

# Memo



**Date:** March 3, 2009  
**To:** Kevin Stewart and Chad Kudym  
**From:** Markus Ritsch  
**Subject:** February 2009 ALERT Data Analysis

---

## I. ALERT Data Source

Raw ALERT data records extracted from the Urban Drainage and Flood Control District's Nova Star 4.0 base station (ALERT 2) were analyzed for the period February 1 through February 28, 2009.

## II. General System Analysis Summary

*The Blue Mountain Repeater was destroyed in a windstorm on February 4, 2009. This repeater handles a large fraction of the District's radio traffic. The repeater was not functional for the entire month of February and remains non-functional into March.*

A total of 190,963 data records were analyzed from the ALERT 2 base station. Meteorological sensors account for 86 percent, water level sensors 3 percent, and rain sensors 2 percent of the total monthly records.

More than ninety-nine percent (99%) of the received data reports were flagged as "good" by the Nova Star validation process.

The system-wide radio traffic loading was 6,820 reports per day with an average hourly loading of 284 reports. The peak hourly traffic loading was 452 reports, which occurred on February 9, between 11:00 AM and 12:00 PM. A plot of monthly average and peak hourly traffic loading is provided.

## III. Rain Sensor Timer Reporting Summary

The following analysis assumes that each rain sensor has a 12-hour timer-reporting interval. System-wide, the ALERT 2 base station received approximately 52 percent of the non-incrementing timer reports. The worst performing rain sensors for the month are summarized (Table 1).

**Table 1. Monthly Summary of Sensors with Poor Timer Performance (Sensor ID)**

Jan	Feb*	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2850	4030										
1650	4200										
1810	4490										
4250	4520										
4790	4790										
4300	4020										

\* - Timer statistics are poor in February and March due to the failure of the Blue Mountain repeater.

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.

Sensor ID 1460 has a 24-hour timer reporting interval and Sensor ID 1810 has an 18-hour timer-reporting interval.

## 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 2).

**Table 2. District-Wide Total Tip/Count Statistical Summary**

Statistical Parameter	Value	Comments
Mean	3.11	Only the 1-mm rain sensors were included in the analysis
Median	3	Only the 1-mm rain sensors were included in the analysis
Standard deviation	1.82	Only the 1-mm rain sensors were included in the analysis
Mean plus three standard deviations	8.57	Only the 1-mm rain sensors were included in the analysis
Minimum total count	1	Many sensors
Maximum total count	10	Red Garden (ID 4030)

The highest reporting rain sensor this month was Red Garden (ID 4030) with 10 tips. Irrigation sprinklers do not influence this sensor. No other sensors reported more than the mean plus three standard deviations.

### B. Monthly Average Tip/Count Summary

A monthly summary of the District-wide mean total tip/count is presented (Table 3).

**Table 3. 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
2008	6.33	3.11											

### C. Sensors with a Jump of Six or More in the Sequential Count

Two sensors experienced a jump in sequential count of more than six (Table 4).

**Table 4. Sensors with a Jump of More than 6 in Sequential Count**

Sensor Description	Sensor ID	Comment
Cal-Wood Ranch	4770	This sensor has a large number of erroneous reports all month long. It almost appears as though a second series is being transmitted on the same ID.
Red Garden	4030	This sensor has a sporadic count all month due to the failure of Blue Mountain repeater.

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

The system-wide reception rate of incrementing, 1-mm tip reports for the month was approximately 78.6 percent. A total of 176 incrementing reports were received and a total of 224 were expected. The total loss of incrementing reports for the month was approximately 21.43 percent. Those sensors with the worst rain event transmission performance characteristics are summarized (Table 5).

**Table 5. Monthly Summary of Sensors with the Most Missed Tips**

<b>Jan</b>	<b>Feb*</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
140	4030										
4490	4470										
1420	4490										
4040	4110										
4160	4510										
4470	4790										

*\* - Event statistics are poor in February and March due to the failure of the Blue Mountain repeater.*

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.

The incrementing data series for those sensors with an event performance of less than 70 % are manually inspected.

### **a. Blue Mountain (ID 4030)**

Only 4 reports were received for the month from this sensor. The performance of this sensor is poor due to the loss of the Blue Mountain repeater.

