

Eye on Nature



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SPRING 2012 A publication of the Wildlife Division — Getting Texans Involved

Pronghorn Problems in the Trans-Pecos

By Shawn Gray

Pronghorn are unique, highly specialized, icons of the prairie. Being the only remnant species of a family that evolved millions of years ago, pronghorn are the ultimate symbol of perseverance and adaptation. However, recent population declines in the Marfa Plateau are putting the pronghorn's perseverance to the test.

Research indicates that Trans-Pecos populations have a significant positive correlation with precipitation. For example, as annual precipitation increases, populations grow, and vice versa. The Trans-Pecos population burgeoned to an all-time high of more than 17,000 in 1987 with about 70% of the state's herd residing in the region. During the drought of the late '90s populations decreased to about 5,000. However, populations rebounded to about 10,000 in 2007 when normal range conditions returned. The following spring and summer would start a "perfect storm" that brought pronghorn numbers spiraling downward. Dry conditions and a late freeze in 2008 sparked a drastic decline in the Marfa Plateau. This loss was coupled with virtually no fawn recruitment in 2009 and 2010. Now the population has reached a record low since the 1940s with the region's herd only 30% of the state's total.

Numerous factors such as precipitation, habitat quantity and quality, barriers to movements, and predation influence pronghorn populations. In 2009 and 2010 when abundant rainfall replenished the range, pronghorn numbers in the Marfa Plateau did not respond. Fawn crops during summer surveys estimated only nine fawns per 100 does in 2009 and five fawns per 100 does in 2010.

Autopsies during the spring and summer of 2009 revealed high levels of *Haemonchus* or barber pole worms – blood-sucking stomach worms. Adult barber pole worms can draw 0.1cc of blood/worm/day by attaching to the stomach wall. The levels we discovered in the autopsied pronghorn were

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The Trans-Pecos

The most western districts of Texas – those beyond the Pecos River – are a lesson in diversity. Desert flat lands give way to mountain forests, canyons cut deep with rugged sides and seasonal streams. With such diverse habitat, is it any wonder that we find a wealth of animal diversity in the Trans-Pecos?

In this newsletter, our authors explore the plants, animals and even the fish of Texas' most western regions. For even more information on this remarkable area, check out our newsletter at www.tpwd.state.tx.us/newsletters/eye-on-nature/2012spring/.

Please note that the fall 2013 edition will be the final edition that we will offer a hard copy of the newsletter. Production costs are excessive, and the funds we save in printing the newsletter can be used in managing the diverse wildlife of Texas.



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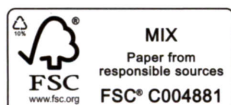


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[Pronghorn Problems in the Trans-Pecos, continued from page 1]

disturbing. Most pronghorn herds have these parasites associated with them, but in much lower numbers. Because of this dilemma the Trans-Pecos Pronghorn Working Group was formed. This group, composed of landowners, researchers from the Borderlands Research Institute at Sul Ross State University (BRI-SRSU), outfitters, hunters, wildlife veterinarians, and TPWD personnel, first met in September 2009. Plausible causes for recent declines were discussed and the working group quickly developed a plan to sample hunter-harvested pronghorn for disease surveillance.

After the 2009 season closed, we had amassed 102 samples representing 50 ranches and 1.8 million acres for analysis. Almost all samples contained *Haemonchus*, but the highest average were from the Marfa Plateau (777 worms/pronghorn). The samples were also low when tested for essential minerals needed for reproduction. These results were puzzling to say the least.

In 2010, 95 samples were collected during the hunting season throughout much of the same range that was sampled in 2009. Barber pole worm loads decreased by about 50%. In contrast, mineral levels increased in 2010. We will continue to monitor barber pole worms in Trans-Pecos pronghorn and will study fawn survivability during the spring of 2011 and 2012 to determine causes of fawn mortality.

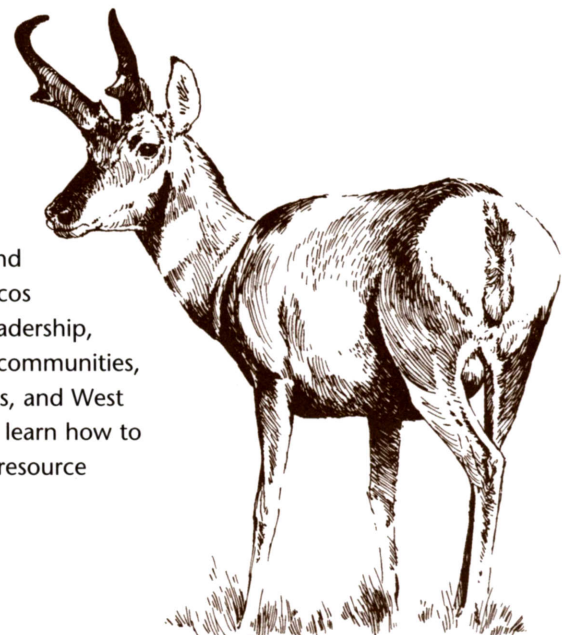
Because of surpluses in the Panhandle population (which are causing increased crop depredation) and historically low numbers in some areas of the Trans-Pecos (Marfa Plateau) a restoration project was started. Donations from the Trans-Pecos Pronghorn Working Group, Dixon Water Foundation, Horizon Foundation, and West Texas Chapter of Safari Club International (SCI) were used to match TPWD Pittman-Robertson Wildlife Restoration monies to fund the project, which is contracted to BRI-SRSU. Our objectives are to reduce Panhandle surpluses, supplement decreasing Trans-Pecos herds, monitor and evaluate success of translocations, study movements and habitat selection of relocated animals, and investigate pronghorn and *Haemonchus* interactions.

