

Cross Timbers Herpetologist

THE JOURNAL OF THE DALLAS-FORT WORTH HERPETOLOGICAL SOCIETY

JANUARY 2012

Volume I, Number I



Dallas-Fort Worth Herpetological Society

Mission: *To promote understanding, appreciation, and conservation of reptiles and amphibians, to encourage respect for their habitats, and to foster responsible captive care.*

Mailing address: P.O. Box 151721
Arlington, TX 76015

Phone (voice mailbox): (972) 949-4191

Web site: www.dfwherp.org

E-mail: Contact@dfwherp.org

Members' E-mail Group: www.groups.yahoo.com
(Search for "dfwherp")

Photos: <http://s225.photobucket.com/albums/dd57/DFWHERP/>

The DFW Herpetological Society is a membership-based organization, with membership open to anyone with an interest in reptiles and amphibians. We encourage anyone with such an interest to join DFWHS, using the membership form provided toward the back of this newsletter or the form available at our web site.

Officers and Members of the Board:

President

Carl Franklin - President@dfwherp.org

Education Director

Mark Pyle - Education@dfwherp.org

Membership Director

Trish Alder - Membership@dfwherp.org

Treasurer

Debbie Dorman - Treasurer@dfwherp.org

Editor

Ardell Mitchell - Editor@dfwherp.org

Field Trip Director

Clint King - FieldTrip@dfwherp.org

At-Large Board Member

Levi Dawson - Dawson@dfwherp.org

At-Large Board Member

David Killpack - Killpack@dfwherp.org

Advisors to the Herpetological Society:

Jonathan A. Campbell PhD
University of Texas at Arlington Amphibian &
Reptile Diversity Research Center

Andy Gluesenkamp PhD
Texas Parks & Wildlife Department

Marsha McLaughlin
Friends of Fort Worth Nature Center

The *Cross Timbers Herpetologist* and its contents are © 2012, by the Dallas-Fort Worth Herpetological Society (DFWHS). All Rights Reserved. The DFWHS is a 501c3 educational organization. Ownership of articles remains with the author, and ownership of photographs remains with the photographer. Please do not reproduce material in the newsletter without permission of the owner. Permission for reproduction for nonprofit educational use is likely to be granted but you must first obtain permission from the owner. Inquire by calling or writing the Editor, or emailing Editor@dfwherp.org. Thank you!

This month's cover photo- A male gladiator frog (*Hypsiboas boans*) is momentarily distracted from vocalizing in hopes of attracting a female to lay her eggs in his recently excavated nest.

From the President

New Publication, ambitious goals, revitalized direction and growth for the DFWHS

The Dallas Fort Worth area is a major center for herpetological activity. Three prominent zoological collections, a major university and several localities within easy driving distance for finding and viewing amphibians and reptiles are all here! Not surprisingly that over the years, this area has hosted a herpetological society. From the 1960's-80's the Dallas Herpetological Society, the North Texas Herpetological Society and now since 1999 the Dallas Fort Worth Herpetological Society. This is a special issue of the Cross Timbers Herpetologist as it signifies the end of our monthly publication of the same name and the birth of our new quarterly journal. The journal will provide our society with a more formal platform to present a wide range of original content pertaining to herpetology, herpetoculture and conservation.

Asides from a new publication you may have noticed a higher attendance at our monthly meetings. If you have not yet noticed then please come to one of our meetings whereby your presence will also increase attendance! Many of us who have been involved with herpetological societies since the 1990's (and earlier) have witnessed a precipitous decline in attendance at monthly meetings. For those of you who were not around, the North Texas Herpetological Society (NTHS) used to hold meetings in room 119 of Life Science and an early arrival was mandatory if you wanted a place to sit. Sometimes there was standing room only with the room overcapacity! In fact, the attendance was so great that a separate room and meeting was held for kids ages 12 and under. This lasted all too briefly as in 1996 most households had the Internet and people had a new and convenient way to acquire animals, information and supplies. Shortly thereafter attendance dwindled to the point that I remember speaking to a room with 7 people (perhaps the others knew I was coming to give the presentation!). This was not unique to the DFW area and was happening across the country. In my opinion it is due to a lack of adapting to what members wanted. If the information they sought could be attained online through a handful of keystrokes or through the pages of a herpetoculture magazine then what good was there for an organization that regurgitated the same information?

In 1999 the Dallas Fort Worth Herpetological Society was created and a new direction was sought. The Cross Timbers Herpetologist began running original monthly content in an informative newsletter. This was unique among Texas herp societies and an increase in membership attendance and participation was noticeable and the society experienced growth. Two essential people in facilitating a healthy and viable society are none other than Steve Campbell and Michael Smith. Both of these men gave tirelessly to develop and promote our society and I don't think we would be as successful as we are today had it not been for all of their hard work. Which leads me to our future as a society. I am delighted to announce that we are gearing up for some additional changes that we believe will set a path for future growth as a society. These changes will materialize in 2012. A new web design and functionality will allow for automatic membership updates and provide a login account to members where back issues of the Cross Timbers Herpetologist and our other publications can be downloaded as full color PDF files. The new web design will also provide full husbandry information for many of the more common species kept as pets.



