

Memo



Date: September 4, 2011
To: Kevin Stewart
From: Markus Ritsch
Subject: August 2011 ALERT Data Analysis

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 August 1 through August 31, 2011.

II. General System Analysis Summary

A total of 376,550 ALERT (legacy) data reports were analyzed. Meteorological sensors account for 78 percent, water level sensors 8 percent, and rain sensors 4 percent of the total monthly records.

The system-wide radio traffic loading was 12,147 reports per day with an average hourly loading of 506 reports. The peak hourly traffic loading was 756 reports, which occurred on August 16, between 3:00 PM and 4:00 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

Rain ID	Description	Timer Performance	Event Performance
4330	Hansen Rain	0.61	0.67
2970	Rampart Range Road	0.61	0.80
4850	Porphory Mtn	0.66	0.93
2750	Castle Rock -Wx	0.67	0.93
2950	DC Public Works	0.73	0.96
2980	Dakan Road	0.84	0.66
400	Montview Park	0.95	0.66
3010	EPC at Hwy 105	0.76	0.75
2270	Cub Cr below Blue	0.90	0.75
4409	Unknown sensor ID with excessive reports		
799	Unknown sensor ID with excessive reports		
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				
1440	1440	4270	3060	700	4710	4330	4850				
4470	4470	4330	3030	540	4330	2750	2750				
1460	1460	4510	700	1710	1700	2280	2950				
140	140	1440	3090	500	4270	870	540				
1570	4490	4810	2970	710	4300	4270	2280				

*- 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	18.25	Only the 1-mm rain sensors were included in the analysis
Median	11.50	Only the 1-mm rain sensors were included in the analysis
Standard deviation	18.35	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	73.29	Only the 1-mm rain sensors were included in the analysis
Minimum total count	0	Four stations recorded no rainfall this month (410, 800, 860, 1330)
Maximum total count	117	ID 430 (Utah Park – 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					

*- 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
Murphy Creek GC	870	Large jump in count on Aug 30
Rampart Range Road	2970	Large jump due to Sutron data server connection problems.
Only two stations 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 87.1 percent. A total of 13,772 incrementing reports were received and a total of 15,811 reports were expected. The total loss of incrementing reports for the month was approximately 12.9 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				
1460	950	2970	1620	1660	4300	4300	400				
4470	1320	710	2930	810	4330	4330	4330				
4330	1330	4330	2990	650	4270	2980	2270				
2710	840	870	4330	940	2980	4490	2240				
1640	1720	1200	2950	1900	310	4790	4530				

*-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	Hr	Expected	Received	Total Load	Loss
16	15	96	84	756	12.5%
4	15	118	111	725	5.9%
16	16	53	53	706	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)	264
Total reports from unknown IDs	456
Unknown IDs with only a single received report (potential noise)	223
Total reports from all IDs – RecData Log entire month	376,550
Unknown reports as a fraction of total reports	0.12%

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				

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%					

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
4409	44
799	38
2239	14
629	11
3015	9
4299	7
1631	6
806	5
808	5
807	5
3019	5
802	5
801	5
804	5
4786	4
4416	4
4412	4
2869	4
4411	4
4414	3
2269	3
4831	3
129	3
4267	3
4259	3
4417	3
4418	3
4334	2
4397	2
4233	2
4094	2
4062	2
4031	2
2200	2
2953	2
2726	2
1039	2
8075	2
748	2
687	2
4808	2
4855	2

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	12	12:00-12:59	32
1:00-1:59	11	1:00-1:59	23
2:00-2:59	11	2:00-2:59	11
3:00-3:59	10	3:00-3:59	17
4:00-4:59	6	4:00-4:59	13
5:00-5:59	11	5:00-5:59	17
6:00-6:59	10	6:00-6:59	17
7:00-7:59	12	7:00-7:59	8
8:00-8:59	12	8:00-8:59	11
9:00-9:59	19	9:00-9:59	12
10:00-10:59	107	10:00-10:59	14
11:00-11:59	52	11:00-11:59	13