In February 2011, 200 pronghorn were moved from the northwest Panhandle to the Marfa Plateau. Eighty of these pronghorn were radio-collared for intensive surveillance. Samples were collected from each pronghorn for disease tests. Previous testing showed that Panhandle pronghorn have barber pole worms at much lower concentrations than Trans-Pecos animals. Relocated pronghorn are being monitored three to four times a week and will be used to compare barber pole worm concentrations in different seasons (summer and fall) and between resident pronghorn. We will also compare fawn survivability between relocated and resident pronghorn.

Our knowledge about Trans-Pecos pronghorn relative to diseases, health, movements, and habitat usage is growing but there are numerous questions that remain. We are proactively trying to answer each question in a systematic and scientific approach.

Thanks to tremendous support and teamwork from landowners, Trans-Pecos Pronghorn Working Group, TPWD Leadership, BRI-SRSU, wildlife veterinarians, local communities, Dixon Water and Horizon Foundations, and West Texas Chapter of SCI, we continue to learn how to conserve our Trans-Pecos pronghorn resource in the midst of baffling declines.

Shawn is Mule Deer and Pronghorn Program Leader working out of Alpine.



Understanding the Plants – A Landowner's First Step in Wildlife Management

By Philip Dickerson

After 28 years in the natural resource field you get to see a lot changes take place. Many advances have been made and much knowledge learned. But it's still somewhat surprising to me that folks will purchase a property on the Internet without having seen it or without having reasonable knowledge of the plants that occur there. In my opinion, the plants have a lot to do with potential wildlife values and property values.

As wildlife resources become increasingly important to landowners for economic and aesthetic reasons, their first step should be to learn all they can about the native vegetation on their properties. In my conversations with landowners and managers, I refer to this as building the "foundation" from which good management decisions can be made. In today's modern high-tech, fast-paced world, there are many perceived shortcuts (breeder pens, high fences, supplemental feeding and culling) to improving our complex natural systems. Managing wildlife in the Trans-Pecos requires patience, hard work and knowledge of the animals and native vegetation.

There are resource professionals (TPWD, NRCS, AgriLife Extension Service and universities) available to assist landowners with this technical guidance throughout the region. Additionally, managers should seek out good field guides on grasses, forbs and woody plants to help with this important aspect of becoming a good habitat manager.

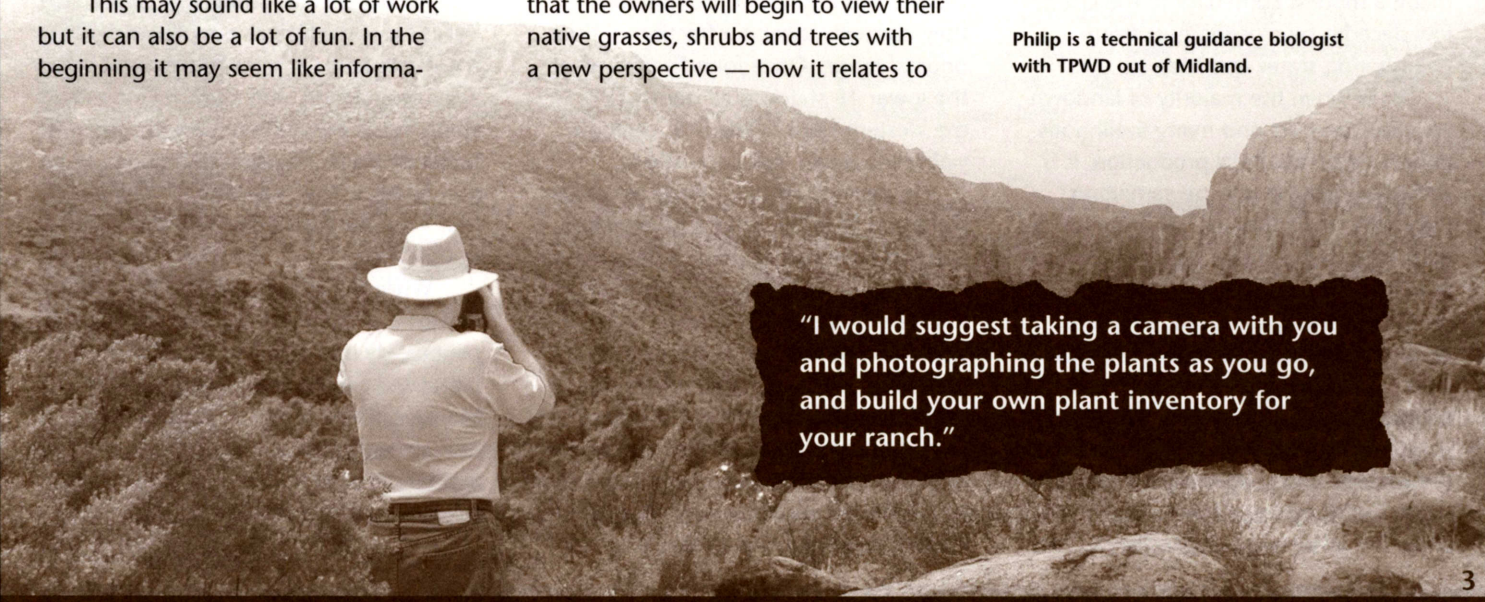
This may sound like a lot of work but it can also be a lot of fun. In the beginning it may seem like informa-

