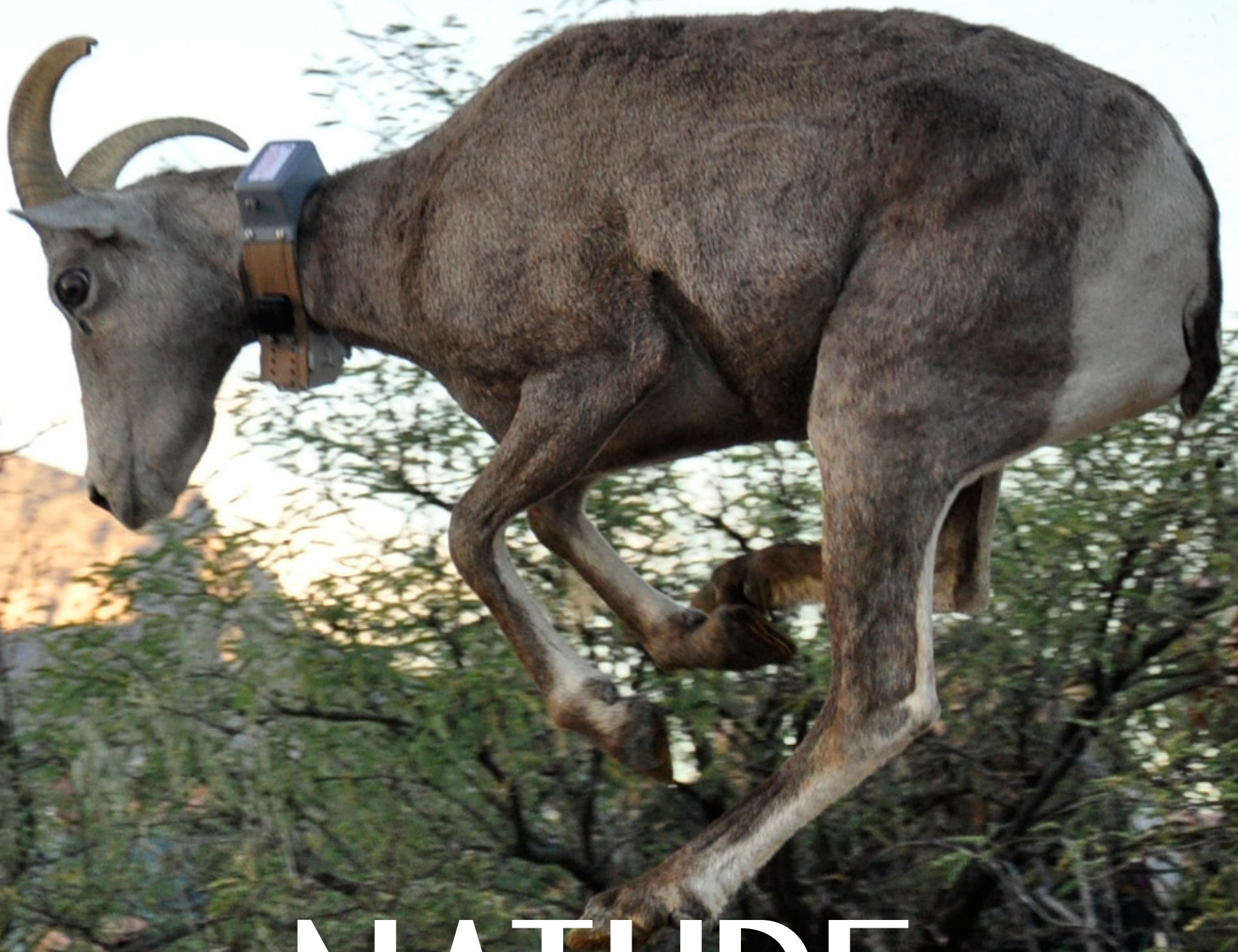


# REBALANCING



# NATURE

Reintroducing Desert Bighorn Sheep  
to the Santa Catalina Mountains

**STORY AND PHOTOGRAPHS BY CATHY ROSENBERG**

A desert bighorn sheep jumps from the trailer that brought it to Catalina State Park. In November 2013 the Arizona Game and Fish Department released 31 bighorns into the Santa Catalina Mountains.





