
Observations and Activities of the Naturalist at the Desert Tortoise Research Natural Area, Kern County, California: March 16 through June 7, 2005

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August, 2005

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ABSTRACT

The Desert Tortoise Preserve Committee staffed a Naturalist at the Desert Tortoise Research Natural Area (DTNA) located northeast of California City in the western Mojave Desert of Kern County, California from March 16, 2005 to June 7, 2005. The Naturalist, Jan Kaur, was stationed at the DTNA Interpretive Center. During the 74 days the Naturalist was on duty, 594 visitor groups totaling 1686 individuals were recorded at the interpretive center. Visitors stayed on average of 87 ± 91 minutes. The Naturalist made contact with 91% ($n=538$) of the 594 visitor groups for a total of 1536 (91%) individuals.

Most (87%) of the visitors who completed the Visitor Survey Form, made an entry in the Recreation Register or reported to the Naturalist were from California and the other 13% were from out of state (Appendix 3). There were visitors from at least twelve additional states including Arizona, Colorado, Connecticut, Illinois, Minnesota, Nevada, New Jersey, New York, Ohio, Oregon, Texas, and Washington, and nine foreign countries including one group each from Australia, Austria, Belgium, Canada, France, Malaysia, New Zealand, Scotland, and Switzerland.

Some of the visitor groups arrived by off-highway vehicle (126 groups; 21%). The mean stay of off-highway vehicle users (22.6 ± 19.6 minutes) was more than one hour shorter than for other visitors (103 ± 94.5 minutes).

One hundred and ninety two visitor groups comprised of 580 (39%) individual members of the public reported seeing at least one tortoise. Fifty two visitor groups comprised of 165 individuals saw two or more tortoises.

No attempts to collect wild tortoises in the interpretive center area were witnessed. No attempts to release captive tortoises were observed. On two occasions, visitors brought wild tortoises including one marked tortoise that they had found outside the DTNA to the Naturalist. These were returned to their capture sites.

Of 37 respondents to a visitor survey, 13 (35%) were repeat visitors. The most common ways that visitors learned about the DTNA were from the DTNA website, presentations, and from maps. The DTNA was the sole destination for 43% of the respondents to the visitor survey. Red Rock Canyon and the Antelope Valley poppy Preserve were the most frequently visited other attractions that were part of the outing to the DTNA.

INTRODUCTION

Founded in 1974, the Desert Tortoise Preserve Committee (DTPC) works to promote the welfare of the California state reptile, the desert tortoise (*Gopherus agassizii*) in its native wild state in the southwestern United States. It strives to do this by working:

(a) To establish and/or assist in establishment of preserves for the desert tortoise in locations within the southwestern United States where there are habitats and ecosystems which support it.

(b) To provide information, education and research regarding ecosystems critical to the desert tortoise and to associated animal and plant species that may be included in these ecosystems.

(c) To develop and implement management programs for preserves, including other land associated with any preserve, to protect the desert tortoise and the biodiversity of the ecosystems in which it lives.

(d) To foster and to publicize the uses for these preserves for selected forms of recreation, for education, for conservation and for research.

The DTPC was instrumental in establishing the 39.5 square mile Desert Tortoise Research Natural Area (DTNA) in the western Mojave Desert. Since its foundation, DTPC has worked to consolidate the Natural Area by raising funds for purchasing and managing private land within the DTNA and surrounding habitat, and to educate the public about the desert tortoise and the DTNA. The DTPC has funded a Naturalist position at the DTNA each spring, the season when tortoises were most active and visitation is greatest, since 1989 in keeping with its goal to protect the desert tortoise and to educate the public. In 2003, the DTPC staffed a Naturalist at the DTNA from mid-March to mid-June. This marks the fifteenth consecutive year in which the DTPC has had a Naturalist on site at the DTNA.

The DTNA is located northeast of California City in the western Mojave Desert of Kern County, California. Initial protection for the area came in 1973 when it was closed to off-highway vehicle (OHV) use (Bureau of Land Management 1973). The Bureau of Land Management (BLM) established the DTNA in 1976 (BLM 1976) as a Wildlife Habitat Management Area and developed its first management plan in 1977. This plan was updated in 1979 (BLM 1979). The perimeter of the DTNA (except for two 1-mile sections) was fenced in 1977-78 (BLM 1988) and it was closed to grazing in 1978 (BLM 1979). In 1980, the public lands were withdrawn from mining and designated as a Research Natural Area and an Area of Critical Environmental Concern (BLM 1980). A primary reason for establishment of the DTNA in its location was because, at the time, it supported the highest known density of desert tortoises (BLM and California Department of Fish and Game 1988).

The DTNA Interpretive Center (IC) is located in Township 31 South, Range 38 East, Section 34. In the southeast corner of Section 34, a dirt road leads from Mojave-Randsburg Road to a small gravel parking area at the IC. There is an outhouse for visitor use. An interpretive kiosk, constructed in 1980 (BLM 1988), and self-guided nature trails are open for use all year. The kiosk, a 15 x 15 foot shelter, includes eight natural history interpretive panels. The self-guided nature trails consist of a plant loop and an animal loop, each approximately 0.5 mile long, and a shorter main loop. The three trails have numbered interpretive trail posts with corresponding trail guides, available in metal boxes at the beginning of each trail. There is also a discovery loop trail that is approximately 1.75 miles long for the more venturesome visitors.

In addition to these year-round facilities, during the spring months the DTPC places a motor home, the Desert Tortoise Discovery Center (DTDC), on site. The DTDC is a recreational vehicle thirty-two feet in length, with brightly colored tortoises and other desert fauna and flora painted on its sides. It is used as a base and living quarters for the Naturalists and as storage space for the associated educational displays and DTPC fundraising products. The DTDC educational displays include information on Mojave rattlesnakes, black-tailed hares, kit foxes, and common ravens, as well as tortoise shells, DTPC newsletters and handouts on desert tortoise natural history, and upper respiratory tract disease (URTD).

Duties of the Naturalist included:

- (1) Data collection: recording information about visitors and visitation patterns.
- (2) Monitoring: observing the conduct of visitors and taking appropriate action when prohibited activities were observed, recording wildlife sightings, maintaining exhibits along trails, monitoring outhouses for venomous animals, and collecting litter.
- (3) Interpretive services: educating visitors and answering their questions about desert tortoises, other fauna and flora around the IC, and the desert ecosystem; and discussing the DTNA and its role in conserving a part of the desert biome.
- (4) Assisting with DTPC activities: taking part in DTPC programs such as guided tours; selling DTPC fundraising products, such as T-shirts, patches, tie tacks, and postcards.
- (5) Reporting: assisting in preparing a final report for the DTPC, summarizing the activities and observations of the Naturalist during the spring season. The report format is similar to that of reports from previous years and contains comparable analyses.

METHODS

Naturalist

DTPC staffed and supervised a Naturalist on-site at the DTNA for six days each week, approximately 10 hours per day for 74 days between March 16 and June 7, 2004. The Naturalist was headquartered at the DTNA Interpretive Center in the DTPC's "Desert Tortoise Discovery Center" (DTDC) motor home that was positioned between the parking lot and the main trailhead. The Naturalist leads scheduled tours, interacts with visitors, collects visitation data, monitors activity at the Interpretive Center, performs routine sign and trail maintenance, and sells DTPC merchandise.

The Naturalist on duty at the DTNA in 2005 was Jan Kaur. Michael J. Connor, Ph.D., Executive Director of the Desert Tortoise Preserve Committee supervised the Naturalist. Training was provided as needed by Michael J. Connor, DTPC Trustee Laura Stockton, and DTPC volunteer Susan Moore. The Naturalist had a cellular telephone, and was in regular contact with and the DTPC Executive Director. In addition, the DTPC Executive Director or other support personnel made on-site visits at least once every two weeks.

Collection of data

Information on visitors was collated from three sources: (1) "Visitor Survey Form for the Desert Tortoise Natural Area" (Appendix 1); (2) the Bureau of Land Management's Recreation Area and Site Register; and (3) data that had been collected verbally or by observation by the Naturalist and noted on the "Data Sheet for the Desert Tortoise Naturalist" (Appendix 2).

(1) "Visitor Survey Form for the Desert Tortoise Natural Area" (Appendix 1)

When visitors arrived they were asked if they would complete a "Visitor Survey Form for the Desert Tortoise Natural Area" at the end of their visits, because the Naturalist was interested in what they observed and any suggestions they might have. Information recorded by the visitors on the visitor survey form included date of visit, name, address, telephone number, number of individuals in their group, other desert attractions included in this trip, how they learned about the DTNA, previous visits to the DTNA, if the interpretive kiosk, self-guided trails, and the Naturalist were informative and helpful, if they are members of the DTPC, if they would like information sent to them about the Committee and other desert conservation organizations, and if they would like educational materials sent to them about the California desert and the desert tortoise.

(2) Bureau of Land Management's "Recreation Area and Site Register"

The Bureau of Land Management's Recreation Area and Site Register is located between the visitor entrance gate and the kiosk at the Interpretive Center. Visitors can record the date, their city or state of origin, the number of people in their party, the length of their stay and any comments they wish to include. The Naturalist did not ask visitors to write in the register but a pen is made available in case they wish to do so. Some visitors who have completed a Visitor Survey Form on a prior visit and do not wish to do so again will sometimes write comments in the Register. Also, the Register is useful to determine how many visitors may have visited while the Naturalist was off duty. At times, when the Naturalist is leading a tour and is away from the visitor's center, data on other visitors may not be recorded but the Register is always available.

(3) "Data Sheet for the Desert Tortoise Naturalist" (Appendix 2)

Data recorded by the Naturalist on the "Data Sheet for the Desert Tortoise Naturalist" included date, name of the Naturalist, start and end time, weather conditions, numbers of groups and individuals, vehicle descriptions, arrival and departure times, visitor gender, length of stay, whether visitors filled out a "Visitor Survey Form for the Desert Tortoise Natural Area," whether visitors were contacted by the Naturalist, notes on tortoises and other species observed, notes on human related impacts, general visitor knowledge, and whether the visitors arrived on an off-highway vehicle (OHV). An OHV is defined as any 2, 3, or 4-wheeled

vehicle that is not designated for use on a highway (i.e. is not considered “street-legal”). Length of stay was determined by recording vehicle arrival and departure times. Visitor gender was categorized as male, female or unknown. The category “unknown” included OHV users who arrived at the DTNA and did not remove their helmets, groups with some members who remained inside their vehicles, and members of large tour groups.

Analysis of data

Analyses similar to previous Naturalists’ reports (Howland 1989, Ginn 1990, Jennings 1991, Ogg and Gallant 1992, Kidd 1993, Boland 1994 and 1995, On-Track Consulting and Research 1996, 1997, 1998, 1999, Connor 2000, 2001, 2002, Connor and Hemingway, 2003, Connor and Kaur, 2004) were conducted to compare data gathered between 1989 and 2003 with the 2004 data sets. These analyses focused on average group size, average length of visit for a group, and average time of day of visit and how these parameters varied by month and type of day, as well as differences in visitation by OHV users versus non-OHV users. Similarly, groups rather than individuals were used as the unit of comparison in analyses of visitation patterns in previous years because individuals within a group cannot be treated as statistically independent observers.

Data was entered into a Microsoft © Access database and statistical analysis performed with Microsoft © Excel using tools available in the Analysis Toolpak. Chi-square tests were used to evaluate overall and OHV visitation by month and by day (weekday, weekend, holiday). Mondays through Fridays were considered weekdays, Saturdays and Sundays were considered weekends. For each of these analyses expected values were compared to observed values. The null hypotheses used were that visitation was equally distributed by month (corrected for the number of days in each month) and that visitation was equally distributed by type of day (corrected for the numbers of each type of day). An unpaired t-test was used to determine if the parameters of group size, length of stay, and time of day of visit varied between OHV and non-OHV users. Relationships between visitor group size, length of stay and visitor encounters with tortoises were examined by regression analysis and analysis of variance (ANOVA) as appropriate.

In all analyses test results with a probability of less than 0.05 were considered significant.