tion overload but the work will pay off in the end. I would suggest taking a camera with you, photographing the plants as you go, and build your own plant inventory for your ranch. It's not only important to know "what it is" but "what value" these plants have to the different animal species. For example, several species of native grasses produce abundant seeds that will be utilized by many species of birds in addition to providing nesting cover. Many of the woody plants that fall into the "shrub" category produce a seed or fruit that becomes a food source for different animals. The terminal ends (new growth) of the stems are often browsed on by deer, elk and bighorn sheep. The point is that many of our native plants provide multiple functions (food, nesting and cover requirements) for wildlife. Understanding the quality and quantity of the native vegetation is vital to developing a management program. One of my goals when working with any landowner is to provide enough of this information so that the owners will begin to view their native grasses, shrubs and trees with a new perspective — how it relates to


wildlife value. With this understanding I hope that as they drive across the ranch they begin to piece together the different habitats that exist and begin to recognize those special wildlife values. This understanding is also critically important so that future management decisions will enhance the habitat and not be detrimental. The time spent on the front end of any management program will provide a greater appreciation later. I would encourage all landowners to take the time to build a good "foundation" of native plant knowledge and pass it on.

The Trans-Pecos District encompasses 16 counties. The Trans-Pecos landscape is blessed with more species of shrubs, grasses and forbs than any other region in the state. Landowners seeking help with wildlife management may contact the Alpine District Office at (432) 837-2051 or use the Texas Parks and Wildlife website at www.tpwd.state.tx.us and click on the Land and Water tab, then under the Land menu, click on Find a Biologist.

Philip is a technical guidance biologist with TPWD out of Midland.



"I would suggest taking a camera with you and photographing the plants as you go, and build your own plant inventory for your ranch."



Mountain Lions in Texas

By Jonah Evans

Once found across all of the lower 48 states, now generally only the western third of the U.S. contains viable mountain lion populations.

Large predators inspire awe, excitement and fear. While many people are intrigued by their strength and prowess, others are more wary of the potential danger to humans and livestock. Efforts to exterminate large predators were once widespread, with federal bounties offered for numerous species. Of the six large predators (gray and red wolf, grizzly and black bear, jaguar and mountain lion) known to have occurred in Texas when Europeans first arrived, all but mountain lions were wiped out of the state. Black bears have made a modest comeback in the last few decades by crossing over from neighboring states and Mexico.

Back when the majority of landowners were ranchers and many livelihoods depended on livestock production, it is understandable that large carnivores were difficult to tolerate. However, as the demographics of Texas shifted from rural to urban, and as fewer landowners relied on their property for profit, efforts to eradicate predators subsided. Mountain lions (also called puma, panther and cougar) managed to survive the era of persecution, primarily in remote areas of the western and southern parts of the state. That they were able to persist while the other large carnivores did not

is testament in part to their stealth and incredible adaptability.

Mountain lions are specialized carnivores, but can eat a surprising variety of prey. While they tend to specialize on deer, they also eat peccary, feral pigs, raccoons, porcupines, coyotes and anything else they can. This adaptability enables them to have the largest distribution of any land mammal in the western hemisphere. They are found from Canada to southern Chile and Argentina, and are able to live in deserts, mountains, jungles and grasslands. Despite this impressive distribution, they currently inhabit a fraction of their original range. Once found across all of the lower 48 states, now generally only the western third of the U.S. contains viable mountain lion populations.

In the western U.S., large mountainous tracts of public land and regulated hunting have contributed to fairly stable mountain lion populations. Today, hunting is permitted in every state where a viable lion population exists except California, where a public referendum prohibited all mountain lion harvest.

Although mountain lions still subsist in west and south Texas, the actual status of Texas' lion populations is not well known. Surveys for mountain lions are

exceedingly difficult; attempting to count one of America's most elusive carnivores as it roams hundreds of square miles in remote deserts and mountains is no easy task. Small research budgets and limited access to private lands further complicate efforts to estimate mountain lion numbers. Some western states use mandatory harvest reporting to roughly estimate populations. In Texas, a few hunters and trappers voluntarily submit harvest reports, but most do not, making the number of hunted lions almost a complete mystery.

Recent genetic studies suggest that Texas has two distinct populations of mountain lions: a more robust west Texas population, and a possibly declining south Texas population. Genetic flow between these populations appears to be very limited. This may be an indication that very few lions exist between these populations.

While the core population centers are in west and south Texas, mountain lions periodically make their way into more the populated central and eastern portions of the state. These lions rarely threaten humans or livestock, but sightings often frighten those not accustomed to having a large predator in their back yards.