### **b. Little Narrows (ID 4470)**

Only 2 reports were received for the month from this sensor. The performance of this sensor is poor due to the loss of the Blue Mountain repeater.

### **c. Apple Valley (ID 4490)**

Only 4 reports were received for the month from this sensor. The performance of this sensor is poor due to the loss of the Blue Mountain repeater.

### **d. Button Rock (ID 4790)**

Only 5 reports were received for the month from this sensor. The performance of this sensor is poor due to the loss of the Blue Mountain repeater.

### **e. Pinewood Springs (ID 4510)**

Only 7 reports were received for the month from this sensor. The performance of this sensor is poor due to the loss of the Blue Mountain repeater.

### **f. Betasso (ID 4110)**

Only 5 reports were received for the month from this sensor. The performance of this sensor is poor due to the loss of the Blue Mountain repeater.

## V. Heavy Radio Traffic Analysis

Periods exceeding 700 messages per hour are analyzed independently in an attempt to identify rain tip sequences where 3 or more, sequential messages are lost.

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

The hourly periods of highest radio traffic this month include:

Peak Traffic Periods	Reports/hour	Hour Beginning
Peak Hourly Traffic	452	2/9/2009 11:00 AM
2nd Max	449	2/9/2009 1:00 PM
3rd Max	438	2/27/2009 4:00 PM
4th Max	430	2/9/2009 12:00 PM
5th Max	427	2/9/2009 2:00 PM

### B. February 9, 2009

The heaviest traffic period occurred on February 9, between 11:00 AM and 3:00 PM. Incrementing rain records from the 1-mm gages for the heavy radio traffic period were examined to characterize the loss of sequential incrementing tip transmissions (Table 6). During the heavy traffic period, a total of 0 reports were expected and 0 were received yielding a loss of approximately 0.00% of the incrementing transmissions.

**Table 6. Peak Traffic Analysis - Loss of Incrementing Tip Reports**

Heavy Traffic Period (February 7)	Occurrences of lost sequential tip reports during period			
	Loss of 3 sequential tips	Loss of 4 sequential tips	Loss of 5 sequential tips	Loss of 6 or more sequential tips
11:00 AM to 12:00 PM	0	0	0	0

The heavy traffic period was composed primarily of wind reports. Incrementing reports from rain sensors did not occur during this period.

## 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 7).

**Table 7. Summary of Unknown IDs**

Description	Quantity
Total number of unknown IDs (IDs without a device definition)	249
Total reports from unknown IDs	572
Unknown IDs with only a single received report (potential noise)	164
Total reports from all IDs – RecData Log entire month	196,974
Unknown reports as a fraction of total reports	0.29%

The total number of reports from unknown sensors is very small relative to the total reports received for the month.

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 8. Reports Received by Unknown IDs**

<b>Unknown Sensor</b>	<b>Reports</b>
1373	48
2993	20
4775	14
4768	11
1657	11
4760	10
4742	10
4093	9
4766	9
4087	8
4739	8
4783	8
2736	8
4644	7
1651	7
4279	7
4643	6
4094	6
4831	6
4740	6
1777	6
2739	5
4639	5
4663	5
4472	5
4828	5
4636	5
4782	5
4646	5
4091	4
4786	4
4063	4
4759	4
2989	4
4846	4
2771	4
4484	4
4659	3
4358	3
1412	3
698	3
699	3
759	3

2716	3
4282	3
4823	3
2775	3
4748	3
4061	3
4838	3
4773	3
2239	3
2760	2
2688	2
2746	2
1562	2
1286	2
2743	2
2706	2
2713	2
2715	2
1137	2
1369	2
2365	2
4088	2
2811	2
145	2
4062	2
4083	2
4086	2
1653	2
4558	2
1663	2
4222	2
1885	2
2334	2
4702	2
5756	2
4836	2
4834	2
4756	2
4736	2
4664	2
675	2
4603	2

The “unknown” device reports are analyzed temporally to understand when they are received during the day (Table 9). 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 9. Temporal Distribution of Unknown Reports**

