

Snake Harvest Working Group Reference Documents (January 4, 2016)

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Texas Parks and Wildlife Department



Table of Contents

Reference Document 1 - Background.....	1
History of “gassing”	1
Regulation Proposal, Scoping Effort, Timeline.....	1
Toxicity of Exposure to Petrochemicals.....	2
Threats and the Federal Listing Process	3
Petition to Prohibit Gassing and Resulting Proposed Rule	3
Reference Document 1 References	4
Reference Document 2 - Gassing Scoping Efforts Timeline.....	6
Reference Document 3 - Petition	9
Reference Document 4 - Correspondence with Legislators	17
Reference Document 5 - Metrics of Success for Snake Events.....	20
Snake Festivals and Round-ups.....	20
Metrics of Success for Events	20
Diversification	20
Attendance, Longevity, Community Impact	20
Profit	21
Effect of Diversification on Attendance and Profit.....	21
Number of Vendors	21
Snakes Harvested.....	21
Figures for Reference Document 5	22
Reference Document 5 Figure 1: Map of Historic Roundups or Hunts	22
Reference Document 5 Figure 2: States Where Events Remain.....	22
Reference Document 5 Figure 3: Locations of Historic Events in Texas.....	23
Reference Document 5 Figure 4: Locations of Current Events in Texas.....	23
Reference Document 5 Figure 5: Diversification of Snake Events.....	24
Reference Document 5 Figure 6: Types of Diversification at Snake Events	24
Reference Document 5 Figure 7: Longevity of Snake Events	25
Reference Document 5 Figure 8: Community Population Impact of Snake Events	25
Reference Document 5 Figure 9: Attendance Trajectory of Snake Events.....	26
Reference Document 5 Figure 10: Percent Population Increase Resulting from Snake Event	26

Reference Document 5 Figure 11: Primary Factor Affecting Attendance	27
Reference Document 5 Figure 12: Estimated Event Profit	27
Reference Document 5 Figure 13: Effect of Diversification on Attendance	28
Reference Document 5 Figure 14: Effect of Diversification on Profit.....	28
Reference Document 5 Figure 15: Number of Vendors at Events.....	29
Tables for Reference Document 5	30
Reference Document 5 Table 1: Summary of Rattlesnake Events	30
Reference Document 5 Table 2: Estimated Pounds of Snakes Per Year.....	31
Reference Document 5 Table 3: Sweetwater Roundup Harvest Data.....	31
Reference Document 5 References	32
Reference Document 6 - Antivenin and Medical Research Industries	33
Antivenin and Medical Research.....	33
Key Players	33
Pet Vaccine.....	33
Antivenin.....	34
Venom Availability for Research.....	34
Reference Document 7 - Alternative Means of Collection	35
Early Spring Den Harvest.....	35
Benefits	36
Complicating Factors	36
Trapping	36
Benefits	36
Complicating Factors	37
Artificial Dens	37
Benefits	37
Complicating Factors	37
Road Cruising	37
Benefits	37
Complicating Factors	38
Surface Cover Searches.....	38
Benefits	38
Complicating Factors	38

Reference Document 7 Figure 1: Diagram of Drift Fence and Funnel Trap.....	39
Reference Document 7 Figure 2: Photo of Funnel Trap and Drift Fence Deployed away from Den..	39
Reference Document 7 Figure 3: Illustration of Funnel Trap and Drift Fence at Den	40
Reference Document 7 Figure 4: Diagram of Artificial Den (dorsal view).....	40
Reference Document 7 Figure 5: Diagram of Artificial Den.....	41
Reference Document 7 References	42
Reference Document 8 - The Efficacy of Snake Trapping.....	43
Reference Document 9 – Unedited Perspectives	55
James Wright.....	55
Dr. Don Steinbach	58
Donna Boatright.....	59
Rob Denkhaus	60
Don Roeber	67
Leah Andrews.....	69
Billy Wright.....	72
Terry Hibbitts	73
Dennis Cumbie	75

REFERENCE DOCUMENT 1 - BACKGROUND

HISTORY OF “GASSING”

Organized hunts or bounties for rattlesnakes have been recorded as early as the 1700s in the U.S., but the rattlesnake roundup as it is known today began in Okeene, Oklahoma in 1939. Ranchers had learned that the Western Diamondback Rattlesnake (WDR) congregated in dens to overwinter and in an attempt to reduce the likelihood of snake bites, they gathered as many WDRs as possible in the spring and took them to a central location to dispatch them. Many methods were used to extract snakes from winter dens. These methods included digging up the den, using poles with hooks to pull snakes out, as well as introducing substances into the den to flush snakes (Arena et al, 1995). Many substances like water, butane, ammonia, etc. were tried but by the 1950s gasoline had proven to be the most popular. As a result, this practice became known as “gassing.”

The typical procedure to gas a den involves a common garden sprayer containing gasoline outfitted with a long (up to 10-12 feet) copper tube attached to the sprayer nozzle at one end and crimped on the other with tiny holes punctured toward the end to allow the release of gasoline and/or gasoline fumes (primarily benzene and toluene). During the months of December through March, teams or individual hunters locate what is believed to be a snake den. Sometimes some team members stay at the mouth of the den while others may be sent to the top of the ridge or other den openings to ensure snakes don't escape through other openings. One of the team members threads the copper tubing as far back into the karst feature (crevices, caves, sinkholes) or burrow as possible then pumps gasoline and/or the associated vapors into the den. The amount introduced varies depending on the size of the den and the individual operating the sprayer, but it has been estimated that a cup of gasoline is used per den. Some hunters have indicated they turn the sprayer upside down and introduce only fumes. Once the den has been gassed, hunters wait approximately 30 minutes for snakes to emerge. A variation on this method involves a team of hunters starting at one end of a ridge and gassing each place along the ridge that looks like a den then moving to the next one along the ridge. Once they have gassed a sufficient number of holes, the team or individual makes its way back picking up snakes that may have emerged from gassed dens.

REGULATION PROPOSAL, SCOPING EFFORT, TIMELINE

Gassing karst features and burrows has come under increasing scientific scrutiny as questions arise concerning negative ecological impacts to associated systems, populations, and non-target species (Arena et al, 1995). The gassing means of take is still associated with the commercial and recreational collection of WDR in Texas today. The practice and the ecological impacts have long been debated with strongly held opinions on either side of the issue (Arena et al, 1995). In response to increasing constituent concern regarding this means of take, Texas Parks and Wildlife Department (TPWD) staff began conducting a review in late 2009. A timeline of events beginning in 2009 is included in Reference Document 2.

Toxicity of Exposure to Petrochemicals

Gasoline is a mixture of more than 150 hydrocarbons (compounds made of hydrogen and carbon), additives and blending agents (USDHHS, 1995). There is ample research detailing the impacts of exposure to hydrocarbons and their associated vapors (aromatic hydrocarbons such as benzene and toluene) on various species under strict laboratory conditions as well as in the wild (Johnson 1913, Moore 1917, Haggard 1920, Svirbely et al 1943, Speake and Mount 1973, Drew and Fouts 1974, Speake and McGlincy 1981, Campbell et al 1989, NSCAUM 1989, Reese and Kimbrough 1993, Caprino and Guiseppina 1998, Blakely et al 2002, USEPA 2002, Olsgard 2007, Al-Saffaf et al 2009, Azeez et al 2012, Azeez et al 2013). The toxicology profile for gasoline is a 224 page document citing over 440 studies detailing its toxicity (USDHHS, 1995). The toxicology profile for benzene is a 438 page document citing over 980 studies detailing its toxicity (USDHHS, 2007). The immediacy of toxicity varies by taxonomic group and by vapor concentration / exposure duration. Much of the research cited above details the toxic effect on birds and mammals inhaling aromatic hydrocarbons. However, for the purpose of this issue it is the comparison of effects between reptiles and invertebrates that is most pertinent.

The toxic effect of exposing reptiles and amphibians to gasoline fumes was documented under strict laboratory conditions by Campbell, et al, (1989). That team of researchers exposed 7 species (snakes, lizards, toads) to gasoline vapors for 30 minutes to simulate the exposure endured by residents when a den is gassed. They found the exposure had “dramatic and obvious effects” with the ultimate impact ranging from significant short term impairment to death.

Speake and Mount (1973) demonstrated the toxic effects of petrochemical exposure in the wild as well by gassing gopher tortoise burrows (containing tortoises, frogs, and 4 species of snakes) with variable exposure durations. They found that fewer than 50% of the snakes left dens when gassed. Those that didn't leave tried to “wait it out.” With few exceptions, those that did not leave the burrow were incapacitated and perished. Similarly, Speake and McGlincy (1983) gassed indigo snake burrows with various duration/concentration exposures. They found that some snakes emerged and others didn't. When the gassed specimens were tracked, they found that gassing affected each snake's ability to thermoregulate. They also would not feed. Ultimately, every gassed snake died.

The toxic effect on invertebrates of exposure to petrochemicals has also been demonstrated in the lab and in the field. Elliott (2000) provided field-based evidence of the vulnerability of karst invertebrates to petrochemical exposure. He detailed several accounts of karst invertebrate populations being decimated by exposure to petrochemicals and lists exposure to chemical contamination as one of the primary causes of dramatic declines in karst fauna. Campbell, et al. (1989) directly compared the impacts of gas exposure across several taxa under laboratory conditions. In addition to exposing reptiles and amphibians to gas vapors, they also ran trials with invertebrates. While some reptiles and amphibians survived, every invertebrate exposed to gasoline vapors perished. This demonstrates that the amount of exposure required to effect a snake within a den is sufficient to kill non-target, cohabiting invertebrates.

Threats and the Federal Listing Process

Since 1988, 26 species of karst invertebrates in Texas have been federally listed as endangered by the US Fish and Wildlife Service (USFWS). In Texas, there are an additional 130 species of rare, endemic (not found anywhere but Texas) karst invertebrates that share similar habitats in the karst systems as those species already listed.

In 2012-2013, USFWS listed exposure to petrochemicals as a threat to karst invertebrates in Critical Habitat documentation for several species. TPWD's goal is to manage populations successfully to avert future federal listings. Staff reviewed the "Five Factor Threats Analysis" the USFWS conducts when considering species for listing. TPWD staff determined the practice of gassing karst features and burrows introduces listing vulnerability in 3 of the 5 factors of that analysis (discussed in more detail below).

Petition to Prohibit Gassing and Resulting Proposed Rule

On March 8, 2013, TPWD received a petition for rulemaking requesting a prohibition on the use of gasoline or other toxic substances to collect wildlife (namely snakes) (Reference Document 3). The petition was submitted by William Rulon-Miller from Pennsylvania and Sara E. Viernum from Texas. The petition was signed by 57 individuals, 15 from Texas and 42 from 27 other states. Given all of the combined factors surrounding this means of take, TPWD responded to the petition by agreeing to brief the TPW Commission on this issue. During the briefing on August 21, 2013, the Commission directed staff to develop options to consider as potential rules. Staff developed options based on the feedback from scoping efforts and presented these to the Commission on November 6, 2013. At that time, the Commission directed staff to develop the proposed rule that was published in the *Texas Register* December 20, 2013.

Public comment was taken December 20, 2013 through January 22, 2014. The resulting totals were 9,312 comments in support of the proposed rule, 743 in partial or complete opposition, and 82 offering no discernible opinion. Partial opposition means the person opposes some aspect of the proposed rule, but not its entirety. Public comment was received at public hearings as well as in electronic form with the majority provided electronically. Public hearings were held in Fort Worth, Houston, San Antonio, Granger and Sweetwater. The hearing in Sweetwater was the most attended with 210 people attending and 83 providing comment. Additionally, TPWD received correspondence from legislators regarding the proposed rule. On January 22, 2014, TPWD received correspondence from the Texas Conservative Coalition (Reference Document 4) as well as personal testimony by Representative Susan King at the January TPWD Commission meeting expressing opposition to the proposed rule. In January, 2014, TPWD staff presented all public comment information to the Commission and soon afterward, the Commission directed TPWD staff to create a working group to study the issue over the course of a year and provide recommendations regarding the issue of gassing.

As a result of the petition related to this issue, House Bill 763 (HB 763) was sponsored by Representative Susan King (District 71) and Charles Perry (District 28) in the 84th Legislature. The bill was signed into law June 9, 2015 and changed several aspects of Section 2001.021 of the Texas Government Code pertaining

to petitions for adoption of rules. Prior to HB 763, an “interested person” could request adoption of a rule by petitioning a state agency. This term allowed for petitions to originate both from within Texas and from out of state. HB 763 defined an “interested person” as a person, business, organization or governmental subdivision located in Texas. Additionally, HB 763 amended the text to require at least 51% of the total number of signatures on a petition requiring signatures be residents of Texas.

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REFERENCE DOCUMENT 2 - GASSING SCOPING EFFORTS TIMELINE

- 9/2009 Texas Parks and Wildlife Department (TPWD) begins scoping the nongame gassing issue by reviewing past files and current literature, identifying potential stakeholder groups, and identifying information that might be needed to further scope the issue with the public (ongoing).
- 1/19/2010 TPWD Biologists Andy Gluesenkamp and Nathan Rains attend monthly meeting of Sweetwater Jaycees to establish a dialogue.
- 3/12-3/13/10 TPWD Biologists Andy Gluesenkamp and Nathan Rains attend annual Sweetwater Rattlesnake Roundup to gain perspective regarding roundups.
- 9/1/2010 TPWD Biologist Andy Gluesenkamp sent 43 invitations to rattlesnake event organizers, herpetological societies, legislators, university professors, and Nongame Collector/Dealer Permit holders who reported trade in Western diamondback rattlesnakes to attend a stakeholder meeting in October. Additionally, surveys to help scope the gassing issue were sent to all Nongame Collector/Dealer Permit holders who had reported trade in Western diamondback rattlesnakes during the previous year.
- 10/5/2010 Stakeholder meeting held in Fort Worth, attended by approximately 24 people, representing Texas Parks and Wildlife Department, Nongame Collector/Dealer permit holders, Southwestern Center for Herpetological Research, Texas Herpetological Society, Dallas-Fort Worth Herpetological Society, Austin Herpetological Society, Texas Speleological Society, UT Arlington, Bioactive Laboratories, Boy Scouts of America, and "The Texas Snake Man" Jackie Bibby.
- 11/3/2010 FAQ posted on TPWD website:
<http://www.tpwd.state.tx.us/faq/huntwild/gassing.phtml>
- 11/8/2010 TPWD Biologist Andy Gluesenkamp and Deputy Wildlife Division Director Matt Wagner met with Representative Susan King and JayCee Roosters David Sager and Mark Sager in Representative King's office in Abilene to discuss Representative King's concerns related to TPWD's scoping efforts.
- 10/12/2011 Second survey sent to expanded list of all Nongame Collector/Dealer Permit holders (not just those who reported trade in Western diamondback rattlesnakes).
- 11/28/2011 TPWD staff briefed the TPWD Wildlife Diversity Advisory Committee.
- 2012-2013 Staff continued scoping efforts and receiving input from stakeholders.
- 2012-2013 Point and nonpoint source pollutants (pesticides, petrochemicals, etc.) listed as threat to several species of karst invertebrates in U. S. Fish and Wildlife Service Critical Habitat documentation.

3/8/2013 TPWD receives petition for rulemaking to prohibit gassing as a means of take.

August 2013 Staff briefed Jonathan Stinson at the Governor's Office on TPWD's scoping efforts.

8/21/2013 TPWD staff briefed Texas Parks and Wildlife Commission on the gassing issue and petition for rulemaking and staff was directed to develop options for possible regulation.

11/6/2013 TPWD staff presented options to Commission for proposed regulation, and Commission selected an option and directed staff to publish the proposed rule and open comment.

11/13/2013 TPWD staff met with Representative Susan King and Bryan Law to brief them on the proposed rule, answer questions, and detail the rule's rationale.

12/20/2013 Proposed rule published in Texas Register and comment period opened.

1/7/2014 Public hearing to take public comment held in Fort Worth.

1/8/2014 Public hearing to take public comment held in Houston.

1/13/2014 Public hearing to take public comment held in San Antonio.

1/14/2014 Public hearing to take public comment held in Granger.

1/17/2014 Public hearing to take public comment in Sweetwater.

1/21/2014 TPWD staff briefed Theresa Spears and Ryan Vise with the Governor's Office regarding the issue, proposed rule, public comment, etc.

1/22/2014 TPWD received correspondence from the Texas Conservative Coalition and Representative Susan King in opposition to the proposed rule.

1/22-23/2014 TPW Commission directed TPWD staff to develop a revised proposed rule based on public comment with the issue to be heard again in March or May of 2014.

3/19/2014 TPWD staff presented a draft of the revised proposed rule to the Private Lands Advisory Committee and sought comment.

3/21/2014 TPWD staff presents a draft of the revised proposed rule to legislative staff.

May 2014 TPWD staff got word that the issue would be tabled from Commission meetings and that a Snake Harvest Working Group (SHWG) was to be created with stakeholders representing various perspectives.

Oct 2014 Snake Harvest Working Group member invitations sent out for confirmation of willingness to serve.

- 12/9/2014 First meeting of the SHWG held in Austin, Texas. Charter distributed and issue analysis began. Science supporting the impact of gassing on non-target species and the environment was covered. The vulnerability the practice creates for Texas related to federal listings was covered.
- 2/11/2015 Second meeting of the SHWG held in Early, Texas. The process of the Sweetwater Roundup was covered. Correspondence with the venom industry was covered demonstrating that a prohibition on gassing would have little, if any, impact on venom supplies for antivenin production or medical research.
- 5/12/15 Third meeting of the SHWG held in Early, Texas. The economic impact of the Sweetwater Rattlesnake Roundup was covered. Correspondence with other rattlesnake events was covered. Group discussion regarding the contents of the final report began.
- 9/2/2015 Fourth meeting of the SHWG held in Early, Texas. The meeting focused on the structure and content of the final report along with creating the Points of Consideration.
- 12/2015 Recommendations from the SHWG to be presented in report format to TPWD leadership.

REFERENCE DOCUMENT 3 - PETITION

January 26, 2013

The Honorable T. Dan Friedkin
Chairman
Texas Parks and Wildlife Commission
1375 Enclave Parkway
Houston, TX 77077

Dear Chairman Friedkin:

This letter is in reference to the use of gasoline as a means of harvesting Western diamondback rattlesnakes in the state of Texas. We are asking that the Texas Parks and Wildlife Department reconsider the legal status of this practice. The purpose of this letter is to submit a formal petition.

Introduction

In the recent past the use of gasoline has been acknowledged when involved in snake collection, specifically rattlesnakes. The Sweetwater Jaycees has listed pressurized spray cans full of gasoline as acceptable equipment for the use of harvesting rattlesnakes (KHS, 1994).

The Problem with Gassing

The practice of spraying gasoline, or gassing, into burrows is highly detrimental not only to the health of the targeted rattlesnakes but to all the other species that inhabit those burrows alongside the rattlesnakes.

Examples of other species impacted by gassing are reptiles, mammals, birds, and invertebrates. Many of these impacted organisms are sensitive species like the state listed Texas tortoise, reticulate collared lizard, Texas indigo snake, white-nosed coati, Texas kangaroo rat, and the state and federally listed ocelot. The use of a toxic chemical like gasoline is also harmful to the overall environment. This has been noted and cases have been repeatedly cited by local herpetological organizations (SWCHR, 2010).

Improper disposal of hazardous wastes has also been known to present a threat to potable aquifers of groundwater that are confined or unconfined with shallow aquifers being at high risk and deep aquifers being at lower but notable risk of contamination (Patrick et al, 263-264).

While much of the literature cited in this petition is from a conservation perspective, some of it comes from the point of view of hunters, collectors and even those sympathetic to the view of rattlesnakes as potential nuisances. Even these sources remark on the potential harm that gassing can do and recommend other methods for collection and removal (Howard, 1994). Many snake hunters have spoken out against the use of gasoline spray cans and, while it is a well documented practice, a large number of them will deny using them.

What can be done about Gassing?

While enforcing an anti-gassing law can become a problem when it involves time, resources and the issue of privacy it has been shown by other states that it is possible to enforce a law against gasoline spraying on public land. States that have implemented a law prohibiting the use of spraying gasoline for recreational hunting purposes include Alabama, Oklahoma, and Georgia.

Petitioners

We have enclosed the petition signed by professional biologist, zoologists, ecologist, chemist, and other organismal scientists appealing to TPWD to stop allowing the use of gasoline as a means of harvesting rattlesnakes.

Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read 'William L. Rulon-Miller J.R.', followed by a horizontal line extending to the right.

William L. Rulon-Miller J.R.

A handwritten signature in black ink, appearing to read 'Sara E. Viernum', followed by a horizontal line extending to the right.

Sara E. Viernum
Wildlife Biologist - Herpetologist

Cameron Young

Petition

To the Texas Parks and Wildlife Department,

Collectors of rattlesnakes in Texas are known to employ the use of gasoline, also referred to as gassing when harvesting Western diamond-back rattlesnakes (*Crotalus atrox*). This is generally agreed upon by ecologists and biologists alike to be detrimental to the overall health of rattlesnakes as well as several other species of reptile, bird and mammal (ASIH, 2006). It is also considered harmful to the environment in general as it can kill vegetation and disrupts functioning ecosystems (Warwick et al, 1991). Furthermore, it could be argued that this use of gasoline has the potential to contaminate as defined by Texas Water Code Title 2, Subtitle E, Chapter 36, Subchapter A8D (Sec. 36.001. Definitions): “(D) pollution or harmful alteration of groundwater in a groundwater reservoir by saltwater or by other deleterious matter admitted from another stratum or from the surface of the ground” (Texas Const., Water Code Chap. 36).

