

# Memo



**Date:** October 12, 2011  
**To:** Kevin Stewart  
**From:** Markus Ritsch  
**Subject:** September 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 September 1 through September 30, 2011.

## II. General System Analysis Summary

A total of 362,681 ALERT (legacy) data reports were analyzed. Meteorological sensors account for 76 percent, water level sensors 8 percent, and rain sensors 5 percent of the total monthly records.

The system-wide radio traffic loading was 12,089 reports per day with an average hourly loading of 504 reports. The peak hourly traffic loading was 1,225 reports, which occurred on September 14, between 6:00 PM and 7:00 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 Poor Performance Characteristics**

<b>Rain ID</b>	<b>Description</b>	<b>Timer Performance</b>	<b>Event Performance</b>
4330	Hansen Rain	0.52	0.70
2970	Rampart Range Road	0.40	0.98
2320	Choke Cherry Resvr	0.60	0.92
440	Fire Station #7	0.63	0.83
4490	Apple Valley	0.72	0.68
4850	Porphory Mtn	0.83	0.84
2980	Dakan Road	0.90	0.65
2270	Cub Cr below Blue	0.73	0.80
2239	Unknown sensor ID with excessive reports		

### ***B. Continuous Operation of Base Receiver/Decoder***

The ALERT/ALERT2/NS5 receiver/decoder was continuously operational 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*
1520	4710	4490	1700	1700	700	4300	4330	4330			
1440	1440	4270	3060	700	4710	4330	4850	2320			
4470	4470	4330	3030	540	4330	2750	2750	440			
1460	1460	4510	700	1710	1700	2280	2950	4490			
140	140	1440	3090	500	4270	870	540	4520			
1570	4490	4810	2970	710	4300	4270	2280	2270			

\*- 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	37.67	Only the 1-mm rain sensors were included in the analysis
Median	34	Only the 1-mm rain sensors were included in the analysis
Standard deviation	15.78	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	85.01	Only the 1-mm rain sensors were included in the analysis
Minimum total count	10	ID 2270 (Cub Creek below Blue)
Maximum total count	115	ID 630 (Temple Pond at DTC – influence by irrigation)

#### 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				

\*- 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
There were no stations this month that experienced a jump in sequential count of more than 6.		

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

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 90.6 percent. A total of 5,969 incrementing reports were received and a total of 6,592 reports were expected. The total loss of incrementing reports for the month was approximately 9.4 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	1620	2280	870	2980	2980			
1460	950	2970	1620	1660	4300	4300	400	4490			
4470	1320	710	2930	810	4330	4330	4330	4330			
4330	1330	4330	2990	650	4270	2980	2270	4240			
2710	840	870	4330	940	2980	4490	2240	4470			
1640	1720	1200	2950	1900	310	4790	4530	330			

\*-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	Received	Total Load	Loss
14	18	387	370	1,208	4.39%
14	22	288	274	1,139	4.86%
14	19	307	282	1,123	8.14%
14	23	199	193	1,024	3.01%
14	21	224	224	972	0.00%
14	20	206	198	971	3.88%
15	0	116	103	879	11.21%
14	17	180	166	753	7.77%
7	12	77	77	740	0.00%
15	1	48	47	739	2.08%
7	11	99	99	722	0.00%
2	20	60	57	715	5.00%

## 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)	164
Total reports from unknown IDs	191
Unknown IDs with only a single received report (potential noise)	151
Total reports from all IDs – RecData Log entire month	362,681
Unknown reports as a fraction of total reports	0.05%

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			

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%				

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	Reports
2239	9
2736	4
2861	4
4043	3
4083	3
4087	3

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	9	12:00-12:59	7
1:00-1:59	8	1:00-1:59	7
2:00-2:59	5	2:00-2:59	6
3:00-3:59	6	3:00-3:59	9
4:00-4:59	3	4:00-4:59	5
5:00-5:59	9	5:00-5:59	8
6:00-6:59	7	6:00-6:59	13
7:00-7:59	7	7:00-7:59	12
8:00-8:59	8	8:00-8:59	11
9:00-9:59	6	9:00-9:59	15
10:00-10:59	14	10:00-10:59	4
11:00-11:59	6	11:00-11:59	8