<b>Hour (AM)</b>	<b>Reports</b>	<b>Hour (PM)</b>	<b>Reports</b>
0:00-00:59	32	12:00-12:59	36
1:00-1:59	28	1:00-1:59	20
2:00-2:59	15	2:00-2:59	27
3:00-3:59	28	3:00-3:59	31
4:00-4:59	23	4:00-4:59	19
5:00-5:59	19	5:00-5:59	23
6:00-6:59	19	6:00-6:59	26
7:00-7:59	17	7:00-7:59	10
8:00-8:59	21	8:00-8:59	25
9:00-9:59	32	9:00-9:59	26
10:00-10:59	29	10:00-10:59	22
11:00-11:59	21	11:00-11:59	23

## VII. Issues Identified this Month

Rain sensors with a large number of invalid reports (bit flip/contention errors/random decode):

Description	Sensor ID	Reports
Cal-Wood Ranch	4770	18
Magnolia	4090	5
Lakeshore	4060	2
Button Rock	4790	2
Louisville Lake	4750	2
Golden Age	4230	2
Taylor Mountain	4260	2

Sensors reporting frequently (over reporting):

Description	Sensor ID	Reports	Fraction of Total
Quincy Reservoir	749	5670	3%
Ward C-1	4707	4241	2%
Castle Rock	2747	3644	2%
Salisbury Park	2727	3389	2%

Sensors reporting infrequently (under reporting):

Description	Sensor ID	Reports
Nott Creek	155	4
Heritage Square	1065	4
Red Garden	4030	4
Red Garden	4035	4
Betasso	4115	4
Lazy Acres	4200	4
Lazy Acres	4205	4
Red Hill	4290	4
Lower Lefthand	4455	4
Apple Valley	4490	4
Fire Station 12	844	3
Niver Detention	1905	3
Eagle Ridge	4520	3
Cold Sprg Gich conf	2240	2
Johnny Park	4310	2
Fourmile at Salina	4415	2
Little Narrows	4470	2
Little Narrows	4475	2

**Poor timer reporting:**

The following sensors showed poor timer performance this month.

<b>Sensor ID</b>	<b>Description</b>	<b>Performance</b>
4790	Button Rock	2%
4520	Eagle Ridge	2%
4490	Apple Valley	2%
4200	Lazy Acres	2%
4030	Red Garden	2%
4290	Red Hill	4%
4230	Golden Age	4%
4020	Rio Grande	4%
4510	Pinewood Springs	5%
4360	Justice Center	5%
4270	Cannon Mountain	5%
4250	Geer Canyon	5%
4110	Betasso	5%
4070	Bear Peak	5%
4050	Walker Ranch	5%
1060	Heritage Square	5%
4350	Conifer Hill	7%
4340	Riverside	9%
4260	Taylor Mountain	9%
4190	Slaughterhouse	9%
4100	Filter Plant	9%
310	Guy Hill Ranch	9%
150	Nott Creek	9%
4160	Sunshine	13%
4040	Martin Gulch	16%
4300	Big Elk Park	18%
1370	West Metro FS13	27%
2930	Spring Valley Rd - DougCnty	30%
140	Blue Mountain	30%
1640	SPR at Union Ave.	32%
1440	Elbert	34%
1050	Jeffco Fairgrounds	34%
1810	Sand Creek at mouth	38%
1350	Chatfield COE	39%
620	Quincy/Highline	39%
520	Jewell Detention	39%
300	Van Bibber Park	39%
1010	Denver West	41%
540	Parker/Mississippi	41%
530	Fire Station #19	41%
440	Fire Station #7	41%
1710	Shop Creek	43%



1460	Stapleton	43%
840	Fire Station 12	43%
1330	Roslyn	45%
830	Side Creek Park	45%
760	Mission Viejo Park	48%
4770	Cal-Wood Ranch	52%

**Poor event reporting:**

The following sensors showed poor event performance.