Many animals are known to share rattlesnake burrows, some of which are protected by the State of Texas as well as the Federal Government. The species that are potentially affected include but are not limited to ornate box turtles (*Terrapene ornata ornata*), gophers (Family Geomyidae), various non-venomous snakes, Texas tortoises (*Gopherus berlandieri*), spiny lizards (genus *Sceloporus*), collared lizards (genus *Crotaphytus*), tree lizards (*Urosaurus ornatus*), earless lizards (*Holbrooki* & *Cophosaurus*), kangaroo rats (genus *Dipodomys*), ringtails (*Bassariscus astutus*), bobcats (*Lynx rufus*), kit foxes (*Vulpes macroti*), Palo Duro deermice (*Peromyscus truei comanche*), ocelots (*Leopardus pardalis*), bumble bees (genus *Bombus*) and burrowing owls (*Athene cunicularia*). General disturbance and the use of gasoline are known to drive them from their habitat (Goode et al, 2004). Gasoline also has potentially lethal effects on all animals that come into contact with it (Speake and Mount, 1973). Yet in Texas the spraying of gasoline in the harvest of rattlesnakes is still allowed. For the good of the environment this antiquated process has to stop.

This is a petition of appeal to the Texas Parks and Wildlife Department by scientific authority to put a stop to the use of gassing as a means of collecting rattlesnakes. Below are the names of biologists, zoologists, ecologists, chemists and other professional organismal scientists that agree that Texas needs to reform its laws regarding wild game and end the legal use of gasoline as means of snake collection.

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Name	Title	City and State
Matt Goode	Research Scientist Wildlife Conservation and Management School of Natural Resources & Environment	Tucson, AZ 85721
Jared L Watts	Wildlife Biologist. Wildlife Response Inc Board of Directors Virginians Interested IN protecting Every Reptile. Board of Directors SAVES VP and Board of Directors. Private Keepers Representative For Virginias Dangerous Animal Initiative	Virginia, 23139
Sara E. Viernum	Wildlife Biologist and Herpetologist	San Antonio, TX
Aimee Kenoyer	Research Technician III / Lab Manager	Seattle, WA
Dr. Kerry Kriger	Founder, Executive Director, and Ecologist at Save The Frogs!	Santa Cruz, CA
Alan D. Cameron	Volunteer, North Carolina Wildlife Resources Commission	Flat Rock, NC
Jeffery N. Holmes	Associate Executive Director at The Amphibian and Reptile Conservancy	Nashville, TN
Amanda Nelson	NSF IGERT fellow	Carbondale, IL
Josef C. Uyeda, PhD	Postdoctoral Fellow, iBEST, University of Idaho	Moscow, Idaho
Raeth J. Morgan	Biological Science Technician	Cambridge, MD
Valorie Titus	PhD Candidate, Contract Scientist	Bozeman, MT
Yekaterina S. Pavlova	Mathematical Biology PhD Candidate, UC Irvine	Irvine, CA
Kreg D. Ellzey	Ecologist	Baton Rouge, Louisiana
Adam Green	Ph.D. Candidate, Fish, Wildlife, and Conservation Biology	Thornton, CO
Doug Hotle	Curator of Herpetology Albuquerque BioPark	Albuquerque, NM
Jennifer Oakley	Wildlife Biologist	San Antonio, TX
Lori Williams	Mountain Wildlife Diversity Biologist	Asheville, North Carolina
Rebecca D. Ijames	Staff Biologist	Central City, KY

Sara Dawn Plesuk	Supervisor – Reptiles & Amphibians Omaha’s Henry Doorly Zoo & Aquarium	Omaha, NE
Michael D. Barton	Weekend Supervisor, Tualatin Hills Nature Park Interpretive Center	Beaverton, OR
Samson W. Smith, MS, Evolutionary Biology	College Biology Instructor	Portland, OR
Robert Dafoe	Marine Ecologist	Chattanooga, TN
Christal Florin	Park Ranger	Portland, OR
Bernice Moser	Physical and Earth Sciences Scientific Lab Technician	Jacksonville, AL
T. Travis Brown	Wildlife Biologist	Nabb, Indiana
Orry Martin	Biology Teacher/Herpetologist	Conroe, TX
Lisa Powers	Biologist – Herpetologist	Bon Aqua, TN
Christopher Law	Director, Central Florida Zoological Services	Zephyrhills, FL
Nonie Maines	Wildlife Educator Naturalist	Fort Walton Beach, Florida
Anissa Delecki	Herpetology/Ecotoxicology/Endocrinology PhD Candidate and Teaching Assistant at Oklahoma State University	Stillwater, OK
Scott Robinson	Owner of Ecto Critterz and iFrog	Queen Creek, AZ
Brandon L. Owens	Herpetologist	San Antonio, TX
Justin Oguni	Doctor of Veterinary Medicine	Marietta, GA
Kristen Leigh Wiley	Curator of the Kentucky Reptile Zoo	Kentucky Reptile Zoo, KY
James R. Harrison	Director of the Kentucky Reptile Zoo	Kentucky Reptile Zoo, KY

Andrew Webb	Business executive Wildlife Conservationist	Mornington, Victoria, Australia
Christopher E. Smith, M.Sc., A.W.B.	Nongame Wildlife Biologist	Wildlife Research & Consulting Services, LLC Saint Paul, MN
Melissa Amarello	Master of Science in Biology, Arizona State University Bachelor of Science in Natural Resources, University of Arizona	Willcox, Arizona
Gordon Schuett, Ph.D.	Adjunct Professor of Biology, Georgia State University	Atlanta, GA
Kenneth A. Harkewicz, VMD	Doctor of Veterinary Medicine Berkeley Dog & Cat Hospital, Berkeley, CA President 2011-2012 The Association of Reptilian and Amphibian Veterinarians (ARAV)	Berkeley, CA
Robert Sprackland, Ph.D.	Herpetologist and Director of the Virtual Museum of Natural History	Lorton, Virginia
Garrett Craft	Graduate Teaching Assistant University of South Florida (BSc, currently PhD student)	Tampa, FL
Shawn Heflick, MS	Conservation Biologist/Herpetologist National Geographic WILD Host	Palm Bay, FL
Sarah Strom-Kieschnick	CEO /Wildlife Educator for the nonprofit “For the Love of Nature” And TPWD Master Naturalist @ the BigCountry MN chapter	Abilene, TX
Jeremy Wilson	Herpetologist and Co-founder for the nonprofit “For the Love of Nature” , Also TPWD Permit holder #EDU-0911-326 under licensed educator	Abilene, TX

Tony Baez	Supervisor of Herpetology for the AZA accredited Abilene Zoo/owner and TPWD licensed educator for “Wild Encounters” permit # Zoo-0411-107	Abilene, TX
Matthew Strong	Reptile Keeper, Abilene Zoo	Abilene, TX
Timothy Singser	Curator, Abilene Zoo	Abilene, TX
Ryan King	Bird Supervisor, Abilene Zoo	Abilene, TX
Joy Harsh	Curator, Abilene Zoo	Abilene, TX
Ariana Keller	Mammal Keeper, Abilene Zoo	Abilene, TX
Katherine Richter	Mammal Keeper, Abilene Zoo	Abilene, TX
Elizabeth Alice Mule	Biologist	Sugar Land, TX
Keith Gisser	Presenting Herpetologist/Herps Alive!	Cleveland Hts., OH
Benjamin Allen	Graduate Teaching Assistant University of Texas at Arlington	Arlington Texas
Wolfgang Wüster	Senior Lecturer, School of Biological Sciences, Bangor University	Bangor, Gwynedd, United Kingdom
Charles E. Button	Associate Professor & Graduate Advisor – Geography Department Faculty Chair – President's Advisory Council for Environmental Sustainability Founder & Faculty Chair – CCSU Global Environmental Sustainability Action Coalition Governor's Climate Change Leadership Award Recipient	Central Connecticut State University, New Britain, Connecticut

REFERENCE DOCUMENT 4 - CORRESPONDENCE WITH LEGISLATORS



January 22, 2014

Mr. Andy Gluesenkamp
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

Re: The Use of Toxic Substances to Collect Non-game Wildlife

Dear Mr. Gluesenkamp:

The Texas Conservative Coalition urges the Texas Parks and Wildlife Department against adopting the proposed amendment to Parks and Wildlife Code, Chapter 65, relating to the collection of non-game wildlife. The evidence presented to the Department does not support a conclusion that the rule is necessary. Furthermore, the proposed rule provides an exemption for persons "engaged in structural or agricultural pest control activities" despite the fact that these exemptions outnumber individuals directly targeted under this rule by tens of thousands, thereby undermining its stated purpose.

Published in the Texas Register on December 20, 2013 are the reasons cited by Texas Parks and Wildlife for prohibiting the use of toxic substances to collect non-game wildlife, namely the Western Diamondback Rattlesnake. Among the cited justifications for the prohibition are its harmful effects on the targeted non-game wildlife, surrounding wildlife, and habitat. The studies cited, however, were performed and observed in contexts that vary broadly from the specific use being prohibited by the new rule. This concession is clearly made in the Register as it explains that "[t]he biological impacts of noxious substances used to collect or harass nongame wildlife have not been exhaustively studied," but then it goes on to draw conclusions from studies that observed organisms and habitats which have very little in common with the Western Diamondback and its habitat.

Furthermore, the actual ends of the rule appear to have little connection to its stated purpose of prohibiting the use of toxic substances. As written, the rule "does not apply to the use of registered pesticides in accordance with labeling instructions by persons licensed" for structural or agricultural pest control. By the numbers cited in the Texas Register, "[a]s of December 1, 2013, there are 507 persons in the state who are permitted to collect nongame wildlife for a commercial purpose or engage in the purchase and sale of nongame wildlife." However, according to data available on the Texas Department of Agriculture website, there are more than 55,000 active licenses for agricultural pest control, each of which is exempted from the proposed rule so long as the pesticide is registered. Pest control licenses outnumber licenses for the collection of non-game wildlife approximately 110 to 1, raising questions

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1

about the purpose and practical effects of adopting the proposed rule. In effect, the exception swallows the rule.

Given the lack of concrete justification for the proposed rule, we are also concerned with the process by which the rule has been presented, considered, and potentially adopted. It appears that the push for this new rule was initiated with a petition containing mostly out of state signatories, and, instead of taking more time to discuss the matter with stakeholders in Texas, the Department appears to be fast-tracking adoption. While we urge the Department to reject the proposed rule, we understand that adoption may be the ultimate decision. However, before that decision is made, there should be a greater effort to collect data and evidence supporting its necessity.

Finally, we recognize the importance of Texas being in compliance with federal guidelines for protecting endangered species, but states have discretion in choosing the means to that end. It is not necessary for the state to overreact by prohibiting a common practice that has not been conclusively shown to harm wildlife and habitats in its controlled, targeted use.

Given the lack of conclusive evidence that the proposed rule is necessary and the rule's undermining exemption, the Texas Conservative Coalition urges the Department not to adopt the proposed amendment to the Parks and Wildlife Code, Chapter 65. Please enter this letter as public comment for each signature affixed.

Sincerely,


Senator Bob Deuell


Senator Robert Nichols


Representative Dan Flynn


Representative Phil King


Representative Susan King


Representative Lois Kolkhorst


Representative George Lavender


Representative Jim Murphy


Representative Charles Perry



Susan Lewis King
State Representative
District 71

December 2, 2015

COUNTIES: TAYLOR, NOLAN & JONES

Dr. Bill Eikenhorst, Chairman
Snake Harvest Working Group

Re: Texas Department of Parks and Wildlife Initiative

Dear Mr. Chairman,

Thank you for your leadership and stewardship of this highly regarded process known as the Snake Harvest Working Group. It is a prime example of government listening and working for the people in a collaborative format. What began as a potentially promulgated rule to regulate a method of snake harvest, has now transformed into a deliberative forum of diverse stakeholders. The leadership and staff of the Texas Department of Parks and Wildlife should also be commended for establishing and supporting such a dynamic model of public engagement.

The findings of the final report also reflect that an forum for open debate and dialogue occurred. While many of the findings did not result in consensus, it should be duly noted and of interest to the Commission that some key areas of strong agreement were found. For instance, while the banning of the "fuming" of snakes using gasoline was a very divisive issue, the work group alternatively agreed that proactive measures by the state and private landowners were important to address. The avoidance of potential federal action on the listing of species at any level was also a contributing factor to consider.

Additional areas of strong consensus included: Streamlining the nongame permitting process making it more efficient and potentially increase the number of snake collectors; prohibiting regulations that would interfere with the right to protect human safety and that the Department would assist and collaborate with Sweetwater and other communities to develop alternative methods of harvest. These areas of common ground will ideally be brought to the Commission and considered for official action. It is clear from the overall findings of the report that a solution forward can be found without government overreach that may impose a punitive regulatory scheme both difficult to enforce and cause further division amongst interested parties. It is also my strong belief that the federal government would judge a robust and collaborative state approach to this issue as more effective than requiring law enforcement to regulate a ban on "fuming."

Overall Mr. Chairman, the work group was a success and my office looks forward to taking the next steps to truly address the concerns of all parties while avoiding the unnecessary negative economic and cultural impacts. Regulatory action should always be reserved for the most urgent and critical matters of public safety, protection of wildlife and environmental protections, (eg. Zebra mussels, Chronic wasting disease, etc). In contrast, matters of public interest and concern such as the harvesting of snakes should continue in a collaborative and positive manner, as the consensus findings of the work group's report demonstrate. Finally, please include this letter as a matter of public record in the final report of the Snake Harvest Working Group.

Most Sincerely,

A handwritten signature in cursive script that reads "Susan J. King".

Susan Lewis King
State Representative, House District 71

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REFERENCE DOCUMENT 5 - METRICS OF SUCCESS FOR SNAKE EVENTS

Snake Festivals and Round-Ups

At least 15 states in the U.S. have had rattlesnake hunts or bounties (Jackley, 1939) with some dating back to the 1700s (Figure 1). A total of 25 events in 6 states (Figure 2) remain active in the U.S. (Texas, Oklahoma, Georgia, Florida, Alabama and Pennsylvania). Texas has had a total of 44 communities that have held rattlesnake events in the past (Figure 3). Nine communities in Texas still host rattlesnake events, although the futures of the events in 2 communities are in question and are marked with a question mark in Figure 4. Mr. John Davis contacted 21 of the 25 events nationwide and gathered data on various aspects of the events. He was unable to establish contact with 4 events. Not every event provided information in all categories, so the analysis presented later reflects that fact. It is worth noting that much of the information used in the analysis below came from estimates provided by individuals involved in organizing the respective events. Although the individuals providing information had extensive experience with their respective events, the fact remains that estimates are not scientifically accurate. However, in the absence of verifiable scientific data, estimates from the organizers are the best information available.

Metrics of Success for Events

The SHWG was charged with identifying measures of success for festivals and events. TPWD staff analyzed information from calls with event organizers across the U.S. and identified several categories that could be used to measure the success or performance of an event, including longevity, diversification, harvest, estimated attendance, stability of attendance, factors affecting attendance, profit, number of vendors, etc.

Diversification

Data gathered from events revealed a diversity of components at snake events across the nation. Twenty events provided information related to the diversity of components (other than rattlesnakes) offered at their event (Figure 5). The data ranged from 0 to 5 or more other components. Forty-five percent of the respondents indicated they offer a carnival (Figure 6). Forty percent offer concerts or other entertainment acts. A flea market, run, or pageant is offered at twenty percent of the events. A vehicle race is offered at fifteen percent of the events. Other events, such as softball tournaments, cook-offs, etc., are offered at ten percent of the events. Nineteen events provided data for diversification, attendance, and profit, thus allowing analysis of the impact of diversification on those metrics.

Attendance, Longevity, Community Impact

Success could also be measured by longevity and the trajectory of attendance. Most of the active events have been around for over 30 years with the oldest starting in the 1930s (Figure 7). Attendance is highly varied among events, ranging from a few hundred to an estimated 60,000 people (Figure 8). Attendance at ninety percent of the events was stable or increasing indicating sustained popularity (Figure 9). Often, these events are held in small communities so some communities realize a 3,000-4,000 percent increase in population due to their event (Figure 10). Nineteen events provided data on

the primary factor that affects attendance (Figure 11). Sixteen indicated weather was the primary factor. Two indicated the presence of snakes was the primary factor. One indicated marketing/advertising was the primary factor.

Profit

Sixteen events provided data related to profit brought in by the event (Figure 12). Three events indicated they break even with two of the three indicating they hold the event to simply stimulate tourism to the community. Thirteen of the events make a profit with estimates ranging from \$2,000 up to \$100,000. The average of those events making a profit is \$21,000.

Effect of Diversification on Attendance and Profit

For events where sufficient data was available, diversification vs. attendance and profit respectively was plotted and it was found that there is a statistically significant positive correlation between diversification and the attendance (Figure 13) as well as profitability of an event (Figure 14). Attendance and profit is higher at events that are more diversified.

Number of Vendors

Given that vendors decide whether to invest in a booth at an event based on the perceived return on investment, the number of vendors could also be considered as a metric of success. Fifteen events offered estimates of vendor numbers ranging from 0 to 250 with the average being 86 (Figure 15).

Snakes Harvested

Another metric of success to be considered is pounds of snakes harvested. In the past, most rattlesnake events were “consumptive” where rattlesnakes were gathered from the wild and brought to the event with the purpose of being processed for meat, skin, etc. (Table 1). However, only 8 of the 21 events examined across the U.S. retain that model. Most events (12) have either stopped processing snakes or only do it periodically for demonstration purposes. One of the 12 non-consumptive events (Fitzgerald, GA) has moved away from rattlesnakes completely and now has built its festival around a population of free-ranging Burmese chickens. One event (Whigham, GA) failed to report whether they process snakes.

The number of snakes harvested for events differs greatly according to the primary species the event targets. Given that the western diamondback rattlesnake (WDR) is the target species in Texas, the analysis of harvest data is limited to events targeting that species. Ten of the 21 events contacted involve the WDR and are consumptive. The harvest data for those ten events was acquired by asking organizers to provide data (if available) or estimate average harvest (Table 2). Only one event (Sweetwater) has maintained detailed records of harvest. Table 3 details the annual harvest of the Sweetwater event as compiled from data received from the Sweetwater JayCees and from a book detailing the history of the Sweetwater Rattlesnake Roundup (Kilmon and Shelton, 1981). Responses from other event organizers were rough estimates. As a result, the accuracy of the data in Table 2 is subjective and dependent upon the estimation skill of the interviewee. In the case of Mangum, OK, the interviewee simply stated that their event usually has less than 3,000 lbs., so the estimate of 2,900 lbs. was used in this analysis. Similarly, the organizer of the event in Thackerville, OK, estimated 130 snakes. Given that the average weight of a WDR specimen is between 1 - 2 lbs. (Adams and Thomas 2008, Nowack et al 2002, Beck 1995), the upper estimate of 260 lbs. was used for this event. Given these

caveats, the data suggests an average total annual harvest to be approximately 20,060 lbs. That number divided by 10 events yields an average harvest across all WDR events of 2,006 lbs. per event per year.

