STUDYING CAVE VISITATION TRENDS AT TIMPANOGOS CAVE NATIONAL MONUMENT AND NUTTY PUTTY CAVE

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Abstract

Visitation data is vital information for properly managing the use of caves. This presentation will show how visitation information has been collected, organized, and analyzed for the tours at Timpanogos Cave National Monument and uncontrolled visitation problems of the nearby Nutty Putty Cave.

Size, time, and date for each tour are recorded at Timpanogos Cave National Monument. The data was used to graph tour size frequency, seasonal and daily visitation fluxes, and the variability between tours sold and tours given.

At Nutty Putty Cave, a StowAway® light intensity datalogger was used to record the maximum light exposures over 15-minute intervals. This method collected high-resolution visitation data used to graph visitation by season, week, days of the week, and time of day. A surface register was used to collect visitation demographics. The data showed that local Boy Scouts troops were the largest visiting group with 17% of the total visitation and that National Speleological Society grottos were the smallest visiting groups of 1% of the total visitation.

Visitation data is a useful tool that can drive management changes. At Timpanogos Cave National Monument, we are currently associating resource violations (such as touching formations, littering, and leaving tours) with visitation trends to reduce visitation impacts. At Nutty Putty Cave, visitation information helped convince the Utah State Trust Lands that better management practices are needed. Having visitation information is vital to creating valuable change for these two heavily used caves.

Caves are managed by managing people. A common management concern is the negative, sometime irreversible, effects of over visitation. An often overlooked tool to managing caves is seeking to understand its visitation.

Visitation statistics were collected from tour operations of Timpanogos Cave National Monument and from the public access of Nutty Putty Cave. This paper shows the different purposes and techniques of collecting the visitor statistics in a tourist cave and a popular wild cave.

Timpanogos Cave

Timpanogos Cave National Monument is located about a 40 minute drive south from Salt Lake City and a 30 minute drive from Provo. The cave is located along the high cliffs of the American Fork Canyon within the Wasatch Mountains. Every visitor hikes 1½ miles gaining 1,100 feet in elevation along a paved trail to reach the cave. Due to being located at 6,600 feet in elevation, the amount of snow allows the cave to be open for only the summer season each year. In that 6-month season, an average of 69,439 visitors toured through Timpa-

nogos Cave.

The tours through Timpanogos Cave offer a unique up-close and personal cave experience of a fault-controlled cave nicely decorated with an abundance of helictites and anthodites. The tours are limited to 20 people per tour at which visitors seem to be crammed in at each stop. The maximum daily visitation is about 1,100 visitors in 55 tours — that's a sold-out tour going every ten minutes.

The goal for studying visitation trends at Timpanogos Cave is to maximize resource protection, safety, and visitor's satisfaction while maximizing revenue. Some of the methods to accomplish this goal are:

- Publish the "best" time to visit.
- Higher use of volunteers and partnerships
- Provide incentives to visitors to come during slow hours or days
- Find the optimal tour size and daily tour densities

At Timpanogos Cave National Monument, visitation statistics are collected at the Visitor Center as tour times are being scheduled and at the cave entrance as tours are being given. So the number of visitors for each tour time is recorded twice.

Looking at the seasonal visitation (Figure 1), the highest average peaks fall along holiday weekends. The minimum daily visitations noticeably increase as schools are out of session. The overall visitation peak occurs during the hottest time of the year with the summer highs reaching over 100º F.

Daily visitation (Figure 2) is fairly constant throughout the day with a very broad peak around noon. Also the cave shows consistently larger average and maximum numbers than the Visitor Center.

Studying tour size frequency

A greater number of large tours occur at the cave to deal with complications such as late and early arrivals. As big tours are scheduled at the Visitor Center, even bigger tours occur at the cave.

