GOPHERUS AGASSIZII (Desert Tortoise). **PREDATION/MOUNTAIN LION**. During a long-term study on tortoise growth within 3 fenced 9-ha enclosures in Rock Valley, Nevada Test Site (NTS), Nye County, Nevada, USA, tortoises have been captured annually since 1964 (Medica et al. 1975. Copeia 1975:630-643; Turner et al. 1987. Copeia 1987:974-979). Between early August and mid October 2003 we observed a significant mortality event. The Rock Valley enclosures were constructed of 6 x 6 mm mesh 1.2 m wide hardware cloth, buried 0.3 m in the soil with deflective flashing on both sides on the top to restrict the movement of small mammals and lizards from entering or leaving the enclosures (Rundel and Gibson 1996, Ecological communities and process in a Mojave Desert ecosystem: Rock Valley, Nevada, Cambridge University Press, Great Britain. 369 pp.). On August 6, 2003, the carcass of an adult female Desert Tortoise #1411 (carapace length 234 mm when alive) was collected while adult male tortoise #4414 (carapace length 269 mm) was observed alive and in good health on the same day. Subsequently the carcass of #4414 was found on October 16, 2003. Between October 16-17, 2003, the remains of 6 (5 adult and 1 juvenile) Desert Tortoises were found, some within each of the 3 enclosures in Rock Valley. A seventh adult tortoise was found on September 26, 2006, its death also attributed to the 2003 mortality event based upon the forensic evidence. Each of the 7 adult Desert Tortoises had the central portion of their carapace broken open approximately to the dorsal portion of the marginal scutes while the plastron was still intact (Figure 1A). Adjacent to 7 of the 8 remains we located numerous bone fragments including parts of the carapace and limbs as well as dried intestines in a nearby Range Rhatany (*Krameria parvifolia*) shrub (Figure 1B). The significance of the frequent use of this shrub is puzzling. Three of the Desert Tortoise shell remains possessed distinctive intercanine punctures measuring 55-60 mm center to center indicating that this was an adult sized Mountain Lion. By comparison, a 2 year old male Mountain Lion salvaged on NTS had an upper intercanine bite width of 45 mm, and a 6 month old kitten measured 35mm respectively. The Mountain Lion (*Puma concolor*) is the only predator that exists in southern Nevada that could possibly have a bite with a gap between its upper canine teeth that large (Murmann et al. 2006. J. Forensic Sci. 51:846-860).

The appearance of the shell remains in Figure 1A is similar to that depicting Jaguar (*Panthera onca*) predation, on the Amazonian Tortoise (*Geochelone denticulata*) as illustrated by Emmons (1989. J. Herpetol. 23:311-314) with the majority of the carapace broken open and the plastron still intact. Predation of Desert Tortoises by Mountain Lions was also documented in 1993 in southern Arizona (Little Shipp Wash Plot), where 7 of 8 carcasses found were attributed to Mountain Lion predation (Averill-Murray et al. 2002. *In*. T.R.Van Devender [ed.], The Sonoran Desert Tortoise: Natural History, Biology, and Conservation, pp.109-134. University of Arizona Press and Arizona-Sonora Desert Museum, Tucson, Arizona). Similarly, predation by a Mountain Lion has been reported on the Argentine Tortoise (*Chelonoidis chilensis*) in Argentina (Acosta et al. 2004. Herpetol. Review 35:53-54), and a Mountain Lion kitten was observed to kill and consume a portion of the carapace of a Texas Tortoise (*Gopherus berlandieri*) in west Texas (Adams et al. 2006. Southwestern Nat. 51:581-581).

