



>>> PUBLICATION OF THE TEXAS BIGHORN SOCIETY

Restoring Bighorn Sheep to their Native Ranges in Texas, and Ensuring the Viability of their Habitat



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Bighorn

The official magazine of the Texas Bighorn Society
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TECHNICAL SPECIFICATIONS

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All other formats must be approved by our production staff

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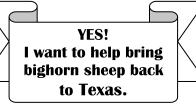
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Fall 2022

BIGHORN



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Howly, New Members!

On behalf of the current members, the TBS Officers & Directors, and all the Texas Bighorn Sheep your patronage will go to support, we'd like to welcome you to our organization! We appreciate your support and look forward to seeing you at the next TBS event!

individual

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Help us stay current with your address and email information!

Contact Kathy Boone if you have moved, changed email addresses, or have questions about your membership. She can be reached at:

info@texasbighornsociety.org or 806.745.7783

A LETTER FROM THE **PRESIDENT**

"

Congratulations Texas Bighorn Society Members!

A huge "Thank You" goes out to everyone for such a great Round Up. You set a record for highest attendance as well as most money raised. It was a special weekend for the Desert Bighorn Sheep in Texas.

Next year, we will be back at Tapatio Springs (Boerne, TX) for the 2023 Round Up. Our work project will be held in Van Horn, Texas, again next year. We will complete our water restoration efforts in the Eagle Mountains. The dates are March 10-11 2023. Visit our website for more information and registration.

TBS will again have a booth at Dallas Safari Club (January 5-8, 2023) and at the Wild Sheep Foundation's Sheep Show in Reno, NV (January 12-14, 2023). Register now to attend both!

Sam Cunningham, President Texas Bighorn Society

San Cium







EDITOR'S letter



Bonnie McKinney Editor, The Bighorn

Finally, the long hot summer is about over and the daytime temperatures are a bit cooler. West Texas has suffered through drought conditions for almost two years, and rainfall was sparse in many areas. This summer was one for the books, brutal daytime temperatures, little rainfall and the drought continued. Late July and August some areas received much needed rains but, a lot of the lower desert country was still sweltering in the heat. September and October brought much needed rains and it was a pure joy to see dirt tanks fill up and green grasses. TBS guzzlers played a huge part in keeping not only desert bighorns but all wildlife and birds going during this prolonged drought period. Hopefully, the drought cycle has broken and we will have a wet winter with a great spring.

Round Up in June at Grapevine was a full house. Great to see many old friends and make new ones. Support for our desert bighorns continues from many different groups and it is great to see young people taking an interest in what the

Texas Bighorn Society represents. Dirk took many photos and I have included several pages in this issue.

TBS will return to the Eagle Mountains, Van Horn, Texas for the work project for 2023, March 10-11th, so mark your calendar and join in to build more waters for desert bighorns. More details will follow on the TBS web page.

We have some great articles on hunts and research in this issue and updates on desert bighorns. I am always looking for articles, so please send me your hunt stories and photos.

Fall is in the air with the holiday season fast approaching, a membership to TBS makes a wonderful gift.

Bonnie McKinner

Bonnie McKinney, Editor Wildlife Coordinator, Cemex-Texas El Carmen Land & Conservation Co.



This & That

JUNE 2022 BOARD MEETINGS SUMMARY

by Curt Brockmann, Secretary

The TBS Board meeting was held in on June 10th in Grapevine, Texas at the Embassy Suites. The Board meeting was called to order, and the Board approved the minutes from the March Board and General Membership meetings.

We have 844 members as of June 2022, which is an increase of 9 members since March. The financial report was presented and approved by the Board. The Board voted on and passed a funding request in part for the Black Gap memorial for Dewey, Brandon and Dr. Dittmar. A report was provided on the Wild Sheep Foundation's Chapter and Affiliate Summit, which was held in San Antonio. Several members attended the May event, which was hosted by TBS. During the event, nearly \$50,000 was raised for TBS.

A report was provided to the Board on the Aoudad Symposium, which was hosted by Texas Tech University in April and supported by TBS. Approximately 70 people attended the event. Several presentations were given on Aoudad research and management practices. TPWD provided the Board updates on the Big Bend National Park and Big Bend Ranch State Park sheep surveys as well as the Bighorn, Aoudad and Mule Deer research project.