Interpretive services

The DTDC was parked perpendicular to the fence in an open flat area west of the parking lot by the main trailhead. Most interpretive services took place in front of the DTDC where the displays, specimens, literature/handouts, and DTPC merchandise were located. When visitors were few, the Naturalist would accompany a group on their walk, help them search for a tortoise, and answer any questions that came up along the way. The DTPC encourages large visitor groups to call in advance and arrange visits on weekdays when visitation is lower.

The Naturalist greeted most visitors as they approached the DTDC to welcome them and answer any initial questions they might have before they began their walks. After welcoming visitor groups to the DTNA, the Naturalist made an attempt to cover the following topics:

- (1) a brief history and purposes of the DTNA; the reason for being set aside, and the mission/goals of the DTPC and partnership agencies;
- (2) direct and indirect human impacts on the Mojave Desert and desert tortoise;
- (3) raven predation, and other reasons for the decline in tortoise populations;
- (4) release of captive tortoises and URTD;
- (5) desert tortoise ecology and natural history, including current and historic geographic range;
- (6) flora and fauna of the Mojave Desert;
- (7) visitation guidelines to be observed while visiting the DTNA:

- a. minimize the impact to the desert--emphasizing this is a "natural area";
- b. do not harass or collect tortoises, lizards, snakes, plants or disturb their habitats;
- c. be alert for rattlesnakes; and
- d. protect self from the desert elements.

Visitors were then directed to the kiosk where additional tortoise information and graphics, as well as illustrations of wildflowers, mammals, birds, snakes, and lizards could be found, and the self-guiding trailheads.

The Naturalist attempted to contact all visitors upon their departure to find out what they had seen on their walks, help them identify unknown flora and fauna, or answer questions that may have arisen during their walks. Sometimes they were reminded to fill out visitor survey forms.

Monitoring

Most of the Naturalists' time was spent observing visitor conduct and monitoring arrival and departure times of visitor groups. When visitor behavior was inappropriate, intervention by the Naturalist was necessary. Visitors arriving with dogs were intercepted before they passed through the entrance and asked to tether their pet to their vehicle or in the shade of the DTDC.

Tortoises and other vertebrate species that were observed by the Naturalist and visitors were recorded on the "Data Sheet for the Desert Tortoise Naturalist." General weather conditions were recorded on data sheets (wind speed, cloud cover, and rain events), and daily high and low temperatures. The daily high, low and noon temperatures were determined with an electronic thermometer (Precisetemp Weather Center, model 91047W, manufactured by Springfield Precision) that was mounted near the DTDC and logged on the "Data Sheet for the Desert Tortoise Naturalist". Rainfall was measured in a rain gauge located near the DTDC.

Other monitoring duties included picking up trash and cigarette butts, cleaning the outhouse, keeping the outhouse door closed to prevent entry of rattlesnakes, removing black widow spiders from the outhouses, returning used trail guides to their appropriate boxes and restocking them when necessary, replacing exhibits, and cleaning out the artificial tortoise burrows on the nature trails. Each morning and evening the Naturalist walked the DTNA entry road to observe any impacts from the day's visitation.

Another duty of the Naturalist was to sell DTPC products. Products were displayed on a table, along with educational materials, in front of the DTDC.

RESULTS

Collection of visitor data

On Site Presence

The Naturalist was present at the Interpretive Center on 74 days between March 16 and June 7, 2005. This included: 14 days in March; 26 days in April; 27 days in May; and, 7 days in June. The Naturalist was on duty about 10 hours a day for 6 days per week. The Naturalist stayed overnight in the DTPC's motor home so on site presence was higher than is indicated by her time on duty. The Naturalist took one day off each week, usually on Tuesday or Wednesday. These days have had the lowest visitation rates at the DTNA in previous years. The dates on which visitation and monitoring data were not collected were: March 23, March 29, April 6, April 12, April 19, April 26, May 3, May 11, May 18, May 25, and May 31.

Visitation

A total of 1686 individuals in 594 visitor groups were recorded on the 74 days the Naturalist was on duty (Table 1), an average of 22.8 individuals per day. This included 606 males, 469 females, and 601 of unreported gender.

In 2004, a total of 965 individuals in 387 visitor groups were recorded on the 79 days the Naturalist was on duty an average of 12.2 individuals per day. This included 512 males, 340 females, and 113 unknown. In 2003, a total of 1243 individuals in 467 visitor groups were recorded on the 79 days the Naturalist was on duty from 21 March through 19 June 2003, an average of 15.7 individuals per day. This included 632 males, 452 females, and 159 unknown. In 2002, a total of 1119 individuals in 418 visitor groups were recorded on 66 days from 15 March through 31 May 2002, an average of 17.2 individuals per day. This included 593 males, 449 females, and 75 unknown. In 2001, a total of 1140 individuals (607 males, 491 females, and 28 unknowns) in 412 visitor groups were recorded on 68 days from 16 March through 31 May 2001, an average of 16.8 individuals per day. In 2000, a total of 1040 (421 males, 400 females, and 219 unknowns) were recorded on the 65 days from 30 March through 9 June 2000, an average of 16.0 individuals per day.

The total number of visitor groups and individual visitors in Spring 2005 were the highest recorded since 1995.

Group Size

Average number of individuals in each visitor group was 2.84 (± 2.53) (Table 1). Average group size for the season was comparable to that of 2004 (2.49 ± 2.26), 2003 (2.66 ± 3.24), 2002 (2.68 ± 3.77), 2001 (2.76 ± 2.45) and 2000 (2.79 ± 2.82). Average length of stay of groups for the 2005 season was 1 hour 27 minutes compared to 1 hour 32 minutes in 2004, 1 hour in 2003, 1 hour 29 minutes in 2002, 1 hour 35 minutes in 2001 and 1 hour 29 minutes in 2000. Average time of day of visit for the season was 12:42 PST.

Table 1. Summary of visitation by month at the Desert Tortoise Research Natural Area in the spring of 2005. (SD = Standard deviation).

Month	Number of Days	Number of Groups	Number of Individuals	Group size mean (\pm SD)	Length of visit minutes (\pm SD)	Mean time of visit PST (\pm SD)
March	14	192	574	2.99 ± 2.19	84 ± 89	$12:39 \pm 2:25$
April	26	260	725	2.79 ± 2.87	93 ± 88	$12:40 \pm 2:26$
May	27	123	339	2.76 ± 2.37	74 ± 99	$12:50 \pm 2:43$
June	7	19	48	2.53 ± 1.83	85 ± 88	$12:45 \pm 3:17$
Overall	74	594	1686	2.84 ± 2.53	87 ± 91	$12:42 \pm 2:31$

More visitors arrived in groups of two than any other group size (Figure 1).

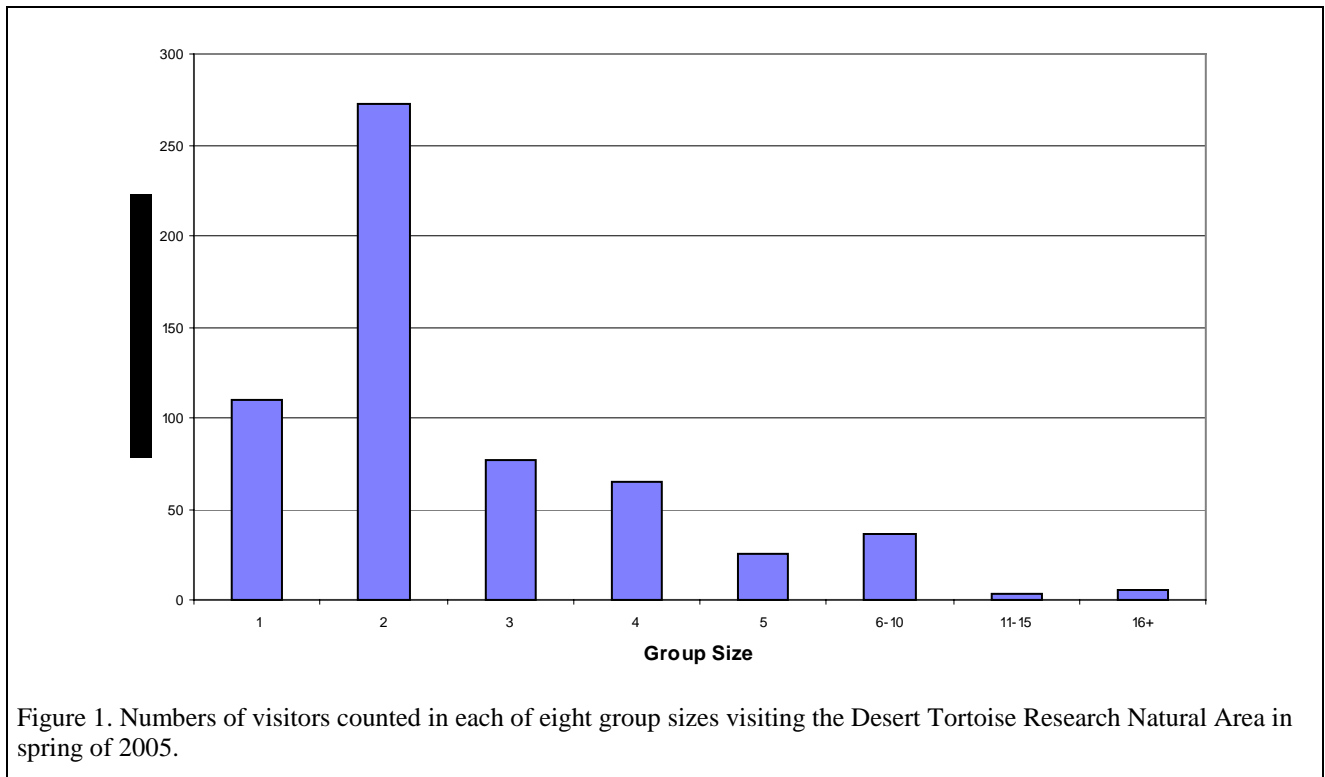


Figure 1. Numbers of visitors counted in each of eight group sizes visiting the Desert Tortoise Research Natural Area in spring of 2005.

The largest groups were hiking club groups (40 members from a Korean-American Hiking group), college classes (including a group of 25 students and faculty from CSU Bakersfield headed by Dr. Kelly, and a group of 20 students of photography from the Brooks Institute), two extended family groups (of 20 and 22 members), and attendees for the DTPC’s spring work party. California Turtle and Tortoise Club (CTTC) members attended in numbers. On Sunday April 10, 6 groups of CTTC members came by on the same day without knowing each other would be there.

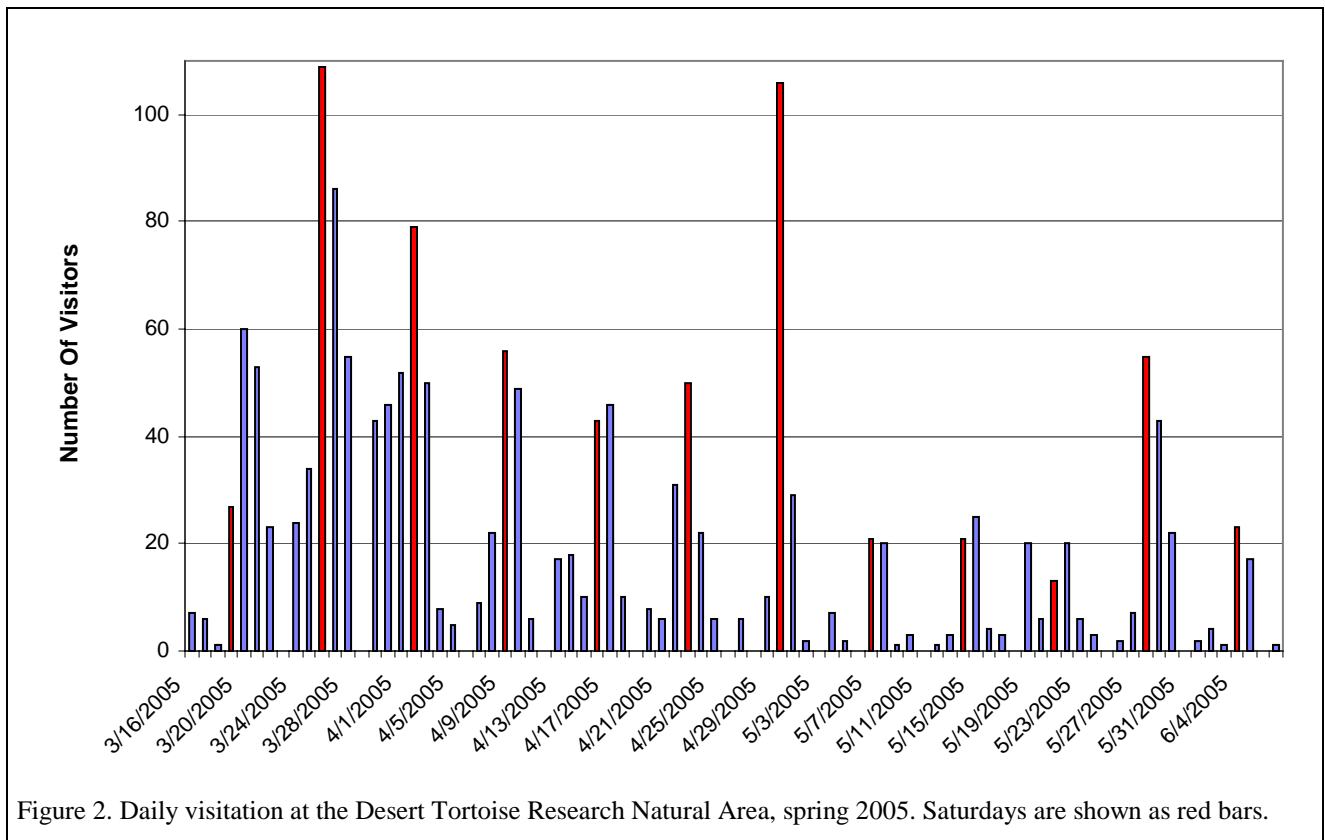


Figure 2. Daily visitation at the Desert Tortoise Research Natural Area, spring 2005. Saturdays are shown as red bars.

