

A photograph of three bighorn sheep in a desert environment. The sheep are the central focus, with one in the foreground showing large, curved horns. The background is filled with cholla cacti and other desert vegetation. The title 'The Bighorn' is overlaid in the top right corner, with 'The' in a script font and 'Bighorn' in a large, bold, sans-serif font. Below the title, 'FALL 2017' is written in a smaller, sans-serif font.

The Bighorn

FALL 2017

>>> PUBLICATION OF THE TEXAS BIGHORN SOCIETY

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

Balcones Cement
2580 Wald Road
New Braunfels, TX 78132

Building the future™



**CEMEX USA AND CUENCA LOS OJOS FOUNDATION
EL CARMEN LAND AND CONSERVATION CO.**

**A WORKING PARTNER WITH THE TEXAS BIGHORN SOCIETY TO INSURE THE FUTURE OF
THE DESERT BIGHORN SHEEP IN WEST TEXAS**

BIGHORN

The official magazine of the Texas Bighorn Society
Advertising Rates Effective 1-1-2009
Bighorn is published 3 times annually

TECHNICAL SPECIFICATIONS

Bighorn is a four-color glossy publication, and the following is required:

Ads should be supplied on a disk and in one of the following formats:

- Photoshop
- TIFF (Preferred)
- PDF (Preferred)
- JPEG

Each ad should be: 300dpi (minimum) in CMYK color space

All other formats must be approved by our production staff

SUBMISSION DEADLINES

Spring – February 1st

Summer – April 1st

Fall / Winter – October 1st

DISPLAY ADVERTISEMENT RATES

Location	Rate Per Issue
Inside Front Cover (Supply as full color bleed)	\$270.00
Inside Back Cover (Supply as full color bleed)	\$270.00
Back Cover (Supply as full color bleed)	\$315.00
Full Page (Supply as full color bleed)	\$225.00
Half Page (4 3/4" Tall X 8" Wide)	\$175.00
Third Page (4 3/4" Tall X 5 1/4" Wide)	\$120.00
Quarter Page (1 3/4" Tall X 8" Wide)	\$ 75.00

Note: An exchange of advertising for Donations, Sponsorships, and In-Kind Advertising will be considered on a case by case basis.

PRODUCTION

Bighorn's production staff is available to help you build your advertising copy. Production costs, hourly rates, and estimates are available upon request.

STAFF

Editor-in-Chief

Bonnie McKinney

bonnie2mckinney@gmail.com

Graphic Design

LaurelHouse Studio / René Graham

rene@laurelhousestudio.com

Printing

Midtown Print / John Frullo

www.midtownprint.com

Marketing/Advertising

Diane Gregson

dgregson@texasbighornsociety.org



cover photo by Mike Pittman



28

BIGHORN

Fall 2017

CONTENTS

This & That	6
President's Letter	7
Obituaries	8
Letter from the Editor	9
Looking Back	10
Lone Star Luck <i>Adam Casagrande</i>	14
2017 Bighorn Sheep Aerial Surveys <i>Froylan Hernandez</i>	18
Water in Wildlife Developments <i>Vernon C. Bleich</i>	20
Water Brake on Elephant Mountain <i>Cody McEntire</i>	22
The Black Gap Guzzler System <i>Travis Smith</i>	24
New Research Partnership <i>Warren Conway</i>	26
Roundup Photo Album	28

bighorns don't
 bighorns don't need our help
 bighorns don't live in Texas
 bighorns don't matter



bighorns don't need the internet. bighorns need you.



Texas Bighorn Society

RENEW YOUR MEMBERSHIP OR DONATE TODAY

4

M. Jones



Texas Bighorn Society

[Fall 2017 Membership Application]

YES! I want to help restore Bighorn Sheep in Texas!

MAIL WITH PAYMENT TO:

TBS Membership
 1615 West Loop 289
 Lubbock, TX 79416

SIGN ME UP FOR:

- RENEWAL/INDIVIDUAL
\$40.00
- STUDENT/ACTIVE MILITARY
\$25.00
*must include copy of valid ID
- FAMILY MEMBERSHIP
\$75.00
1-yr membership, 1 yr Bighorn Magazine,
2 Window Decals
- SPONSOR
\$250.00 [annual]
1-yr membership, 1 yr Bighorn Magazine,
2 Window Decals, 5-yr Wall Plaque
- LIFE
\$750.00 [one time]
Life membership, Life Bighorn Magazine,
2 Window Decals, Wall Plaque & Badge

LAST NAME FIRST NAME SPOUSE

ADDRESS

CITY STATE ZIP

EMAIL ADDRESS

HOME PHONE CELL/OFFICE PHONE

PAYMENT: MC/Visa/Discover/AMEX Check # _____ DATE: _____

CARD# CV# EXPIRATION DATE SIGNATURE

OFFICERS

Jim Payne (Jill) *President*
344 Wulf Creek Dr.
Center, TX 75935
936.554.7307 (M)
jpayne@fairchildlawfirm.com

Sam Cunningham *Vice President*
6600 Sumac Place
Amarillo, Texas 79124
806.282.6889 (M)
scunningham@quailcreekent.com

Curt Brockmann (Tina) *Secretary*
1714 Aspen Ridge
San Antonio, TX 78248
210.846.4516 (M)
cdbrockmann@cpsenergy.com

Kathy Boone (Dan) *Treasurer*
1615 West Loop 289
Lubbock, TX 79416
806.745.7783 (B)
kboone@sonoramfg.com

DIRECTORS

Booner Beck (Shelli)
5433 Mustang Valley Trail
Wimberley, TX 78676
512.799.0229
boonerbeck@yahoo.com

Steve Bolner (Kathy)
107 Indian Bend Drive
Lakeway, TX 78734
512-217-3338 M
thebolners@gmail.com

Clay Brewer
131 County Road 458
Rochelle, Texas 76872
325-792-4177 (M)
cbrewer@wildsheepfoundation.org

Lynton Holloway (Wendy)
P.O. Box 79577
Ft. Worth, TX 76179
817.271.7558 (M)
lyntonholl@netscape.net

Robert Joseph (Daniele)
P. O. Box 2603
Lubbock, TX 79408
806.787.8650 (M)
icm-lbk@swbell.net

Dirk Parks (Susan)
3600 Timberwold Trail
Midland, TX
432.288.4784 (M)
bscott1009@att.net

Bill Scott (Barbara)
7924 Chapelwood Drive
North Richland Hills, TX 76182
817.498.2186 (H)
bscott1009@att.net

Tommy Caruthers (Patricia) (Emeritus)
209 Ridgecrest Circle
Denton, TX 76205
940.391.1730 (M)
tommy@caruthersoil.com

ADVISORY DIRECTORS

Charlie Barnes	Warren Conway	Bob McCoy
Ron Bell	Chuck Cox	Billy Pat McKinney
Mike Berger	Brian Fienhold	Bonnie McKinney
Vern Bleich	Terry Fricks	John Meyer
J.D. Bolner	Froylan Hernandez	James Payne III
Charlie Butler	Rutledge High	Tamara Trail
Ben Carter	Hunter Holloway	Carleton Turner
Jerrell Coburn	Tyler Mansell	

Howdy, 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

Jay Chernosky
Larry Davis
Dan Dinges
Jim Gresham
Michael Guerra
Gary Liefer
Kevin Olmstead
Nathan Olmstead

Stephen Porto
Ronnie Rector
Sandra Sadler
Aaron Schultz
Randy Woodson
Jared Zachery
Wayne Zachery

family

Bryant and Susan Bradshaw

life

Kai Buckert
David Jalufka

student

Don't forget - Student Memberships are only \$25/year!
Encourage students you know to join today!