We had a great turnout at the 2022 Roundup. It was good seeing you all. Thank you for all your support. Please plan to attend the 2023 Roundup, which will be held in Boerne at the Tapatio Springs Resort. I hope you got all the rain you needed, and I hope you have a great fall!

REMINDER TO ALL TBS MEMBERS:

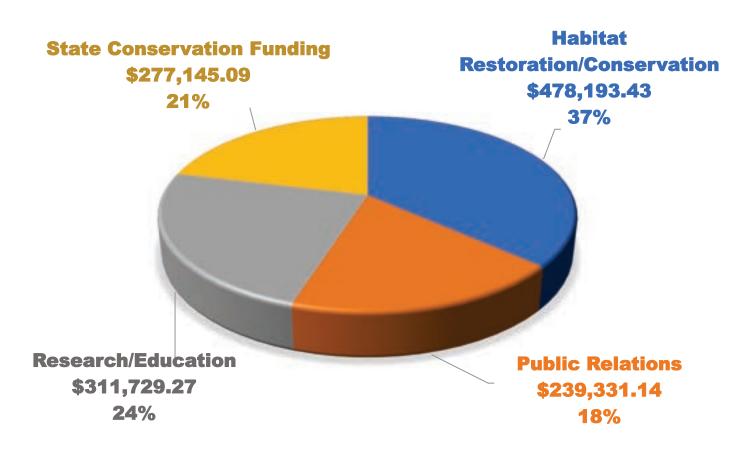
TBS uses "mail chimp" service to email our members upcoming news and events. If you are one of our long-time members please make sure we have your most recent and up-to-date email address.

Please send to: info@texasbighornsociety.org or call 806-745-7783

Projects Funded 2017-2022 YTD \$1,306,398.93

Mission Statement:

"Restoring Bighorn Sheep to their Native Ranges in Texas, and Ensuring the Viability of their Habitat"



TBS thought that as our membership you would like to see where your hard-earned dollars have been going over the past five (5) years. TBS still has no full-time paid employees. Most of our funds go to bighorn sheep conservation and habitat restoration, where we work closely with private landowners and Texas Parks and Wildlife Department. In these past five (5) years, TBS has also funded specific research on diseases and habitat encroachment with competitive species partnering with Texas Tech University, Borderlands Research Institute and Sul Ross. The pandemic was a challenge, but TBS emerged very strong financially. Thank you for your support.



Memorial Dedication at Black Gap Wildlife Management Area

by Calvin Richardson, Regional Director TPWD

On the morning of June 8, 2022 a memorial dedication was held at Black Gap Wildlife Management Area for Dewey Stockbridge, Brandon White, and Dr. Bob Dittmar who died in a helicopter crash on August 8, 2020 while conducting a survey of desert bighorn sheep at Black Gap. Thoughtful remarks were provided by TPWD Wildlife Division Director John Silovsky, Executive Director Carter Smith, and Commission Chairman Arch "Beaver" Aplin. Numerous family members, friends, and TPWD staff were in attendance, as well as former Commission Chairman S. Reed Morian. Among the attendees were numerous TBS members including several Board members.

The monument stands 10-feet tall and is constructed of 13 limestone quarry blocks dry-stacked in a semi-pyramidal formation. The monument face displays three bronze plaques which include each man's portrait and written tribute. A three-dimensional bronze sculpture of a bighorn ram skull (life-size replica of a ram from Elephant Mt. WMA) is mounted at the apex of the wall. Landscaping includes medium-gray gravel lined with stones from the local area. Four quarry blocks are placed on the gravel landscaping in a semi-circle for visitor seating/reflection. The monument wall is framed by two beaked yuccas on each side. Financial support for the monument and the dedication was provided by the Texas Parks and Wildlife Foundation, The Horizon Foundation, the Texas Bighorn Society, Chairman Arch "Beaver" Aplin, former Chairman S. Reed Morian, and Texas Parks and Wildlife Department.