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Sighting a mountain lion in the wild is a rare event that few people get to experience. TPWD receives numerous reports of lion sightings each week, but many are difficult or impossible to confirm. A large number of the callers report seeing a "black panther," which leaves biologists in the awkward position of explaining that there has never been a proven case of a melanistic (black form) of a mountain lion. Any large black cats seen in Texas could only be escaped melanistic leopards or jaguars. However, it is unlikely that the large number of sightings of "black panthers" in Texas signifies a pandemic of escaped exotic felines. While the natural coat of an adult mountain lion is a rich tan color, they can appear very dark when in shadows or in low light. Possibly this accounts for the majority of Texas's "black panthers." Many dogs are also mistaken as mountain lions at a distance or in poor light. In contrast with dogs, mountain lions have a long body, a very long drooping tail, and a small head and ears.

While mountain lions can be dangerous and attacks on people do happen, they are extremely rare. There are just 20 confirmed fatal lion attacks on humans from 1890-2011. Eleven of these happened since 1979. Compare this to the 538 human deaths from domestic dogs from 1979-2011. If you do have a chance encounter with a mountain lion, and it displays aggressive behavior (stalking, crouching, etc.), make an effort to appear large and unafraid. If you are with other people, gather in a group. Put all children behind you. Do not run. Wave your arms, yell and throw objects. Pick up a stick or other improvised weapon and if attacked, fight back. The victims of most fatal mountain lion attacks are children, so if you're hiking in lion country be sure to keep kids in sight. Many other lion attack victims are runners. Avoid running in lion country, especially at dawn and dusk.

Despite the potential danger mountain lions present to people and livestock, public perception in Texas is relatively

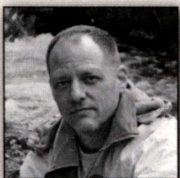
high. A recent survey found that 84% of respondents believed mountain lions were an essential part of nature and that 74% believed efforts should be made to ensure their survival in Texas. The high support for mountain lions signifies just how much Texas has changed since the early years of predator eradication.

With the strong public perception of mountain lions in Texas, it is increasingly important that biologists have reliable population data. Making effective efforts to ensure the continued survival of mountain lions in Texas requires accurate information and TPWD is currently investigating an innovative fecal genetic technique and footprint identification technique that may help. If successful, these methods could finally provide an efficient and effective way to monitor one Texas' most elusive carnivores.

Jonah is a Diversity Biologist working in the Alpine area.

2011 Saw Changes to the Wildlife Diversity Program at TPWD

By Mark Klym



John Davis became the Program Director after serving in the role as Acting Program Director since 2010. Previous to this, John has served as Program Director for the Conservation and Outreach Program, an Urban Biologist in the Dallas Fort Worth area and a field researcher studying endangered songbirds. John is committed to passing on the passion he has for wildlife to as many people as possible, and to helping other biologists convey this passion as well.



Richard Heilbrun is the new Conservation Outreach Coordinator for the Wildlife Diversity Program. Richard has more than 11 years experience providing technical guidance to landowners, conservation organizations, urban planners and developers. Richard has served as a Wildlife Biologist for the Victoria area, an Urban Biologist in the San Antonio area and an intern at Elephant Mountain Wildlife Management Area. He has also worked for the Caesar Kleberg Wildlife Research Institute and the Welder Wildlife Foundation.



Wendy Connally is the new Team Leader for several groups including the Texas Conservation Action Plan, the Permits Program and the Rare Species Program. Wendy has more than 20 years experience in rare species work including work with Texas Parks and Wildlife Department, Lower Colorado River Authority, Bureau of Land Management, and the Nature Conservancy in both Texas and Washington State.



Michelle Haggerty has added to her duties as coordinator of the award winning Master Naturalist program which she has overseen since 1999. She has taken on the oversight of the Outreach Programs in the Wildlife Diversity Program. Prior to her work with the Master Naturalists, Michelle has worked with the Michigan Department of Natural Resources Natural Heritage Program and the Michigan State University Extension Program.



The Desert Bighorn Sheep Restoration Effort: A work in progress

By Froylan Hernandez

Historically, the native Texas desert bighorn sheep occupied 15-16 mountain ranges in the Trans-Pecos region. In the 1880s, an estimated 1,500 bighorns inhabited these mountain ranges and possibly 2,500+ prior to 1880. However, by the mid-1940s, they had disappeared from much of their native mountain ranges. And by the early 1960s, the native bighorns had been extirpated. Their demise is attributed to unregulated hunting, the introduction of domestic sheep and goats that competed with bighorns for resources, domestic sheep/goat diseases that bighorns had not been exposed too, and net-wire fencing that impeded natural movements in search of food and water.

Protective measures were taken as early as 1903 with the prohibition of bighorn hunting and later with the establishment of the Sierra Diablo WMA (1945), a sanctuary for the few remaining bighorns. A cooperative agreement in 1954 between the Arizona Game and Fish Commission; Boone and Crockett Club; Texas Game, Fish and Oyster Commission; U.S. Fish and Wildlife Service; and Wildlife Management Institute marked the beginning of the restoration efforts in Texas. These efforts focused primarily on captive propagation. The first propagation facility was constructed on the Black Gap WMA and stocked with 16 desert bighorn sheep from Arizona in 1959. Additional facilities were constructed at the Sierra Diablo WMA in 1970 and 1983, and Chilicote Ranch in 1977.

Today, desert bighorns are coming back to their historic mountain ranges. Greatly in part to decades of work by Texas Parks and Wildlife Department, various state agencies including Arizona, Utah, and Nevada, as well as wildlife conservation groups such as Texas Bighorn Society, Wild Sheep Foundation,

and Dallas Safari Club. Of equal importance have been the many private landowners and individuals committed to the restoration and management of desert bighorn sheep.