Nutty Putty Cave

Nutty Putty Cave is the most heavily visited
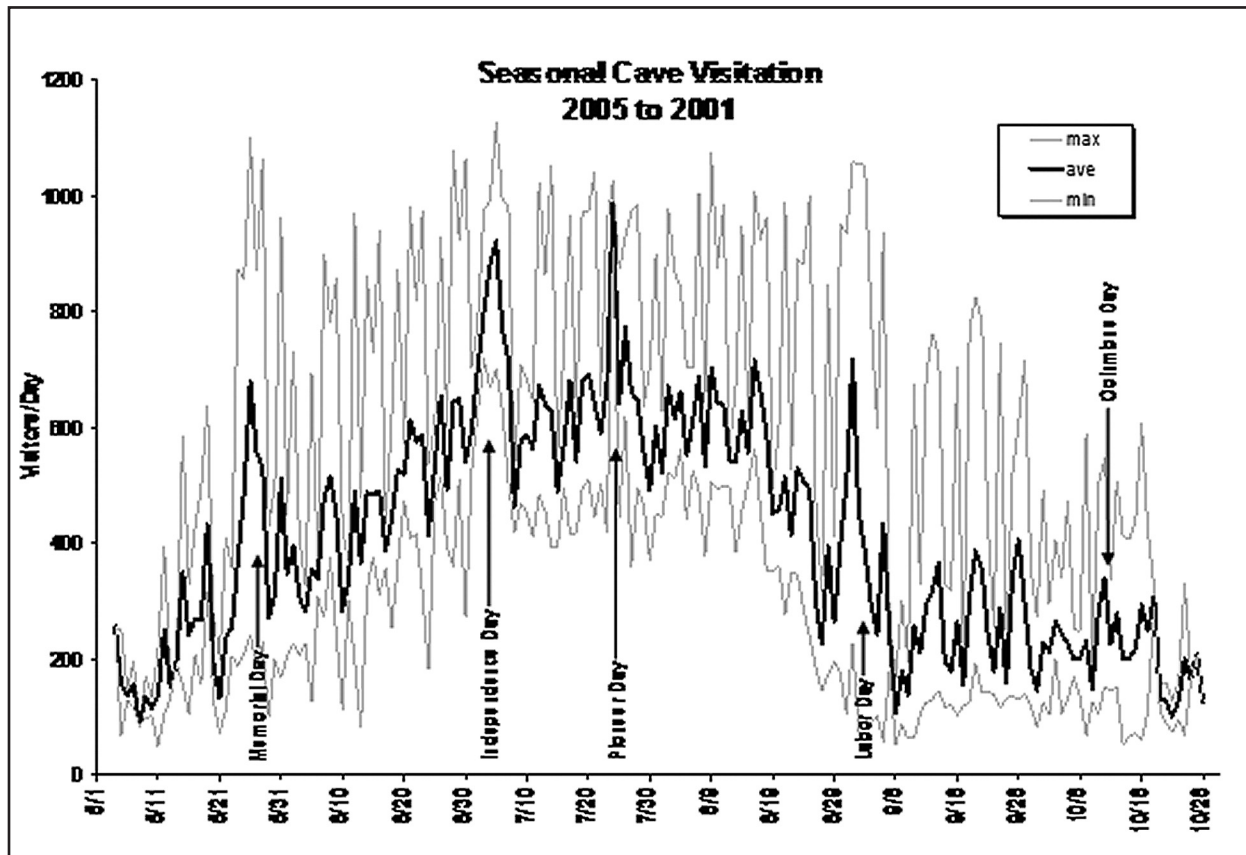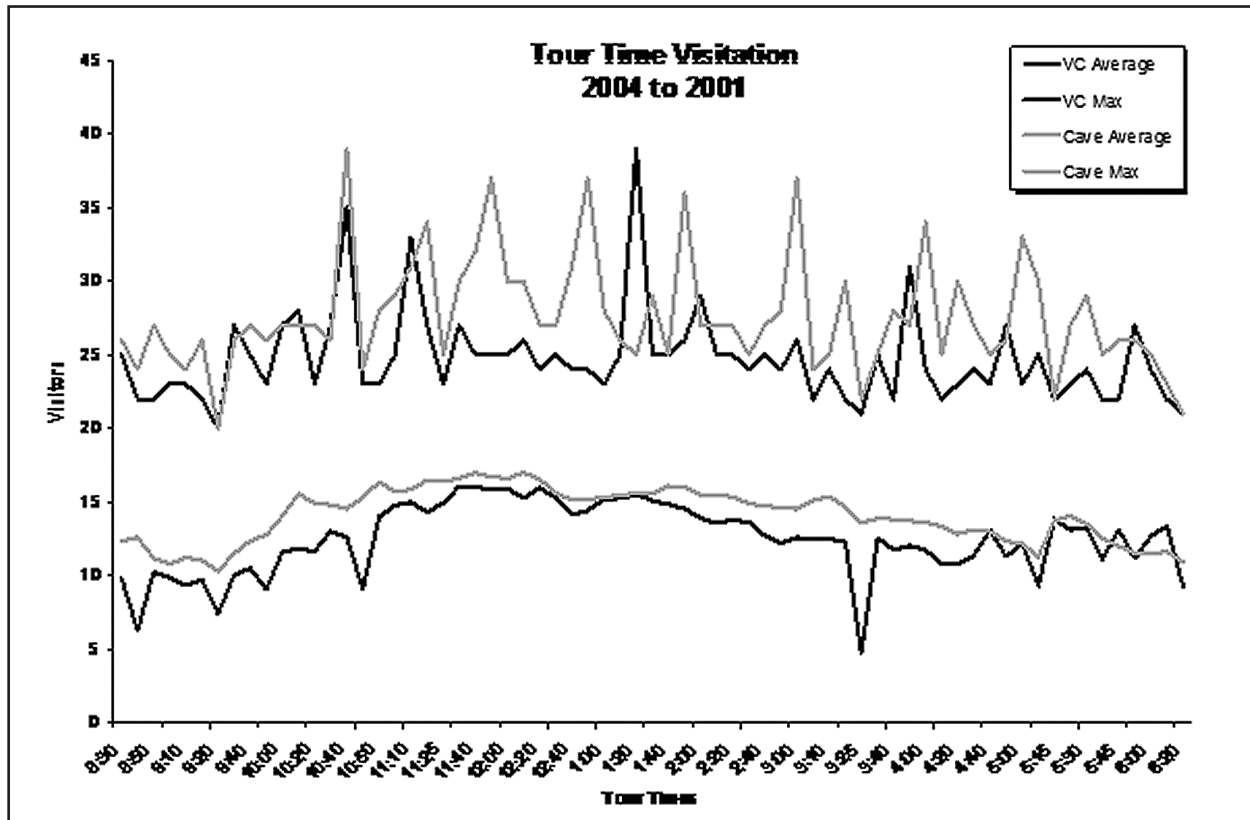

