

**ARIZONA GAME AND FISH DEPARTMENT
HABITAT PARTNERSHIP COMMITTEE
HABITAT ENHANCEMENT AND WILDLIFE MANAGEMENT PROPOSAL**

Game Branch / HPC Project Number: 15-523

PROJECT INFORMATION

Project Title: Out of Cycle Request – Augmentation of the Aravaipa and Redfield BHS Population

Region and Game Management Unit: 5, units 31 and 32

Local Habitat Partnership Committee (LHPC):
 • Tucson and Safford

Was the project presented to the LHPC?
YES[X] (Tucson) **NO** []

Has this project been submitted in previous years? **YES** [] **NO** [X]

If Yes, was it funded? **YES** [] **NO** [] → **Funded HPC Project #(s):**

Project Type: Bighorn Augmentation

Brief Project Summary:

Bighorn populations in Arizona are actively managed due to their low intrinsic rate of increase which makes this species slow in recovering from population level reductions and in recolonizing areas formerly inhabited. Translocations are a common tool for reestablishing historical populations that have been extirpated and for augmenting existing small populations. However, with an increasing understanding of disease in wild sheep and the potential to inadvertently spread pathogens, it is important that all translocations consider the risks associated with introducing deadly agents into naïve populations.

In 2015, bighorn in the Silver Bells and the Aravaipa/Galiuro Mountain complex (AGMC) were sampled to gather disease and genetic information. Results from the disease testing recently made available suggest that the disease profiles from both the Silver Bells and the AGMC are compatible. Thus, the Silver Bell bighorn herd is a viable source for an augmentation effort in the AGMC.

We propose augmenting the AGMC with 30 bighorn from the Silver Bell Mountains and fitting 15 with GlobalStar GPS collars to track movements and provide cause-specific mortality data.

Big Game Wildlife Species to Benefit: bighorn sheep

Implementation Schedule (Month/Day/Year):

Project Start Date: February 1, 2016

Project End Date: June 30, 2018

Environmental Compliance:

NEPA Completed: Yes[X] No[] N/A[] for 37A

Projected Completion Date: _____

State Historic Preservation Office - Archaeological Clearance:

Yes[] No[] N/A[X]

Projected Completion Date: To be determined _____

Arizona Game and Fish Department EA Checklist: N/A[]

To be Completed by: Regional personnel _____

Projected Completion Date: July 2016 or as needed _____

PROJECT FUNDING

Special Big Game License Tag Funds Requested: \$ 92,250

Cost Share or Matching Funds: \$ TBD

Total Project Costs: \$ 92,250

PARTICIPANT INFORMATION

Applicant (please print): Ben Brochu	Address: 555 N. Greasewood Road Tucson, AZ 85745	E-mail: bbrochu@azgfd.gov
Telephone: 520-591-7636		Date: December 28, 2015
AGFD Contact and Phone No. (If applicant is not AGFD personnel):		
Project has been coordinated with: Local members of the ADBSS.		

NEED STATEMENT – PROBLEM ANALYSIS:

Bighorn populations in Arizona are actively managed in a number of ways largely due to their low intrinsic rate of increase which makes this species slow in recovering from population level reductions and in recolonizing areas formerly inhabited. Translocations are a common tool for reestablishing historical populations which have been extirpated and, for augmenting existing small populations for various reasons. However, with an increasing understanding of disease in wild sheep and the potential to inadvertently spread pathogens, it is important that all translocations consider the risks associated with introducing deadly agents into naïve populations.

In 2015, bighorn in the Silver Bells and the Aravaipa/Galiuro Mountain complex (AGMC) were sampled to gather disease and genetic information. Results from the disease testing suggest that the disease profiles from both the Silver Bells and the AGMC are compatible. Thus, the Silver Bell bighorn herd is a viable source for an augmentation effort in the AGMC.

Also, we can infer from the history of how translocated herds were founded that they have less genetic diversity than their parent herds. A paper this year by Phil Hedrick used population genetic estimates that indicate Aravaipa has a lower genetic diversity than average sheep populations. This is not surprising, considering the small number of founders that started the population. There is no evidence of genetic inbreeding depression (reduced survival or reproduction) in the APMC population, however, in the event there is, augmenting them with Silver Bell sheep will greatly increase genetic diversity and may enhance survival and reproduction.