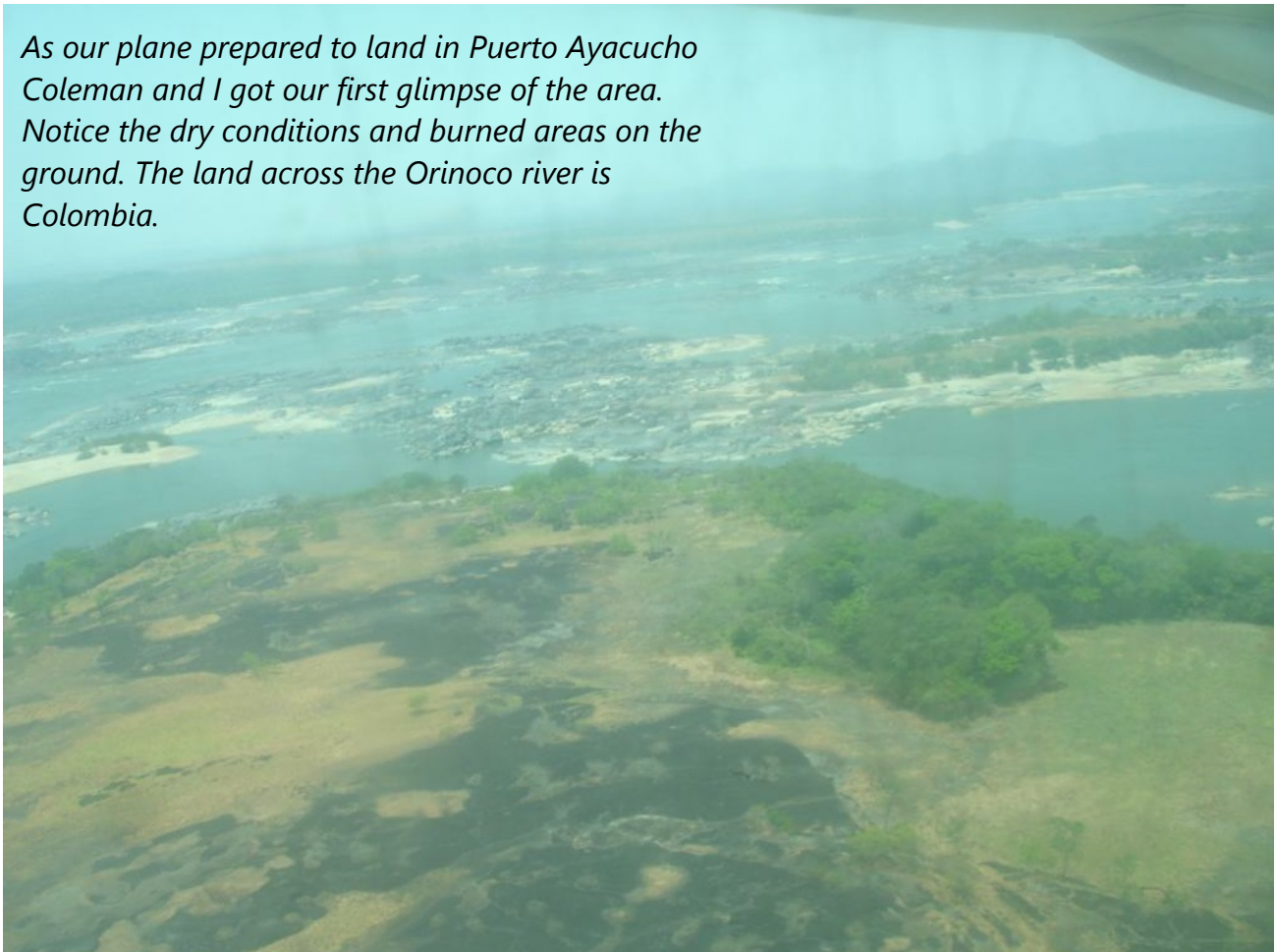
In the end I would like to thank you for being a member and helping us through another year. We already have several goals set for 2012 and look forward to what looks to be a promising and eventful year!

Herpetological Highlights from Venezuela - 2007

By Carl J. Franklin

In March of 2007 I accompanied Coleman Sheehy III to Puerto Ayacucho in Departamento Amazonas, Venezuela in an effort to collect live specimens of the snail eating snake *Sibon nebulata*, a series of voucher specimens from the region, and a specimen of a locally occurring species of aquatic coral snake. March is the dry season for much of northern South America and this expedition provided a stark contrast to the wet and lush rainy seasons to which I have become accustomed. In fact, the area was so dry that much of the forest was burning and the sky was always overcast due to a constant haze of smoke. Nevertheless, Coleman and I continued to brave the fires, potential conflicts with indigenous militant groups, and the ever-growing presence of the Chavez military. We were graciously hosted by a German transplant, Axel Keleman, and we highly recommend him as both host and guide, should anyone decide to visit the region. Later we were joined by our Venezuelan colleagues, herpetologists Tito Barros and Gilson Rivas. We were also joined by our Venezuelan colleagues, herpetologists Tito Barros and Gilson Rivas.

As our plane prepared to land in Puerto Ayacucho Coleman and I got our first glimpse of the area. Notice the dry conditions and burned areas on the ground. The land across the Orinoco river is Colombia.





Due to their cryptic appearance, leaf litter toads (*Rhinella margaritifera*) were most frequently noticed when they moved.

Herpetological Highlights - Venezuela (*continued*)

We met with a local insect collector, Antonio, and his family just outside of Puerto Ayacucho. Antonio is of Guajibo descent and his wife is Piaroa. Given their native heritage, and lifelong experience in the forest, both were skilled experts on the regions' fauna. Antonio is an avid beetle collector and occasionally sells specimens. The following photos depict a few species he routinely encounters.



A large beetle belonging to the family Cerambycidae always leaves a distinct impression.

A shining example of a large beetle belonging to the family Buprestidae.



How about a jar filled with *Megasoma*?



A juvenile calico snake (*Oxyrhopus petola*) was found as it actively patrolled the riverside forest floor at night.



A mature calico snake was also encountered during a tropical forest



A brown-banded water snake (*Helicops angulatus*) was found submerged in a shallow stream.

Given the dry conditions, we continued to search the streams in hopes that most herpetological activity would be concentrated in areas containing moisture. These marine toads (*Rhinella marinus*) were found in a shallow pool in an otherwise dry creek bed. They were also noticeably skinny, likely a side effect of the dry season scarcity of food.





This smooth sided toad (*Rhaebo guttatus*) was found near one of the pools. This was the first specimen encountered outside of old growth secondary or primary forest.



After finding this spider belonging to the family Ctenidae consuming a frog I decided to grab the prey with forceps and an epic tug of war ensued. However, as a testament to the potency of the spider's venom the frog was reduced to little more than a small pile of mush a few hours later.



The small craters are the dried out remnants of the nest constructed by gladiator frogs (*Hypsiboas boans*).



Males prepare the nest in such a fashion that water remains inside after the levels begin to drop, thus forming an isolated pool in which the eggs can hatch and the larvae develop free of aquatic predators. Pictured here are some recently hatched tadpoles. Notice that various age classes of tadpoles are present in the same nest.



Males call from the nest sites to attract females. When another male comes within the territorial reproductive location of another male a fight ensues. Although somewhat difficult to see in this photo, the male shown in this nest bears two scars on its back from a previous fight.



This female was approaching the nest of a vocalizing male.