WELCOME SARA WYCKOFF

NEW TPWD VETERINARIAN

My name is Sara Wyckoff and I am one of the two wildlife veterinarians for the Texas Parks and Wildlife Department. I was born and raised in Arizona where I earned my bachelor's degree in Biological Sciences from Arizona State University and my veterinary medicine degree from Midwestern University. After veterinary school I did a one-year internship in exotic animal medicine in South Florida, followed by a second internship specializing in wildlife medicine and surgery in Massachusetts at the Tufts Wildlife Clinic. I then returned to Arizona and practiced at a wildlife only hospital for native Arizona wildlife before moving to Austin for the wildlife veterinarian position at TPWD. Outside of veterinary school I have volunteered and worked at various wildlife hospitals, assisted Dr. Anne Justice-Allen of Arizona Game and Fish with elk and pronghorn captures and relocations, along with participating in a multi-year CWD study of farmed elk in Colorado. I am very excited to be working with Dr. Reed to promote wildlife population health and disease surveillance through the Wildlife Health program at TPWD.



TTU Genomics and Disease Research Update

by Emily Wright Texas Tech University



What is a desert bighorn sheep and what do they genetically look like in Texas? It may be easier to say what they are not. They are not Rocky Mountain bighorn sheep (Ovis canadensis canadensis) or Sierra Nevada bighorn sheep (O. c. sierrae). These two subspecies are sister taxa to the desert bighorn complex (O. c. cremnobates, O. c. mexicana, and O. c. nelsoni) that form two monophyletic clades on a phylogenetic tree when using mitochondrial DNA. Desert bighorn, on the other hand, have several unique mitochondrial lineages that are paraphyletic to each other (meaning they do not form a coherent group). These numerous lineages could be a result of Pleistocene glaciation events and the evolutionary consequence of isolation by distance, which is commonly observed in desert ecosystems that are characteristic of 'sky islands' instead of continuous mountain chain systems. Another confounding factor to consider is the translocation history of desert bighorn sheep throughout southwestern North America. Historic and contemporary populations of Texas desert bighorn sheep genetically resemble all three desert subspecies in the mitochondrial genome.

Although the addition of microsatellites (an assay of nuclear markers) was incorporated into this study, it is too early to arrive at a conclusive answer. It may be that the bone samples were too degraded to obtain sufficient and reliable genotypes to resolve the taxonomic status of pre-extirpated Texas bighorn sheep. This technique seems promising; however, more analyses are needed to determine if this data is usable.

The genomic portion of this research is still ongoing with final analyses currently running day and night on the supercomputer at TTU. The final dataset of contemporary populations of bighorn sheep includes 372 individuals representing populations from eight mountains in Texas (Basse, Baylor, Beaches, Black Gap, Dove, Elephant, Sierra Diablo, and Van Horn) and areas in Arizona, California, Colorado,

Idaho, Nevada, and New Mexico. The early preliminary data indicated connectivity among the desert populations and differentiation between desert and Rocky Mountain populations as would be expected from translocation history. I hope to be able to tease out these relationships to a finer scale. There are >100,000 loci to investigate, with some violating biological principles (i.e., Hardy-Weinberg Equilibrium). We currently are examining all of these informative sites using a variety of bioinformatic methods. Not only are we examining all individuals as a whole, but also each population in Texas to define genomic substructure among the different mountain ranges.

Further, another project currently is in the works to detect *Mycoplasma ovipneumoniae* in nasal swabs of hunter-harvested bighorn sheep and aoudad. Although the Washington Animal Disease and Diagnostic Laboratory was the first to apply a sequence typing approach to identify the presence of *M. ovipneumoniae*, Rachael Wiedmeier and I were able to develop a similar technique in the Bradley and Phillips lab at the TTU Department of Biological Sciences. I currently am applying this technique to key bighorn sheep and aoudad samples from areas known to have experienced die-offs in recent years.

With the mitochondrial and genomic datasets in final stages of analyses and interpretations, I plan to defend this research and graduate in Spring 2023. My tentative future plans are to accept an Oak Ridge Institute for Science and Education (ORISE) Fellowship with the Viral Special Pathogens Branch at the CDC in Atlanta, Georgia. None of this research would be possible without the Texas Bighorn Society so thank you to all the members for supporting this study and affording me a graduate education.