## 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	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sep 2011	
140	Wx-Blue Mountain	0	4	1	0	0	0	
500	Havana Park	0	6	1	1	0	0	
630	Temple Pond at DTC	0	7	0	1	0	0	
650	Iliff Pond	0	4	0	2	0	0	
760	Mission Viejo Park	0	5	0	1	0	0	
810	Granby Ditch @ 6th	0	4	0	1	0	0	
920	Wx-Aurora Town Hall	0	7	1	0	0	0	
940	Sampson Gulch	0	8	0	0	0	0	
950	Piney at Liverpool	0	0	0	0	0	3	
1010	Denver West	0	5	0	0	1	2	
1460	Wx-Urban Farm	0	5	1	0	1	0	
1480	Third Creek at DIA	0	0	0	5	0	0	
1520	Wx-Marston Lake North	2	4	1	0	1	0	
1530	Bear Creek at Lowell	2	10	0	0	1	0	
1710	Shop Creek	0	5	4	0	0	0	
1920	Wx-Brighton	3	3	1	2	1	1	
2190	Wx-Squaw Mountain	0	8	0	1	0	0	
2350	Idledale	0	0	0	0	0	3	
3010	EPC at Hwy 105	2	2	3	7	2	2	
3020	West Creek Wx	2	1	3	1	2	0	
4330	Hansen Rain	0	5	4	2	3	3	
4850	Porphory Mtn	0	0	0	4	1	2	



# General System Analysis

**Database Name**

P:\A207-UDFCD-Data-Analysis\2011\09-2011\Novastar\_extract\_2011Sep.mdb

**First Date in Database**

9/1/11 12:00 AM

**Total Days**

30.0

**Last Date in Database**

9/30/11 11:59 PM

**Total Hours**

720.0

**Total Records Analyzed**

362,681

**Records by Group**

Temperature	62,057	17%
Wind Gust	59,953	17%
Relative Humidity	59,106	16%
Barometric Pressure	28,616	8%
Water Level PT-HSE	23,034	6%
Wind Direction	20,978	6%
Battery Voltage	20,387	6%
Wind Speed Average	20,327	6%
Precipitation	17,849	5%
Wind Speed Average & Azimuth	14,261	4%
Solar Radiation	9,353	3%
Fuel Temperature	5,727	2%
Fuel Moisture	5,720	2%
Water Level Float	3,965	1%
Water Level PT	3,096	1%
Soil Moisture	2,825	1%
Repeater Status Report	2,297	1%
Water Level	746	0%
Wind ALERT	705	0%
Repeater Pass List	593	0%
12Hr Status Report	501	0%
Hayman Battery	332	0%
Unknown	191	0%
Handar 585 ALARM Status	61	0%
Repeater Battery Check	1	0%
<b>Total</b>	<b>362,681</b>	

**Records by Major Group**

Meteorologic Sensors	274,651	76%
Water Level Sensors	30,095	8%
Rain Sensors	17,849	5%
Soil and Fuel Sensors	14,272	4%
Sensor Status Transmissions	3,452	1%
<b>Total</b>	<b>340,319</b>	

**Traffic Loading Summary**

Alert Reports	362,681	
Average Daily Traffic	12,089	
Average Hourly Traffic	504	
Median Hourly Traffic	492	hour beginning
Peak Hourly Traffic	1,225	Sep 14, 6:00 PM
2nd Max	1,142	Sep 14, 10:00 PM
3rd Max	1,125	Sep 14, 7:00 PM
4th Max	1,026	Sep 14, 11:00 PM
5th Max	976	Sep 14, 9:00 PM



