

# Memo

**Date:** August 9, 2013  
**To:** Kevin Stewart  
**From:** Markus Ritsch  
**Subject:** July 2013 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 5.0 base station were analyzed for the period July 1 through July 31, 2013.

## II. General System Analysis Summary

In 2013 the District will upgrade the telemetry backbone from legacy ALERT (A1) to the new A2 protocol. As the season progresses, the A1 feed from outlying repeaters to the District base station at Diamond Hill will terminate and all data will be received as A2. The following table quantifies the data reception throughout the conversion of the telemetry system as the season progresses. As of January 29, 2013, the West Creek repeater in Douglas County processes both incoming data on A1 and A2 but passes on only A2 format messages to Diamond Hill.

**Table 1. Reception of A1/A2 Data at Diamond Hill**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Legacy	321,136	218,368	264,984	243,044	318,423	342,585	269,475					
Concentrator	304,067	319,089	379,891	381,523	571,616	686,278	538,090					
ALERT2	--	--	16,450	47,415	88,786	113,822	97,216					
<b>TOTAL</b>	<b>625,203</b>	<b>537,457</b>	<b>661,325</b>	<b>671,982</b>	<b>978,825</b>	<b>1,142,685</b>	<b>904,781</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Conc+A2	--	--	396,341	428,938	660,402	800,100	635,306					

In 2013, WET will analyze only the concentrator and A2 data each month going forward since only the concentrator and A2 data received at Diamond Hill represents a complete dataset.

The District base is still receiving many duplicate reports which accounts for the large number of total reports. For example:

08/06/2013 22:03:35 Device: 1640 Data: 76 Line: 2 (ALERT 2 Concentrator)  
08/06/2013 22:03:35 Device: 1640 Data: 76 Line: 2 (ALERT 2 Concentrator)  
08/06/2013 22:03:36 Device: 1640 Data: 76 Line: 1 (Legacy)  
08/06/2013 22:03:36 Device: 1640 Data: 76 Line: 1 (Legacy)

### A. Performance of New A2 Sites

Currently there are only a handful of remote sites operating on the new A2 protocol. The "event" performance of these sites will be tracked throughout the 2013 flood season.

**Table 2. Event Performance of New A2 Sites**

Description	ID	Install Date	Apr	May	Jun	Jul	Aug	Sep	Oct	
Heritage Regional Park	3090	03/14/2013	100%	93%	100%	91%				
ETG @ Hampden	100110	05/01/2013	--	100%	100%	100%				
Blackstone	100100	05/03/2013	--	100%	100%	100%				
Newlin Gulch	3070	05/24/2013	--	--	51%	50%				
Carr Street	100	05/31/2013	--	--	36%	85%				
Maple Grove	1000	05/20/2013	--	--	67%	95%				

## ***B. Specific Issues Identified this Month***

Performance of the following sensors (Table 3) was questionable this month.

**Table 3. Sensors with Poor Performance Characteristics**

Sensor ID	Description	Timer	Event	Comments
730	No Name at Quincy	95%	--	Recorded zero tips for entire month
2190	Squaw Mountain	16%	--	Recorded zero tips for entire month
1480	DIA at Third Creek	13%	--	Recorded zero tips for entire month
840	Aurora FS 12	40%	35%	Poor timer/event performance
1481, 1482, 1486, 1487	Unknown sensor IDs possibly coming from DIA at 3 <sup>rd</sup> Street			
1604, 1606, 1607, 1602, 1608, 1601	Unknown sensor IDs coming possibly coming from Englewood Dam			
644, 642	Unknown sensor IDs possibly coming from Goldsmith/Eastman			

Last month a problem existed with the A2 data packets emanating from Carr Street (100) and Maple Grove Reservoir (1000). Both of these sites are using a CR1000 logger and the Tipping Bucket Report (TBR) format but the tip reports within the A2 data packet were not in the correct order. This problem has been resolved by OneRain with the release of an updated OS by CSI and both sites are reporting as expected.

Newlin Gulch is using a CR850 logger and the General Sensor Report (GSR) format but is not able to package multiple GSR reports into a single data packet. It seems the transmitter is sending only one GSR rain report per frame causing missed tips when multiple tips occur within the same frame. An updated OS for the CR850 will be installed by WET this month.

Highland Heritage Regional Park (ID 3090) is using a HydroLynx 5096 with the A2 upgrade kit. Tips are missed at the base from this site. WET is currently investigating the cause of these missed tips.

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

The NS5 base station was **NOT** in continuous operation for the entire month. The base station was down on July 1 from 12:09:29 AM to 10:58:43 AM. Neither legacy nor A2 messages were received during this period. NS5 was rebooted on July 1 at 11:00 AM. The cause of this outage was evident in the NS5 syslog file which showed the USGS polling program had hung on an internet connection to the USGS site at 07/01/2013 00:00:04. The polling started at 00:00:00 and one site was successfully polled at 00:00:02 but the second site polled at 00:00:04 hung. Then every minute after another polling program was started and hung in memory. This continued until all resources (ports, memory, etc.) were used up and the entire system went down.

To prevent this from occurring again, Dave Leader added a health check to NS5 that looks for more than one occurrence of the USGS polling program. The health check runs every minute. If more than one instance is in memory, then something is wrong. The cleanup action is to kill all USGS polling programs. USGS data collection will be down until the network problem is corrected but it will not affect other data collection.

Additionally, WET is working to develop a separate data collection service to poll state and federal data sources including USGS, DWR, NRCS, NOAA. With this process, the data polling can be off-loaded from NS5 and handled in a separate program. The polled data will be visible within the gmap display but it will not be stored within NS5.

A second base station outage was discovered by WET on July 24, 2013 that affected A2 data concentrator packets only. The A2 data collection was down from July 18 through July 24 when a new A2 station was defined and its water level sensor was accidentally associated with the wrong station. The problem was fixed when the water level sensor was associated with the proper station. Since all sites in Douglas County are received only via A2 concentrator, the reporting statistics this month are lower for the Douglas County sites. Sites in the remainder of the District are received both via A2 concentrator and legacy.

### 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 4).

**Table 4. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)**

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
4470	4470	2790	1200	3070	2710	1480					
3070	4550	4550	840	2800	840	2190					
1660	4870	2710	800	840	4350	840					
2790	2790	4870	4330	1700	2790	1660					
4870	4490	4270	2360	2790	5940	3010					
2320	4510	4190	620	100100	1660	3090					

\*- 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 5). 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 5. District-Wide Total Tip/Count Statistical Summary**

Statistical Parameter	Value	Comments
Mean	52.33	Only the 1-mm rain sensors were included in the analysis
Median	51	Only the 1-mm rain sensors were included in the analysis
Standard deviation	25.89	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	130	Only the 1-mm rain sensors were included in the analysis
Minimum total count	1	Kelly Dam (410)
Maximum total count	122	Gold Hill (4150)

#### B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 6).

**Table 6. Monthly Summary of District-Wide Mean Total 1-mm Tip/Count**

Year	Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*	Ave
2006	4.62	5.92	18.39	20.47	19.44	13.75	74.03	46.89	24.17	41.13	5.04	16.45	24.19
2007	11.56	5.40	29.75	65.03	68.30	15.87	36.20	46.38	22.13	29.50	6.54	11.29	29.00
2008	4.05	7.38	12.26	20.57	54.82	26.06	16.43	90.20	37.54	19.59	2.82	9.24	25.08
2009	6.33	3.11	11.37	59.26	63.45	68.00	65.00	20.00	27.29	30.24	11.00	5.60	30.89
2010	5.97	11.90	32.54	70.57	39.63	56.04	50.23	31.01	4.18	18.31	8.30	3.31	27.67
2011	6.78	7.45	7.54	33.94	92.68	39.42	90.87	18.25	37.67	25.73	10.41	13.59	32.03
2012	4.89	13.57	2.35	30.17	38.97	19.35	73.03	11.31	48.81	22.32	2.98	4.18	22.66
2013	2.96	14.31	21.86	35.96	45.87	16.39	52.33						

\*- 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 7).