Sensor ID	Performance
4030	20%
4470	20%
4490	25%
4110	33%
4510	33%
4790	33%
4200	40%
4250	40%
4040	43%
4770	50%
840	50%
4160	50%
4290	50%
4340	50%
4020	67%
4070	67%
4130	67%
4140	67%
4190	67%

**Low rain total:**

Sensor ID	Tips
1460	1
1710	1
2210	1
4010	1
4050	1
4080	1
4100	1
4180	1
4220	1
4230	1
4260	1
4270	1
4360	1
4520	1
4750	1

**High rain total:**

<b>Sensor ID</b>	<b>Tips</b>
4040	7
4170	7
4810	8
4030	10

**Large Jump in Sequential Count (bit flip errors/contention loss/transmitter problems):**

<b>Sensor ID</b>	<b>Performance</b>	<b>&gt;6-tips</b>
4770	50%	3
4030	20%	1

**Reports from “Unknown Sensors”:**

Table 8 in the text shows the “unknown” sensor IDs and the number of reports received for the month.

# General System Analysis

Database Name P:\A207-UDFCD-Data-Analysis\2009\2009-Feb\Novastar\_extract\_2009Feb.mdb

First Date in Database	2/1/09 12:00 AM	Total Days	28.0
Last Date in Database	2/28/09 11:58 PM	Total Hours	672.0

Total Records Analyzed 190963

## Records by Group

Wind Gust	34058	18%
Temperature	32255	17%
Relative Humidity	30801	16%
Wind Speed Average & Azimuth	20799	11%
Barometric Pressure	15823	8%
Wind Direction	12261	6%
Wind Speed Average	11021	6%
Solar Radiation	8054	4%
Water Level Float	3013	2%
Precipitation	3006	2%
Water Level PT-HSE	2841	1%
Battery Voltage Analog	2730	1%
Battery Voltage Digital	1973	1%
Battery Voltage HSE	1971	1%
Fuel Temperature	1492	1%
Fuel Moisture	1481	1%
Soil Moisture	1011	1%
Repeater Status Report	375	0%
Repeater Pass List	353	0%
Longmont Flow Gage	280	0%
Wing Gust	261	0%
12Hr Status Report	137	0%
Battery	79	0%
Precipitation - Test	74	0%
Water Level PT	67	0%
Longmont Water Level PT	5	0%
<b>Total</b>	<b>186221</b>	

## Records by Major Group

Meteorologic Sensors	165072	86%
Sensor Status Transmissions	7539	4%
Water Level Sensors	6206	3%
Soil and Fuel Sensors	3984	2%
Rain Sensors	3006	2%
<b>Total</b>	<b>185807</b>	

## Records by Validation Type

Good	0	188854	99%
Questionable	1	2109	1%
<b>Total</b>		<b>190963</b>	

## Sensors With Most Invalid Data

Description	Sensor	Reports
Blue Mountain	137	880
Blue Mountain	139	537
Castle Rock	2744	43
Ferril Lake	1383	40
Quincy Reservoir	755	39

## Traffic Loading Summary

Alert Reports	190963	
Average Daily Traffic	6820	
Average Hourly Traffic	284	
Median Hourly Traffic	299	hour beginning
Peak Hourly Traffic	452	2/9/2009 11:00 AM
2nd Max	449	2/9/2009 1:00 PM
3rd Max	438	2/27/2009 4:00 PM
4th Max	430	2/9/2009 12:00 PM
5th Max	427	2/9/2009 2:00 PM

# Rain Timer Performance

Analyze Rain Sensors

systemwide average (days)