# Rain Timer Performance

Analyze Rain Sensors

Rain Id	Description	Rcv	Timer	Exp	Performance
2970	Rampart Range Rd (Satellite)	24		60.00	40%
4330	Hansen Rain	31	23:54	60.00	52%
2320	Choke Cherry Resvr	36	19:07	60.00	60%
440	Fire Station #7	38	11:57	60.00	63%
4490	Apple Valley	43	14:47	60.00	72%
4520	Eagle Ridge	43	12:54	60.00	72%
2270	Cub Cr below Blue	44	15:33	60.00	73%
3020	Wx-West Creek WX	46	15:32	60.00	77%
4470	Little Narrows	46	14:56	60.00	77%
540	Parker/Mississippi	48	14:34	60.00	80%
4530	Winiger Ridge	48	14:13	60.00	80%
2230	Bear Cr below Cub	49	14:18	60.00	82%
310	Guy Hill Ranch	50	13:34	60.00	83%
1330	Roslyn	50	13:05	60.00	83%
2850	Cherry Cr bl Bayou Glch	50	13:37	60.00	83%
4170	Pine Brook	50	14:10	60.00	83%
4240	Sunset	50	13:04	60.00	83%
4570	St. Antons	50	13:51	60.00	83%
4850	Porphyry Mtn	50	13:27	60.00	83%
870	Murphy Creek GC	51	13:49	60.00	85%
4510	Pinewood Springs	51	13:30	60.00	85%
4550	Boulder Jail	51	13:43	60.00	85%
100	Carr Street	52	13:34	60.00	87%
1010	Denver West	52	13:14	60.00	87%
2240	Cold Sprg Glch conf	52	13:38	60.00	87%
2840	Sulphur Gulch	52	13:35	60.00	87%
2920	West Cherry Head-Douglas Cnty	52	13:21	60.00	87%
2960	Indian Creek	52	13:15	60.00	87%
4140	Logan Mill	52	13:15	60.00	87%
4190	Slaughterhouse	52	12:45	60.00	87%
750	Wx-Quincy Reservoir	53	12:40	60.00	88%
820	ETG @ Buckley	53	13:00	60.00	88%
1100	Louisville Rec Ctr	53	13:31	60.00	88%
1710	Shop Creek	53	13:01	60.00	88%
2370	Red Rocks Park	53	13:14	60.00	88%
2860	CC at Stroh Rd	53	13:11	60.00	88%
4010	Crescent	53	12:42	60.00	88%
4080	Twin Sisters	53	12:58	60.00	88%
4220	Fling's	53	13:01	60.00	88%
4270	Cannon Mountain	53	13:16	60.00	88%
4750	Wx-Louisville Lake	53	12:15	60.00	88%
4860	Fairview Peak	53	12:51	60.00	88%
830	Side Creek Park	54	12:56	60.00	90%
840	Fire Station 12	54	13:18	60.00	90%
2280	Kinney Peak	54	12:44	60.00	90%
2910	East Cherry Cr-Douglas	54	13:01	60.00	90%
2980	Dakan Rd	54	12:59	60.00	90%
2990	Wx-Tomah Rd-DougCnty	54	13:15	60.00	90%
3010	EPC at Hwy 105	54	12:31	60.00	90%
4030	Red Garden	54	13:11	60.00	90%
4790	Wx-Button Rock	54	12:44	60.00	90%
4830	SBC @ San Souci	54	12:58	60.00	90%
530	Fire Station #19	55	12:56	60.00	92%
620	Quincy/Highline	55	12:43	60.00	92%