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

General System Analysis

Database Name

P:\A207-UDFCD-Data-Analysis\2011\08-2011\Novastar_extract_2011Aug.mdb

First Date in Database

8/1/11 12:00 AM

Total Days

31.0

Last Date in Database

8/31/11 11:59 PM

Total Hours

744.0

Total Records Analyzed

376,550

Records by Group

Temperature	64,875	17%
Wind Gust	64,490	17%
Relative Humidity	62,786	17%
Barometric Pressure	31,003	8%
Wind Direction	21,726	6%
Water Level PT-HSE	21,308	6%
Wind Speed Average	21,012	6%
Battery Voltage	19,718	5%
Wind Speed Average & Azimuth	17,117	5%
Precipitation	14,886	4%
Solar Radiation	9,833	3%
Fuel Temperature	5,738	2%
Fuel Moisture	5,699	2%
Water Level Float	3,908	1%
Water Level PT	3,621	1%
Soil Moisture	2,922	1%
Repeater Status Report	2,320	1%
Wind ALERT	809	0%
Water Level	765	0%
Repeater Pass List	609	0%
12Hr Status Report	519	0%
Unknown	456	0%
Hayman Battery	368	0%
Handar 585 ALARM Status	60	0%
ALERT/A2 Testing	1	0%
Repeater Battery Check	1	0%
Total	376,550	

Records by Major Group

Meteorologic Sensors	292,842	78%
Water Level Sensors	28,837	8%
Rain Sensors	14,886	4%
Soil and Fuel Sensors	14,359	4%
Sensor Status Transmissions	3,508	1%
Total	354,432	

Traffic Loading Summary

Alert Reports	376,550	
Average Daily Traffic	12,147	
Average Hourly Traffic	506	
Median Hourly Traffic	503	hour beginning
Peak Hourly Traffic	756	Aug 16, 3:00 PM
2nd Max	725	Aug 4, 3:00 PM
3rd Max	706	Aug 16, 4:00 PM
4th Max	685	Aug 3, 6:00 PM
5th Max	658	Aug 4, 4:00 PM

Rain Timer Performance

Analyze Rain Sensors

Rain ID	Description	Rcv	Interval	Exp	Performance	Comment
2970	Rampart Range Rd	38	15:12	62.00	61%	
4330	Hansen Rain	38	16:34	62.00	61%	
4850	Porphory Mtn	41	14:54	62.00	66%	
2750	Wx-Castle Rock	42	15:52	62.00	68%	
2950	DC Public Works	45	15:46	62.00	73%	
540	Parker/Mississippi	46	16:01	62.00	74%	
2280	Kinney Peak	46	12:55	62.00	74%	
3010	EPC at Hwy 105	47	14:24	62.00	76%	
3030	Bingham Lake Park	47	13:17	62.00	76%	
870	Murphy Creek GC	48	15:16	62.00	77%	
4270	Cannon Mountain	48	14:06	62.00	77%	
4510	Pinewood Springs	48	13:50	62.00	77%	
2320	Choke Cherry Resvr	50	13:54	62.00	81%	
4060	Lakeshore	50	13:34	62.00	81%	
1200	Broomfield 3207	51	13:13	62.00	82%	
2880	lappy Canyon at N Surrey [52	12:15	62.00	84%	
2980	Dakan Rd	52	12:35	62.00	84%	
4010	Cresent	52	14:02	62.00	84%	
4030	Red Garden	52	13:35	62.00	84%	
4080	Twin Sisters	52	13:18	62.00	84%	
4570	St. Antons	52	13:10	62.00	84%	
4820	Doudy Draw	52	13:34	62.00	84%	
4860	Fairview Peak	52	12:51	62.00	84%	
1040	Lena @ U.S. Hwy 6	53	12:28	62.00	85%	
1100	Louisville Rec Ctr	53	13:57	62.00	85%	
2730	Wx-Salisbury Park	53	13:52	62.00	85%	
2910	East Cherry Cr-Douglas	53	13:30	62.00	85%	
2960	Indian Creek	53	13:18	62.00	85%	
4170	Pine Brook	53	13:42	62.00	85%	
4240	Sunset	53	14:00	62.00	85%	
4490	Apple Valley	53	12:42	62.00	85%	
4520	Eagle Ridge	53	13:45	62.00	85%	
4550	Boulder Jail	53	13:25	62.00	85%	
1330	Roslyn	54	13:35	62.00	87%	
1710	Shop Creek	54	13:24	62.00	87%	
2230	Bear Cr below Cub	54	13:19	62.00	87%	
2810	Pine Cliff Road	54	13:04	62.00	87%	
4470	Little Narrows	54	13:26	62.00	87%	
4840	SBC@S Boulder Ditch	54	13:11	62.00	87%	
310	Guy Hill Ranch	55	12:43	62.00	89%	
2820	Haskins Gulch Conf	55	12:34	62.00	89%	
4040	Martin Gulch	55	13:30	62.00	89%	
4140	Logan Mill	55	12:58	62.00	89%	
4220	Fling's	55	13:03	62.00	89%	
4790	Wx-Button Rock	55	12:44	62.00	89%	
1530	Bear Creek @ Lowell	56	13:03	62.00	90%	
1810	Sand Creek at mouth	56	12:49	62.00	90%	
2250	Rosedale	56	13:16	62.00	90%	
2270	Cub Cr below Blue	56	12:48	62.00	90%	
2850	Cherry Cr bl Bayou Glch	56	12:45	62.00	90%	
2930	x-Spring Valley Rd-DougCr	56	12:31	62.00	90%	
2940	Willow Creek - DougCnty	56	12:31	62.00	90%	
2990	Wx-Tomah Rd-DougCnty	56	12:51	62.00	90%	
3080	Tallman Gulch	56	12:57	62.00	90%	