FIGURES FOR REFERENCE DOCUMENT 5

Reference Document 5 Figure 1: Map of Historic Roundups or Hunts



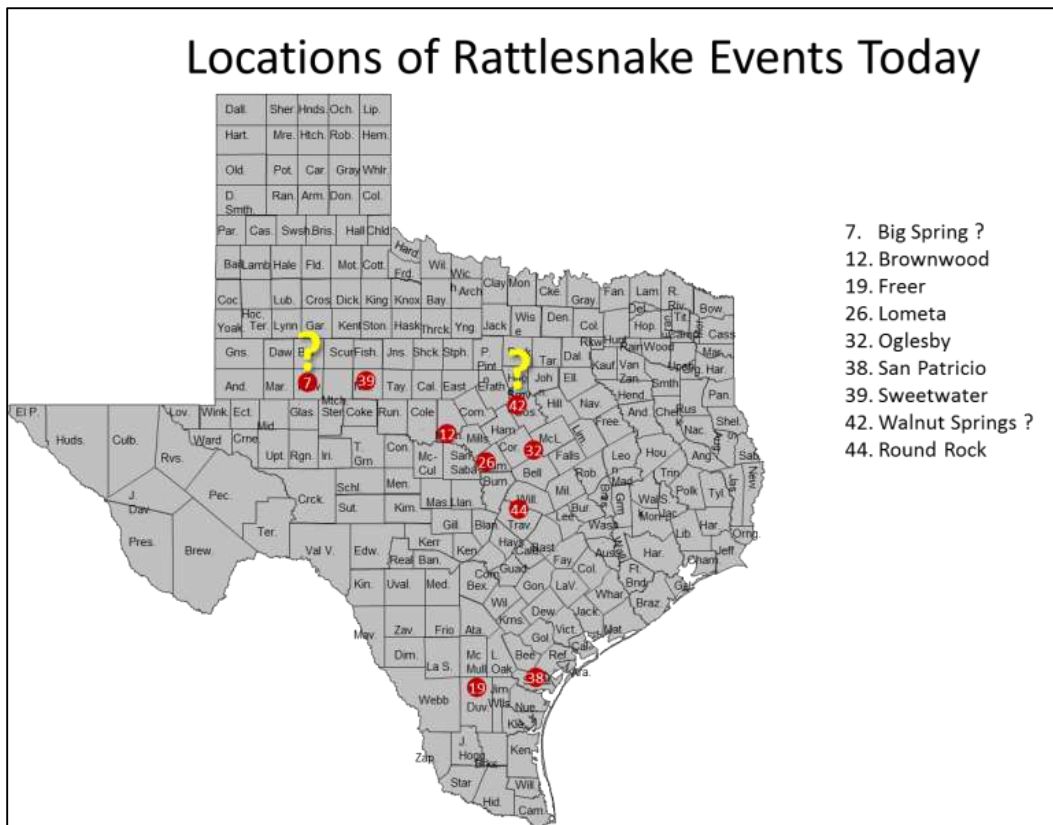
Reference Document 5 Figure 2: States Where Events Remain



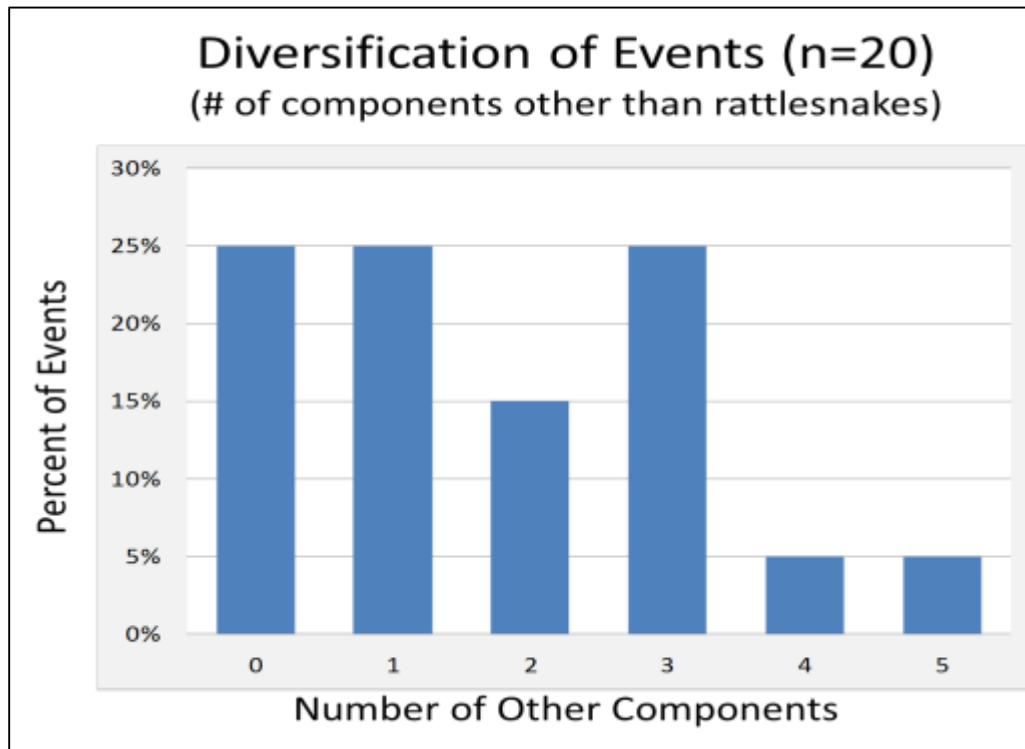
Reference Document 5 Figure 3: Locations of Historic Rattlesnake Events in Texas



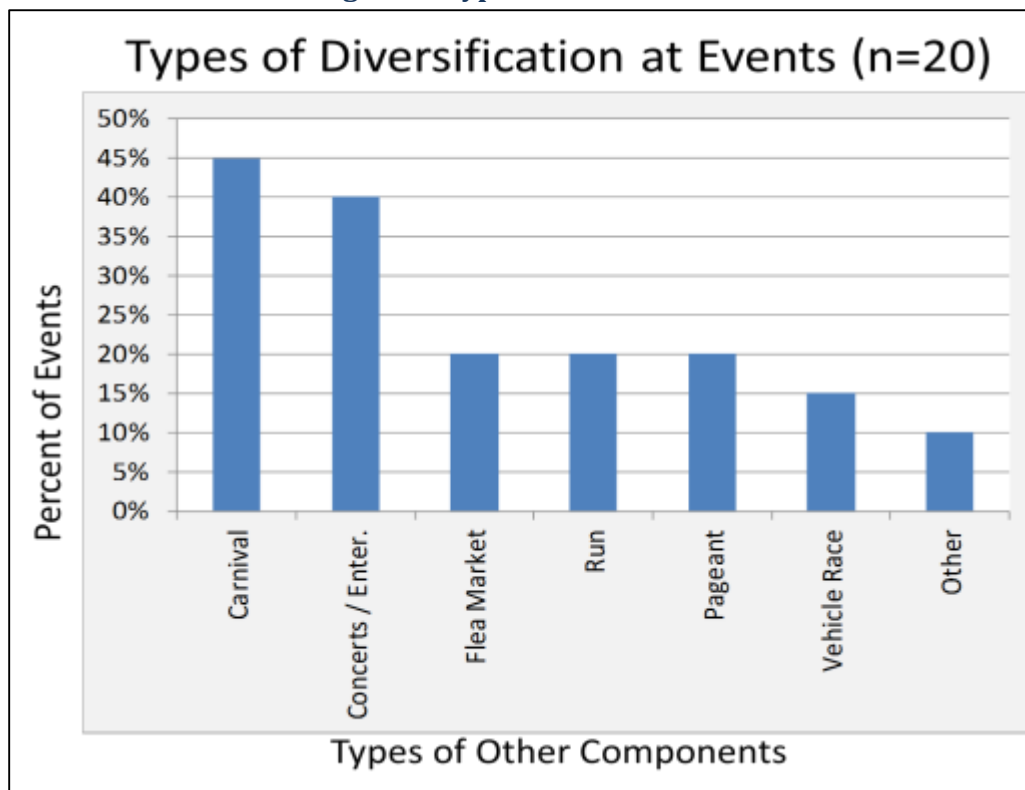
Reference Document 5 Figure 4: Locations of Current Events in Texas



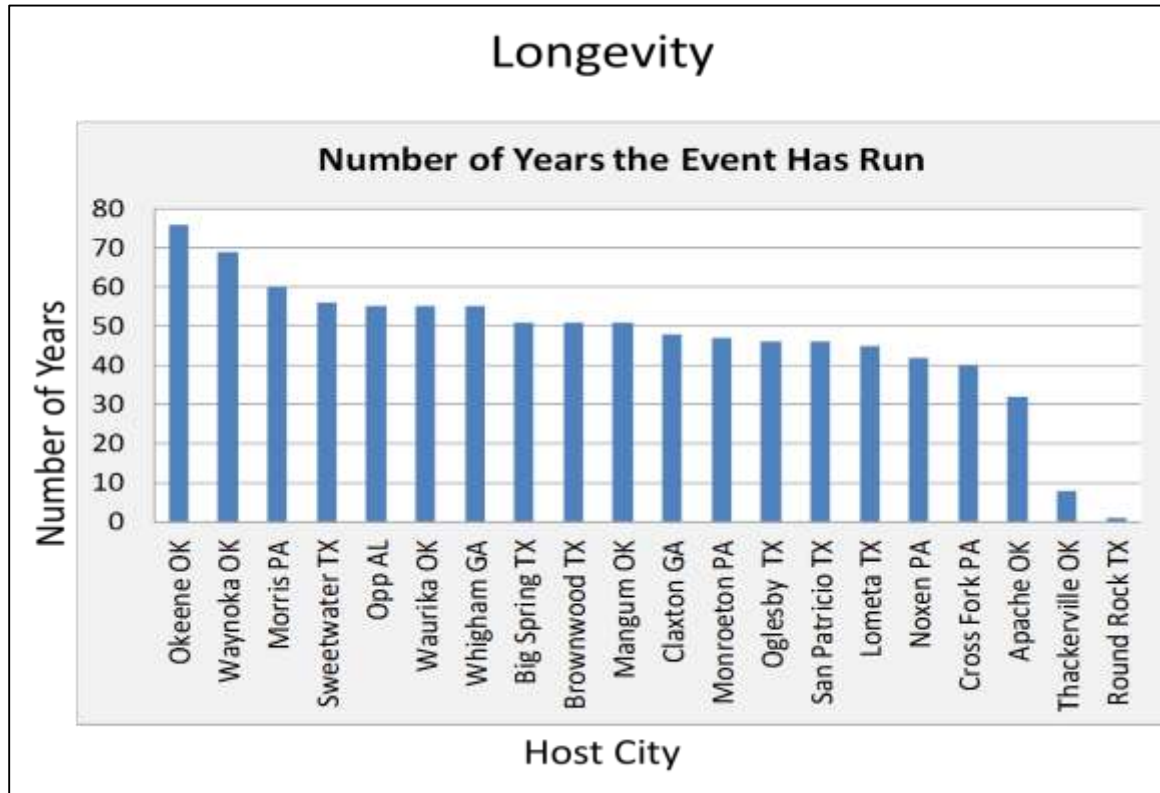
Reference Document 5 Figure 5: Diversification of Snake Events



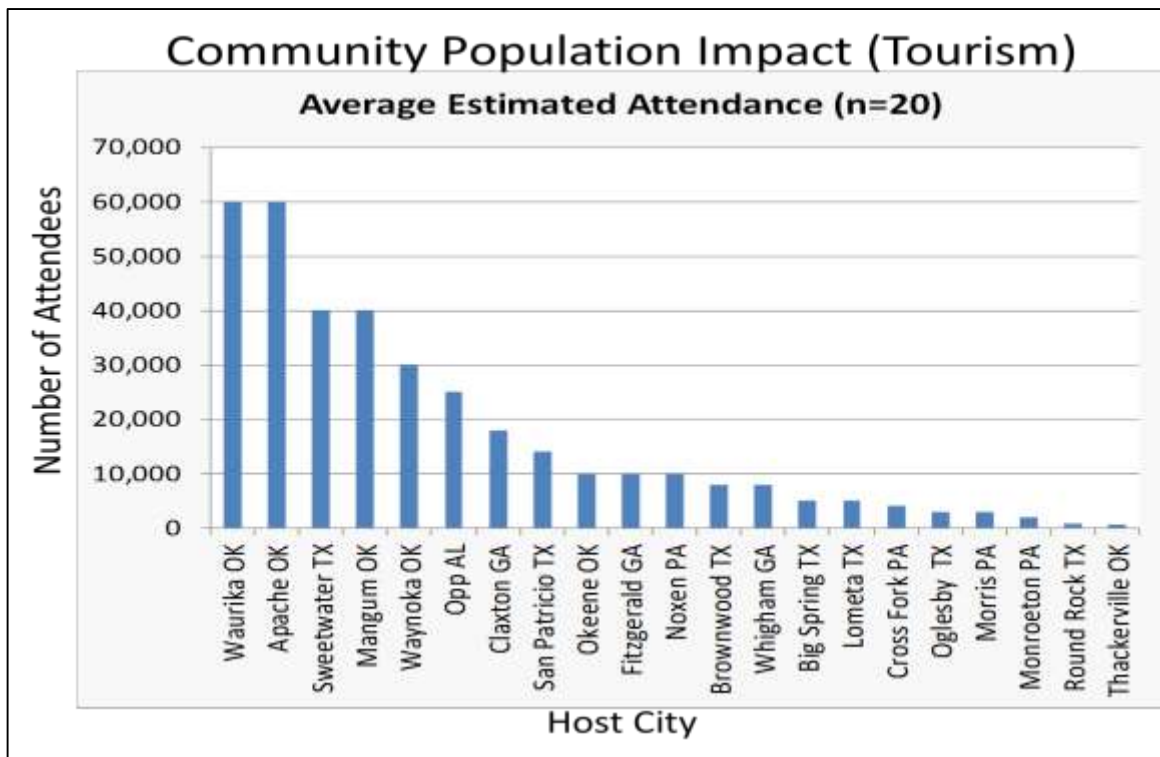
Reference Document 5 Figure 6: Types of Diversification at Snake Events



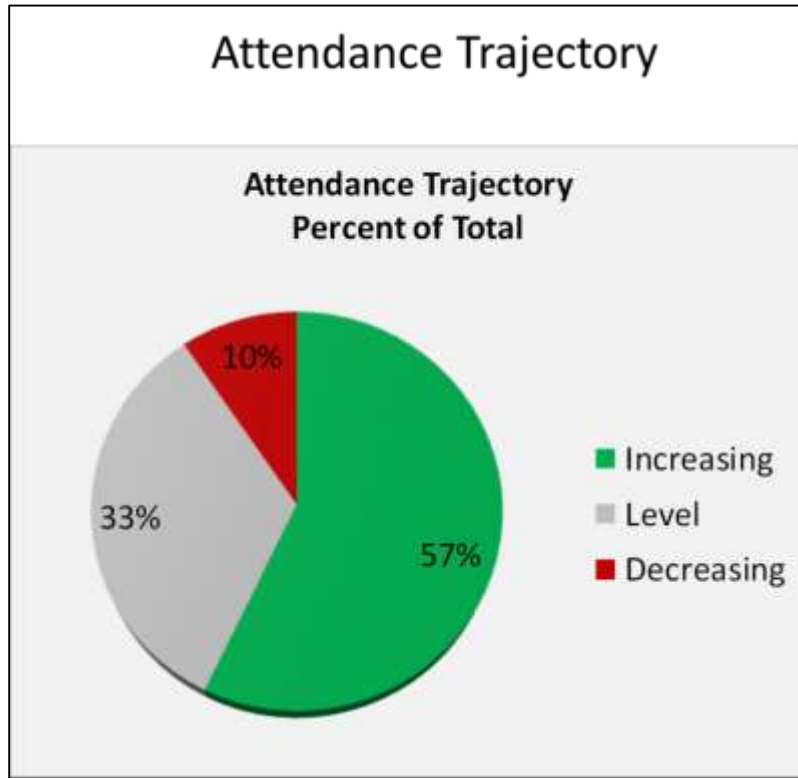
Reference Document 5 Figure 7: Longevity of Snake Events



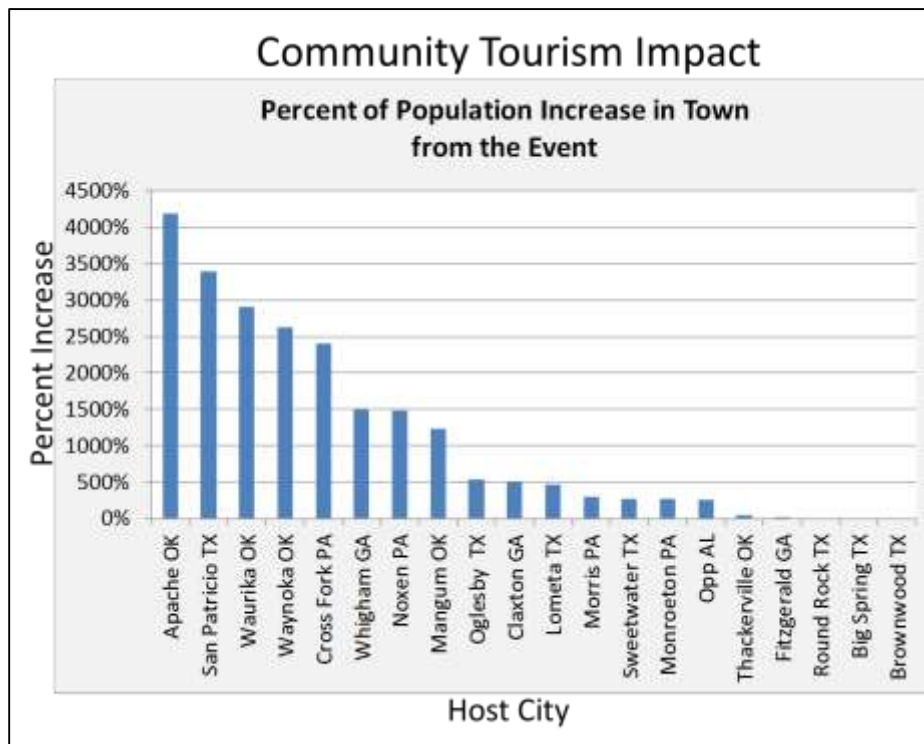
Reference Document 5 Figure 8: Community Population Impact of Snake Events



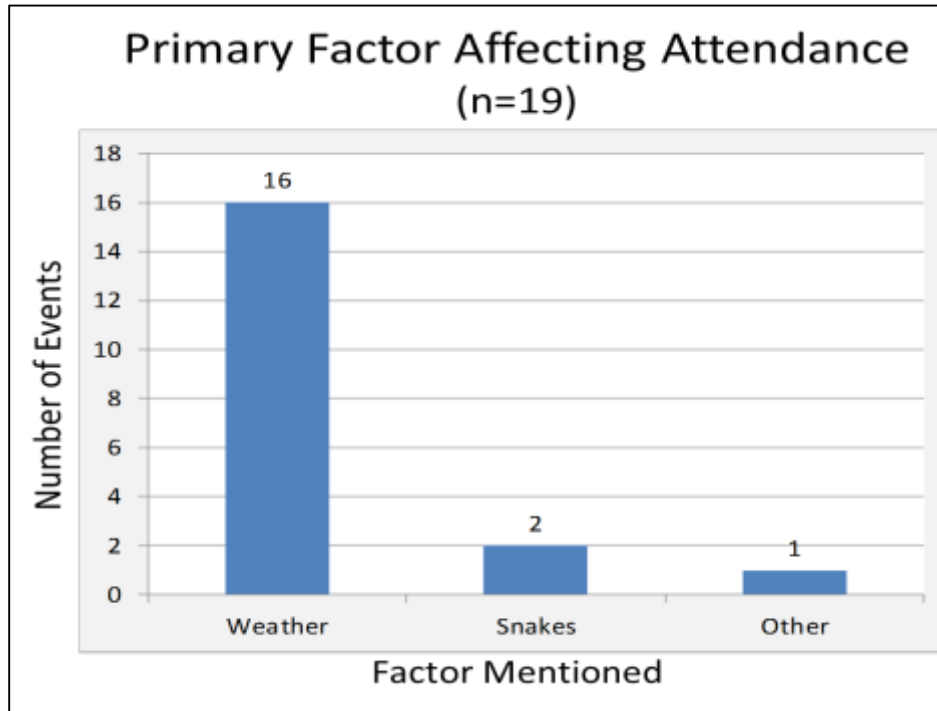
Reference Document 5 Figure 9: Attendance Trajectory of Snake Events



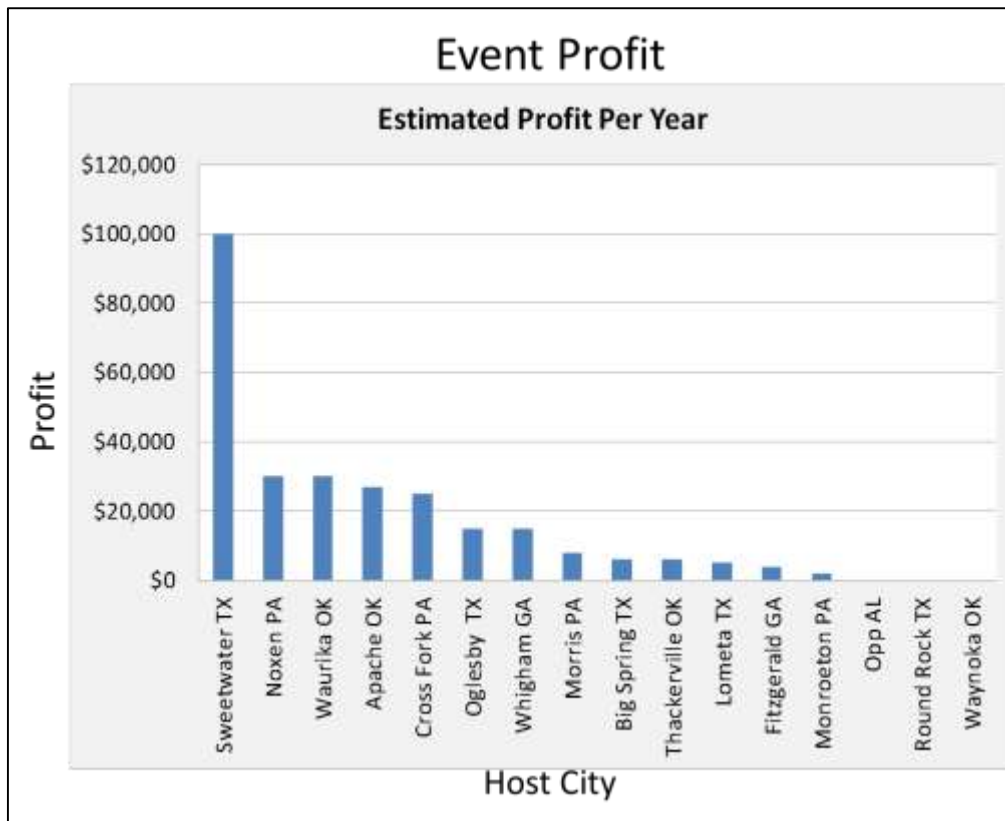
Reference Document 5 Figure 10: Percent Population Increase Resulting from Snake Event



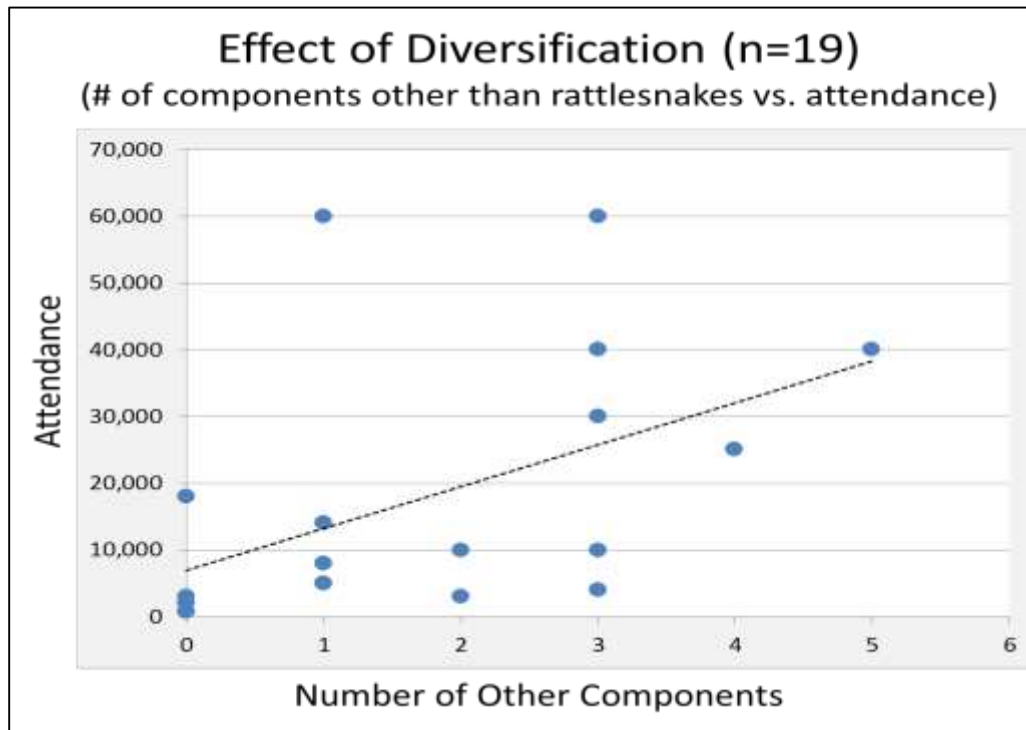
Reference Document 5 Figure 11: Primary Factor Affecting Attendance