850	Flying J	55	12:00	60.00	92%
1500	Powers Park	55	11:57	60.00	92%
1810	Sand Creek at mouth	55	12:39	60.00	92%
2310	Genesee Village	55	12:42	60.00	92%
2810	Pine Cliff Road	55	12:43	60.00	92%
2870	Cottonwood (Apache)	55	12:12	60.00	92%
2880	Happy Canyon at N Surrey Dr	55	12:29	60.00	92%
2940	Willow Creek - DougCnty	55	12:44	60.00	92%
3030	Bingham Lake Park	55	12:44	60.00	92%
3070	Newlin Gulch	55	12:14	60.00	92%
4090	Magnolia	55	12:26	60.00	92%
4100	Filter Plant	55	12:43	60.00	92%
4110	Betasso	55	12:57	60.00	92%
4150	Gold Hill	55	12:27	60.00	92%
4250	Geer Canyon	55	12:40	60.00	92%
4360	Justice Center	55	12:55	60.00	92%
4820	Doudy Draw	55	12:39	60.00	92%
4840	SBC@S Boulder Ditch	55	12:58	60.00	92%
120	West Woods	56	12:41	60.00	93%
330	Van Bibber @ Hwy 93	56	12:41	60.00	93%
500	Havana Park	56	12:14	60.00	93%
640	Goldsmith @ Eastman	56	12:19	60.00	93%
700	Toll Gate @ 6th	56	12:44	60.00	93%
720	Confluence Pond	56	12:12	60.00	93%
760	Mission Viejo Park	56	12:41	60.00	93%
970	Pump Sta 3	56	12:29	60.00	93%
1040	Lena @ U.S. Hwy 6	56	12:42	60.00	93%
1110	Gunbarrel	56	12:26	60.00	93%
1310	LDC at 64th	56	12:25	60.00	93%
1320	SPR at 3rd Ave	56	12:26	60.00	93%
1420	Wx-Diamond Hill	56	12:45	60.00	93%
1480	Third Creek at DIA	56	12:12	60.00	93%
1520	Wx-Marston Lake North	56	12:42	60.00	93%
1550	Lakewood CC	56	11:57	60.00	93%
1620	Slaughterhouse Glch	56	12:26	60.00	93%
2360	Indian Hills	56	12:27	60.00	93%
2950	DC Public Works	56	12:57	60.00	93%
3080	Tallman Gulch	56	12:43	60.00	93%
4020	Rio Grande	56	12:26	60.00	93%
4040	Martin Gulch	56	12:26	60.00	93%
4060	Lakeshore	56	12:11	60.00	93%
4070	Bear Peak	56	12:25	60.00	93%
4160	Sunshine	56	12:26	60.00	93%
4180	Gold Lake	56	12:13	60.00	93%
4230	Golden Age	56	12:41	60.00	93%
4260	Taylor Mountain	56	11:58	60.00	93%
4300	Big Elk Park	56	12:27	60.00	93%
4350	Conifer Hill	56	12:41	60.00	93%
150	Nott Creek	57	12:11	60.00	95%
220	Upper Leyden	57	12:27	60.00	95%
320	Sports Complex	57	11:56	60.00	95%
410	Kelly Dam	57	11:58	60.00	95%
520	Jewell Detention	57	12:30	60.00	95%
600	Harvard Gulch Park	57	12:10	60.00	95%
610	Harvard @ Jackson	57	11:57	60.00	95%
800	Sable Ditch @ 18th	57	12:11	60.00	95%
950	Piney at Liverpool	57	12:25	60.00	95%
1000	Maple Grove Resv.	57	12:40	60.00	95%
1050	Jeffco Fairgrounds	57	12:11	60.00	95%

1200	Broomfield 3207	57	12:39	60.00	95%