Male gladiator frogs possess prepollical spines located at the base of their thumbs. These concealed weapons are covered in skin and come out as soon as a fight ensues. This often causes severe injuries as the frogs will cut and scrape the flesh and even stab eyes and tympanum. Males are protective of their nest, as well as the eggs and tadpoles within.



These are sizable tree frogs and sometimes holding them in this fashion can result in being stabbed by the spines.



Sapo minero, or the yellow banded poison dart frog (*Dendrobates leucomelas*) was another common denizen of the rainforest floor. Many of the specimens found near Puerto Ayacucho had greenish finger tips.



Herpetological Highlights - Venezuela (*continued*)

In one location 13 dart frogs were found crammed together in the crevice of a granite boulder. This location was near a section of forest that was burning.



A leptodactylid frog of the genus *Adenomera*



Mysterious knife fish (*Gymnotus* sp) were present in the remaining pools of water in seasonally dry stream beds. The presence of this fish species roused our enthusiasm that we might find our target species the aquatic coral snake.



Inspecting the vegetation alongside a forest stream at night revealed this tiger-monkey frog (*Phyllomedusa hypochondrialis*)



More leaf littler toads.



Herpetological Highlights - Venezuela (*continued*)

Although it was during the dry season, many tropical amphibians are opportunistic breeders as evidenced by this recently metamorphosed *Osteocephalus*.



Bone headed tree frogs (*Osteocephalus taurinus*) were common throughout most of our trip. Coleman spotted this specimen peering from beneath a blanket of leaf litter. It was perfectly concealed, yet betrayed by the reflection of its eyes.

Horribly large amblypigids are always an interesting challenge to capture.



The quantity of large tarantulas we found every night was amazing. Dozens of these huge arachnids could be seen on the banks of creeks no more than 1 meter apart. This is a species of bird-eating spider that was described in 1991 as

Theraphosa apophysis. Identification of this specimen provided by tarantula expert Rick West.





Due to their abundance it was easy to understand how these arachnids could wind up in the diet of the Piaroa people. Pictured here is Antonio's wife capturing a live specimen.



She was definitely one of the best spider handlers I've witnessed!



Another common species was the Mapanare or Fer de lance (*Bothrops atrox*). All of the following photos were taken in situ, the result often being the snake fleeing the area upon discharging the camera flash. In some stream beds very little effort was required to find them. I often wondered how many were missed (or stepped over!).





I almost stepped on this one!



With perfect timing, a moth shared the photo with this female Hagmann's water snake (*Helicops hagmanni*). The bulge is due to a recently swallowed fish. This is also the first published photograph of this species and currently the only specimen outside of South America.

This turnip tailed gecko (*Thecadactylus rapidicauda*) did not live up to its common name due to its skinny tail. Perhaps it had relied upon its fat deposits during the dry season. Notice how this specimen is attempting to tear its flesh and break its tail in an attempt to escape.



This forest racer (*Drymoluber dichorus*) was found hunting Gymnophthalmid lizards in the leaf litter and although it was treated gently the specimen died approximately 2-3 minutes after capture. The heart could be seen pounding from under the skin followed by rapid and deep breathing. Sometimes the stress of being handled is enough to make some reptiles suffer greatly.





This bright-eyed inhabitant of the leaf litter on the forest floor is *Leposoma hexalepis*.



A tree frog belonging to the *Hypsiboas geographica* complex resting among exposed roots.



Although it appears mostly green, the forest was largely dry and fires continued to spread. The evidence of fire was everywhere. (below)





Fire also directly affected the fauna in the forest. Pictured here is Coleman capturing a *Chironius*. What we didn't know until the specimen was in hand is that it was injured from the fire. In fact the extreme left side of the snake in this photo you can see some grayish skin. In this area the snake was literally cooked. This specimen died minutes following its capture. On another occasion we found a completely char-broiled *Chironius*.





Although we didn't see any in the field there were lots of red foot tortoises maintained in chicken pens.



This stunning rainbow boa was collected in Puerto Ayacucho in 1999.



Unaware that he is part of a photographic subject, Gilson diligently inspects the accumulated leaf litter between the buttresses of this tree in hopes of finding additional specimens of a newly discovered species of gecko.

A male *Gonatodes* sp.



A female *Gonatodes* sp. As in many other gecko species, females are more subdued in coloration.





As previously mentioned, one of the primary purposes for the trip was to secure a specimen and tissues of *Micrurus nattereri*. Although long since considered a subspecies of *Micrurus surinamensis*, there are strong characteristics that indicate this is a distinct species. One night we dropped Antonio off at his home and did not see him for 2 days. During that time he called and informed us of a coral snake he had collected. However, the military inspections were pretty ridiculous that day and we decided our time in the field was better spent away from the military. At the time Antonio called the snake was alive and we went to his house the next day. When I got there he shrugged his shoulders and said "I don't have the coral snake, it died". My heart sank and I asked him what he did with it. "My daughter went and buried it". So we went to the spot where she placed a small crucifix and began digging. Soon we had one of the most important specimens of the trip in hand. Despite having been dead for about a day there was no sign of decomposition and the specimen was intact.

The Effects of Roadways on Herpetofauna: Enumeration and Mitigation

Ryan Blankenship

Introduction:

As urban expansion throughout the globe continues, supportive infrastructure races ahead into areas previously devoid of augmentation. Roadway systems now span the globe, with an approximate 6.6 million km of public roadways in the U.S. alone (Andrews *et al.* 2007). However, this does not address the affected area radiating out from a roadway's breadth. This zone, referred to as the "road-effect zone", shows the combined ecological effects generated by roads (Forman 2000). An analysis of North American ecosystems revealed that the road-effect zone ranges in width from 100 to 800 meters, depending on the combination of affecting factors such as thermal, hydrological, chemical, auditory, and luminescent characteristics as well as the presence of pollutants, invasive species, and physical automobile collision with crossing herpetofauna from motorist access (Reijnen *et al.* 1995). Shockingly, because of the extent of North America's roadway infrastructure, an estimated 73% of U.S. land area is being impacted, in some way, by roadway factors when considering a worst case scenario of an 800 meter road effect zone (Riitters and Wickham 2003).

This swath of impermeable substrate affects all aspects of ecological function, to some extent. The cumulative ecological impacts that roads have on herpetofauna, in particular, across both temporal and spatial scales, is enormous and extends from the construction phase through to daily use (Andrews *et al.* 2007).