4020	Rio Grande	56	12:41	62.00	90%
4150	Gold Hill	56	12:26	62.00	90%
4180	Gold Lake	56	12:13	62.00	90%
4290	Red Hill	56	13:06	62.00	90%
4810	Shanahan Ridge	56	12:40	62.00	90%
640	Goldsmith @ Eastman	57	12:17	62.00	92%
820	ETG @ Buckley	57	12:24	62.00	92%
1110	Gunbarrel	57	12:52	62.00	92%
1500	Powers Park	57	11:57	62.00	92%
1550	Lakewood CC	57	11:57	62.00	92%
2240	Cold Sprg Glch conf	57	13:08	62.00	92%
2370	Red Rocks Park	57	12:50	62.00	92%
2860	CC at Stroh Rd	57	12:26	62.00	92%
2870	Cottonwood (Apache)	57	12:25	62.00	92%
2900	Russelville Gulch-Douglas	57	12:31	62.00	92%
4050	Walker Ranch	57	12:12	62.00	92%
4070	Bear Peak	57	12:54	62.00	92%
4090	Magnolia	57	12:40	62.00	92%
4300	Big Elk Park	57	10:52	62.00	92%
4530	Winiger Ridge	57	12:41	62.00	92%
4730	Wx-Sugarloaf	57	12:28	62.00	92%
4830	SBC @ San Souci	57	12:37	62.00	92%
140	Wx-Blue Mountain	58	12:41	62.00	94%
420	Expo Park	58	12:34	62.00	94%
650	Iliff Pond	58	12:23	62.00	94%
810	Granby Ditch @ 6th	58	12:48	62.00	94%
940	Sampson Gulch	58	12:23	62.00	94%
1030	NREL/S. Table Mtn.	58	12:35	62.00	94%
1480	Third Creek at DIA	58	12:37	62.00	94%
1620	Slaughterhouse Glch	58	12:25	62.00	94%
1720	Cherry Cr @ Steele	58	12:36	62.00	94%
2350	Idledale	58	12:38	62.00	94%
3020	Wx-West Creek WX	58	12:14	62.00	94%
3050	East/West Trailhead	58	12:28	62.00	94%
3070	Newlin Gulch	58	12:27	62.00	94%
4160	Sunshine	58	12:25	62.00	94%
4190	Slaughterhouse	58	12:12	62.00	94%
4200	Lazy Acres	58	12:24	62.00	94%
4250	Geer Canyon	58	12:25	62.00	94%
4360	Justice Center	58	12:25	62.00	94%
4710	Wx-Ward C-1	58	12:16	62.00	94%
150	Nott Creek	59	12:26	62.00	95%
200	Leyden Reservoir	59	12:22	62.00	95%
220	Upper Leyden	59	12:25	62.00	95%
300	Van Bibber Park	59	12:22	62.00	95%
400	Montview Park	59	12:22	62.00	95%
430	Utah Park	59	11:56	62.00	95%
610	Harvard @ Jackson	59	12:10	62.00	95%
720	Confluence Pond	59	12:11	62.00	95%
850	Flying J	59	11:51	62.00	95%
1000	Maple Grove Resv.	59	12:23	62.00	95%
1010	Denver West	59	12:36	62.00	95%
1050	Jeffco Fairgrounds	59	12:10	62.00	95%
1300	Hidden Lake	59	12:12	62.00	95%
1310	LDC at 64th	59	12:36	62.00	95%
1320	SPR at 3rd Ave	59	12:35	62.00	95%
1400	Upper Sloan Det.	59	12:23	62.00	95%
1460	Wx-Urban Farm	59	12:25	62.00	95%
1600	Englewood Dam	59	12:24	62.00	95%

