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ARIZONA STRIP BIGHORN SHEEP RECOVERY EFFORTS

FY 1985



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Bureau of Land Management, Arizona Strip District
and
Arizona Game and Fish Department

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History and Restoration Status

This report documents the history of desert bighorn sheep on the Arizona Strip and the cooperative restoration efforts between the Bureau of Land Management (BLM) and the Arizona Game and Fish Department (AGFD). Specifics regarding FY 1985 expenditures and efforts are given.

Historically, desert bighorn sheep (Ovis canadensis nelsoni) occurred through much of northwestern Arizona. Although there have been recent sightings of bighorn sheep in the Hacks Canyon and Paria Canyon areas (Figure 1), there has not been a known reproducing population in the area since the 1940s (Morgart and Krausman, 1981). Desert bighorn sheep numbers and range have declined in North America during the past 200 years (Buechner, 1960). This decline was probably due to overhunting, illegal hunting, competition and diseases from domestic livestock and loss of habitat (Morgart and Krausman, 1981).

The reintroduction of desert bighorn sheep into historic range on the Arizona Strip has been a cooperative project between the BLM and the Arizona Game and Fish Department. The BLM and the AGFD compiled the Black Rock Habitat Management Plan in 1976 to "provide suitable habitat in the Virgin Mountains for the reintroduction of desert bighorn sheep" (Morgart and Krausman, 1981).

In 1979, the first reintroduction of desert bighorn sheep occurred in the Virgin Mountains on the Arizona Strip (Figure 1). Twelve bighorn sheep were captured in the Black Mountains near Lake Mead, Arizona, and released into a 700-acre enclosure on the western slopes of the Virgin Mountains (Figure 2).

Figure 1. Map of the Arizona Strip District of the Bureau of Land Management showing locations of places mentioned in the text of this report.

