	Nov 2010	Dec 2010	Jan 2011	Feb 2011	Mar 2011	Apr 2011
140	Wx-Blue Mountain	3	5	4	2	2	0
860	Sand Cr at Colfax	0	0	0	0	4	0
870	Murphy Creek GC	0	0	0	0	4	1
1420	Wx-Diamond Hill	2	0	3	2	3	0
1460	Wx-Urban Farm	2	2	1	1	0	0
1500	Powers Park	0	0	0	0	3	0
1520	Wx-Marston Lake North	0	0	0	3	2	2
1530	Bear Creek at Lowell	0	0	0	5	2	2
1570	Wx-Brighton Ditch	0	0	0	0	4	1
1580	Roslyn	0	0	0	0	4	0
1920	Wx-Brighton	0	0	4	1	0	3
2190	Wx-Squaw Mountain	2	1	1	1	0	0
2750	Wx-Castle Rock	0	0	4	0	1	3
4060	Lakeshore	13	7	1	0	1	1
4090	Magnolia	65	27	0	1	0	0
4840	SBC-S. Boulder Ditch	3	1	1	0	1	0



# General System Analysis

**Database Name**

P:\A207-UDFCD-Data-Analysis\2011\04-2011\Novastar\_extract\_2011Apr.mdb

**First Date in Database**  
**Last Date in Database**

4/1/11 12:00 AM
4/30/11 11:59 PM

**Total Days**  
**Total Hours**

30.0
720.0

**Total Records Analyzed**

342575

**Records by Group**

Wind Gust	56851	17%
Temperature	51792	15%
Relative Humidity	51499	15%
Wind Speed Average & Azimuth	30351	9%
Barometric Pressure	22212	6%
Wind Direction	20031	6%
Wind Speed Average	19695	6%
Battery Voltage	19200	6%
Water Level PT-HSE	17038	5%
Precipitation	16014	5%
Solar Radiation	9021	3%
Fuel Temperature	5510	2%
Fuel Moisture	5500	2%
Water Level Float	4339	1%
Water Level PT	3423	1%
Soil Moisture	2742	1%
Repeater Status Report	2580	1%
Wind ALERT	1433	0%
Unknown	1254	0%
Water Level	642	0%
Repeater Pass List	577	0%
12Hr Status Report	516	0%
Hayman Battery	275	0%
Handar 585 ALARM Status	61	0%
Solar Power	14	0%
ALERT/A2 Testing	5	0%
<b>Total</b>	<b>342575</b>	

**Records by Major Group**

Meteorologic Sensors	261452	76%
Water Level Sensors	24800	7%
Rain Sensors	16014	5%
Soil and Fuel Sensors	13752	4%
Sensor Status Transmissions	3748	1%
<b>Total</b>	<b>319766</b>	

**Traffic Loading Summary**

Alert Reports	342575	
Average Daily Traffic	11419	
Average Hourly Traffic	476	
Median Hourly Traffic	481	hour beginning
Peak Hourly Traffic	892	Apr-13, 10:00 PM
2nd Max	803	Apr-13, 9:00 PM
3rd Max	781	Apr-18, 11:00 PM
4th Max	777	Apr-18, 10:00 PM
5th Max	776	Apr-13, 11:00 PM