The greatest number of visitors (N=109) was recorded on Saturday, 26 March (Figure 2). This was Easter Saturday. Visitation was also high on the Sunday and Monday of this holiday weekend.

There were no visitors for three (4.0%) out of the seventy-four days: April 28, May 6, and June 6. In 2004, there were no visitors for four (5.0%) out of the seventy-nine days: April 30, May 24, May 26, and June 4. In 2003, there were no visitors for five (7.5%) out of the sixty-six days: May 8 and June 2, 4, and 17. In 2002, there were no visitors for two (3%) out of the sixty-six days: 15 May and 20 May but observations ended on May 31, 2002. In 2001, there were no visitors observed on 3 days (4%). In 2000, there were no visitors for five (8%) out of sixty-five days, 18 April, 2 May, 4 May, 11 May and 18 May. In 1999, there were no visitors for eight (12%) out of sixty-five days, 29 March, 31 March, 7 April, 12 April, 20 April, 28 April, 12 May, and 21 May.

Seasonality of visitation was examined by comparing group size, length of visit, time of day of visit, and total number of visiting groups by month (Table 1). The average length of visit was similar in March, April, May and June.

Visitation was further examined by comparing group size, length of visit, time of arrival, and total number of groups of visitors by day of the week (Table 2). There were more groups on weekend days compared to weekdays. There were no significant differences in average length of visit or average arrival time on the weekend days as compared to weekdays although average stays on weekend days tended to be shorter. Overall mean arrival time was about 1 hour earlier in 2004 compared to 2003, and similar to the mean arrival time in 2002.

Table 2. Summary of visitation at the Desert Tortoise Research Natural Area in the spring of 2005 by day of the week.

Day	Number of groups	Group size mean (\pm SD)	Length of visit minutes (\pm SD)	Mean time of visit PST (\pm SD)
Monday	62	2.79 \pm 2.73	84 \pm 59	11:52 \pm 2:18
Tuesday	17	2.24 \pm 1.89	94 \pm 55	12:38 \pm 2:11
Wednesday	38	2.37 \pm 2.19	117 \pm 148	12:16 \pm 2:34
Thursday	51	2.71 \pm 2.82	112 \pm 123	12:34 \pm 2:23
Friday	67	2.64 \pm 1.93	82 \pm 73	12:58 \pm 2:37
Saturday	190	3.17 \pm 3.24	85 \pm 91	12:48 \pm 2:47
Sunday	169	2.76 \pm 1.62	74 \pm 77	12:56 \pm 2:14

Visitation by off-highway vehicle users

Of 594 visitor groups, 126 (21%) arrived on an OHV (Table 3). The latter number is proportionately higher than in 2004 when 17% arrived on an OHV but is the same as in 2003 when 21% of visitors arrived on an OHV.

Table 3. Visitation by visitor type at the Desert Tortoise Research Natural Area in the spring of 2005. Probabilities of <0.05 are considered significant and are shown with an asterisk.

Visitor Type	Group size mean (\pm SD)	Length of visit minutes (\pm SD)	Mean time of visit PST (\pm SD)	Number of groups
OHV	3.79 \pm 2.80	22.6 \pm 19.6	12:47 \pm 2:30	126 (21%)
Non-OHV	2.58 \pm 2.39	103 \pm 94.5	12:41 \pm 2:31	468 (79%)
Probability	$<0.005^*$	$<0.0001^*$	N.S.	

There were some differences in visitation patterns between OHV users and non-OHV users. For the

season, there was a significant difference in the average size of groups of visitors arriving by OHV: group size was 3.79 individuals per group of visitors arriving on an OHV compared to 2.58 individuals per group of non-OHV users. This difference may in part reflect the monitoring technique as well as differences in behavior. For example, a group of 4 dirt bike riders driving through the parking lot together would be treated as a single group by the naturalist. A group of non-OHV visitors may arrive in several vehicles at slightly different times and not be counted as one group. However, OHV recreationists certainly tended to travel in groups, and only 8 (6%) of 125 OHV visitor groups consisted of a single individual. This compares to 102 (22%) out of 469 of the non-OHV groups consisting of a single individual.

Average length of visit was 22.6 minutes for visitors arriving by OHV compared to an average length of visit of 103 minutes for visitors arriving on street legal vehicles. This difference is statistically significant. Time of day of visit for the two subgroups was similar. The average time of day of visit for visitors arriving on an OHV was 12:47 and for non-OHV visitors was 12:41.

During their visits, a number of OHV users (N=27; 22%) drove through the parking lot without stopping or stayed for 5 minutes or less. Forty five (36%) of visitors arriving on OHV stayed for 10 minutes or less with many of these stopping in to use the restroom. The remainder of the visitors arriving by OHV behaved just as the other visitors and looked at the displays, talked with the Naturalist at length about tortoises and other wildlife they have seen while riding, or took long walks looking for tortoises.

Several OHV groups (n=10) stayed for an hour or longer raising the mean stay to 22.6 minutes. The Naturalist was sought out by a number of family groups that arrived by OHV for her interpretive services. Two examples of these encounters from the Naturalist's notes are given below.

The first was with a large middle-aged man from the San Fernando Valley who has visited the DTNA several times with family members. He had seen 3 tortoises while riding his dirt bike out in open desert and wanted to provide the localities to the Naturalist. He asked a number of questions about tortoise biology and behavior, and was clearly interested in finding out more about desert wildlife. He was interested in knowing why he had seen 3 tortoises outside the DTNA. He was reminded that while driving he covers a large area in a short time and that the entire surrounding area is tortoise habitat. The Naturalist concluded by reminding him of the need to stay on designated routes. His answer was "Well we don't ride over any bushes or through any flowers but we wouldn't see any wildlife if we stayed on the roads."

The second family was a father and son that arrived on dirt bikes. The Naturalist was shocked to hear the father explain the value of the DTNA in somewhat stark times. He was describing an incident with a tortoise that took place in a prior year. "I was going 60 miles an hour and came around a bend and ran right over it. The father and son walked to the kiosk and read through the displays and told the Naturalist they would return on Mother's Day, with the mother.

General information on visitors

The Naturalist made contact with 538 (91%) of the 594 visitor groups for a total of 1536 (91%) individuals.

Most (87%) of the visitors who completed the Visitor Survey Form, made an entry in the Recreation Register or reported to the Naturalist were from California (Appendix 3). There were visitors from at least twelve additional states including Arizona, Colorado, Connecticut, Illinois, Minnesota, Nevada, New Jersey, New York, Ohio, Oregon, Texas, and Washington, and nine foreign countries including one group each from Australia, Austria, Belgium, Canada, France, Malaysia, New Zealand, Scotland, and Switzerland.

Members of 37 groups completed Visitor Survey Forms, representing a 6.9% sample of the 538 visitor groups contacted by the Naturalist. This compares with 46 groups, representing a 13% sample of 357 visitor groups contacted by the Naturalist in 2004, 42 groups, representing a 10% sample of 419 visitor groups contacted by the Naturalist in 2003, 37 groups, representing a 9.6% sample of the 387 visitor groups contacted by the Naturalist in 2002 and 62 out of the 366 visitor groups (17%) contacted by the Naturalist in 2001.

Of the 37 respondents to the visitor survey, 13 (35%) had visited the DTNA before and 24 (65%) had not (Figure 3). Two respondents (5.5%) indicated that they were Desert Tortoise Preserve Committee members.

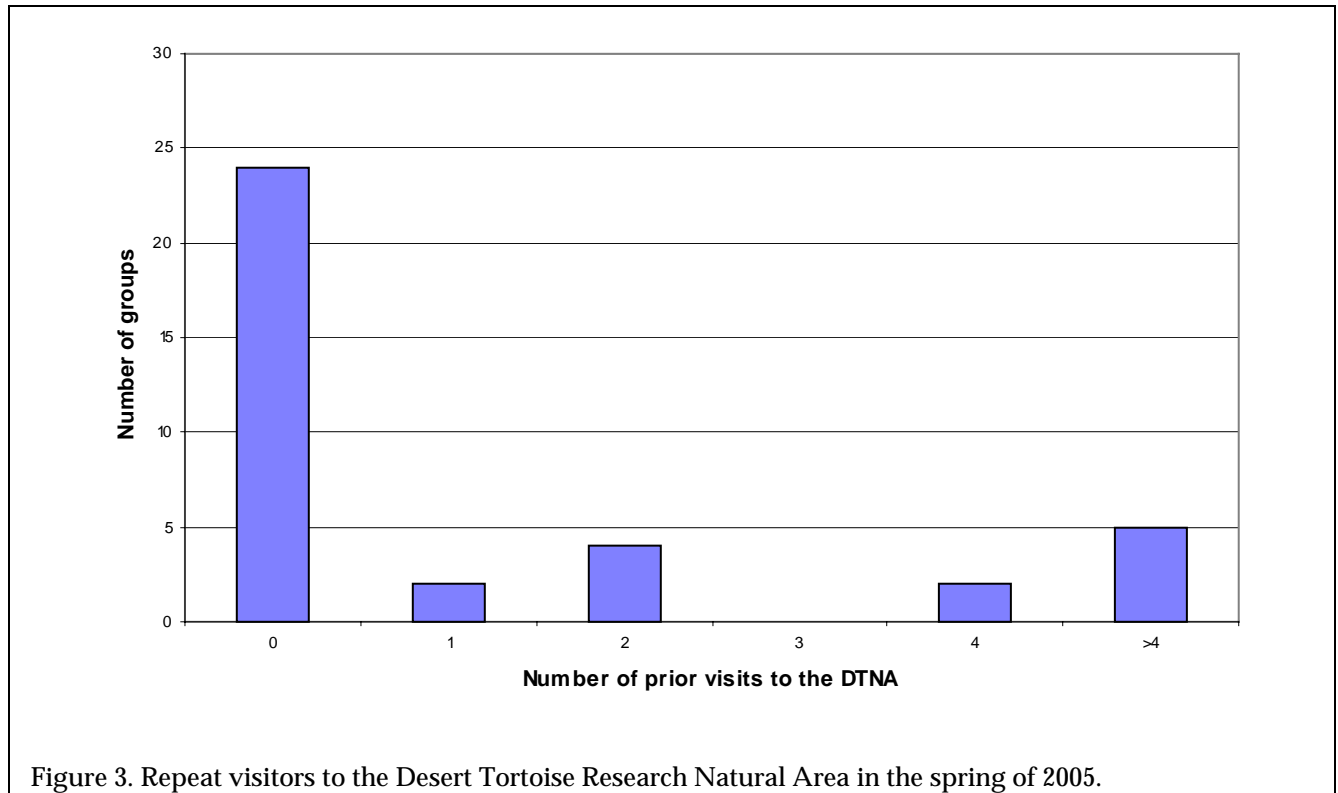


Figure 3. Repeat visitors to the Desert Tortoise Research Natural Area in the spring of 2005.