Surveys resulted in nearly 1,100 sheep for Texas in September 2011, up from 822 in 2006 and 352 in 2002. Currently, restoration efforts have resulted in an estimated 1,300 bighorns occupying about half of their historic mountain ranges.

Since 1959, 596 desert bighorns have been restored to eight mountain ranges in the Trans-Pecos. Of these, 146 have been from out-of-state sources including, Utah, Nevada, Arizona, and Baja California, Mexico. The remaining 450 have been in-state transplants all occurring after 1971. Three major capture and transplants have occurred since 1971. The first was conducted in December 2000 when 45 bighorns (23 M, 22 F) were moved from Elephant Mountain Wildlife Management Area to Black Gap Wildlife Management Area.

The second was in December 2010 when 46 bighorns (12 M, 34 F) were transplanted from Elephant Mountain

WMA to the Bofecillos Mountains of Big Bend Ranch State Park. Up until this point, the Bofecillos Mountains and surrounding ranges had been unoccupied by desert bighorn for over 50 years.

The third took place in December 2011. It marked the largest in-state capture and transplant in Texas bighorn restoration history. A total of 95 bighorns (19 M, 76 F) were captured from the Beach, Baylor and Sierra Diablo mountains located north of Van Horn, TX. All bighorns were transplanted to the Bofecillos Mountains of Big Bend Ranch State Park, over 160 miles to the southwest.

Of the 141 bighorns that have been transplanted since December 2010, almost 80 have been fitted with radio-collars with transmitters that enable the monitoring the bighorns. Monitoring the bighorn permitted evaluation of the success of the transplant and provides data that will aid in our understanding of the bighorn and its management in Texas. Preliminary observations indicate some bighorns have made movements almost 15 miles to the north of the release site.

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[Bighorn Restoration, continued from page 6]

But movements have not stopped there. Several collared bighorns have ventured south of the border, crossing Rio Grande and making use of bighorn habitat on the Mexico side. Some of these bighorns have journeyed over 10 miles from the release site into Mexico. It appears a few bighorns travel back and forth, which will allow the identification of wildlife travel corridors.

Though there have been several milestones accomplished and these initial results are interesting, there is still plenty of work ahead and the future of the Texas bighorn restoration effort is a work in progress.

Froylan is the Desert Bighorn Sheep coordinator working out of Alpine.



[The Back Porch, continued from the back page]

spill over into collaboration with resource professionals in Mexico as well.

This part of the state has long been recognized as big ranch country, with many properties encompassing over 50,000 acres. While there has been some recent division of these properties, the Trans-Pecos has not experienced the extensive fragmentation that much of the rest of Texas has. While livestock operators still make up a significant portion of landowners, absentee landowners have purchased many Trans-Pecos ranches as recreation and investment opportunities. TPWD Wildlife Division staff have always worked with Trans-Pecos landowners concerning wildlife and habitat management, but the advent of the Managed Lands Deer Permit program for mule deer in 2005 jumpstarted requests for technical assistance in a big way. This popular program provides mule deer managers increased harvest flexibility while requiring them to maintain an active wildlife management plan approved by a TPWD wildlife biologist. This interest definitely increases our interface with landowners and managers, and assists in ultimately putting conservation on the ground. It also taxes an already full work load. During an average year, most Trans-Pecos District Wildlife staff spend about a quarter of their time on technical assistance to landowners.

The Trans-Pecos is home to five of the six native big game animals found in Texas (all but alligators) and we spend a lot of time on activities associated with big game. With the lack of roads and rough terrain found out west, aircraft have been a constant tool of the trade for estimating populations for years, and we currently complete aerial surveys for three species. Fixed wing (airplane) surveys for pronghorn occur in June and July and biologists track populations, as well as issue permits to private landowners. In August, desert bighorn sheep surveys are carried out with helicopters over much of the rougher terrain, with data again used to track populations and issue permits. Helicopter mule deer surveys typically occur in January and February and

allow biologists to get a good handle on “post-hunt” population information.

Various other responsibilities fill up the rest of wildlife biologists’ time pretty quickly. From completing dove and quail surveys, to assisting with desert bighorn sheep hunts on wildlife management areas, to giving wildlife habitat presentations to civic and educational groups, there is always something different to do. This variety is probably one of the most attractive components of these jobs, and it means we are usually busy at any given time of the year.

Once in a while, we might be fortunate enough to help with the active restoration efforts of a particular species. The last few years we have assisted with the trapping and relocation of both pronghorn and bighorn sheep. These are fantastic opportunities for staff to actually get their hands on critters and partake of an activity they dreamed of when they started down this career path in college.

Of course unforeseen issues and needs often take a large percentage of our time and/or are manifested at inopportune times. Spending significant hours on politically charged subjects such as dunes sagebrush lizard recommendations, or receiving a call about a nuisance black bear that might have to be darted and moved at 3 a.m. all add to the challenges of working with natural resource management in the Trans-Pecos. Couple those challenges with the isolation and relative seclusion found in many communities in this part of Texas, and one can see why it may be hard for employees (and their families) to commit to this lifestyle.