Surveys in the Silver Bells were at an all-time high in 2015 with 168 bighorn observed consisting of 40 rams, 77 ewes, 17 lambs, and 34 yearlings. This is well above the 34 year average of 48 bighorn observed. Using the Kofa Group Size Estimator, the calculated observation rate was 86% and the population estimate was 194 bighorn. This year's survey was the best ever recorded for 37A with the second best being last year in which 133 bighorn were observed.

PROJECT OBJECTIVES:

- Increase the abundance of bighorn sheep and expand the current distribution of bighorn sheep to occupy suitable habitat
- Manage game populations to meet the objectives established within hunt guidelines
- Secure habitat connectivity to enhance wildlife conservation
- Ensure active conservation of wildlife, and maintain the Department's jurisdiction and relevance to the public
- Inform management decisions through robust and credible biological and social research

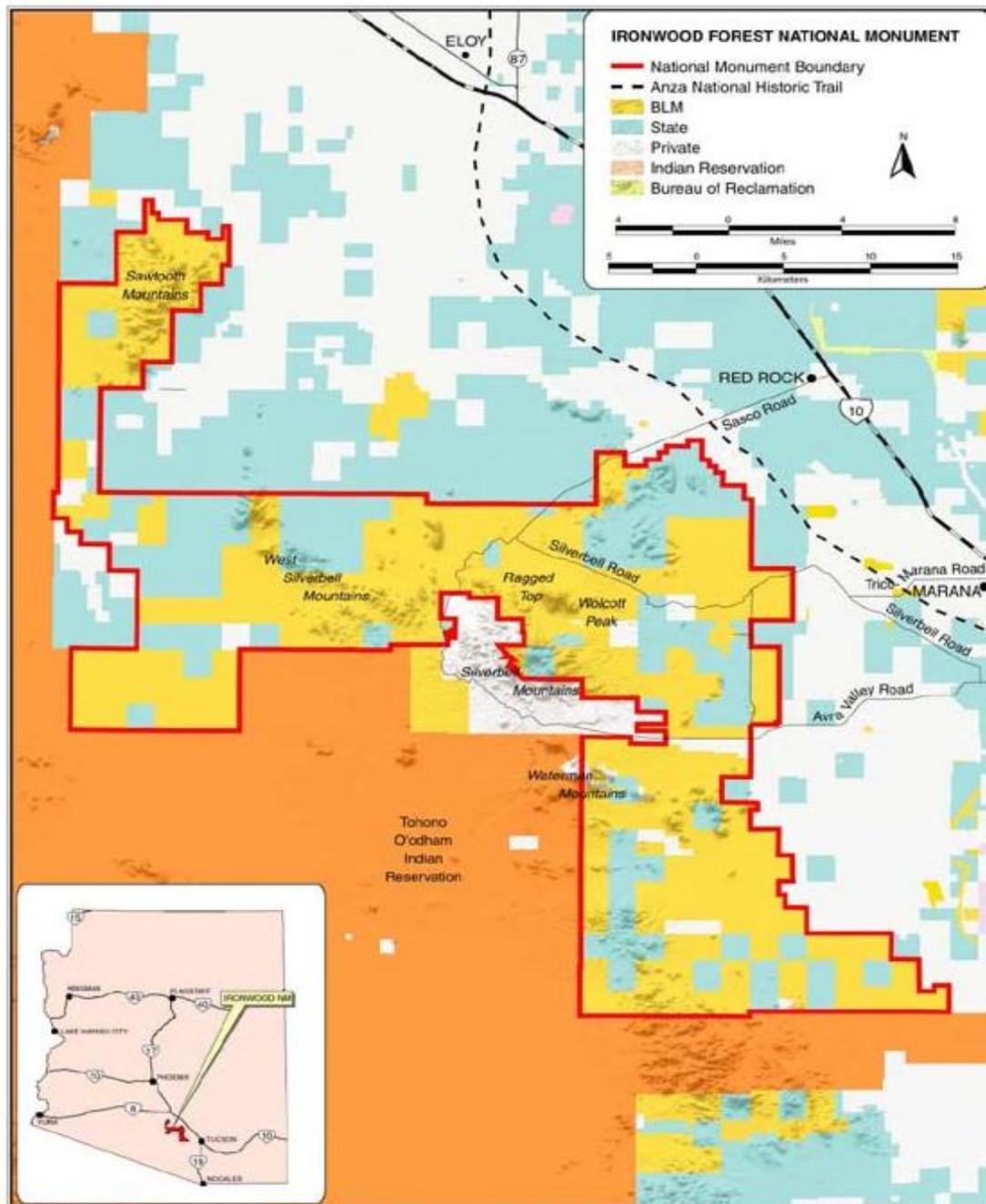
PROJECT DESCRIPTION AND STRATEGIES:

Approximately 30 bighorn sheep will be captured with a helicopter and net gun as is standard procedure from U37A (as suggested by the Bighorn Species Management Guidelines, preferably these will be 65% ewes, 20% yearlings, and 15% medium aged rams [Classes II and III]), and 15 of which will be fitted with real time mortality sensing GPS collars, for release into Aravaipa and the Galiuros in November of 2016. Specific release sites and numbers of sheep to be released at each site will be determined by Department personnel. Approximately 22 females and 8 males (or a ratio of about 3 females to 1 male if fewer than 30 sheep are captured) will be captured.

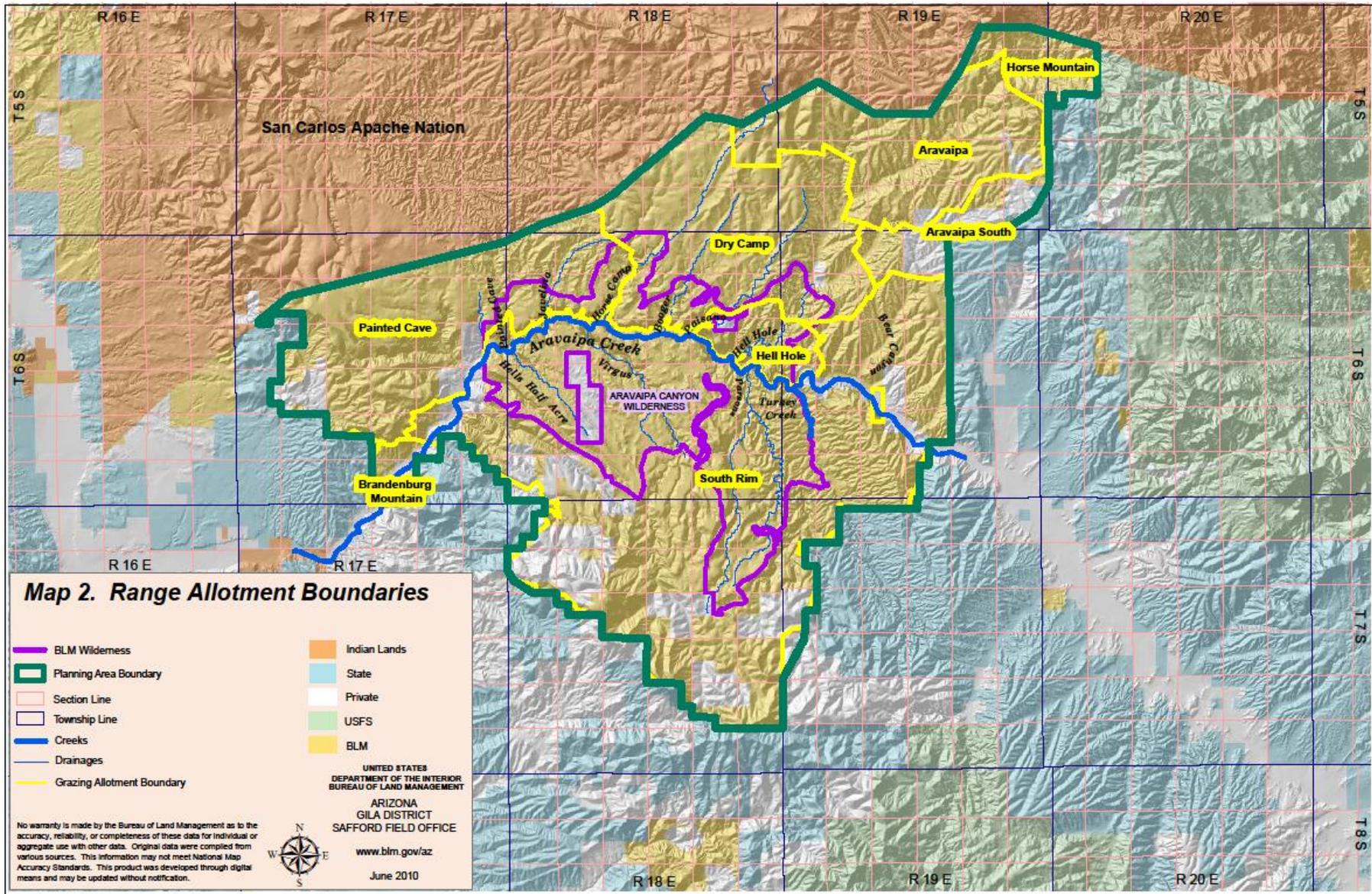
PROJECT LOCATIONS:

Silver Bell Mountains and the Ironwood Forest National Monument

Ironwood Forest National Monument



Aravaipa Canyon Area

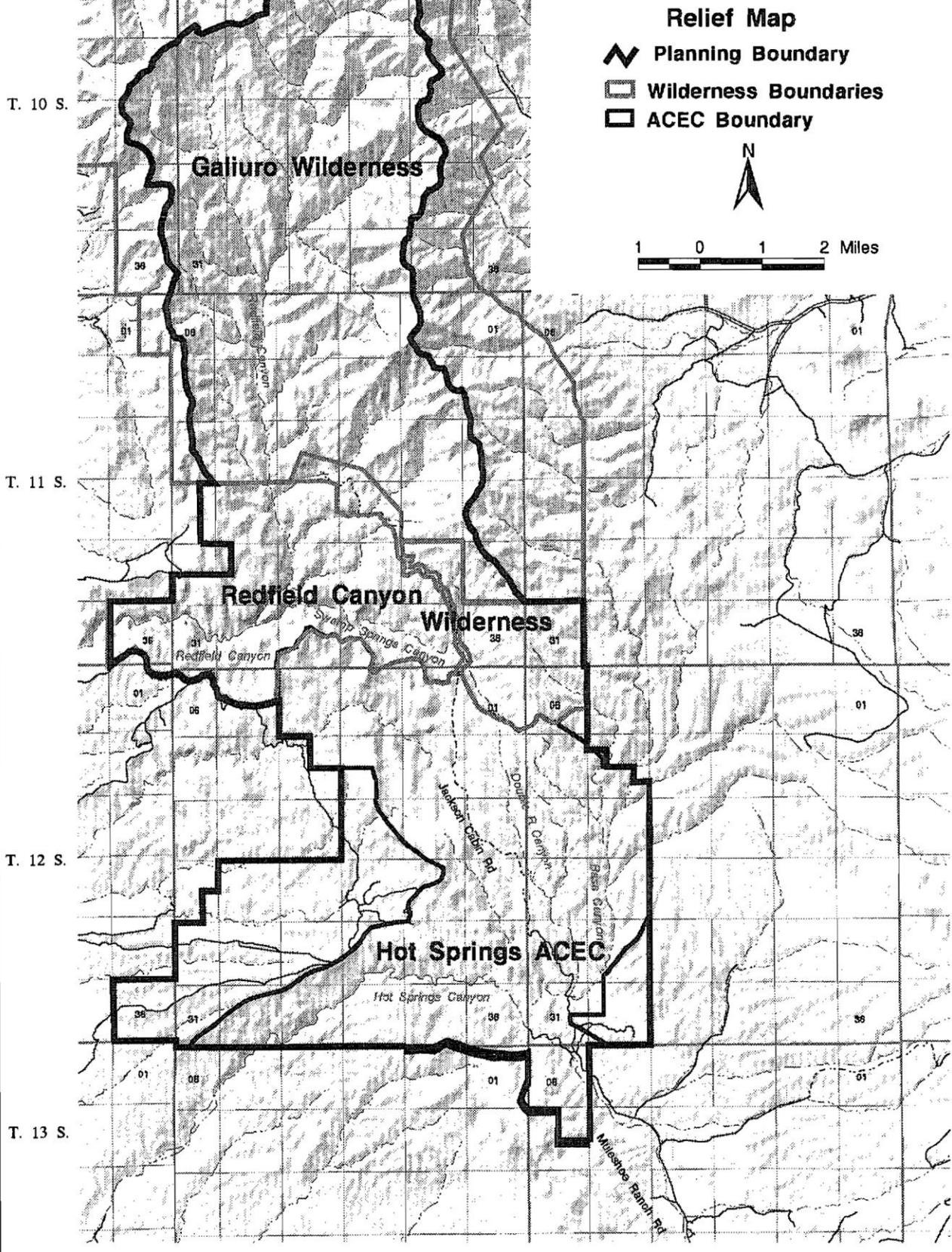


Galiuro Mountains including Redfield Canyon

R. 19 E.

R. 20 E.

Figure 1
**MULESHOE ECOSYSTEM
MANAGEMENT PLAN**
Relief Map



LAND OWNERSHIP AT THE PROJECT SITE(S):