**A HELICOPTER TRANSPORTS CAPTURED BIGHORN SHEEP TO A STAGING AREA AS PART OF A PROGRAM TO RE-ESTABLISH A VIABLE POPULATION IN THE CATALINAS.**

**T**he helicopter lands easily on the concrete slab. Hurriedly, the team onboard carries the desert bighorn sheep to a stretcher. Blindfolded and entangled in a capture net, the sheep is moved to a nearby staging area.

Many hands restrain the animal as the twisted net is quickly removed. The ram struggles, and then relents as he is poked, prodded and processed in preparation for transport to his new home in the Santa Catalina Mountains near Tucson.



**WILDLIFE SPECIALISTS FROM ARIZONA GAME AND FISH EVALUATE THE SHEEP'S HEALTH AND EQUIP THEM WITH GPS MONITORING COLLARS. THE SHEEP WILL BE TRACKED AS THEY VIE FOR A FOOTHOLD IN MOUNTAINS WHERE BIGHORNS ROAMED UNTIL THE LATE 1990S.**



“Overheating is the greatest concern during the capture,” says Anne Justice-Allen, a wildlife health specialist for the Arizona Game and Fish Department. Overheating can cause capture myopathy, a stress-related complication from problems such as overexertion that sometimes occur during capture. The condition damages muscles and can lead to heart failure.

After a temperature reading, cool water is poured over the animal. The sheep is given oxygen and an intravenous drip to help keep him from overheating during his evaluation.

Along with a team of assistants, Justice-Allen draws blood, takes nasal and oral swabs to check for respiratory diseases such as pneumonia, and snips a small piece of skin from the sheep’s ear for DNA testing. Then a biologist attaches a satellite GPS radio collar to the ram’s neck.

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A captured sheep is processed at a staging area in the Imperial National Wildlife Refuge, north of Yuma, Ariz. The sheep are given oxygen and an intravenous drip to offset the effects of stress.

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The GPS system will show Arizona Game and Fish where the sheep is located after his release. If satellite reception is good, the system will upload at 7 a.m. each day and indicate four of the ram’s locations from the past 24 hours.

Twenty-one adult ewes, three yearling ewes, five adult rams and two yearling rams were captured in the Trigo Mountains near Yuma, Ariz., and the Plomosa Mountains near Quartzite, Ariz. Shortly after sunrise on the two days of capture, helicopters headed out into the mountains in search of sheep.

Arizona Game and Fish contracts the copters. Their pilots come from Grand Canyon Papillon Helicopters, the company that flies helicopter tours of the Grand Canyon.

A nonlethal net gun is shot from one copter as it hovers over the sheep. The net entangles the animals, which are then scooped up by the crew and brought back to the staging area.

The operation took place on a weekend in November 2013. The following Monday morning the sheep were released in Catalina State Park as the first phase of the Catalina Bighorn Restoration Project.



The reintroduction leaves many questions unanswered. No one knows if the sheep will become a self-sustaining population. The bighorns might fall victim to the same fate that caused their disappearance from the Pusch Ridge Wilderness Area of the Catalinas in the late 1990s. Sheep had thrived in that range through most of the 20th century.

“No one is really certain why the original herd disappeared,” said Mike Quigley, the Arizona representative for the Wilderness Society. “It was likely due to a combination of factors.”

The sheep declined as the number of people living in the region grew. That correlation suggests that human encroachment might have contributed to the sheep’s demise.

Other theories include the effects of fire suppression on bighorn habitat, predation by mountain lions and disease passed to the native sheep by their domestic cousins. In the last two decades, much speculation has occurred about why the sheep disappeared, but no definitive answer has been confirmed.

## HISTORICAL PRESENCE

**D**esert bighorn sheep have roamed the American Southwest for tens of thousands of years — from what is now Mexico into Arizona and Nevada, through southern New Mexico and western Texas.

In the 1800s large populations lived in nearly all the mountainous regions of Arizona. As settlers moved in, the number of bighorns declined. Diseases transmitted by domestic sheep brought from Europe infected and killed the native sheep. The bighorns didn’t have enough evolutionary time to adapt to these new diseases.