* please,

Help us stay current with your address and email information! Contact Diane Gregson if you have moved, changed email addresses, or have questions about your membership. She can be reached at:

dgregson@texasbighornsociety.org
806-745-7783

This & That

June 2017 Board Meeting Summary

by Curt Brockman

The June 2017 Texas Bighorn Society Board Meeting was held just before TBS' Roundup at the Tapatio Springs Resort in Boerne, Texas. Twenty-eight people attended the meeting. The minutes of the March 2017 Board meeting were reviewed and approved. Kathy Boone gave the treasurer's report, which was also reviewed and approved. Robert Joseph gave the membership report and reported that TBS now has 824 members.

The majority of the Board's discussions were centered on the upcoming sheep relocation and the Texas Parks and Wildlife Department's preparation for the event. In December, TPWD plans to capture over 100 sheep from Elephant Mountain and relocate them to Black Gap. They plan to collect and test tissue samples from all of the sheep and collar 80 of the sheep with satellite

collars. The satellite collars will allow TPWD to collect real-time data to track sheep movement. TPWD asked if TBS would pay a portion of the relocation cost. The Board approved spending \$87,004 to purchase 20 collars and pay for the needed air-time for all 80 collars. TPWD also discussed that the Black Gap sheep pens needed some work. The pens need new hot wire and reinforcement. They asked if TBS would pay for the materials and provided a materials list. The Board reviewed the list and agreed to consider the request at a later date. The Board approved spending \$160,000 over four years for the TBS-Texas Tech Disease Research Project. The Project is a joint conservation group effort to provide genetic and herd health baselines and a disease risk assessment of Texas bighorn

sheep. The Project will provide wildlife scientists the necessary information to study and understand sheep health and genetic information. This information is necessary to make proper and informed sheep management decisions and to monitor long-term herd health. Finally and as you may have heard, Jerrell Coburn retired from the Board but not from TBS. Jerrell has dedicated many years of his life to TBS and has served in various TBS positions. Consequently, the Board approved Jerrell's nomination to serve as an Advisory Director. Thank you Jerrell for your many years of service and dedication to the organization. We all look forward to working with you for many more years and eating your and Pam's cookies.



Check facebook.com/texasbighornsociety for more news, info, photos and videos!



MGA Ultra-Light Rifles

The most accurate ultra-light rifle without compromise

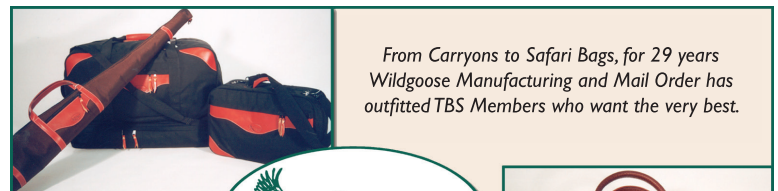
A precision firearm designed for ultra-minimum weight, ultra-minimum recoil, and ultimate accuracy.

- Custom Built as Light as 4 3/4 lbs.
- Customer's Choice of Caliber
- Guaranteed Accuracy

MGA ARMS
INCORPORATED

WWW.MGARMSINC.COM
T: 281.821.8282 | MGARMS@SWBELL.NET

MGA Arms recommends Swarovski Optik for precision long-range optics and is an Authorized Swarovski Dealer.



From Carryons to Safari Bags, for 29 years Wildgoose Manufacturing and Mail Order has outfitted TBS Members who want the very best.

TEXAS MADE
Fine Leathersgoods
Corporate Gifts, Logos, Ranch Brands



Don't miss our 2,200 sq. ft. Hill Country Store featuring custom furniture and lamps in mesquite and antler, art including Wildlife and Western original paintings, bronzes, scrimshaw, custom knives and so much more!

www.wildgoosetexas.com

Wildgoose
3189 Junction Highway
Ingram, TX 78025-3189

WE SHIP WORLDWIDE
800-749-1805

830-367-5553

Fax 830-367-5243

info@wildgoosetexas.com

President's Letter



Jim Payne
TBS President

Hello Friends,

After watching Hurricane Harvey swarm the Texas coast from Port Aransas to Beaumont, and the reactions of everyday people to the situation, I'm reminded of the remarkable selflessness and resiliency of Texans. Those very characteristics have always been reflected in the passion and the effort of our TBS members and friends. With hunting season upon us and the holiday season around the bend, lets all be thankful for our families, friends and Texas.

October will see the TPWD Trans-Pecos crew revamping the holding pens, aka soft release pens, at Black Gap WMA. That is a project for which TBS was pleased to fund the necessary materials. That work is in anticipation of a very large capture and release of desert bighorn sheep anticipated this December. Hopefully a little over 100 sheep will be captured on Elephant Mountain WMA to be released on Black Gap WMA. A significant number of those will be fitted with the latest in satellite tracking collars to monitor and trace the sheep's movement in "The Gap". TBS has likewise contributed significant funds towards the cost of those efforts.

After the holidays we will send out a request for help in manning the TBS booth at the Dallas Safari Club Convention on January 4th-7th. That is always a great time. I would also encourage you to attend the Wild Sheep Foundation Convention, the "Sheep Show", in Reno on January 18th-20th. TBS has a booth there as well and we could really use your help in working it. If you've never been to the Sheep Show you owe it to yourself to attend as it is both fascinating and fun. Please put it on your calendar.

As always, if I can answer any questions or provide any information, all you have to do is call. I hope you enjoy this edition of The Bighorn!

Jim Payne

President
jpayne@fairchildlawfirm.com



TEXAS BIGHORN SOCIETY Services for Merylyn Cantley



Long time life member Merylyn Cantley passed away Sunday, September 10, 2017. Merylyn left this world for a better place, leaving behind her beloved husband of 36 years, Kennon L. Cantley and her beloved dog children, Ruka and Biscuit. She lived life to the fullest, hunting with KC all over the world and left countless friends scattered all along the way. She will be sadly and sorely missed by one and all.

She left loving parents, Elmo and Jeannine Sample of Smiley; brother, John A. Sample of Waelder; and sister, Charlotte and husband Trey McMahon also of Smiley.

A Celebration of Merylyn's Life was held at Kennon and Merylyn's home, 3883 S. County Road 118, Smiley, Texas, Friday, September 15th.