**Table 7. Sensors with a Jump of 6 or More in Sequential Count**

Sensor Description	Sensor ID	Comment
Fire Station 12	840	Three jumps occurred during heavy rain periods on July 13, July 15, July 20
East/West Trail Head	3050	Intermittent transmissions received on id 3050 (maybe a battery)

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

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 93 percent. A total of 9,474 incrementing reports were received and a total of 10,177 reports were expected. The total loss of incrementing reports for the month was approximately 7 percent. Those sensors with the worst event transmission performance are summarized (Table 8).

**Table 8. Monthly Summary of Sensors with the Most Missed Tips**

Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct*	Nov*	Dec*
4470	4510	4270	1200	4470	100	840					
2330	2930	4490	840	5900	4470	3070					
2980	4470	4790	4330	2980	1000	2980					
1660	2980	4510	4100	2790	500	1700					
--	2730	4320	4270	840	1660	2790					
--	4790	4870	2980	4060	3070	2730					

\*-Only sensors that are operational year-round (weather stations and stations in Boulder County) are included for the analysis in these months.

Sensors identified as having poor event performance in multiple months are shaded with unique colors. A developing trend can thus be identified from the color shading as the year progresses.

## V. Heavy Radio Traffic Analysis

Periods exceeding 1,000 messages per hour are analyzed independently in an attempt to quantify data loss rates from rain sensors using their sequential tip count series.

### A. The Heaviest Hourly Traffic Periods This Month

The hourly periods of highest radio traffic this month are shown (Table 9). The five heaviest hours of radio traffic are analyzed to quantify the number of missing rain reports for that hour.

**Table 9. Periods of Heavy Radio Traffic**

Day	Hour	Expected	Received	Total Load	Loss
13	18	441	424	2,486	3.85%
13	17	637	604	2,334	5.18%
15	12	309	309	1,803	0.00%
15	13	75	75	1,776	0.00%
13	19	68	68	1,580	0.00%

## 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 10).

**Table 10. Summary of Unknown IDs**

Description	Quantity
Total number of unknown IDs (IDs without a device definition)	726
Total reports from unknown IDs	5,230
Unknown IDs with only a single received report (potential noise)	517
Total reports from all IDs – RecData Log entire month	635,306
Unknown reports as a fraction of total reports	0.82%

The total number of reports from unknown sensors is very small relative to the total reports received for the month. Shown below (Table 11) are the total reports received from unknown sensor IDs for each month of the year.

**Table 11. Monthly Summary of Total Reports from Unknown IDs**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	1,220	1,474	1,276	1,174	721	5,707	610	1,738	442	533	2,857	6,396
2011	1,231	2,165	3,065	1,254	2,051	439	489	456	191	683	747	861
2012	692	750	1,575	977	5,469	11,016	453	683	774	2,657	3,854	5,466
2013	4,265	994	1,100	2,589	3,623	6,973	5,230					

The fraction of reports from unknown sensors relative to the total number of reports is shown below (Table 12).

**Table 12. Monthly Percent of Unknown Sensor Reports**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	0.42%	0.56%	0.38%	0.32%	0.20%	1.61%	0.17%	0.49%	0.13%	0.16%	0.93%	1.88%
2011	0.39%	0.73%	0.90%	0.37%	0.58%	0.12%	0.12%	0.05%	0.12%	0.18%	0.22%	0.26%
2012	0.30%	0.25%	0.43%	0.26%	1.37%	2.74%	0.11%	0.18%	0.20%	0.72%	1.15%	1.62%
2013	1.40%	0.31%	0.29%	0.60%	0.37%	0.61%	0.82%					

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 13).

**Table 13. Reports Received by Unknown IDs**

Unknown ID	Reports	Comment
1481	529	Unknown ID – DIA at Third Creek?
1482	519	Unknown ID – DIA at Third Creek?
1486	455	Unknown ID – DIA at Third Creek?
1487	445	Unknown ID – DIA at Third Creek?
1604	366	Unknown ID – Englewood Dam?
1606	354	Unknown ID – Englewood Dam?
1607	306	Unknown ID – Englewood Dam?
1602	279	Unknown ID – Englewood Dam?
1608	263	Unknown ID – Englewood Dam?
1601	219	Unknown ID – Englewood Dam?
644	62	Unknown ID – Goldsmith/Eastman?
642	61	Unknown ID – Goldsmith/Eastman?

## VII. Sensors with Invalid Reports

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

Sensor ID	Description	Bad Reports	Comments
1613	Holly Dam	46	Changed validation criteria on NS5 base to eliminate all the invalid reports
1483	Third Cr at DIA	125	Station is out of service
953	Piney at Liverpool	953	Many negative stage values resulting in invalid data.....changed RL to match OneRain
3050	East/West Trailhead	8	Sequential months showing numerous invalid reports
2210	Wx-Hiwan G.C.	10	Sequential months showing numerous invalid reports
750	Wx-Quincy Reservoir	9	

## VIII. Rainfall Alarms and Intensity Analysis

The following rainfall rate alarms from the Urban Drainage and Flood Control District NovaStar 5.0 Web Server were identified this month.