It is well known for reptiles and amphibians to frequent roadways, thus making them perhaps more susceptible to degradation than other clades of organisms (Dodd *et al.* 1989). Beginning in the 1930s, herpetologists employed "road cruising" as a standard collecting and sampling technique due to the abundance of occurring specimens (Dodd *et al.* 1989). In particular, roadways built through fragile ecological systems with abundant reptile and

amphibian life, such as wetlands, cause significant mortality to populations and create barriers to dispersal and migration (Aresco 2005). Further, the expanse of roadways, compounded with the effects of habitat fragmentation upon meta-populations of herpetofauna, decrease an individual's fecundity and dispersal rate; reducing a species effective population size.

Impacts of Roadways:

Roads are detrimental to herpetofaunal ecology because they present a physical barrier to disbursement across a spatial scale. This barrier not only impedes the movement of reptiles and amphibians but affects the flow of genetic information and dynamics of population ecology. Because of behavioral responses by reptiles and amphibians to the attributes of roadways, vehicular traffic, and chemical and physical composition, roads constitute barriers to animal movements that effectively fragment populations (Mader 1984, Reh 1989, Fehlbeg 1994).

Habitat Selection: Avoidance or Attraction?

The impacts of roadways on reptiles and amphibians revolve around the simple behavioral response of habitat selection, or preference (Shine *et al.* 2004). For example, if an individual, species, or local population actively selects against roadways and seldom frequents them, then obvious ramifications would apply. The group would experience minimal impact from direct highway mortality but would be more regionally isolated and fragmented by any road presence. Conversely, herpetofauna that select for roadside habitat, perhaps attracted to sun drenched roadways for thermal reasons, would experience high rates of road-kill, but could permeate the roadway environment, ensuring genetic variability between meta populations (Gibbons and Semlitsch 1987). Selection for or against roadways by reptiles and amphibians occur because of unique properties of the roads themselves, the scope of which has not been fully quantified. For instance, variation in roadway surface leads to variation in habitat selection. A general lack of shade and open canopy that accompanies roadways, compared to surrounding habitats, results in higher incident solar radiation, making the reflectivity of roadway substrate that

much more influential (Shine *et al.* 2004). In a study comparing gravel roads to cement roads, reflectivity of gravel roads was significantly higher than that of cement, (120 000 vs. 80 000 lux) resulting in a large discrepancy between both substrates thermal gradients throughout the day (Shine *et al.* 2004). A comparison by Shine *et al.* states that road reflectivity constitutes a greater effect regarding thermal attributes of roads than accompanying input of radiation from occurrence of canopy cover (2004). Therefore, the much cited belief that reptiles actively seek out roadways for basking surfaces may be only partly true. Depending on road substrate composition, roadway surfaces are, in the case of gravel roads, significantly cooler than surrounding habitat types with disparity sometimes exceeding 5°C (Shine *et al.* 2004). This shows that thermal selection, for or against roadways, is in many cases determinant on the specific road in question and cannot be generalized by consultants and city planners.

Road-kill:

Direct mortality by impact with vehicles during attempted road crossing events, also referred to as 'road-kill', is thought to be a major impact by roadways on herpetofauna. However, unlike studies conducted on mammalian or avian mega-fauna, reptile and amphibian road-kill survey counts are probably a gross underrepresentation of actual mortality. This is due to the fact that small, soft bodied carcasses of many amphibian and saurian species do not last long on well-travelled roads and that injured animals may re-locate after being struck by a passing car and go unnoticed by recorders (Dodd *et al.* 1989).

Similarly, road mortality does not affect all herpetofauna in the same manner. For instance, a road cruising survey conducted in Alabama by Dodd *et al.* (1989) showed that road survey techniques failed to find 11 of the 22 species of snakes that are listed as common residents of the deciduous forests of the region. This disparity is due to life history traits, such as daily activity cycles of different species of reptiles and amphibians. All 11 species of non-represented snakes in the 1989 survey were small, fossorial, and generally shy species, all within genera *Diadophis*, *Storeria*, and *Thamnophis*; who simply do not encounter roadways as often as large, aggressively

roaming snake genera such as *Masticophis* or *Coluber*. As a compounding effect, selective killing of larger reptiles by motorists can also skew the frequencies of road-cruising survey occurrences and road-kill mortalities (Dodd *et al.* 1989).

Researchers and statistical analysts have created an equation to estimate the relative fitness or survivorship of species when crossing roadways. This formula can also be applied to reptiles and amphibian crossing attempts.

$$P_{\text{killed}} = 1 - e^{-Na/v}$$

where N is traffic rate in vehicles/lane/sec during 80% of daily volume

a = width of the kill zone (2 tire widths per lane plus 2 times weighted average length of 5 species)

v = animal crossing speed (m/sec)
(Aresco 2005)

Although this equation can be useful in determining the impact of a given road on a species, it fails to represent the increase in mortality probability when a species emigrates multiple times between roadways. This takes place in many species of wetland fauna, specifically freshwater turtles, where annual and seasonal overland movements occur across roads to reach suitable water sources (Burke and Gibbons 1995, Joyal *et al.* 2001, Marchand and Litvaitis 2004).

It would seem logical that species with greater home ranges and a necessity to move over a greater spatial scale would be more vulnerable to road-kill. Supportive evidence is beginning to accumulate after 5 independent surveys on freshwater turtle species recorded the number of dead on road (DOR) individuals; citing an occurrence of 50 DOR individuals /km /yr at a site on Lake Erie, an occurrence of 23 DOR individuals /km /yr of female diamondback terrapins (*Malaclemys terrapin*) on a New Jersey roadway, an occurrence of 53 DOR individuals /km /yr of painted turtles (*Chrysemys picta*) on a U.S. Highway in Montana, an occurrence of 58 DOR individuals /km /yr on a small stretch of Florida highway, and, most alarmingly, an occurrence of 2007 DOR individuals /km /yr on a U.S. Highway at Lake Jackson Florida. (Ashley and Robinson 1996, Wood and Herlands 1997, Fowle 1996; Smith and

Dodd 2003, Aresco 2005). Because of the ecological role of K selected species of many clades of herpetofauna, demographic studies suggest that even low levels of additive mortality of adults can contribute to drastic population declines (Brooks et al. 1991, Congdon et al. 1993, 1994).