Unregulated hunting and loss of traditional water sources might also have contributed to the bighorns’ decline. Bighorn meat was commonly sold in Arizona markets in the late 1800s.

As early as 1887, bighorns gained protection in the Arizona Territory. This protected status, however, did not result in an increased abundance of sheep. The factors contributing to their decline continued to affect their overall numbers.

Two national wildlife refuges — Kofa and Cabeza Prieta — were established in 1939, providing 1.5 million acres in southwestern Arizona for the bighorn sheep as well as other wildlife. About 900 bighorns still live in these two refuges. By the early 1990s, however, their range elsewhere in the state had been reduced to the Grand Canyon and a few other remote areas.

Today the desert bighorn sheep again occupy many of their historical sites in Arizona because of translocation projects implemented by Arizona Game and Fish. More than 5,000 sheep now live throughout the state.



The bighorn sheep disappeared from the Catalinas in the late 1990s, when construction and development brought in large numbers of new residents. The roadways expanded, with some 55,500 cars now passing along Oracle Road daily at the Ina Road intersection, according to the Arizona Department of Transportation.

One theory is that the mere presence of people precipitated the bighorns' decline. "The sheep are notoriously sensitive to humans, especially during lambing season," said Randy Serraglio, the Southwest conservation advocate for the Center for Biological Diversity. "Hikers can cause sheep to scatter and get separated from their young."



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Humans can also prevent sheep from moving freely from one part of their habitat to another in search of food and water. Ewes can miscarry when frightened by humans, Serraglio said.

In response to the declining population, the U.S. Forest Service instituted hiking and trail restrictions in the historical lambing areas in 1996. Those restrictions are still in place.

Hikers are instructed to stay on hiking trails. No off-trail hiking or bushwhacking is allowed from January through April, when the ewes give birth and nurture their newborn lambs. Dogs are also banned from lambing sites because they traumatize sheep. Research has shown that bighorns have higher heart rates when dogs accompany hikers than when hikers are alone.

"Encroachment of the urban area may have also cut off connectivity corridors that the sheep used to get from the Catalinas to other mountain ranges around the Tucson Basin," Serraglio said.

## PLAYING WITH FIRE

**A**long with human encroachment, fire suppression and predation are thought to be responsible for the disappearance of the sheep. Historically, the mountain ranges in Arizona burned on a regular basis. Natural fires, usually set by lightning strikes, "maintain the forests by keeping the undergrowth in balance with the rest of the ecosystem," Serraglio said. "There was no one around to put the fires out."



In recent decades, however, the U.S. Forest Service has routinely extinguished forest fires. Because of fire suppression, the undergrowth grew thicker. “The change in forest structure may have crowded out the sheep’s preferred forage,” Quigley said.

The dense vegetation also created hiding places for mountain lions, Quigley said. The sheep could not see the lions and were more likely to fall victim to attacks.

Conditions needed to change if the species was going to be restored to the region. “There has always been a desire to put sheep back into the Catalinas,” said Joe Sacco, a field supervisor for Arizona Game and Fish.

After two large fires in the Pusch Ridge Wilderness Area — the Bullock Fire in 2002 and the Aspen Fire in 2003 — the habitat again became suitable for bighorn sheep. The fires reduced the opportunity for mountain lions to prey on sheep and also increased the grasses, forbs and shrubs like jojoba and fairy duster that sheep eat, Serraglio said.

The U.S. Forest Service is exploring a new policy to allow some of the natural fires in sheep country to burn — as long as they do not threaten human life or property. Prescribed burns will not only help maintain better conditions for sheep but will also re-establish a healthy ecosystem naturally driven by fire.

## FORMING A COALITION

Typically, Arizona Game and Fish uses an accumulation of biological data to manage wildlife. The agency sometimes consults with conservation organizations and holds public hearings to solicit community input.

With the bighorn translocation, however, the agency wanted to implement creative solutions to some of the existing issues, particularly management of fire and predation by mountain lions. “We knew this project was going to be controversial and wanted broad support from the community,” Sacco said.