Urban Drainage and Flood Control District  
ALERT Web Server

#	ID	Description	Type	Date
1	5720	Four Mile Creek Precipitation-DG	Hayman 30 minute rainfall	7/7/2013 15:08
2	5860	Cedar Mountain Precipitation-TL	Hayman 30 minute rainfall	7/7/2013 15:15
3	2790	West Cherry Creek Precipitation-DG	Douglas County 10 minute rainfall	7/7/2013 15:48
4	2790	West Cherry Creek Precipitation-DG	Douglas County 1 hour rainfall	7/7/2013 16:04
5	2230	Bear Creek below Cub Creek Precipitation-JF	Jefferson County 10 minute rainfall	7/10/2013 12:41
6	4150	Gold Hill Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/12/2013 14:06
7	4150	Gold Hill Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/12/2013 14:16
8	4320	Lee Hill Rain Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/12/2013 15:01
9	4160	Sunshine Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/12/2013 15:07
10	5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/13/2013 15:34
11	310	Guy Hill Ranch Precipitation-JF	Jefferson County 10 minute rainfall	7/13/2013 16:38
12	1460	Urban Farm Precipitation	Plains 10 minute rainfall	7/13/2013 16:40
13	1460	Urban Farm Precipitation	Plains 1 hour rainfall	7/13/2013 16:51
14	310	Guy Hill Ranch Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:02
15	300	Van Bibber Park Precipitation-JF	Jefferson County 10 minute rainfall	7/13/2013 17:09
16	300	Van Bibber Park Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:15
17	2270	Cub Creek below Blue Creek Precipitation-JF	Jefferson County 10 minute rainfall	7/13/2013 17:16
18	1000	Maple Grove Reservoir Precipitation-JF	Jefferson County 10 minute rainfall	7/13/2013 17:18
19	2280	Kinney Peak Precipitation-JF	Jefferson County 10 minute rainfall	7/13/2013 17:25
20	1000	Maple Grove Reservoir Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:26
21	2280	Kinney Peak Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:28
22	1400	Upper Sloan Detention Precipitation-JF	Jefferson County 10 minute rainfall	7/13/2013 17:32
23	1030	NREL/South Table Mountain Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:34

24	2270	Cub Creek below Blue Creek Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:36
25	1050	Jeffco Fairgrounds Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:43
26	1400	Upper Sloan Detention Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:47
27	2370	Red Rocks Park Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:47
28	1550	Lakewood CC Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:53
29	1550	Lakewood CC Precipitation-JF	Jefferson County 10 minute rainfall	7/13/2013 17:54
30	1010	Denver West Precipitation-JF	Jefferson County 1 hour rainfall	7/13/2013 17:55
31	1360	Denver Zoo Precipitation-DN	Plains 10 minute rainfall	7/13/2013 17:57
32	1460	Urban Farm Precipitation	Plains 10 minute rainfall	7/13/2013 18:38
33	530	Fire Station #19 Precipitation-DN	Plains 1 hour rainfall	7/13/2013 18:40
34	600	Harvard Gulch Park Precipitation-DN	Plains 1 hour rainfall	7/13/2013 18:42
35	1360	Denver Zoo Precipitation-DN	Plains 1 hour rainfall	7/13/2013 18:47
36	610	Harvard Gulch @ Jackson Precipitation-DN	Plains 1 hour rainfall	7/13/2013 18:53
37	2820	East Plum Creek at Haskins Gulch Precipitation-DG	Douglas County 10 minute rainfall	7/14/2013 19:48
38	310	Guy Hill Ranch Precipitation-JF	Jefferson County 10 minute rainfall	7/14/2013 21:08
39	2970	Rampart Range Road Precipitation-DG	2970 Rampart Range Road 0.2" in 30 Minutes Rainfall	7/14/2013 21:15
40	4150	Gold Hill Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/14/2013 21:21
41	4180	Gold Lake Precipitation-BO	Boulder County 10 minute rainfall	7/14/2013 21:23
42	4180	Gold Lake Precipitation-BO	FMC-BA 0.75" in 1 Hour Rainfall	7/14/2013 21:25
43	4150	Gold Hill Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/14/2013 21:37
44	4180	Gold Lake Precipitation-BO	Boulder County 1 hour rainfall	7/14/2013 21:39
45	4530	Winiger Ridge Precipitation-BO	Boulder County 10 minute rainfall	7/14/2013 21:43
46	4570	St. Antons Precipitation-BO	Boulder County 10 minute rainfall	7/14/2013 21:47
47	4240	Sunset Precipitation-BO	FMC-BA 0.75" in 1 Hour Rainfall	7/14/2013 21:55
48	4340	Riverside Precipitation-BO	Boulder County 1 hour rainfall	7/14/2013 21:57
49	4220	Fling's Precipitation-BO	Boulder County 1 hour rainfall	7/14/2013 22:06
50	4220	Fling's Precipitation-BO	Boulder County 10 minute rainfall	7/14/2013 22:07
51	4240	Sunset Precipitation-BO	Boulder County 1 hour rainfall	7/14/2013 22:10
52	4260	Taylor Mountain Precipitation-BO	Boulder County 1 hour rainfall	7/14/2013 22:32
53	4320	Lee Hill Rain Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/14/2013 23:00
54	4320	Lee Hill Rain Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/14/2013 23:09
55	4160	Sunshine Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/14/2013 23:12
56	4880	Whispering Pines Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/14/2013 23:16
57	4140	Logan Mill Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/15/2013 5:11
58	4150	Gold Hill Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/15/2013 5:17
59	4150	Gold Hill Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/15/2013 5:26
60	860	Sand Creek at Colfax Precipitation-AD	Plains 10 minute rainfall	7/15/2013 12:12
61	860	Sand Creek at Colfax Precipitation-AD	Plains 1 hour rainfall	7/15/2013 12:21
62	800	Sable Ditch @ Colfax Precipitation-AD	Plains 10 minute rainfall	7/15/2013 12:22
63	440	Fire Station #7 Precipitation-AR	Plains 10 minute rainfall	7/15/2013 12:25
64	920	Aurora Town Hall Precipitation-AR	Plains 1 hour rainfall	7/15/2013 12:42
65	800	Sable Ditch @ Colfax Precipitation-AD	Plains 1 hour rainfall	7/15/2013 12:45
66	820	East Toll Gate @ Buckley Precipitation-AR	Plains 1 hour rainfall	7/15/2013 12:46
67	640	Goldsmith @ Eastman Precipitation-DN	Plains 10 minute rainfall	7/15/2013 12:47
68	640	Goldsmith @ Eastman Precipitation-DN	Plains 1 hour rainfall	7/15/2013 12:54
69	4150	Gold Hill Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/18/2013 15:11

70	4150	Gold Hill Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/18/2013 15:20
71	4150	Gold Hill Precipitation-BO	FMC-BA 0.75" in 1 Hour Rainfall	7/18/2013 15:56
72	5730	West Creek Precipitation-TL	Hayman 30 minute rainfall	7/24/2013 14:45
73	5740	Trail Creek Precipitation-TL	Hayman 30 minute rainfall	7/24/2013 14:48
74	5730	West Creek Precipitation-TL	Hayman 1 hour rainfall	7/24/2013 14:54
75	5900	Horse Creek Precipitation-DG	Hayman 30 minute rainfall	7/24/2013 15:00
76	5900	Horse Creek Precipitation-DG	Hayman 30 minute rainfall	7/24/2013 15:15
77	4880	Whispering Pines Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/25/2013 14:02
78	4160	Sunshine Precipitation-BO	FMC-BA 0.25" in 10 Min Rainfall	7/25/2013 14:02
79	3030	Bingham Lake Park Precipitation-DG	Douglas County 10 minute rainfall	7/27/2013 19:54
80	3080	Tallman Gulch at Tallman Park Precipitation-DG	Douglas County 10 minute rainfall	7/27/2013 20:10
81	3030	Bingham Lake Park Precipitation-DG	Douglas County 1 hour rainfall	7/27/2013 20:16
82	3040	East Cherry Creek at Russellville Road Precip-DG	Douglas County 10 minute rainfall	7/27/2013 20:40
83	2860	Cherry Creek at Stroh Precipitation-DG	Douglas County 10 minute rainfall	7/27/2013 21:23
84	2730	Salisbury Park Precipitation-DG	Douglas County 10 minute rainfall	7/27/2013 21:23
85	4850	Porphyry Mountain Precipitation-BO	FMC-BA 0.50" in 30 Min Rainfall	7/29/2013 13:38