1800	Sand Creek Park	59	12:22	62.00	95%
1900	Niver Detention	59	12:23	62.00	95%
2260	Brook Forest	59	11:58	62.00	95%
2310	Genesee Village	59	12:24	62.00	95%
2340	El Rancho	59	12:10	62.00	95%
2840	Sulphur Gulch	59	12:13	62.00	95%
3060	Fire Sta 47	59	12:26	62.00	95%
3090	Highland Heritage Park	59	12:14	62.00	95%
4230	Golden Age	59	12:25	62.00	95%
4310	Johnny Park	59	12:12	62.00	95%
4340	Riverside	59	12:11	62.00	95%
4750	Wx-Louisville Lake	59	12:13	62.00	95%
110	Ralston Reservoir	60	11:57	62.00	97%
120	West Woods	60	12:10	62.00	97%
330	Van Bibber @ Hwy 93	60	12:23	62.00	97%
410	Kelly Dam	60	12:10	62.00	97%
440	Fire Station #7	60	12:10	62.00	97%
500	Havana Park	60	11:56	62.00	97%
510	Virginia Court	60	12:15	62.00	97%
530	Fire Station #19	60	12:21	62.00	97%
620	Quincy/Highline	60	12:09	62.00	97%
700	Toll Gate @ 6th	60	12:12	62.00	97%
710	Horseshoe Park Drop	60	12:10	62.00	97%
750	Wx-Quincy Reservoir	60	12:23	62.00	97%
840	Fire Station 12	60	12:12	62.00	97%
860	Sand Cr at Colfax	60	12:12	62.00	97%
950	Piney at Liverpool	60	12:10	62.00	97%
970	Pump Sta 3	60	12:13	62.00	97%
1060	Heritage Square	60	12:22	62.00	97%
1340	Sanderson at Xavier	60	12:12	62.00	97%
1350	Chatfield COE	60	12:13	62.00	97%
1360	Denver Zoo	60	12:00	62.00	97%
1420	Wx-Diamond Hill	60	12:00	62.00	97%
1440	Wx-Elbert	60	12:13	62.00	97%
1520	Wx-Marston Lake North	60	12:12	62.00	97%
1570	Wx-Brighton Ditch	60	12:13	62.00	97%
1640	SPR at Union Ave.	60	12:12	62.00	97%
1700	Cherry Cr @ Champa	60	12:00	62.00	97%
1920	Wx-Brighton	60	12:12	62.00	97%
2190	Wx-Squaw Mountain	60	12:00	62.00	97%
4110	Betasso	60	11:59	62.00	97%
4130	Swiss Peaks	60	11:57	62.00	97%
4350	Conifer Hill	60	12:11	62.00	97%
100	Carr Street	61	12:09	62.00	98%
210	Leyden Confluence	61	11:57	62.00	98%
320	Sports Complex	61	12:09	62.00	98%
600	Harvard Gulch Park	61	12:09	62.00	98%
730	No Name @ Quincy	61	11:57	62.00	98%
760	Mission Viejo Park	61	12:10	62.00	98%
830	Side Creek Park	61	11:57	62.00	98%
920	Wx-Aurora Town Hall	61	12:00	62.00	98%
1370	West Metro FS13	61	11:57	62.00	98%
1660	SPR at Henderson	61	12:09	62.00	98%
2210	Wx-Hiwan G.C.	61	12:00	62.00	98%
2330	Morrison	61	11:57	62.00	98%
2360	Indian Hills	61	11:57	62.00	98%
2710	Wx-Highlands Ranch WTP	61	12:00	62.00	98%
2920	West Cherry Head-Douglas C	61	12:00	62.00	98%
4100	Filter Plant	61	11:59	62.00	98%