1340	Sanderson at Xavier	57	12:36	60.00	95%
1360	Denver Zoo	57	12:14	60.00	95%
1370	West Metro FS13	57	12:26	60.00	95%
1530	Bear Creek @ Lowell	57	12:12	60.00	95%
1570	Wx-Brighton Ditch	57	12:28	60.00	95%
1640	SPR at Union Ave.	57	12:00	60.00	95%
1800	Sand Creek Park	57	12:11	60.00	95%
1900	Niver Detention	57	12:25	60.00	95%
2350	Idledale	57	12:25	60.00	95%
3060	Fire Sta 47	57	12:13	60.00	95%
4290	Red Hill	57	12:40	60.00	95%
4340	Riverside	57	12:11	60.00	95%
4770	Wx-Cal-Wood Ranch	57	12:14	60.00	95%
4810	Shanahan Ridge	57	12:40	60.00	95%
110	Ralston Reservoir	58	12:12	60.00	97%
140	Wx-Blue Mountain	58	12:00	60.00	97%
200	Leyden Reservoir	58	12:24	60.00	97%
210	Leyden Confluence	58	12:24	60.00	97%
400	Montview Park	58	11:57	60.00	97%
420	Expo Park	58	11:58	60.00	97%
430	Utah Park	58	11:56	60.00	97%
650	Iliff Pond	58	12:12	60.00	97%
710	Horseshoe Park Drop	58	12:11	60.00	97%
810	Granby Ditch @ 6th	58	11:57	60.00	97%
860	Sand Cr at Colfax	58	12:14	60.00	97%
900	Wx-Aurora Reservoir	58	12:00	60.00	97%
1350	Chatfield COE	58	12:13	60.00	97%
1400	Upper Sloan Det.	58	12:26	60.00	97%
1440	Wx-Elbert	58	12:13	60.00	97%
1460	Wx-Urban Farm	58	12:00	60.00	97%
1720	Cherry Cr @ Steele	58	11:57	60.00	97%
1920	Wx-Brighton	58	12:13	60.00	97%
2190	Wx-Squaw Mountain	58	12:13	60.00	97%
2210	Wx-Hiwan G.C.	58	12:00	60.00	97%
2250	Rosedale	58	12:12	60.00	97%
2340	El Rancho	58	11:57	60.00	97%
2710	Wx-Highlands Ranch WTP	58	12:00	60.00	97%
2820	Haskins Gulch Conf	58	12:13	60.00	97%
2900	Russelville Gulch-Douglas	58	12:13	60.00	97%
2930	Wx-Spring Valley Rd-DougCnty	58	12:00	60.00	97%
3050	East/West Trailhead	58	12:14	60.00	97%
3090	Highland Heritage Park	58	12:13	60.00	97%
4050	Walker Ranch	58	11:58	60.00	97%
4130	Swiss Peaks	58	12:11	60.00	97%
4200	Lazy Acres	58	12:11	60.00	97%
4710	Wx-Ward C-1	58	12:00	60.00	97%
4730	Wx-Sugarloaf	58	12:00	60.00	97%
630	Temple Pond at DTC	59	11:57	60.00	98%
920	Wx-Aurora Town Hall	59	12:00	60.00	98%
940	Sampson Gulch	59	11:56	60.00	98%
1030	NREL/S. Table Mtn.	59	12:10	60.00	98%
1060	Heritage Square	59	11:57	60.00	98%
1300	Hidden Lake	59	11:57	60.00	98%
1600	Englewood Dam	59	12:11	60.00	98%
1660	SPR at Henderson	59	11:43	60.00	98%
1700	Cherry Cr @ Champa	59	12:00	60.00	98%
2330	Morrison	59	11:57	60.00	98%
2730	Wx-Salisbury Park	59	12:00	60.00	98%