Over the past 45 years this Desert Tortoise population has been monitored yearly, with no prior evidence of predation to tortoises within the fenced enclosures. On several occasions other predators such as Bobcats (*Lynx rufus*) have been observed within the study enclosures for as long as a week. Evidence of Kit Fox (*Vulpes macrotus*) sign has been observed on numerous occasions, and a Spotted Skunk (*Spilogale putorius*) and Longtail Weasels (*Mustela frenata*) have been captured and released (B.G. Maza, pers. comm.; Medica 1990. Great Basin Nat. 50:83-84), while Coyotes (*Canis latrans*) were never observed within the fenced enclosures. Prior to this predation event in Rock Valley, 17 Desert Tortoises were alive between 2000 and 2002, only 7 were known to be alive in 2004, while 2 tortoises have not been seen since 2002. Predation studies of Mountain Lions indicate that these events may be an example of a learned behavior of individual animals developing a preference for a prey (Logan and Sweanor 2001, Desert Puma: Evolutionary ecology and conservation of an enduring carnivore. Hornocker Widlife Institute, Island Press, Washington. 463 pp.; Creeden and Graham 1997, Desert Bighorn Council Transactions. p. 37-43), or the plight of a large predator locating an available source of food while passing through low elevation Mojave Desert habitat in late summer or early fall. Several Mountain Lion sightings were recently recorded in late summer and early spring (July 5, and 26, 2006; March 15, 2007) at lower elevations (1300 m) in *Larrea/Ambrosia* habitat on the NTS, 8-10 km northeast of Rock Valley in canyons near the base of Skull Mountain. Predation upon Desert Tortoises and their nests is also perpetrated by smaller carnivores, i.e. coyotes, kit foxes and badgers (Grover and DeFalco 1995, Desert Tortoise (*Gopherus agassizii*): Status-of-knowledge outline with references. U.S. Department of Agriculture, Forest Service Report INT-GTR-316 p.76-79). Predation by these smaller carnivores generally leaves the carapace intact and the head and legs are gnawed off sometimes leaving the upper portions of the appendages still connected to the carcass. The carcass of an adult male tortoise #1212 (carapace length 289 mm when last captured alive) was found in this condition on October 15, 2004. Such predation events upon alternative prey such as the Desert Tortoises appear to take place toward the end of the summer season and coincide with a combination of drought years and the reduced density of normal prey such as small mammals. Localized predation events by a large predator such as Mountain Lions can have a significant impact upon on a small population of prey, e.g., the reduction of the population of bighorn sheep in the Granite Mountains during drought 1989-1991 (Wehausen 1996. Wildlife Society Bulletin 24:471-479). The Mountain Lion predation event that took place in Rock Valley during 2003 was likely a chance happening but has had a profound impact upon the localized population. The presence of Bighorn Sheep (*Ovis canadensis*) in the adjacent Specter Range since their introduction in the fall of 1990 may have influenced the distribution of Mountain Lions.

We thank E. Boydston, D. Hall, D. Hansen, and K. Nussear for reviewing this note. Additionally, we thank the numerous dedicated individuals from federal, state, university, and contractors that have volunteered to assist in the recapture of the Rock Valley Desert Tortoises particularly, J. Burroughs, M. Burroughs, K. Murphy and K. Drake, and K. Nolte for preparing the figures. This study was conducted under Fish and Wildlife Service, U.S. Threatened Species Permit TE 759747, and Nevada Division of Wildlife Permits S-21692, S-24391, and S-28154 issued to (PAM). We gratefully acknowledge

the U.S. Department of Energy, National Nuclear Security Administration for continued access to the study area. This manuscript (DOE/NV/25946--494) has been co-authored by National Security Technologies, LLC, under Contract No. DE-AC52-06NA25946 with the U.S. Department of Energy. The United States Government retains and the publisher, by accepting the article for publication, acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this manuscript, or allow others to do so, for United States Government purposes.

Submitted by **PHILIP A. MEDICA**, U.S. Geological Survey, Western Ecological Research Center, 160 N. Stephanie Street, Henderson, Nevada 89074, USA (e:mail: pmedica@usgs.gov); and **PAUL D. GREGER.** National Security Technologies, Nevada Test Site, Mercury, Nevada 89023, USA (e-mail: gregerpd@nv.doe.gov).

A

B

Figure 1. A) Shell remains of an adult female Desert Tortoise (#1411) characteristic of Mountain Lion predation. B) Pieces of Desert Tortoise carapace and remnants of intestines found in a *Krameria parvifolia* shrub.