4770	Wx-Cal-Wood Ranch	61	12:00	62.00	98%	
520	Jewell Detention	62	11:57	62.00	100%	
4260	Taylor Mountain	62	11:51	62.00	100%	
900	Wx-Aurora Reservoir	63	11:40	62.00	102%	
630	Temple Pond at DTC	68	8:52	62.00	110%	
800	Sable Ditch @ 18th	94	7:43	62.00	152%	
2890	Spruce Mt - Douglas	114	6:24	62.00	184%	
5720	Four Mile Creek	22	1:36	62.00	35%	Hayman Burn
5730	West Creek	58	12:32	62.00	94%	Hayman Burn
5740	Trail Creek	60	12:14	62.00	97%	Hayman Burn
5810	Stump Bump	55	13:07	62.00	89%	Hayman Burn
5860	Cedar Mountain	58	12:30	62.00	94%	Hayman Burn
5880	Hackett Mountain	57	12:14	62.00	92%	Hayman Burn
5940	Log Jumper	36	18:12	62.00	58%	Hayman Burn

Rain Event Performance		Reports Received	2,902	Analyze Rain Sensors										
	Systemwide Avg	Total Tips	3,103											
	93.52%	Data Loss	6.48%											
Rain ID	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold-off	Bucket	
2980	66%	30	16	5	0	0	0	0	51	77	26	0	0.0393701	
400	67%	1	1	0	0	0	0	0	2	3	1	0	0.0393701	
4330	67%	5	2	1	0	0	0	0	8	12	4	0	0.0393701	
2270	75%	32	3	5	0	0	0	0	40	53	13	0	0.0393701	
2240	76%	10	2	1	0	0	0	0	13	17	4	0	0.0393701	
4530	77%	20	6	1	0	0	0	0	27	35	8	0	0.0393701	
4550	78%	5	2	0	0	0	0	0	7	9	2	0	0.0393701	
610	80%	3	1	0	0	0	0	0	4	5	1	0	0.0393701	
2970	80%	22	0	1	0	1	0	1	24	30	6	0	0.0393701	
4010	80%	20	2	2	0	0	0	0	24	30	6	0	0.0393701	
4190	83%	13	1	1	0	0	0	0	15	18	3	0	0.0393701	
4510	84%	23	3	1	0	0	0	0	27	32	5	0	0.0393701	
2340	85%	10	0	1	0	0	0	0	11	13	2	0	0.0393701	
2820	85%	38	6	1	0	0	0	0	45	53	8	0	0.0393701	
1200	86%	5	1	0	0	0	0	0	6	7	1	0	0.0393701	
4490	86%	5	1	0	0	0	0	0	6	7	1	0	0.0393701	
4710	87%	30	3	1	0	0	0	0	34	39	5	0	0.0393701	
200	88%	6	1	0	0	0	0	0	7	8	1	0	0.0393701	
870	88%	6	1	0	0	0	0	1	7	8	1	0	0.0393701	
4110	88%	6	1	0	0	0	0	0	7	8	1	0	0.0393701	
310	88%	20	1	1	0	0	0	0	22	25	3	0	0.0393701	
2210	88%	13	2	0	0	0	0	0	15	17	2	0	0.0393701	
4030	88%	26	4	0	0	0	0	0	30	34	4	0	0.0393701	
120	89%	7	1	0	0	0	0	0	8	9	1	0	0.0393701	