# General System Analysis

**Database Name**

P:\A207-UDFCD-Data-Analysis\2013\07-2013\Novastar\_extract\_2013July.mdb

**First Date in Database**

7/1/13 12:00 AM

**Total Days**

31.0

**Last Date in Database**

7/31/13 11:59 PM

**Total Hours**

744.0

**Total Records Analyzed**

635,306

## Records by Group

Wind Data	206,419	32%
Temperature	97,630	15%
Relative Humidity	90,153	14%
Water Level	44,652	7%
Battery Voltage	41,019	6%
Barometric Pressure	39,773	6%
Precipitation	34,495	5%
Solar Radiation	19,506	3%
Dew Point Temperature	9,524	1%
Wind Chill	9,524	1%
Peak Wind	9,523	1%
Fuel Temperature	9,508	1%
Fuel Moisture	9,475	1%
Soil Moisture	5,353	1%
Unknown	5,230	1%
Repeater Status Report	1,752	0%
12Hr Status Report	825	0%
Flasher Status	408	0%
Hayman Battery	352	0%
Handar 585 ALARM Status	119	0%
Repeater Pass List	56	0%
ALERT/A2 Testing	4	0%
Dewpoint Temperature	2	0%
Evapotranspiration	2	0%
Longmont Flow Gage	1	0%
Solar Power	1	0%
<b>Total</b>	<b>635,306</b>	

## Records by Major Group

Meteorologic Sensors	247,062	39%
Water Level Sensors	44,653	7%
Rain Sensors	34,495	5%
Soil and Fuel Sensors	24,336	4%
Sensor Status Transmissions	2,753	0%
<b>Total</b>	<b>353,299</b>	

## Traffic Loading Summary

Alert Reports	635,306	
Average Daily Traffic	20,494	
Average Hourly Traffic	854	
Median Hourly Traffic	837	hour beginning
Peak Hourly Traffic	2,486	Jul 13, 6:00 PM
2nd Max	2,334	Jul 13, 5:00 PM
3rd Max	1,804	Jul 15, 12:00 PM
4th Max	1,776	Jul 15, 1:00 PM
5th Max	1,580	Jul 13, 7:00 PM

# Rain Timer Performance

Analyze Rain Sensors

Rain Sensors	Description	Rcv	Timer	Exp	Performance
1480	Third Creek at DIA	8	11:57	62	13%
2190	Wx-Squaw Mountain	10	0:01	62	16%
840	Fire Station 12	25	0:00	62	40%
5810	Stump Bump	35	12:57	62	56%
5720	Four Mile Creek	40	14:24	62	65%
1660	SPR at Henderson	41	14:44	62	66%
3010	EPC at Hwy 105	42	14:28	62	68%
3090	Highland Heritage Park-A2	42	12:45	62	68%
2930	Wx-Spring Valley Rd-DougCnty	44	15:43	62	71%
640	Goldsmith @ Eastman	45	11:34	62	73%
2800	Columbine Open Space	45	14:40	62	73%
1370	West Metro FS13	46	15:43	62	74%
2790	Wx-W. Cherry Creek	47	14:10	62	76%
5730	West Creek	47	12:11	62	76%
2810	Pine Cliff Road	48	14:27	62	77%
2890	Spruce Mt - Douglas	48	13:56	62	77%
4870	SBC @ SB Road	48	13:45	62	77%
5940	Log Jumper	48	12:42	62	77%
2990	Wx-Tomah Rd-DougCnty	49	13:48	62	79%
4850	Porphory Mtn	49	12:00	62	79%
5880	Hackett Mountain	49	14:32	62	79%
2910	East Cherry Cr-Douglas	50	13:13	62	81%
4470	Little Narrows	50	13:15	62	81%
2710	Wx-Highlands Ranch WTP	51	13:50	62	82%
2820	Haskins Gulch Conf	51	13:40	62	82%
2980	Dakan Rd	51	13:42	62	82%
4220	Fling's	51	12:41	62	82%
4790	Wx-Button Rock	51	13:42	62	82%
2360	Indian Hills	52	12:56	62	84%
2870	Cottonwood (Apache)	52	13:06	62	84%
2950	DC Public Works	52	13:23	62	84%
3040	CC @ Prairie Canyon Ranch	52	13:05	62	84%
4330	Hansen Rain	52	12:50	62	84%
2240	Cold Sprg Glch conf	53	12:33	62	85%
2840	Sulphur Gulch	53	13:49	62	85%
2880	Happy Canyon at N Surrey Dr	53	13:04	62	85%
2900	Russelville Gulch-Douglas	53	12:52	62	85%
2940	Willow Creek - DougCnty	53	13:27	62	85%
3050	East/West Trailhead	53	13:38	62	85%
4060	Lakeshore	53	12:32	62	85%
310	Guy Hill Ranch	54	13:11	62	87%
850	Flying J	54	12:20	62	87%
2750	Wx-Castle Rock	54	13:30	62	87%
2860	CC at Stroh Rd	54	13:14	62	87%
3020	Wx-West Creek WX	54	12:55	62	87%
4490	Apple Valley	54	12:15	62	87%
4570	St. Antons	54	12:17	62	87%
5860	Cedar Mountain	54	12:19	62	87%
620	Quincy/Highline	55	12:30	62	89%
2370	Red Rocks Park	55	12:49	62	89%
2850	Cherry Cr bl Bayou Glch	55	12:58	62	89%
2960	Indian Creek	55	12:46	62	89%
3030	WX-Bingham Lake Park	55	12:32	62	89%
5740	Trail Creek	55	12:20	62	89%