Visitors reported learning about the DTNA in a variety of ways. The most common ways were from the Internet and from studying maps of the area (Figure 4).

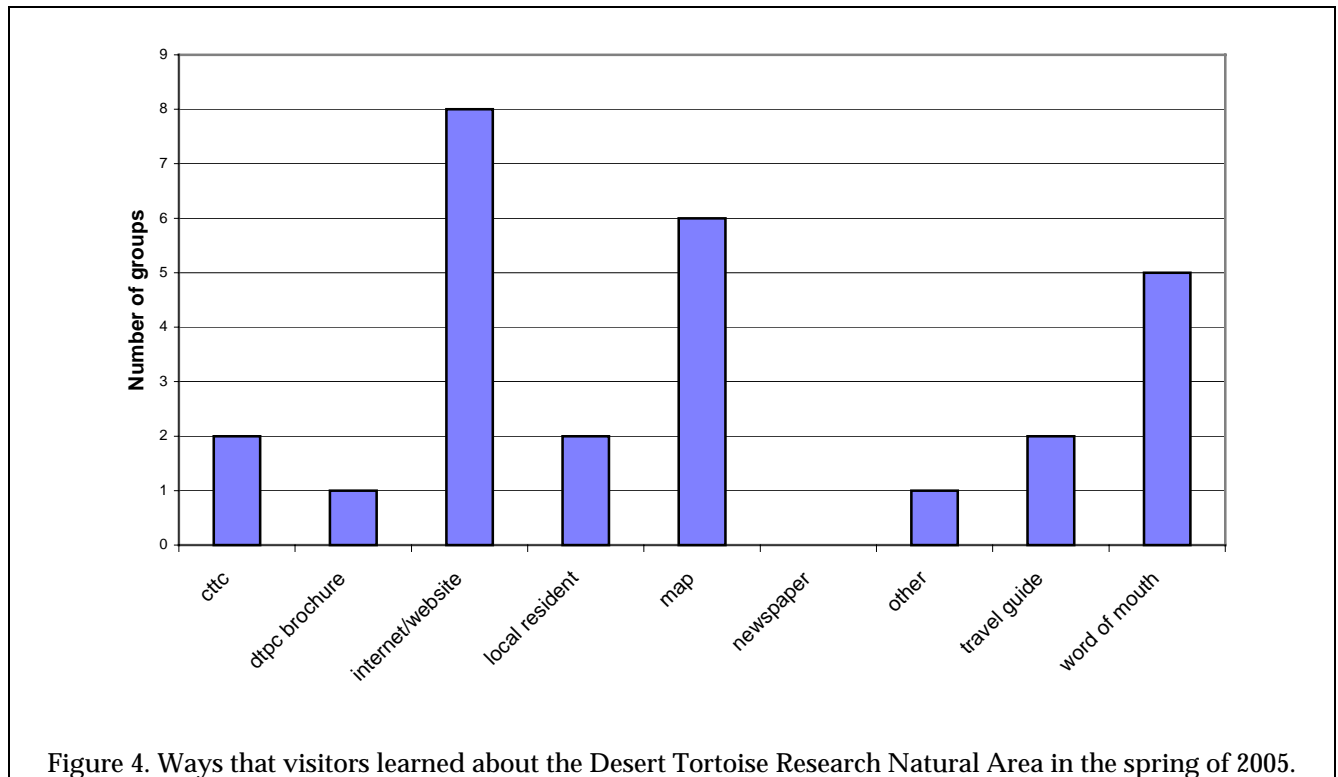


Figure 4. Ways that visitors learned about the Desert Tortoise Research Natural Area in the spring of 2005.

Among visitors responding to the survey, 16 (43%) indicated that the DTNA was the sole destination of their outing. The rest of the surveyed visitors indicated that their visit to the DTNA was part of a trip that included one or more destinations (Figure 5).

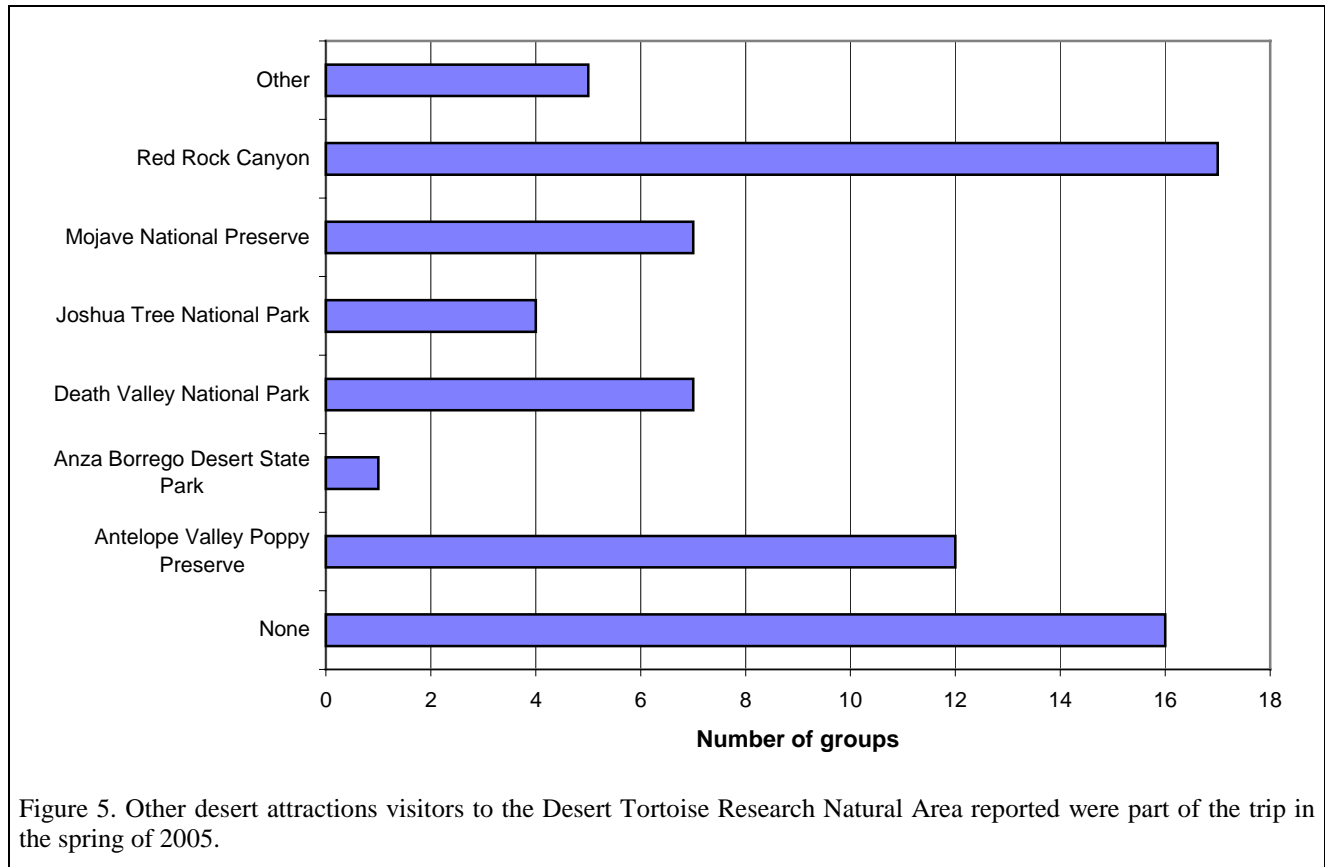


Figure 5. Other desert attractions visitors to the Desert Tortoise Research Natural Area reported were part of the trip in the spring of 2005.

Those visitors planning on visiting other desert attractions most frequently reported that they would be visiting Red Rock Canyon State Park which is relatively close to the DTNA followed by the Antelope Valley Poppy Preserve, Mojave National Preserve, and Joshua Tree and Death Valley National Parks.

Interpretive services

Visitor knowledge and expectations were varied and diverse, and this is reflected in both the Naturalist's data sheets and in written comments made by visitors. Most visitors had a basic awareness that the tortoise population is in trouble, and many were familiar with some of the reasons for the decline of the species. Many visitors knew that the desert tortoise is both state and federally protected, but were not sure what provisions are addressed by the Endangered Species Act, and what penalties and fines are applied when these laws are violated. Most visitors used the term "rare," "threatened," or "endangered" interchangeably. Some considered these all to simply mean "hard to find" or "uncommon." Others perceived the terms to mean that the tortoise is heading for extinction.

A number of school and other organized groups received short presentations from the Naturalist. On April 30, a group of 40 members of a Korean Hiking Club visited. Most of the members are from the Inland Empire region but one of them lives in California City. They had made arrangements a month ahead. The Naturalist's presentation was simultaneously translated into Korean by one of the group. The "Hiking Club" members seemed to really enjoy and appreciate their visit.

Many visitors that exhibited tortoise knowledge were owners of registered captives, and were members or had been educated through the activities of the California Turtle and Tortoise Club (CTTC) or

similar organizations. These visitors, in particular, enjoyed sharing entertaining stories and behavioral observations from their captive tortoise experiences. Many of the visitors mentioned their use of the DTPC website at <<http://www.tortoise-tracks.org>> and its value in educating themselves and other members of the public.

Many visitors expressed their complete support for the DTPC's campaign to preserve desert tortoise habitat and the species (see Appendix 4 for visitor comments). Most visitors made a point to mention their appreciation of the DTPC's conservation efforts, and that they were glad the DTNA existed and urged the Committee to continue its efforts with comments such as "Great job! Beautiful site. Keep up the good work." and "Great site. Good work preserving this habitat.". Several visitors encouraged further land acquisition with written comments such as "We need more places like this". Others made helpful suggestions to improve access for visitors such as "Need more signs on the road here. I thought I had gone too far and was just about to turn back. Thanks for being here!"

As in previous years, many of the written responses on the Visitor Survey Form or in the Register are comments strongly supporting the value of having a host interpreter present - "Excellent preserve and helpful staff. Thanks.". Many visitors valued the opportunity provided to learn useful information about desert tortoises and their habitat from the Naturalist. One commenter who wrote "It was disappointing to find no naturalist available for questions" exemplified the importance of having an on-site interpreter. That particular day was the Naturalist day off.

Because this was a wet year, many visitors made written and spoken comments and had questions relating to the DTNA's flora. The spectacular displays of annual flowers in April helped many visitors see the general value of closing areas such as the DTNA to livestock grazing and OHV activities. Many visitors commented on the wildflowers. Written comments ranged from "Beautiful flowers. Glad it's a protected area." to "Up with wildlife and botany. Down with OHVs!" to a simple "Wildflowers!".

Many visitors commented on the trails and hiking opportunities afforded by the DTNA including "3.6 miles hiked. Friendly trails, wildlife, no tortoise sightings." and succinctly, "Nice trails, flowers!"

Many visitors mentioned the location of tortoise sightings in the Register so that others would know where to look. Locality information cited included references to points on the ground "Saw a tortoise between marker 31 and 32 on the 1.5 mile loop. Maybe 7 inches in length (shell). No marker or transmitter on shell. Very cool. Watched it for 30 minutes." and "Saw 1 tortoise between Plant Loop 10 and 11 to the left." and "Saw a tortoise! Glad I did. Near #14 Animal Loop." Visitors also listed other animal species they had encountered.

Visitors that were unable to find a tortoise usually expressed some disappointment, but enjoyed seeing flowers, lizards, and snakes, and just walking through the desert. Typical comments being "No tortoises. I will be back to see them one day." and "No tortoises - snakes - lizards. Beautiful."