However, for those that can make it happen, the rewards of being a wildlife biologist in the Tran-Pecos can result in sizable professional rewards by actually getting one close to some of the neatest wildlife resources our great state has to offer, even if you do have to drive 50 miles for groceries.

Billy is the Trans-Pecos Wildlife District Leader.

Fishes of the Texas Desert

By Stephanie Shelton and Gary Garrett

Organisms of the Chihuahuan Desert in Texas present biologists with some of the most fascinating examples of how to exist in an extreme environment. Unfortunately, they also present us with some of the most formidable challenges to resource conservation and ensuring survival of these sometimes rare species. The mission of Texas Parks and Wildlife Department is to make sure that future generations of Texans can count on healthy, intact ecosystems such as the Chihuahuan Desert, but we could not do it without the many partners we work with (e.g., state and federal agencies, NGOs and universities) and most importantly the stewardship of the private landowners of Texas. Here are some of our interesting species and issues.

RIO GRANDE SILVERY MINNOW

If you are fortunate enough to see a Rio Grande silvery minnow (*Hybognathus amarus*) swimming in the waters of the Texas Big Bend region, it is due to a coordinated effort of Texas Parks and Wildlife, U.S. Fish and Wildlife Service, National Park Service and University of Texas–Pan American. To date, over one million fish have been released into the Rio Grande, in and adjacent to Big Bend National Park and Big Bend Ranch State Park, in an experimental effort to restore this once common minnow of the Rio Grande.

The Rio Grande silvery minnow was extirpated from Texas in the 1960s with the only remaining population located near Albuquerque, New Mexico. With approximately six percent of its historic range still intact, this species was very near extinction and was listed as endangered on July 20, 1994.

It is typically reasoned that the decline in this minnow's abundance and range was due to decreased water

quality and quantity. Recent studies have also suggested that changes in the geomorphology of the Rio Grande along with reduction of drift zones which facilitated egg development are another cause. Presently, connectivity, stream-flow, and habitat and water quality issues are being addressed with the goal of improving this portion of the watershed.

PECOS PUPFISH

In the Pecos River basin of Texas and New Mexico, there are saline waters that are home to the Pecos pupfish (*Cyprinodon pecosensis*). In Texas, the only remaining location of this species occurs in Salt Creek, Reeves County, Texas. In New Mexico there are still multiple locations that exist.

The Pecos pupfish was on the candidate species list for some time but it was removed in 2001. It was determined that a Conservation Agreement could be as, if not more, effective in reducing threats to its populations than listing it under the Endangered Species Act. The

Conservation Agreement was designed to facilitate and encourage conservation and stewardship by private landowners and provided assurances of no negative repercussions if the fish were to eventually be federally listed. Although not mentioned as a reason for removal from the candidate list, in Texas it signified the good faith effort of keeping this species "common" in light of any possible tensions between landowners and government entities.

The Texas population differs genetically from the New Mexico populations and is the most susceptible to extinction due to introgression by the sheepshead minnow (*Cyprinodon variegatus*). Other stressors like the quality of their habitat (groundwater depletion, drought, and water quality degradation), golden alga toxic blooms, and geographic variations add further pressure to an already small population.

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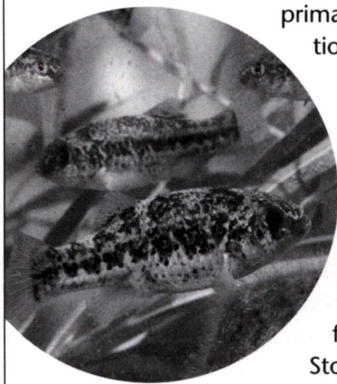
Research and watershed improvements aim to help the Rio Grande silvery minnow.



San Solomon Springs Ciénega

By Mark Lockwood

Although Balmorhea State Park is best known for the spring-fed pool, it is also an important conservation area. San Solomon Spring flows at a rate of at least 15 million gallons a day and prior to the construction of the pool by the Civilian Conservation Corp (CCC) in the 1930s this spring formed a large ciénega. These desert marshes provided important habitat for a wide variety of aquatic organisms. San Solomon Spring is home to a number of species of conservation concern including two fishes and three invertebrates that are either listed as endangered or threatened or are candidates for listing. This makes the 45-acre Balmorhea State Park a very important conservation area.



The state park is the primary conservation area for the endangered Comanche Springs Pupfish (*Cyprinodon elegans*). This fish was also found at Fort Stockton in Comanche Springs before that spring ceased flowing in 1961. Surveys at San Solomon Spring for this small fish in the late 1960s raised concerns about the continued survival of the species. This resulted

in the construction of a refuge for the species in 1975. This concrete refugium also provided habitat for the endangered Pecos gambusia (*Gambusia nobilis*) and the three rare invertebrates: Phantom Spring snail (*Tryonia cheatumi*), diminutive amphipod (*Gammarus hyalleloides*), and Phantom Lake cave snail (*Cochliopa texana*). This small refuge played a very important role in the continued existence of these organisms for nearly 20 years. In the early 1990s a multi-partner project was started within the state park to expand the amount of habitat available and help conservation of these organisms as well as San Solomon Spring itself. The completion of the San Solomon Ciénega in 1994 provided a larger, more natural wetland.