Reproduction and population ecology:

Roads impact herpetofaunal reproduction by physically altering the mating paths of roaming males and subdividing populations. Compounding the effects, substrate composition and chemical contaminants on roadways may impair many reptile and amphibian species chemo-sensory vomeronasal acuteness which is vital in successfully locating a mate for breeding. Olfaction is vital in many species of reptiles and amphibians in both migration and orientation (Duellman and Trueb. 1986). Studies in garter snakes (*Thamnophis*) revealed that males were unwilling or unable to follow artificially placed pheromone trails of reproductive females across a gravel road (Shine *et al.* 2004).

This induced reduction of successfully finding a mate, and thus reduced fecundity, is especially important to herpetofauna because they occur in low population densities as a natural feature of their place within trophic levels. Further, impaired mate-locating abilities from the presence of roads will leave a proportion of reproductive females un-inseminated, removing them from the effective population until breeding occurs (Shine *et al.* 2004). From a population genetics standpoint, reduced mate-locating ability affects the viability of offspring, as females will not receive genetic information from multiple males, at a loss to genetic diversity. (Madsen *et al.* 1992). Lastly, because of reduced ability to effectively follow pheromone trails, males may travel farther and longer to locate a female, thus exposing themselves to a higher probability of predation or road-kill events (Aldridge and Brown 1995, Bonnet et al. 1999).

In many cases, road mortality is not distributed equally between the age classes or sexes; young roaming males are more likely to encounter roadways, resulting in higher road-kill events. Differential mortality affects the demography and the dynamics of all populations. However, smaller isolated populations resulting from roadway fragmentation are at an even

greater risk (Moore and Mangel 1996, Steen and Gibbs 2004, Aresco 2005). To further complicate this matter for regulatory agencies, as well as engineers and city planners, there is a significant lag between current mortality rates and observable population declines from alteration of reproductive success by roadways (Findlay and Bourdages 2000). An interesting hypothesis by Dodd *et al.* is that selection acts against individuals attempting to cross roads (1989). Although unlikely, studies have shown behavioral responses by individual snakes (*Pituophis melanoleucus*, *Masticophis flagellum*) who selectively use culverts or watch for traffic before crossing safely (2004). If proven, this imposed selection by roadway mortality would affect genetic variation, both phenotypically and genotypically. In short, it appears that roadways do not just affect herpetofaunal densities and distributions but are capable of altering a species' genetic variation through selection and decreased fecundity.

Mitigation: Animal behavior modification

Mitigation is the final means by which Conservationists attempt to 'right a wrong'. In respects to roadways, the steps of 'first avoid' and 'then minimize' impacts may be all but lost. Roadways are a necessary ecological evil in the development and spread of urbanization and their paths must be placed from junction to junction along development corridors. The Intermodal Surface Transportation Efficiency Act (ISTEA), established in 1991, outlines an "economically efficient and environmentally sound" plan for US roadways which considers the "external benefits of reduced air pollution, reduced traffic congestion and other aspects of quality of life" (Forman *et al.* 1997). However, US transportation policy largely ignores the loss of biodiversity, habitat fragmentation, disruption of natural processes, fluvial and wetland hydrology, and surface and groundwater chemistry all caused by the construction and implementation of roadways (Forman & Alexander 1998). Many impacts from roadways, such as chemical pollutants, changes in hydrology, as well as thermal and reflective impacts, cannot be mitigated without foundational changes in roadway construction techniques and material improvements.

The most common form of mitigation, in regards to road-kill events, is implementation of animal behavior modification structures; namely, under-pass

structures and exclusion fencing. These simple, effective, cost efficient and low maintenance structures have begun to be implemented adjacent to European and Canadian roadways.

A study comparing the pre and post mortality of freshwater turtles along a Florida highway before and after the installation of a drift fence used to re-locate migrating individuals to a pre-existing storm water drainage culvert revealed a 98% increase in road crossing success rates (Aresco, 2005). In the same study, turtle mortality before installation of the diverting drift fence resulted in a recorded 11.9 mortalities /km /day and after installation resulted in a marked decrease of only 0.09 mortalities /km /day (Aresco, 2005). The resulting mortalities after the installation of the fence were attributed to individuals who either scaled the 0.4m high fence or dug beneath its 20cm deep skirt. This case study reveals the ease and degree of affordability that accompanies the addition of herpetofaunal excluding drift fences which utilize existing drainage culverts.

Mitigation: Driver behavior modification

Perhaps idealistic, however easily and cheaply implemented, is the modification of driver behavior, primarily through the use of speed limits, lights and signs, (Romin & Bissonette 1996; Forman *et al.* 2003). Stretches of roadways through areas of known high density herpetofauna populations or seasonal migratory routes should be targeted for use of motorist awareness measures. Although the use of signage and lighting initially appears to be a viable mitigation measure because installation and implementation can be accomplished on truncated time tables with limited budgets, their long term effectiveness remains uncertain (Glista *et al.* 2009). Similarly, problems with placement arise as signage and lighting is only effective if the proper length of roadway is targeted. Intensive field surveys over multiple seasons are necessary to fully assess the density of reptile and amphibian populations and their proclivity for roadway occurrences. In this way, herpetofauna are particularly difficult to protect, in regards to driver behavior modification mitigation measures, when compared to their mammalian or avian counterparts because of their relatively small size, relatively sedentary life history, and un-obtrusive ecological niche.

Conclusion:

Evidence strongly supports the claim that roadways impose negative environmental impacts on reptile and amphibian communities. Environmental impacts call for measures of avoidance, minimization, and mitigation. Implementation of these environmental management practices is believed by many regulatory agencies to be a detriment to the success and viability of city planning and the inevitable sprawl of urbanization. However, mitigation measures such as underpass systems and drift fences for animal behavior alteration as well as an increase in the use of driver awareness measures are intended to harmoniously preserve herpetofaunal communities while providing safe and affordable routes of transportation. Ultimately, successful mitigation for the effects of roads on herpetofauna and their habitats will depend on effective cooperation and communication between government agencies, engineers, local communities, non-profit organizations, and scientists (Andrews *et al.* 2007).