2750	Wx-Castle Rock	59	12:00	60.00	98%
300	Van Bibber Park	60	11:57	60.00	100%
510	Virginia Court	60	11:57	60.00	100%
730	No Name @ Quincy	60	11:57	60.00	100%
2260	Brook Forest	60	11:58	60.00	100%
4310	Johnny Park	60	11:57	60.00	100%
2890	Spruce Mt - Douglas	119	6:01	60.00	198%
5720	Four Mile Creek	14	9:20	60.00	23%
5730	West Creek	57	12:00	60.00	95%
5740	Trail Creek	51	12:49	60.00	85%
5810	Stump Bump	57	12:15	60.00	95%
5860	Cedar Mountain	53	12:16	60.00	88%
5880	Hackett Mountain	59	12:00	60.00	98%
5940	Log Jumper	33	14:52	60.00	55%

Rain Event Performance				Analyze Rain Sensors									
		Reports Received	5,969										
	Systemwide Avg	Total Tips	6,592										
	90.55%	Data Loss	9.45%										
Rain ID	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket
2980	65%	12	8	2	0	0	0	0	22	34	12	0	0.0393701
4490	68%	28	10	1	1	1	0	0	41	60	19	0	0.0393701
4330	70%	48	6	6	0	2	0	0	62	88	26	0	0.0393701
4240	73%	16	7	1	0	0	0	0	24	33	9	0	0.0393701
4470	73%	40	9	4	1	0	0	0	54	74	20	0	0.0393701
330	76%	28	2	3	1	0	0	0	34	45	11	0	0.0393701
2820	76%	20	7	1	0	0	0	0	28	37	9	0	0.0393701
4170	76%	33	2	2	2	0	0	0	39	51	12	0	0.0393701
4060	78%	23	5	0	1	0	0	0	29	37	8	0	0.0393701
1660	79%	9	1	1	0	0	0	0	11	14	3	0	0.0393701
3090	79%	21	4	0	1	0	0	0	26	33	7	0	0.0393701
2270	80%	6	2	0	0	0	0	0	8	10	2	0	0.0393701
4790	80%	36	7	2	0	0	0	0	45	56	11	0	0.0393701
4270	80%	29	7	1	0	0	0	0	37	46	9	0	0.0393701
4510	82%	49	5	4	0	0	0	0	58	71	13	0	0.0393701
1720	82%	19	3	1	0	0	0	0	23	28	5	0	0.0393701
2950	83%	26	7	0	0	0	0	0	33	40	7	0	0.0393701
4180	83%	36	6	0	1	0	0	0	43	52	9	0	0.0393701
440	83%	13	1	1	0	0	0	0	15	18	3	0	0.0393701
650	83%	16	4	0	0	0	0	0	20	24	4	0	0.0393701
4710	83%	38	6	0	1	0	0	0	45	54	9	0	0.0393701
4810	84%	48	8	0	1	0	0	0	57	68	11	0	0.0393701
2280	84%	22	3	1	0	0	0	0	26	31	5	0	0.0393701
4520	84%	40	5	2	0	0	0	0	47	56	9	0	0.0393701
900	84%	27	4	1	0	0	0	0	32	38	6	0	0.0393699
1110	85%	29	4	1	0	0	0	0	34	40	6	0	0.0393701
2330	85%	34	7	0	0	0	0	0	41	48	7	0	0.0393701
1600	86%	16	1	1	0	0	0	0	18	21	3	0	0.0393701
2350	86%	31	4	1	0	0	0	0	36	42	6	0	0.0393701
4020	86%	31	6	0	0	0	0	0	37	43	6	0	0.0393701
950	86%	28	2	0	1	0	0	0	31	36	5	0	0.0393701
2310	86%	28	1	2	0	0	0	0	31	36	5	0	0.0393701
2960	86%	22	2	1	0	0	0	0	25	29	4	0	0.0393701
4220	86%	37	7	0	0	0	0	0	44	51	7	0	0.0393701
1360	86%	27	5	0	0	0	0	0	32	37	5	0	0.0393701
3020	86%	27	5	0	0	0	0	0	32	37	5	0	0.0393701
4290	86%	56	6	2	0	0	0	0	64	74	10	0	0.0393701
4550	87%	40	3	2	0	0	0	0	45	52	7	0	0.0393701
4770	87%	35	4	1	0	0	0	0	40	46	6	0	0.0393701
2850	87%	24	2	1	0	0	0	0	27	31	4	0	0.0393701
310	87%	30	3	1	0	0	0	0	34	39	5	0	0.0393701
1100	87%	30	3	1	0	0	0	0	34	39	5	0	0.0393701
1640	87%	29	5	0	0	0	0	0	34	39	5	0	0.0393701
700	88%	18	3	0	0	0	0	0	21	24	3	0	0.0393701
1200	88%	18	3	0	0	0	0	0	21	24	3	0	0.0393701
2870	88%	20	1	1	0	0	0	0	22	25	3	0	0.0393701
2230	88%	27	2	1	0	0	0	0	30	34	4	0	0.0393701
1480	88%	20	3	0	0	0	0	0	23	26	3	0	0.0393701
1710	88%	20	3	0	0	0	0	0	23	26	3	0	0.0393701
220	89%	42	6	0	0	0	0	0	48	54	6	0	0.0393701
600	89%	21	3	0	0	0	0	0	24	27	3	0	0.0393701
4250	89%	67	5	2	0	0	0	0	74	83	9	0	0.0393701
4080	89%	30	2	1	0	0	0	0	33	37	4	0	0.0393701
2710	89%	22	3	0	0	0	0	0	25	28	3	0	0.0393701
110	89%	37	5	0	0	0	0	0	42	47	5	0	0.0393701
4840	89%	54	4	0	1	0	0	0	59	66	7	0	0.0393701
4070	90%	38	5	0	0	0	0	0	43	48	5	0	0.0393701
3070	90%	23	3	0	0	0	0	0	26	29	3	0	0.0393701
4050	90%	23	3	0	0	0	0	0	26	29	3	0	0.0393701
4190	90%	40	3	1	0	0	0	0	44	49	5	0	0.0393701
840	90%	24	3	0	0	0	0	0	27	30	3	0	0.0393701
1310	90%	16	2	0	0	0	0	0	18	20	2	0	0.0393701
1800	90%	24	3	0	0	0	0	0	27	30	3	0	0.0393701
3060	90%	24	3	0	0	0	0	0	27	30	3	0	0.0393701
4140	90%	41	3	1	0	0	0	0	45	50	5	0	0.0393701
720	90%	17	2	0	0	0	0	0	19	21	2	0	0.0393701