Guns Up!, Emily Wright



My quest for a Grand Slam of North American sheep began forty years ago. My wife and I were remodeling our home and we had two tiny toddlers running afoot. I needed some air! I perused hunting publications and dreamed of escaping on a big adventure. On a whim, I bid on a combination hunt offered by the Safari Club International which included moose, caribou, grizzly bear and a Dall Sheep. I didn't hear anything for several weeks, so I called the Safari Club office to inquire about the auction. "Mr. Means, you were successful," she replied. What marvelous words! During that hunt in the Yukon some distance north of Whitehorse, guided by John Ostashek, I bagged my Dall Sheep.

In the succeeding eight years, I successively killed a Stone Sheep in British Columbia and a Rocky Mountain Bighorn in Wyoming. It would be decades before I completed my slam on the Bean ranch in the Sierra Diablos near my home in west Texas. The Bean Ranch is one of the most scenic ranches in the Trans-Pecos. Located in, above and around the

GRAND SLAM COMPLETED

by Jon Means

Sierra Diablos Victorio Canyon the vistas are incredible. The headquarters home is a stellar example of a ranch house with history and charm. Filled with beautiful family antiques and impressive hunting trophies it was a delightful launch pad for my great adventure.

I knew for a year that I was going to hunt my desert ram in 2022, I decided, of coure, that I needed a new rifle and scope. Jim Breck Bean, owner of High West Outfitters and my guide, as well as owner of the Bean Ranch, helped me select the perfect weapon—a 6.5 PRC custom made for me by Mesa Precision Arms.

Early on the morning of our hunt, we made our way to the Diablo rim and proceeded to walk down its slope. I am thankful it was down the rim and not up as the Diablos are rough territory top to bottom. We walked about 10 miles during which we saw more than 55 sheep. I recall several groups—6 ewes and 2 rams, 32 sheep with 6 or 8 young rams and finally a group of 4 with 1 ram judged to be 9 to 10 years old by Jim Breck and his compadre Jasper Klein. The hunt was on!

The sheep were not spooked and we were able to make up some ground on them. I had cut a dagger stalk to help walk in the rough country, and Jasper carried my rifle. Many thanks to him for this assistance! We were able to get within 300 yards of the sheep. The small band was getting ready to head out of the canyon and over a hill. I was nervous, to say the least, and I had a bit of trouble getting the ram in my scope as the ewes kept blocking my view of him. Finally, my ram moved into position for a shot. I fired and the 6.5 did its job. I knew the ram was hit hard. We hurried to the area where the ram had been and found a good blood trail. Jim Breck's prized Jack Russell terrier, King was on the trail. I walked down the mountain looking, while Jim Breck and Jasper hiked up. I heard excitement from above, and I knew I had my ram!

That wasn't the end of the story. The ram in his last breath fell off the rim—a drop off a 400 foot bluff. Miraculously he didn't break a horn. As we made our way down to him, we were fortunate to find a reasonable descent. What a magnificent animal! I teared up a bit overcome by the moment. It was such an incredible blessing to hunt this beautiful animal in God's creation. This was a moment I will cherish forever.

As we made our way off the mountain, Jasper was carrying the hide and meat and Jim Breck was carrying the head, I heard a Polaris Ranger down below. Breck Bean, Jim Breck's Dad was approaching a pickup point. What a great sight! It had been a remarkable, but exhausting day! We drove back to the Bean Ranch headquarters talking excitedly about the wonderful hunt. Marianna, the Bean's delightful cook served us a delicious Mexican supper.

At the age of 70, I had finally completed my Grand Slam in what was a perfect and memorable hunt. Many thanks to Jim Breck, Jasper and Breck and the Bean Ranch for ensuring I had the hunt of a lifetime.

"High West Outfitters/Bean Ranch would like to say a special congratulations to

Jon Means

on a lifetime achievement.
We were honored to be a part of the Grand Finale!"



"RETURN TO THE EAGLES" VAN HORN, TEXAS

TBS WORK PROJECT 2023
MARCH 10th-11th

DETAILS TO FOLLOW
CHECK TBS WEB PAGE



MONSOON HUNTS

by Jim Breck Bean, High West Outfitters

People often ask, "why do you wait until so late in the season to hunt?" My response is typically simple; late July brings the west Texas monsoon season and the desert sheep rut. Most years, contrary to what people believe, late July through October can be some of the prettiest months of the year in the high elevations of the Trans-Pecos. When our monsoon season kicks in, on a typical day you can expect temperatures in the mid seventies for highs and in the mid fifties for lows. A typical afternoon will bring scattered thunderstorms, and sometimes flash floods. We all know, when it rains it pours. The summer of 2022 was shaping up to be one for the books, certain areas were receiving much needed rainfall and hopefully water tables were rising. Texas Bighorn Society guzzlers were certainly brim full throughout most areas.

