

---

---

# Tortoise Tracks

---

The Desert Tortoise Preserve Committee, Inc.

Fall 2003 23:3

---



Desert Tortoise Fitted With Transmitter  
Photograph by Mark Massar

---

## DESERT TORTOISE SOCIAL BEHAVIOR BY MARK MASSAR

This year, as part of my graduate work I became involved in a project to study desert tortoise social behavior in a remote corner of the National Training Center at Fort Irwin. This study, funded by the Army and under the direction of Dr. Kristin Berry, is a multi-year project to study tortoise social behavior in an area free from human impacts. This information will be used to compare differences in social behavior in disturbed areas. My role in the study is to look at various aspects of the mating behavior of the female tortoises, including female choice.

The study plot is located on the eastern border of the National Training Center (north of Baker, CA) in an area proposed for military training. This is an extreme desert region with little rainfall, sparse

### DTPC ANNUAL MEETING & BANQUET

January 24, 2004  
Ramada Inn, Palmdale

#### PROGRAM

- Annual Meeting 2:00 to 5:00 P.M.
  - No-host Social Hour 5:00 to 6:00 P.M.
  - Banquet Program 6:00 to 9:00 P.M.
- Banquet Speaker, Dr. Matthew Brooks

See page 5 for details

---

---

vegetation, and extreme summer temperatures—not unexpected given its proximity to Death Valley. Tortoises are on the edge of their distribution here. A few miles to the east is the Baker Sink—an area too hot and dry for tortoises. Because of the extreme conditions, tortoise densities are correspondingly low. On the plot, a series of small washes oriented north-south separate ridges of desert pavement. Here tortoises use as coversites small caves eroded into the hardened, calcified walls of the washes.

Twenty tortoises (10 males and 10 females) have been fitted with radio transmitters. Their home ranges have been delineated. Over 280 coversites, mostly caliche caves, have been identified and uniquely labeled with metal tags. Tortoises use multiple coversites within their home range, sometimes sharing them with other tortoises. Within one wash wall may be a complex of multiple caves, with several tortoises living side by side.

We concentrated our observing during the months of September and October to correspond with the peak of the mating season. Although tortoises engage in mating from the time they emerge from hibernation (March) until they return to hibernation (November), mating activity peaks in September and October. This is when male testosterone levels are at their highest (male desert tortoises have the highest levels of testosterone known for any vertebrate animal). As it turns out, male and female reproductive cycles are asynchronous. In males, gamete maturation occurs in early summer; in females ovarian growth and egg

laying occur in the spring. Male testes are fully regressed in spring and are thus incapable of producing sperm. Female tortoises overcome this obstacle by storing sperm from fall mating in tubules located within the oviduct. Females may use the stored sperm to fertilize their eggs the following spring. It is not known for how long female desert tortoises can store sperm, whether they can actively chose sperm from certain males to fertilize their eggs, or whether the eggs from a single clutch have multiple paternities. These phenomena have been observed in other animals. Although spring mating appears to have no obvious benefit for the males, it may be important for proper growth and development of female reproductive organs and gametes.

I tracked 6 female tortoises, all located in the southwestern portion of the study plot. Because of the ruggedness of the terrain, the heat, and the time it would take to visit all the transmitted female tortoises on the plot, I instead focused on these 6, all of which were located fairly close together. I would walk in a large loop visiting each female in succession, scanning the surrounding area visually with binoculars and electronically with the antennae searching for nearby male tortoises. If no males were present, I would move on to the next female. When a male was found near a female, I would start focal observations on the animals, precisely recording the behavior of the individuals. I was looking for behavioral patterns by the female which might indicate female choice for particular males. Behavioral patterns such as continuously turning her shell away from the advancing male, dropping her



Telephone: (909) 683-3872  
 Fax: (909) 683-6949  
 e-mail: <dtpc@pacbell.net>  
<http://www.tortoise-tracks.org>

## The Desert Tortoise Preserve Committee, Inc.

Founded 1974

Executive Director **Dr. Michael J. Connor**

### Board of Trustees

President **Mark Hagan**  
 Vice President **Laura Stockton**  
 Vice President **Arthur Braudrick**  
 Vice President **Mark Massar**  
 Treasurer **Dr. Kristin Berry**  
 Recording Secretary **Dr. Jill Heaton**

shell tightly to the ground, or quickly seeking refuge under a bush or coversite, would likely indicate rejection of the male by the female. Often times, a female simply remained sequestered in her coversite while the male courted her at the cave's entrance. Because males are generally much larger than females, females would often be in caves too small for the males to enter. The best the male could hope for in this situation is for the female to accept his advances and come out of her cave. This would be a clear sign of female choice, and I've observed this on occasion.