The Naturalist encouraged visitors to stop by the DTDC before they began their walks. This provided the Naturalist with an opportunity to remind visitors how to respect all forms of plant and animal life and to be aware of rattlesnakes. Visitors posed questions about the DTNA and made comments that were similar to those reported by Ginn (1990), Boland (1994 and 1995) and Connor (2000 and 2001). The most frequent questions posed by visitors were "How many tortoises are there?" and "Where can I see one?" Many visitors extolled the educational opportunities presented by the Naturalist, interpretive trails and kiosk. "Great information" and "Excellent preserve and helpful staff. Thanks."

Monitoring

Daily Temperatures

Figure 6 shows the daily low, noon and high temperatures recorded by the Naturalist from March 16 to June 6, 2005. The average daily low, noon and high temperatures were $10.0 \pm 4.7^{\circ}\text{C}$ ($50.0 \pm 8.4^{\circ}\text{F}$), $22.3 \pm 6.0^{\circ}\text{C}$ ($72.2 \pm 10.8^{\circ}\text{F}$), and $24.3 \pm 6.8^{\circ}\text{C}$ ($75.7 \pm 12.2^{\circ}\text{F}$).



Figure 6. Temperature variation at the Desert Tortoise Research Natural Area observed during spring of 2005.

Sightings of tortoises by visitors

A total of 192 (37%) of 523 visitor groups contacted by the Naturalist as they were leaving the DTNA saw at least one desert tortoise during the 74 days in 2005 (Table 4). The 192 groups included 580 persons, or 39% of visitors that the Naturalist contacted. In spring 2004, a total of 98 (29.5%) of 332 visitor groups contacted saw at least one desert tortoise. The 98 groups included 233 persons, or 32% of visitors that the Naturalist contacted. In spring 2003, a total of 91 (28%) of 329 visitor groups contacted saw at least one desert tortoise. The 91 groups included 315 persons, or 32% of visitors that the Naturalist contacted. In spring 2002, a total of 116 (37%) of 313 visitor groups contacted by the Naturalist reported seeing at least one desert tortoise. The 116 groups included 363 persons, or 38.9% of visitors that the Naturalist contacted. In 2001 a total of 94 (26.6%) of 354 visitor groups saw at least one desert tortoise during a three month period. The 94 groups in 2001 included 294 persons, or 28.9% of visitors that the Naturalist contacted.

Although 37% of all visitor groups contacted by the Naturalist in 2005 saw at least one tortoise, only 28 out of 86 (32%) visitor groups arriving on an OHV saw a tortoise.

Table 4. Tortoise sightings by visitors at the Desert Tortoise Research Natural Area in the spring of 2005.

Tortoises seen	Number of groups	Number of visitors	Length of Stay
0	331	915	75.0 ± 69.9
1	140	415	111 ± 79.6
2	39	130	214 ± 160
3	13	35	252 ± 110
≥ 1	192	580	146 ± 117

Fifty two groups including 165 individuals saw more than 1 tortoise on their visit (Table 4). This compares to only 31 groups comprising 55 individuals seeing more than 1 tortoise in 2004, 16 groups comprising 78 individuals seeing more than 1 tortoise in 2003, 29 groups comprising 66 individuals seeing more than 1 tortoise in 2002, and 38 groups comprising 129 individuals seeing more than 1 tortoise in 2001,

Table 5. Tortoise sightings by visitors at the Desert Tortoise Research Natural Area by month in the spring of 2005.

Month	Number of groups	%	Number of visitors	%
March 2005	75	42%	229	43%
April 2005	81	35%	245	37%
May 2005	32	34%	101	41%
June 2005	4	23%	5	11%

Forty two percent (42%) of visitor groups contacted by the Naturalist reported seeing at least one tortoise in March, thirty five percent (35%) in April, thirty four percent (34%) in May and twenty three (23%) percent in June. In 2004, 25% of visitor groups contacted by the Naturalist reported seeing at least one tortoise in March, 27% in April, 18% in May and 14% in June. In 2003, twenty three (25%) of visitor groups contacted by the Naturalist reported seeing at least one tortoise in March, 38 groups (27%) in April, and 28 groups (35%) reported seeing at least one in May. No visitors reported seeing tortoises in June. In 2002, 36 groups (33.3%) reported seeing at least one tortoise in March, 57 groups (40.7%) in April, and 23 groups (35.4%) in May. The high percentage of visitors seeing a desert tortoise in 2005 is similar to that seen in 2002 where the presence of a tortoise that had created a burrow in the IC parking lot, and the presence of a tortoise survey crew contracted by DTPC increased opportunities for visitors to see a tortoise (Connor, 2002).

The relationship between the number of tortoises seen and length of stay was investigated by regression analysis (table 4). The number of tortoises seen correlated positively with the length of visitor stay ($R^2 = 0.11$; $p < 0.01$). The longer the visit, the more likely was a visitor to encounter a tortoise.

The relationship between visitor group size and whether or not they encountered a tortoise is examined in Table 6. As was the case in 2004 and 2003, larger groups were not more likely to see a tortoise than smaller groups.

Table 6. Tortoise sightings at the Desert Tortoise Research Natural Area in 2005 by visitor group size.

Tortoises seen	Size of group
0	2.78 ± 2.13
1	2.96 ± 2.95
2	3.33 ± 4.24
3	2.69 ± 1.49

Comparison of visitation and sightings of tortoises by visitors in prior years

Figure 7 shows daily visitation (number of visitors per day) and the percentage of visitors who saw a live tortoise recorded by DTPC Naturalists each spring between 1989 and 2005.

Comparison of the 2005 visitation rates to those of previous years is complicated by variations in length and hours of service by the Naturalists, and minor variations in monitoring and reporting but some general conclusions can be drawn. However, the average number of visitors per day in the spring 2005 season (22.8) was the highest since 1995. It was well above the average of all the spring seasons from 1989 to

2005 (17.1 ± 4.63) despite the fact that it included 7 days in June, a low visitation month, whereas in most years, monitoring ended by June 1.

The percentage of visitor groups that saw a tortoise on their visit in 2005 was 36.7% and the number of individual members of the public seeing a tortoise was 38.8%. These are among the highest percentages of visitors encountering a tortoise on record. Between 1989 and 2005, the mean percentage of visitors seeing a desert tortoise ranged from 6.5% to 39.5% with a mean of 25.6 ± 8.8 . In spring 2004, 29.5% of visitors saw a desert tortoise on their trip to the DTNA. In spring 2002, 39.5% of visitors saw a desert tortoise on their trip to the DTNA. In 2001, there were 1140 visitors in 412 visitor groups. In 2000, there were 1040 visitors in 323 visitor groups. In 1999, there were 213 visitor groups totaling 595 visitors (9.2 individuals/day), significantly less than in 1998. In 1998, there were 561 visitor groups comprised of 1580 individuals, an average of 19.5 individuals/day. In 1997, there were 327 visitor groups comprised of 1,124 individuals, an average of 18.4 individuals/day. In 1996, there were 1,068 visitors (12.7 individuals/day). In 1995, there were 2,483 visitors (27.0 individuals/day), over twice as many visitors than in 1996. In 1994, there were 1,668 visitors (18.1 individuals/day) and in 1993, there were 2,003 visitors (22.0 individuals/day).

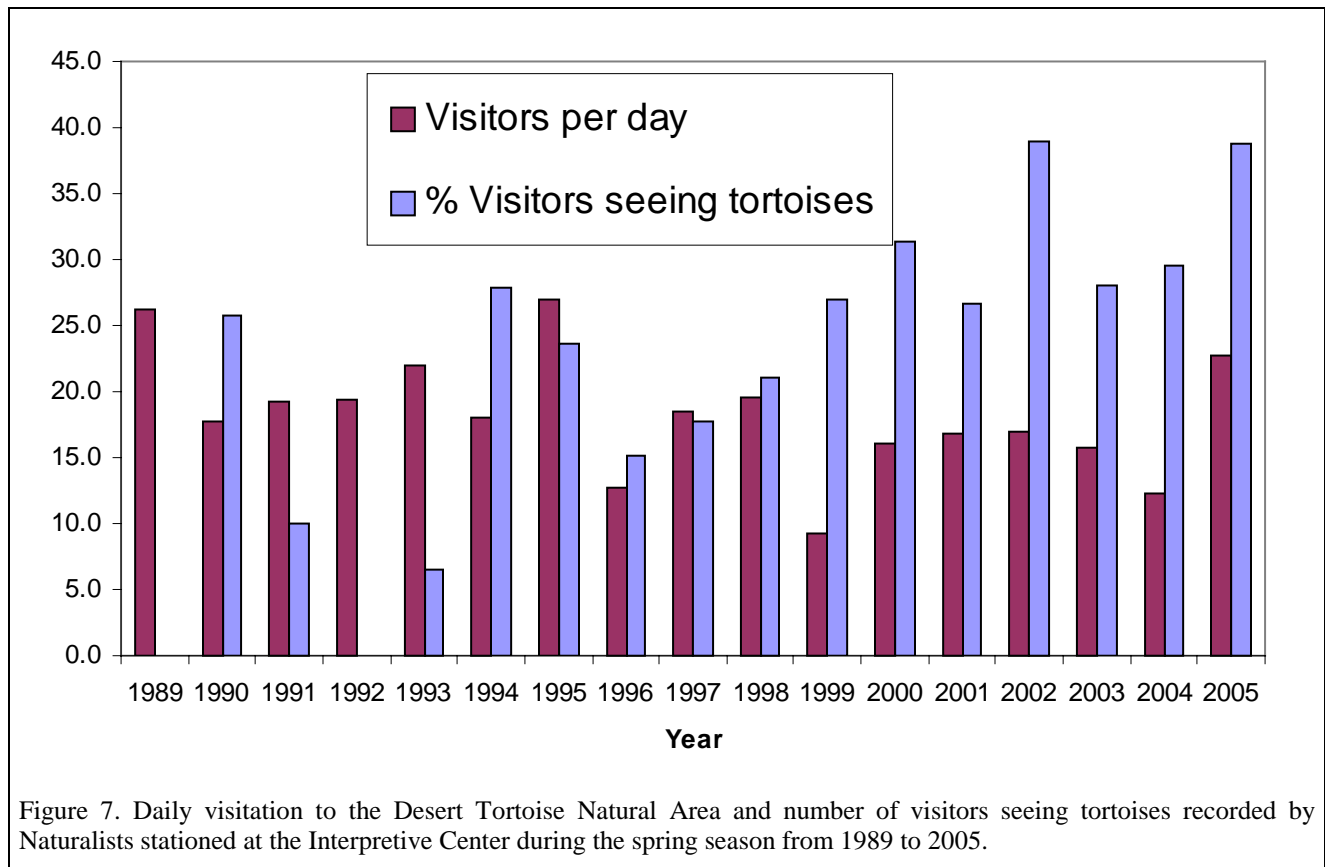


Figure 7. Daily visitation to the Desert Tortoise Natural Area and number of visitors seeing tortoises recorded by Naturalists stationed at the Interpretive Center during the spring season from 1989 to 2005.

Visitor behavior

Generally, visitors to the Interpretive Center were respectful and well behaved. Littering along the trails and in the parking lot was not a problem.

Unfortunately, however, as in 2004 there were several incidents that in some cases required the Naturalist to contact law enforcement officers.

On 7 days, March 25 (Saturday), April 24 (Sunday), April 25 (Monday), May 1 (Sunday), May 14 (Saturday), May 15 (Sunday), May 21 (Saturday), and June 4 (Saturday) the Naturalist heard semiautomatic gunfire or rifle shots coming from the east and southeast. Discharge of firearms is illegal in the city limits of California City. The Naturalist reported the gunfire incidents to the California City Police Department. In

one case, three arrests were made and a shotgun was confiscated.

There were two notable fence breaks during the season. On Sunday March 20, 2005 a visitor reported seeing a fence break at the Section 34/27/26 corner. The fence had been cut between 2 posts and there were motorcycle tracks leading into and out of the break. The break was repaired by DTPC volunteers on March 21. The second break was much more serious. On April 13, at 9:30-9:45 am, the southeast corner of the section 34 fence was vandalized by a heavy vehicle that drove through from the east side to the south side taking out about 80 feet of fence. This is a section of the fence close to the entry gate. It is unclear if this was an accidental or intentional event. Reports were taken by the Bureau of Land Management Ranger and officers from the California City Police Department. The fence was repaired by DTPC staff.