# Rain Timer Performance

Analyze Rain Sensors

12:17

92%

Rain ID	Description	Rcv	Timer	Exp	Performance
1700	Cherry Cr @ Champa	19	16:48	60.00	32%
3060	Fire Sta 47	20	13:42	60.00	33%
3030	Bingham Lake Park	24	13:19	60.00	40%
700	Toll Gate @ 6th	28	0:00	60.00	47%
2970	Rampart Range Rd	29	15:10	60.00	48%
3090	Highland Heritage Park	29	12:00	60.00	48%
3050	East/West Trailhead	32	15:00	60.00	53%
2930	Wx-Spring Valley Rd-DougCnty	36	16:00	60.00	60%
2990	Wx-Tomah Rd-DougCnty	37	12:06	60.00	62%
1710	Shop Creek	39	13:20	60.00	65%
2810	Pine Cliff Road	39	14:00	60.00	65%
1620	Slaughterhouse Glch	41	13:46	60.00	68%
3010	EPC at Hwy 105	41	13:14	60.00	68%
4330	Hansen Rain	41	14:01	60.00	68%
2850	Cherry Cr bl Bayou Glch	42	14:59	60.00	70%
920	Wx-Aurora Town Hall	43	13:07	60.00	72%
2920	West Cherry Head-Douglas Cnty	43	15:52	60.00	72%
2980	Dakan Rd	44	14:19	60.00	73%
2270	Cub Cr below Blue	45	13:46	60.00	75%
2950	DC Public Works	45	13:01	60.00	75%
3020	Wx-West Creek WX	45	11:41	60.00	75%
2320	Choke Cherry Resvr	46	13:21	60.00	77%
4140	Logan Mill	46	14:08	60.00	77%
4470	Little Narrows	46	12:19	60.00	77%
2820	Haskins Gulch Conf	47	14:54	60.00	78%
2960	Indian Creek	47	13:22	60.00	78%
4060	Lakeshore	47	13:25	60.00	78%
4080	Twin Sisters	47	13:25	60.00	78%
4850	Porphory Mtn	47	12:58	60.00	78%
620	Quincy/Highline	48	12:54	60.00	80%
1110	Gunbarrel	48	13:35	60.00	80%
2750	Wx-Castle Rock	48	12:38	60.00	80%
2910	East Cherry Cr-Douglas	48	14:06	60.00	80%
4510	Pinewood Springs	48	12:44	60.00	80%
400	Montview Park	49	13:13	60.00	82%
540	Parker/Mississippi	49	12:56	60.00	82%
1330	Roslyn	49	13:57	60.00	82%
1660	SPR at Henderson	49	13:29	60.00	82%
2240	Cold Sprg Glch conf	49	13:27	60.00	82%
4180	Gold Lake	49	12:56	60.00	82%
1100	Louisville Rec Ctr	50	13:47	60.00	83%
1520	Wx-Marston Lake North	50	12:00	60.00	83%
2230	Bear Cr below Cub	50	13:03	60.00	83%
2940	Willow Creek - DougCnty	50	13:40	60.00	83%
4010	Crescent	50	13:09	60.00	83%
4070	Bear Peak	50	12:51	60.00	83%
4190	Slaughterhouse	50	12:17	60.00	83%
4530	Winiger Ridge	50	12:49	60.00	83%
4550	Boulder Jail	50	13:11	60.00	83%
600	Harvard Gulch Park	51	12:54	60.00	85%
710	Horseshoe Park Drop	51	12:33	60.00	85%
900	Wx-Aurora Reservoir	51	12:48	60.00	85%
1350	Chatfield COE	51	12:22	60.00	85%
1400	Upper Sloan Det.	51	12:33	60.00	85%