On one occasion a male tortoise (Male 61) performed head bobs for two hours at the entrance of Female 41's cave before she would exit. Mating took place in the lower branches of a creosote bush for precisely 19 minutes, after which time the female seemed to have lost interest and quickly retreated back to her cave, followed closely by the male. The male continued headbobbing at the cave's entrance, despite the apparent lack of interest on the part of the female. He remained at the cave the rest of the day, blocking its entrance, possibly doing this to prevent other males from gaining access to the female. We've noticed this burrow blocking behavior on numerous occasions with many of the male tortoises.

When two male tortoises encounter each other, a dramatic battle often ensues. This is especially the case when the two are alpha males and when a female is nearby. Fights involve rapid head bobbing, biting, and ramming in which males charge each other with their gular horns (often resulting in one or both males being flipped on to their carapace). Desert tortoises maintain dominance hierarchies. By recording the outcomes of fights, we are beginning to map out the dominance hierarchy of the males on the study plot. One thing we've noticed is that it appears that the alpha males are spending a disproportionate amount of their time engaged in battles and patrolling their territories instead of mating, while the smaller males are mating with the females.

Because tortoises are such long-lived animals (80-100 years), a clear picture of their social structure could take years. This project was started just three years ago. I'll be out there again next year, with my five-foot diameter shade umbrella and bottles of sunscreen, living among the tortoises.

## DTPC ANNUAL FALL WORK PARTY

This year, the DTPC had two Fall work parties; one each at the DTNA and at the Pilot Knob grazing allotment.

Sixteen volunteers attended the DTNA work party, with eleven attending at Pilot Knob. The DTNA workparty completed work on the fence on the northwestern boundary of the DTNA. This is an area where the original fence line excluded a more recent land acquisition. The workparty completed the fence realignment and added a gate at the south end of section 5. The fence around section 5 at the northwest corner of the DTNA now includes the 160 acres that were once outside the fence-line.

The volunteers at Pilot Knob included Jill Heaton, Wendy McIntyre and students and family from the University of Redlands. One of DTPC's long-term projects at Pilot Knob has been to reduce unauthorized off road vehicle activity by removing superfluous fences. The volunteers made good headway into removing the southern half of a superfluous fence across the Grass Valley Wilderness area of the Pilot Knob grazing allotment. The northern half was removed in previous workparties, and judging by the absence of tire tracks has successfully decreased unauthorized off road vehicle trespass in the area.

The Spring 2004 work party will be held March 20-21.



New Fence Includes 160 Acres of Habitat  
DTNA Northwest Corner.  
Photograph by Michael J. Connor

## EXTRACTS FROM THE 2003 DTNA NATURALIST REPORT\* BY MICHAEL CONNOR & CHARLES HEMINGWAY

Since its foundation, the Desert Tortoise Preserve Committee has worked to consolidate the Desert Tortoise Natural Area by raising funds for purchasing private land within the DTNA and surrounding area, and to educate the public about the area and its desert tortoises. In keeping with these goals, since 1989 DTPC has funded a Naturalist position at the DTNA each spring, the season when tortoises are most active and visitation is greatest. In 2003, the DTPC staffed a Naturalist at the DTNA from mid-March to mid-June. This marks the fifteenth consecutive year that DTPC has had a Naturalist on site at the DTNA.

The Naturalist, Charles (Chuck) Hemingway, was stationed at the DTNA Interpretive Center from March 21 to June 19, 2003. During the 79 days the Naturalist was on duty, 467 visitor groups totaling 1243 individuals were recorded at the interpretive center, and they stayed an average of 60 minutes. The Naturalist contacted 419 (89.7%) of the visitor groups totaling 1133 (91.1%) individuals.

Most of the visitors were from California but 26% were from out of state. There were visitors from Alaska, Arizona, Colorado, Indiana, Kentucky, Maine, Montana, Nevada, New York, Oregon, Texas, Virginia, and Washington. Visitors from foreign countries included groups from Australia, Canada Germany, Great Britain, Poland and Sweden.

Visitors were not only sympathetic to the desert tortoise population and the problems it faces, but were also anxious to learn how they might help save the species. Many were surprised to learn 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.

About half of the responses written on survey forms were comments strongly supporting the value of having a host interpreter present and the opportunity it provides to learn useful information about desert tortoises and their habitat. Because this was a "wet" year, many visitors commented on 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. Written comments included "Great flowers. Glad we came." Several visitors made management suggestions including

expanding the DTNA and reducing the unauthorized OHV use outside the fence.

Ninety one visitor groups comprised of 329 (29.0%) individuals saw at least one tortoise. Sixteen visitor groups comprised of 78 (6.9%) individuals saw two or more tortoises.