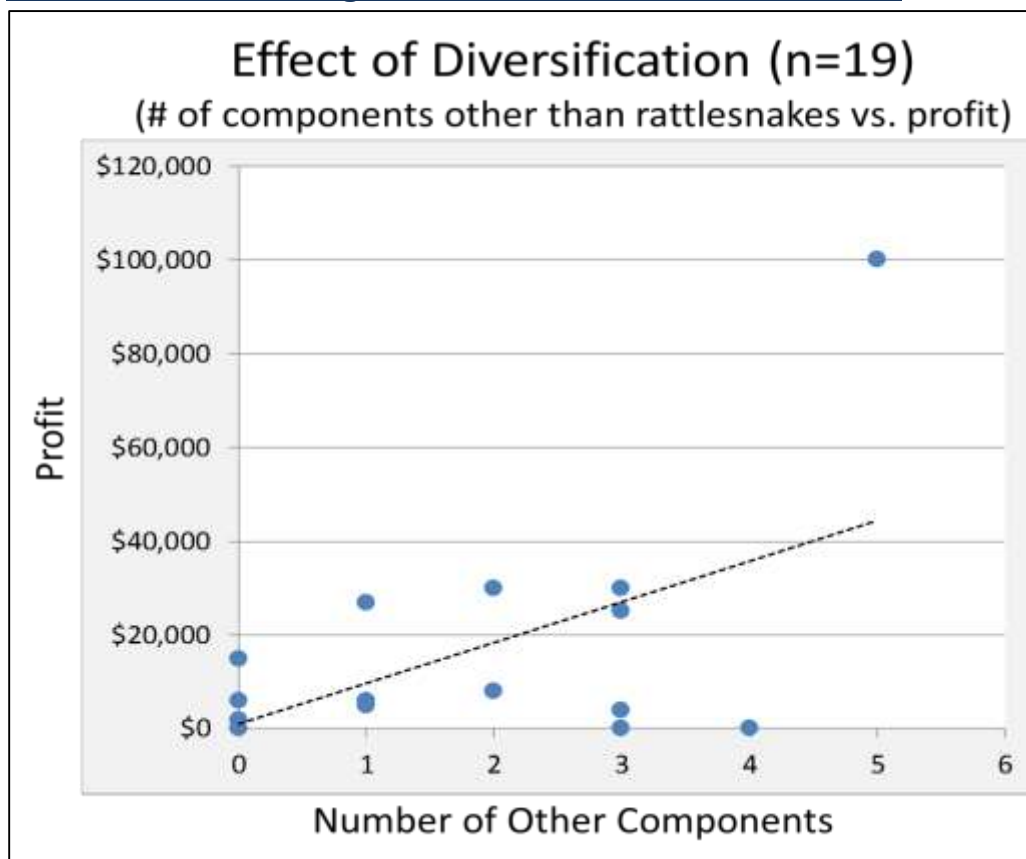
Reference Document 5 Figure 12: Estimated Event Profit



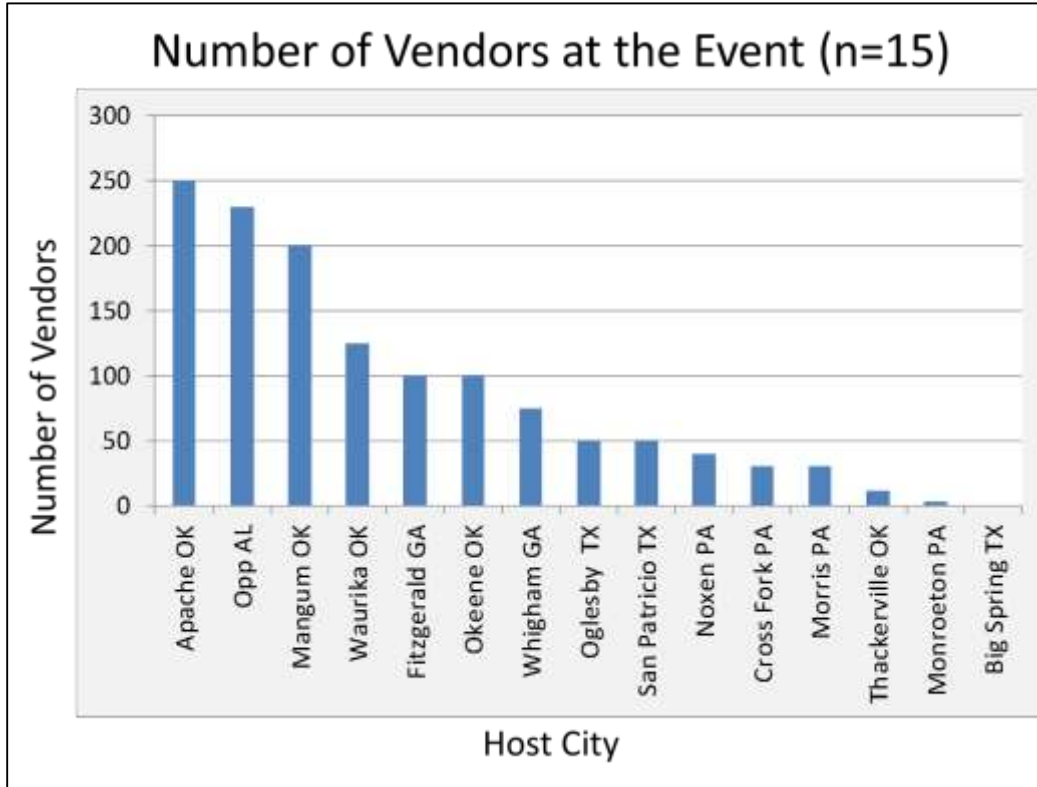
Reference Document 5 Figure 13: Effect of Diversification on Attendance



Reference Document 5 Figure 14: Effect of Diversification on Profit



Reference Document 5 Figure 15: Number of Vendors at Events



TABLES FOR REFERENCE DOCUMENT 5

Reference Document 5 Table 1: Summary of Rattlesnake Events

Event City	State	Event Type	Event Sponsor / Organizer	Year Held	Month	Year Held	From	Est. Avg. Attend.	% Population Increase	Attendance Change Last Few Years	Primary Factors Affecting Attendance	Est. # of Snakes	# of Snakes Sold	Process Snakes?	Event Profit/Loss	Who Profits?	Primary Species	Source of Snakes	Method of Collection	Snake P.R. / Shop?	Snake Milling?	Snake Carnival Entertainment?	Consent / Fun	Repayment	Fair Use?	Vehicle event?	Other	Notes			
Apache OK	OK	Roundup	Rattlesnake Assoc	1983	Apr	1,000	60,000	4183.7%	Level	Level	Weather	2500	250	Yes	\$27,000	Community	Western Diamondback	Mostly local	Mostly collect at month of dens on warm days	Yes	Yes	Yes	No	No	No	No	No	Worst have an event in 2015 and may never have another one. Lost their building and the future of the event is uncertain.			
Bigspring TX	Texas	Roundup	American Business Club (AMBCS)	1968	March	20,000	5,000	-82.1%	Level	Level	Weather	800	N/A	Yes	\$5,000	Community	Western Diamondback	Mostly local	Mostly collect at month of dens on warm days	Yes	Yes	Yes	No	No	No	No	No				
Brownwood TX	Texas	Fair / Expo	Jaycoes	1964	March	10,000	8,000	-57.9%	Increasing	Increasing	Weather	N/A	Ddn't say	Yes	No	Community	Western Diamondback	Snakes are provided by other party. They don't say why.	N/A	Yes	Only for denim	Yes	No	No	No	No	No	No	The event is not a round up per se since they "see" their snakes from a third party. They are trying to move away from snakes in up. One called Boettcher said this year and were told that the dealer was not interested and had an overstock of Wgs whom he couldn't sell. Their event was dying as attendance was dropping. They changed from a consumptive event to wildlife celebration and attendance increased.		
Claxton GA	GA	Wildlife Festival	Evans County Wildlife Club	1967	Mar	3,000	18,000	500.0%	Increasing	Increasing	Ddn't say	N/A	Ddn't say	No	Ddn't say	Ddn't say	N/A	N/A	N/A	No	No	No	No	No	No	No	No	catch, tag and release - snakes not banded. A local reptile club handles all of the snakes for the event and does educational shows.			
Cross Fork PA	PA	Educational	Vol. Fire Dept (VFD)	1973	June	150	4,200	2,900.0%	Level	Level	Snakes	4340 rattlesnakes	30	No	\$25,000	VFD	Timber Rattlesnakes	Local	active hunting	No	No	No	Yes	Yes	Yes	Yes	Yes	No			
Fitzgerald GA	GA	Chicken Festival	Used to be Jaycoes but now sponsors it	unk	Mar	9,000	10,000	11.1%	Level	Level	Weather	N/A	100	No	\$4,000	Next year's event	N/A	N/A	N/A	N/A	N/A	No	Yes	Yes	Yes	Yes	No	No	Rattlesnake roundup was dying. Snakes were not enough draw. Whom dealers stopped buying worms. They had to change so they gifted for a festival in 2010 and since then, the event has been successful again.		
Lometa TX	Texas	Roundup	Lions Club	1970	March	877	5,000	470.1%	Increasing	Increasing	Weather	2,200	Ddn't say	No	\$5,000	Community	Western Diamondback	"From all over"	Mostly passive	Yes	No	No	Yes	No	No	No	No	No	No	They had a boy milk snakes one year but it's not a normal part of their catch, tag and release - snakes not banded	
Mangum OK	OK	Roundup	Shoregas	1964	Apr	2,000	40,000	1,200.0%	Level	Level	Weather	43,000 rattlesnakes	200+	Yes	Ddn't say	Community	Western Diamondback	Ddn't say	collection at month of dens on warmer days	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No	catch, tag and release - snakes not banded	
Marathon PA	PA	Educational	Recreation Club	1968	July	5,45	2,000	297.2%	Increasing	Increasing	Weather	2,250	3	No	\$2,000	Community	Timber Rattlesnakes	Local	active hunting	No	No	No	No	No	No	No	No	No			
Morris PA	PA	Educational	Vol. Fire Dept (VFD)	1955	June	750	3,000	300.0%	Level	Level	Weather	-15 rattlesnakes	30	No	\$8,000	VFD	Timber Rattlesnakes	Local	active hunting	No	No	No	No	No	No	No	No	Yes	catch, tag and release - Chicken BBQ, Fire Market, One Piece Softball Tournament, Bingo, Concessions, Entertainment, fireworks		
Nowan PA	PA	Educational	Vol. Fire Dept (VFD)	1973	June	630	10,000	1,487.3%	Increasing	Increasing	Weather	-30 rattlesnakes	40	No	\$30,000	VFD	Timber Rattlesnakes	Local	active hunting	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	catch, tag and release - snakes not banded	
Opelika TX	Texas	Roundup	Lions Club	1969	Feb	475	3,000	531.5%	Increasing	Increasing	Community Advertising	600	50	No	\$15,000	Community	Western Diamondback	Mostly local	Mostly collection on warmer days	Yes	No	No	No	No	No	No	No	No	No	Snakes are purchased at their event and taken to Sweetwater's event.	
Okeene OK	OK	Roundup	Local nonprofit	1939	May	1,200	no list	No value calculated	Increasing	Increasing	Weather	400	100	Yes	Ddn't say	Ddn't say	WDR	Mostly local but some from TX some years	collection at month of dens on warmer days	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	She said that they will occasionally buy snakes from other places (Texas) if they are short on snakes, but that there are a lot of folks who buy snakes at these events then try to sell them to Okeene for a profit snake down. She said they just don't need them because it just doesn't take that many snakes to have an event and she indicated they worry about snakes from Texas being released.		
Opal AL	AL	Roundup	Used to be Jaycoes but now Jay Coop	1960	Apr	7,000	25,000	257.1%	Increasing	Increasing	Weather	80-100 snakes	230	No	Break even	N/A	EDN	Local	poth with hook	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Used to be held in March but moved to April. They worry why Snakes in containers, not a pit. They used to use pits, but now use a table with a hook. Snakes are not a main focus of the event but they do have a lot of people who buy snakes. They do not have a board for the event. Event tickets are only to attend toward dollars to community.	
Round Rock TX	Texas	Educational Festival	Various Orgs	2014	April	110,000	80	-99.3%	N/A	N/A	?	N/A	No	Break even	N/A	All Participants	Private collections	N/A	N/A	No	Yes	Yes	No	No	No	No	No	No	Inaugural year was 2014. Organizer expects attendance to double this year as higher profile sponsors have come on board. Event is purely educational.		
Salt Plains TX	Texas	Snake Show	San Antonio Reptile and Amphibian Service	1960	March	400	14,000	3,400.0%	Increasing	Increasing	Weather	200	50	No	Ddn't say	Sponsor	Western Diamondback	Part of from a guy	N/A	No	No	No	No	No	No	No	No	No	No	Not a roundup. 200 snakes are "adopted" and returned to owner at the end of event.	
Sweetwater TX	Texas	Roundup	Jaycoes	1959	March	10,700	40,000	273.2%	Increasing	Increasing	Weather	5,800	?	Yes	\$100,000	Community	Western Diamondback	Texas, Oklahoma	Gasling and collection at month of dens on warm days	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
Thackerville OK	OK	Roundup	Vol. Fire Dept (VFD)	2007	Apr	460	700	52.2%	Level	Level	Weather	130	12	Yes	\$4,000	VFD	WDR	Local	active hunting	Yes	No	No	No	No	No	No	No	No	No		
Wauka OK	OK	Roundup	Vol. Fire Dept (VFD)	1960	Apr	2,000	60,000	2900.0%	Increasing	Increasing	Weather	3,500	125	Yes	\$30,000	VFD	WDR	Oklahoma and Texas	collection at month of dens on warmer days	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	He indicated the event wouldn't work without the carnival. He said that several hundred pounds each year come from two or three of guys that turned animals. Ddn't see them.	
Waynes OK	OK	Roundup	Saddle Club	1961	Apr	1,100	30,000	2627.3%	Decreasing	Decreasing	Weather	1,500	Ddn't say	Yes	Break even	Community	WDR	Mostly local but some from TX some years	collection at month of dens on warmer days	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	A guy from TX tried to sell them OK for 500 last year but they turned animals. Ddn't see them.	
Whigham GA	GA	Roundup	Whigham Community Club	1960	Jan	500	8,000	1500.0%	Decreasing	Decreasing	Weather	70 snakes	75	Ddn't say	18,000	Community	EDN	Ddn't say	collection at month of dens on warmer days	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Board of directors discussing changes	

Reference Document 5 Table 2: Estimated Pounds of Snakes Per Year

Host City	Est. lbs/yr of snakes
Sweetwater TX	5,600
Waurika OK	3,500
Mangum OK	2,900
Apache OK	2,500
Lometa TX	2,000
Waynoka OK	1,500
Big Spring TX	800
Oglesby TX	600
Okeene OK	400
Thackerville OK	260

Reference Document 5 Table 3: Sweetwater Roundup Harvest Data

YEAR	TOTAL POUNDS	YEAR	TOTAL POUNDS	YEAR	TOTAL POUNDS
1959	3128	1979	5839	1999	3479
1960	8989	1980	4470	2000	2276
1961	no data	1981	5155	2001	3042
1962	2486	1982	17986	2002	3005
1963	4500	1983	15053	2003	4207
1964	3762	1984	6281	2004	6467
1965	2340	1985	12797	2005	10212
1966	3400	1986	16086	2006	13552
1967	4000	1987	11359	2007	5240
1968	no data	1988	11709	2008	3500
1969	2474	1989	3620	2009	5199
1970	8886	1990	3129	2010	2168
1971	3700	1991	4474	2011	1841
1972	7274	1992	10006	2012	1664
1973	3584	1993	7082	2013	2361
1974	2456	1994	4503	2014	3890
1975	5730	1995	1846	2015	3780
1976	2397	1996	2228		
1977	6348	1997	2343		
1978	3343	1998	3942	Total lbs	304,588

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REFERENCE DOCUMENT 6 - ANTIVENIN AND MEDICAL RESEARCH INDUSTRIES

ANTIVENIN AND MEDICAL RESEARCH

As part of the scoping process for the prohibition of gassing that was proposed in 2014, several concerns were voiced by stakeholders that pertained to the venom industry. These concerns include a potential impact to WDR venom supplies for vaccine and antivenin production as well as for medical research. As a result, it was determined early in the SHWG process that protecting the venom supply for antivenin production and medical research would be considered a metric of success. To ascertain the possible impacts on the venom industry should gassing be prohibited, TPWD staff contacted various experts in the industry. Mr. John Davis presented a summary of the correspondence received from various sectors of the venom industry related to the potential impacts a gassing prohibition in Texas would have on the industry as a whole. [Please note that the term “crotalids” herein refers to species of the *Crotalus* genus. The WDR is a member of this genus.]

Key Players

The venom production industry is a relatively small, specialized business with the majority of trade passing through a handful of producers/suppliers/dealers. It is fair to say that any major venom transaction in the U.S. will involve one of these suppliers (in no specific order):

- George Van Horn – Biotoxins, Inc. – St. Cloud, Florida
- Jim Harrison – Kentucky Reptile Zoo – Slade, Kentucky
- Carl Barden – MedToxin Venom Laboratories – DeLand, Florida
- Ken Darnell – Bioactive Laboratories – Gordon, Alabama
- Dr. Elda Sanchez – National Natural Toxins Research Center – Kingsville, Texas
- Nancy Haast – Miami Serpentarium – Punta Gorda, Florida (unable to establish dialogue with them)

In addition to the supply of WDR venom in the U. S., TPWD staff researched possible suppliers in Europe. There is a company (Latoxan) in France that produces WDR venom from its own captive colony.

Like the WDR venom production industry, the WDR venom consumption industry is also focused in some aspects (vaccine and antivenin production) with other aspects (research) being more diversified. TPWD staff learned that there is only one company (Red Rock Biologics) that produces the pet vaccine for WDR. Additionally, there is only one company (BTG International) that produces *CroFab*, which is the only FDA-approved antivenin for crotalids (including WDR). The field of venom research among academic institutions and biotech companies is more diversified.

Pet Vaccine

The dog and horse WDR vaccine is made by Red Rock Biologics (RRB). TPWD staff corresponded with RRB and learned that they only deal with firms which maintain a population of rattlesnakes under controlled conditions. The president of RRB (James Wallis) indicated that RRB is probably the world’s largest consumer of rattlesnake venom. Further research revealed that the Kentucky Reptile Zoo is the

primary (if not sole) producer of WDR venom for this company. In summary, a prohibition on gassing in Texas would not affect the WDR venom supply for vaccine production.

Antivenin

BTG International

BTG International is the producer of *CroFab*, the only FDA-approved antivenin for WDR. BTG has a facility in Salt Lake City, Utah. TPWD staff corresponded with Heather Ambrose (Senior Manager) and Dr. Richard Straight (Facility Director).

TPWD received statements from BTG in 2010 and again in 2014 stating that BTG has its own crotalids and that venom is produced under strict laboratory protocols and outside sources cannot be used. TPWD heard countermanding from stakeholders that WDR venom from Texas sources was making its way into the supply chain for *CroFab*. In further correspondence between TPWD and BTG, BTG staff explained that the company was not purchasing WDR venom from outside sources when they sent correspondence in 2010, but during an experimental stockpiling phase from 2011 through 2013, they did purchase WDR venom and stated that during that time it was possible that WDR from Texas sources entered their supply chain through a third party supplier.

In January, 2014, BTG sent TPWD staff its revised purchasing terms and conditions. This revised document has a paragraph added stating that venom collected from gassed snakes or from roundups will not be allowed. Additionally, the document further indicated that venom that has passed through the inventory of an individual or company that engages in gassing or roundups will not be purchased, regardless of how it was collected. This document appears to be BTG's effort to ensure that venom from gassed snakes does not enter their supply for *CroFab* now or in the future. Since *CroFab* is the only FDA-approved antivenin, it seems apparent that a gassing prohibition would not affect the supply of WDR venom for antivenin production.

Rare Disease Therapeutics/Bioclon

TPWD staff also learned that a new antivenin (*Anavip*) for WDR will be coming to the U.S. market in October of 2018. TPWD staff corresponded with Jude McNally of Rare Disease Therapeutics (the U.S. Company that will market the product). This product is made by Bioclon in Mexico and uses no WDR venom. As a result, the WDR venom supply is unrelated to the production of this antivenin.

Venom Availability for Research

To attempt to gain the clearest understanding of possible research impacts should a gassing prohibition be implemented in Texas, TPWD sought feedback from the key suppliers as well as experts in the field of venom research. Additionally, TPWD sought feedback from biotech companies specializing in using snake venoms to develop pharmaceuticals.

Venom Dealers and Suppliers

- Biotoxins indicated that captive husbandry and other collection methods will supply enough WDR specimens for venom production should gassing be prohibited.
- The Kentucky Reptile Zoo indicated the need for WDR specimens to supply the market demand can be obtained without gassing.
- Medtoxin Venom Laboratories indicated that a prohibition on gassing WDR would not affect the market supply as long as other collection methods in Texas are allowed.
- Bioactive Laboratories indicated that there would be a shortage of WDR specimens collected from Texas should gassing be prohibited and the current collection permit requirements are not abolished.
- The National Natural Toxins Research Center indicated they do not accept gassed snakes and there is no shortage of WDR venom.
- Latoxan indicated they only sell venom produced at their breeding center.