(if the project area is private property, please state specifically and provide the landowner's name)

Source - A mixture of State Land Department lands, BLM lands, and private property (Silver Bells)

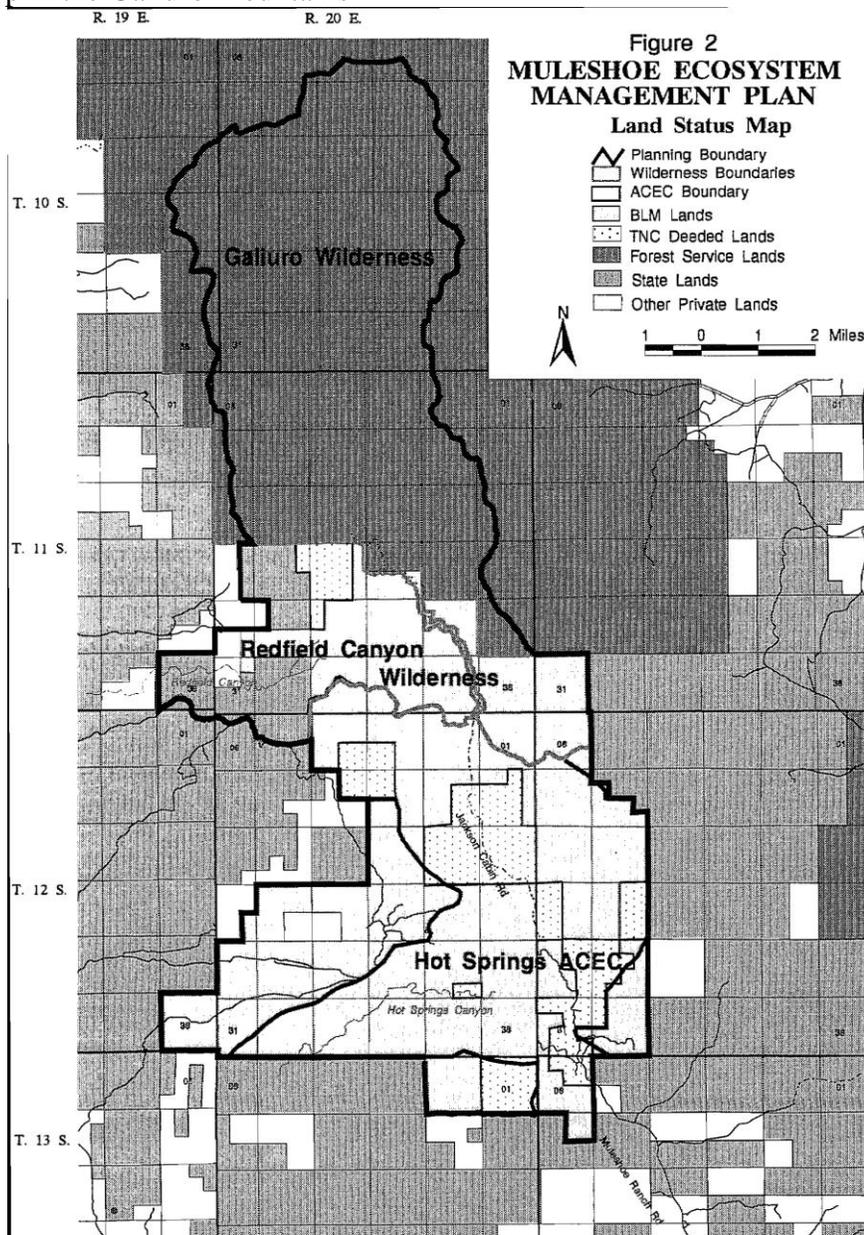
An agreement may be developed with Asarco to be able to conduct bighorn management actions on mine properties within the Silver Bells.