1460	Wx-Urban Farm	51	12:27	60.00	85%
2370	Red Rocks Park	51	12:31	60.00	85%
4130	Swiss Peaks	51	13:01	60.00	85%
4150	Gold Hill	51	12:41	60.00	85%
4570	St. Antons	51	13:03	60.00	85%
4860	Fairview Peak	51	12:41	60.00	85%
100	Carr Street	52	11:40	60.00	87%
330	Van Bibber @ Hwy 93	52	12:35	60.00	87%
1030	NREL/S. Table Mtn.	52	12:54	60.00	87%
1440	Wx-Elbert	52	13:24	60.00	87%
4020	Rio Grande	52	12:50	60.00	87%
4160	Sunshine	52	12:56	60.00	87%
440	Fire Station #7	53	12:13	60.00	88%
530	Fire Station #19	53	12:32	60.00	88%
820	ETG @ Buckley	53	13:25	60.00	88%
830	Side Creek Park	53	12:29	60.00	88%
940	Sampson Gulch	53	12:15	60.00	88%
1200	Broomfield 3207	53	13:27	60.00	88%
1370	West Metro FS13	53	12:36	60.00	88%
1550	Lakewood CC	53	12:11	60.00	88%
2310	Genesee Village	53	12:19	60.00	88%
4170	Pine Brook	53	12:53	60.00	88%
4200	Lazy Acres	53	12:18	60.00	88%
4490	Apple Valley	53	13:05	60.00	88%
4730	Wx-Sugarloaf	53	12:00	60.00	88%
140	Wx-Blue Mountain	54	12:17	60.00	90%
200	Leyden Reservoir	54	12:13	60.00	90%
310	Guy Hill Ranch	54	11:07	60.00	90%
410	Kelly Dam	54	12:15	60.00	90%
630	Temple Pond at DTC	54	12:33	60.00	90%
850	Flying J	54	12:31	60.00	90%
1900	Niver Detention	54	12:29	60.00	90%
2730	Wx-Salisbury Park	54	12:00	60.00	90%
2840	Sulphur Gulch	54	12:49	60.00	90%
4100	Filter Plant	54	12:31	60.00	90%
4240	Sunset	54	12:15	60.00	90%
4340	Riverside	54	13:15	60.00	90%
4520	Eagle Ridge	54	12:00	60.00	90%
4770	Wx-Cal-Wood Ranch	54	12:19	60.00	90%
120	West Woods	55	11:58	60.00	92%
510	Virginia Court	55	13:08	60.00	92%
650	Iliff Pond	55	12:14	60.00	92%
720	Confluence Pond	55	11:58	60.00	92%
730	No Name @ Quincy	55	12:43	60.00	92%
750	Wx-Quincy Reservoir	55	12:14	60.00	92%
860	Sand Cr at Colfax	55	12:31	60.00	92%
870	Murphy Creek GC	55	12:00	60.00	92%
1010	Denver West	55	13:01	60.00	92%
1310	LDC at 64th	55	12:13	60.00	92%
1480	Third Creek at DIA	55	12:16	60.00	92%
2190	Wx-Squaw Mountain	55	12:00	60.00	92%
4090	Magnolia	55	12:14	60.00	92%
4110	Betasso	55	12:32	60.00	92%
4360	Justice Center	55	12:13	60.00	92%
420	Expo Park	56	12:15	60.00	93%
430	Utah Park	56	12:16	60.00	93%
760	Mission Viejo Park	56	11:57	60.00	93%
800	Sable Ditch @ 18th	56	12:14	60.00	93%
810	Granby Ditch @ 6th	56	12:14	60.00	93%

840	Fire Station 12	56	12:15	60.00	93%