Venom Researchers

TPWD corresponded with venom researchers who provided feedback as well as various protocols for research venom that they consider as standards. TPWD contacted/corresponded with the following:

- Dr. Paul Reid, President of Celtic Biotech: Celtic Biotech produces CroToxin, a cancer tumor drug made from crotalid venom. Dr. Reid indicated that their venom comes from captive colonies. Gassed snakes (and/or the venom from them) are not allowed. He indicated that snakes must be kept in good health with proper care and handling and that they not be under stressful conditions.
- Dr. Bryan Fry, Director of the Venom Evolution Lab at the University of Queensland in Australia: Dr. Fry indicated that WDR is a large venom yielder that does well in captivity, so venom from that species is easy to obtain and plentiful from captive colonies. He also reiterated Dr. Reid's standard that venom for research must come from snakes in good health. In Dr. Fry's expert opinion, venom is affected when snakes are emaciated or dehydrated. He revealed that snakes producing venom for research must have known geographic localities due to variations in venom composition within a species.
- Dr. Zoltan Takacs, a venom consultant with the National Geographic Society and owner of a designer toxin biotech company that specializes in using snake venoms to develop pharmaceuticals: Dr. Takacs indicated research using WDR venom is comparatively limited now when compared to the past. He indicated that WDR venom is sufficiently supplied by captive colonies and that the industry standard has shifted away from large volumes of crude venom to isolating components of a particular venom sample and producing it synthetically.

REFERENCE DOCUMENT 7 - ALTERNATIVE MEANS OF COLLECTION

EARLY SPRING DEN HARVEST

Many snake hunters have learned to use WDR behavior to their advantage. On warm days in late winter / early spring, WDRs will emerge from dens and congregate within a short distance from the den

opening (Thompson, 1975). During this time, they enter a sleep-like state as they warm themselves in the sun. This “sunning” behavior makes it possible for a hunter to collect numerous snakes at once.

Benefits

Capturing snakes sunning at the mouths of dens allows hunters to harvest many snakes from a den at one time while not having detrimental impacts to other vulnerable species (Thompson, 1975). Though some hunters who gas dens report getting snakes from the same dens year after year (personal communication), other hunters have documented that gassing a den often reduces or eliminates the harvest in future years (Etheredge, 2004). As gassed dens become less productive, hunters must locate new dens. Locating new dens requires time and expense as well as requiring hunters to forge relationships with additional landowners. By surface collecting snakes at the mouth of the den, hunters do not risk contaminating dens. This eliminates the time and cost of locating new dens and the effort required to develop relationships with new landowners.

Complicating Factors

Capturing snakes sunning at the mouths of dens requires cooperative weather conditions. Gassing can be done on any Saturday regardless of weather conditions. To maximize success without gassing, warm days in February / March are needed to coax snakes from dens. There is also debate about the volume of snakes one can harvest using this method. One member of the SHWG indicated that a person can't collect a sufficient number of snakes using this warm-weather method. Other SHWG members disagreed and one indicated that hunters who work his property have been successfully using this method for years. It is not debated that the success of this method improves as the number of good weather days increases.

TRAPPING

Benefits

Various funnel trap designs have been used for decades to capture snakes (Jackley 1943, Imler 1945, Fitch 1951, Brock and Howard 1962). A one-way, double funnel trap is the most effective method of trapping snakes (Farallo et al, 2010). This method employs drift fencing made of various materials (silt fencing or metal flashing) to intercept snakes as they move across the landscape and guide them into the trap (Figures 1 and 2). Funnel traps with drift fencing can be deployed at the mouths of dens to capture snakes as they emerge from the den to sun themselves periodically or as they leave the den for the summer (Figure 3). Similarly, they can be placed such that they capture snakes going to the den (Jackley, 1943). Trapping offers many benefits. This method allows for easy harvest since traps can be placed at accessible locations and can be checked/harvested regardless of weather conditions. Harvest can be highly selective (size, sex, age, etc.) with no ill effects on snakes that are released whether they are target species or non-target species. Funnel traps are mobile and adaptable and can be deployed in new locations or only used seasonally as the hunter desires. Funnel traps are inexpensive and easy to construct and can be tailored to work in most every condition. Finally, funnel traps have been deployed at dens to capture up to 100 rattlesnakes at a time (Klauber, 1956). With the secured snakes removed periodically, an unlimited number can be captured (Jackley, 1943). During meeting #4, an action item was created asking TPWD to provide the SHWG with information regarding the efficacy of snake

trapping. Documentation from published papers and government documents was gathered and delivered to the SHWG in the form of a report (Reference Document 8).

Complicating Factors

Depending on the size and design of trap construction, hunters could experience weather-related loss if traps are not checked with sufficient frequency and animals die from exposure. Installing traps and drift fencing requires a bit of labor, but once the trap is deployed, it works around the clock. Securing drift fencing atop solid rock may require ingenuity, but can be done. Additionally, drift fencing may need to be strategically placed along fence lines to avoid damage from livestock. Though funnel traps are inexpensive, there is a cost for trap and drift fence materials.

ARTIFICIAL DENS

Benefits

Artificial snake dens have been created in many places either intentionally or unintentionally (Nowak et al 2002, Walker et al 2009, Zappalorti and Reinert 1994). In many ways, artificial dens can function like a funnel trap, but are designed to actually house snakes over the winter. They can be constructed of various materials using various designs, but the concept is to create a man-made structure that rattlesnakes find conducive for overwintering (Figures 4 and 5). The advantages of artificial dens are numerous. They can be constructed in locations that are easily accessed. They can be designed to have an access port to facilitate harvesting occupants regardless of weather conditions. They have known entrances and exits and can be coupled with drift fencing to guide snakes to the structure facilitating colonization. Artificial dens can serve as predictable harvest locations once constructed. Selective harvest of age or size classes is also possible with these structures. Artificial dens are not natural habitat for karst invertebrates, thus eliminating the concern of impacting those species. In addition, artificial dens are designed to provide long term shelter, so weather-related loss and the requirement to “check traps” is eliminated, unless coupled with a funnel trap system. Given that this method of collection allows harvest directly from the den structure, hunters do not have to wait for snakes to emerge. Therefore, this method of snake capture is more compatible with snake events held in February or early March.

Complicating Factors

Artificial dens are not mobile and the initial investment of cost and labor up front would be higher than funnel trapping depending on the design and materials used in construction.

ROAD CRUISING

Benefits

Road cruising takes advantage of the fact that reptiles lie on warm paved surfaces at night to absorb heat. Snake hunters and reptile enthusiasts cruise country roads after dark looking for specimens. This collection method doesn't require strenuous hiking to remote locations. It is done after dark, so it does not interfere with work hours like collection methods that must be done during the day. Additionally, this method is often how incidental captures are made. People find snakes without actively hunting for them.

Complicating Factors

Success while road cruising is less predictable than trapping or collection at dens due to the randomness of encounters. It is also a method that is time consuming and can be costly if one drives many miles with no success. Since this method relies on snakes being active, it is a collection method that is successful only after snakes emerge from dens. As a result, this method would not provide snakes for events held before snakes emerge. Additionally, collecting snakes from public roads for commercial purposes is illegal in Texas.

SURFACE COVER SEARCHES

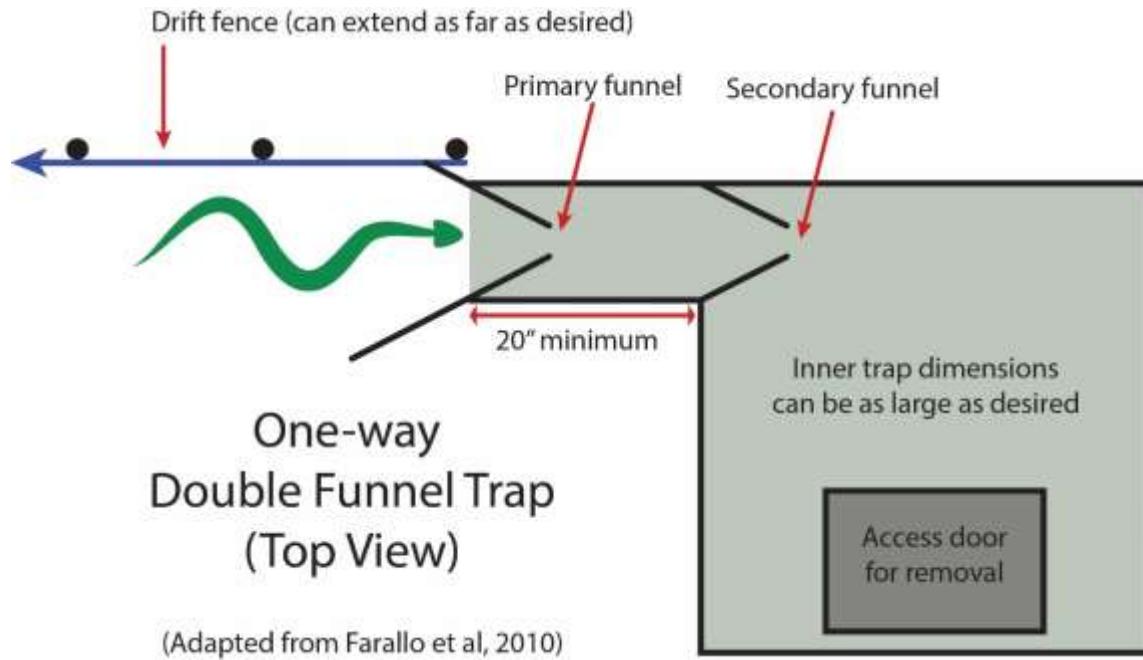
Benefits

Snake hunters and enthusiasts can also take advantage of the tendency of reptiles to hide under objects on the surface of the ground for shelter. By creating areas with cover boards (plywood, pieces of tin roofing, etc.), one can attract snakes to locations that are easily checked. This method does not require strenuous hiking on remote ridges. Cover boards can be checked in variable weather conditions, but don't have to be checked with frequency (like traps) since animals using cover boards are able to relocate before exposure to extreme heat or cold kills them. This method is inexpensive and can make use of scrap materials a landowner may have on hand.

Complicating Factors

Like road cruising, this method is less predictable than traps or artificial den methods. Cover objects become important once snakes have emerged from dens, so events would have to be postponed to later in the season for this method to provide a harvest. Finally, a field dotted with cover objects may seem unsightly to the landowner.

Reference Document 7 Figure 1: Diagram of Drift Fence and Funnel Trap



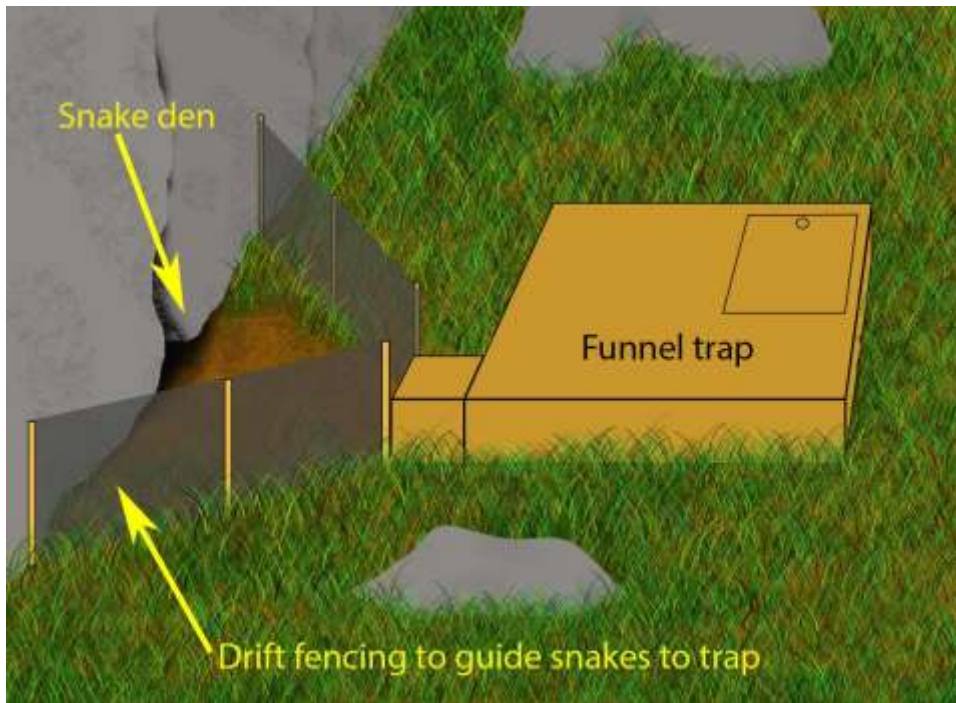
Reference Document 7 Figure 2: Photo of Funnel Trap and Drift Fence Deployed away from Den

Funnel traps and drift fencing used to capture snakes. Photo source: louisianaconservationist.org



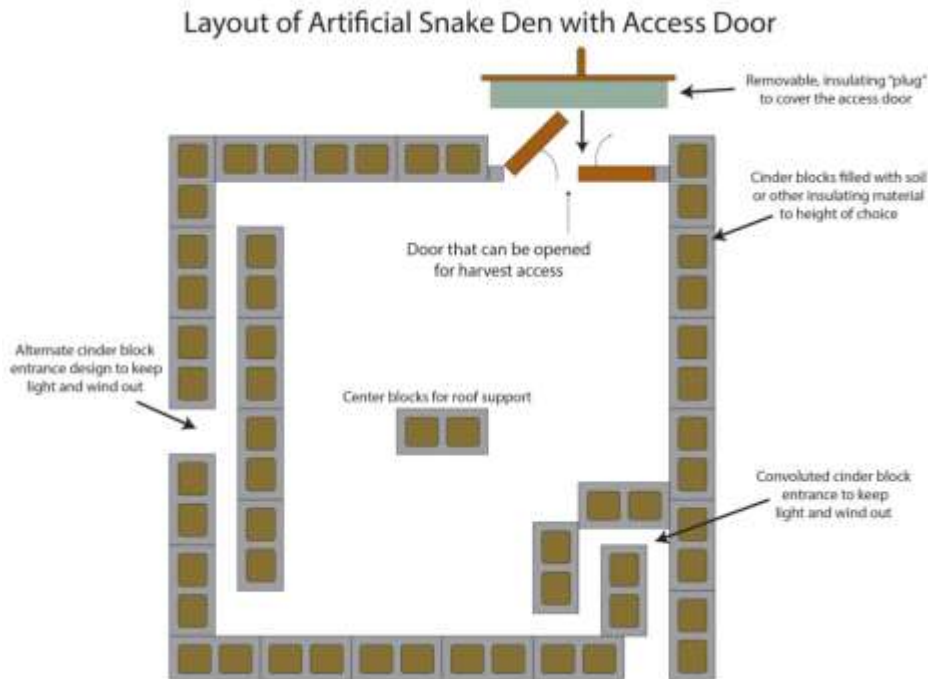
Reference Document 7 Figure 3: Illustration of Funnel Trap and Drift Fence at Den

Funnel traps coupled with drift fencing can be installed at the mouths of dens to capture snakes as they emerge to sun themselves or depart the den.



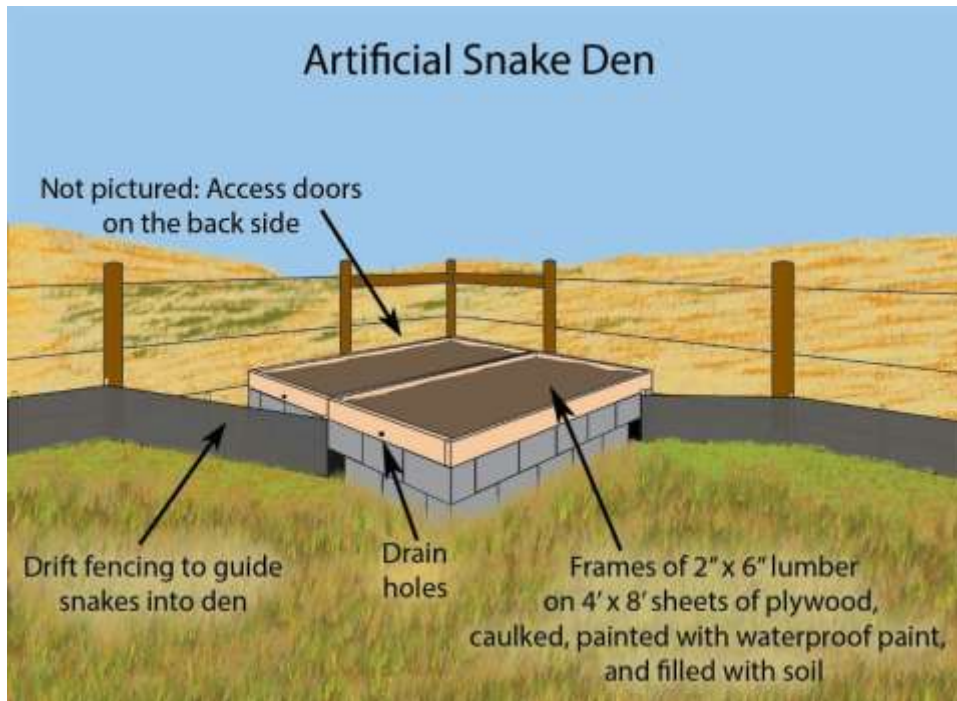
Reference Document 7 Figure 4: Diagram of Artificial Den (dorsal view)

Layout of artificial den structure made of cinder blocks (roof is not pictured).



Reference Document 7 Figure 5: Diagram of Artificial Den

Artificial den constructed in the corner of a pasture with drift fencing deployed to guide snakes into the structure. The access door is on the back and is not illustrated.



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REFERENCE DOCUMENT 8 - THE EFFICACY OF SNAKE TRAPPING

South Dakota Reptile Control Program: A Case Study for Snake Harvest/Control Methods

Prepared for the Snake Harvest Working Group
by John M. Davis, Texas Parks and Wildlife Department
October 2015

Background

In December, 2014, the Texas Parks and Wildlife Department convened a Snake Harvest Working Group (SHWG) to examine the practice of using gasoline and its associated vapors to collect rattlesnakes. Over the course of the following 9 months, the issue was discussed and the efficacy of alternative means of collection was debated. Toward the end of the SHWG's process, several members requested examples where snake trapping had been demonstrated to be effective. It is in response to this request that this summary of South Dakota's historic "Reptile Control Program" was developed.

South Dakota Reptile Control Program

In the early 1900s, South Dakotans faced environmental challenges such as extreme weather, drought, fire, and (in the western half of the state) prairie rattlesnakes (*Crotalus viridis*). By the 1930s, rattlesnake hunting had become a hobby for some in that part of the state and in 1937 South Dakota hired a man named Albert Matthew ("A. M.") Jackley to establish a rattlesnake abatement program (Dalstrom, 2013).

A. M. Jackley was born in Iowa in 1880 and by 1905 he had moved to New Mexico and become an attorney with a keen personal interest in rattlesnakes. He was said to have had about 1,000 live rattlesnakes at his home at one time. By the 1930s Jackley had moved to South Dakota and had developed quite a reputation as a snake handler. Also by this time he had learned to use his knowledge of rattlesnake behavior to reduce their numbers in hopes of decreasing the threat of snakebite (Dalstrom, 2013).

Jackley worked for what became known as the Department of Agriculture's "Reptile Control Program" from 1937 until his death in 1950. During those 13 years, Jackley's detailed understanding of rattlesnake behavior earned him the respect of renowned herpetologists such as Lawrence Klauber and Howard K. Gloyd (Dalstrom, 2013).

Rattlesnakes

The prairie rattlesnake (PR) is a species that ranges from northern Mexico northward through Texas and the central U.S. into Canada. This species is similar to the western diamondback rattlesnake (WDR) in several ways. The two species are similar in size with the WDR being slightly larger in general (Tennant, 1985). Both species are similar in habit and behavior. Both species congregate at winter dens and migrate to/from summer feeding grounds. Both species attempt to reuse dens each year and exhibit similar behaviors of basking in the sun at the mouths of dens (Werler and Dixon, 2000). The denning habitat occupied by prairie rattlesnakes in western South Dakota is also similar to that occupied by western diamondback rattlesnakes in Texas (Figure 1).

Methods

Mr. Jackley utilized a variety of methods in his rattlesnake control program including shooting / clubbing at den sites, gassing, and trapping.

Jackley recognized from the start of the program that enacting control measures at den sites was the best way to affect large numbers of snakes. As a result, the peak seasons of his work each year occurred during the fall as snakes were moving to dens and in the spring as they were leaving. From

1937 to 1944, Jackley emphasized the value of organized volunteer snake hunting at dens to shoot or club snakes basking outside dens in the early fall or late winter / early spring. This method proved quite effective with an estimated 10,000 rattlesnakes captured and killed in the first year of the program (unidentified newspaper clipping as cited in Dalstrom, 2013).

In 1941, Jackley began experimenting with the use of poisonous gasses to kill snakes in dens. He tried many gasses and though he had some success, he realized that no single gas or combination of gasses would be the vehicle for rattlesnake extermination. The physical variability of dens combined with danger to humans and non-target species were complicating factors (Jackley 1942, Jackley 1946, Jackley 1949, Dalstrom 2013).

Between 1944 and 1946, however, Jackley perfected a low-cost trap design and deployed such traps with tremendous success (Jackley 1946, Johnson 1975, Dalstrom 2013). From that time forward, trapping was the key component of Jackley's campaign.