0.5546

52%

Sensor ID	Description	Rcv	Average Timer Interval	Exp	Performance
4790	Button Rock	1		56.00	2%
4520	Eagle Ridge	1		56.00	2%
4490	Apple Valley	1		56.00	2%
4200	Lazy Acres	1		56.00	2%
4030	Red Garden	1		56.00	2%
4290	Red Hill	2	23:43	56.00	4%
4230	Golden Age	2	23:55	56.00	4%
4020	Rio Grande	2	23:48	56.00	4%
4510	Pinewood Springs	3	23:48	56.00	5%
4360	Justice Center	3	11:33	56.00	5%
4270	Cannon Mountain	3	11:53	56.00	5%
4250	Geer Canyon	3	23:44	56.00	5%
4110	Betasso	3	23:58	56.00	5%
4070	Bear Peak	3		56.00	5%
4050	Walker Ranch	3	23:56	56.00	5%
1060	Heritage Square	3	17:56	56.00	5%
4350	Conifer Hill	4	23:48	56.00	7%
4340	Riverside	5	15:49	56.00	9%
4260	Taylor Mountain	5	15:50	56.00	9%
4190	Slaughterhouse	5	23:48	56.00	9%
4100	Filter Plant	5	7:58	56.00	9%
310	Guy Hill Ranch	5	11:57	56.00	9%
150	Nott Creek	5	11:57	56.00	9%
4160	Sunshine	7	2:15	56.00	13%
4040	Martin Gulch	9	9:54	56.00	16%
4300	Big Elk Park	10	8:28	56.00	18%
1370	West Metro FS13	15	16:00	56.00	27%
2930	Spring Valley Rd - DougCnty	17	12:39	56.00	30%
140	Blue Mountain	17	12:45	56.00	30%
1640	SPR at Union Ave.	18	12:00	56.00	32%
1440	Elbert	19	12:40	56.00	34%
1050	Jeffco Fairgrounds	19	14:12	56.00	34%
1810	Sand Creek at mouth	21	4:48	56.00	38%
1350	Chatfield COE	22	12:36	56.00	39%
620	Quincy/Highline	22	12:33	56.00	39%
520	Jewell Detention	22	13:06	56.00	39%
300	Van Bibber Park	22	12:33	56.00	39%
1010	Denver West	23	11:57	56.00	41%
540	Parker/Mississippi	23	11:57	56.00	41%
530	Fire Station #19	23	11:57	56.00	41%
440	Fire Station #7	23	12:32	56.00	41%
1710	Shop Creek	24	13:05	56.00	43%
1460	Stapleton	24	1:05	56.00	43%
840	Fire Station 12	24	12:32	56.00	43%
1330	Roslyn	25	12:00	56.00	45%
830	Side Creek Park	25	11:57	56.00	45%
760	Mission Viejo Park	27	11:29	56.00	48%
4770	Cal-Wood Ranch	29	15:30	56.00	52%
4730	Sugarloaf	39	16:00	56.00	70%
1630	SPR at Dartmouth	39	16:22	56.00	70%
4150	Gold Hill	41	16:03	56.00	73%
4860	Fairview Peak	43	14:50	56.00	77%
4570	St. Antons	43	14:41	56.00	77%
4560	Lyons Diversion NSV	43	14:51	56.00	77%

4140	Logan Mill	43	14:20	56.00	77%
4850	Porphory Mtn	45	13:38	56.00	80%
4240	Sunset	45	14:18	56.00	80%
4130	Swiss Peaks	45	14:30	56.00	80%
4090	Magnolia	45	13:06	56.00	80%
4060	Lakeshore	45	13:59	56.00	80%
4010	Crescent	45	13:20	56.00	80%
4810	Shanahan Ridge	46	13:43	56.00	82%
4530	Winiger Ridge	46	13:39	56.00	82%
4080	Twin Sisters	46	13:34	56.00	82%
2710	Highlands Ranch WTP	46	13:40	56.00	82%
1000	Maple Grove Resv.	46	13:21	56.00	82%
4840	SBC@S Boulder Ditch	47	13:18	56.00	84%
4750	Louisville Lake	47	12:16	56.00	84%
4710	Ward C-1	47	13:45	56.00	84%
4220	Fling's	47	13:49	56.00	84%
4830	SBC @ San Souci	48	13:00	56.00	86%
4180	Gold Lake	48	13:15	56.00	86%
2750	Castle Rock	48	13:16	56.00	86%
700	Toll Gate @ 6th	48	13:16	56.00	86%
4820	Doudy Draw	49	13:15	56.00	88%
2990	Tomah Rd-Douglas Cnty	49	13:01	56.00	88%
1920	Brighton	49	13:00	56.00	88%
1570	Brighton Ditch Wx	49	12:46	56.00	88%
920	Aurora Town Hall Wx	49	12:46	56.00	88%
4550	Boulder Jail	50	12:28	56.00	89%
4170	Pine Brook	50	11:59	56.00	89%
2730	Salisbury Park	51	12:28	56.00	91%
2220	Evergreen Lake	51	12:26	56.00	91%
2210	Hiwan G.C.	51	12:44	56.00	91%
2190	Squaw Mountain	51	12:14	56.00	91%
1420	Diamond Hill	51	12:15	56.00	91%
900	Aurora Reservoir	51	12:14	56.00	91%
2330	Morrison	52	12:12	56.00	93%
970	Pump Sta 3	52	12:28	56.00	93%
750	Quincy Reservoir	52	12:52	56.00	93%
1660	SPR at Henderson	53	12:38	56.00	95%
2320	Choke Cherry Resvr	192		192.00	100%