Of 42 respondents to a visitor survey, 10 (24%) were repeat visitors. The most common ways that visitors learned about the DTNA were from tour books/guides, the DTPC website, and road signs and maps. The DTNA was the sole destination for 36% 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.

The Naturalist and visitors observed tortoises on 49 days out of the 79 days (62%). Thirteen individual marked tortoises (#'s 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 the area known as "The Pit").

There were seven sightings of rattlesnake near the Interpretive Center during the period March 21 through June 19, 2002. On all occasions, the sighting was of a Mojave rattlesnake. Except on one occasion, it was not necessary to move the animals, but visitors were made aware of the known location of any rattlesnakes before they left for their walk. One young rattlesnake had to be moved from the entry road for its own safety.

Several vertebrate species were observed that have not been seen in recent years. These include: desert iguana, Mojave patch-nosed snake, northern harrier, and long-nosed snake. The most unusual visitor was a snowy egret that appeared at the Interpretive Center on May 16, 2003. The bird stayed nearby for at least 10 hours. This is the first recorded occurrence of snowy egret at the DTNA.

The 2003 Naturalist position was funded by your contributions and with matching funds provided by the National Fish and Wildlife Foundation.

\*From: Observations and Activities of the Naturalist at the Desert Tortoise Research Natural Area, Kern County, California: March 21 through June 19, 2003 by Michael J. Connor and Charles C. Hemingway. October 2003. Desert Tortoise Preserve Committee, Riverside.



**THE DESERT TORTOISE PRESERVE COMMITTEE  
INVITES YOU TO JOIN US AT OUR**

**29th Annual General Meeting & Banquet  
Ramada Inn, 300 West Palmdale Blvd., Palmdale**

The Desert tortoise Preserve Committee will hold its 29th Annual Meeting and Banquet Saturday, January 24, 2004 at the Ramada Inn, 300 West Palmdale Blvd., Palmdale, California (Note new location). The Banquet speaker will be Dr. Matthew Brooks.

**PROGRAM**

**Dr. Matthew Brooks, US Geological Survey**

- Annual Meeting 2:00 to 5:00 P.M.
- No-host Social Hour 5:00 to 6:00 P.M.
- Banquet Program 6:00 to 9:00 P.M.

**“Effects of Livestock Watering Sites on  
Plant Communities in the Mojave Desert”**

**Matt will review his recent work at the DTPC’s Pilot Knob Grazing Allotment. Livestock watering sites in desert tortoise habitat create localized disturbances that significantly affect plant community structure and species composition in the Mojave Desert.**

Conveniently located just west of the Interstate 14 Freeway at the Palmdale Boulevard exit. From Los Angeles take the 405 N to the 5 N to the 14, continue N on 14 to the Palmdale Blvd. exit, turn left (west) under the freeway, hotel is on the left. From San Bernardino: Take the 15 N to 138, continue W on 138, it turns into Palmdale Blvd., continue on Palmdale Blvd. to hotel located just west of the 14. From Mojave, take the 14 S to Palmdale Boulevard exit. Turn right. Ramada Inn is on the left.

If you want to stay overnight at the Ramada Inn, call (661) 273-1200 for room reservations. There is a special overnight rate of \$59/night for attendees.

.....  
**CHECKS AND RESERVATION FORMS MUST BE RECEIVED BY JANUARY 15, 2004**

**Questions? Please call Michael Connor at (909) 683-3872 or e-mail (dtpc@pacbell.net)  
Or visit our website at (<http://www.tortoise-tracks.org>)**

\_\_\_ Dinner reservations at \$25 each: \$ \_\_\_\_\_

Optional tax-deductible donation: \$ \_\_\_\_\_

Enclosed is my check for a total of: \$ \_\_\_\_\_

Name(s): \_\_\_\_\_

Phone Number: (\_\_\_\_)\_\_\_\_-\_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_

Organizational Affiliation (if any) \_\_\_\_\_

I (we) plan to attend the afternoon business meeting: Yes \_\_\_\_\_ No \_\_\_\_\_

Make checks payable to DTPC and mail to:  
DTPC Annual Banquet, 4067 Mission Inn Blvd., Riverside, CA 92501

## IN MEMORIAM - BARBARA HORTON BY LAURA STOCKTON

Barbara Horton, a longtime supporter of the DTPC passed away on November 18<sup>th</sup> after a brief battle with cancer.

As an active member of the Southern California Chapter of The Nature Conservancy, Barbara was instrumental in the beginning efforts of the DTPC/TNC partnership to fund-raise for and acquire private DTNA land.