Chronology of the Reptile Control Program

A. M. Jackley ran the program from its inception in 1937 until he died in 1950 from heart related ailments. After Jackley's death, Gerald Miller managed the program from 1950 to 1953. Miller credited Jackley with great success, but stated that in addition to trapping, he would increase efforts to use poisonous gas. Miller had success with a gas produced by mixing two chemicals, but cautioned anyone attempting the method that the fumes are "very deadly when inhaled" (Miller, 1952).

Miller resigned in 1953 and Thomas Myers ran the program from 1953 to 1955. He shifted the emphasis of the program back to trapping where it remained for the duration of the program. It was also during Myer's tenure that the position became a part-time one (Ausman, 1953).

Richard Jacoby took over managing the program from 1955 to 1963 and he relied on traps based on Jackley's design but with some modifications that Jacoby preferred (Bruett, 1956).

In 1963, the position was assumed by Edward Cronk who continued the trapping tradition. By this time, the trapping campaign demonstrated considerable success in reducing rattlesnake numbers such that entire areas were deemed "clear" of snakes (Johnson, 1964). This assessment is supported by reduced numbers harvested in the later years of the program (South Dakota's Annual Report of the Department of Agriculture, 1973).

According to an interview (as cited in Dalstrom, 2013), Steve Thompson took over the program in 1974 and though he continued using Jackley-styled traps, he shifted the emphasis of the program away from eradication and concentrated on controlling rattlesnakes in public areas and teaching the public how to control snakes themselves. In 1977, the program was ended.

The Trap

The trap designed by A. M. Jackley and later modified by his successors is detailed in Thompson (1975). Diagrams are provided in this document for ease of reference (Figure 2). The trap is essentially what biologists have come to call a funnel trap today. It utilizes a mechanism such as a fence or tube to guide snakes into a simple one-way entrance that allows snakes to enter the holding cage without allowing them to escape. Jackley's design used a hinged "door" for its one-way entrance(s) while more modern designs employ a cone made of wire screen because it is easier and more cost effective to construct. The funnel trap concept is considered standard methodology for capturing snakes today and numerous variations are routinely deployed in Texas and elsewhere to capture snakes at dens as well as on the landscape (Imler 1945, Fitch 1951, Brock and Howard 1962, Thompson 1975, Bird and Peak 2009, Jenkins et al 2009, Farallo et al 2010).

As documented above, all of the reptile control officers of the Reptile Control Program successfully used such traps to capture rattlesnakes as they migrated to the winter dens, emerged to bask on warm days, and when they emerged to leave the den in the spring.

The efficacy of trapping versus gassing to obtain live snakes was well demonstrated by the Reptile Control Program. Jackley experimented with killing snakes by introducing poisonous gasses into dens, but understood that it was impossible to ascertain the species and numbers of snakes killed by this method. When toxic gasses were introduced into a den, some snakes emerged while others undoubtedly perished without emerging from the den (Jackley, 1949). Rattlesnakes are resistant to being forced from dens since snakes retreat into them to escape harsh conditions outside (Klauber, 1956). This combined with a low metabolic rate (Klauber, 1956) and reduced susceptibility to gaseous irritants (Campbell et al, 1989) makes the snakes' tendency to stay put and "wait it out" an unsurprising one when gasses are introduced into a den. Unfortunately, this reaction often results in snakes being overcome and perishing in the den (Speake and Mount 1973, Speake and McGlincy 1981).

It wasn't until he perfected trapping that Jackley was able to determine the various species and numbers of snakes in a den (Jackley, 1946). Since Jackley's trap takes advantage of natural snake behavior, snakes that leave the den to bask, forage, or migrate are captured (Figure 3). Using a gas to collect live rattlesnakes from dens can result in a "loss rate" as high as 50% (Speake and Mount, 1973). However, trapping live snakes as they emerge to bask, etc., does not generate such "loss rate." Snakes emerge on their own volition. As such, all snakes emerge and are available for trapping.

Additionally, numerous documented cases of animals fleeing gassed dens leave no question that gassing affects the environment in a den (Jackley 1949, Speake and Mount 1973, Speake and McGlincy 1981, Kilmon and Shelton 1981, Etheredge 2004). However, there is debate on the specific duration of impacts. There are reports of dens being gassed year after year and snakes returning, as well as reports of snakes never returning after a den was gassed (Kilmon and Shelton 1981, Etheredge 2004). Trapping does not impact the environment of dens and, as such, eliminates this debate.

The typical trap used by South Dakota reptile control officers was designed to hold 100 rattlesnakes (Figure 3). This level of harvest was commonly achieved (Ausman, 1954). This capacity is solely a function of the size of the holding area. As a result, traps can be constructed to hold more than 100. However, even with the 100-snake design, captures of up to 400 rattlesnakes from a single den were recorded according to an article in the *Mitchell Daily Republic* (as cited in Dalstrom, 2013).

Results

Klauber (1956) said Jackley's efforts were likely the most effective rattlesnake control campaign ever implemented. Just before Jackley's death in 1950, a *Souix Falls Daily Argus-Leader* article (as cited in Dalstrom, 2013) credited Jackley's campaign with killing as many as 25,000 to 30,000 rattlesnakes a year by focusing on trapping and killing them at dens. Eradication of rattlesnakes was the original purpose of the program. Though the ecological impact of that purpose could be debated today, the efficacy of the program cannot. Jackley and his successors were able to trap so many snakes from dens in the '30s and '40s that rattlesnake populations had noticeably declined in some areas by 1947 (Jackley, 1947) and were considered extirpated over large areas by the 1960s (Johnson, 1964). Several present-day rattlesnake authorities have provided support for those reports from the 1960s by noting that the prairie rattlesnake is now rare in regions where it was once very common and attribute this pattern to campaigns to capture/eliminate this species at den sites (Hammerson 1999, Ernst and Ernst 2003).

Additional support for the efficacy of this campaign in removing rattlesnakes from the landscape is provided by the notable change in prairie rattlesnake distribution when comparing a range map (Figure 4) (Ernst and Ernst, 2003) and the current International Union for Conservation of Nature (IUCN) extant population map (Figure 5) (Frost et al, 2007). The IUCN is a widely recognized source of data for the conservation status of species. The IUCN produces a "Red List" that is touted as the most comprehensive, objective global approach for evaluating the conservation status of a species (IUCN, 2015). According to this source, the prairie rattlesnake is a species of "least concern" due to its wide distribution and presumed large population as a whole. One can see from Figure 4, that prairie

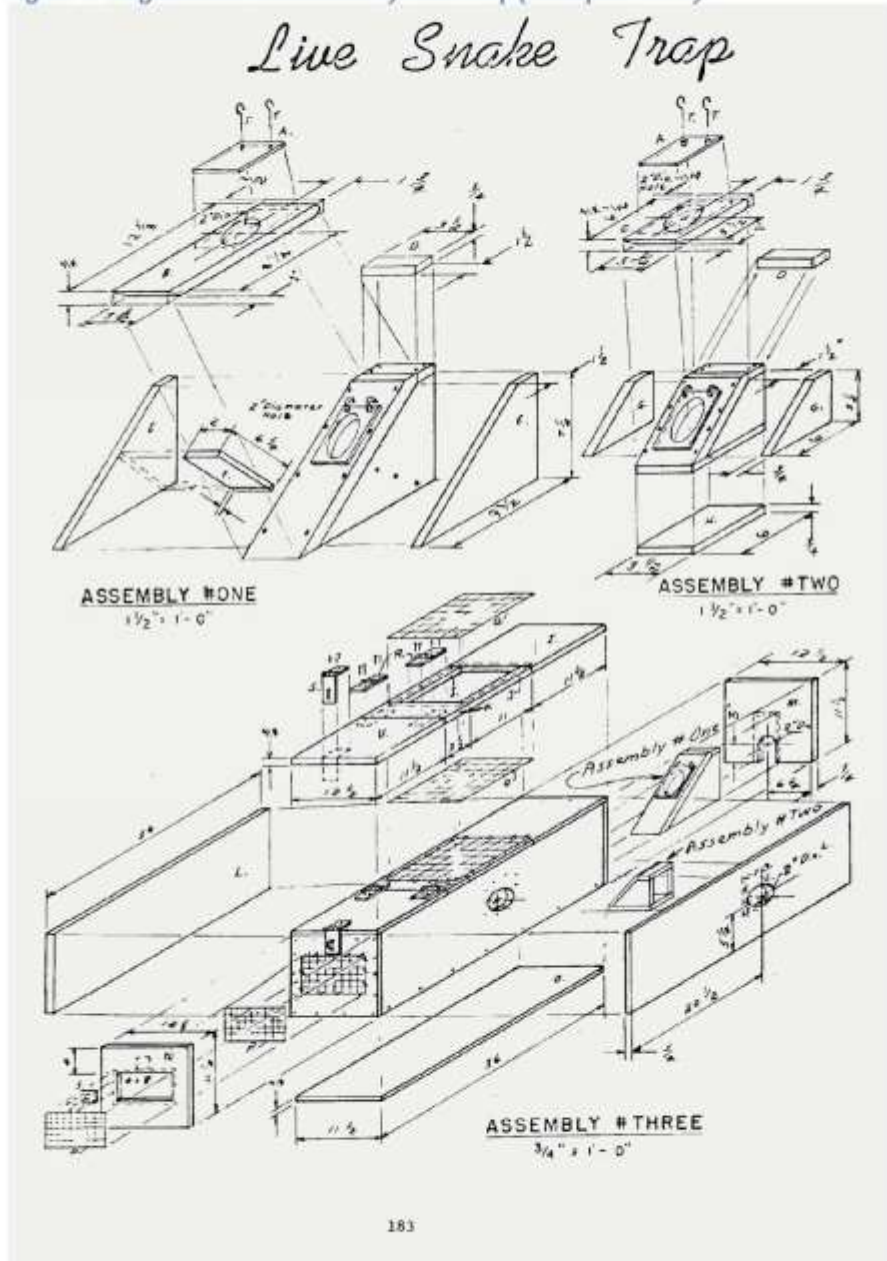
rattlesnakes were once common across the western two-thirds of South Dakota. In 2007, the IUCN's panel of experts conducted a status assessment of the species and produced an updated map (Figure 5). The updated map shows a noticeable change across most of South Dakota where decades of den trapping efforts were conducted.

Conclusion

Members of the SHWG requested an example demonstrating the efficacy of snake trapping as an alternative to gassing. Mr. Jackley and his successors trapped large volumes of snakes over multiple decades, demonstrating that their method has been thoroughly tested and proven effective. Research has indicated that this method is even more efficient at collecting live snakes than gassing due to eliminating the loss of snakes not emerging and perishing. Based on extensive field-based success, the efficacy and efficiency of trapping is established and, therefore, provides a proven method of large-scale collection that does not rely on gassing.

Figures

Figure 1: Diagram and material list of snake trap (Thompson 1975)



MATERIAL LIST

Sound Construction Grade Lumber is Sufficient.

ASSEMBLY # ONE:

REMARKS:

- A. 1 - .080 gauge x 3" x 4" plexiglass
- | | Stock Size | Actual Size |
|----|--|---|
| B. | 1 - 1" x 4" x 12 5/8" board | (3/4" x 3/4" x 12 5/8") (Cut as shown) |
| D. | 1 - 1" x 2" x 3 1/2" board | (3/4" x 1 1/2" x 3 1/2") |
| E. | 2 - 1" x 8" x 9 1/2" board | (3/4" x 7 1/2" x 9 1/2") (Cut as shown) |
| F. | 1 - 1" x 2" x 6 1/2" board | (3/4" x 2" x 6 1/2") (Cut from 1" x 4" board) |
| T. | 2 - size 14 ceiling hooks (or screw eyes size 114) | |

3d Galv. Nails

6d Galv. Nails

ASSEMBLY # TWO:

- A. 1 - .080 gauge x 3" x 4" plexiglass
- | | | |
|----|----------------------------|---------------------------------------|
| C. | 1 - 1" x 4" x 6 1/2" board | (3/4" x 3/4" x 6 1/2") (Cut as shown) |
| D. | 1 - 1" x 2" x 3 1/2" board | (3/4" x 1 1/2" x 3 1/2") |
| G. | 2 - 1" x 4" x 6" board | (3/4" x 3/4" x 6") (Cut as shown) |
| H. | 1 - 1" x 4" x 6" board | (3/4" x 3/4" x 6") |
| T. | 2 - size 14 ceiling hooks | |

3d Galv. Nails

6d Galv. Nails

ASSEMBLY # THREE:

- | | | |
|----|------------------------------|--|
| I. | 1 - 1" x 12" x 12 1/2" board | (3/4" x 11 1/2" x 12 1/2") |
| U. | 1 - 1" x 12" x 12 1/2" board | (3/4" x 11 1/2" x 12 1/2") |
| J. | 2 - 1" x 1 1/4" x 11" board | (3/4" x 1 1/4" x 11") (Cut from 1" x 4") |
| K. | 1 - 1" x 4" x 12 1/2" board | (3/4" x 3/4" x 12 1/2") |

NOTE: Parts of combination I-J-K may be cut from 1 - 1" x 14" x 25" board to dimensions shown.

- | | | |
|----|------------------------------|---|
| L. | 2 - 1" x 12" x 12 1/2" board | (3/4" x 11 1/2" x 12 1/2")(drill 2" hole - 1 panel) |
| M. | 1 - 1" x 12" x 12 1/2" board | (3/4" x 11 1/2" x 12 1/2")(drill 2" hole) |

ASSEMBLY # THREE

(Continued):

	Stock Size	Actual Size
X.	1 - 1" x 12" x 12 1/2" board	(3/4" x 11 1/4" x 12 1/4") (cut 4" x 5" hole)
O.	1 - 1" x 12" x 36" board	(3/4" x 11 1/4" x 36")
P.	2 - 6" x 10" - 4" hardware cloth	(hail screen)
Q.	2 - 12" x 13" - 1/2" hardware cloth	(hail screen)
R.	2 - 3" hinges & Screws	
S.	1 - 3 1/2" safty hasp & Screws	

Poultry staples.

6d nails

3d nails

INSTRUCTIONS:

1. Cut out all parts to dimensions as shown in drawings.
2. Assemble assemblies # One & # Two.
3. Attach assembly # One to Part M. over 2" hole as shown with 6d nails.
4. Attach Assembly # Two to Part L. over 2" hole as shown with 3d nails.
5. Attach 12" x 13" hardware cloth (Q) to each side of parts combination I.-J.-K. over opening with poultry staples.
6. Attach 6" x 10" hardware cloth (P) to each side of Part N. over opening with poultry staples.
7. Assemble assembly # Three as shown with 6d nails.
8. Attach hinges and safty hasp.

I shall make no claim for the originality of this snake trap. The trap herein described combines more advantageously the characteristics of other traps that have been seen.

Steve Thompson
S. D. Dept. of Agriculture
February 6, 1976

Figure 2: Photo: "Typical rattlesnake habitat in western South Dakota where hundreds of snakes have been trapped and killed" (Bruett, 1958).



Figure 3: Trap with ~100 rattlesnakes caught as they emerged to bask (Miller, 1952)



Figure 4: Range map (shaded) of Prairie Rattlesnake (*Crotalus viridis*) (adapted from Ernst and Ernst, 2003)

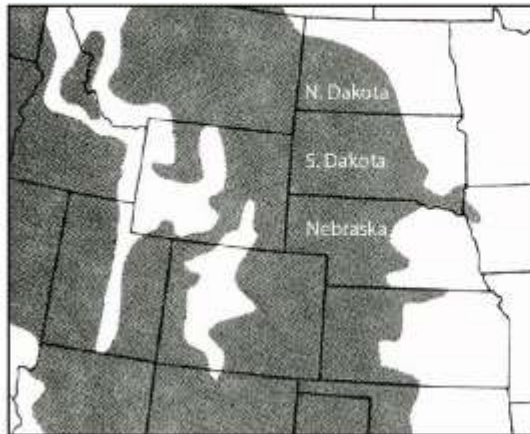
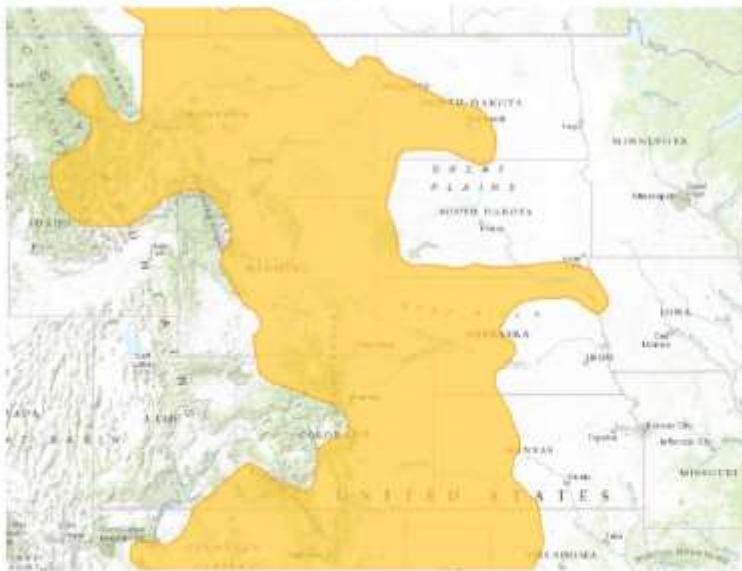


Figure 5: 2007 distribution map of Prairie Rattlesnake (*Crotalus viridis*) (Frost et al, 2007)



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REFERENCE DOCUMENT 9 - UNEDITED PERSPECTIVES

JAMES WRIGHT

Snake Harvest Report from James Wright

9-3-15

My name is James Wright and was ask to join the Snake Harvest Working Group (SHWG) and have attended all the meetings in person or by phone.

We currently own and operate ranch property in Coleman, Runnels and Bell Counties. We purchased ranch property in 1983 in Coleman County and have resided in Coleman County full time for the past 20 years.

As reported to the SHWG - In the past years I have personally hunted rattlesnakes in their winter dens using gas vapors to force the snakes out. In those gassing experiences I have witnessed not only rattlesnakes evacuating the dens but also raccoons, bats, rats, mice, flies, scorpions, spiders, several types of bees, lizards, and snakes (other than rattlesnakes).

My last personal experience was about 15 years ago on a cold day in late February. As these other animals exited the dens I remember being deeply concerned about displacing them into near freezing weather to quickly find another place to survive. (In the event the exposure to benzene didn't kill them first).

At present two groups of local snake hunters work our properties along with other ranches in Coleman and Runnels Counties and harvest rattlesnakes. I meet with them several times during the year and discuss snake harvest methods. Both groups indicated they have stopped gassing dens several years ago. The reasons gassing was discontinued are (1) after gassing the dens the snakes will not return in

higher numbers for several years due to the gas residue created in the dens. (2) Additional ranch property must be located and explored each year for new snake dens.

They indicated on certain sunny days the snakes will move to the entrance of the den and sun. On those days the snakes can be picked up and removed without gassing. They also indicated that working the snakes on the sunny days can be hit or miss however the snakes will return and use these dens on a yearly basis. This eliminates them constantly looking for new property and new dens to harvest snakes and is overall less time consuming. Using this method they reported capturing 200 to 300 pounds of rattlesnakes yearly.

This process is currently working successfully. In my opinion this is the best alternate method for collecting rattlesnakes without the use of any gas or gas vapors.

On several occasions I have had the opportunity to witness the Texas Parks and Wildlife team present the science concerning the possible negative effects not only to rattlesnakes but all other animals including invertebrates from exposure while gassing snake dens in Texas. This presentation is comprehensive and conclusive, identifying the damage gassing presents to wildlife.

I have attended the Sweetwater Rattlesnake Roundup in the past with my children and feel it an important event to the area and well organized. One comment made in the SHWG group was if gassing is stopped the Roundup would cease to exist. After attending the SHWG meetings and considering successful alternative snake harvest methods I feel the Sweetwater Rattlesnake Roundup should continue and

prosper without using gas or gas vapors to extract rattlesnakes from their dens.

I am convinced (beyond doubt) spraying gasoline in snake dens is harmful to rattlesnakes and harmful if not deadly to all other species occupying the contaminated area. Therefore it is my recommendation to prohibit snake gassing.

Best Regards,

James Wright

DR. DON STEINBACH

As Executive Director for The Texas Chapter of the Wildlife Society, I wanted to express our appreciation for being included as a stakeholder and member of the Snake Harvest Working Group. The Snake Harvest Working Group has broad array of stakeholders representing the diverse interest in this topic, and they have provided valuable information that pertains to this issue.

John Davis and his staff have provided excellent support for this working group and have now provided us with a draft of the information that has resulted from our several meetings of the group. I want to commend them for synthesizing the vast amount of information resulting from extensive discussions of this group. As you would know there are differing opinions about the use of gasoline in rattle snake dens as a method of harvest and the products that result from rattle snake roundups. This draft working group report captures all of the topics that were discussed by our working group and provides for both a majority and minority opinions of each topic.

This document when finalized should provide Texas Parks and Wildlife staff, administration, and commission, with the most current information to determine the correct course of action in order to guide the policy making process.

Don Steinbach

Executive Director Texas Chapter Wildlife Society

DONNA BOATRIGHT

Dear Dr. Eikenhorst,

Please accept my apology for sending these comments at the last minute and my thanks for allowing me to go past the 5pm deadline. I would like to express my appreciation for being selected to participate in this work group and for listening and taking interest in all opinions and perspectives. I have said much of what I think at the meetings but want to reiterate some points I feel are important.