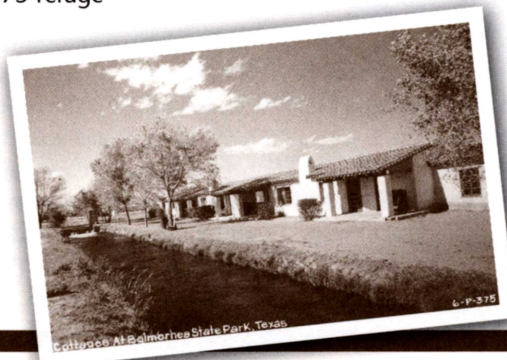
In addition to constructing the pool, the CCC also built a motor court and other buildings. The 1975 refuge was built to encircle two sides of the motor court and by 2006 the concrete bottom was severely cracked and

leaking water.

This was damaging the adobe walls of the courts and TPWD started looking for solutions that would protect both the fish and the historic building. The only viable solution was to move the water farther away from the building and grade the surface to keep water away from the walls. The potential to build more high-quality habitat for the fish similar to the San Solomon Ciénega led to a partnership with the U.S. Fish and Wildlife Service (USFWS). During 2008 the plan for construction of a new ciénega was developed through a Section 6 grant from the USFWS. This allowed construction to start in 2009. In addition to the USFWS other groups were very important to the completion of the project, including the Reeves County Water District, the Texas Department of

Transportation (TxDOT), Sul Ross State University, and the Tierra Grande Master Naturalists.

[Continued on page 10]



DEVILS RIVER MINNOW

The Devil's River minnow (*Dionda diaboli*) is found only in a unique area where three very special ecoregions overlap. These are the Edwards Plateau, Southern Texas Plains and the Chihuahuan Desert. Spring fed streams and rivers of this area that have gravelly or riverine cobble substrates, channels, and rapid water flow are the preferred habitat for the Devils River minnow. Today this state and federally threatened fish species is only found in the Devils River, San Felipe Creek, and Pinto Creek — only a small portion of its original range from Rio Grande tributaries in this part of Texas and northern Mexico.

Presently, the biggest threats to this species are water quality and quantity degradation as well as non-native species. These factors have been exacerbated by dam construction, causing fragmentation and habitat deterioration, as well as continuing drought conditions.

Efforts are being made to conduct further research on the life history of this fish. Additional information on its feeding patterns, reproductive behaviors, and life span may help in its recovery. This information coupled with watershed conservation and good land stewardship will help to improve and maintain habitat quality for not only *D. diaboli* but also all the other inhabitants of the region.

RIO GRANDE CHUB

The Rio Grande chub (*Gila pandora*) is found in Little Aguja Creek in the Davis Mountains, Jeff Davis County, Texas. Elsewhere, it is found in limited portions of the Rio Grande, Pecos, and Canadian basins of New Mexico and the Rio Grande and Pecos basins of southern Colorado. Presently, it is considered a sensitive species according to the USFS Region II and has special status among other agencies.

The preferred habitat of the Rio Grande chub is found in fast-flowing, cool, clear, headwaters of creeks and smaller rivers that exhibit sandy to gravelly substrates. Areas that include pools, undercut banks, and overhanging vegetation and macrophytes are where this species tends to congregate. At this time, it is suggested that this species is no longer found in the mainstem of the Rio Grande but now only in tributaries.

Threats to this species include water flow issues and fragmentation due to water diversion structures such as dams and reservoirs, non-native, invasive species have increased competition as well as predation on the chub. Finally, habitat alteration and degradation have changed the structure of the riparian areas, decreasing the availability of preferred habitat for the species.

Stephanie is Science and Policy Coordinator for Inland Fisheries working out of Austin. Gary is the director of the Watershed Policy and Management Program working out of Austin.



The planning process was the easy part of the project and construction started in the summer of 2009. The Balmorhea TxDOT office was a major contributor to the construction of the new ciénega by providing man-power and equipment for the regrading of the surface and construction of the wetland. This process turned out to be more difficult than originally anticipated because of the incredible gravel bar that was just under the surface. Despite difficulty, the Clark Hubbs Ciénega was completed and water was flowing through the wetland by spring 2010. This phase of the project is just part of the story, the fantastic

[San Solomon Springs Ciénega, continued from page 9]

capacity of these desert fishes to occupy new habitat was something to see.

As part of the construction process a population of the endangered fish were moved from the old concrete refuge into the main portion of the wetland which was maintained using spring water. However due to fish-eating birds and other factors the number of fish present by the time the water was flowing in April 2010 seemed to be low. The response to the stabilized environment brought about by the constantly flowing water was nothing short of astounding. Within two weeks there were hundreds, if not thousands, of juvenile fish in the new system. Chad Hargrave from Sam Houston State University and his students began studying the productivity of the new ciénega and collected data that support what was readily apparent. There were excellent numbers of Comanche Springs pupfish by mid-summer and that trend has continued. The same is true for

the other species of conservation concern. We have also learned that there are productivity differences between the two ciénegas and are looking for ways to increase the populations of these fish in the San Solomon Ciénega based on these data.

There have been several benefits to this project, both to the park and the fish. Despite some of the difficulties in constructing the wetland, it is functioning better than anticipated as a refuge for the aquatic organisms associated with San Solomon Spring. We have taken a big step forward in the protection of the Comanche Springs Pupfish in particular and we hope to be able to build on that momentum. The success of the design of the wetlands has also removed a danger to the historic CCC motor court and added to the overall aesthetics of the park.

