Using Science to Accelerate Desert Bighorn Sheep Restoration

The thought of bighorn sheep invokes images of rugged mountains, hard hikes and exciting adventures to many enthusiasts. Although few people have had the opportunity to hunt such a regal creature, many individuals and organizations have been involved in restoring and conserving it. Throughout the 20th century, most of western North America suffered a huge decline (and, in some cases, a complete loss) of bighorn populations. Texas was no exception.

In the late 1800s, there were believed to be 1,500 desert bighorn roaming throughout 16 mountain ranges in the Trans-Pecos region of Texas. By the early 1960s, the last of the native bighorn were believed to be extirpated from the state. Starting in 1954, the Texas Game and Fish Commission (now Texas Parks and Wildlife Department) initiated restoration efforts with cooperative agreements between several agencies and organizations. In 1957, desert bighorn were captured from Arizona and translocated to Texas. Over the next 40 years, 146 desert bighorns were captured from Nevada, Arizona, Utah and Mexico and released in Texas brood facilities. Over time, bighorn populations grew within the enclosures, and excess individuals were liberated to the open mountain ranges. Today, with the help of numerous individuals and organizations, desert bighorn occupy nine of their 16 historic mountain ranges and recent population estimates put their numbers at approximately 1,400–1,500 individuals.

Beginning in 2010, desert bighorn restoration greatly accelerated in Texas. In December of 2010, 46 bighorn were captured from the Elephant Mountain Wildlife Management Area (EMWMA) and transported to Big Bend Ranch State Park (BBRSP). BBRSP is currently the only state park in Texas occupied by bighorn. The following December (2011), bighorn populations at BBRSP were augmented with an additional 95 bighorn from the Beach, Baylor and Sierra Diablo Mountains (Sierra Diablo meta-population). Just one year later, 44 bighorn were captured from EMWMA and transported to suitable habitat in southern Brewster County. This restoration venture marked the 500th bighorn born and raised in Texas to be translocated from in-state sources.

In January 2014, TPWD once again captured and translocated 61 bighorn from EMWMA and released them into formerly occupied habitats in the Sierra Vieja Mountains. With these last four captures, a total of 246 bighorn have been transported and released into three of their formerly inhabited historic mountain ranges.

Partnering with TPWD, the Borderlands Research Institute at Sul Ross State University has been at the forefront of desert bighorn sheep research in Texas. Since 2010, 154 bighorn (55 rams and 99 ewes) of the 246 captured and released have been fitted with GPS radio collars for research purposes. The collars are programmed to collect GPS locations every three to five hours for up to 25 months. This data helps us analyze movements, range sizes and habitats utilized by the bighorn. The collars also allow us to locate and monitor the bighorn in their everyday activities and determine causes of mortality.

From our data and field observations at the three study sites of BBRSP, southern Brewster County and Sierra Vieja Mountains, we have learned many valuable lessons. Over the last four years, we have investigated 53 bighorn mortalities. Of the 53 mortalities, 19 were killed by mountain lions, one fell from a cliff, two died in a water catchment, one ewe died from birth complications, one ram died from toxic plants, one ram died from an injury it received while fighting, and 22 deaths were from unknown causes. There were also six documented mortalities of bighorn rams with skin conditions that we believe to be associated with the parapox virus (e.g., sore mouth). Five of the six cases consisted of mature rams.

Although the causes of mortalities that we report above are typical, we believe the amount of mortalities associated with predation, toxic vegetation, drowning and unknown causes
were likely higher than usual because of drought-like conditions. As many of you may remember, 2011 and 2012 were very hot and very, very dry throughout most of Texas; this was especially true for the Big Bend region. Even some of the most well adapted desert plants (i.e., cacti, lechugilla, sotol, mesquite and others) were either dead or dying during this time. Fortunately, the desert habitats that bighorns prefer respond quickly to rainfall. Most notably, we documented that bighorn mortalities decreased once measurable rains returned to the area. As habitat conditions improved with rain, desirable forage became more abundant and was better distributed. The improved habitat conditions also led to increased populations of small mammals and other big game species which likely helped reduce the mountain lion predation on bighorns.

We are still actively monitoring bighorns in the Sierra Vieja and southern Brewster County mountains, but have retrieved 54 collars from the BBRSP study. The collars have produced over 100,000 GPS points for our analysis, revealing that bighorns dispersed in all directions of the release site at BBRSP. The greatest recorded distance from the release site was by a ewe more than 40 miles north of the release site. Collectively, the translocated bighorns used over 1.25 million acres of habitat. Nearly 40 percent of the 54 collared bighorns were documented crossing into Mexico and 33 percent ventured onto private lands outside of BBRSP boundaries. The high percentage of bighorns crossing into Mexico demonstrates that our restoration undertakings are on a scale more grand than previously imagined. Just as Texas lost all of its native bighorn during the mid-1900s, the states of Chihuahua and Coahuila, Mexico did so as well. Unlike BBRSP, adequate accessibility on the two other study sites has allowed us to better monitor the translocated bighorn throughout the year. Interesting movements, behavior and ecology have been noted for both collared and uncollared individuals at these sites. We have had bighorn from the southern Brewster County mountains return to EMWMA and then go back to the translocation site. We currently do not know how many bighorn have traversed back and forth between these mountains, but we are hoping these movements continue. Movements and behaviors from ewes with and without lambs appear to differ during the lambing and nursing periods at these sites. Timing and investigation of the lambing season and the lambs’ survival is underway with more in-depth research planned for the future.

Although the research and monitoring of these studies are short term, the knowledge gained will hopefully better our understanding of bighorn restoration and conservation efforts in Texas. One of the greatest lessons affirmed from our recent endeavors is the necessity for cooperation on all levels: public, private and international. Recent bighorn translocations have helped unite numerous individuals, landowners, organizations, agencies, properties, states and even countries for one of the most noble causes – conservation. Without collaborative conservation, the desert bighorn sheep restoration program would not be where it is today.