Works Cited:

- Aldridge, R. D., and W. S. Brown. 1995. Male reproductive cycle, age at maturity, and cost of reproduction in the timber rattlesnake (*Crotalus horridus*). *Journal of Herpetology* 29:399-407.
- Andrews, K. M., J. W. Gibbons, and D. M. Jochimsen. 2007. Ecological effects of roads on amphibians and reptiles: a literature review. In J. C. Mitchell and R. E. Jung (eds.). *Urban Herpetology. Herpetological Conservation Vol. 3*, Society for the Study of Amphibians and Reptiles, Salt Lake City, UT. In press.
- Aresco, M. J. 2005. Mitigation measures to reduce highway mortality of turtles and other herpetofauna at a North Florida lake. *The Journal of Wildlife Management*, 69 (2):549-560.
- Ashley, E.P., and J. T. Robinson 1996. Road mortality of amphibians, reptiles and other wildlife on the Long Point causeway, Lake Erie, Ontario. *Canadian Field Naturalist* 110: 403-412.
- Bonnet, X., G. Naulleau, and R. Shine. 1999. The dangers of leaving home: dispersal and mortality in snakes. *Biological Conservation* 89:39-50.
- Brooks, R.J., G.P. Brown, and D. A. Galbrai. 1991. Effects of a sudden increase in the natural mortality of adults in a population of the common snapping turtle (*Chelydra serpentina*). *Canadian Journal of Zoology* 69:1314-1320.
- Burke, V., and Andj. W. Gibbons 1995. Terrestrial buffer zones and wetland conservation: a case study of fresh-water turtles in a Carolina bay. *Conservation Biology* 9:1365-1369.
- Congdon, J.D., A.E. Dunham, and R. C. van Loben Sels. 1993. Delayed sexual maturity and demographics of Blanding's turtles (*Emydoidea blandingii*): implications for conservation and management of long lived organisms. *Conservation Biology* 7:826-833.
- Congdon, J.D., A.E. Dunham, and R. C. van Loben Sels. 1994. Demographics of common snapping turtles (*Chelydra serpentina*): implications for conservation and management of longlived organisms. *American Zoologist* 34:397-408.
- Dodd, C. K. Jr, Enge, K. M. & Stuart, J. N. (1989). Reptiles on highways in north-central Alabama, USA. *Journal of Herpetology*, 23, 197-200.
- Duellman, W.E., and L. Trueb. 1986. *Biology of Amphibians*. McGraw-Hill, New York, NY. 670 pp.
- Fowle, S.C. 1996. Effects of roadkill mortality on the western painted turtle (*Chrysemys picta belli*) in the Mission valley, western Montana. Pages 205-223 in G. Evink, D. Zeigler, P. Garrett, and J. Berry, technical coordinators. *Highways and movement of wildlife: improving habitat connections and wildlife passage-ways across highway corridors*. Proceedings of the transportation-related wildlife mortality seminar of the Florida Department of Transportation and the Federal Highway Administration. Report FHWA-PD-96-041. Florida Department of Transportation, Orlando, USA.
- Gibbons, J.W. and R. D. Semlitsch. 1987. Activity pattern. Pages 396, 421 in R.A. Seigel, J.T. Collins, and S.S. Novak, editors. *Snakes: ecology and evolutionary biology*. MacMillan. New York, NY. USA.
- Glista, D.J., T.L. DeVault, and J.A. DeWoody. 2009. A review of mitigation measures for reducing wildlife mortality on roadways. *Landscape and Urban Planning* 91: 1-7
- Fehlberg, U. 1994. Ecological barrier effects of motorways on mammalian wildlife: an animal protection problem. *Deutsche Tierärztliche Wochenschrift* 101:125-129.
- Findlay, C. S., and J. Bourdages. 2000. Response time of wetland biodiversity to road construction on adjacent lands. *Conservation Biology* 14:86-94.
- Forman, R.T.T. 2000. Estimate of the area affected ecologically by the road system in the United States. *Conservation Biology* 14:31-35.
- Forman RTT, Alexander LE. 1998. Roads and their major ecological effects. *Annu. Rev. Ecol. Syst.* 29:207-31.
- Forman RTT, Friedman DS, Fitzhenry D, Martin JD, Chen AS, Alexander LE. 1997. Ecological effects of roads: toward three summary indices and an overview for North America. pp. 40-54.
- Forman, R.T.T., Sperling, D., Bissonette, J.A., Clevenger, A.P., Cutshall, C.D., Dale, V.H., Fahrig, L., France, R., Goldman, C.R., Heanue, K., Jones, J.A., Swanson, F.J., Turrentine, T., Winter, T.C., 2003. *Road Ecology: Science and Solutions*. Island Press, Washington DC.
- Joyal, L. A., M. Mccollough, and M.L. Hunter 2001. Landscape ecology approaches to wetland species conservation: a case study of two turtle species in southern Maine. *Conservation Biology* 15:1755-1762.
- Mader, H-J. 1984. Animal habitat isolation by roads and agricultural fields. *Biological Conservation* 29:81-96.
- Madsen, T., R. Shine, J. Loman, and T. Håkansson. 1992. Why do female adders copulate so frequently? *Nature* 335:440-441.
- Marchand, M.N. and J.A. Litvaitis 2004. Effects of habitat features and landscape composition on the population structure of a common aquatic turtle in a region undergoing rapid development. *Conservation Biology* 18:758-767.
- Moore, T.G., and M. Mangel. 1996. Traffic related mortality and the effects on local populations of barn owls *Tyto alba*. In G. L. Evink, P. Garrett, D. Zeigler, and J. Berry, technical coordinators. *Trends in addressing transportation related wildlife mortality: Proceedings of the transportation related wildlife mortality seminar*. Florida Department of Transportation Report FL-ER-58-96, Tallahassee, USA.