970	Pump Sta 3	56	12:00	60.00	93%
1060	Heritage Square	56	11:57	60.00	93%
1800	Sand Creek Park	56	11:58	60.00	93%
4220	Fling's	56	11:41	60.00	93%
4750	Wx-Louisville Lake	56	11:27	60.00	93%
220	Upper Leyden	57	11:28	60.00	95%
500	Havana Park	57	11:58	60.00	95%
520	Jewell Detention	57	11:57	60.00	95%
1720	Cherry Cr @ Steele	57	12:27	60.00	95%
2900	Russelville Gulch-Douglas	57	12:00	60.00	95%
4270	Cannon Mountain	57	11:43	60.00	95%
4790	Wx-Button Rock	57	12:17	60.00	95%
150	Nott Creek	58	11:08	60.00	97%
950	Piney at Liverpool	58	12:13	60.00	97%
1570	Wx-Brighton Ditch	58	12:00	60.00	97%
4230	Golden Age	58	12:13	60.00	97%
1000	Maple Grove Resv.	59	11:11	60.00	98%
1320	SPR at 3rd Ave	59	11:55	60.00	98%
1360	Denver Zoo	59	12:00	60.00	98%
1530	Bear Creek @ Lowell	59	10:52	60.00	98%
2860	CC at Stroh Rd	59	11:26	60.00	98%
1340	Sanderson at Xavier	60	11:43	60.00	100%
320	Sports Complex	61	11:14	60.00	102%
4350	Conifer Hill	61	11:51	60.00	102%
1420	Wx-Diamond Hill	62	11:27	60.00	103%
1920	Wx-Brighton	62	10:39	60.00	103%
110	Ralston Reservoir	63	10:51	60.00	105%
210	Leyden Confluence	63	11:24	60.00	105%
1050	Jeffco Fairgrounds	63	11:13	60.00	105%
1300	Hidden Lake	63	11:02	60.00	105%
1810	Sand Creek at mouth	63	11:57	60.00	105%
4260	Taylor Mountain	63	10:40	60.00	105%
4290	Red Hill	63	10:36	60.00	105%
1040	Lena @ U.S. Hwy 6	64	10:51	60.00	107%
1500	Powers Park	64	11:06	60.00	107%
2340	El Rancho	64	10:30	60.00	107%
1640	SPR at Union Ave.	65	10:21	60.00	108%
4250	Geer Canyon	65	11:09	60.00	108%
300	Van Bibber Park	67	9:41	60.00	112%
4310	Johnny Park	68	10:10	60.00	113%
4300	Big Elk Park	70	9:41	60.00	117%
2710	Wx-Highlands Ranch WTP	72	9:48	60.00	120%
2250	Rosedale	73	10:17	60.00	122%
610	Harvard @ Jackson	74	9:43	60.00	123%
2870	Cottonwood (Apache)	74	9:15	60.00	123%
1600	Englewood Dam	75	9:02	60.00	125%
2260	Brook Forest	77	9:57	60.00	128%
2280	Kinney Peak	78	9:22	60.00	130%
4040	Martin Gulch	78	9:06	60.00	130%
2210	Wx-Hiwan G.C.	83	8:42	60.00	138%
4030	Red Garden	84	8:58	60.00	140%
640	Goldsmith @ Eastman	85	8:12	60.00	142%
4050	Walker Ranch	85	8:08	60.00	142%
2350	Idledale	89	8:50	60.00	148%
4810	Shanahan Ridge	90	7:57	60.00	150%
4820	Doudy Draw	90	8:20	60.00	150%
2360	Indian Hills	92	8:01	60.00	153%
4830	SBC @ San Souci	93	7:58	60.00	155%