Memorial Contributions may be made payable to Buby Valley Conservancy, and may be mailed to Corby Dodson, 503 Cottonwood Street, Glen Rose, TX 76043. All proceeds will be used in the anti-poaching efforts on the Buby Valley Conservancy.



DAVID ABBEY OBITUARY

We received the sad news that David Abbey, a long time TBS member and the recipient of the first desert bighorn public hunt tag in Texas passed away recently in Wyoming. David was a young Texas Tech graduate that drew the hunt permit which was held at the Sierra Diablo WMA. TPWD made camp in the historic Victorio Canyon, Ray Watley, Wildlife Technician and the late Mike Hobson, District Leader guided the hunt. The late Bob West, Regional Director cooked for the group and Ruben Cantu, then Technical Guidance Biologist was the official photographer. David harvested a good ram. Our deepest condolence is extended to his family.

From the Editor



Bonnie McKinney
Editor, *The Bighorn*

To All TBS Members,

Roundup at Tapatio Springs in June was a fun filled weekend, great to see old friends and new members of TBS. Make plans now to attend the 2018 Roundup in Austin, which will be the 30th Anniversary of the TBS Roundup. In this issue and the next we are featuring a "Looking Back" segment of photos from years ago, hope you enjoy a look back in the past of not only Roundup but of TBS members working on guzzlers, tending sheep at Sierra Diablo, a pictorial history that so many of the TBS members have been an integral part of.

This issue has a great variety of articles from Adam Casagrande's hunt on Elephant Mountain, to water quality, guzzler systems, building drinkers, and new research on desert bighorns by Texas Tech as well as the 2017 desert bighorn survey results.

Many thanks to all of the contributors to this issue of "Bighorn." A special thanks to Dirk Parks for his continued generosity and photography skills that showcase the 2017 Roundup.

On a sadder note, it is with a heavy heart I report that TBS lost long time member Marilyn Cantley, affectionately known as "Mo," she was a great gal and a bigger than life personality, she will be missed by all her TBS friends. Secondly, David Abbey, who was the recipient of the first public hunt tag for bighorn in Texas recently passed away in Wyoming. Our deepest sympathy is extended to both families.

I hope you enjoy all the contributions to this issue of "Bighorn."

Saludos,

Bonnie McKinney

Wildlife Coordinator

El Carmen Land Conservation Co.

Email: bonnie2mckinney@gmail.com



Looking





Back





Looking





Back





Lone Star Luck

by Adam Casagrande

View from the top of Elephant Mountain. Photo by: Adam Casagrande.

When you mention the great state of Texas most people think of the Alamo, BBQ, Football, Longhorn cattle and even black gold or “Texas Tea” as they call it. Very few people think of Desert Bighorn Sheep. When you mention Desert Bighorn Sheep to a sheep hunter or a hunter who dreams of becoming a sheep hunter they think Nevada, California, Arizona, New Mexico and Old Mexico in fact very few even realize there is an established population of Desert Bighorn Sheep thriving in West Texas.

This population of Desert Bighorn Sheep in Texas is a true conservation success story that began in the early 80's thanks to Texas Bighorn Society the Wild Sheep Foundation and the Texas Parks and Wildlife. Native populations of Desert Bighorn Sheep in Texas are thought to have been gone since the

1960's. But hard work and generosity of those who truly wanted to see these amazing animals again call the great state of Texas home has paid off. Today there are around 1,500 Desert Bighorn Sheep living on public and private lands in the West Texas landscape.

Anyone can drive the many hours into the heart of West Texas and go look at these awesome animals on one of the Wildlife Management Areas they call home. However only a very few hunters every year will have the opportunity to hunt and harvest a Texas Desert Bighorn Sheep. Fifteen or so tags are issued every year from TPWD. Each year one tag is auctioned through a non-profit organization to the highest bidder, one tag is given away in the Big Time Texas Hunts raffle and one is given away in the Texas Parks and Wildlife public draw. The other dozen or

so tags every year are given to private land owners which are typically sold as land owner tags.

Even though hunting Desert Bighorn Sheep in Texas is not at the forefront of Desert Bighorn Sheep hunting, it is no secret. Last year there was 5455 applicants for the public draw hunt and who knows how many raffle tickets were sold for the Big Time Texas Hunts Grand Slam Package. Every year for the last ten or so years I have made my annual \$10 contribution to the TPWD via the application for the public draw hunt. Why do I call it a contribution you ask? Because when the odds are 1 in 5445 or .00018% I don't even bother checking the results. I just figured I would do my part as a conservationist who cares deeply for bighorn sheep.

So on New Year's Eve of this year while on a ski vacation with my family

I was browsing through emails from the last few days and I came across an email from TPWD. It didn't even get my heart racing as I didn't know the draw date and it didn't even cross my mind until I read Congratulations! After a few expletives came from my mouth and rereading the email a dozen or so times I picked up the phone to call TPWD no answer, well no wonder it was 9:00 on New Year's Eve in TX. With two sheep tags drawn in the last six months. Let's just say it was a New Year's celebration that night.

After a few days of trying to get in touch with the correct people, I finally got verbal confirmation from TPWD that I was indeed the winner of the Desert Bighorn Sheep hunt. Even better news was that I would be hunting in April, and it was a fully outfitted and guided hunt at no additional cost. Mark Garrett manager of the Trans Pecos Wildlife Management Areas filled me in on all the details and put me in touch with Dewey Stockbridge who manages the Elephant Mountain WMA where I would be hunting. Dewey would also be my primary guide for the hunt.

Dewey and I had many conversations over the next three months and he did an outstanding job laying out what I should expect and what was expected of me. TPWD is working very hard on the conservation and growth of Texas Desert Bighorn Sheep and they know most all of the animals that call Elephant Mountain home. There were a few mature age class rams they wanted me to consider harvesting. I am a member WSF and multiple WSF chapters so conservation of these animals was right in line with my expectations as well.

Elephant Mountain WMA is a 23,000 acre ranch that was donated in 1985 to TPWD and in 1987 the first 20 Desert Bighorn Sheep were transplanted there. Today there are approximately 150 Desert Bighorn that call Elephant Mountain home. TPWD has had great success in growing this herd and they want to see that success continue through proper management and conservation of the resource.

April 1st quickly arrived and I was on a plane headed for El Paso Texas where I would meet up with my good friend Seth Henrie. We loaded the rental car and headed east through the deserts

of West Texas to Elephant Mountain WMA. We arrived late that evening but were greeted by Mark Garrett, Dewey Stockbridge and a few other local area biologists all familiar with the Desert Bighorn that resided here. We would be staying in a large ranch house right at the base of Elephant Mountain. We told a few stories and got to know one another while looking at pictures of past tag holders hanging on the walls before heading off to bed.