720	Confluence Pond	56	13:00	62	90%
1550	Lakewood CC	56	12:13	62	90%
1700	Cherry Cr @ Champa	56	12:15	62	90%
1710	Shop Creek	56	12:46	62	90%
2260	Brook Forest	56	13:17	62	90%
2280	Kinney Peak	56	13:04	62	90%
2310	Genesee Village	56	13:04	62	90%
2730	Wx-Salisbury Park	56	12:45	62	90%
3060	Fire Sta 47	56	12:15	62	90%
3080	Tallman Gulch	56	12:28	62	90%
4180	Gold Lake	56	12:51	62	90%
4340	Riverside	56	12:15	62	90%
4510	Pinewood Springs	56	12:33	62	90%
4770	Wx-Cal-Wood Ranch	56	12:17	62	90%
4810	Shanahan Ridge	56	12:46	62	90%
440	Fire Station #7	57	12:27	62	92%
1340	Sanderson at Xavier	57	12:29	62	92%
1530	Bear Creek @ Lowell	57	12:44	62	92%
2350	Idledale	57	12:13	62	92%
2920	West Cherry Head-Douglas Cnty	57	12:00	62	92%
4010	Crescent	57	12:15	62	92%
4250	Geer Canyon	57	12:14	62	92%
4270	Cannon Mountain	57	12:35	62	92%
4310	Johnny Park	57	12:16	62	92%
110	Ralston Reservoir	58	12:29	62	94%
150	Nott Creek	58	11:57	62	94%
320	Sports Complex	58	12:29	62	94%
710	Horseshoe Park Drop	58	12:12	62	94%
800	Sable Ditch @ 18th	58	11:57	62	94%
940	Sampson Gulch	58	12:12	62	94%
1030	NREL/S. Table Mtn.	58	11:57	62	94%
1040	Lena @ U.S. Hwy 6	58	12:14	62	94%
1350	Chatfield COE	58	12:15	62	94%
1500	Powers Park	58	12:18	62	94%
2230	Bear Cr below Cub	58	12:32	62	94%
2270	Cub Cr below Blue	58	12:15	62	94%
2330	Morrison	58	12:28	62	94%
2340	El Rancho	58	12:15	62	94%
4040	Martin Gulch	58	12:28	62	94%
4130	Swiss Peaks	58	12:15	62	94%
4170	Pine Brook	58	12:14	62	94%
4190	Slaughterhouse	58	11:57	62	94%
4360	Justice Center	58	12:12	62	94%
4520	Eagle Ridge	58	12:15	62	94%
4550	Boulder Jail	58	12:11	62	94%
4820	Doudy Draw	58	12:31	62	94%
4830	SBC @ San Souci	58	12:13	62	94%
4860	Fairview Peak	58	12:00	62	94%
120	West Woods	59	11:58	62	95%
140	Wx-Blue Mountain	59	12:15	62	95%
210	Leyden Confluence	59	12:13	62	95%
220	Upper Leyden	59	12:00	62	95%
400	Montview Park	59	12:12	62	95%
420	Expo Park	59	11:58	62	95%
500	Havana Park	59	12:10	62	95%
520	Jewell Detention	59	11:57	62	95%
530	Fire Station #19	59	11:57	62	95%
540	Parker/Mississippi	59	12:11	62	95%
600	Harvard Gulch Park	59	12:12	62	95%

630	Temple Pond at DTC	59	12:17	62	95%
650	Iliff Pond	59	12:12	62	95%
700	Toll Gate @ 6th	59	12:00	62	95%
730	No Name @ Quincy	59	12:10	62	95%
820	ETG @ Buckley	59	12:26	62	95%
900	Wx-Aurora Reservoir	59	12:14	62	95%
1010	Denver West	59	11:57	62	95%
1060	Heritage Square	59	11:57	62	95%
1320	SPR at 3rd Ave	59	12:13	62	95%
1400	Upper Sloan Det.	59	12:12	62	95%
1460	Wx-Urban Farm	59	12:28	62	95%
1520	Wx-Marston Lake North	59	12:14	62	95%
1620	Slaughterhouse Glch	59	12:12	62	95%
1640	SPR at Union Ave.	59	12:11	62	95%
2250	Rosedale	59	12:15	62	95%
2320	Choke Cherry Resvr	59	12:17	62	95%
4090	Magnolia	59	12:13	62	95%
4100	Filter Plant	59	12:14	62	95%
4110	Betasso	59	12:13	62	95%
4160	Sunshine	59	11:58	62	95%
4230	Golden Age	59	12:14	62	95%
4350	Conifer Hill	59	12:15	62	95%
4530	Winiger Ridge	59	11:58	62	95%
4840	SBC@S Boulder Ditch	59	11:58	62	95%
4880	Whispering Pines	59	11:57	62	95%
100110	A2-ETG @ Hampden Precip	59	12:00	62	95%
200	Leyden Reservoir	60	11:57	62	97%
300	Van Bibber Park	60	11:43	62	97%
330	Van Bibber @ Hwy 93	60	11:58	62	97%
750	Wx-Quincy Reservoir	60	11:57	62	97%
760	Mission Viejo Park	60	11:57	62	97%
830	Side Creek Park	60	11:58	62	97%
860	Sand Cr at Colfax	60	12:00	62	97%
950	Piney at Liverpool	60	11:57	62	97%
1100	Louisville Rec Ctr	60	11:59	62	97%
1200	Broomfield 3207	60	11:58	62	97%
1300	Hidden Lake	60	11:58	62	97%
1360	Denver Zoo	60	12:00	62	97%
1420	Wx-Diamond Hill	60	12:00	62	97%
1440	Wx-Elbert	60	12:00	62	97%
1570	Wx-Brighton Ditch	60	12:00	62	97%
1720	Cherry Cr @ Steele	60	11:57	62	97%
1800	Sand Creek Park	60	12:11	62	97%
1810	Sand Creek at mouth	60	11:58	62	97%
1900	Niver Detention	60	12:13	62	97%
4020	Rio Grande	60	12:13	62	97%
4050	Walker Ranch	60	11:58	62	97%
4070	Bear Peak	60	11:58	62	97%
4140	Logan Mill	60	12:12	62	97%
4240	Sunset	60	11:58	62	97%
4290	Red Hill	60	11:57	62	97%
4300	Big Elk Park	60	12:15	62	97%
410	Kelly Dam	61	11:57	62	98%
430	Utah Park	61	11:57	62	98%
510	Virginia Court	61	11:57	62	98%
610	Harvard @ Jackson	61	11:57	62	98%
810	Granby Ditch @ 6th	61	11:57	62	98%
870	Murphy Creek GC	61	11:46	62	98%
970	Pump Sta 3	61	12:00	62	98%

1050	Jeffco Fairgrounds	61	11:57	62	98%
1110	Gunbarrel	61	11:58	62	98%
1310	LDC at 64th	61	11:58	62	98%
1920	Wx-Brighton	61	12:00	62	98%
4030	Red Garden	61	11:59	62	98%
4080	Twin Sisters	61	11:58	62	98%
4150	Gold Hill	61	11:58	62	98%
4200	Lazy Acres	61	11:59	62	98%
4260	Taylor Mountain	61	11:57	62	98%
4320	Lee Hill Rain 2012	61	12:13	62	98%
4710	Wx-Ward C-1	61	12:00	62	98%
4730	Wx-Sugarloaf	61	12:00	62	98%
100100	A2-Blackstone Precip	61	12:00	62	98%
1600	Englewood Dam	62	11:37	62	100%
2970	Rampart Range Rd-Satellite	203		62	100%
4750	Wx-Louisville Lake	62	11:47	62	100%
5900	Horse Creek-Satellite	1443		62	100%
920	Wx-Aurora Town Hall	65	10:59	62	105%
2210	Wx-Hiwan G.C.	65	11:19	62	105%
3070	Newlin Gulch-A2	114	6:20	62	184%
100	A2-Carr Street	820		62	
1000	A2-Maple Grove Resv.	885		62	