July 2022, was no exception with the High West crew, we had our sheep tags lined up and the last week would be busy as always. On July 25, we had two customers scheduled to arrive at the Sierra Diablo Mountain range. After a day or two of scouting, myself and Jasper Klein had multiple bands of sheep spotted throughout the mountain range. Herd rams changed

daily, and young rams were seen moving across the entire mountain range searching for solo ewes. We watched a fifteen-year-old ram move eight miles in two days. The last time he was spotted he was dropping into the dark corners and crevices of Victorio Canyon.

The first morning found us splitting into the northern and southern parts of the Diablo rim. As luck would have it, scouting would pay off. By lunchtime on the first morning one of our target rams was down. Quick communications were made with Jasper, and he was not seeing a shortage of sheep in his area. The first day of the hunt was concluded with only one ram down, but by mid-afternoon on the second day our second ram was down. Populations in the Sierra Diablos are looking promising, and lamb recruitment from this year's lambing season is looking successful so far.

By the last day of July all three scheduled customers were successful. We would like to say a special thanks to all of our landowners, guides and customers for putting their trust in us. My favorite quote, "Desert Sheep in July," this is a time of the year that is very special to me and my crew.





DESERT BIGHORN PROGRAM UPDATE

by Froylán Hernández, Program Leader TPWD Desert Bighorn

TPWD has been actively monitoring and surveilling aoudad populations for potential disease threats to desert bighorn throughout the West Texas mountains for several years now. The most recent disease sampling efforts occurred in late August 2022 with a goal to dispatch 20-30 aoudad from 4 mountain ranges with quality bighorn habitat. These ranges included the Quitman Mtns., Eagle/Carrizo Mtns., Chinati Mtns., and Bofecillo Mtns. of Big Bend Ranch SP (BBRSP). While the ultimate goal was to test 120 samples from an equal proportion of rams and ewes, we were only able to collect a total of 98 aoudad samples (28 rams, 70 ewes) due to logistical limitations (Table 1).

Table 1. August 2022 aoudad tissue sampling summary.

Mtn Range	Rams	Ewes	Total
Quitman	5	20	25
Eagle/Carrizo	5	15	20
Chinati	8	22	30
BBRSP	10	13	23
TOTAL	28	70	98

These sampling efforts were in collaboration with Texas Tech University (TTU). TTU is also interested in Aoudad pathogen surveillance, and their research will help us gain a greater understanding of *Mycoplasma ovipneumoniae* (M. ovi) transmission dynamics within aoudad herds.

During this sampling effort, nasal swabs, tonsil swabs, and blood were collected. TTU had tonsil and nasal swabs collected for their project. TPWD had nasal swabs and blood for M. ovi surveillance which were submitted to Washington Animal Disease Diagnostic Laboratory (WADDL). The findings for the TTU samples are not discussed in this update. The nasal swabs collected for TPWD were Polymerase Chain Reaction (PCR) tested to identify the presence of M. ovi genetic material, which can be used to help identify active infections. The blood collected for TPWD was Enzyme-Linked Immunosorbent Assay (ELISA) tested for antibodies against M. ovi, which would indicate the animal was previously exposed to M. ovi; however, it is difficult to determine when that exposure occurred.

The following is a synopsis assembled by TPWD Veterinarians Drs. J Hunter Reed and Sara Wyckoff. The synopsis provides results for individual mountain ranges, as well help interpreting the results.

Aoudad Sampling Synopsis - August 2022

M. ovi PCR Test Results:

Mtn Range	Positive	Not Detected	Indeterminate	Total*
Quitman	0	22	3	25
Eagle/Carrizo	2	16	2	20
Chinati	4	22	2	28
BBRSP	0	23	0	23
Total	6	83	7	96

^{*}Table indicates number of tested animals

M. ovi PCR Test Interpretation: lower CT (cycle threshold) values generally mean there is more M. ovi genetic material; this is often used as an indicator of active infection.