The Catalina Bighorn Advisory Committee was formed to bring to the table many diverse voices interested in public lands and a healthy wildlife population. Representatives from the Wilderness Society, Arizona Wilderness Coalition, Center for Biological Diversity, Sky Island Alliance and Arizona Bighorn Sheep Society joined the committee. The members work closely with Arizona Game and Fish and the U.S. Forest Service in making decisions about translocating the bighorns to the Catalina Mountains.

Participating on the advisory committee created an opportunity for the conservation community to work hand in hand with Arizona Game and Fish. In the past, Sacco said, the agency did not always have a good working relationship with some environmental groups.



The Wilderness Society was interested in restoring a population of desert bighorn sheep “to where they rightfully belonged, within the context of a larger restoration project for the mountain range as a whole,” Quigley said.

Forming a committee could be a good model not only for the success of the bighorn project but also for wildlife restoration in the rest of the state. The high level at which the coalition influences decision-making in the restoration project is unprecedented in any wildlife management undertakings in Arizona, Quigley said.

If the advisory committee could agree on the bighorn translocation, then maybe this type of committee could again be used in other environmental restoration initiatives. “At the Center for Biological Diversity we believe every species is important,” Serraglio said, “especially in a time when species are winking out faster than they have in millions and millions of years.”

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A desert bighorn sheep is doused with water to reduce overheating after its capture.

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Biologists and wildlife managers at Arizona Game and Fish believe that a healthy, robust population of mountain lions lives in the Catalina Mountains. Track counts and scat analysis, plus the large number of lions taken by hunters in recent years, support this theory. White-tailed deer and javelina, the lion’s primary prey, also thrive in the range, indicating that the predator population is probably large too.

“The best way to determine if a healthy number of lions exists in a region is through hunt harvest information,” said Ben Brochu, a wildlife manager for Arizona Game and Fish. Hunting mountain lions is legal in the state, and Arizona Game and Fish issues yearly tags to interested hunters.





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Mountain lions are very difficult to survey because they are secretive. Lions avoid human contact and are rarely seen. This behavior leads people to a false assumption that mountain lions are rare or even endangered.

In addition, the lions have large home ranges. Those found in the Catalinas are part of a



metapopulation that roams the Catalina, Rincon, Tortolita and Galiuro ranges. Because of this enormous area, “There is no such thing as a limited or fixed mountain lion population in the Catalinas,” Brochu said.

Mountain lions reproduce more quickly than their prey. The females have litters of one to six kittens every year and a half. About 66 percent survive.

Bighorn sheep, however, are more susceptible to drops in population because of their low reproduction rate. “Ewes usually only have one lamb a year, with about a 20 to 25 percent success rate,” Sacco said. Lambs fall off cliffs, die from disease and are lost to mountain lions and other predators such as golden eagles.

The ultimate goal is for sheep and lions to coexist in a natural balance. But until the sheep population is stable, the advisory committee supports a short-term predator management protocol for mountain lions. If a mountain lion preys on bighorn sheep, a hunter will be sent in to attempt to kill the lion. Usually a mountain lion will remain in the vicinity of its kill for several days. If five days go by and the lion is not found, it won’t be removed. A mountain lion with kittens will be spared.

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The animals remained in one area for several days. “It took time for the sheep to relax and begin to explore their new surroundings,” Brochu said.

After the sheep calmed down, they started moving around more and found suitable terrain higher up on peaks and cliffs with an open field of view.

The Arizona Desert Bighorn Sheep Society has been working with Arizona Game and Fish to reestablish desert bighorns for more than 40 years, said Brian Dolan, past president of the Arizona Desert Bighorn Sheep Society and a member of the Catalina Bighorn Advisory Committee.

One of the first translocation projects the two organizations worked on together was in Aravaipa Canyon. “The new, reintroduced population is doing quite well,” Dolan said. Overall, the translocation projects in Arizona have been about 70 percent successful.

## THE RELEASE

The trailer loaded with desert bighorn sheep sat at a distance from the group of spectators at Catalina State Park. Before the release a representative from the Tohono O’odham Nation spoke privately to the sheep. He said they were ready to go into their new home.