Rain Event Performance			Reports Received	9,474	Analyze Rain Sensors										
	Systemwide Avg	Total Tips	10,177												
	93.09%	Data Loss	6.91%												
Description	Sensor	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket	
Fire Station 12	840	35%	18	2	1	0	0	0	3	21	60	39	0	0.0393701	
Newlin Gulch-A2	3070	50%	7	14	3	0	0	1	0	25	50	25	0	0.0196855	
Dakan Rd	2980	53%	8	5	1	1	1	0	0	16	30	14	0	0.0393701	
Rampart Range Rd-Satellite	2970	71%	25	6	4	0	0	0	0	35	49	14	0	0.0393701	
Cherry Cr @ Champa	1700	72%	24	1	1	0	0	0	1	26	36	10	0	0.0393701	
Wx-W. Cherry Creek	2790	74%	47	12	4	1	0	0	0	64	87	23	0	0.0393701	
Wx-Salisbury Park	2730	77%	17	5	1	0	0	0	0	23	30	7	0	0.0393701	
WX-Bingham Lake Park	3030	78%	30	5	3	0	0	0	0	38	49	11	0	0.0393701	
Choke Cherry Resvr	2320	78%	62	3	5	0	0	0	1	70	90	20	1	0.0393701	
Gunbarrel	1110	78%	17	0	0	0	0	1	0	18	23	5	0	0.0393701	
Fire Sta 47	3060	78%	14	3	1	0	0	0	0	18	23	5	0	0.0393701	
Little Narrows	4470	79%	39	3	1	1	1	0	0	45	57	12	0	0.0393701	
Tallman Gulch	3080	81%	39	5	3	0	0	0	0	47	58	11	1	0.0393701	
Russelville Gulch-Douglas	2900	82%	34	1	1	0	0	1	0	37	45	8	0	0.0393701	
SPR at Henderson	1660	82%	12	1	1	0	0	0	0	14	17	3	0	0.0393701	
Apple Valley	4490	83%	32	6	1	0	0	0	0	39	47	8	0	0.0393701	
Haskins Gulch Conf	2820	84%	31	4	0	1	0	0	0	36	43	7	0	0.0393701	
Quincy/Highline	620	84%	32	5	1	0	0	0	0	38	45	7	0	0.0393701	
Sulphur Gulch	2840	85%	14	3	0	0	0	0	0	17	20	3	0	0.0393701	
Doudy Draw	4820	85%	34	5	1	0	0	0	0	40	47	7	0	0.0393701	
A2-Carr Street	100	85%	63	2	2	2	0	0	1	69	81	12	2	0.0393701	
Wx-Button Rock	4790	86%	52	6	2	0	0	0	0	60	70	10	0	0.0393701	
East/West Trailhead	3050	86%	22	2	1	0	0	0	1	25	29	4	0	0.0393701	
Pine Cliff Road	2810	87%	24	1	0	1	0	0	0	26	30	4	0	0.0393701	
Kinney Peak	2280	87%	71	8	2	0	0	0	0	81	93	12	0	0.0393701	
Hansen Rain	4330	87%	47	6	1	0	0	0	0	54	62	8	0	0.0393701	
Wx-West Creek WX	3020	87%	52	9	0	0	0	0	0	61	70	9	0	0.0393701	
St. Antons	4570	88%	85	8	1	1	0	0	0	95	108	13	0	0.0393701	
Wx-Castle Rock	2750	88%	13	2	0	0	0	0	0	15	17	2	0	0.0393701	
CC at Stroh Rd	2860	88%	26	4	0	0	0	0	0	30	34	4	0	0.0393701	
NREL/S. Table Mtn.	1030	89%	50	5	1	0	0	0	0	56	63	7	0	0.0393701	
Bear Creek @ Lowell	1530	89%	29	2	1	0	0	0	0	32	36	4	0	0.0393701	
Gold Lake	4180	89%	71	8	1	0	0	0	0	80	90	10	0	0.0393701	
Guy Hill Ranch	310	89%	72	8	1	0	0	0	0	81	91	10	0	0.0393701	
East Cherry Cr-Douglas	2910	89%	68	6	0	1	0	0	0	75	84	9	0	0.0393701	
Indian Hills	2360	89%	62	4	0	0	1	0	0	67	75	8	0	0.0393701	
Morrison	2330	90%	31	4	0	0	0	0	0	35	39	4	0	0.0393701	
DC Public Works	2950	90%	32	4	0	0	0	0	0	36	40	4	0	0.0393701	
SBC@S Boulder Ditch	4840	90%	16	2	0	0	0	0	0	18	20	2	0	0.0393701	
Spruce Mt - Douglas	2890	90%	51	4	1	0	0	0	0	56	62	6	0	0.0393701	
SBC @ SB Road	4870	90%	17	2	0	0	0	0	0	19	21	2	0	0.0393701	
Cherry Cr bl Bayou Glch	2850	91%	9	1	0	0	0	0	0	10	11	1	0	0.0393701	
Cold Sprg Glch conf	2240	91%	55	6	0	0	0	0	0	61	67	6	0	0.0393701	
El Rancho	2340	91%	47	4	0	0	0	0	1	51	56	5	0	0.0393701	
Genesee Village	2310	91%	37	4	0	0	0	0	0	41	45	4	0	0.0393701	
Highland Heritage Park-A2	3090	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701	
SBC @ San Souci	4830	91%	19	2	0	0	0	0	0	21	23	2	0	0.0393701	
Cub Cr below Blue	2270	92%	89	7	1	0	0	0	0	97	106	9	0	0.0393701	
Riverside	4340	92%	71	4	0	1	0	0	0	76	83	7	0	0.0393701	
West Cherry Head-Douglas Cnty	2920	92%	61	6	0	0	0	0	0	67	73	6	0	0.0393701	
Columbine Open Space	2800	92%	42	2	1	0	0	0	0	45	49	4	0	0.0393701	
Willow Creek - DougCnty	2940	92%	31	3	0	0	0	0	0	34	37	3	0	0.0393701	
Toll Gate @ 6th	700	92%	44	4	0	0	0	0	0	48	52	4	0	0.0393701	
Nott Creek	150	92%	56	5	0	0	0	0	0	61	66	5	0	0.0393701	
Happy Canyon at N Surrey Dr	2880	93%	23	2	0	0	0	0	0	25	27	2	0	0.0393701	
Upper Sloan Det.	1400	93%	70	6	0	0	0	0	0	76	82	6	0	0.0393701	
Wx-Marston Lake North	1520	93%	24	2	0	0	0	0	0	26	28	2	3	0.0393701	
Crescent	4010	93%	48	4	0	0	0	0	0	52	56	4	0	0.0393701	
Murphy Creek GC	870	93%	38	3	0	0	0	0	0	41	44	3	0	0.0393701	
CC @ Prairie Canyon Ranch	3040	93%	51	4	0	0	0	0	0	55	59	4	0	0.0393701	
Wx-Highlands Ranch WTP	2710	93%	26	2	0	0	0	0	0	28	30	2	0	0.0393701	
Englewood Dam	1600	94%	28	2	0	0	0	0	0	30	32	2	0	0.0393701	
Wx-Cal-Wood Ranch	4770	94%	70	5	0	0	0	0	0	75	80	5	0	0.0393701	
Fling's	4220	94%	87	4	1	0	0	0	0	92	98	6	0	0.0393701	
Wx-Elbert	1440	94%	31	2	0	0	0	0	0	33	35	2	0	0.0393701	
Golden Age	4230	94%	48	1	1	0	0	0	0	50	53	3	0	0.0393701	
Red Rocks Park	2370	95%	49	3	0	0	0	0	0	52	55	3	0	0.0393701	
Pinewood Springs	4510	95%	49	3	0	0	0	0	0	52	55	3	0	0.0393701	
Wx-Louisville Lake	4750	95%	33	2	0	0	0	0	0	35	37	2	1	0.0393701	
Temple Pond at DTC	630	95%	100	6	0	0	0	0	0	106	112	6	0	0.0393701	
Wx-Spring Valley Rd-DougCnty	2930	95%	52	3	0	0	0	0	0	55	58	3	0	0.0393701	
Slaughterhouse	4190	95%	52	3	0	0	0	0	0	55	58	3	0	0.0393701	
Leyden Confluence	210	95%	35	2	0	0	0	0	0	37	39	2	0	0.0393701	
A2-Maple Grove Resv.	1000	95%	88	5	0	0	0	0	0	93	98	5	1	0.0393701	
Montview Park	400	95%	53	3	0	0	0	0	0	56	59	3	0	0.0393701	
Van Bibber @ Hwy 93	330	95%	59	3	0	0	0	0	0	62	65	3	0	0.0393701	