There were a number of incidents of minor vandalism and or harassment of the naturalist by OHV users. For example, on Friday April 22, 3 ATVs drove through the Interpretive Center 4 times in a row. The naturalist spoke to them and was told that they were doing this "to teach a child to ride trike ATV". They stopped after being warned that the police would be called. However, the following day (Saturday) the Naturalist heckled by a family in white van who were relatives of the prior day's multiple drive through group.

On Saturday, May 28 at 12:30 red sand rail driving 20 mph went off the entry road over the rocks burning skid marks in habitat. The same sand rail had driven through the IC parking lot 3 times the previous day and had killed a leopard lizard by the entry gate.

Law enforcement officers visited the DTNA on several days in addition to visits following the incidents mentioned above. On March 19, 2005 the BLM and the Kern County Sheriff drove through. On April 22, BLM Ranger Bill Irwin came by on patrol with a trainee. On April 25, the BLM Ranger came by on patrol and discussed general security at DTNA and dealing with OHV problems with the Naturalist.

Release, collection and harassment of wild tortoises and other wildlife

Intentional harassment of tortoises was not observed, but visitors frequently had to be reminded to step back and observe the wild tortoises from a respectful distance. Occasionally excited visitors were reminded that not only tortoises, but snakes, lizards, insects, and plants are all protected within the DTNA, and that capture, collection, or harassment are not permitted.

No attempted collection of a wild tortoise was observed. No releases of tortoises were observed. There were 8 incidences of tortoises being brought to the Naturalist by visitors. A large male tortoise living about 3 miles south of the DTNA by Randsburg-Mojave Road, known as "the Candles" tortoise because of a dense patch of Desert Candle growing there, was one of the tortoises brought to the Naturalist. On the April 1, a group of OHV enthusiasts arrived at the DTNA parking lot in a quad. One of the riders had "The Candles" tortoise under his arm. The tortoise was transferred to a box and returned to his known location of origin. Twice during the same weekend, visitors reported that they had stopped on the way to move "the Candles" tortoise from the middle of the Randsburg-Mojave Road. He was seen by visitors along the same stretch of road three times in the next few weeks, so appeared to have settled back into his home range and resumed his former habits. On May 1, marked male tortoise #1065 was brought to the Naturalist by a group of 5 women camping nearby. They had found him on Essex Road north of 20 Mule Team Parkway and were concerned that intense dirt biking and other OHV activities that were underway in the immediate vicinity would harm him. Tortoise #1065 had been reported from that general area several times. The Naturalist returned #1065 to the capture site at 18:30, after the OHV activities had ended. It was relatively common for visitors to mention to the Naturalist that they had moved tortoises "out of harms way." Visitors reported moving at least 8 different tortoises including 2 moved from 140th street to the southeast of the DTNA, and a juvenile tortoise that was moved from the middle of the Randsburg-Mojave Road.

The Naturalist made regular foot patrols of the DTNA entry road and recorded any vertebrates that had been killed or injured by vehicles. Table 7 summarizes the direct impact of visitors vehicles to local wildlife along the DTNA entry road. In addition to vehicle-caused fatalities, one visitor stepped on a horned lizard while hiking along the Discovery Loop trail.

Table 7. Visitor Impacts to Wildlife at the Desert Tortoise Research Natural Area, spring 2005

Road kill	Date	Time	Location*	Notes
Mojave Rattlesnake, <i>Crotalus scutulatus</i>	3-27-05	12:30	At gate	A dirt biker accidentally killed snake. Snake was still alive when reported by rider but died 2 hours later.
Mojave Rattlesnake, <i>Crotalus scutulatus</i>	4-03-05		Entry road half way between gate and RM Road	First season juvenile.
Kangaroo Rat, <i>Dipodomys merriami</i>	4-20-05		Entry road near parking lot	
Leopard Lizard, <i>Gambelia wislizenii</i>	4-21-05		Entry road near parking lot	Run over by vehicle
Western Whiptail, <i>Cnemidophorus tigris</i>	5-17-05	07:30	Entry road	Recently run over by vehicle, was soft but not warm.
Desert Horned Lizard, <i>Phrynosoma platyrhinos</i>	5-21-05	20:20	Entry road half way to gate	
Western Whiptail, <i>Cnemidophorus tigris</i>	5-22-05		Entry road near gate	
Leopard Lizard, <i>Gambelia wislizenii</i>	5-27-05	19:30	Entry road near gate	Run over by a sand rail
Desert Horned Lizard, <i>Phrynosoma platyrhinos</i>	6-01-05	08:00	At gate	

* Abbreviations: RM, Randsburg-Mojave

Resident tortoise observations

The Naturalist and visitors observed tortoises on 50 days out of the 74 days (68%). The Naturalist and visitors sighted tortoises on 11 days in March, on 19 days in April, on 15 days in May, and on 5 days in June.

Eleven individual marked tortoises (#467, #596, #599, #602, #789, #983, #999, #1055, #1056, #1065, 1151) and as many as 16 unmarked tortoises were observed. In 2004, 9 individual marked tortoises (#212, #467, #599, #789, #979, #999, #1009, #1055, #1059) and as many as 16 unmarked tortoises (1 of which was a captive brought to the DTNA and given to the Naturalist) were observed. In 2003, 13 marked tortoises (#212, #467, #599, #672, #789, #849, #893, #999, #1055, #1059, #1091, #1108, #1151) and 13 unmarked tortoises were observed (2 of which were seen outside the DTNA fence line in section 13 in the area known as "the pit"). In 2002, twelve individual marked tortoises (#212, #467, #568, #573, #595, #789, #827, #1060, #1083, #1128, #1129, and #1151) and 12 unmarked tortoises were observed. In 2001, eight individual marked tortoises (#420, #568, #573, #789, #894, #983, #999, #1004) and 14 unmarked tortoises were observed. Three (25%) of the marked tortoises seen in 2002 had been seen in 2001. Four (33%) of the tortoises seen in 2002 had been seen in the year 2000 when eight individual marked tortoises were reported (#467, #568, #573, #789, #999, #1002, #1108, and #1054).

On May 15, 2005 visitors and the Naturalist saw 7 different tortoises.

Venomous animals

Live rattlesnakes were sighted by the naturalist or reported to her on eight days (11%) between March 16 and June 7, 2005. On five days, the sighting was of Mojave rattlesnakes. This included a pair that was observed courting on the railroad ties in the parking lot on April 1, 2005. The other sightings were of sidewinders. Sidewinders were observed on the main loop trail on 3 occasions. It was not necessary to move the animals, but visitors were made aware of a known location of the snake before they left for their walk. In addition to the sighting of live rattlesnakes, the Naturalist found two freshly killed dead or dying Mojave rattlesnakes on the DTNA entry road (see table 8 above).

Raven observations

Ravens were observed on 54 (73%) of the 74 days that the Naturalist was present. Ravens were observed on 6 days in March, 22 days in April, 21 days in May and 5 days in June. These observations were usually of small flocks of 1 to 3 birds with multiple sightings of ravens made throughout the day, and 2 ravens sighted regularly at the kiosk may have been a locally resident pair. Since the Naturalist was unable to distinguish individual birds, it is possible that these were repeated observations of the same birds. However, on April 23, a flock of 11 ravens was observed at 1700 hours. Such aggregations are unusual at the DTNA but have been observed in prior years, (Boland 1995; Connor 2001). Ravens were observed feeding on trash at Camp E on several occasions.

Observations of other animals

A list of vertebrate species observed in and around the Interpretive Center in spring 2005 can be found in Appendix 5. Several species were observed that have not been seen in recent years or were new to the inventory. New additions were the blue-gray gnatcatcher, *Poliophtila caerulea* and Lawrence's Goldfinch, *Carduelis lawrencei*. As in 2004, there were several sightings of the Roadrunner, *Geococcyx californianus*, which had not been sighted at the DTNA for over 6 years. Again, as in 2004, the rare Short-eared Owl, *Asio flammeus*, was seen in April. An Osprey, *Pandion haliaetus* was seen soaring across the DTNA in March and in April. Visitors reported seeing Mohave Ground Squirrels near the Animal Loop on several occasions, with four confirmed sightings being made by the Naturalist in April and May.

Table 7. Sightings of other listed, sensitive or rare species at the Desert Tortoise Research Natural Area in the spring of 2005

Species	Date	Time	Location*	Notes
Burrowing Owl, <i>Athene cunicularia</i>	4/15/05	20:00	DL	First heard calling.
	5/4/05	12:00	Section 4 (N)	2 pairs flushed from separate burrows
	5/6/05	19:00	DL	
Short-eared Owl, <i>Asio flammeus</i>	4/8/05	17:00	DL	
Mohave Ground Squirrel, <i>Spermophilus mohavensis</i>	4/20/05	16:15	Section 24	2 seen
	5/11/05	15:30	Section 24	
	5/29/05	18:30	East fence	
	5/30/05	08:00	IC	
Loggerhead Shrike, <i>Lanius ludovicianus</i>	Resident		IC	
LeConte's Thrasher, <i>Toxostoma lecontei</i>	Resident		IC	

Species	Date	Time	Location*	Notes
Osprey, <i>Pandion haliaetus</i>	3/30/05	14:00	Flying over DL	
	4/3/05	13:00	Flying N over PL	
Badger, <i>Taxidea taxus berlandieri</i>	4/30/05	12:00	PL	In den.
New additions				
Blue-gray gnatcatcher, <i>Poliophtila caerulea</i>	4/20/05	15:00	Section 24	Observed by D. Pellegrini
Lawrence's Goldfinch, <i>Carduelis lawrencei</i>	5/12/05	13:30	IC	Female, observed by D. Pellegrini and J. Kaur.

* Abbreviations: AL, Animal Loop; DL, Discovery Loop; IC, Interpretive Center; PL, Plant Loop.

DISCUSSION

Rainfall in the DTNA area for the 2004-2005 seasons was about 11.5 inches. The result was that the spring wildflowers bloomed profusely making for spectacular viewing. Even the sandy and rocky trails at the DTNA were carpeted with a luxuriant growth of Bromes and filaree, weedy invasive species that generally do well in disturbed areas. March and April saw many visitors from around the state who had included the DTNA in a sweep of desert spots which mostly focused around Death Valley National Park which had had a "once in a lifetime" showing of wildflowers that was widely publicized. Many of these visitors commented that they were here to view and photograph the wildflowers.

Average daily visitation (22.8 visitors/day) during the spring 2005 season was the highest since 1995 and well above the fifteen-year average of 17.1 ± 4.63 visitors/day. This was despite heavy rain on two of the typically high visitation weekends. About 87% of visitors were from California (Appendix 3). The other 13% were from out of state. This comprised visitors from twelve additional states including Arizona, Colorado, Connecticut, Illinois, Minnesota, Nevada, New Jersey, New York, Ohio, Oregon, Texas, and Washington, and nine foreign countries including one group each from Australia, Austria, Belgium, Canada, France, Malaysia, New Zealand, Scotland, and Switzerland. Because of its location, most visitors to the DTNA travel through California City. Based on analysis of completed Visitor Survey forms, 39% of visitors gave the DTNA as their sole destination for that day. Given the local, national, and international visitation, it is likely that DTNA visitation may significantly contribute to the local economy by visitors who stop in California City and Mojave. Clear demonstration of the value that the DTNA contributes to the local economy could offer a tool to gain stronger local support for desert tortoise conservation.

Most visitors were sympathetic to the desert tortoise and were interested in learning how they might help save the species. As in previous years, many visitors mentioned that they owned or used to own pet desert tortoises and had very personal interests in the plight of the species. Several visitors helped directly by working to improve the interpretive materials available. One couple who have been regular visitors to the DTNA over the last 5 years began a year-long project to record video footage of the DTNA each month to illustrate how the local desert changes with the season. Another regular visitor from California City who is an excellent photographer provided some great close up shots of tortoises that made an excellent addition to the Discovery Center exhibits. Most visitors were also highly supportive of the DTPC and BLM efforts to protect the DTNA.