When the gates opened, there were a few moments of silence, followed by banging as most of the sheep bolted. Others, probably unsure of what was happening, had to be pulled out by their horns. One sheep jumped out of the trailer, stopped, looked around at the crowd of people and then skedaddled, following the other sheep into the mountains.

The GPS monitoring collars help Arizona Game and Fish keep track of the sheep. A few days after the release, many of the sheep had shifted to two canyons farther east, an area used in the past for lambing. One ram had roamed higher into the mountains.

Another ram had not moved much since the release. A few days later that ram died, most likely from capture myopathy, which can persist for two to four weeks after release.

By the second weekend, two ewes had been killed by mountain lions. As established by the management plan set up for the project, a houndsman and a wildlife manager were sent into the area where the sheep were killed. Separately, the men found and shot the two mountain lions responsible for killing the two sheep, whose remains were found in both of the lions’ stomachs.

A third ewe was killed by a mountain lion and found on Dec. 9, bringing the total mortalities up to four. The mountain lion responsible for the recent death was not removed because snow and ice prevented the hunter’s dogs from picking up a scent.



The rest of the sheep have begun moving into habitat where mountain lions are less likely to prey on them.

The plans for reestablishing a viable herd remain in place. Arizona Game and Fish intends to capture about 30 sheep in 2014 and another 30 in 2015 for release into the Catalinas.

*This story appeared in the Tucson Weekly on Jan. 8, 2014.*

**TWO RELOCATED SHEEP SET OFF INTO THE MOUNTAINS AFTER THEIR RELEASE. THE SHEEP FACE MANY CHALLENGES, INCLUDING PREDATION BY MOUNTAIN LIONS.**





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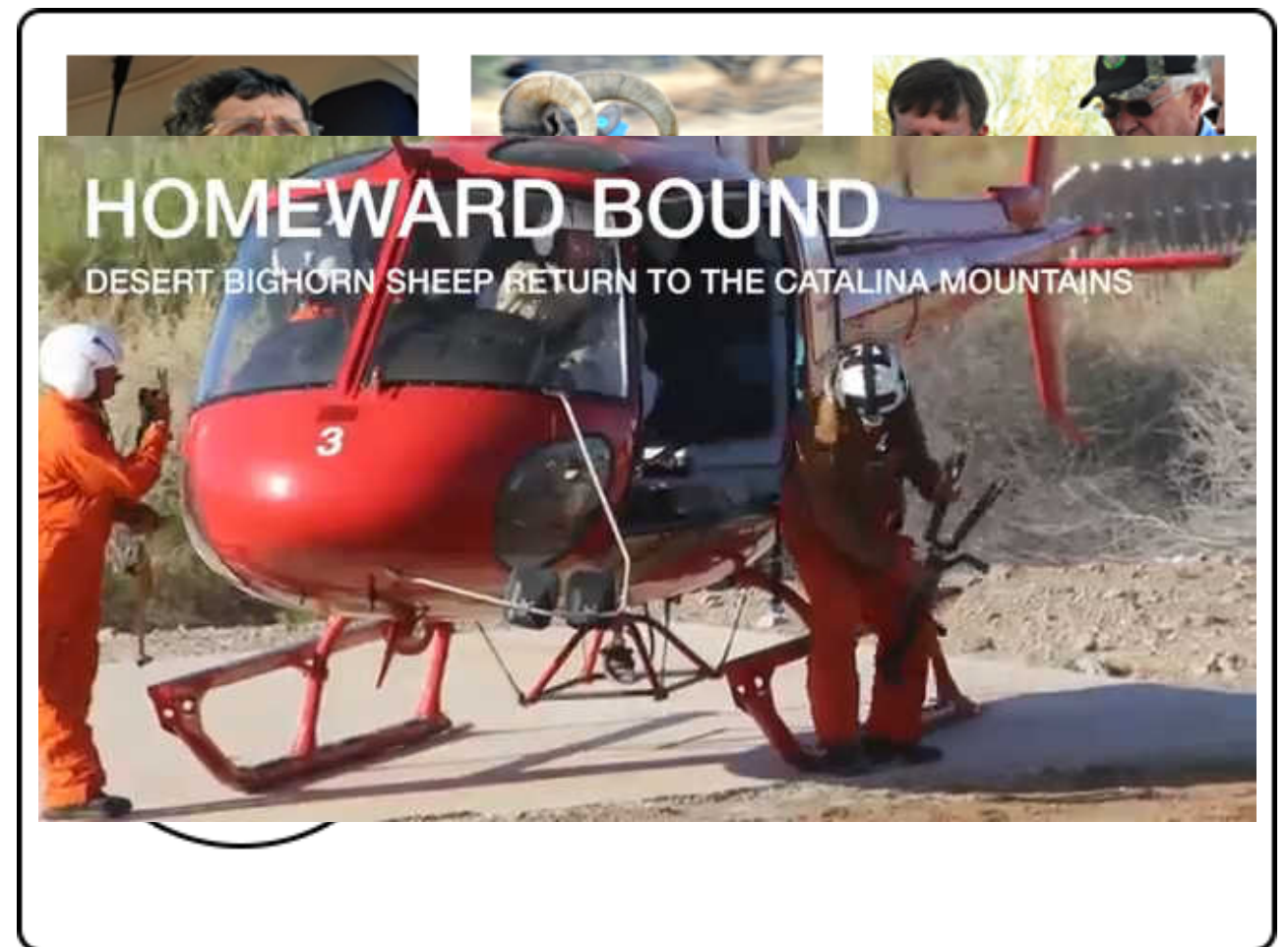