Sunrise presented me with my first views of Elephant Mountain itself which is really a large mesa. Gaining about 1500-2000 feet in elevation the scattered rock and jagged cliffs give way to a grass filled plateau. Food, water and shelter all were present here on this isolated mesa in the middle of an unforgiving endless rugged desert landscape. We gathered our gear ate a quick breakfast and headed off to check the zero on my rifle. Dewey was satisfied with my shooting and we had one last discussion in regards his expectations on killing a mature ram. We jumped in the trucks and headed down a dirt road as we would be circling the south side of the mountain stopping to glass every mile or so. The mountain was so broken up with cuts and ravines the sheep could hide anywhere. We managed to glass up a bunch of ewes and lambs up in the cliffs but were unable to turn up any rams early that morning. The weather was not what I expected for April in TX as it was cloudy windy and misting rain which did not make for ideal glassing conditions. The low clouds continually rolled through, socking in the top half of the mountain. We continued to glass and move around the south side of the mountain retreating to the cover of the trucks a few times as the rain became more constant. By no means is this a canned hunt these sheep are free to roam where they wish, but I will say the hardest part of this hunt was going to be drawing the tag.

By early afternoon we had made our way to the north side of the mountain where Mark and some of the other biologist had been glassing all morning. They had been watching a group of mature rams feeding about three quarters of the way up the face and thought there was one or two rams in the group worth looking over. We

set up the spotting scopes and Dewey agreed that we needed a closer look but was pretty sure two of the rams were ones that were on his list he wanted me to consider. Both were heavy dark horned rams that he thought were ten years old. Neither of them had super long horns as they were broomed back, but their mass all but made up for what they lacked in length. We formulated a plan to close the distance on the rams and confirm they were indeed the correct age class.

We decided to go around the mountain and come at them from above due to the winds and where they were situated. Our stalk would put us within 300 yards which would allow us to confirm age and set up for a clear shot. Back in the trucks we headed about a mile down to a dirt road that would lead us to the top. We stopped about a quarter of the way up and would go on foot the rest of the way. Seth, Dewey, Cody and myself grabbed our gear and headed up. Only a few hundred yards from the truck Dewey stopped in front of me and pointed across a canyon. On the skyline two rams were walking dead away. We backed off a little and circled to get behind what little cover there was and continued up. Suddenly Dewey stopped again and threw up his binoculars as did I. I glassed across the canyon about 350 yards trying to pick up what he was watching. I whispered, "I don't see anything." Seth who was right behind me whispered back, "Right there." "Right where," I replied. "Seventy yards" Seth said. Well seventy yards was on this side of where the canyon started so I threw my binos up again and nothing. Seth whispered "at the base of the rock pile." I panned down and all I could see were horns. But something wasn't right, they were laying on the ground. As I studied them through my binos I couldn't see a body all I could see were horns. I said "that is just a ram skull." Dewey who was to my right about five feet said no that is a ram. I leaned to my right and sure enough I could see the rams body. He was laying nose down in the dirt facing straight at me sound asleep. This ram was not part of the other group we were making a play on as they were well over a mile away.

We eased to the ground and I got set up prone on my bipod. Dewey

confirmed he was at least ten years old and a mature old ram for the area and met the criteria we were looking for. His exact words as I peered through my scope were "he fits the bill so it is up to you." Here I sit with a mature Desert Bighorn Sheep in my crosshairs at 99 yards. I didn't have to think twice, but I was going to wait till he stood up and presented me with a broadside shot. A few minutes later he lifted his head and the mass he carried throughout his horns was unreal. Just then he decided to stand but was still facing me straight on. He then dropped out of sight in a gully and this is when things got just a little western.

With him out of sight and headed down into the canyon we quickly worked our way closer to the edge. About fifty yards further as we started to crest I looked down to my left and there he was. He started to trot and I locked on to him. Dewey whispering beside me, "let him stop let him stop." Just as he got the rim he hesitated which gave my trigger just enough time to break. Over the edge he went and we scurried up

to where he went over. I had another round in the chamber if needed but felt confident of the shot. There was no immediate blood but it only took a minute or so to locate him piled up in the rocks fifty or so yards below.

The standard high fives and hugs all around ensued as we were all a little shocked at what had just occurred. We were joined by a few of the other biologists who had been out glassing including Froylan Hernandez the head sheep biologist for the state of Texas. Everyone was amazed by the sheer mass and age of the ram. At eleven years old he ties for the oldest ram ever harvested on Elephant Mountain WMA. Everyone especially myself was extremely pleased as this ram was a perfect example of the type of ram TPWD wanted to harvest. Dewey looked at me and said, "I don't know this ram." I said, "What do you mean." He said, "I have not seen this ram before or at least not for the last few years." Had he been that good at hiding or had he wandered off the WMA into the vast West Desert landscape and just recently made his

way back? Who knows but he is an impressive ram none the less. Back at the ranch house we prepped the cape and skull for the journey back to Idaho and took DNA and blood samples for research. The horns were green scored at an incredible 172 4/8 gross and then plugged so all was official. We celebrated with a fantastic steak dinner and a few cold beverages while telling sheep hunting stories of years past. Although this hunt ended sooner than I would have liked and by no means was a physically demanding sheep hunt I am thrilled with the outcome. Again the hardest part of hunting Desert Bighorn Sheep in the great State of Texas is drawing the tag. Thanks again to TPWD and all of those involved for the work you have done to bring these amazing animals back to Texas.

Trophy Ram. Photo by: Adam Casagrande.





Proud Hunter. Photo By: Adam Casagrande



TPWD Guides. Photo By: Adam Casagrande

2017 Desert Bighorn Sheep

The 2017 Desert Bighorn Sheep aerial surveys began a few days earlier than normal. Typically, aerial bighorn surveys are conducted yearly during the month of August. However, this year because only 1 helicopter was going to be used, and to ensure surveys were completed within the allotted timeframe, bighorn surveys began on 27 July 2017.

For the last several years, 2 helicopters have been used to complete surveys. Even though having 2 helicopters cut back survey time in half, it also required for two survey crews to be available simultaneously. While this was efficient, it did create scheduling conflicts because survey crews needed to commit for at least 2-3 entire weeks, meaning other responsibilities were

potentially put on hold.

We have moved away from using 2 helicopters for bighorn surveys and going back to one. With proper planning, 1 helicopter should be sufficient to complete bighorn surveys in a timely manner.

Slightly over 140 total hours were flown during the 2017 DBS Surveys. This is the second year in a row we have flown as many hours. The new "standard" from this point forward will be 140 hours, which will allow for thorough surveys.

No "new" areas were surveyed this year. Two foot surveys were conducted on Elephant Mountain during May and August 2017, both with healthy counts. A foot survey, as well as an aerial survey, was conducted on Capote Peak. Only

aerial surveys were conducted in all other areas and mountain ranges.

We continue to survey the Sierra Diablo Mtns and the metapopulation closely. The difference in count from 2016 (N=333) and 2017 (N=297) was off by 36 animals. The concern for the Sierra Diablo Mtns bighorn herd health has been ongoing. There were no new or fresh carcasses observed during the survey.