Visitors seemed interested in learning just how fragile and delicate the desert habitat is, the abundance of life it supports, and how long it takes to recover from disturbance and injury, despite its seemingly harsh appearance. Given the climatic conditions, this spring was an ideal time to view the Natural Area's abundant and diverse flora and fauna. Tortoises were seen by visitors on 50 of the 74 days the Naturalist was on duty. Some 37% of visitor groups contacted by the Naturalist as they were leaving the DTNA reported seeing at least one desert tortoise. The 192 groups included 580 persons, or 39% of all visitors that the Naturalist contacted. This is much higher than the 16-year average of $25.6 \pm 8.87\%$. Five hundred and eighty persons seeing tortoises is the highest number in 16 years, and is the second highest recorded percentage of visitors, only slightly exceeded in 2002 when female tortoise #595 burrowed in the parking lot (Connor, 2002). However, in 2002 overall visitation was considerably lower than in 2005 and the number of individuals who saw at least 1 tortoise was only 363.

Some 165 individuals saw more than 1 tortoise on their visit (Table 4). This is the highest number of spring visitors reporting seeing more than one tortoise on their visit on record. The most commonly seen tortoises were adult females #599 and #789 that were seen on 12 and 11 different days respectively and an unmarked juvenile male tortoise that was also seen on 11 different days. The latter tortoise visited the kiosk regularly and was thus seen by a number of short-stay visitors who may not otherwise have seen a tortoise. Tortoise #789 spent much of the season near the Discovery Loop and was observed being courted and mounted by an unmarked male right at the opening of the season. Tortoise #599 was located on the same stretch of the Animal Loop trail that she occupied in 2004. She was also the most commonly seen tortoise in 2004.

Group size did not seem to make a difference in the chances of a group finding tortoises in 2004. In

part this reflects the fact that large, organized groups were managed by the Naturalist to minimize any potential impacts to habitat around the Interpretive Center. Typically, the Naturalist would walk large groups around the main loop and instruct them to remain on the trail as much as possible. Additionally, visitors experienced in finding tortoises tended to arrive in small groups. There was a strong correlation between length of stay and likelihood of seeing a tortoise.

Several visitors made management suggestions for the DTNA. These frequently referred to managing the ever-prevalent OHVs. This is exemplified by comments such as "Dune buggies and motorcycles are way too close to this sensitive area", "Thank you for saving this place from the OHV/ATV disease", and "Up with wildlife and botany. Down with OHVs!" (Appendix 4). However, visitors were also concerned with other management issues such as the local raven population (one visitor commented on the Visitor Survey Form "Devise and implement raven controls").

Interestingly, many of the visitors who arrived on OHVs also expressed their concern for the desert and for the desert tortoise, and were supportive of the DTNA. A number expressed their concern that the behavior of the few who abuse the desert with their OHVs is more likely to result in the creation of "more fences" or closed areas.

Generally, visitors were well mannered and well behaved. However, there were several incidences of rude behavior and harassment of Naturalist by OHV riders. The City of California City has placed signs on the Randsburg-Mojave Road close the DTNA entrance designating it as a camping area known as "Camp E". Abutting the DTNA fence-line, this has become a focus for weekend OHV activities that are incompatible with the ACEC's purposes. Apart from the direct impacts to habitat and the areas flora and fauna (see table 8) there is noise and dust, and a considerable amount of associated trash. The weekend's trash and road-kill provides ample raven forage in early to midweek. The Naturalist saw groups of ravens feeding at "Camp E" on a number of occasions.

The diverse assortment of visitors, and the wide range of awareness, knowledge and perceptions they brought with them made interacting with the public both interesting and enlightening for the Naturalist. The Naturalist also provides a clear degree of security for the area's resources and integrity. Continuing to provide an on-site seasonal Naturalist with sound interpretive skills and enthusiasm is an important tactic in accomplishing the DTNA's goals and objectives.

Year 2005 Recommendations

- (1) On holiday weekends in April and May weekends have two people on duty.
- (2) Upgrade weather-monitoring capabilities to facilitate rain and wind measurement.
- (3) Develop and adopt measures to minimize risks to tortoises and other wildlife from vehicles in and around the DTNA. Suggestions include:
 - (a) Limit vehicle speeds to 5 mph.
 - (b) Extend the fence along the DTNA entry road to the Randsburg Mojave Road. This would: Make the DTNA entrance more obvious and attractive to visitors. It would restrict entry to vehicles arriving on the Randsburg Mojave Road eliminating cross-country travel. It would allow entry to the DTNA parking lot to be restricted to street legal vehicles and reduce the number of dangerous drive-through visits. It would also help manage the illegal off-roading now occurring on BLM lands in section 2 north of Randsburg Mojave Road where no routes are designated.

ACKNOWLEDGMENTS

We thank the following organizations and individuals for contributing to the ongoing success of the DTPC Naturalist program: the DTPC Trustees for their efforts in establishing and expanding the DTNA and for their continued interest in tortoises and ongoing educational outreach to the public, with particular thanks to Laura Stockton for her years of unstinting support and encouragement for the program; the many DTPC members and contributors for their financial support; DTPC volunteer Chuck Hemingway; BLM support staff who assisted the Naturalist and helped maintain the facilities; Susan Moore for supervising merchandise sales at the DTNA; BLM enforcement staff and the California City Police Department; and a special thanks to Field Manager Hector Villalobos, Bob Parker, and Jeff Aardahl of the Bureau of Land Management's Desert District Ridgecrest Field Office for all their considerable support and help.

WORKS CONSULTED

- Boland, C. 1994. Observations and Activities of the Naturalists at the Desert Tortoise Natural Area, Kern County, California: 1 March through 31 May 1994, for the Desert Tortoise Preserve Committee, Inc. San Bernardino, CA.
- Boland, C. 1995. Observations and Activities of the Naturalists at the Desert Tortoise Natural Area, Kern County, California: 1 March through 31 May 1995, for the Desert Tortoise Preserve Committee, Inc. San Bernardino, CA.
- Bureau of Land Management. 1973. Interim Critical Management Plan for recreation vehicle use in the California Desert. Bureau of Land Management, Sacramento, California.
- Bureau of Land Management. 1976. El Paso Management Framework Plan. Bureau of Land Management, Bakersfield, California.
- Bureau of Land Management. 1979. Desert Tortoise Natural Area Management Plan. Bureau of Land Management, Ridgecrest, California.
- Bureau of Land Management. 1980. The California Desert Conservation Area Plan. Bureau of Land Management, Riverside, California.
- Bureau of Land Management and California Department of Fish and Game. 1988. A Sikes Act Management Plan for the Desert Tortoise Research Natural Area and Area of Critical Environmental Concern.
- Connor, M. J. 2000. Observations and Activities of the Naturalist for the Desert Tortoise Natural Area, Kern County, CA., March 30 - June 9, 2000. Desert Tortoise Preserve Committee, Riverside, CA.
- Connor, M. J. 2001. Observations and Activities of the Naturalist for the Desert Tortoise Natural Area, Kern County, CA., March 16 - May 31, 2001. Desert Tortoise Preserve Committee, Riverside, CA.
- Connor, M. J. 2002. Observations and Activities of the Naturalist for the Desert Tortoise Natural Area, Kern County, CA., March 15 - May 31, 2002. Desert Tortoise Preserve Committee, Riverside, CA.
- Connor, M. J. and Hemingway, C. C. 2003. Observations and Activities of the Naturalist for the Desert Tortoise Natural Area, Kern County, CA., March 24 - June 19, 2003. Desert Tortoise Preserve Committee, Riverside, CA.
- Connor, M. J. and Kaur, J. 2004. Observations and Activities of the Naturalist at the Desert Tortoise Research Natural Area, Kern County, California: March 12 - June 7, 2004. Desert Tortoise Preserve Committee, Riverside, CA.
- Ginn, S. E. 1990. Observations and Activities of the Naturalist for the Desert Tortoise Natural Area, Kern County, CA., March 18 - June 2, 1990. Desert Tortoise Preserve Committee Inc., Ridgecrest, CA.
- Howland, J. M. 1989. Observations and Activities of the Naturalist for the Desert Tortoise Natural Area, Kern County, California, March 12 - July 12, 1989. Desert Tortoise Preserve Committee, San Bernardino, CA.
- Jennings, W. B. 1991. Observations and Activities of the Naturalists for the Desert Tortoise Natural Area, Kern County, CA March 2 - May 27, 1991. Desert Tortoise Preserve Committee, Ridgecrest, CA.
- Kidd, J. 1993. Observations and Activities of the Naturalists at the Desert Tortoise Natural Area, Kern County, California: 1 March through 31 May 1993. Desert Tortoise Preserve Committee, Inc., San Bernardino, CA.

-
- Ogg, S. and Gallant, S. 1992. Observations and Activities of the Naturalists for the Desert Tortoise Natural Area, Kern County, California, March 3 - May 31, 1992. Desert Tortoise Preserve Committee, San Bernardino, CA.
- On-Track Consulting and Research. 1996. Observations and Activities of the Naturalists at the Desert Tortoise Research Natural Area, Kern County, California: 9 March through 31 May 1996. Desert Tortoise Preserve Committee, San Bernardino, CA.
- On-Track Consulting and Research. 1997. Observations and Activities of the Naturalists at the Desert Tortoise Research Natural Area, Kern County, California: 8 March through 25 May 1997. Desert Tortoise Preserve Committee, San Bernardino, CA.
- On-Track Consulting and Research. 1998. Observations and Activities of the Naturalists at the Desert Tortoise Research Natural Area, Kern County, California: 12 March through 31 May 1998. Desert Tortoise Preserve Committee, San Bernardino, CA.
- On-Track Consulting and Research. 1999. Observations and Activities of the Naturalists at the Desert Tortoise Research Natural Area, Kern County, California: 28 March through 2 May and 8 May through 6 June 1999. Desert Tortoise Preserve Committee, San Bernardino, CA.

APPENDIX 1. Visitor survey form used at the Desert Tortoise Research Natural Area, spring of 2005.

VISITOR SURVEY FORM

for the

DESERT TORTOISE
NATURAL AREA



Date of Visit: _____

Name: _____

Address: _____

State: _____ Zip: _____

Number in Party: _____

What other desert attractions are included in this trip?

- None
- Death Valley National Park
- Joshua Tree National Park
- Anza Borrego Desert State Park
- Antelope Valley Poppy Reserve
- Red Rock Canyon
- Mojave National Preserve
- The Living Desert Reserve
- Other (Please list)

How did you learn about the Desert Tortoise Natural Area?

Is this your first visit? YES NO

If not, how many times have you visited the DTNA? _____

Were the interpretive kiosk, self-guided trails, and naturalist informative and helpful?

YES NO

Are you a Desert Tortoise Preserve Committee member?

YES NO

Would you like information sent to you about the Committee and other desert conservation organizations?

YES NO

Would you like educational materials sent to you about the California Desert and the Desert Tortoise?

YES NO

ADDITIONAL COMMENTS:

Thank you for your visit and for completing this survey. Please return this form to the naturalist.

APPENDIX 2. Data sheet used by the Naturalist at the Desert Tortoise Research Natural Area in the spring of 2005.

DATA SHEET FOR THE DESERT TORTOISE NATURALIST

Date _____ Day _____

Name Jan Kaur

Start time (PST) _____

End time (PST) _____

Total time (hrs) _____

WEATHER DATA

Temperatures LOW: _____ NOON: _____ HIGH: _____

Winds _____

Cloud cover _____

Precipitation _____

Group #	Number in group	Vehicle description (for identification of group only)	Arrival time (PST)	Departure time (PST)	OHV recreationalist?	Contact by naturalist?	# of males	# of females	# of unknown gender	# of tortoises seen	Visitor knowledge
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
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16											
17											
18											
19											
20											
21											
22											
Page totals											

APPENDIX 3. Reported places of residence of visitors to the Desert Tortoise Research Natural Area in the spring of 2005 from Visitor Survey Forms, Naturalist Data Sheets and the Recreation Area and Site Register.