AGMC - A mixture of State Land Department, USFS, BLM and potentially The Nature Conservancy.

IF PRIVATE PROPERTY, IS THERE A COOPERATIVE BIG GAME STEWARDSHIP or LANDOWNER AGREEMENT BETWEEN THE LANDOWNER AND THE DEPARTMENT?

YES[] NO[] N/A[X]

Land ownership in the Galiuro Mountains



HABITAT DESCRIPTION:

Silver Bell Mountains

The Silver Bell Mountains are an arid north-northwest by southeast trending small mountain range in north-central Pima County, Arizona. The range lies 14 miles (23 km) west of Marana, Arizona, northwest of Tucson. Elevations here range from 1,800 to more than 4,200 feet.

The range is located in the east portion of the Ironwood Forest National Monument, and is located in a group of four mountain ranges. Ragged Top, located in the north of the range. The range is named for the Silver Bell Mine located at the southern end of the mountains. The range abuts the Waterman Mountains to the southeast.

The West Silver Bell Mountains are a small, low elevation range, in eastern regions of Arizona's Sonoran Desert. Lower elevation regions west or southwest are even more arid, as the Sonoran Desert gets closer to northwest Mexico's Gran Desierto de Altar. The high point of the range is Solo Peak, 2,749 feet (838 m). The West Silver Bell Mountains are northwest-southeast trending, and merge in the southeast with a mostly north-south Silver Bell Mountains.

The West & Silver Bell Mountains both lie in the northeast of the Aguirre Valley, a 35-mile-long, northwest-by-southeast trending valley bordered by five regional, low-elevation mountain ranges; the valley is Basin and Range oriented, and the north merges into the floodplain region near the confluence of the northwest-flowing section of the Santa Cruz River (Arizona) with the Gila River. The community of Saguaro, Arizona lies at the southeast end foothills of the West Silver Bell Mountains, and is also bordered east by the main Silver Bell range foothills.

Ironwood Forest National Monument is located in the Sonoran Desert of Arizona. Created by Bill Clinton by Presidential Proclamation 7320 on June 9, 2000, the monument is managed by the Bureau of Land Management, an agency within the United States Department of the Interior. The monument covers 188,619 acres (76,331 ha), of which 59,922 acres (24,250 ha) are non-federal and include private land holdings and Arizona State School Trust lands.

A significant concentration of Ironwood (also known as Desert Ironwood, *Olneya tesota*) trees is found in the monument, along with two federally recognized endangered animal and plant species. More than 200 Hohokam and Paleo-Indian archaeological sites have been identified in the monument, dated between 600 and 1450.

Aravaipa Canyon

Aravaipa Canyon Wilderness is a 19,410 acres wilderness area located in the U.S. State of Arizona. It forms the northwest border of the Galiuro Mountain range. The wilderness is administered by the BLM and is located northeast of Mammoth, Arizona in Graham and Pinal counties, about 120 miles southeast of Phoenix. The wilderness includes the 11-mile long Aravaipa Canyon, the surrounding tablelands and nine side canyons.

The area's uniqueness is most evident in the diversity of wildlife habitat. The Aravaipa region consists of five major terrestrial communities: Sonoran Desertscrub, Desert Grassland/Semi-desert Scrubland, Interior Chaparral, Evergreen Woodland, and Deciduous Riparian Forest.

The cavernous, buff-and-brown colored walls you see as you walk through the canyon from the east are composed of Hell Hole Conglomerate, which extends to Parson's Canyon on the south wall and

Hell Hole Canyon on the north wall. From here and continuing west, the Galiuro Volcanics begin and shape Paisano Canyon, and from Booger to Horse Camp Canyon. This mid-portion of the canyon displays impressive red, orange, and gray walls with columns towering over 1,000 feet.

On the West end of the canyon, between Virgus and Hell's Half Acre canyons, the creek cuts through a dark red porphyry (rock containing crystal structures). This rock is considered part of the Pinal Schist group which originated in the Precambrian Era. It is older and harder than the other formations and may be why the stream has cut a narrower channel in this area.