Some ranges where counts were slightly up included the Eagle and Van Horn Mountains. The total count for 2017 was 1027 bighorns. Figure 1.

TPWD intends on continuing to use the 140-Hr survey benchmark in the future to amply and adequately monitor survey populations in the West TX mountains.



Aerial Surveys *by Froylan Hernandez*

Figure 1. 2017 DBS Survey Summary

LOCATION	RAM AGE CLASS				TOTAL			TOTAL	RATIOS		
	I	II	III	IV	RAMS	EWES	LAMS	SHEEP	M	: 100 F :	L
BAYLOR MOUNTAINS	5	5	6	4	20	33	15	68	61	100	45
BEACH MOUNTAINS	16	7	11	11	45	76	47	168	59	100	62
BLACK GAP / BREWSTER COUNTY	7	14	12	17	50	70	18	138	71	100	26
BIG BEND RANCH STATE PARK	3	4	2	3	12	27	17	56	44	100	63
CARRIZO MOUNTAINS**	4	0	0	4	8	10	3	21	80	100	30
EAGLE MOUNTAINS	0	3	3	4	10	18	7	35	56	100	39
EMWMA *	14	10	16	26	66	80	36	182	83	100	45
SIERRA DIABLO MOUNTAINS	13	14	16	28	71	150	76	297	47	100	51
SIERRA VIEJA MOUNTAINS	1	1	5	1	8	14	11	33	57	100	79
VAN HORN MOUNTAINS	2	2	7	8	19	31	11	61	61	100	35
9 POINT MESA	2	9	6	4	21	44	18	83	48	100	41
TOTALS	67	69	84	110	330	553	259	1142	60	100	47

* Foot Survey; the count is an average of two foot surveys conducted on 9 May and 29 August 2017

Water in Wildlife Water Developments Has Proven to Be of Good Quality

by Vernon C. Bleich, Ph.D.

—Dr. Vern Bleich is an independent wildlife biologist who worked for the California Department of Fish and Game for 34 years. He currently resides in Bismarck, ND but remains active in the conservation and management of bighorn sheep and other large mammals inhabiting arid landscapes throughout the western United States. He serves as an advisor to several nongovernmental organizations, including the Texas Bighorn Society where he is a member of the Advisory Board. He also serves on the Bureau of Land Management's Montana-Dakotas Resource Advisory Council. In the interest of conserving space, the citations documenting material presented in this article have not been included. Interested parties can, however, request those references (or the entire review published by Simpson, Stewart, and Bleich) by contacting Vern directly (vcbleich@gmail.com).

In an article that appeared recently in this magazine, I reviewed information regarding what is known about predation events at wildlife water developments, and whether wildlife water developments act as ecological sinks, or traps, for the species that the water developments are intended to benefit. Those remarks were based on an updated version of a review paper that my co-authors Nova Simpson (the senior author and a former graduate student at the University of Nevada Reno), Kelley Stewart (an associate professor at UNR), and I published several years ago. Another issue that frequently is brought up by critics of wildlife water developments or by “wilderness aficionados” revolves around water quality. Water quality

is important, and virtually every investigation to date has concluded that water quality concerns are, at best, minimal for wildlife, as reported previously by Simpson, Stewart, and Bleich. In this discussion, I include the results of our review (again, much of it being verbatim), and update that information with several recent publications, at least one of which has asserted erroneous and misleading information.

Water quality is an issue in the debate over wildlife water developments, and frequently has been brought up as being potentially problematic for wildlife. Indeed, quality of water available for use by wildlife is an important management consideration, and poor water quality could affect health of wildlife through physiological distress, electrolyte imbalances, or dehydration, as well as being potentially noxious or toxic. Biological factors most likely to affect water quality at natural or artificial sources are the result of high temperatures, high evaporation rates, contamination by feces or other organic matter, and infrequent flushing, most of which are of heightened concern during summer. For example, evaporation raises the ionic concentrations of already mineralized or saline waters, and biological contaminants (blue-green algae, bacteria, or invertebrates) can cause toxemia, diseases, or parasitism and transmission of parasites. Nevertheless, it has been repeatedly demonstrated that appropriate design and maintenance

of water developments can assure availability of good-quality water.

A frequently cited example of water developments having posed a health risk to wildlife was described by Pam Swift of the California Department of Fish and Game, and her coauthors, in the *Journal of Wildlife Diseases*. In that incident, at least 45 bighorn sheep died near two wildlife water developments at Old Dad Peak in the Mojave National Preserve, San Bernardino County, California. Investigators reported that toxin produced by *Clostridium botulinum* was most likely responsible for the mortality event, a result of contaminated water being consumed by bighorn sheep. Condition and dispersion of bighorn sheep carcasses indicated a rapid onset of mortality, typical of toxicity caused by ingestion of toxin produced by *C. botulinum*, the same organism that is frequently associated with massive mortality events among waterfowl occupying contaminated wetlands. Conditions suitable for the production of *C. botulinum* toxin, including anaerobic (i.e., not requiring oxygen) decomposition of organic material associated with warm temperatures, are not restricted to wildlife water developments, and I have argued in the professional literature that such conditions likely occur at natural water sources used by bighorn sheep more often than previously had been recognized.

Several investigators have assessed quality of water in wildlife water developments. In 2006, Vern Bleich

and coauthors compared water quality among 3 types of water sources (water stored in natural tinajas [rock basins], aboveground in tanks constructed of metal or plastic [typical of those used cooperatively by the Bureau of Land Management, National Park Service, the California Department of Fish and Game, and the Texas Bighorn Society], and underground in fiberglass tanks [typical of those constructed by the Arizona Game and Fish Department and Desert Wildlife Unlimited in the Sonoran Desert of California and Arizona]). Few differences in water-quality parameters were reported among the natural tinajas and the two different types of wildlife water developments. Water quality in the catchments was within available recommended guidelines for livestock, and the reported differences were thought to be related to the design features of the developments, such as construction materials. Because guidelines for water quality have not been published for large, wild mammals, guidelines for livestock often are used as a surrogate.

Water quality also was evaluated at natural, modified natural, and anthropogenic water developments, including natural tinajas, modified tinajas, springs, rainwater catchments, and wells by Steve Rosenstock of the Arizona Game and Fish Department, and his coauthors. The majority of constituents detected in those developments occurred at levels below recommended maxima for livestock, and those few that occurred above recommended levels (pH, alkalinity, and fluoride) were presumed to be nontoxic to wildlife. Additionally, no significant evidence of toxins produced by blue-green algae has been observed, and water developments do not appear to play a meaningful role in transmission of hemorrhagic disease viruses.

Although water quality guidelines specific to wildlife largely are lacking, results of investigations completed to date—with the exception of the aforementioned incident at Old Dad Peak—do not support assertions that water quality is problematic for wildlife that use anthropogenic water developments. Indeed, several investigators have concluded that water developments in desert environments do not constitute a health threat to the

wildlife they are intended to benefit. Situations in which specific elements or other parameters that do not meet guidelines for water quality of livestock may occasionally exist at some water developments, but studies to date indicate they rarely occur.