Figure 1. Seasonal visitation at Timpanogos Cave.

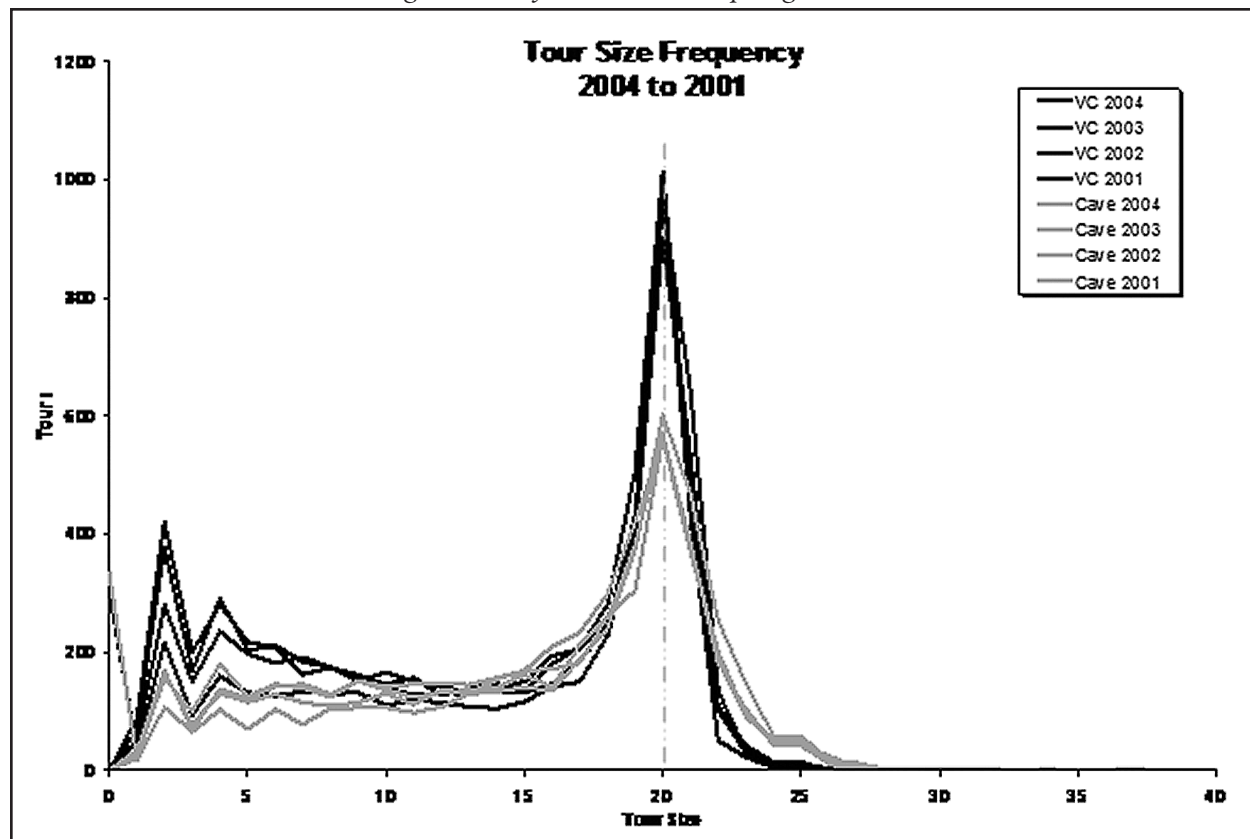*Figure 2. Daily visitation at Timpanogos Cave.*
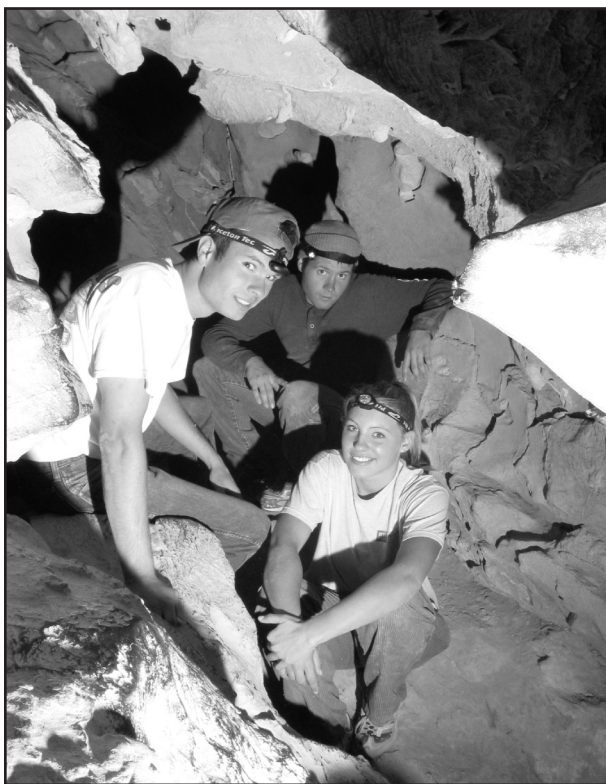

Figure 3. Tour size frequency.

Figure 4. Typical outfitted Nutty Putty Cavers.

wild cave in Utah. Using a light counting sensor the annual visitation is estimated at over 4,909 visits – twice the combined visitation to all of the other Utah wild caves.

The main concern in Nutty Putty Cave is safety. A large percentage of the visitors are not properly prepared. They do not wear helmets, carry extra lights, or seek proper leadership or training. The fixed ropes for the short climbs in the cave are worn through their shields in a matter of months. Often trails of blood and other human waste litter the cave.

