

Ole's Cave and Lake Cave Visitation For April 25, 2015 – November 1, 2015

*** Revised Report – February 11, 2016 ***

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Summary

The objective of this ongoing study is to better determine human visitation **in Lake Cave, Ole's Cave and Upper Ape Cave**. This is the first six month report.

Motion sensors were placed in Ole's Cave in the ceiling 200 feet down flow from the third entrance, and in Lake Cave 205 feet down flow from the bottom of the ladder, high on the right wall. Both collected data from April 25, 2015 to November 1, 2015 for a total of 191 days. A third data logger was placed inside the Upper Ape Cave entrance 200 feet down from the Upper Entrance but was not activated correctly, consequently there is no report for Ape Cave. Time stamps for motion detected in Ole's Cave and Lake Cave from April 25, 2015 to November 1, 2015 was not seen in the original data exported from the data loggers. Further investigation of the data logger files lead to the discovery of time stamps for each motion detected. The time stamps allow a more accurate analysis of each cave's activity. With the time information, analysis implies the conclusions from the earlier report were incorrect.

Most of Ole's Cave activity is at night (animals). Most of Lake Cave's activity is by day. Lake Cave receives three to four times more trips than Ole's Cave.

Ole's Cave:

Over 90 percent of motion detected in Ole's Cave was during night time hours. **Motion during the day In Ole's Cave indicates there were up to 77 trips with the highest traffic during the weekends followed by Fridays and Mondays.** It was anticipated that most of the day visits would be round trips, however some trips may have been "through trips". Of the 77 trips, 35 showed return motion. The remaining 42 trips had no other activity for the day or, there were several hours between the day's motion detections indicating a second trip. Some of these day motion detections may be from animals. Motion was detected a total of 1429 times; people going in, people going out, or animal movement. Motion during the day hours was 139 times (9.7%). Motion during the night hours was 1290 times (90.3%).

There was an average of less than three trips per week to Ole's Cave during the 27 week period.

Lake Cave:

Lake Cave activity was primarily by day and primarily by humans. Very little night activity occurred. Lake Cave has one entrance, so trips into the cave return by the same route. Motion during the day in Lake Cave indicates **there were approximately 244 trips with the highest traffic during the weekends**

followed by Fridays and Mondays. The trips vary from a few minutes to about two hours, with a large percentage being 1-1.5 hours long. This is understandable with the round trip traverse time.

There are two items of note:

- On seven days during the period there was constant use during several hours of the day, so a “best guess” of a trip count was made; total hits divided by two.
- There were at least twelve night trips in the cave. In all cases, motion was detected in the evening, and then detected again about an hour later during exit. Six of these trips were on Friday evenings.

There was motion in Lake Cave a total of 565 times; people going in, people going out, or animal movement. The day activity was 503 times (89.0%) and the night activity was 62 times (11.1%).

There was an average of nine trips per week to Lake Cave during the 27 week period.

Equipment and Methods

Three Onset HOBO UX90-006Ms, each capable of over 346,795 measurements were used. Each unit was packaged inside a small container and filled with desiccant to reduce humidity. Only the motion detection sensor array was used due to the memory capacity and in-cave conditions. Onset software was downloaded from the Onset website at no extra cost. Each data logger was started with a button push when positioned in each location. Data was downloaded on site, and then the replaced for the next period. Batteries are good for up to one year. After data extraction and battery replacement, each device was launched for the next period using a laptop computer on site. A laptop with Windows 7 was used for this set of data. A 16 foot collapsible ladder was used for positioning each sensor high out of reach of visitors.

Motion was detected in one second intervals. These detections were then collected in one-minute blocks. There were 191 days of data taken. In Ole’s Cave there were 1429 hits with 172 days of activity (90%).

For this study the Day-Night determination was made as follows:

- Day starts at 8:00 am
- Night starts at Sunset minus ½ hour
- Sunset times based on Portland, OR. sunset times (+/- 2 minutes)

Trip “in/out” determinations were made by the author after observing patterns that developed. Many Lake Cave “round trips” were in the 50 minute two hour timeframes. Sometimes these were the only hits for the entire day. This pattern continued during the evening/night trips.

SUNSET	0.5	
6th of Month	Sunset minus 1/2 hour Est. *	Daily Sunset change in month
January	16.22	0.023
February	16.90	0.023
March	17.58	0.056
April	19.27	0.021
May	19.90	0.018
June	20.43	0.003
July	20.52	-0.017
August	20.02	-0.030
September	19.12	-0.032
October	18.17	-0.028
November	17.33	-0.046
December	15.95	0.009
* Example: 16.22 is 4:22 pm		
Sunset Time Approximation		

In Ole’s Cave, less than half were “round trips”. The majority of the round trips were in the 30 minute to 75 minute range. Sensor placement was optimal so it is doubtful a return trip was missed. This implies that some of the day time activity was animals and not human.

Ole's Cave Activity

Ole's Cave Visitor Day Activity by Day of the Week:

As expected, the activity was highest activity was on Saturdays.