2330	Morrison	97	8:21	60.00	162%
4840	SBC@S Boulder Ditch	98	7:49	60.00	163%
5720	Four Mile Creek	24	20:28	60.00	40%
5730	West Creek	49	14:51	60.00	82%
5740	Trail Creek	46	14:09	60.00	77%
5810	Stump Bump	49	13:45	60.00	82%
5860	Cedar Mountain	44	15:20	60.00	73%
5880	Hackett Mountain	45	14:27	60.00	75%

Rain Event Performance				Analyze Rain Sensors										
		Reports Received	5,190											
	Systemwide Avg	Total Tips	5,804											
	89.42%	Data Loss	10.58%											
Rain ID	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket	
1700	18%	4	0	0	0	0	0	2	4	22	0	0	0.0393701	
1620	61%	13	1	0	2	1	0	0	17	28	11	0	0.0393701	
2930	67%	12	0	0	1	1	0	0	14	21	7	0	0.0393701	
2990	70%	13	2	0	0	0	1	0	16	23	7	0	0.0393701	
4330	70%	34	2	1	1	0	2	1	40	57	17	1	0.0393701	
2950	72%	12	0	0	0	0	1	0	13	18	5	0	0.0393701	
1660	74%	15	3	2	0	0	0	0	20	27	7	0	0.0393701	
2230	74%	24	1	3	1	0	0	0	29	39	10	0	0.0393701	
2910	75%	16	1	0	0	0	1	0	18	24	6	0	0.0393701	
2980	75%	14	7	0	0	0	0	0	21	28	7	0	0.0393701	
3060	75%	7	1	1	0	0	0	0	9	12	3	0	0.0393701	
4470	75%	39	3	1	2	1	0	0	46	61	15	0	0.0393701	
1480	76%	18	3	0	0	1	0	0	22	29	7	0	0.0393701	
2340	76%	16	5	1	0	0	0	0	22	29	7	0	0.0393701	
1200	76%	26	2	4	0	0	0	0	32	42	10	0	0.0393701	
2250	77%	23	5	2	0	0	0	0	30	39	9	0	0.0393701	
4820	77%	31	6	3	0	0	0	0	40	52	12	0	0.0393701	
2240	77%	24	0	2	0	1	0	0	27	35	8	0	0.0393701	
2820	79%	14	0	0	0	1	0	0	15	19	4	0	0.0393701	
1330	79%	18	4	1	0	0	0	0	23	29	6	0	0.0393701	
2320	80%	22	5	1	0	0	0	0	28	35	7	0	0.0393701	
3030	80%	10	1	1	0	0	0	0	12	15	3	0	0.0393701	
3050	80%	14	1	0	1	0	0	0	16	20	4	0	0.0393701	
4550	80%	34	6	0	0	1	0	0	41	51	10	0	0.0393701	
4840	82%	34	4	1	1	0	0	0	40	49	9	0	0.0393701	
4100	82%	31	5	0	1	0	0	0	37	45	8	0	0.0393701	
4190	83%	47	4	0	1	1	0	0	53	64	11	0	0.0393701	
2270	83%	28	5	1	0	0	0	0	34	41	7	0	0.0393701	
2940	83%	8	2	0	0	0	0	1	10	12	2	0	0.0393701	
4770	84%	42	4	0	0	0	1	0	47	56	9	0	0.0393701	
4170	84%	32	4	0	1	0	0	0	37	44	7	0	0.0393701	
4360	84%	38	3	1	1	0	0	0	43	51	8	0	0.0393701	
1060	84%	24	2	0	1	0	0	0	27	32	5	0	0.0393701	
2960	85%	19	2	1	0	0	0	0	22	26	4	0	0.0393701	
4730	85%	31	0	1	0	1	0	0	33	39	6	0	0.0393701	
4520	85%	41	3	0	0	0	1	0	45	53	8	0	0.0393701	
200	85%	30	4	1	0	0	0	0	35	41	6	0	0.0393701	
1440	86%	10	2	0	0	0	0	0	12	14	2	0	0.0393701	
2970	86%	43	4	0	0	1	0	1	48	56	8	0	0.0393701	
4200	86%	38	2	1	1	0	0	0	42	49	7	0	0.0393701	
1570	86%	34	1	1	1	0	0	0	37	43	6	0	0.0393701	
1050	86%	21	4	0	0	0	0	0	25	29	4	0	0.0393701	
4490	86%	40	3	0	0	1	0	0	44	51	7	0	0.0393701	
2810	86%	18	0	0	1	0	0	0	19	22	3	0	0.0393701	
600	87%	23	2	1	0	0	0	0	26	30	4	0	0.0393701	
2310	87%	30	2	0	1	0	0	0	33	38	5	0	0.0393701	
4140	87%	50	2	0	2	0	0	0	54	62	8	0	0.0393701	
1030	88%	26	1	0	1	0	0	0	28	32	4	0	0.0393701	
2860	88%	12	2	0	0	0	0	0	14	16	2	0	0.0393701	
4110	88%	45	3	0	0	1	0	0	49	56	7	0	0.0393701	
4040	88%	45	4	0	1	0	0	0	50	57	7	0	0.0393701	
4070	88%	39	2	2	0	0	0	0	43	49	6	0	0.0393701	
430	88%	26	2	1	0	0	0	0	29	33	4	0	0.0393701	
650	88%	19	3	0	0	0	0	0	22	25	3	0	0.0393701	
920	88%	20	1	1	0	0	0	0	22	25	3	0	0.0393701	
2850	88%	14	0	1	0	0	0	0	15	17	2	0	0.0393701	
1900	88%	22	0	0	1	0	0	0	23	26	3	0	0.0393701	
2920	88%	22	0	0	1	0	0	0	23	26	3	0	0.0393701	
1110	89%	36	2	0	1	0	0	0	39	44	5	0	0.0393701	
100	89%	30	1	0	1	0	0	0	32	36	4	0	0.0393701	
720	89%	14	2	0	0	0	0	0	16	18	2	0	0.0393701	
4060	89%	36	3	1	0	0	0	0	40	45	5	0	0.0393701	
4510	89%	50	5	1	0	0	0	1	56	63	7	0	0.0393701	
4570	89%	43	6	0	0	0	0	0	49	55	6	0	0.0393701	
320	89%	31	1	0	1	0	0	0	33	37	4	0	0.0393701	
1000	89%	31	1	0	1	0	0	0	33	37	4	0	0.0393701	