Fire Station #7	440	95%	40	2	0	0	0	0	0	0	42	44	2	1	0.0393701
Indian Creek	2960	95%	20	1	0	0	0	0	0	0	21	22	1	0	0.0393701
Side Creek Park	830	96%	41	2	0	0	0	0	0	0	43	45	2	0	0.0393701
SPR at Union Ave.	1640	96%	21	1	0	0	0	0	0	0	22	23	1	0	0.0393701
Sampson Gulch	940	96%	21	1	0	0	0	0	0	0	22	23	1	0	0.0393699
Pump Sta 3	970	96%	43	2	0	0	0	0	0	0	45	47	2	0	0.0393701
Geer Canyon	4250	96%	43	2	0	0	0	0	0	0	45	47	2	0	0.0393701
Bear Cr below Cub	2230	96%	87	4	0	0	0	0	0	0	91	95	4	1	0.0393701
Chatfield COE	1350	96%	22	1	0	0	0	0	0	0	23	24	1	0	0.0393701
Cottonwood (Apache)	2870	96%	22	1	0	0	0	0	0	0	23	24	1	0	0.0393701
Sand Cr at Colfax	860	96%	67	3	0	0	0	0	0	0	70	73	3	1	0.0393701
Ralston Reservoir	110	96%	47	2	0	0	0	0	0	0	49	51	2	0	0.0393701
Cherry Cr @ Steele	1720	96%	25	1	0	0	0	0	0	0	26	27	1	0	0.0393701
Broomfield 3207	1200	96%	26	1	0	0	0	0	0	0	27	28	1	0	0.0393701
Betasso	4110	96%	52	2	0	0	0	0	0	0	54	56	2	0	0.0393701
Niver Detention	1900	97%	28	1	0	0	0	0	0	0	29	30	1	0	0.0393701
Sable Ditch @ 18th	800	97%	58	2	0	0	0	0	0	0	60	62	2	0	0.0393701
Denver West	1010	97%	60	2	0	0	0	0	0	0	62	64	2	0	0.0393701
Flying J	850	97%	63	2	0	0	0	0	0	0	65	67	2	1	0.0393701
Fire Station #19	530	97%	64	2	0	0	0	0	0	0	66	68	2	0	0.0393701
Justice Center	4360	97%	33	1	0	0	0	0	0	0	34	35	1	0	0.0393701
Wx-Tomah Rd-DougCnty	2990	97%	34	1	0	0	0	0	0	0	35	36	1	0	0.0393701
Whispering Pines	4880	97%	72	2	0	0	0	0	0	0	74	76	2	0	0.0393701
Sunset	4240	97%	109	3	0	0	0	0	0	0	112	115	3	0	0.0393701
Jeffco Fairgrounds	1050	97%	73	2	0	0	0	0	0	0	75	77	2	0	0.0393701
Horseshoe Park Drop	710	98%	39	1	0	0	0	0	0	0	40	41	1	0	0.0393701
Winiger Ridge	4530	98%	79	2	0	0	0	0	0	0	81	83	2	0	0.0393701
LDC at 64th	1310	98%	40	1	0	0	0	0	0	0	41	42	1	0	0.0393701
Wx-Diamond Hill	1420	98%	42	1	0	0	0	0	0	0	43	44	1	0	0.0393701
Brook Forest	2260	98%	84	2	0	0	0	0	0	0	86	88	2	0	0.0393701
Jewell Detention	520	98%	43	1	0	0	0	0	0	0	44	45	1	0	0.0393701
Wx-Hiwan G.C.	2210	98%	88	2	0	0	0	0	0	0	90	92	2	4	0.0393701
Upper Leyden	220	98%	47	1	0	0	0	0	0	0	48	49	1	0	0.0393701
Parker/Mississippi	540	98%	49	1	0	0	0	0	0	0	50	51	1	0	0.0393701
Harvard Gulch Park	600	98%	49	1	0	0	0	0	0	0	50	51	1	0	0.0393701
Denver Zoo	1360	98%	51	1	0	0	0	0	0	0	52	53	1	0	0.0393701
Sanderson at Xavier	1340	98%	52	1	0	0	0	0	0	0	53	54	1	0	0.0393701
Logan Mill	4140	98%	54	1	0	0	0	0	0	0	55	56	1	0	0.0393701
Red Hill	4290	98%	54	1	0	0	0	0	0	0	55	56	1	0	0.0393701
Sports Complex	320	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.0393701
Lena @ U.S. Hwy 6	1040	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.0393701
Martin Gulch	4040	98%	56	1	0	0	0	0	0	0	57	58	1	0	0.0393701
Iliff Pond	650	98%	58	1	0	0	0	0	0	0	59	60	1	0	0.0393701
Goldsmith @ Eastman	640	98%	61	1	0	0	0	0	0	0	62	63	1	0	0.0393701
Virginia Court	510	98%	63	1	0	0	0	0	0	0	64	65	1	0	0.0393701
Twin Sisters	4080	98%	63	1	0	0	0	0	0	0	64	65	1	0	0.0393701
Johnny Park	4310	99%	71	1	0	0	0	0	0	0	72	73	1	0	0.0393701
Big Elk Park	4300	99%	73	1	0	0	0	0	0	0	74	75	1	0	0.0393701
Cannon Mountain	4270	99%	75	1	0	0	0	0	0	0	76	77	1	0	0.0393701
Conifer Hill	4350	99%	75	1	0	0	0	0	0	0	76	77	1	0	0.0393701
Wx-Urban Farm	1460	99%	81	1	0	0	0	0	0	0	82	83	1	0	0.0393701
Expo Park	420	99%	83	1	0	0	0	0	0	0	84	85	1	0	0.0393701
Rosedale	2250	99%	83	1	0	0	0	0	0	0	84	85	1	0	0.0393701
Lakewood CC	1550	99%	84	1	0	0	0	0	0	0	85	86	1	0	0.0393701
Taylor Mountain	4260	99%	101	1	0	0	0	0	0	0	102	103	1	0	0.0393701
Wx-Ward C-1	4710	99%	105	1	0	0	0	0	0	0	106	107	1	0	0.0393701
West Woods	120	100%	39	0	0	0	0	0	0	0	39	39	0	0	0.0393701
Wx-Blue Mountain	140	100%	70	0	0	0	0	0	0	0	70	70	0	1	0.0393701
Leyden Reservoir	200	100%	22	0	0	0	0	0	0	0	22	22	0	0	0.0393701
Van Bibber Park	300	100%	97	0	0	0	0	0	0	0	97	97	0	0	0.0393701
Kelly Dam	410	100%	1	0	0	0	0	0	0	0	1	1	0	0	0.0393701
Utah Park	430	100%	101	0	0	0	0	0	0	0	101	101	0	0	0.0393701
Havana Park	500	100%	2	0	0	0	0	0	0	0	2	2	0	0	0.0393701
Harvard @ Jackson	610	100%	54	0	0	0	0	0	0	0	54	54	0	0	0.0393701
Confluence Pond	720	100%	22	0	0	0	0	0	0	0	22	22	0	0	0.0393701
Wx-Quincy Reservoir	750	100%	10	0	0	0	0	0	0	0	10	10	0	0	0.0393701
Mission Viejo Park	760	100%	18	0	0	0	0	0	0	0	18	18	0	0	0.0393701
Granby Ditch @ 6th	810	100%	47	0	0	0	0	0	0	0	47	47	0	0	0.0393701
ETG @ Buckley	820	100%	58	0	0	0	0	0	0	0	58	58	0	0	0.0393701
Wx-Aurora Town Hall	920	100%	92	0	0	0	0	0	0	0	92	92	0	0	0.0393701
Piney at Liverpool	950	100%	11	0	0	0	0	0	0	0	11	11	0	0	0.0393701
Heritage Square	1060	100%	78	0	0	0	0	0	0	0	78	78	0	0	0.0393701
Louisville Rec Ctr	1100	100%	25	0	0	0	0	0	0	0	25	25	0	1	0.0393701
Hidden Lake	1300	100%	54	0	0	0	0	0	0	0	54	54	0	0	0.0393701
SPR at 3rd Ave	1320	100%	39	0	0	0	0	0	0	0	39	39	0	0	0.0393701
West Metro FS13	1370	100%	28	0	0	0	0	0	0	0	28	28	0	0	0.0393701
Powers Park	1500	100%	82	0	0	0	0	0	0	0	82	82	0	0	0.0393701
Wx-Brighton Ditch	1570	100%	27	0	0	0	0	0	0	0	27	27	0	0	0.0393701
Slaughterhouse Glch	1620	100%	27	0	0	0	0	0	0	0	27	27	0	0	0.0393701
Shop Creek	1710	100%	15	0	0	0	0	0	0	0	15	15	0	1	0.0393701
Sand Creek Park	1800	100%	23	0	0	0	0	0	0	0	23	23	0	0	0.0393701