In 2004, the problem escalated with two full rescues occurring over Labor Day weekend. The local Utah County Sheriff's office and the owners,

Figure 5. HOBO stow-away light intensity logger.

the Utah State Trust, initiated a meeting between the Boy Scouts of America, Brigham Young University, and Timpanogos Grotto to find solution to increasing liability risks. The visitation data gather has been a helpful tool

in guiding the actions to implement proper cave management practices in this popular cave.

Visitation data was collected through two methods, a light sensing datalogger and a cave register. A HOBO Stowaway light intensity logger (retails for $191) was used to collect maximum light intensity readings every 15 minutes. The logger was then placed into a clear HOBO submersible case (retails for $39) and hidden in an out-of-reach location with the light sensor facing towards the cave's main path. A flip-top cave register was placed on the surface to record demographics, such as group affiliation and visitor's locality.

Before the light intensity logger was stolen, 9 months of continuous data was collected (Figure 6). Over a period of 288 days, 3,871 visits were recorded. This is an average of 13.4 visits per day. The logger showed that the cave was occupied 13.8% of the time.

An advantage of collecting visitation data through a datalogger is that the data can be filtered by date, days of the week, and 15-minute time slots. When studying the data graphed by time intervals (Figure 7), visitation trends can be seen. The bottom bars show the constant Saturday visitation. The next bars represent the most frequently occurring Friday night visitation. Surprisingly, almost all of the possible 15-minute intervals within a day recorded some visitation.

The surface cave register recorded the percentage of the cave's usage by organized groups (Figure 8). Amazingly, organized cavers or grotto members seem to have abandoned the cave. The main use was from Boy Scouts, Latter Day Saints church wards, and universities. So these groups are going to be included in implementing the future management solutions to improve the Nutty Putty Cave's safety problems.