Sunday was next, followed by Friday and Monday.

Trips: Day of Week	
Sunday	16
Monday	12
Tuesday	3
Wednesday	4
Thursday	6
Friday	14
Saturday	22
Total Trips	77

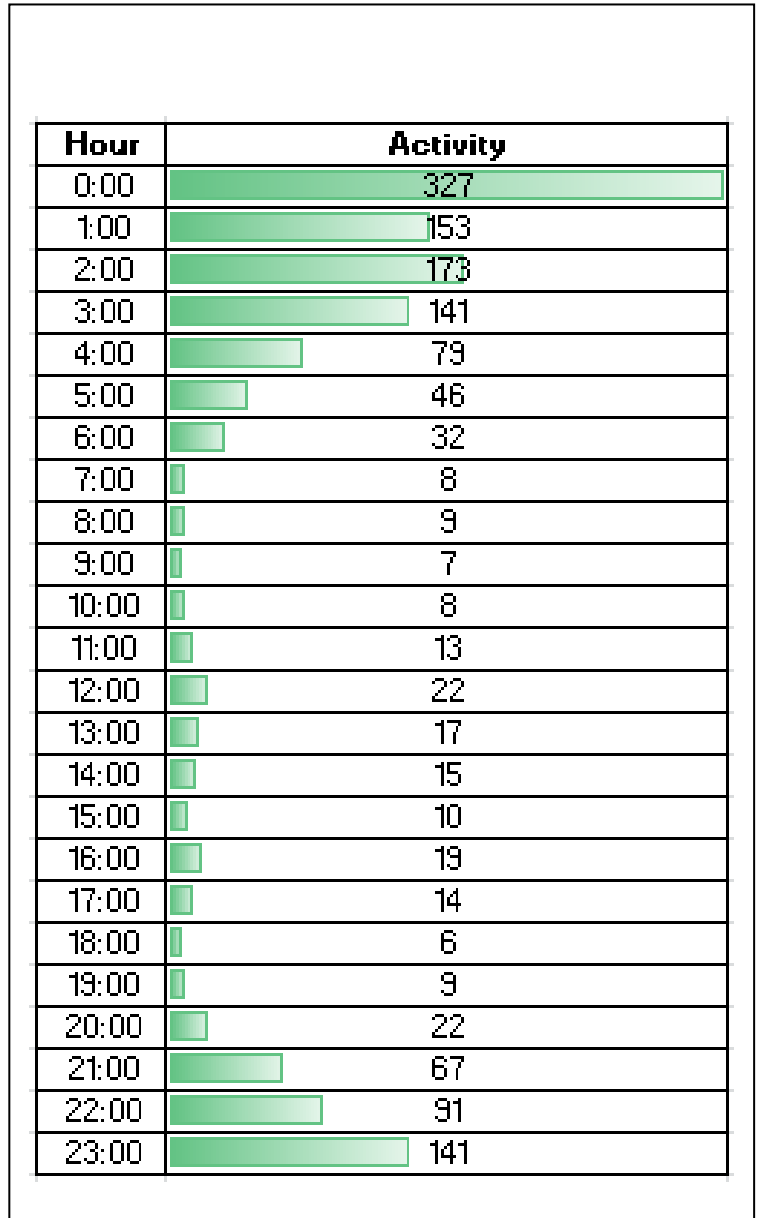
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Monday	12
Tuesday	3
Wednesday	4
Thursday	6
Friday	14
Saturday	22
Total Trips	77

For computations in Excel, ASCII times were converted to decimal format. For example, 4:31 pm was converted to 16.31 (military time with decimal minutes.)

Ole's Cave Activity by Hour of Day:

The vast majority of activity in the cave is at night from 11 pm to 4 am. The highest activity was from 12 midnight to 1 am.

Any Activity: Hour of Day (start)		
Hour	Activity	Trip
0:00	327	
1:00	153	
2:00	173	
3:00	141	
4:00	79	
5:00	46	
6:00	32	
7:00	8	
8:00	9	5 trips
9:00	7	5 trips
10:00	8	7 trips
11:00	13	6 trips
12:00	22	14 trips
13:00	17	5 trips
14:00	15	5 trips
15:00	10	7 trips
16:00	19	13 trips
17:00	14	5 trips
18:00	6	1 trip
19:00	9	1 trip
20:00	22	3 trips
21:00	67	
22:00	91	
23:00	141	
Total	1429	77 trips



Other Items of Interest in Ole's:

- Holidays (Memorial Monday, 4th of July, Labor Day Monday) had no additional activity.
- Night activity was more than ten times Day activity.
- Some Entry and Return times are over an hour later. Multiple activities with less than 10 minutes in between are listed below.
- The In/Out times show that the motion from many of the trips was detected in both directions.