- It is unfortunate that there is little research that has been done in relation to the effect of gassing on karst populations and on any petrochemical negative effects in snake populations. The assumption has been made, and possibly rightfully so, that gassing snakes may pose harm to other species and to snakes themselves, but little has been done to scientifically prove this point.
- I don't believe anyone wants to practice strategies that could be harmful, but lack of data keeps the point as one of conjecture or at best, an extrapolation from other situations.
- Our roundup is a very important event to our community, both culturally and economically, but also in the area of awareness and education. The JayCs make a huge effort to educate the public on WDBR and I think that has merit. I do not hunt snakes and do not participate in the Roundup, but I do see the benefits.
- WDBRs are dangerous, I have seen some terrible bites with serious outcomes and very expensive treatments and I believe the public needs to remain aware and vigilant in watching out for and controlling these creatures.
- I do not believe prohibiting gassing is practical from an enforcement perspective. I believe that the JayCs themselves are the best enforcers in that they observe the state of the snakes when they come in to be weighed and should continue to be very conscientious of this and refuse snakes that have been treated in such a way. Perhaps there is a way to work together with TP&W to make this a stronger deterrent.
- I do not believe what the TP&W was told about antivenin manufacturing. It is obvious that snakes are being milked that have been gassed and the venom is sold to manufacturers. The question is why are they lying?
- I would also be interested to see what ideas could be generated to improve the harvesting of the WDRS. It is hard to believe that there are not some alternatives that would be less objectionable. However, I strongly feel that many of the work group members do not condone snake harvesting of any kind. They are entitled to their opinions. I do not believe we should be spending time and money of the State or of our own if the end game is to stop harvesting of the WDRS. That is not what the objective of the group was and should not be the outcome.

Thank you for allowing my comments.

Donna Boatright, RN, MSN

Administrator

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ROB DENKHAUS

To: Carter Smith, Executive Director, Texas Parks and Wildlife Department

From: Rob Denkhaus, SHWG member, Wildlife Diversity Advisory Committee Chair

Date: 16 September 2015

Re: Final thoughts/opinion on Snake Harvest Working Group charges

Over the past ten months, the twelve members of the Snake Harvest Working Group (SHWG), in conjunction with an array of Texas Parks and Wildlife Department (TPWD) staff members, have explored, discussed, and debated the pros and cons of the use of gasoline in the collection of western diamondback rattlesnakes (WDR) and the potential ramifications of continuing to allow the use of gasoline versus those of banning the practice through a series of four face-to-face meetings and a multitude of email exchanges. This process was guided by the able hand of Chairman Dr. Bill Eikenhorst who managed to maintain the group's focus despite a wide range of disparate views and personalities.

Because the group could not come to a consensus, I feel that it is imperative to express that the process was designed to be consummately fair allowing all opinions to be presented equally. Each SHWG member was provided ample opportunity to express their thoughts and opinions at each meeting and group members and TPWD staff were held to a high standard of professional conduct.

It is clear that the gassing issue is related to, but not synonymous with, the issues of the social and ecological acceptance of rattlesnake roundups. This fact was clearly stated at the outset of the group's engagement and most group members appeared able and willing to separate the two. On the issue of the appropriateness of rattlesnake roundups, I would like to clearly state that I do not believe that the legal take of WDR for use in roundups is a limiting factor in WDR populations except possibly in highly localized areas. I also believe that continuation of the roundups provides a social/cultural value for participants in this era of limited exposure to historic connections between wildlife and people although I am opposed to some of the methods used to achieve this connection.

The following opinions are my own based upon the data presented to the group, and found in my own research, as interpreted through a filter constructed of my own biases and a 30 year career as a wildlife biologist.

OPINION: Gassing does not negatively impact WDR populations except possibly on a local scale.

No evidence has been presented that indicate that WDR populations are negatively impacted by gassing or other forms of collecting except for small local populations. While the number of snakes reportedly collected are significant, the fact that snake hunters report the ability to return to the same areas annually to collect indicate that the WDR population exhibits sufficient reproductive potential for such collecting to be sustainable.

OPINION: A ban on gassing is impossible to enforce.

Like most other groups of people, it is apparent that the groups of snake hunters who collect solely or primarily to supply the roundups are bound by tradition and the tradition of snake collecting using

gassing is the greatest obstacle to the continued vitality of the roundups. Acceptance of alternative capture methods will require a cultural change in addition to the technological changes necessary to utilize these new and unfamiliar methods.

It is also apparent that snake hunters have not been subject to the basic rules of hunting, particularly that of fair chase. Gassing for WDR has been likened to fishing with dynamite often because of the stated objective to remove a potential (or perceived) nuisance from the landscape. The link to human health and safety makes the indiscriminate killing of karst fauna (both known and unknown) more palatable to the average person than doing the same for harmless fish. In addition, of course, there is a widely held hatred or phobia regarding snakes in general and venomous snakes, such as WDR, specifically that condones such catholic collection methods.

Personally, I compare the gassing situation more closely to the illegal use of poison for controlling feral hogs, an exotic invasive species disdained by those impacted by their noxious behaviors and loved by those who appreciate its hunting and meat qualities. Like the WDR, feral hogs have no season, no limit, and most people would choose to not have them on their properties. Millions of dollars are spent in repairing damage and controlling feral hog populations yet no pesticide (poison) is permitted for use on feral hogs despite a number of registered toxicants successfully being used in Australia and elsewhere. The culture that allows us to refrain from using toxicants to aid us in our efforts to control feral hogs for fear of indiscriminately killing a myriad of non-target species is what will be required to eliminate gassing from the snake hunters traditional toolbox.

Beyond the cultural changes necessary to successfully move beyond gassing, effective enforcement methods is, in my opinion, the most likely obstacle in evolving towards alternative methods. Again, the feral hog example is pertinent here as enforcing the ban on the use of toxicants for hogs is an equally daunting challenge and yet the ban remains and those who flaunt the ban are prosecuted. The obstacles, while substantial, are no greater than those being overcome in other areas of wildlife management.

OPINION: Gassing has significant negative impacts on populations of non-target species.

All pertinent studies indicate that invertebrates are lethally impacted by exposure to gasoline fumes at the level needed to cause WDR to vacate their dens. Many of these karst invertebrates are endemic to the state and/or included on the Species of Greatest Conservation Need (SGCN) list which was developed in concert with the creation of the Texas Conservation Action Plan (TCAP). The TCAP outlines the threats to the state's wildlife resources and gives priority to those species included on the SGCN list. TPWD would be guilty of ignoring its responsibility to manage all of the state's wildlife resources if gassing is allowed to continue.

Suggestions have been made for regulating gassing by defining seasons, limiting the practice to specific geographic areas, or identifying a maximum volume of gasoline vapors to be used to collect WDR. None of these suggestions constitute a viable solution as our knowledge base regarding non-target species' range and population status is inadequate to accurately predict the results of even a regulated impact. The potential for losing a species to extinction is too great to consider such watered-down regulations.

Aldo Leopold wrote, “The first rule of intelligent tinkering is to save all of the pieces.” To allow the continuation of gassing in even a limited form ignores this rule by risking the complete loss of a catastrophic number of species and places the blame for this loss squarely on the shoulders of TPWD, the agency charged with protecting the state’s wildlife resources.

OPINION: A ban on gassing will have no negative impacts on human health and safety.

No evidence was presented in support of one group member’s claim that a gassing ban would lead to a loss of venom used in medical research and antivenin production. On the contrary, virtually all members of the venom industry stated that a gassing ban would have no effect on their business because they did not use venom from gassed snakes and did not purchase venom from roundups.

No evidence was presented in support of contentions by the Sweetwater representatives that there would be an increase in rattlesnake bites following a ban on gassing.

The implications of roundup visitors consuming meat from rattlesnakes exposed to gasoline fumes were discussed without resolution. However, it is logical to assume that a gassing ban would eliminate this potential hazard.

OPINION: A ban on gassing will reduce the possibility of federal listing for 130 endemic karst invertebrate species.

The implications of federal listing were made clear during presentations by TPWD staff. While the existence of populations of specific species in specific karst areas may be currently unknown, it is safer to err on the side of conservation, to eliminate the potential risk of federal listing that comes with allowing gassing. Texans pride themselves on being a part of a private lands state, of being in control of what takes place on their property, yet continuing gassing and the potential resulting listing of up to 130 endemic karst invertebrates could limit private landowners’ activities in far more ways than simply banning gassing.

OPINION: A ban on gassing will not lead to the demise of the Sweetwater Rattlesnake Roundup and other events in Texas and the loss of their cultural and economic benefits.

Despite claims to the contrary by the Sweetwater representatives, there is no evidence to indicate that a gassing ban will lead to the demise of any of the WDR events in the state. In fact, there is evidence that a reduction in the number of WDR used in the Sweetwater event actually increases event revenue. The Sweetwater representatives provided historic total snake weights from their event and claimed that “4,000 pounds were needed for a successful event”. Despite refusals to provide revenue figures from historic roundups to analyze the validity of this statement, I was able to obtain Form 990s for the Sweetwater Jr. Chamber of Commerce nonprofit organization for the years 2004-2013 so as to perform my own analysis. Figure 1 shows the relationship between two revenue figures (gross and net) and two frequently cited factors that influence event success (pounds of snakes and high temperature). Revenue figures were obtained from Form 990s. Pounds of snakes were obtained from documents provided by Sweetwater representatives. High temperature was identified for the Saturday of the event and defined

as an indicator of “good” weather and obtained from archived online weather data. Due to the extreme range of values presented (from >100 for high temperatures to over \$290,000 for gross revenue), a logarithmic scale was used for the vertical axis. Note that no year from 2010 – 2013 had a reported total weight of snakes over 4,000 pounds (range 1664 – 2361, average = 2008.5) yet the gross and net revenues exhibited overall growth. The single year of revenue decline could be explained by the unusually low high temperature of 42° F.

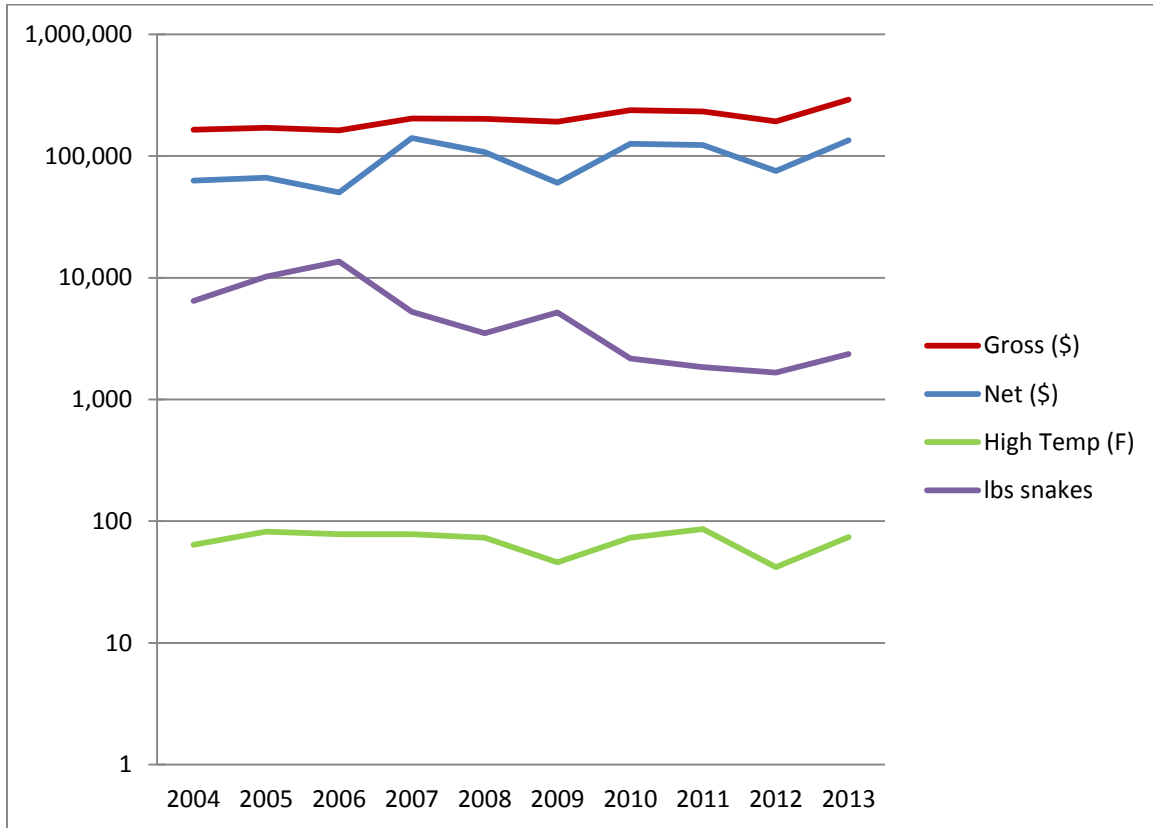


Figure 1.

Figure 2 shows the same data but uses linear trend lines to better predict future figures.

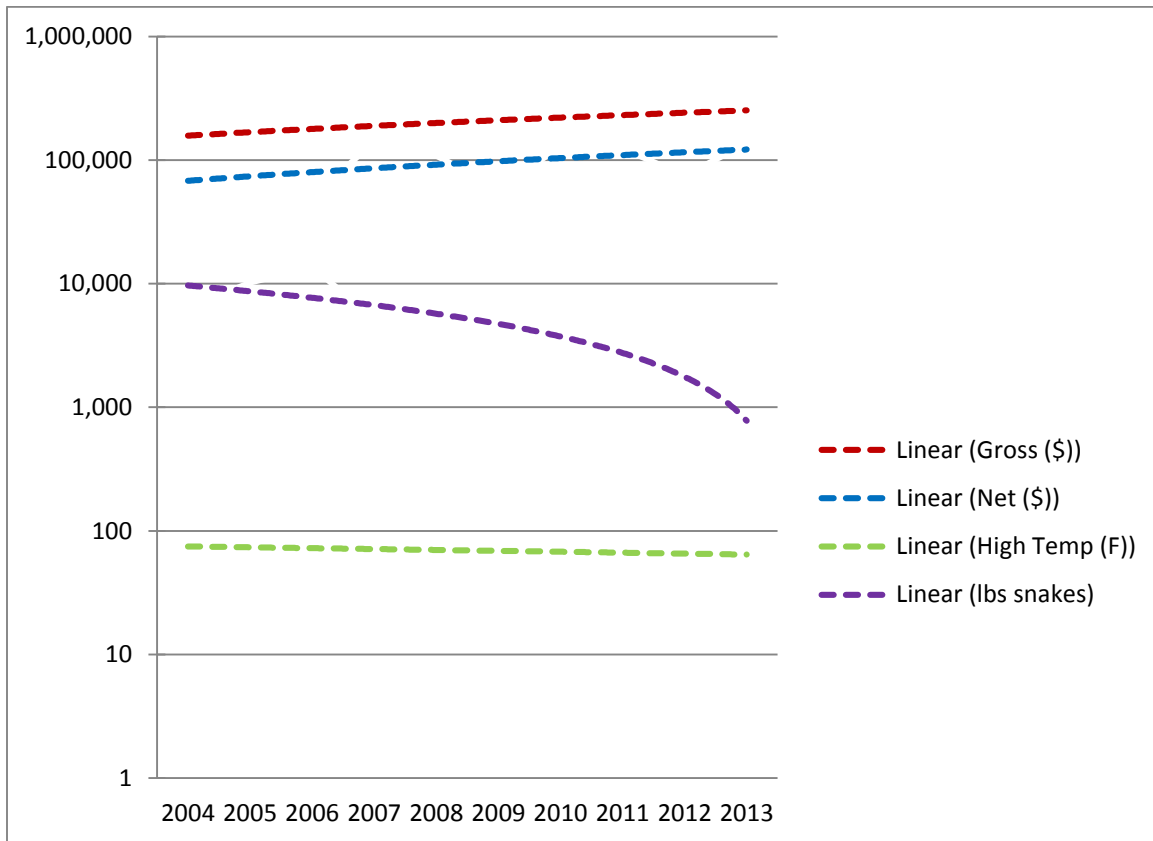


Figure 2.

It is evident that the ten year trend for revenues is upward while the temperature trend is relatively stable and the trend in pounds of snake is on a noticeable downward arc (arc is due to the logarithmic scale of the vertical axis). This indicates that event revenues are not dependent upon the mass of snakes exhibited although a lower limit certainly exists. This limit must be less than 1664, the minimum number of pounds of snakes exhibited in 2012. Sweetwater representatives stated that they “broke even” or “lost money” by purchasing snakes which validates the correlation as by being forced to buy fewer snakes they reduced expenditures.

Because a poor showing of snakes in one year is more likely to impact following years, the same analysis was performed with revenue figures offset by one and two years (Figures 3 & 4, respectively).

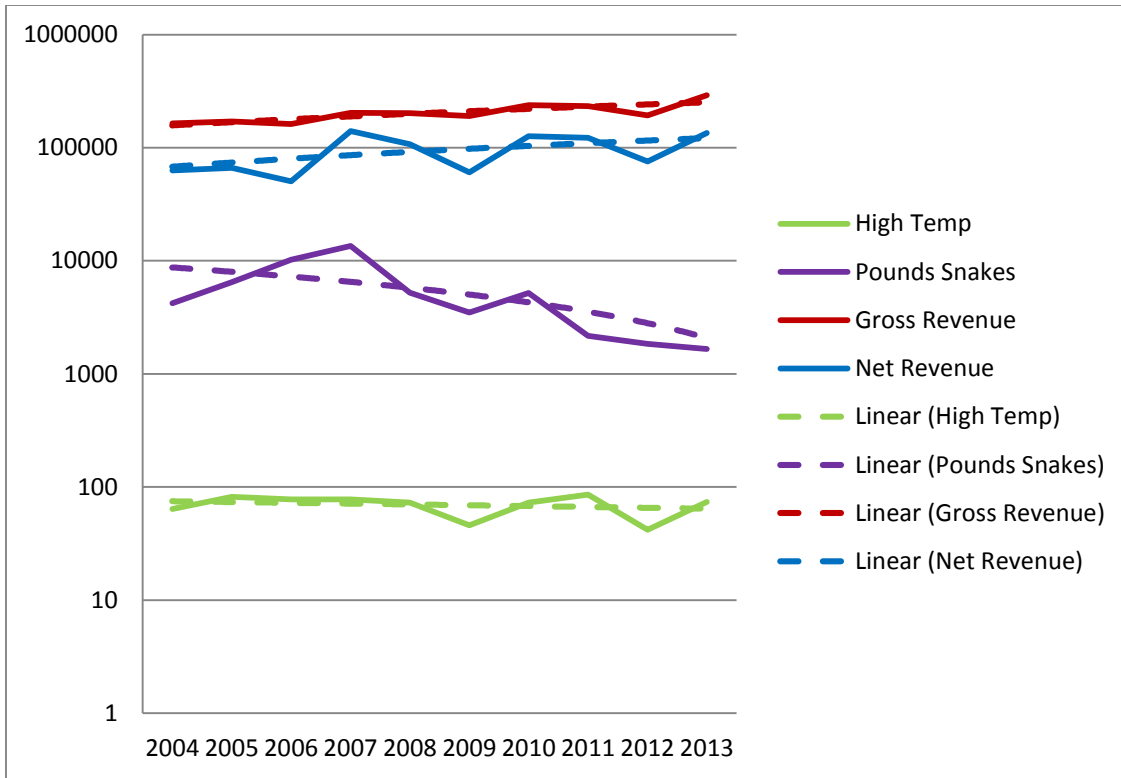


Figure 3. One year offset of revenue figures indicating impacts of snake mass on future years.

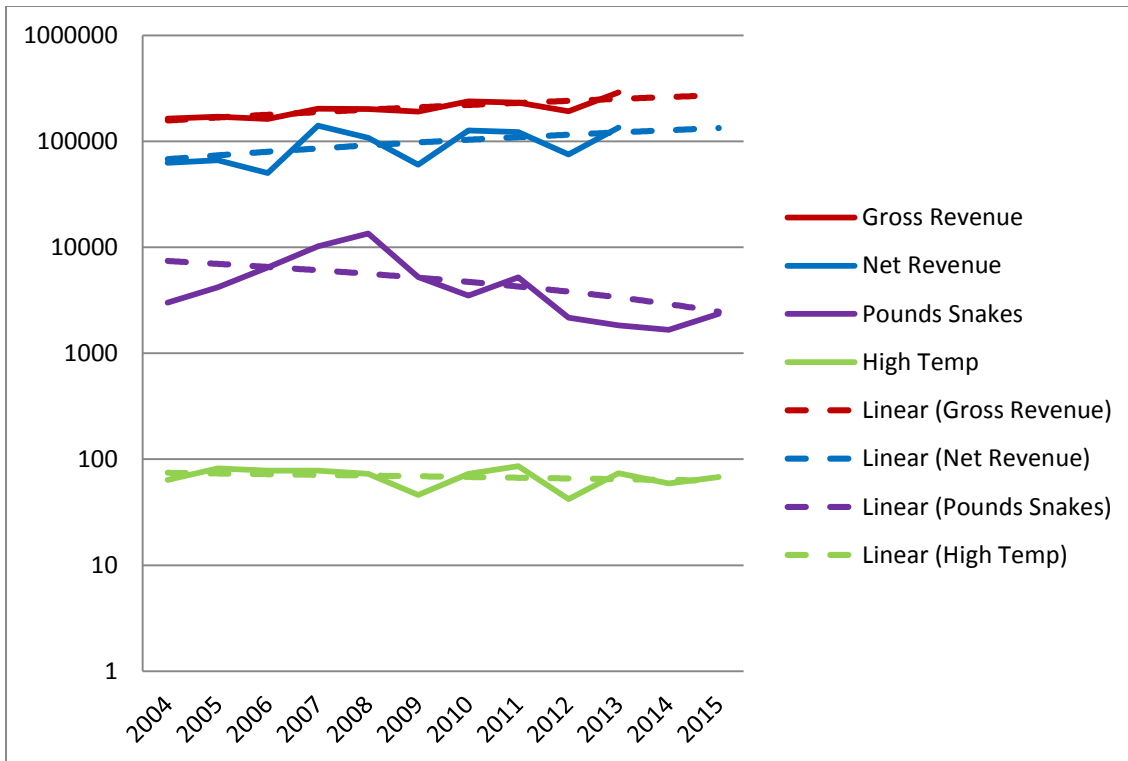


Figure 4. Two year offset of revenue figures indicating impacts of snake mass on future years. Revenue figures for 2014-2015 are projected.