Galiuro Wilderness

The vegetation growing in Galiuro Wilderness varies from species of the semi-desert grassland type to those of the mixed conifer type. The majority of the south and west-facing slopes of the Galiuro Range are covered with dense stands of manzanita, live oak, mahogany and other brush species. The higher slopes and ridgetops have moderate to dense stands of juniper, pinon pine, and oak trees. Along the canyon bottoms and on the northern slopes of the higher elevations grow Arizona cypress, Ponderosa pine, Chihuahua pine, Mexican white pine, Douglas fir, and smaller stands of white fir. Deciduous trees such as sycamore, alder, maple, ash, walnut, and aspen grow in the riparian areas where springs supply water almost year-round, including Power's Garden, Mud Spring, Corral Spring, Juniper Spring, South Field Spring, Kielberg Dam, Walnut Spring, Cedar Spring, and Holdout Spring.

Elevations in the Galiuro Wilderness range from 4,000 feet to 7,671 feet at the summit of Bassett Peak. The Galiuro Mountain Range is a very rough and brushy block fault range characterized by block-like uplifts rising abruptly from relatively level plains that are characteristic of southern Arizona. Erosion has produced many rugged cliffs and steep slopes which have brightly colored exposed soils and rocks. The mountain is a double range bisected by two main canyons, Rattlesnake and Redfield. The wilderness boundary generally follows the forest boundary on the west and approximately one mile east of Trail 287 on the east. The most prominent peaks and high points in the Wilderness include Bassett Peak at 7,671 feet, Kennedy Peak at 7,540 feet, and Sunset Peak at 7,094 feet along the east divide. Those along the west divide include Rhodes Peak at 7,116 feet, Maverick Mountain at 6,990 feet, and Kielberg Peak at 6,880 feet.

Redfield Canyon Wilderness

The 6,600-acre Redfield Canyon Wilderness, part of the Muleshoe Cooperative Management Area, is located about 32 miles north of Benson, Arizona in Graham and Cochise counties.

Redfield Canyon is a narrow red-walled chasm containing tall cliffs pocked with eroded caves and strewn with boulders. Located in the eastern part of the wilderness is the impressive Galiuro escarpment, an example of the fault-block development of the Basin and Range Province. Other small canyons containing perennial streams can be found in the area.

The Muleshoe Ecosystem is located in the Galiuro Mountains in southeastern Arizona within northern Cochise County and southern Graham County. The Ecosystem planning area encompasses the Muleshoe Cooperative Management Area (CMA) which is jointly managed by the Bureau of Land Management (BLM), Forest Service (FS), and The Nature Conservancy (TNC). The 57,500 acres comprise major portions of the Redfield, Hot Springs, and Cherry Springs watersheds. Included within the planning boundary are the Redfield Canyon Wilderness and Hot Springs Watershed Area of Critical Environmental Concern (ACEC), administered by the BLM, and a portion of the Galiuro Wilderness, administered by the FS.

ITEMIZED USE OF FUNDS:

Aravaipa and Redfield Canyon BHS Project Costs	
Description of Cost or Activity	Cost
Capture Costs	\$27,000
GPS Collars - \$4,350 ea (15 collars)	\$65,250
Total	\$92,250

Special Big Game License Tag Funds
\$92,250

Cost Share or Matching Funds (for volunteer labor rates please refer to the worksheet below)
To be determined.

LIST COOPERATORS AND DESCRIBE POTENTIAL PARTICIPATION:

Asarco Silver Bell Mine – capture assistance and logistics
Arizona Desert Bighorn Sheep Society – volunteers, support and funding.
BLM – Safford – NEPA coordination
Coronado NF – NEPA coordination
The Nature Conservancy – to be determined
University of Arizona - Volunteers

WOULD IMPLEMENTATION OF THIS PROJECT ASSIST IN PROVIDING, MAINTAINING, OR FACILITATING RECREATIONAL ACCESS?

YES[] NO[] N/A[X]

PROJECT MONITORING PLAN:

To be determined by regional personnel and largely addressed above.

PROJECT MAINTENANCE:

To be determined by regional personnel.

PROJECT COMPLETION REPORT TO BE FILED BY:

Regional personnel.

WATER DEVELOPMENT PROJECTS (please use the worksheet below):

TREE CLEARING/REMOVAL PROJECTS (please use the worksheet below):