-
- Riitters, K. H., and J. D. Wickham. 2003. How far to the nearest road? *Frontiers in Ecology and the Environment* 1(3):125-129.
- Reijnen, R., R. Foppen, C. ter Braak, and J. Thissen. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity to main roads. *Journal of Applied Ecology* 32:187-202.
- Reh, W. 1989. Investigations into the influence of roads on the genetic structure of populations of the common frog *Rana temporaria*. Pages 101-103 in T. E. S. Langton, editor. *Amphibians and roads: Proceedings of the Toad Tunnel Conference*. Rendsburg, Federal Republic of Germany, 7-8 January 1989. ACO Polymer Products Ltd., Bedfordshire, UK.
- Romin, L.A., Bissonette, J.A., 1996. Deer-vehicle collisions: status of state monitoring activities and mitigation efforts. *Wildlife Society Bulletin* 24, 276-283.
- Shine, R., M. Lemaster, M. Wall, T. Langkilde, and R. Mason. 2004. Why did the snake cross the road? Effects of roads on movement and location of mates by garter snakes (*Thamnophis sirtalis parietalis*) *Ecology and Society* 9 (1):9
- Steen, D. A., and J. P. Gibbs. 2004. Effects of roads on the structure of freshwater turtle populations. *Conservation Biology* 18:1143-1148.
- Smith, L. L., and C.K. Dodd, JR. 2003. Wildlife mortality on U.S. Highway 441 across Paynes Prairie, Alachua County, Florida. *Florida Scientist* 66:128-140.
- Wood, R.C., Andr, Herlands. 1997. Turtles and tires: the impact of roadkills on the northern diamondback terrapin, *Malaclemys terrapin*, populations on the Cape May peninsula, southern New Jersey, USA. Pages 46-53 in J. Van Abbeema, technical coordinator. *Proceedings: conservation, restoration, and management of tortoises and turtles-an international conference*, 11-16 July 1993, State University of New York, Purchase. New York Turtle and Tortoise Society, New York, USA.



www.naturecenterfriends.org



Supporting 3600 acres of prime herp habitat in Fort Worth. Visit—Learn—Volunteer—Join. Members of the FONC get free access to the Refuge and other benefits. Visit the website or call (817) 392-7410



Society for the Study of Amphibians and Reptiles

Join SSAR! All SSAR members receive 10% off the purchase of SSAR books (see "Special Publications") including back issues of journals as available. Included in the membership fee are subscriptions to the Journal of Herpetology and Herpetological Review.

<http://www.ssarherps.org/pages/membership.php>

Member Advertising

Advertising is available without charge to members of the DFWHS, so long as the content is wildlife-related and consistent with the society's mission. Contact the Editor to submit an ad. Please note: DFW Herpetological Society is not responsible for anything about animals or goods offered for sale in the advertisements. DFW Herpetological Society assumes no responsibility for transactions between readers and advertisers.



The Teaching Zoo That Comes To You!

Exotic animal education for schools,
day care, libraries, scouts, events &
parties

972/979-9847



Information for Turtles
of the Lone Star State

WWW.TEXASTURTLES.ORG

Your ad here!

DFWHS Membership includes a monthly ad

If you have a herp or nature-related project or
business, consistent with the DFWHS mission, you
can put an ad here if you like.

Contact Editor@dfwherp.org

The Snake Room

Stan & Andrea Grumbeck

Email: sgrumbeck@yahoo.com



JS Dragons

Hand-crafted jewelry, crested geckos, etc.

Jo & Michael Smith www.jsdragons.com

email—Jo: js@jsdragons.com

Michael: michael@jsdragons.com

Vivarium Concepts

Custom Vivarium Design, consultation, sales & service. Large selection of
captive-bred dart frogs, fruit fly cultures and supplies.

Cindy Dicken
214-563-8833

vivariumconcepts.com@gmail.com
<http://www.vivariumconcepts.com>

Wear Your Attitude

www.petisnotarock.com

Fun T-shirts • mugs • kids cloth • bags

Presented by — www.veggiechild.com

Barbara Dillard • urbanveggie@yahoo.com



PET IS NOT A ROCK

David Ramos

Mice for sale - live

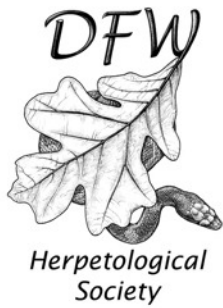
(817) 927-2706

DFW Turtle and Tortoise Club

...is a great place to exchange ideas and information to create a
better understanding of the care of our chelonians in the Dallas –
Fort Worth climate.

Come and join us at ...www.dfwttc.org

<http://pets.groups.yahoo.com/group/DFWTurtleandTortoiseClub/>



Membership Form

Dallas-Fort Worth Herpetological Society

Membership dues cover an individual or household for 12 months starting the month in which dues are received. Membership entitles you to a journal and newsletter subscription, classified advertising in the DFWHS journal and newsletter, and participation in meetings and other activities.

Today's date: _____

Your name: _____

Please give names of others *in the household* you would like included as members (they will have the same membership privileges as you will):

Your mailing address:

Street: _____

City: _____ State: _____ Zip code: _____

Your phone number: (Area code: _____) _____

E-mail address: _____

Membership is \$25 for the first year.

Renewal is \$15 if you have been a member in the past year, AND you receive the newsletter by email.

If the newsletter is printed and mailed to you by the postal service, renewal is \$25.

Dues payment: Please check one:

- ☐ I have not been a member in the past year, and I am enclosing \$25 payable to "DFW Herp Society."
- ☐ I'm renewing my membership (I was a member during the past year), and I get the newsletter electronically - I am enclosing \$15.

Newsletter: We encourage members to get the newsletter by email or download as a pdf file (opens on your computer in full color). Or you can choose to have it printed and mailed to you.

Your choice: ☐ electronic (pdf file) (make sure we have your email!) ☐ printed and mailed to me

Interest in herp society activities and topics (check all that apply):

- ☐ field surveys and trips ☐ education displays/presentations ☐ conservation activities ☐ publications
- ☐ snakes ☐ lizards ☐ turtles ☐ crocodilians ☐ frogs & toads ☐ salamanders, caecilians
- ☐ other: _____

Where did you hear about us?

Please return this form, with your dues, to: **Dallas-Fort Worth Herpetological Society**
P.O. Box 151721
Arlington, TX 76015



Cross Timbers Herpetologist

Dallas-Fort Worth Herpetological Society

P.O. Box 151721
Arlington, Texas 76015

Cross Timbers Herpetologist—On your screen, in color, printable

Each issue can be emailed to you as a PDF file (and it can be downloaded from the Yahoo Groups website).



The best way to receive the *Cross Timbers Herpetologist* is electronically, as a PDF document. It looks just like the paper newsletter **except** that it opens in full color and can be printed from your computer. You get your newsletter faster and in color, and you save your herp society the cost of printing and mailing. When it is time to renew your membership, we pass that savings along to you in the form of lower dues.