Sand Creek at mouth	1810	100%	29	0	0	0	0	0	0	29	29	0	0	0.0393701
Wx-Brighton	1920	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701
Idledale	2350	100%	22	0	0	0	0	0	0	22	22	0	0	0.0393701
Rio Grande	4020	100%	53	0	0	0	0	0	0	53	53	0	0	0.0393701
Red Garden	4030	100%	46	0	0	0	0	0	0	46	46	0	0	0.0393701
Walker Ranch	4050	100%	57	0	0	0	0	0	0	57	57	0	0	0.0393701
Lakeshore	4060	100%	41	0	0	0	0	0	0	41	41	0	0	0.0393701
Bear Peak	4070	100%	46	0	0	0	0	0	0	46	46	0	0	0.0393701
Magnolia	4090	100%	41	0	0	0	0	0	0	41	41	0	0	0.0393701
Filter Plant	4100	100%	34	0	0	0	0	0	0	34	34	0	0	0.0393701
Swiss Peaks	4130	100%	78	0	0	0	0	0	0	78	78	0	0	0.0393701
Gold Hill	4150	100%	122	0	0	0	0	0	0	122	122	0	0	0.0393701
Sunshine	4160	100%	84	0	0	0	0	0	0	84	84	0	0	0.0393701
Pine Brook	4170	100%	21	0	0	0	0	0	0	21	21	0	0	0.0393701
Lazy Acres	4200	100%	35	0	0	0	0	0	0	35	35	0	0	0.0393701
Lee Hill Rain 2012	4320	100%	67	0	0	0	0	0	0	67	67	0	0	0.0393701
Eagle Ridge	4520	100%	19	0	0	0	0	0	0	19	19	0	0	0.0393701
Boulder Jail	4550	100%	19	0	0	0	0	0	0	19	19	0	0	0.0393701
Wx-Sugarloaf	4730	100%	47	0	0	0	0	0	0	47	47	0	0	0.0393701
Shanahan Ridge	4810	100%	41	0	0	0	0	0	0	41	41	0	0	0.0393701
A2-Blackstone Precip	100100	100%	25	0	0	0	0	0	0	25	25	0	1	0.0393701
A2-ETG @ Hampden Precip	100110	100%	13	0	0	0	0	0	0	13	13	0	0	0.0393701
Wx-Aurora Reservoir	900	100%	16	0	0	0	0	0	0	16	16	0	0	0.0393699
EPC at Hwy 105	3010	81%	139	30	2	2	0	0	0	173	213	40	0	0.01
Porphory Mtn	4850	80%	141	31	2	0	1	1	2	176	220	44	14	0.01
Fairview Peak	4860	92%	277	19	2	1	0	0	0	299	325	26	59	0.01
		Total Tips	8932	464	57	13	4	4	10	9474	10177	703	94	
Four Mile Creek	5720	82%	46	13	0	0	0	0	1	59	72	13	0	0.0393701
West Creek	5730	93%	62	5	0	0	0	0	1	67	72	5	0	0.0393701
Trail Creek	5740	90%	74	9	0	0	0	0	0	83	92	9	0	0.0393701
Stump Bump	5810	78%	38	5	2	0	1	0	0	46	59	13	0	0.0393701
Cedar Mountain	5860	96%	91	4	0	0	0	0	0	95	99	4	0	0.0393701
Hackett Mountain	5880	90%	61	8	0	0	0	0	0	69	77	8	0	0.0393701
Horse Creek-Satellite	5900	96%	46	2	0	0	0	0	0	48	50	2	0	0.0393701
Log Jumper	5940	80%	63	12	2	0	1	0	0	78	98	20	0	0.0393701



### 2013 Monthly ALERT Radio Traffic Summary