1530	89%	29	4	0	0	0	0	0	33	37	4	0	0.0393701
4790	81%	51	7	0	0	0	0	1	58	72	7	0	0.0393701
4250	89%	47	2	0	0	1	0	0	50	56	6	0	0.0393701
4160	90%	49	2	0	0	1	0	0	52	58	6	0	0.0393701
330	90%	32	2	1	0	0	0	0	35	39	4	0	0.0393701
220	90%	41	2	0	1	0	0	0	44	49	5	0	0.0393701
440	90%	16	2	0	0	0	0	0	18	20	2	0	0.0393701
620	90%	24	3	0	0	0	0	0	27	30	3	0	0.0393701
4080	90%	32	4	0	0	0	0	0	36	40	4	0	0.0393701
2280	90%	33	4	0	0	0	0	0	37	41	4	0	0.0393701
700	90%	17	2	0	0	0	0	0	19	21	2	0	0.0393701
870	90%	17	2	0	0	0	0	0	19	21	2	0	0.0393701
4150	91%	43	5	0	0	0	0	0	48	53	5	0	0.0393701
4340	91%	43	5	0	0	0	0	0	48	53	5	0	0.0393701
4750	91%	36	2	1	0	0	0	0	39	43	4	0	0.0393701
810	91%	18	2	0	0	0	0	0	20	22	2	0	0.0393701
1800	91%	18	2	0	0	0	0	0	20	22	2	0	0.0393701
4030	91%	47	3	1	0	0	0	0	51	56	5	0	0.0393701
1400	91%	29	1	1	0	0	0	0	31	34	3	0	0.0393701
1520	91%	30	1	1	0	0	0	0	32	35	3	0	0.0393701
1310	92%	32	0	0	1	0	0	0	33	36	3	0	0.0393701
1720	92%	20	2	0	0	0	0	0	22	24	2	0	0.0393701
1300	92%	31	3	0	0	0	0	0	34	37	3	0	0.0393701
400	92%	22	2	0	0	0	0	0	24	26	2	0	0.0393701
500	92%	22	2	0	0	0	0	0	24	26	2	0	0.0393701
2190	92%	11	1	0	0	0	0	0	12	13	1	0	0.0393701
4020	92%	33	3	0	0	0	0	0	36	39	3	0	0.0393701
4810	92%	47	1	0	1	0	0	0	49	53	4	0	0.0393701
120	93%	38	1	1	0	0	0	0	40	43	3	0	0.0393701
1460	93%	25	2	0	0	0	0	0	27	29	2	0	0.0393701
2840	93%	13	1	0	0	0	0	0	14	15	1	0	0.0393701
4290	93%	56	0	0	0	1	0	0	57	61	4	0	0.0393701
1810	94%	27	2	0	0	0	0	0	29	31	2	0	0.0393701
4180	94%	41	3	0	0	0	0	0	44	47	3	0	0.0393701
4260	94%	41	3	0	0	0	0	0	44	47	3	0	0.0393701
2870	94%	14	1	0	0	0	0	0	15	16	1	0	0.0393701
4530	94%	42	3	0	0	0	0	0	45	48	3	0	0.0393701
4090	94%	44	1	1	0	0	0	0	46	49	3	0	0.0393701
4050	94%	29	2	0	0	0	0	0	31	33	2	0	0.0393701
4830	94%	45	1	1	0	0	0	0	47	50	3	0	0.0393701
110	94%	31	0	1	0	0	0	0	32	34	2	0	0.0393701
750	94%	15	1	0	0	0	0	0	16	17	1	0	0.0393701
900	94%	15	1	0	0	0	0	0	16	17	1	0	0.0393699
1370	94%	30	2	0	0	0	0	0	32	34	2	0	0.0393701
2370	94%	30	2	0	0	0	0	0	32	34	2	0	0.0393701
4240	94%	30	2	0	0	0	0	0	32	34	2	0	0.0393701
300	94%	32	0	1	0	0	0	0	33	35	2	0	0.0393701
820	94%	16	1	0	0	0	0	0	17	18	1	0	0.0393701
850	94%	16	1	0	0	0	0	0	17	18	1	0	0.0393701
940	94%	16	1	0	0	0	0	0	17	18	1	0	0.0393699
950	94%	16	1	0	0	0	0	0	17	18	1	0	0.0393701
1920	94%	32	2	0	0	0	0	0	34	36	2	0	0.0393701
1100	95%	33	2	0	0	0	0	0	35	37	2	0	0.0393701
630	95%	34	2	0	0	0	0	0	36	38	2	0	0.0393701
710	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701
970	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701
410	95%	18	1	0	0	0	0	0	19	20	1	0	0.0393701
1550	95%	36	2	0	0	0	0	0	38	40	2	0	0.0393701
2360	95%	36	2	0	0	0	0	0	38	40	2	0	0.0393701
150	95%	38	2	0	0	0	0	0	40	42	2	0	0.0393701
800	95%	19	1	0	0	0	0	0	20	21	1	0	0.0393701
760	96%	21	1	0	0	0	0	0	22	23	1	0	0.0393701
540	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701
4130	96%	44	2	0	0	0	0	0	46	48	2	0	0.0393701
4230	96%	23	1	0	0	0	0	0	24	25	1	0	0.0393701
420	96%	25	1	0	0	0	0	0	26	27	1	0	0.0393701
1600	96%	25	1	0	0	0	0	0	26	27	1	0	0.0393701
1710	96%	25	1	0	0	0	0	0	26	27	1	0	0.0393701
4310	96%	51	2	0	0	0	0	1	53	55	2	0	0.0393701
140	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
530	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701