Several investigators recently have criticized wildlife water sources as being potentially problematic for amphibians because of high levels of ammonia those authors detected in the waters examined. A very recent publication erroneously reported that Bleich and coauthors did not consider water quality to be a concern because those investigators, "...did not assess ammonia concentrations." In fact, Bleich and coauthors did report ammonia concentrations in three types of wildlife water sources, and compared those results to each other. There were no differences among those water sources in ammonia concentrations; in fact, ammonia concentrations reported in each type of development were less (and by two orders of magnitude) than those reported in the critique.

In the incident at Old Dad Peak that was described above, the cover of one of the water storage tanks had become dislodged, and about a dozen lambs had fallen through the "manhole" in the top of that tank and could not escape. Decaying flesh in the tank subsequently created conditions suitable for the growth of *Clostridium botulinum*, resulting in the production of botulinum

toxin. Concomitantly, bighorn sheep that repeatedly had jumped on the top of the tank and caused it to become concave, rather than convex. Thus, when it rained the concave surface resulted in water entering the tank to mix with the already contaminated water and overflow on to the concave surface, thereby becoming available to bighorn sheep in that unintended, accidental "reservoir." Had the dislodged lid been detected, a crew would have replaced it and ensured access to the tank was not possible.

Currently, another problem at Old Dad Peak exists in the form of major cracks at the top of one of the three water storage tanks, all of which have been in service for more than 20 years. The lids currently are in place, but the situation is quite dangerous because one or more sheep jumping on top of that tank could break through and be unable to escape—and with the probable result of another botulism outbreak. Thus far, repeated requests by the Society for the Conservation of Bighorn Sheep to replace the damaged tank or to construct a barrier that will prevent bighorn sheep from accessing the top of the tank have been firmly rejected by the administration at Mojave National Preserve. If wildlife conservation was as important in legislated wilderness as "solitude" or as a "wilderness experience" are considered to be, I doubt the administration's views would be the same.



Wildlife Water Drinker with Clean Water on ECLCC. Photo by: Bonnie McKinney

Water Brake on Elephant Mountain

by Cody McEntire, TPWD

The Trans-Pecos region of Texas is often associated with towering desert peaks and a highly diverse flora and fauna. Not often associated with this area however, is the abundance of available free water sources. On a landscape that receives less than fourteen inches of rain per year, water is the limiting factor that dictates survival of all species.

Elephant Mountain WMA, located 26 miles south of Alpine, Texas on Highway 118, is an excellent representation of diversity in habitat types and their associated wildlife species within the Trans-Pecos. Sitting dead center of the property, and rising an impressive 2,000 feet above the desert floor, is Elephant Mountain proper. From the steep slopes, to the high-desert grassland at the summit, Elephant Mountain is host to many iconic desert species. Mule deer, Montezuma quail, javelina, black bear, and the coveted desert bighorn sheep all occur in this area. With this highly diverse ecosystem, comes the need for available water sources.

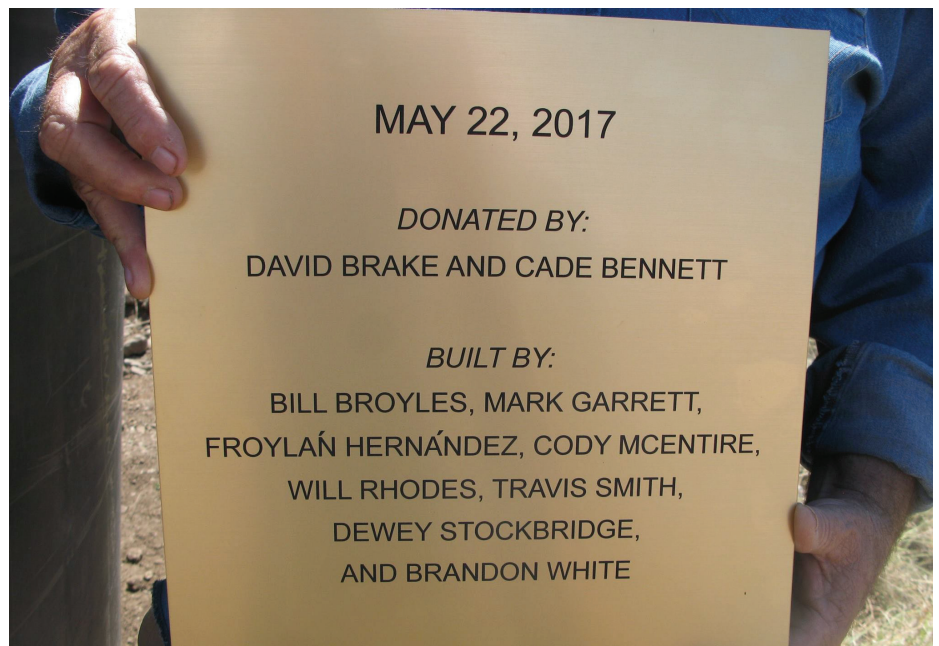
On May 22, 2017 Texas Parks and Wildlife staff and volunteers teamed up with Mr. David Brake to add water to the high, western slopes of Elephant Mountain. With a generous donation from David Brake and his grandson Cade Bennett, a plan was developed to accomplish this goal. WMA staff members: Mark Garrett, Dewey Stockbridge, Travis Smith, Will Rhodes, Brandon White, and Cody McEntire teamed up with David

Brake, and Desert Bighorn Sheep Program Leader: Froylan Hernandez, as well as volunteer: Bill Broyles to accomplish the scope of work.

In an area that provides lambing and parturition cover/topography for desert bighorn sheep and where mule deer, javelina, and a variety of birds are commonly observed, an existing spring was chosen to provide the water source needed for this project. The spring was refurbished and made void of litter. A portion of flowing spring water was redirected into a five-hundred gallon poly tank at the spring head. A pipeline was then connected to transport the captured water into a

thirty-five hundred gallon poly tank. This tank provides storage for the two drinkers that are positioned along Elephant Mountain's western bench. Potentially, this will provided over four thousand gallons of available water for the native fauna while ensuring the viability of the existing spring.