Rain Event Performance				Analyze Rain Sensors										
		Reports Received	176											
	Systemwide Avg	Total Tips	224											
	78.6%	Data Loss	21.43%											
Sensor ID	Performance	1-tips	2-tips	3-tips	4-tips	5-tips	6-tips	>6-tips	Rcv	Exp	Miss	Hold	Bucket	
4030	20%	1	0	0	0	0	0	1	2	10	8	0	0.0393701	
4470	20%	0	0	0	0	1	0	0	1	5	4	0	0.0393701	
4490	25%	0	0	0	1	0	0	0	1	4	3	0	0.0393701	
4110	33%	0	0	1	0	0	0	0	1	3	2	0	0.0393701	
4790	33%	0	0	1	0	0	0	0	1	3	2	0	0.0393701	
4510	33%	1	0	0	0	1	0	0	2	6	4	0	0.0393701	
4200	40%	0	1	1	0	0	0	0	2	5	3	0	0.0393701	
4250	40%	1	0	0	1	0	0	0	2	5	3	0	0.0393701	
4040	43%	2	0	0	0	1	0	0	3	7	4	0	0.0393701	
4770	50%	2	0	0	0	0	0	3	2	4	2	0	0.0393701	
840	50%	0	1	0	0	0	0	0	1	2	1	0	0.0393701	
4160	50%	0	1	0	0	0	0	0	1	2	1	0	0.0393701	
4290	50%	0	1	0	0	0	0	0	1	2	1	0	0.0393701	
4340	50%	1	0	1	0	0	0	0	2	4	2	0	0.0393701	
4020	67%	1	1	0	0	0	0	0	2	3	1	0	0.0393701	
4070	67%	1	1	0	0	0	0	0	2	3	1	0	0.0393701	
4130	67%	1	1	0	0	0	0	0	2	3	1	0	0.0393701	
4140	67%	1	1	0	0	0	0	0	2	3	1	0	0.0393701	
4190	67%	1	1	0	0	0	0	0	2	3	1	0	0.0393701	
4150	75%	2	1	0	0	0	0	0	3	4	1	0	0.0393701	
1370	80%	3	1	0	0	0	0	0	4	5	1	1	0.0393701	
4820	80%	3	1	0	0	0	0	0	4	5	1	0	0.0393701	
1460	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
1710	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
2210	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4010	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4050	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4080	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4100	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4180	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4220	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4230	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4260	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4270	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4360	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4520	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
4750	100%	1	0	0	0	0	0	0	1	1	0	0	0.0393701	
310	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
520	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
830	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
1060	100%	2	0	0	0	0	0	0	2	2	0	1	0.0393701	
1570	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
2320	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
2710	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
4550	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
4570	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
4730	100%	2	0	0	0	0	0	0	2	2	0	0	0.0393701	
440	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
620	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
760	100%	3	0	0	0	0	0	0	3	3	0	1	0.0393701	
920	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
1010	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
1050	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
1330	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
1640	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
4060	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
4240	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
4300	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
4530	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
4840	100%	3	0	0	0	0	0	0	3	3	0	0	0.0393701	
300	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701	
530	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701	
540	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701	
1000	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701	
2990	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701	
4090	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701	
4830	100%	4	0	0	0	0	0	0	4	4	0	0	0.0393701	
1350	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701	
1420	100%	5	0	0	0	0	0	0	5	5	0	0	0.0393701	
4710	100%	6	0	0	0	0	0	0	6	6	0	0	0.0393701	
4170	100%	7	0	0	0	0	0	0	7	7	0	0	0.0393701	
4810	100%	8	0	0	0	0	0	0	8	8	0	0	0.0393701	
	<b>Total Tips</b>	<b>154</b>	<b>12</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>176</b>	<b>224</b>	<b>48</b>	<b>3</b>		