1810	90%	17	2	0	0	0	0	0	19	21	2	0	0.0393701
4090	90%	34	4	0	0	0	0	0	38	42	4	0	0.0393701
2890	91%	44	3	1	0	0	0	0	48	53	5	0	0.0393701
4150	91%	43	5	0	0	0	0	0	48	53	5	0	0.0393701
1440	91%	26	3	0	0	0	0	0	29	32	3	0	0.0393701
800	91%	19	0	1	0	0	0	0	20	22	2	0	0.0393701
4750	91%	27	3	0	0	0	0	0	30	33	3	0	0.0393701
850	91%	28	3	0	0	0	0	0	31	34	3	0	0.0393701
100	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701
760	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701
4360	91%	39	4	0	0	0	0	0	43	47	4	0	0.0393701
120	92%	30	3	0	0	0	0	0	33	36	3	0	0.0393701
400	92%	22	0	1	0	0	0	0	23	25	2	0	0.0393701
410	92%	21	2	0	0	0	0	0	23	25	2	0	0.0393701
4310	92%	42	4	0	0	0	0	0	46	50	4	0	0.0393701
2320	92%	32	3	0	0	0	0	0	35	38	3	0	0.0393701
2730	92%	22	2	0	0	0	0	0	24	26	2	0	0.0393701
2840	92%	23	0	1	0	0	0	0	24	26	2	0	0.0393701
4230	92%	45	4	0	0	0	0	0	49	53	4	0	0.0393701
210	93%	23	2	0	0	0	0	0	25	27	2	0	0.0393701
1370	93%	23	2	0	0	0	0	0	25	27	2	0	0.0393701
2750	93%	24	0	1	0	0	0	0	25	27	2	0	0.0393701
2860	93%	23	2	0	0	0	0	0	25	27	2	0	0.0393701
2920	93%	47	4	0	0	0	0	0	51	55	4	0	0.0393701
610	93%	24	2	0	0	0	0	0	26	28	2	0	0.0393701
2940	93%	36	3	0	0	0	0	0	39	42	3	0	0.0393701
4820	93%	49	4	0	0	0	0	0	53	57	4	0	0.0393701
2930	93%	37	3	0	0	0	0	0	40	43	3	0	0.0393701
4040	93%	37	3	0	0	0	0	0	40	43	3	0	0.0393701
4130	93%	37	3	0	0	0	0	0	40	43	3	0	0.0393701
1000	93%	25	2	0	0	0	0	0	27	29	2	0	0.0393701
4830	93%	50	4	0	0	0	0	0	54	58	4	0	0.0393701
4200	93%	63	5	0	0	0	0	0	68	73	5	0	0.0393701
4340	93%	38	3	0	0	0	0	0	41	44	3	0	0.0393701
3030	93%	26	2	0	0	0	0	0	28	30	2	0	0.0393701
1340	94%	27	2	0	0	0	0	0	29	31	2	0	0.0393701
2880	94%	28	0	1	0	0	0	0	29	31	2	0	0.0393701
2910	94%	43	1	1	0	0	0	0	45	48	3	0	0.0393701
4030	94%	42	3	0	0	0	0	0	45	48	3	0	0.0393701
1460	94%	29	2	0	0	0	0	0	31	33	2	0	0.0393701
510	94%	30	2	0	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
1520	94%	30	2	0	0	0	0	0	32	34	2	0	0.0393701
2240	94%	31	2	0	0	0	0	0	33	35	2	0	0.0393701
4570	94%	31	2	0	0	0	0	0	33	35	2	0	0.0393701
4350	94%	47	3	0	0	0	0	0	50	53	3	0	0.0393701
1900	94%	16	1	0	0	0	0	0	17	18	1	0	0.0393701
420	95%	34	2	0	0	0	0	0	36	38	2	0	0.0393701
540	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701
640	95%	51	3	0	0	0	0	0	54	57	3	0	0.0393701
830	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701
1570	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701
4010	95%	34	2	0	0	0	0	0	36	38	2	0	0.0393701
4530	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701
4730	95%	38	2	0	0	0	0	0	40	42	2	0	0.0393701
1550	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
2260	95%	40	2	0	0	0	0	0	42	44	2	0	0.0393701
140	96%	41	2	0	0	0	0	0	43	45	2	0	0.0393701
820	96%	21	1	0	0	0	0	0	22	23	1	0	0.0393701
1500	96%	64	3	0	0	0	0	0	67	70	3	0	0.0393701
4300	96%	43	2	0	0	0	0	0	45	47	2	0	0.0393701
810	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701
870	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701
1300	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701
1330	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701
4110	96%	45	2	0	0	0	0	0	47	49	2	0	0.0393701
4260	96%	45	2	0	0	0	0	0	47	49	2	0	0.0393701
860	96%	23	1	0	0	0	0	0	24	25	1	0	0.0393701
4160	96%	47	2	0	0	0	0	0	49	51	2	0	0.0393701
1420	96%	24	1	0	0	0	0	0	25	26	1	0	0.0393701
2810	96%	24	1	0	0	0	0	0	25	26	1	0	0.0393701