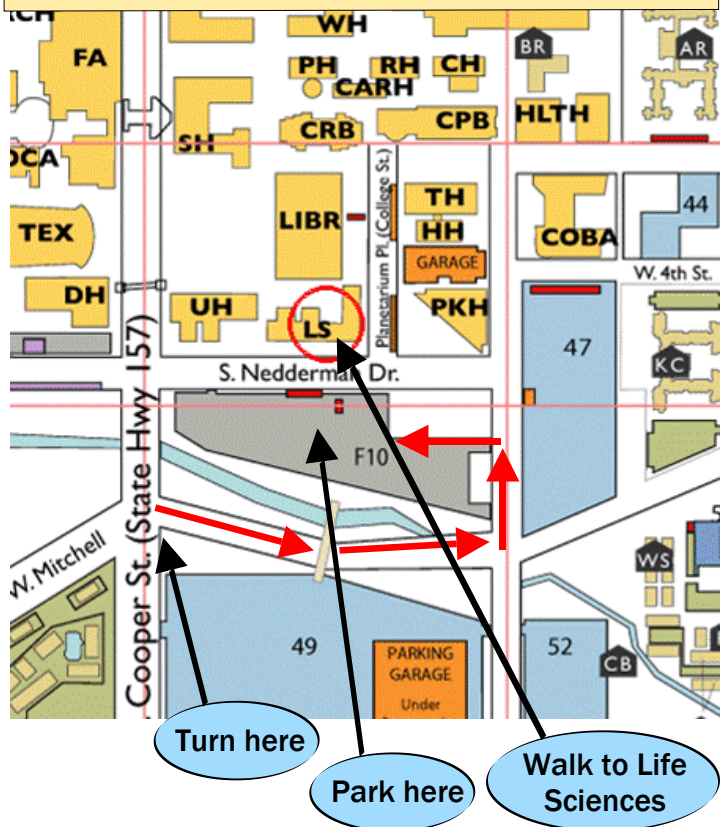
Most computers come with the free software—Adobe Acrobat Reader—needed to open PDF files. If not, the free software is available at: <http://get.adobe.com/reader/>

Information About Meetings

Meetings are held on the 3rd Saturday of each month at 7pm (*if the date falls on or near a holiday, the meeting date may be changed*). We meet at the University of Texas at Arlington, Life Sciences building, ground floor. UTA is in central Arlington, south of I-30 and north of I-20. From Cooper Street, at the south end of the university, turn east on Mitchell, and then north on West Street and enter the parking lot on your left. Life Sciences is across Nedderman Dr. from the parking lot.

Visitors are welcome. A reminder for visitors and members: No pets or animal sales are allowed on the University of Texas at Arlington campus.

Map to Our Meeting Location at the University of Texas at Arlington



IN MEMORIAM

This month the herpetological community lost two prominent stalwarts. Both of whom provided enlightenment and inspiration. One of them (Andy Price) was a speaker for the DFWHS a participant to some of our hosted events. The other (Joseph T. Collins) was someone that many of us here in the DFW area knew as an author to our most often referred field guide *The Peterson Field Guide to Reptiles and Amphibians Eastern/Central North America*. It is with fond memories that we bid farewell to both of these guys while finding comfort in the legacies they provided.

Andrew Hoyt Price, 60, died January 16th, 2012, at Christopher House in Austin, TX, after a long fight against Multiple Myeloma. Andy was born on May 12, 1951, in Brussels Belgium to his parents, C. Hoyt of Arkansas and Rosemary Price of England that preceded him in death. He was an avid herpetologist and worked for Texas Parks and Wildlife Department from 1986 to 2008. From 2009-2010, Andy worked with the Texas Natural Science Center and taught at Southwestern University. Andy was passionate about fieldwork and was granted awards for his lifetime efforts in conservation of Texas reptiles and amphibians by the Southwestern Association of Naturalists and Texas Herpetological Society. He was given the Southwest Book Award for Literary Excellence for his book, *Amphibians and Reptiles of New Mexico*. He was Editor-in-Chief for the *Catalogue of American Amphibians and Reptiles* from 1994 to his death.

He is survived by his brothers, Roger Price of Pittsburgh, PA and Carl Price of Chandler, AZ; His son, Alexander Hoyt Price and wife Callie A Price; His two grandsons, Aiden Hoyt Price and Oliver Clarence Price of Lovington, NM; His cousins Donald Price of Beaumont, TX; Rev. Dr. Robert E. Price of Monson, MA; Paul Price of Hoover, AL; Rita Givens of Payson AZ; James Price of Sheridan, AR.

A wake will be held Saturday, January 21, at 6:00 pm at 3405 Aldwyche Dr. In lieu of flowers, donations should be sent in his name to support the "Field Research" section of the Society for the Study of Amphibians and Reptiles, Grants in Herpetology program: Dr. Kirsten Nicholson, SSAR Treasurer, Museum of Cultural and Natural History, 103 Rowe Hall, Central Michigan University, Mount Pleasant, Michigan 48859.

IN MEMORIAM: JOSEPH THOMAS COLLINS (1939 - 2012)

Thursday 19 January 2012: Lawrence, Kansas - CNAH NEWS RELEASE The Center for North American Herpetology Lawrence, Kansas <http://www.cnah.org>
19 January 2012

It is with very heavy hearts that we report the passing of The Center for North American Herpetology Co-founder and Director Joseph T. Collins. Joe Collins suffered a massive coronary attack and died on 14 January 2012 in Florida. He and his wife Suzanne were on their annual herpetofaunal expedition to the Florida panhandle and St. George Island. Joe was 72 years old.

Like so many of us, Joe turned a childhood passion into a lifelong career. His accomplishments are too vast for this brief note, and his influence on the lives of past, present, and future herpetologists is immeasurable. His comical subject lines for many of the daily CNAH notes announcements are a testament to Joe's quick-witted sense of humor. They will certainly be missed.

Plans for a memorial service have not yet been made. Details will be released in future announcements as they are received. To say that Joe will be sorely missed is an understatement. CNAH, The Kansas Herpetological Society, and the herpetological community in general have lost a great scientist, a bold leader, and a true friend. Rest in Peace Joe.

The Board of Directors of The Center for North American Herpetology would like to extend its deepest sympathies to Joe's loving wife Suzanne and to all of Joe's family and friends.