- Not Detected PCR Results: CT value > 40.
- Indeterminate PCR Results: CT value between 35-40.
- Positive PCR Results: CT value < 35.

M. ovi ELISA Test Results:

Mtn Range	Detected	Not Detected	Indeterminate	Total*
Quitman	16	7	2	25
Eagle/Carrizo	6	12	2	20
Chinati	11	14	4	29
BBRSP	3	19	1	23
Total	36	52	9	97

^{*}Table indicates number of tested animals

M. ovi ELISA Test Interpretation: greater % inhibition indicates higher serum antibody levels against M. ovi; this is often used as an indicator of *historical infection*.

- Not detected ELISA Results: < 40% antibody inhibition.
- Indeterminate ELISA Results: 40-50% antibody inhibition.
- Detected ELISA Results: >50% antibody inhibition.

M. ovi Summary Statistics:

Mtn Range	% PCR Positive using Definitive	% ELISA Positive using Definitive	
	Results	Results	
Quitman	0 (0/22)	70 (16/23)	
Eagle/Carrizo	11 (2/18)	33 (6/18)	
Chinati	15 (4/26)	44 (11/25)	
BBRSP	0 (0/23)	14 (3/22)	
Regional Average	<u>7 (6/89)</u>	<u>41 (36/88)</u>	

Interpretation:

- Most endemic infections within a population are like an iceberg, where you will have:
 - A few, clinically visible cases (sickly-looking animals);
 - A moderate amount of infected, non-clinical animals (infected, but not sickly-looking); and
 - A large amount of previously exposed, but currently uninfected animals.
- This model falls in line with our findings where:
 - No sampled aoudad exhibited signs of respiratory disease (not unusual for aoudad which have had historical exposure to the pathogen);
 - Few active infections (via PCR) were detected in the sampled mountain ranges;
 but
 - Several previous exposures were detected (via ELISA).
- According to Washington Animal Disease Diagnostic Laboratory (WADDL), "populations not exposed to *M. ovipneumoniae* will have <1% of animals with 'detected' antibody [i.e., detected ELISA results], whereas exposed populations will have 30-100% of animals with 'detected' antibody."
 - Using the WADDL interpretation, 4 of 4 sites are considered M. ovi "exposed."
 - It should be noted that the ELISA test has only been validated for bighorn and domestic sheep, not aoudad; however, considering the PCR results, the ELISA results make sense.
- It is important to interpret both sets of data together, for example:
 - Although the Quitman's had no PCR detections, they are still considered an M.
 ovi exposed population. This indicates there is still a risk of M. ovi transmission
 to bighorns, albeit there do appear to be less animals actively shedding the
 organism.
- These results, like all test results, are a snapshot in time. Changes in disease exposure and risk occur, necessitating the importance of consistent disease surveillance through time.
- Lastly, it is important to remember:
 - No translocation, project, or research can be performed 100% risk free.
 - Future translocations are *required* from Elephant Mountain WMA to keep that community healthy (animals and habitat).

Next Steps:

- Determine a study range considering these diagnostic results.
 - A discussion with biologists, stakeholders, DBS experts, and wildlife veterinarians.
 - The disease transmission risks, study goals (and effective sample sizes), in addition to overall restoration objectives should all be considered.
 - Currently, BBRSP appears to be a relatively lower risk site in comparison to the other 3 ranges.
- Strain typing is being performed on positive samples to gain further insight on pathogenicity and relatedness between these and other samples submitted from Texas.

TPWD intends on continuing the aoudad disease surveillance and monitoring program as well as expanding sampling efforts to include other mountain ranges.