940	96%	25	1	0	0	0	0	0	26	27	1	0	0.0393699
1400	96%	25	1	0	0	0	0	0	26	27	1	0	0.0393701
1320	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
3080	96%	26	1	0	0	0	0	0	27	28	1	0	0.0393701
620	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
2990	97%	27	1	0	0	0	0	0	28	29	1	0	0.0393701
300	97%	28	1	0	0	0	0	0	29	30	1	0	0.0393701
1350	97%	28	1	0	0	0	0	0	29	30	1	0	0.0393701
970	97%	29	1	0	0	0	0	0	30	31	1	0	0.0393701
1050	97%	29	1	0	0	0	0	0	30	31	1	0	0.0393701
1060	97%	30	1	0	0	0	0	0	31	32	1	0	0.0393701
3050	97%	30	1	0	0	0	0	0	31	32	1	0	0.0393701
430	97%	93	3	0	0	0	0	0	96	99	3	0	0.0393701
1030	97%	31	1	0	0	0	0	0	32	33	1	0	0.0393701
1040	97%	31	1	0	0	0	0	0	32	33	1	0	0.0393701
2900	97%	33	1	0	0	0	0	0	34	35	1	0	0.0393701
1530	97%	34	1	0	0	0	0	0	35	36	1	0	0.0393701
200	97%	37	1	0	0	0	0	0	38	39	1	0	0.0393701
2250	98%	38	1	0	0	0	0	0	39	40	1	0	0.0393701
4100	98%	39	1	0	0	0	0	0	40	41	1	0	0.0393701
2190	98%	41	1	0	0	0	0	0	42	43	1	0	0.0393701
2370	98%	45	1	0	0	0	0	0	46	47	1	0	0.0393701
630	98%	111	2	0	0	0	0	0	113	115	2	0	0.0393701
500	98%	56	1	0	0	0	0	0	57	58	1	0	0.0393701
150	100%	28	0	0	0	0	0	0	28	28	0	0	0.0393701
320	100%	27	0	0	0	0	0	0	27	27	0	0	0.0393701
520	100%	27	0	0	0	0	0	0	27	27	0	0	0.0393701
530	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
710	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
730	100%	14	0	0	0	0	0	0	14	14	0	0	0.0393701
920	100%	34	0	0	0	0	0	0	34	34	0	0	0.0393701
1010	100%	31	0	0	0	0	0	0	31	31	0	0	0.0393701
1620	100%	30	0	0	0	0	0	0	30	30	0	0	0.0393701
1700	100%	24	0	0	0	0	0	0	24	24	0	0	0.0393701
1920	100%	19	0	0	0	0	0	0	19	19	0	0	0.0393701
2210	100%	26	0	0	0	0	0	0	26	26	0	0	0.0393701
2340	100%	28	0	0	0	0	0	0	28	28	0	0	0.0393701
2360	100%	35	0	0	0	0	0	0	35	35	0	0	0.0393701
	<b>TOTAL</b>	<b>5,441</b>	<b>451</b>	<b>62</b>	<b>12</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>5,969</b>	<b>6,592</b>	<b>623</b>	<b>0</b>	
3010	85%	124	22	2	0	0	0	0	148	174	26	0	0.01
4850	84%	147	17	6	1	0	0	0	171	203	32	0	0.01
4860	83%	199	36	6	1	0	0	0	242	293	51	1	0.01
5720	71%	12	2	0	0	1	0	1	15	21	6	0	0.0393701
5730	98%	39	1	0	0	0	0	0	40	41	1	0	0.0393701
5740	96%	42	2	0	0	0	0	0	44	46	2	0	0.0393701
5810	96%	42	2	0	0	0	0	0	44	46	2	0	0.0393701
5860	89%	44	4	1	0	0	0	0	49	55	6	0	0.0393701
5880	91%	44	3	1	0	0	0	0	48	53	5	0	0.0393701
5940	79%	26	2	3	0	0	0	0	31	39	8	0	0.0393701

# 2011 Monthly ALERT Radio Traffic Summary