Foreign	
Country	Number
Australia	1
Austria	1
Belgium	1
Canada	1
France	1
Malaysia	1
New Zealand	1
Scotland	1
Switzerland	1

USA		
Havasu	AZ	2
	AZ	1
Acton	CA	1
Anaheim	CA	2
Arcata	CA	1
Arcadia	CA	1
Arroyo Grande	CA	1
Ahwahnee	CA	1
Bakersfield	CA	8
Berkeley	CA	7
Big Pine	CA	1
Blair Valley	CA	1
Boron	CA	1
California City	CA	11
Castaic	CA	1
Chico	CA	1
Chino Hills	CA	1
Claremont	CA	1
Compton	CA	1
Concord	CA	3
Corona	CA	1
Covina	CA	1
Davis	CA	2
Eureka	CA	1
Fairfield	CA	1
Fresno	CA	7
Glendale	CA	2
Grass Valley	CA	1
Hacienda Heights	CA	1
Hayward	CA	2
Huntington Beach	CA	2
Irvine	CA	1
La Grange	CA	1
Laguna Beach	CA	1
Lancaster	CA	6

Livermore	CA	4
Long Beach	CA	3
Los Alamitos	CA	1
Los Altos	CA	1
Los Angeles	CA	13
Mammoth Lake	CA	1
Manhattan Beach	CA	1
Mendocino	CA	1
Merced	CA	1
Mill Valley	CA	2
Modesto	CA	2
Monrovia	CA	1
Monterey	CA	1
Napa	CA	1
Oakland	CA	1
Oceanside	CA	1
Ontario	CA	1
Onyx	CA	1
Palmdale	CA	4
Pebble Beach	CA	1
Pico Rivera	CA	1
Porterville	CA	1
Quail Valley	CA	1
Redondo Beach	CA	1
Redwood City	CA	1
Ridgecrest	CA	4
Riverside	CA	1
Rosamond	CA	1
Sacramento	CA	3
San Anselmo	CA	3
San Bernardino	CA	1
San Diego	CA	6
San Francisco	CA	6
San Jose	CA	8
San Luis Obispo	CA	1
Santa Ana	CA	1
Santa Barbara	CA	4
Santa Clarita	CA	8
Santa Cruz	CA	5
Santa Maria	CA	3
Santa Monica	CA	3
Santa Rosa	CA	3
Santa Ynez	CA	3
Simi Valley	CA	2
Stockton	CA	2
Sunnyvale	CA	1
Tahoe	CA	1
Tehachapi	CA	5
Thousand Oaks	CA	3

Tustin	CA	1
29 Palms	CA	1
Valencia	CA	1
Ventura	CA	1
Victorville	CA	4
West Covina	CA	1
Boulder	CO	1
West Haven	CT	1
Sugar Grove	IL	1
	MN	1
Metuchen	NJ	1
Las Vegas	NV	1
Reno	NV	3
NY	NY	1
	NY	1
Cincinnati	OH	1
Medford	OR	1
	OR	1
	TX	1
	WA	4

APPENDIX 4. Comments from visitor survey forms (16 comments) and register (65 comments), Desert Tortoise Research Natural Area, spring of 2005.

Thank you!
Thank you!
We hope you continue to keep the motorbikes off - this is a great place!
Dune buggies and motorcycles are way too close to this sensitive area.
Saw 2 tortoises, many wildflowers, 1 leopard lizard, 1 horned lizard.
Saw small male tortoise, several leopard lizards, Swainson's hawk and sage thrasher.
Need more signs on the road here. I thought I had gone too far and was just about to turn back. Thanks for being here!
Saw a tortoise between marker 31 and 32 on the 1.5 mile loop. Maybe 7 inches in length (shell). No marker or transmitter on shell. Very cool. Watched it for 30 minutes.
Please, please do not give my information to other organizations.
We will join your membership through the internet.
Very special place.
It was disappointing to find no naturalist available for questions (FYI - This was a Tuesday and the naturalists day off).
Plant loop good, animal loop not
Excellent preserve and helpful staff. Thanks.
Desert tortoise at Animal Loop #10. No number on tortoise.
We love it!
Thanks - we had a great time!
2 tortoise (male)
2 tortoise, 3 Jack rabbits, leopard lizard and gopher snake
1 tortoise, 3 lizards
2 lizards
6 lizards, 10 birds, squirrel and a tortoise
Saw a tortoise! Glad I did. Near #14 Animal Loop.
Beautiful flowers. Glad it's a protected area.
Saw small M tortoise approx. 1.5 miles N vis center.
Great job! Beautiful site. Keep up the good work.
Traveling to SE Arizona
Love it here!
First time, cool!
Very nice place for protection of wildlife.
We love it here!
On a wildflower tour.
Up with wildlife and botany. Down with OHVs!
Desert Tortoise Animal Trail #19
Enjoyed seeing lizards.
Thanks!
Birdwatching near Galileo.
Motorcycles

No torts!
Parking lot tortoise.
Excellent 2 tortoises. One was ancient. Great photos.
No tortoise but lizards.
Where dey at yo? No tortoises, 1 lizard, lots of bugs.
No tortoises. I will be back to see them one day.
Research.
No tortoises - snakes - lizards. Beautiful.
Great!
3.6 miles hiked. Friendly trails, wildlife, no tortoise sightings.
No tortoise. Lots of leopard lizards.
Saw the tortoise and all lizards except the horned.
Thank you for saving this place from the OHV/ATV disease
Photographing
We saw 3 tortoises
2 tortoises
2 Mojave shovel nosed snakes at dusk! Thank you for all this wonderful place of tranquility!
Saw 2 tortoises at #10 and #11 Animal Trail
Devise and implement raven controls
Saw 1 tortoise between Plant Loop 10 and 11 to the left.
Saw 1 tortoise on Animal Loop.
Saw 3 tortoises on Animal Loop and Mojave green rattlesnake.
Saw 1 tortoise between 10 and 11 in yellow flowers
Saw 1 between 10 and 11.
Saw 2 tortoises near post 15 Animal Trail
Saw a red racer, gopher snake, horny toad, and a tortoise
We're camping here for the weekend and like to come here each time we come! OHV-ers
Thank you (BLM) saw one tortoise
Wildflower viewing
Wildflowers!
Wildflowers!
Saw one small tortoise. Beautiful!
Wildflowers and small tortoise
3 tortoises, one a baby.
2 large turtles, 1 small. Friendly people.
No tortoises. Lots of flowers.
Wildflower watching. Thank you saw a tortoise!
Photography.
No turtles!
Nice trails, flowers
Nice trails, flowers
Great information
A first for us and it is beautiful.
Great site. Good work preserving this habitat.

APPENDIX 5. Vertebrate species observed in and around the Interpretive Center and within 0.5 mile of the visitor area between March 16 and June 7, 2005. Underlined text indicates an addition to the inventory of vertebrate species.

CLASS REPTILIA

ORDER TESTUDINATA

FAMILY TESTUDINIDAE

Desert Tortoise

Gopherus agassizii

ORDER SQUAMATA

FAMILY IGUANIDAE

Zebra-tailed Lizard

Callisaurus draconoides

Desert Iguana

Dipsosaurus dorsalis

Leopard Lizard

Gambelia wislizenii

Desert Horned Lizard

Phrynosoma platyrhinos

Desert Spiny Lizard

Sceloporus magister uniformis

Side-blotched Lizard

Uta stansburiana

FAMILY TEIIDAE

Western Whiptail Lizard

Cnemidophorus tigris

FAMILY COLUBRIDAE

Glossy Snake

Arizona elegans

Mojave shovel-nosed snake

Chionactis occipitalis occipitalis

King Snake

Lampropeltis getulus californiae

Coachwhip Snake

Masticophis flagellum

Gopher Snake

Pituophis melanoleucus

Long-nosed Snake

Rhinocheilus lecontei

Mojave Patch-nosed Snake

Salvadora hexalepis mojavensis

FAMILY VIPERIDAE

Sidewinder Rattlesnake

Crotalus cerastes

Mojave Rattlesnake

Crotalus scutulatus

CLASS AVES

ORDER APODIFORMES

FAMILY TROCHILIDAE

Costa's Hummingbird

Calypte costae

ORDER CAPRIMULGIFORMES

FAMILY CAPRIMULGIDAE

Lesser Nighthawk

Chordeiles acutipennis

Poor-will

Phalaenoptilus nutallii

ORDER COLUMBIFORMES

FAMILY COLUMBIDAE

Mourning Dove

Zenaida macroura

ORDER CUCULIFORMES

FAMILY CUCULIDAE

Greater Roadrunner

Geococcyx californianus

ORDER FALCONIFORMES

FAMILY ACCIPITRIDAE

Red-tailed Hawk

Buteo jamaicensis

Swainson's Hawk

Buteo swainsoni

Northern Harrier

Circus cyaneus

Osprey

Pandion haliaetus

FAMILY CATHARTIDAE

Turkey Vulture

Cathartes aura

FAMILY FALCONIDAE

Prairie falcon

Falco mexicanus

Kestrel

Falco sparverius

ORDER GALLIFORMES

FAMILY PHASIANIDAE

California Quail

Callipepla californica

Chukar

Alectoris chukar

ORDER PASSERIFORMES

FAMILY ALAUDIDAE	
Horned Lark	<i>Eremophila alpestris</i>
FAMILY CERTHIIDAE	
<u>Blue-gray Gnatcatcher</u>	<i>Polioptila caerulea</i>
FAMILY CORVIDAE	
Common Raven	<i>Corvus corax</i>
FAMILY EMBERIZIDAE	
Sage Sparrow	<i>Amphispiza belli</i>
<u>Lawrence's Goldfinch</u>	<i>Carduelis lawrencei</i>
Lesser Goldfinch	<i>Carduelis psaltria</i>
House Finch	<i>Carpodacus mexicanus</i>
Bullock's Oriole	<i>Icterus galbula</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Western Tanager	<i>Piranga ludoviciana</i>
Brewer's Sparrow	<i>Spizella breweri</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
FAMILY FRINGILLIDAE	
Black-throated Sparrow	<i>Amphispiza bilineata</i>
FAMILY HIRUNDINIDAE	
Barn Swallow	<i>Hirundo rustica</i>
Tree Swallow	<i>Iridoprocne bicolor</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
FAMILY ICTERINAE	
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Hooded Oriole	<i>Icterus cucullatus</i>
Western Meadowlark	<i>Sturnella neglecta</i>
FAMILY LANIIDAE	
Loggerhead Shrike	<i>Lanius ludovicianus</i>
FAMILY MIMIDAE	
Mocking Bird	<i>Mimus polyglottus</i>
LeConte's Thrasher	<i>Toxostoma lecontei</i>
Sage Thrasher	<i>Oreoscoptes montanus</i>
FAMILY PARULINAE	
Audubon's Warbler	<i>Dendroica coronata</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
FAMILY MUSCICAPIDAE	
Ruby-crowned Kinglet	<i>Regulus calendula</i>
FAMILY REMIZIDAE	
Verdin	<i>Auriparus flaviceps</i>
FAMILY PTILOGONATIDAE	
Phainopepla	<i>Phainopepla nitens</i>
FAMILY STURNIDAE	
European Starling	<i>Sturnus vulgaris</i>
FAMILY THRAUPIDAE	
Western Tanager	<i>Piranga ludoviciana</i>
FAMILY TROGLODYTIDAE	
Cactus Wren	<i>Campylorhynchus brunneicapillus</i>
FAMILY TYRANNIDAE	
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Say's Phoebe	<i>Sayornis saya</i>
ORDER STRIGIFORMES	
FAMILY STRIGIDAE	
Short-eared Owl	<i>Asio flammeus</i>
Burrowing Owl	<i>Athene cunicularia</i>
CLASS MAMMALIA	
ORDER CARNIVORA	
FAMILY CANIDAE	

Kit Fox	<i>Vulpes macrotis arsipus</i>
FAMILY MUSTELIDAE	
American badger	<i>Taxidea taxus berlandieri</i>
ORDER LAGOMORPHA	
FAMILY LEPORIDAE	
Black-tailed Hare	<i>Lepus californicus</i>
Audubon Cottontail	<i>Sylvilagus auduboni arizonae</i>
ORDER RODENTIA	
FAMILY CRICETIDAE	
Desert Woodrat	<i>Neotoma lepida lepida</i>
Deer Mouse	<i>Peromyscus maniculatus sonoriensis</i>
FAMILY HETEROMYIDAE	
Merriam's Kangaroo Rat	<i>Dipodomys merriami</i>
FAMILY SCIURIDAE	
Antelope Ground Squirrel	<i>Ammospermophilus leucurus</i>
Mojave Ground Squirrel	<i>Spermophilus mohavensis</i>