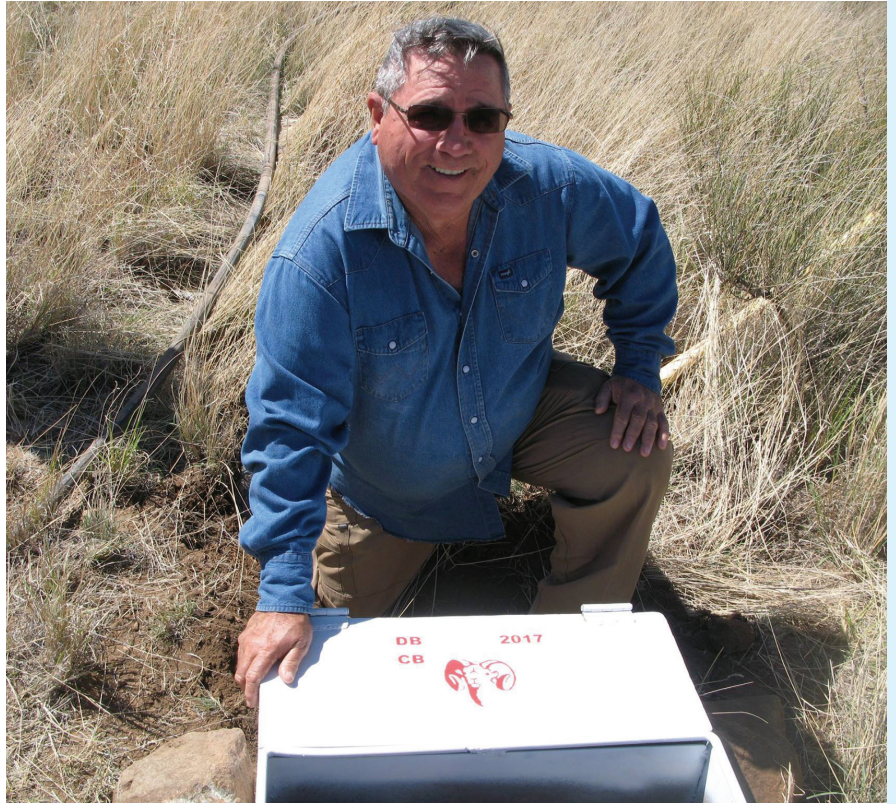
With two days of hard work, David's plan came to full fruition. A jubilant crew of workers headed down the mountain for good food, good camaraderie, and, of course, good drinks. TPWD would like to, once again, thank Mr. Brake and Mr. Bennett for their commitment and contributions to the conservation of wildlife in the Trans-Pecos region!



Sign for the Brake Drinker. Photo by: Cody McEntire

“A true conservationist is a man who knows that the world is not given by his fathers but borrowed from his children.”

- John James Audubon



The Brake Drinker. Photo by: Cody McEntire



The Brake Drinker Crew. Photo by: Cody McEntire

The Black Gap Guzzler System

by Travis Smith, TPWD



Conventional Guzzler



One of the most important habitat enhancements that one can do in the desert is to provide water. One way this can be accomplished is by constructing rain catchments or guzzlers. Guzzlers help by catching and storing water during the rainy seasons to supplement water during the dry period of the year. So how much water is caught and stored on an average year?

Black Gap has one of the most extensive guzzlers systems in the state, with 44 guzzlers spread throughout the 103,127 acres. Most of the guzzlers on Black Gap are conventional guzzlers; these catchments are constructed of an inverted roof to funnel water to a center gutter that feeds the water into a storage tank via a 4inch irrigation pipe. The storage tanks then supply water to the trough. Another type of Guzzler used on Black Gap is the header dam guzzler. These are built in areas where it's not practical to build a conventional guzzler

due to the topography of the build site. Header dam guzzlers are constructed by building a dam in an area where rain runoff is naturally funneled into a drainage. The dam catches the water and it is then transferred to the storage tank by an irrigation pipe or poly pipe. The size of a conventional guzzler is 24ftX24ft or 576 sq. ft. According to the USGS Rainfall Calculator the amount of rain collected during a 1 inch rain on 576 sq. ft. guzzler is 359 gallons.

The average size of a header dam guzzler can vary, so to make calculations a little easier I estimate the average size of a header dam catchment at 1 acre (knowing some have bigger catchments areas and some being smaller). One inch of rain falling on 1 acre of ground is equal to 27,154 gallons of water. This sounds like a huge amount of water, but not all of this water is caught and stored. Depending on the intensity of the rain it is possible for the header dam to become over whelmed and a majority of the water spill over the dam. Another



Header Dam Guzzler

factor that impacts the amount of water caught by a header dam is water that soaks into the ground. This area of Texas is very rocky and porous, so there is a lot of water in the catchment area that goes into the ground. Taking into account these factors it is almost impossible to calculate the average amount to rainfall collected by a header dam guzzler. With that being said I think a good conservative number is about 500 gallons being

collected during a 1 inch rain event. Black Gap WMA has 35 conventional guzzlers and 9 header dam guzzlers, so how much water is caught and stored during a 1 inch rain event and how much water is caught and stored on an average year? If all the 35 conventional guzzlers receive a 1 inch rain, 12,565 gallons of water will be caught. If all the header dam guzzlers receive that same 1 inch of rain 4,500 gallons will be caught. That means a total of 17,065 gallons of water is caught and stored on a single 1 inch rain event. On an average year Black Gap will receive

11.17 inches per year, when calculated out; Black Gap guzzlers will catch around 190,616.05 gallons of water. That's a lot of water! Unfortunately, the total capacity of all the storage tanks on Black Gap is only 155,500 gallons, which means on an average rainfall year and all 44 guzzlers are functioning properly they will be full of water.

Efforts are on the way to refurbish all the old wooden catchment guzzlers and construct 2 new guzzlers in areas lacking of water. Building and maintaining a rain catchment system of this size could not be possible without the help from our partner in Texas Bighorn Society, Mule Deer Foundation, Sul Ross State University, and BRI.

have a story to share?

WRITE US

We'd love to hear from you!
Send articles, photos, comments,
suggestions to:

Diane Gregson
dgregson@texasbighornsociety.org

New Research Partnership Announced for Texas Bighorn Sheep

by Dr. Warren Conway

*Dr. Warren Conway, Ph.D.
Bricker Endowed Chair in Wildlife Management
Texas Tech University*

Desert Bighorn Sheep have some new partners in conservation, research, and management in Texas!! The Texas Bighorn Society (TBS) recently provided a \$160,000 check to Texas Tech University to support a Ph.D. Graduate Fellowship within the Department of Natural Resources Management for the next four years. These funds were coupled with \$50,000 from the Wild Sheep Foundation to support research collaborations among researchers, students, biologists, and private landowners focused examining risk of disease probability in Texas Bighorn Sheep to inform future population management and translocation efforts throughout the Trans Pecos Region of Texas. Combined, this generous \$210,000 donation is eligible to be matched (up to 50%) through the Texas Research Incentive Program at Texas Tech, which would provide funds for more long-term research and conservation efforts on bighorn sheep in Texas.

Throughout its geographic range, bighorn sheep remain an iconic element of the American West, especially in the Trans Pecos Region of Texas. During the last 30+ years, tremendous efforts have successfully reestablished desert bighorn populations throughout much of its original endemic Texas range. These collaborative efforts among

Texas Parks and Wildlife Department biologists, members of TBS, and other private landowners have typically used translocation techniques, from both in-state, and out-of-state source stocks. Since restoration efforts were initiated in the 1970s and 1980s, bighorn sheep were translocated to Texas from Nevada, Utah, Arizona, and Mexico, and post-establishment efforts have used these founder populations to translocate bighorn sheep within Texas from stable or increasing micro-populations to augment smaller, or declining micro-populations. These have been very successful over time, but advancements in molecular and disease screening techniques now provide the tools to more precisely characterize the genetic structuring and disease risk probability of bighorn sheep in Texas.