640	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
1360	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
2210	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
2260	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
1320	97%	29	1	0	0	0	0	0	30	31	1	0	0.0393701
1340	97%	33	1	0	0	0	0	0	34	35	1	0	0.0393701
1420	97%	36	1	0	0	0	0	0	37	38	1	0	0.0393701
2330	98%	41	1	0	0	0	0	0	42	43	1	0	0.0393701
4220	98%	49	1	0	0	0	0	0	50	51	1	0	0.0393701
4350	98%	54	1	0	0	0	0	0	55	56	1	0	0.0393701
210	100%	37	0	0	0	0	0	0	37	37	0	0	0.0393701
310	100%	28	0	0	0	0	0	0	28	28	0	0	0.0393701
510	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
520	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
610	100%	29	0	0	0	0	0	0	29	29	0	0	0.0393701
730	100%	11	0	0	0	0	0	0	11	11	0	0	0.0393701
830	100%	18	0	0	0	0	0	0	18	18	0	0	0.0393701
840	100%	18	0	0	0	0	0	0	18	18	0	0	0.0393701
860	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
1010	100%	35	0	0	0	0	0	0	35	35	0	0	0.0393701
1040	100%	35	0	0	0	0	0	0	35	35	0	0	0.0393701
1350	100%	15	0	0	0	0	0	0	15	15	0	0	0.0393701
1500	100%	36	0	0	0	0	0	0	36	36	0	0	0.0393701
1640	100%	29	0	0	0	0	0	0	29	29	0	0	0.0393701
2350	100%	36	0	0	0	0	0	0	36	36	0	0	0.0393701
2710	100%	26	0	0	0	0	0	0	26	26	0	0	0.0393701
2730	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
2750	100%	11	0	0	0	0	0	0	11	11	0	0	0.0393701
2900	100%	28	0	0	0	0	0	0	28	28	0	0	0.0393701
3020	100%	15	0	0	0	0	0	1	15	15	0	0	0.0393701
3090	100%	25	0	0	0	0	0	0	25	25	0	0	0.0393701
4010	100%	14	0	0	0	0	0	0	14	14	0	0	0.0393701
4270	100%	40	0	0	0	0	0	0	40	40	0	0	0.0393701
4300	100%	49	0	0	0	0	0	0	49	49	0	0	0.0393701
	Total Tips	4,785	303	49	31	15	7	9	5,190	5,804	589	1	
3010	96%	65	3	0	0	0	0	1	68	71	3	0	0.01
4850	87%	105	14	2	0	0	0	1	121	139	18	0	0.01
4860	93%	145	6	1	1	0	0	1	153	164	11	0	0.01
5720	85%	9	2	0	0	0	0	0	11	13	2	0	0.0393701
5730	100%	9	0	0	0	0	0	0	9	9	0	0	0.0393701
5740	91%	9	1	0	0	0	0	0	10	11	1	0	0.0393701
5810	94%	14	1	0	0	0	0	0	15	16	1	0	0.0393701
5860	86%	11	0	1	0	0	0	0	12	14	2	0	0.0393701
5880	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701

# 2011 Monthly ALERT Radio Traffic Summary