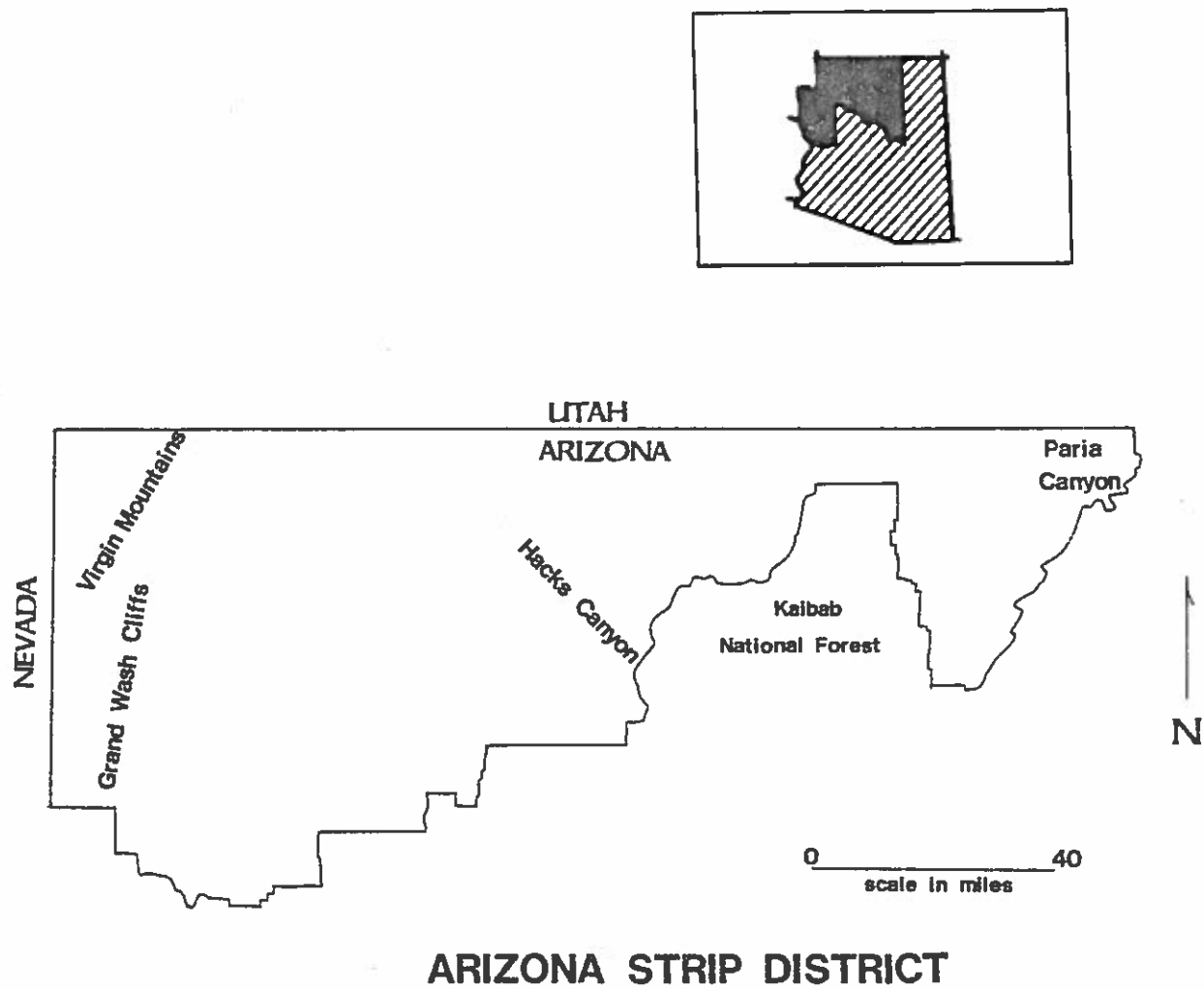


Figure 2. A group of desert bighorn sheep inside the Virgin Mountain Bighorn Sheep Enclosure.



This reintroduction was supplemented with the release of 41 additional bighorn sheep from the Black Mountains. Since 1983, bighorn sheep have been reintroduced to the Grand Wash Cliffs, Paria Canyon and Hacks Canyon on the Arizona Strip (Figure 1).

In April 1985, five areas on the Arizona Strip were officially designated as wilderness and were to be managed as such. Approximately 90 percent of all the bighorn sheep habitat on the Arizona Strip is now being managed as wilderness.

Bighorn sheep habitat improvement projects such as spring developments and wildlife water catchments have been constructed on the Arizona Strip since 1978. This report will discuss the status and progress of bighorn sheep habitat improvement projects and transplants for the federal fiscal year 1985. None of the projects were constructed within the wilderness areas, but adjacent to the boundaries atop the cliff faces, where it is believed the sheep will spend most of their time.

Bighorn Sheep Habitat Improvement Projects - FY 85

In an effort to expedite the bighorn habitat improvement work and help coordinate the project load, it was necessary to hire a seasonal BLM wildlife biologist. The seasonal assisted in the work as planned and was a true asset to the completion of planned bighorn sheep habitat management efforts. Approximately \$8,500 of the "add-on" monies were used to cover the costs of the seasonal.

In fiscal year 1985, five wildlife water catchments were planned for construction (Table 1 and Appendix I). Three catchments (Overlook, Mirage and Hacks Canyon No. 2) were completed during the fiscal year. One other--the

Table 1. Desert bighorn sheep habitat improvement cost summary on the Arizona Strip BLM in fiscal year 1985.

PROJECT	C O S T S		
	B L M	PRIVATE	AGFD
<u>Water Catchments</u>			
Mirage Wildlife Catchment	\$ 4,500	-----	\$11,000
Overlook Wildlife Catchment	4,500	-----	11,000
Hacks Canyon No. 2 Wildlife Catchment	4,500	-----	8,250
Chamberlain Canyon Wildlife Catchment	4,500	-----	8,250
Cunningham Wildlife Catchment	4,000	-----	-----
Grand Gulch Wildlife Catchment	4,000	-----	-----
Ferguson Pockets Wildlife Catchment	4,000	-----	-----
Helicopter Rental	21,000	-----	-----
<u>Additional Contract Costs on other Wildlife Catchments</u>	\$12,570	-----	-----
<u>Maintenance</u>			
Sheep Enclosure	\$ 2,700	-----	-----
<u>Monitoring</u>			
Equipment	\$ 3,100	-----	9,100
<u>Transplants</u>			
Hacks Canyon	\$ 2,500	40,000	-----
Paria Canyon Supplement			
<u>Workmonths</u>			
Seasonal Employee	\$ 8,500	-----	-----
TOTALS:	\$80,370	\$40,000	\$47,600

Chamberlain Canyon Catchment--was completed shortly after the end of the fiscal year. In addition, materials for Cunningham, Grand Gulch, and Ferguson Pockets Catchments were purchased with construction planned for mid-year 1986. The AGFD projects crew provided the majority of the labor for construction of the four completed wildlife catchments (Figures 3 & 4).

Two of the catchments--Overlook and Mirage--required the use of a helicopter to slingload materials, tools, camp gear and personnel to and from the sites. BLM fire helitack personnel and wildlife biologists were on hand to oversee the operation (Figure 5). BLM biologists also assisted with labor in the physical construction of the catchments. Total helicopter cost incurred in the construction of the catchments was approximately \$21,000 for 1985.

Original requests for bighorn sheep "add-ons" included \$18,000 for helicopter monitoring of bighorn sheep. The wilderness designation was judged to conflict with the use of helicopters for monitoring; consequently this decision precluded our utilization of the \$18,000 for monitoring. The helicopter money was, however, utilized in the greater than expected need to airlift catchment materials to the remote locations on which the sheep catchments were built.