Date	In/Out Time Difference in Minutes	Comments
4/26	62	3 outs over 6 minutes
4/26	12	2 outs over 2 minutes
4/29	20	
5/18	11	
5/29	43	2 outs over 9 minutes
5/30	39	2 outs over 3 minutes. Sat. 8:39 pm trip
6/4	65	
6/12	39	One group. 2 ins, 2 outs
6/20	88	20 day hits. Est. five trips Sat. 8:47 pm trip
7/12	75	2 outs over 2 minutes
7/14	63	
7/25	43	
8/16	39	
8/16	28	2 outs over 3 minutes
8/20	63	
8/20	13	2 ins over 2 mins
8/29	64	
9/11	11	
9/19	34	
10/4	26	
10/6	29	
10/16	58	
10/17	65	2 outs over 1 min

Lake Cave Activity

Lake Cave activity was primarily by day and primarily by humans. For the 27 week period, **Lake Cave received an average of nine trips per week with the majority of the trips occurring on the weekends.** Many of the trips were in the cave for one to two hours. Very little night activity occurred. There were

565 hits during the 191 day period. There were at least twelve night trips into Lake Cave. These were identified by noting motion in the evening, followed by a second sensor hit one to two hours later.

On seven days Lake Cave received substantial, continuous visits during the days. Four of the seven days were on the weekends. The Tuesday April 28th activity was from a large high school field trip (personal communication)

- Tuesday April 28th (21 hits from 11:00 am to 2:30 pm – 3.5 hours)
- Sunday May 24th (17 hits from 12:30 pm to 5:45 pm – 5.75 hours)
- Saturday June 6 (22 hits from 12:30 pm to 2:30 pm – 3 hours)
- Thursday August 6th (15 hits from 11:55 am to 4:45 pm – 5 hours)
- Saturday August 8th (25 hits from 10:10 am to 5:15 pm – 7 hours)
- Saturday June 15 (15 hits from 10:20 am to 1:40 pm – 3.3 hours)
- Thursday October 29th (13 hits from 10:50 am to 12:10 pm – 1.3 hours)

Lake Cave Visitor Day Activity by Day of the Week:

As expected, the activity was highest activity was on Saturdays.

Sunday was next, followed by Thursday and Friday.

Trips: Day of Week	
Sunday	62
Monday	21
Tuesday	15
Wednesday	11
Thursday	28
Friday	23
Saturday	84
Total Trips	244

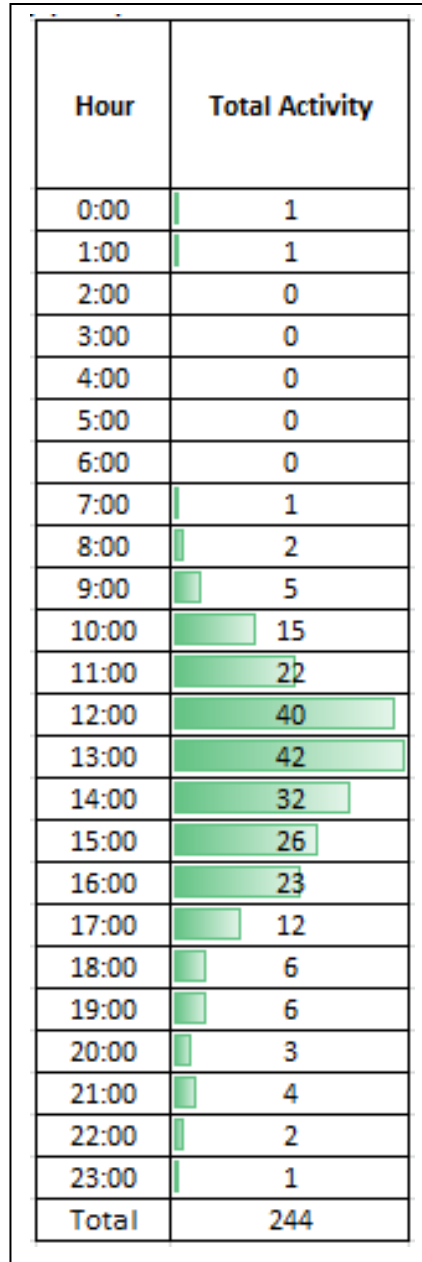
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Total Trips	244

For computations in Excel, ASCII times were converted to decimal format. For example, 4:31 pm was converted to 16.31 (military time with decimal minutes.)

Lake Cave Activity by Hour of Day

The vast majority of activity in the cave is in the afternoons on weekends.

Any Activity: Hour of Day (start)	Activity	Trip
0:00	1	trip
1:00	1	trip
2:00	0	
3:00	0	
4:00	0	
5:00	0	
6:00	0	
7:00	1	trip
8:00	2	trips
9:00	5	trips
10:00	15	trips
11:00	22	trips
12:00	40	trips
13:00	42	trips
14:00	32	trips
15:00	26	trips
16:00	23	trips
17:00	12	trips
18:00	6	trips
19:00	6	trips
20:00	3	trips
21:00	4	trips
22:00	2	trips
23:00	1	trip
Total	244	244 trips



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