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To build a viable population of sheep, mountain lions that preyed on reintroduced bighorns would have to be removed. Some mountain lions even specialize in preying solely on sheep.

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The animals remained in one area for several days. “It took time for the sheep to relax and begin to explore their new surroundings,” Brochu said.

After the sheep calmed down, they started moving around more and found suitable terrain higher up on peaks and cliffs with an open field of view.

The Arizona Desert Bighorn Sheep Society has been working with Arizona Game and Fish to reestablish desert bighorns for more than 40 years, said Brian Dolan, past president of the Arizona Desert Bighorn Sheep Society and a member of the Catalina Bighorn Advisory Committee.

One of the first translocation projects the two organizations worked on together was in Aravaipa Canyon. “The new, reintroduced population is doing quite well,” Dolan said. Overall, the translocation projects in Arizona have been about 70 percent successful.

## THE RELEASE

**T**he trailer loaded with desert bighorn sheep sat at a distance from the group of spectators at Catalina State Park. Before the release a representative from the Tohono O’odham Nation spoke privately to the sheep. He said they were ready to go into their new home.

When the gates opened, there were a few moments of silence, followed by banging as most of the sheep bolted. Others, probably unsure of what was happening, had to be pulled out by their horns. One sheep jumped out of the trailer, stopped, looked around at the crowd of people and then skedaddled, following the other sheep into the mountains.

The GPS monitoring collars help Arizona Game and Fish keep track of the sheep. A few days after the release, many of the sheep had shifted to two canyons farther east, an area used in the past for lambing. One ram had roamed higher into the mountains.

Another ram had not moved much since the release. A few days later that ram died, most likely from capture myopathy, which can persist for two to four weeks after release.

By the second weekend, two ewes had been killed by mountain lions. As established by the management plan set up for the project, a houndsman and a wildlife manager were sent into the area where the sheep were killed. Separately, the men found and shot the two mountain lions responsible for killing the two sheep, whose remains were found in both of the lions' stomachs.

A third ewe was killed by a mountain lion and found on Dec. 9, bringing the total mortalities up to four. The mountain lion responsible for the recent death was not removed because snow and ice prevented the hunter's dogs from picking up a scent.

The rest of the sheep have begun moving into habitat where mountain lions are less likely to prey on them.

The plans for reestablishing a viable herd remain in place. Arizona Game and Fish intends to capture about 30 sheep in 2014 and another 30 in 2015 for release into the Catalinas.

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**TWO RELOCATED SHEEP SET OFF INTO THE MOUNTAINS AFTER THEIR RELEASE. THE SHEEP FACE MANY CHALLENGES, INCLUDING PREDATION BY MOUNTAIN LIONS.**