1570	89%	7	1	0	0	0	0	0	8	9	1	0	0.0393701	
4360	89%	7	1	0	0	0	0	0	8	9	1	0	0.0393701	
4820	89%	16	0	1	0	0	0	0	17	19	2	0	0.0393701	
4080	90%	25	1	1	0	0	0	0	27	30	3	0	0.0393701	
2230	90%	17	2	0	0	0	0	0	19	21	2	0	0.0393701	
4180	90%	17	2	0	0	0	0	0	19	21	2	0	0.0393701	
2890	91%	45	2	0	1	0	0	0	48	53	5	0	0.0393701	
4040	91%	26	3	0	0	0	0	0	29	32	3	0	0.0393701	
4020	91%	18	2	0	0	0	0	0	20	22	2	0	0.0393701	
4230	91%	9	1	0	0	0	0	0	10	11	1	0	0.0393701	
4290	91%	9	1	0	0	0	0	0	10	11	1	0	0.0393701	
4050	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701	
900	92%	10	1	0	0	0	0	0	11	12	1	0	0.0393699	
1480	92%	20	2	0	0	0	0	0	22	24	2	0	0.0393701	
3070	92%	10	1	0	0	0	0	0	11	12	1	0	0.0393701	
2730	92%	11	1	0	0	0	0	0	12	13	1	0	0.0393701	
2930	92%	46	2	1	0	0	0	0	49	53	4	0	0.0393701	
2750	93%	35	1	1	0	0	0	0	37	40	3	0	0.0393701	
2920	93%	49	2	1	0	0	0	0	52	56	4	0	0.0393701	
3030	93%	25	2	0	0	0	0	0	27	29	2	0	0.0393701	
2850	93%	26	2	0	0	0	0	0	28	30	2	0	0.0393701	
4130	93%	13	1	0	0	0	0	0	14	15	1	0	0.0393701	
4160	93%	13	1	0	0	0	0	0	14	15	1	0	0.0393701	
4270	93%	13	1	0	0	0	0	0	14	15	1	0	0.0393701	
2960	94%	27	2	0	0	0	0	0	29	31	2	0	0.0393701	
2710	94%	14	1	0	0	0	0	0	15	16	1	0	0.0393701	
2990	94%	70	5	0	0	0	0	0	75	80	5	0	0.0393701	
2810	94%	44	3	0	0	0	0	0	47	50	3	0	0.0393701	
4090	94%	15	1	0	0	0	0	0	16	17	1	0	0.0393701	
4570	94%	31	2	0	0	0	0	0	33	35	2	0	0.0393701	
500	94%	47	3	0	0	0	0	0	50	53	3	0	0.0393701	
2280	94%	16	1	0	0	0	0	0	17	18	1	0	0.0393701	
2860	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701	
4150	95%	17	1	0	0	0	0	0	18	19	1	0	0.0393701	
2900	95%	53	3	0	0	0	0	0	56	59	3	0	0.0393701	
2190	95%	37	2	0	0	0	0	0	39	41	2	0	0.0393701	
2910	95%	57	1	1	0	0	0	0	59	62	3	0	0.0393701	
4220	95%	19	1	0	0	0	0	0	20	21	1	0	0.0393701	
2950	96%	41	2	0	0	0	0	0	43	45	2	0	0.0393701	
4810	96%	21	1	0	0	0	0	0	22	23	1	0	0.0393701	
4070	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701	
4260	96%	22	1	0	0	0	0	0	23	24	1	0	0.0393701	