2022





All photos by Dirk Parks and Claiborne Myers



















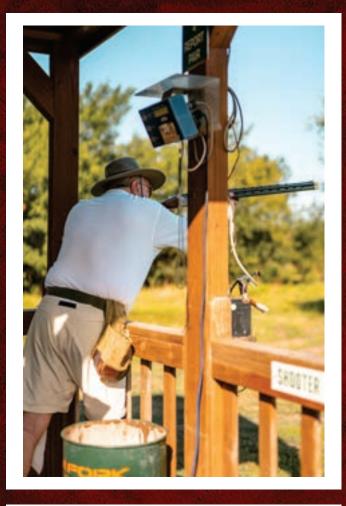






















































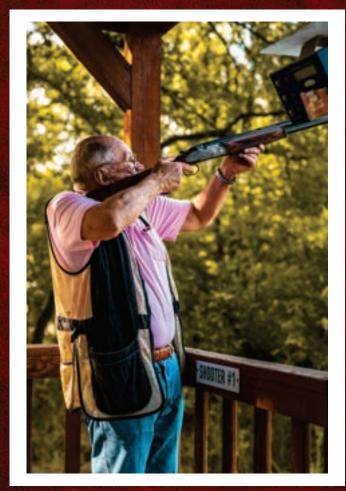




























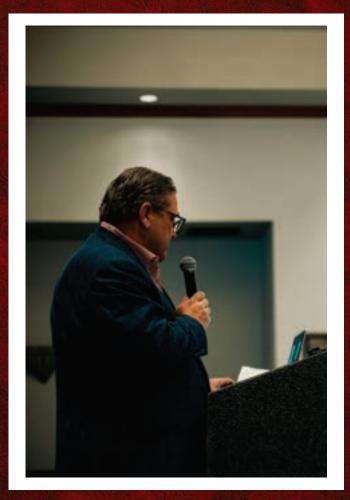


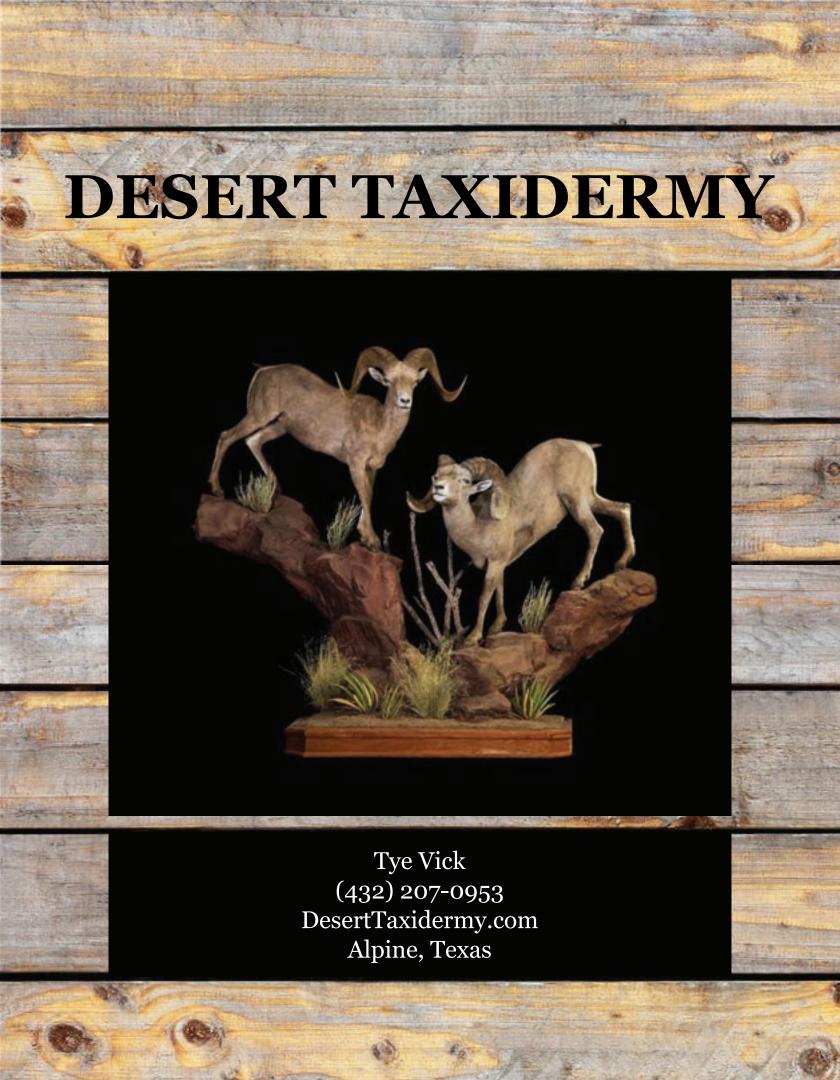




















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