Conclusion

Caves are highly limited resources. They can only maintain a certain amount of use before resource or safety concerns become overly evident. Seeking to understand visitation uses and trends can greatly aid in properly managing cave resources. Positive management changes are slowly being implemented at Timpanogos Cave and Nutty Putty Cave due to these visitation studies.
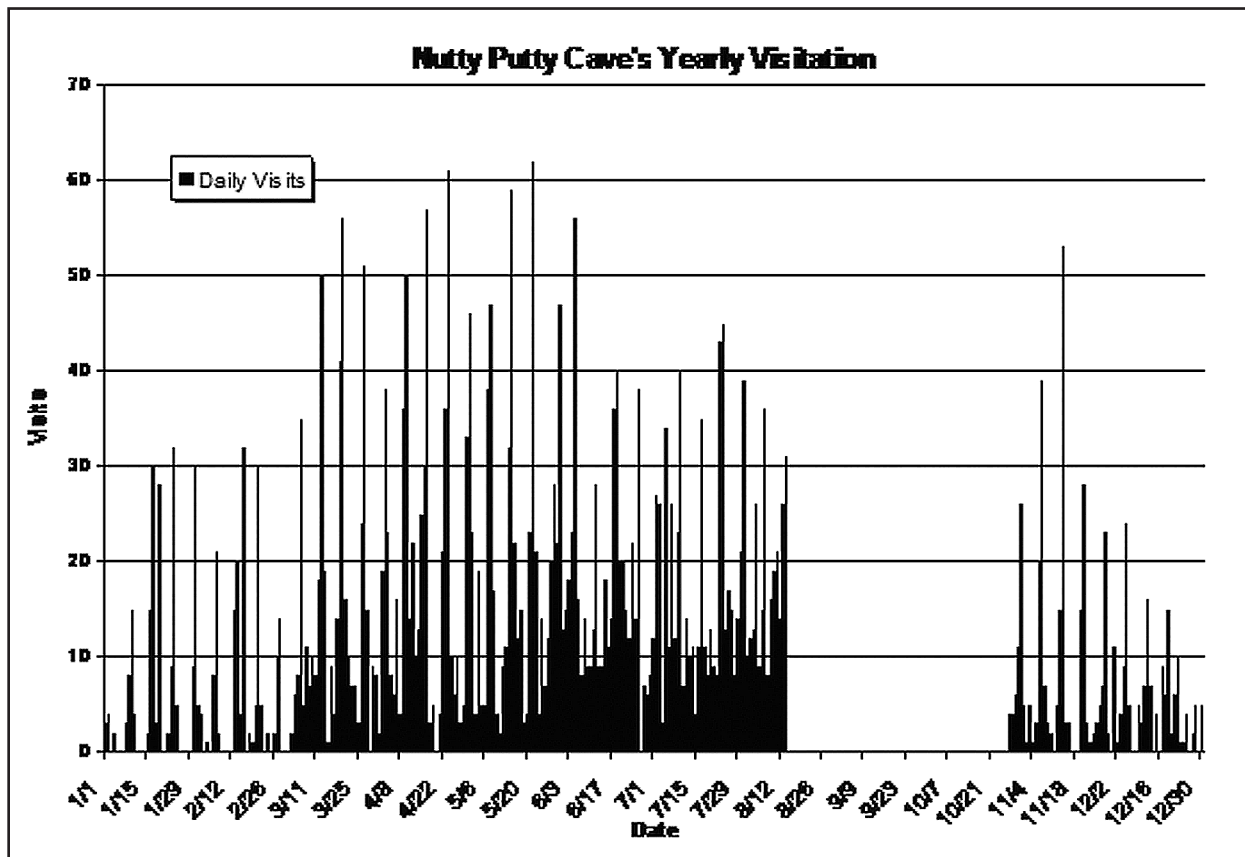
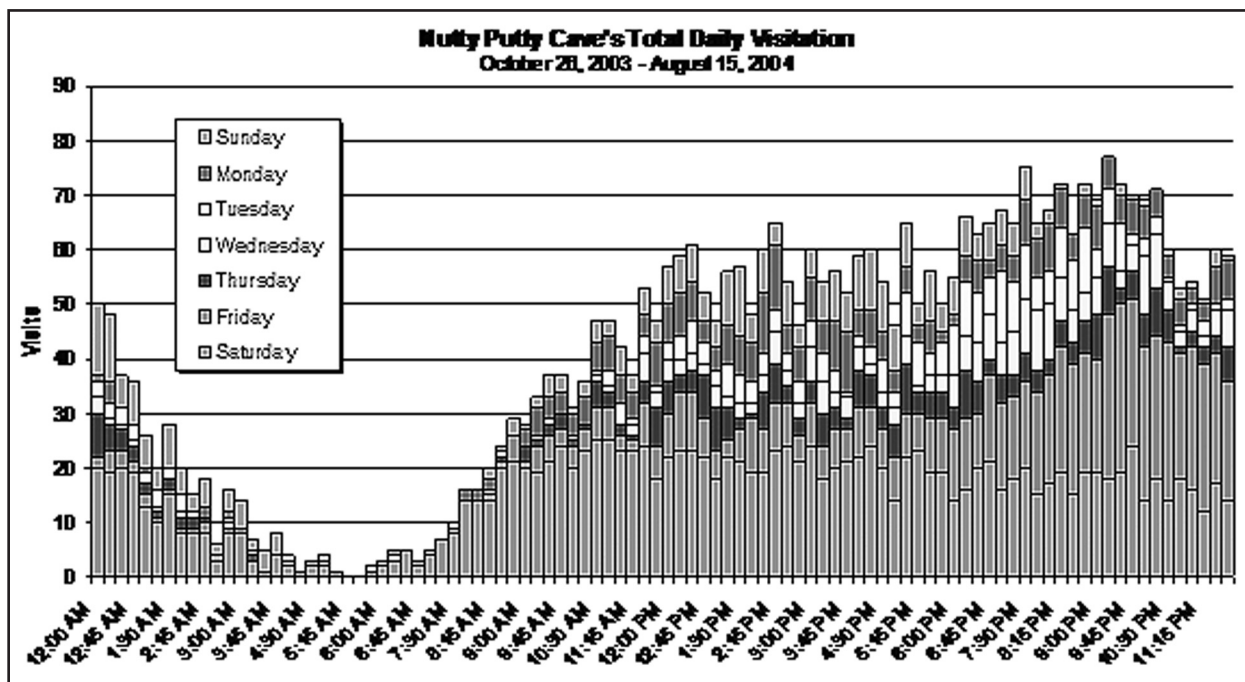*Figure 6. Daily visitation totals collected from Stowaway Logger in Nutty Putty Cave.*