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Habitips

Simple things you can do on your land to enhance wildlife value.

April

- Monitor grazing program to provide nesting cover and plant diversity.
- Continue controlling feral hogs through hunting or trapping.
- Clean and store prescribed burning equipment.
- Develop a checklist of birds you see in various habitats.
- Clean your hummingbird feeders every three to four days.
- Continue to trap brown-headed cowbirds.
- Protection of roost sites is essential in areas with limited numbers of large roost trees. Turkeys like a lot of open space adjacent to roost sites for.
- March, April and May are prime wildflower blooming.

May

- Leave some unharvested winter crops next to edges of field.
- Monitor grazing program to provide nesting cover and plant diversity.
- Prepare ground and plant summer food plots.
- Clean your hummingbird feeders every three to four days.
- Monitor wildlife food plots. High-protein foods in May and June are critical to good antler growth.
- Continue controlling feral hogs through hunting or trapping.
- Cowbird trapping season ends May 31. Report all trapping data to TPWD.
- After dispersal of wintering flocks, juniper and mid-story hardwoods should be thinned adjacent to roost sites when they become too dense to provide for open space from the ground to tree branches where turkeys roost.
- Begin fire ant control as daytime temperatures reach 85 degrees.

June

- Monitor grazing program to provide nesting cover and plant diversity.
- Continue to control feral hogs through hunting or trapping.
- Leave some unharvested winter crops next to edges of field.
- Before mowing, walk through hay meadows in order to reduce wildlife mortality, and consider leaving unmowed strips.
- Do not mow wildflowers until the seedpods have matured. Mowing at the proper time will ensure reseeding for a good crop for following years.
- Make sure summer wildlife water sources are operable.
- Clean your hummingbird feeders every three to four days.

July

- Monitor/fluctuate water levels in wetland areas.
- Monitor grazing program to provide nesting cover and plant diversity.
- Continue to control feral hogs through hunting or trapping.
- Provide supplemental water for wildlife as necessary.
- Complete wetland dike repairs as needed.
- Defer grazing in some pastures to ensure adequate nesting cover for ground-nesting birds next spring.

- Start planning for fall youth hunts to assist in reaching wildlife management population goals.
- Clean your hummingbird feeders every three to four days.

August

- Monitor wetlands for signs of botulism. Notify TPWD of any disease problems.
- Monitor grazing pressure on rangelands and move cattle accordingly.
- Conduct spotlight deer counts.
- Roadside disking will promote germination of both warm and cool season forbs.
- Defer grazing in some pastures to ensure nesting cover for ground nesting birds.
- Provide supplementary water for wildlife when necessary.
- Clean and maintain bird feeders.
- Clean and maintain nestboxes when birds have finished. Prepare some boxes to serve as winter shelter.
- Increase the concentration of sugar in hummingbird feeders to prepare for migration.

September

- Prepare ground and plant winter crops.
- Conduct soil tests on food plot sites.
- Shred or disk sunflowers, millet or goat weed for dove feed.
- Shred around tanks to facilitate doves coming to water.
- Continue control of feral hogs.
- Begin flooding moist soil units for ducks.
- Defer grazing on some pastures to protect nesting cover for ground nesting birds.
- Hummingbird migration peaks this month, begin providing additional feeders for winter hummingbirds.



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Texas Parks and Wildlife Department
Wildlife Diversity Program
4200 Smith School Road
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The Back Porch

KEEP TEXAS *wild!*

What We Do: Work as a Trans-Pecos Wildlife Biologist

By Billy Tarrant

Several years back, during a social event at a TPWD Wildlife Division staff meeting, I subjected many of my unprepared coworkers to an impromptu poll questioning their professional desires. My question was simple: "As a wildlife biologist, putting all other personal conflicts aside, what part of Texas would you most want to work in?" Without exception, each of my victims responded that the Trans-Pecos would be their first choice. And, without exception, they each followed that up with several personal conflicts that would prohibit them from ever working in the Trans-Pecos.

The Far West Wildlife Team of Texas Parks and Wildlife is split into two forces. The Wildlife Management Area (WMA) personnel are primarily in charge of the

three WMAs found here: Black Gap, Elephant Mountain and Sierra Diablo. The district component of this team includes wildlife biologists with particular counties of responsibility, as well as specialists in both technical guidance and nongame. In the next few paragraphs I will try to summarize some of the responsibilities of the "district" side of this team, as well as why we enjoy working in this unique and isolated locale.

The landscape of the Trans-Pecos Ecological Region is definitely the most varied in our state. Marked differences in geology, elevation and annual precipitation result in a various array of plant communities and associated wildlife populations. From Gambel's quail and screwbean mesquites along the Rio Grande to ponderosa pine trees and

band-tailed pigeons in the higher mountain ranges, this part of Texas definitely merits the label "diverse." To quote the authors of the valuable resource book *Rare Plants of Texas*, "Its landscape is so varied that any attempt at an overall description requires countless digressions regarding interesting exceptions." One exception is actually the name "Trans-Pecos." Most descriptions of this eco-area also include the fascinating sandhills around Monahans, which are in fact on the east side of the Pecos River.

Land ownership in far west Texas is also varied. This area encompasses more public land than anywhere else in the state. National parks, state parks and WMAs all present unique opportunities for conservation partnerships that actually

[Continued on page 7]