The above data, not presented to the working group, indicates that the Sweetwater Rattlesnake Roundup is not affected in following years by reduced quantities of WDR and the Roundup and similar events can continue to be successful community events despite a gassing ban. It is my belief that the minimum quantity of snakes necessary for a successful event is a social construct, i.e. open to the interpretation of the individual, rather than a set number. As long as event-goers leave the roundup feeling that they saw, in their own opinion, “a lot of snakes” they will be satisfied and the event will be successful.

The Sweetwater representatives presented selected excerpts from an economic study conducted in conjunction with the 2015 event that illuminated the multi-million dollar impact of the event on the local community. This impact is not in dispute and probably is under-estimated although a complete copy of the report has not been made available to the working group at the time of this writing. However, it should be noted that the vast majority of other snake-related events in Texas and throughout the country have diversified their events to appeal to a wider audience.

CONCLUSION: I recommend that the practice of gassing be banned.

I thank you and the Texas Parks and Wildlife Commission for the opportunity to participate in the Snake Harvest Working Group. I further thank Dr. Bill Eikenhorst for his steady leadership and the TPWD staff members who, through their research and communication skills, provided valuable and unbiased information upon which my opinions are based.

Robert Denkhaus

Chair, Wildlife Diversity Advisory Committee

Snake Harvest Working Group

Position on Whether to Allow Continued Practice of Gassing

By Don Roeber

Compelling data and additional discussion in the group has demonstrated to me that petroleum, whether in liquid or gaseous form, has a negative impact on all animals in a karst system (whether invertebrates or vertebrates). This fact is not lost on concerned persons and groups, both inside and outside of Texas. Continued use of this gassing practice could expose Texas to re-classify some karst animals. This act would, in turn, place additional burden on the Department to develop, administer, and enforce the appropriate species management plans. Additional constraints could also be placed on landowners with karst features on their property as to their land-use practices. Even (provided that the process would be enforceable) if the Department were to allow gassing at only a few select den sites, there is significant risk that even at those sites, invertebrates that have evolved specifically in those karst features could be endangered. So, the argument to limit gassing is not a valid one either.

Given the above risk, are there compelling reasons to continue with the gassing practice anyway? I don't think so. The antivenin industry has sources other than the roundups for obtaining needed venom. In fact, a new emerging Mexican vendor in this space is not even using western diamondback venom to produce their antivenin. Other major vendors in this space are keeping their own captive populations of rattlesnakes for producing antivenin. There is simply no compelling argument that rattlesnake roundups provide a significant amount of venom to this industry.

My second argument that there is no compelling reason to continue with the practice of gassing is that rattlesnakes can be harvested in sufficient numbers by timing collection activities when the snakes are above ground around the openings of the dens. This requires a little more extra consideration and work from the collectors, but can definitely be done. There are also opportunities to place funnel trap mechanisms around the openings of den sites to collect the snakes. Funnel traps of various designs have been used by scientists as well as lay persons to collect all manners of species in the past, including snakes. Funnel traps are a proven technique for collecting wildlife. One consideration with this argument is that roundups may need to be moved to dates that are better timed to take advantage of non-gassing methods of take, but with proactive marketing and planning, these events can be moved to other dates.

In contemporary times, the main reason for communities to have rattlesnake roundups is primarily for bringing in funds for the local economy of each hosting city as well as to provide funds to charities. These funds come from ticket sales and really have no bearing on the number of snakes collected or displayed. As long as enough animals can be collected to provide the visual incentive for the public to continue to attend these events, roundup management should not be concerned with the specific number or poundage of snakes collected for their respective event. This conclusion further supports why it makes sense to discontinue gassing and move to alternate methods of take. In the future, I have no doubt that serious supporters of the roundups will still manage to procure sufficient numbers of

snakes for the roundups. Also, just the competitive factor alone will ensure the each collector works as hard as possible to figure out ways to maximize their take of rattlesnakes in hopes of recognition at the applicable roundup event.

In conclusion, unless additional compelling data is provided to the SHWG that supports why gassing should continue to be allowed, my position is that the Department set forth regulations that no longer allow gassing as a practice for flushing wildlife from their concealment and sanctuary.



December 2, 2012

Dr. Bill Eikenhorst, Chairman
Fellow Snake Harvest Working Group Members

Official Comments for Final Report

Dear Chairman Eikenhorst and fellow members,

I want to begin by thanking the Chairman and all the members who gave their time, focus, travel and minds to the Snake Harvest Working Group. Self-determination and a citizen driven government are strong democratic traditions that this working group exemplified. As a representative from the community of Sweetwater, it was a true honor to be a voice to explain, and at times, passionately defend the interests of the community I love, live in and cherish.

Sweetwater, like most small communities, has one major event per year that has enough appeal to attract out of town visitors who infuse our small businesses, shops and restaurants with much needed revenue that in turn funds our schools, local governments and way of life. The Sweetwater Rattlesnake Round Up is this event for our community. While some may have legitimate philosophical or ecological concerns those can be addressed conceptually and over time. Sweetwater on the other hand, will have to directly deal with the consequences of any regulation on the harvesting of rattlesnakes. Drastically changing how our community volunteers have hunted and collected snakes would have a real and negative impact both economically and culturally to my community. When the final report is published and decisions are made, please remember it will be the people of Sweetwater that will permanently and most comprehensively be impacted. I strongly recommend reading the economic impact study commissioned by the Sweetwater Chamber of Commerce, included with this report for a more specific and comprehensive understanding.

Additionally, there are several key points I would like to highlight from the findings of the work group that I believe provide a path forward for continued collaboration and cooperation on this issue. The people of Sweetwater have shown a determination and a strong wiliness to participate and work with the Department of Parks and Wildlife on this issue and I believe we can continue together towards a solution for all parties in good faith. Below I have provided my own recommendations and rationale based upon the findings of the working group.

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Recommendation # 1: A Formal Collaboration between Sweetwater and the Texas Department of Parks and Wildlife would be the best solution for all parties.

When I first started as a member of the work group I was simply opposed to the ban on gassing regulation. The issue was very black and white to me. However, as the Snake Harvest Work Group progressed I really began to listen to the other side and their concerns. It became clear to me that Sweetwater could no longer just say “no”. Our community needed to be part of the solution without harming our way of life. I also recognized that the State of Texas has a vested interest to avoid the listing of species and federal government intervention. Therefore, three key findings of the work group gained my full support and provide a framework for a solution forward.

Point of Consideration #1: *Snake Theme Events are long standing traditions in some communities that provide social and economic benefits.*

Point Consideration #11: *Proactive efforts be made by the state and private landowners to reduce threats to non-target species to avert action by the U.S. Fish and Wildlife Service.*

Point Consideration #14: *The Texas Department of Parks and Wildlife will assist with any potential future research and provide support for alternative methods of capture.*

It cannot be emphasized enough that these key findings represented three of the most substantial and agreed upon findings by the group per the voting chart provided in the report’s executive summary.

Additionally, Parks and Wildlife staff provided and referenced an example of state assistance and support for the eradication of rattlesnakes using alternative methods of capture. This was provided in the final report under reference document #8, entitled “Report Documenting the Efficacy of Snake Trapping.” Such an example highlights why support from the Department would be critical to move forward on alternative methods of capture. A true collaborative effort would require the Department to work closely with the community of Sweetwater to establish new methods, measure their efficacy and document real scientific proof of protection on non-target species.

Recommendation #2: Reject A Ban on Gassing and Pursue a Policy of Collaboration

In contrast, a regulation to ban gassing would pit law enforcement against snake hunters and force the individuals and a community to comply with a law that will reduce the number of snakes collected, leading to potential adverse economic impacts. A higher rattlesnake population would harm more livestock and human life, thus increasing health care and private landowner costs.

While some may argue that the number of snakes collected has little statistical impact on the number of attendees to the Round Up, I would counter that this is neither a fair or complete representation of the whole picture. ***The Round Up’s biggest pull is that it is advertised as the largest round up in the world.*** While annual numbers of attendees do not directly correlate to number of pounds collected, such an analysis misses the forest for the trees. It is the overall perception and verifiable reality that Sweetwater has the biggest round up in the world. If a substantial decrease in the number of snakes collected occurred, it would jeopardize such a perception and erode the appeal to come to Sweetwater.

To avoid such potential negative outcomes and as detailed above, the Department could instead adopt an official position to help and assist Sweetwater to annually achieve a successful event while integrating

new practices of alternative capture, similar to how South Dakota found the most effect method of capture for their specific regions and dens. Further, the Department could more accurately document on the ground and in the field the actual impacts of gassing on non-target species and develop alternative methods of capture in collaboration with snake hunters for each major den hunted. Such collaboration and documentation would be far more convincing evidence of a species protection than a ban on gassing that is difficult to enforce and produce little to no data on whether a non-target species is actually being protected.

One specific idea I would propose would be for the Department to host a public contest for high school science and university students to develop alternative non-toxic gassing agents. As Director of the Sweetwater Chamber, annually I work with the future bright minds of our community through a program called Future Sweetwater. I have great faith that the civic engagement of our young people into solving our state's challenges. Such an example of collaboration would be far more productive and beneficial to our State than a ban on gassing.

Recommendation #3: Formally Adopt Through Rule Additional and Strongly Supported Points of Consideration

Point of Consideration #12: *Flexibility and/or streamlining the non-game permitting process for western diamondback rattlesnakes should be considered*

Point of Consideration #13: *If any regulatory action considered, there should be no restriction on the method of taking around man-made structures or areas of human activity.*

These additional findings by the work group underscore the need for ongoing communication and cooperation between the Department, communities and snake hunters. Point 13 makes it clear that human life and human activity deserve ultimate protection, while Point 12 provides that a simpler process for people to hunt and collect snakes should be developed and adopted. These points taken together would represent a second area of cooperation between the Department, communities, and snake hunters.

Concluding Remarks

Overall, I am very humbled and thankful for the opportunity to have served as member of the working group. I hope this is only the beginning and first phase of a collaborative process. One that will benefit all parties and address all concerns. As a member of the working group from Sweetwater, I commit to continuing the dialogue towards positive and innovative solutions that achieve real results while avoiding harm my community and way of life. The findings of this report are a great opportunity for the Department to demonstrate its expertise and abilities to the general public and a rare moment to highlight the positive impacts of government in our daily lives. Thank you again Mr. Chairman for your leadership and I look forward to the implementation of the consensus items of the working group's report.

With Gratitude,



Leah Andrews

ADDENDUM BY BILL WRIGHT

The SHWG tried and failed to find a solution to a problem that does not exist.

From the beginning of the process it was apparent that the staff of the Parks and Wildlife Department was working to steer the group to conclude that gassing of snake dens needed to be prohibited. Reports favorable to ending gassing were presented by the staff at face value and recommended to be accepted without critical review. On the other hand information showing the benefits of gassing was subject to a much stricter standard of review. Therefore the information in support of gassing is much more credible than the information promoting ending gassing.

Despite the mass of information accumulated by the working group the fact remains that there is no scientific evidence, in any credible form, indicating gassing harms animals inhabiting karst features along with the Western Diamondback Rattle Snake in Texas.

The snakes do not inhabit the moist area and karst features where the other species live. Gassing is done by injecting a very small amount of gas during a three (3) month period of time during the year in very minute geographical areas where the snake dens are located. Gassing has no impact on the remaining massive area of karst features located throughout Texas. The working group was presented with five categories for measure of success, to-wit:

1. Preserve/Enhance economic vitality of snake events
2. Preserve heritage of snake events
3. Protect human health
4. Protect antivenin (or antivenom) supply
5. Avert future federal listings

Gassing is necessary in order to enhance and promote the first four categories above listed. A prohibition of gassing might address the 5th category but there is no assurance of such.

As with most issues a government regulation only compounds the problem and rarely solves it. A Texas prohibition on gassing Western Diamondback Rattle Snake dens would simply result in more of the "Californation" of Texas.

TERRY HIBBITTS

The Texas Parks and Wildlife Department (TPWD) Snake Harvest Working Group

Final Comments by Terry Hibbitts

The Texas Parks and Wildlife Department (TPWD) Snake Harvest Working Group reviewed the existing practice of using noxious substances, typically gasoline fumes, to collect snakes. The Working Group identified issues, obstacles and potential solutions to assist the agency in its ongoing commitment to conservation and sustainable wildlife harvest practices, while also striving to maintain the cultural traditions and economic viability of snake festivals and roundups as well as customary farming/ranching practices.

The Snake Harvest Working Group consisted of four individuals from Sweetwater, two amateur herpetologists, three represented the TPWD, a representative from Susan King's office, a representative of the Wildlife Society of Texas, a representative of the Wildlife Association, two private landowners, one from Private Lands Advisory Committee, and one from Wildlife Diversity Advisory Committee. **I thought the selection process was unbalanced. Four from Sweetwater and one of those has a vested interest through his work with the venom extraction industry. I think it would have been better if we had an equal number of individuals with no vested interest on any of the issues. Bring in various vested interest groups (the Sweetwater Jaycees, the venom industry, the wildlife societies, professional herpetologists, agriculture professionals, etc.) to make presentations on their reasoning for or against the issues.**

The group's charges were:

1. Evaluate snake harvest data, cultural impact and economic trends of snake festivals and Roundups. **Depended on the Sweetwater group for most of this information. The rest of the information was researched by the TPWD staff.**
2. Identify measures of success for snake festivals and roundups. **Again depended on the Sweetwater group and the rest was researched by TPWD staff.**
3. Review scientific data related to take of snakes with noxious substances (e.g. gasoline fumes) and ecological/habitat impacts from such practices. **All from research by TPWD staff. No professional herpetologists were called in. Even though all of the research collected was excellent, I think it would have been more effective if we had speakers that had actually done the research. The Sweetwater bunch did not like the science involved since the research did not occur in their area.**
4. Identify any systematic obstacles to alternative, ecologically sound capture methods. **TPWD was able to find and document several alternative methods of take. Trapping and drift fences have proven to be successful. The obstacle to these methods is a willingness to try them out by the rattlesnake roundup group. It may be too much work for them.**
5. Review historic recommendations (previous TPWD/other position statements) regarding related regulations. **Presented by TPWD staff. Some individuals did not see any correlation to the historic recommendations.**
6. Discuss potential implications to U.S. Fish and Wildlife Service endangered species listing process. **TPWD said that if Texas doesn't do something the feds will. It has happened before.**
7. Provide practical solutions and preferred recommendations in a written report to the Executive Director. **The gassing issue was not unanimous and it was not possible to provide a final report with recommendations that**

everyone would agree on. As soon as I saw the makeup of the working group, I knew this was not going to be possible. Based on the Point of Consideration statements, hopefully the commission will address the statewide prohibition on gassing Western Diamondback Rattlesnake dens.

Conclusion

The science and common sense tells us that toxic fumes of any kind should not be used to capture snakes. The reasons have been discussed over and over by competent researchers. We could have answered the Points of Consideration statements after the first meeting and been done with it. I don't think anyone's opinion was changed by the information presented over the four meetings. I found one thing from this experience. I don't have the right kind of personality for it.

DENNIS CUMBIE

Dennis Cumbie

Snake Harvest Working Group

My name is Dennis Cumbie, I am a native Texan and live in Nolan County Texas. I am a lifetime member of the Sweetwater Jaycees and an avid snake hunter for the past 37 years. I have a Bachelor of Science Degree in Animal Science from Angelo State University. I currently serve as the milking pit chairman for the Sweetwater Jaycees World's Largest Rattlesnake Roundup, and have milked snakes for over 25 years. I also have milked snakes at several other roundups for several years, including Big Spring's, Brownwood, Waurika Oklahoma, and Mangum Oklahoma. I milked snakes at those roundups for Ken Darnell (Bio-Active Labs) and now myself as a venom wholesale dealer. My Primary profession is in the agricultural field in which I directly deal with hundreds of farmers and ranchers in this West Texas area.

I would like to express my appreciation for being selected to participate in this work group. Although some of my knowledge of this issue was expressed in the workgroup meetings, I would like to summarize some points that I feel are very important information for the Commission to consider.

Petition:

I would like to say this all began with the petition to ban gassing of the Western Diamondback Rattlesnake (WDR), but that is not really the case. The TPWD acknowledges that the WDR population has not become threatened or endangered by the harvesting of them for Roundups. Therefore gassing has not caused a problem in their numbers. So a few individuals with the TPWD decided to use the KARST as a tool of excuse to ban gassing of WDR, to reach their ultimate goal (To eliminate Rattlesnake Roundups) as one of them was quoted as saying "he did not like roundups as it exploited the snakes". This is evidenced by the listing of actions they show in this report dating back to 2009.

KARST:

Throughout the meetings of the work group it was mentioned that we do not want the US Fish and Wildlife Service to get involved with the gassing of WDR because of the potential danger to the Karst.

Western Diamondback Rattlesnakes primarily live and are hunted in dry arid areas of the state, to survive they must den in the winters in DRY areas of cracks and crevasses.

Karst live primarily in moist high humidity areas (majority in caves/where snakes are not gassed). This is stated by numerous scientific articles including TPWP and US Fish & Wildlife Service.

Therefore virtually no gassing is affecting the Karst.

Size and Scope:

How much potential impact is there? Texas has approximately 171.8 million acres of land. On an average less than 12000 pounds of WDR are collected in Texas each year. A conservative estimate would be 4 pounds of snakes harvested per den, which would mean approximately 3000 dens are hunted each year.

If the average area that a den covered was approximately 500 square feet (that would be a big den) assuming all dens were gassed (which they are not). The snake hunter surveys taken this year at Sweetwater showed that less than 8 ounces of gas was/is used per den.

Therefore $3000 \text{ dens} \times 500 \text{ sq. ft.} \div 43566 \text{ (sq. ft. in an acre of land)} = 34 \text{ acres of land}$ divided by 171.8 million land acres in Texas = .00002% of land is potentially exposed to gassing of WDR.

Fact- Using gas to collect WDR in Texas has been going on for over 50 years without one shred of scientific data showing that any living thing has been negatively affected.

I dare to say if any other animal not endangered or threatened was affected on such a small amount of acreage in Texas the TPWD would not be spending this amount of time and resources on this tiny issue.

Snake hunters are generally good stewards of the land and Snake dens. Dens are difficult to find therefore hunters regulate the gas volume used to not hurt the den for future hunts. I myself have gassed the same dens over a 20 year time frame without any damage to the den, and still harvest snakes from the same den.

Report:

Most of the Work Group Report is made up of data solely the opinion and skewed data of a few TPWD employees. Due to the vast amount of skewed data I will not break down all the information irregularities or incorrect data collected. (He said, they said, data collected by government employees from companies or individuals not wanting to reveal information that could cause them detrimental risk. Example: BTG the company that produces the antivenin first told Mr. Davis they had never purchased venom that was collect from roundups or outside sources. When in fact for years they have been purchasing large amounts of venom from Ken Darnell ever since CroFab went on the market which he purchased from Roundups including Sweetwater. I have been in part of the Sweetwater Jaycees for over thirty years and every drop of venom collected at those roundups has been sold and used by some medical research and/or for the development of antivenin. We average approximately 1000 milliliters per year of venom sold.

Snake traps offered as alternative method of catch, not proven to work in West Texas, and are not practical in the areas where most snakes are caught.

Effects:

There will be many negative effects if the TPWD Commission agrees to ban gassing as a collection method of WDR. I believe all Roundups will be negatively affected, and I know that the Sweetwater

World's Largest Rattlesnake Roundup will be negatively affected and put in jeopardy of survival. Not only is our roundup a tradition, but it has great value to the economic impact of our community. It also will affect the Jaycees being able to fund thousands of dollars to needy organizations and individuals. By affecting the survival of roundups it will affect the safety of the people in west Texas. I also have direct knowledge without roundups the shortage of readily available venom collected at roundups would be certain which could affect supplies of antivenin. As the cost of antivenin rises it may become less available in many rural hospitals. (In 2010 Peyton Hood a 23 month old child was bitten near Possum Kingdom Lake and died. The rural hospital did not have antivenin on hand because of the cost.) Our goal is to save lives of livestock and humans through control of snake population, snake safety education, and supplying venom for the medical needs.

Meetings:

Meetings:

The Work Group Charter dated 9/01/2015 by Mr. Carter Smith, TPWD Director, "Stated That" The agency will make available appropriate subject matter experts as well as administrative support. This was clearly not the case, the entire meetings were dictated and taken over by the TPWD staff. The majority of the time at the meetings was presentations of bogus information presented by John Davis. When a work group member challenged or opposed him it was quickly dismissed and not covered fully in the work group minutes. Everything Mr. Davis presented was simply written as fact, everything opposing members presented was opinion.

The meetings were designed as to herd us like sheep, into agreeing with what was wanted in the first place. "To Ban Gassing"

No compromising solutions were ever presented by TPWD, and all those offered by members were dismissed.

No PRACTICAL solutions or preferred recommendations were ever agreed on by this work group.

In the FOUR Meetings we have had Not One Item has been VOTED on.

I believe the ultimate vote should have been weather to ban gassing of WDR or not! I believe no vote was taken intentionally for fear that at least 6 members would vote not to ban gassing.

I offered a reasonable practical solution of compromise to this issue, which would have answered the petition, controlled negative effects, yet allowed hunting WDR to continue to be successful.

Simply "Limit the amount of gas that can be used in hunting WDR." Example: 4 ounces for every 500 sq. feet of den area not to exceed 16 ounces per acre of land.

Waste:

As a taxpayer and citizen of this great state, I am appalled by the vast amount of time, resources and money that the TPWD has spent on this issue.

Conclusion:

I would ask the TPWD Commissioners to consider the facts of what we know will be impacted by this proposed rule vs. the potential kind of, maybe, non-scientific studied impact of something that no data in Texas has been taken or studied. (If something that has been going on for over 50 years and no proof, no study, or no evidence shows that a negative impact exist or has occurred. Why would one assume it would start now?)