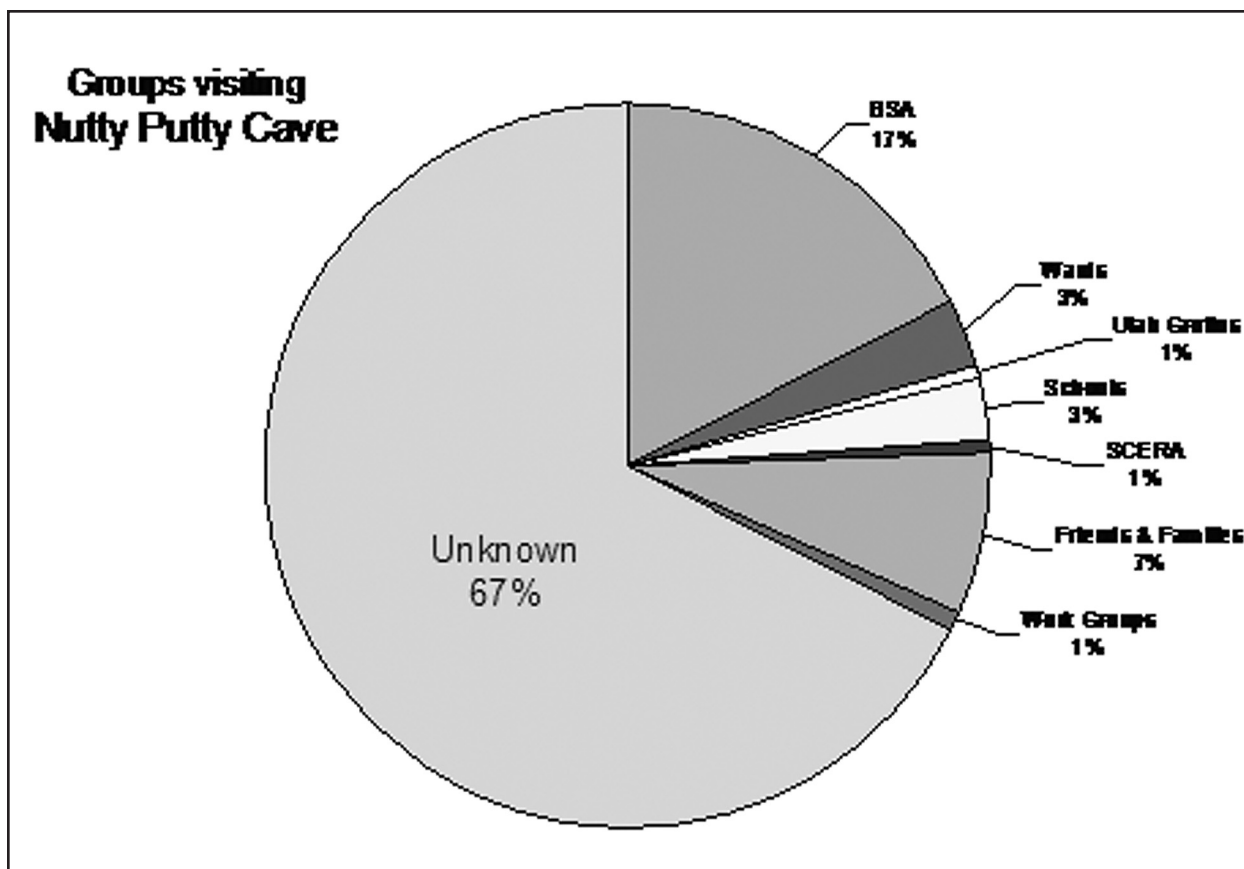*Figure 7. Accumulative visitation graphed in 15 minute intervals.*

Figure 8. Percentage of group usage in Nutty Putty Cave.

Figure 9. Nutty Putty Cave Register.

Figure 10. TV coverage of a mock rescue at Nutty Putty Cave.