This research is focused upon characterizing the genetic structuring and diversity of bighorn sheep in Texas using whole-genome techniques, where we will be correlating genetic data with disease risk probability. We know that sheep from other states likely still have some unique genetic signatures within Texas, and part of this research is to characterize how much of that original source-stock genetic material remains. Given that, we can also begin to build predictive models of disease risk probability in Texas that could be used to help inform future within-state sheep translocation efforts, so as to minimize disease transmission potential. This

entire effort falls in line with a bighorn sheep Disease Management Venture (DMV) that is focused upon identifying disease presence, prevalence, and risk of spread throughout the entire geographic range of bighorn sheep in the U.S. and Canada. Specifically, both disease risk and genetic structuring of bighorn sheep populations are key elements to inform comprehensive, and adaptive, sheep management plans throughout their geographic range and this research will be useful to TPWD to more precisely develop translocation and management approaches for bighorn sheep in Texas.

The second piece of this collaborative effort is more specifically focused upon establishing a range-wide repository for bighorn sheep tissue samples at the Texas Tech University, Natural Sciences Research Laboratory (NSRL). This effort is being supported by the WSF donation, as it falls in line with the DMV, as a tissue storage facility for sheep samples throughout its geographic range, not just in Texas. The mission of the NSRL is to archive biological samples and their associated data for researchers at TTU, and for reputable scientists throughout the world. The NSRL houses natural history collections (mammals – 125,000; birds – 7,000, and invertebrates – 4.5 million) as well as the Genetic Resource Collection (350,000 vials of tissue from about 90,000 specimens representing over 1,000 species). The impetus to establish the NSRL as a central repository for bighorn

sheep tissue samples is to maintain valuable tissue samples for current and future disease and genetic research and management questions. For example, if some new disease emerges 20 years from now, these samples will be priceless in terms of providing information for whether “new” diseases were already present in sheep populations, but were previously undetectable due to lack of technology for their detection in the past. In-perpetuity archival tissue storage for use by researchers and collaborators

examining relevant research questions that require stable bighorn sheep tissues will be priceless. As the DMV gains momentum, we envision the NSRL to be a key component for maintaining samples for use by researchers world-wide.

In sum, characterizing current genetic diversity and structure, as related to source-stock remnant signatures should provide a more clear understanding of not only potential population persistence probability, but also potential molecular basis for disease resistance, or risk.

Coupled with the integration of the NSRL in the DMV, we believe our research is novel, and potentially impactful for conservation and management of bighorn sheep specifically in Texas, but also throughout its geographic range in North America. This collaborative research effort among TBS, TTU, WSF, and partners from TPWD is the first of its kind in Texas, and we are excited to get this collaborative research effort moving forward.





28

ROUNDUP PHOTO ALBUM

| June 9-10, 2017 | Thank you to everyone for attending! | Boerne, TX |















Photos by Dirk Parks



Check
facebook.com/
texasbighornsociety
for more photos
and videos!

volunteer with us!

WE'D LOVE TO HAVE YOU AS A MEMBER, AND MEET YOU OUT
ON THE MOUNTAIN. TO FIND OUT MORE CONTACT THE TBS
OFFICES AT 806-745-7783

The Next Level of Excellence



TAXIDERMY AT ITS FINEST &
WORLD CLASS TROPHY ROOMS



Chris and Felicia Cammack have joined together **Prairie Mountain Wildlife Studios** and **Brush Country Studios** to offer you custom taxidermy at its finest and world class trophy rooms.

Combining the skilled and knowledgeable staff that has been at Brush Country Studios for 23 yrs. and the artistic gifts and vision of Team Prairie Mountain Wildlife Studios will bring one of the best combinations ever offered to the hunting world.



Cell: 713.202.8956
Office: 281.256.0742

chris@brushcountrystudios.com
michele@brushcountrystudios.com

Dick MURRAY CUSTOM LEATHER COMPANY

C-8 Murray Rifle Cartridge Belt



10 round:
Elastic Loops **\$160**
Leather Loops **\$180**

C-3C Murray Buttstock Shell Holder

\$50
Black **\$55**

Lace-up type designed for straight stocked rifles, 8 elastic loops, nylon stitched on a rich saddle tan leather, quick access and available in cartridge sizes from 270 through 577 Nitro*. Available in left- or right-handed version.



*6 round capacity for most African calibers

C-1 Murray Rifle Shell Holder



Belt type made from billfold leather. Fold-over, double layer style with two safety snaps, 9 round capacity, virtually rattle-proof, soft point protection, and available in 4 cartridge sizes

Short - 243 length	\$50
Medium - 30.06, 300 Winchester, etc.	\$50
Long - 375 H & H, 300 Weatherby, 300 Jarrett, etc.	\$50
W size - 378, 460 Weatherby, 416 Rigby, 300 Rem Ultra etc.	\$60
Winchester Short Mag	\$55

S-11 Murray Traditional Gun Slip **\$495**

Full length, end flap opening designed for your side-by-side or over/under. This case is a re-creation of the turn of the century style and is a time proven winner. Adjustable shoulder strap, hand grip, hanging loop, and lined with our exclusive man-made fleece. Made from the finest saddle leather or durable boot leather. Double stitched throughout. Also available for some scoped rifles.



C-7 Murray Carry All

For pleasure or competition this bag will work as a sporting clays bag, carry-on, camera case, or gear bag. Spill-proof design features a flat base and zippered top for quick, easy access. Features two strong hinged carrying straps, double nylon stitched throughout and hand-burnished edges.

Made of prime saddle leather that is oiled and finished to a beautiful saddle tan. Ample room for your accessories.



\$550

S-10 Murray Takedown Rifle or Shotgun Case

Designed for your double rifle or shotgun, featuring two side by side compartments. Constructed of heavy duty saddle skirting leather and lined with our exclusive man-made fleece. This unit can be shipped inside your duffel. Full length brass zippers, Gorilla proof hinged leather carrying handles in rich oiled saddle tan finish.

\$595

Also available for 2 barrel set. **\$795**



S-2 Murray Ultimate Saddle Scabbard

Designed for maximum protection of your big game rifle, this case is made from the very finest saddle leather and completely encases the gun. Lined with an exclusive man-made sheepskin that is breathable and non-reactive to gun oil, it will protect the gun blue as well as the stock finish. This scabbard will conveniently fit inside most hard cases for travel. A detachable leather grip enables this scabbard to be used as a rugged year-round gun case.



S-2 designed for scoped (up to 44 mm) rifles **\$450**
S-2A designed for scoped (up to 56 mm) rifles. **\$495**

Dick MURRAY CUSTOM LEATHER ~ Phone: 817-441-7480 ~ Fax: 817-441-5690

www.murraycustomleather.com ~ dick@murraycustomleather.com ~ MasterCard ~ Visa ~ American Express