For most of her 85 years Barbara was an advocate for wildlife and habitat throughout the world. One of the projects that remained most dear to her heart is the Dorland Mountain Arts Colony that she

cofounded 25 years ago. It is both a natural area of chaparral habitat and a working artist colony.

Part of Barbara's environmental legacy includes her two children, Alison and Curtis, who are both professional environmentalists. Curtis acted as the first Executive Director of the DTPC. Those of us who had the pleasure of working with and being inspired by Barbara's dedication share the loss of this great lady with Curtis and Alison.

Barbara requested that donations in her memory be made to Dorland Mountain Arts Colony, P.O. 6, Temecula, CA 92593.

### Natural History Notes

#### Desert Tortoises and Water

Desert tortoises live in some of the driest places on earth. Acquiring water is a challenge for tortoises as it is for all desert animals.

Some desert animals such as kangaroo rats are famous for never needing to drink liquid water—they get all the water they need

metabolically from the seeds they eat. However, while desert tortoises can go months without liquid water, at some point they require it.

Most of the rain in the Mojave Desert falls during winter when tortoises are hibernating. Some rain occurs in spring and summer during



Adult Tortoise Drinking From a Puddle  
in a Tire Rut  
**Photograph Courtesy of Mickey Quillman**



Young Tortoises Drinking Runoff At the Base of  
a Support in a Head-starting Pen at FISS  
**Photograph by Mark Massar**

## DESERT TORTOISE PRESERVE COMMITTEE

### MEMBERSHIP/DONOR FORM

NAME \_\_\_\_\_ DATE \_\_\_\_\_  
 ADDRESS \_\_\_\_\_ RENEWAL   
 CITY \_\_\_\_\_ NEW   
 STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Individual membership	\$ 15 annually	[ ]
Family membership	\$ 20 annually	[ ]
Sponsor membership	\$ 30 annually	[ ]
Benefactor membership	\$ 75 annually	[ ]
Patron membership	\$100 annually	[ ]
Life	\$500	[ ]

Membership Dues	\$ _____
Additional Donation	\$ _____
Total Enclosed	\$ _____

#### DONATION ONLY

Enclosed is my donation of \$ \_\_\_\_\_

Please make checks payable to: **DTPC**

And mail to: **DTPC**  
**4067 Mission Inn Avenue**  
**Riverside, CA 92501**

The DTPC is an IRS recognized tax-exempt 501 (c)(3) nonprofit corporation. All contributions above the basic \$15 annual membership dues are tax-deductible to the full extent allowed by law.

All contributors receive the quarterly newsletter *Tortoise Tracks*.

Membership and donor information are kept confidential and will not be disclosed to third parties.

#### I WANT TO VOLUNTEER

My area of interest/expertise is:

\_\_\_\_\_

My e-mail address is:

\_\_\_\_\_

brief rainstorms. This is when tortoises are able to replenish their water supply. Tortoises also get water from the fleshy, succulent annuals they consume in spring.

During storms, water accumulates in depressions on the ground and on rock surfaces. These small pools are very ephemeral, quickly evaporating in the summer heat, so tortoises must act quickly to get a drink.

Tortoises also dig their own small drinking depressions.

These small, saucer-shaped depressions several centimeters deep are dug in areas of desert pavement. Tortoises dig away the small pebbles on the surface of the pavement down to the silt layer. Because this silt layer is relatively impermeable, water stays on the surface until it is evaporated away. Tortoises know the locations

of the drinking depressions within their home range, and will quickly gather there during rainstorms.

When tortoises drink, they submerge half their head and take deep gulps. They will do this for an extended period (10 minutes or more) and can increase their body weight by as much as 17 percent.

Tortoises use their bladders like a canteen, storing water there where it can be reabsorbed later. This water is used by tortoises to balance the concentrations of salts in their blood, and is absolutely crucial for their survival in the desert. Tortoises are only able to replenish this water supply a few times a year during brief and sporadic thunderstorms. Because tortoises are apt to void their bladders when disturbed, they should never be startled or stressed by picking them up or turning them over.



# Tortoise Tracks

NONPROFIT ORG.  
U.S. POSTAGE  
PAID  
RIVERSIDE, CA  
PERMIT NO. 3216

THE DESERT TORTOISE PRESERVE COMMITTEE  
4067 MISSION INN AVENUE  
RIVERSIDE, CALIFORNIA 92501

Address Service Requested



---

## DTPC CALENDAR OF EVENTS

24 January, 2004  
Desert Tortoise Preserve Committee  
Annual General Meeting & Banquet

20-22 February, 2004  
Desert Tortoise Council Symposium  
Sam's Town, Las Vegas, Nevada.

20-21 March 2004  
Desert Tortoise Preserve Committee's  
Fall Work Party