4060	96%	23	1	0	0	0	0	0	24	25	1	0	0.0393701
1500	96%	70	3	0	0	0	0	0	73	76	3	0	0.0393701
3020	97%	55	2	0	0	0	0	0	57	59	2	0	0.0393701
4300	97%	28	1	0	0	0	0	0	29	30	1	0	0.0393701
2940	98%	44	1	0	0	0	0	0	45	46	1	0	0.0393701
2260	98%	60	1	0	0	0	0	0	61	62	1	0	0.0393701
630	99%	107	1	0	0	0	0	0	108	109	1	0	0.0393701
100	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
110	100%	11	0	0	0	0	0	0	11	11	0	0	0.0393701
140	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
150	100%	20	0	0	0	0	0	0	20	20	0	0	0.0393701
210	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
220	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
300	100%	6	0	0	0	0	0	0	6	6	0	0	0.0393701
320	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701
330	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
420	100%	25	0	0	0	0	0	0	25	25	0	0	0.0393701
430	100%	117	0	0	0	0	0	0	117	117	0	0	0.0393701
440	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701
510	100%	17	0	0	0	0	0	0	17	17	0	0	0.0393701
520	100%	6	0	0	0	0	0	0	6	6	0	0	0.0393701
530	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701
540	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701
600	100%	4	0	0	0	0	0	0	4	4	0	1	0.0393701
620	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701
640	100%	25	0	0	0	0	0	0	25	25	0	0	0.0393701
650	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701
700	100%	3	0	0	0	0	0	0	3	3	0	2	0.0393701
710	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
720	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
730	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
750	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
760	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
810	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
820	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
830	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701
840	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
850	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
920	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701
940	100%	9	0	0	0	0	0	0	9	9	0	0	0.0393699
950	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701
970	100%	19	0	0	0	0	0	0	19	19	0	0	0.0393701
1000	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1010	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1030	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
1040	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701
1050	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1060	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701
1100	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1110	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1300	100%	15	0	0	0	0	0	0	15	15	0	0	0.0393701
1310	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1320	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1340	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701
1350	100%	20	0	0	0	0	0	0	20	20	0	0	0.0393701
1360	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1370	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
1400	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701
1420	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
1440	100%	27	0	0	0	0	0	0	27	27	0	0	0.0393701
1460	100%	2	0	0	0	0	0	0	2	2	0	1	0.0393701
1520	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
1530	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
1550	100%	32	0	0	0	0	0	0	32	32	0	0	0.0393701
1600	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
1620	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701
1640	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
1660	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
1700	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701
1710	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
1720	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701

1800	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701
1900	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701
2250	100%	27	0	0	0	0	0	0	27	27	0	0	0.0393701
2310	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
2320	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701
2330	100%	12	0	0	0	0	0	0	12	12	0	0	0.0393701
2350	100%	10	0	0	0	0	0	0	10	10	0	0	0.0393701
2360	100%	17	0	0	0	0	0	0	17	17	0	0	0.0393701
2370	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701
2840	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
2870	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701
2880	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
3050	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
3060	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
3080	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
3090	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
4100	100%	8	0	0	0	0	0	0	8	8	0	1	0.0393701
4140	100%	11	0	0	0	0	0	0	11	11	0	0	0.0393701
4170	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701
4200	100%	17	0	0	0	0	0	0	17	17	0	0	0.0393701
4240	100%	12	0	0	0	0	0	0	12	12	0	0	0.0393701
4250	100%	17	0	0	0	0	0	0	17	17	0	0	0.0393701
4310	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
4340	100%	12	0	0	0	0	0	0	12	12	0	0	0.0393701
4350	100%	11	0	0	0	0	0	0	11	11	0	0	0.0393701
4470	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701
4520	100%	6	0	0	0	0	0	0	6	6	0	0	0.0393701
4730	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701
4750	100%	6	0	0	0	0	0	0	6	6	0	0	0.0393701
4770	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
4790	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701
4830	100%	14	0	0	0	0	0	0	14	14	0	0	0.0393701
4840	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
Total		2,734	138	28	1	1	0	2	2,902	3,103	201	5	
4850	93%	49	4	0	0	0	0	0	53	57	4	1	0.01
3010	75%	127	24	5	2	2	1	1	161	214	53	0	0.01
4860	81%	42	6	3	0	0	0	0	51	63	12	0	0.01
5720	76%	36	9	0	2	0	0	1	47	62	15	0	0.0393701
5730	93%	80	6	0	0	0	0	0	86	92	6	0	0.0393701
5740	93%	62	3	1	0	0	0	0	66	71	5	0	0.0393701
5810	91%	52	6	0	0	0	0	0	58	64	6	0	0.0393701
5860	92%	51	3	1	0	0	0	0	55	60	5	0	0.0393701
5880	91%	81	5	2	0	0	0	0	88	97	9	0	0.0393701
5940	77%	35	3	0	0	1	1	0	40	52	12	0	0.0393701

2011 Monthly ALERT Radio Traffic Summary