FY 85 bighorn sheep water catchments involved (1) the construction of a sheet metal apron to collect rainfall, (2) fiberglass or galvanized steel storage tanks, (3) a ground-level drinking trough and (4) fencing (where appropriate). The ground-level drinker permits water accessibility for all types of wildlife. Water catchment sites accessible to livestock and wild burros were fenced with a "wildlife passable" fence. This fence type has a smooth (rather than barbed) bottom wire, total height and wire spacing that permits passage by wildlife. Bighorn catchments are normally only fenced

Figure 3. AGFD projects crew building the apron for Mirage Wildlife Water Catchments, Virgin Mountains.



Figure 4. Overlook Wildlife Water Catchment during construction. Note placement of steel storage tank under apron, Grand Wash Cliffs.



Figure 5. Helicopter slingloading construction materials to the Mirage Wildlife Catchment site, Virgin Mountains.



along those sides which are accessible by livestock and burros. Catchments are placed such that rugged escape terrain for bighorn sheep exists nearby on one, two, three or all sides of the site. Care is taken in not designing fences that would permit bighorn sheep from becoming trapped in corners by predators. Fence design also includes consideration of livestock needs. Three of the catchments--Mirage, Chamberlain and Hacks Canyon No. 2--have some type of fencing involved. The sheet metal aprons were painted a camouflage pattern and placed in areas so as to be least visible for visual resource management purposes.

Bighorn Sheep Enclosure Maintenance - FY 85

Three bighorn sheep were found dead inside the enclosure in February 1985 by former AGFD wildlife manager, Todd Soderquist. Cause of death was determined to be predation by mountain lions. The electric fence around the enclosure was not operable at the time due to battery failure over winter and ground faults caused by vegetation growth. Wash crossings under the fence were in need of repair from recent rainstorms. In March, the U.S. Fish and Wildlife Service trapper, Jim Orr, caught two yearling mountain lions in two consecutive days inside the enclosure. The electric fence and open portions of the fence wash crossings were repaired in Spring and Summer of 1985 to make the enclosure "as predator-proof as possible" to protect the remaining sheep. A pipeline from a spring development to the existing water storage tank inside the enclosure was repaired. Costs for the maintenance and labor of the enclosure were approximately \$2,700 in 1985. Plans for more substantial maintenance work to be done during FY 86 on the enclosure are being designed to complement the Paiute Wilderness Area.

Bighorn Sheep Transplants - FY 85

Bighorn sheep were transplanted in two locations on the Arizona Strip in 1985. On July 15, 24 sheep were released in Hacks Canyon on Kanab Creek north of the Grand Canyon (Figure 1). On July 16, 15 sheep were transplanted to supplement the 1984 Paria Canyon transplant. They were released near Wilson Canyon within Paria Canyon (Figure 1). For both of these transplants, bighorns were captured in the Black Mountains near Lake Mead, Arizona. Most sheep were caught using the apple mash bait technique and a large drop net. With this method, a large net is suspended over a site baited with dried apple mash to lure the sheep (Figure 6). When sufficient numbers arrive, electronically detonated blasts cut the support ropes and the animals are trapped. Sheep were removed from the net, blindfolded, hobbled, ear tagged (several were radio-collared) and inoculated with a vaccine by a veterinarian to prevent disease. Eight of the sixteen radio transmitters attached to the sheep were purchased by the Arizona Strip BLM from the bighorn sheep add-on funds at a cost of \$2,800. They were then placed on stretchers (Figure 7) for transport to boats which would take them across Lake Mead to Callville Bay, Nevada. From there they were put in modified livestock trucks for transport approximately 200 miles to the release sites on the Arizona Strip. Prior to the arrival of the captured sheep, small holding paddocks were constructed at the release sites. Sheep were flown by helicopter from the trucks to the paddocks in cargo boxes (Figure 8). The sheep remained in the paddocks overnight to recuperate from the stress of capture and transportation before release the next morning (Figure 9). In all, approximately 30 people were involved in the sheep capture and transplant operation. Two-thirds of those (20) were volunteers from the private sector. Approximately \$500 of BLM funds

Figure 6. AGFD and ADBHSS personnel setting up drop net at Indian Cove on Lake Mead, Arizona.



Figure 7. Desert bighorn ewe being carried on stretcher to waiting boat.



Figure 8. Bighorn ewe in cargo box prior to slingloading to release site.



Figure 9. Bighorn sheep in covered paddock prior to release in Hacks Canyon. Note ear tags and radio collars on sheep.



were used to reimburse the volunteers for food and travel (up to 500 miles in some cases). Approximately \$40,000 of the expense for the transplants was paid for by the Arizona Desert Bighorn Sheep Society. The AGFD monitors the radio-collared sheep on a monthly basis. More collars will be needed as transmitter batteries or mechanical failure occurs. None of the Virgin Mountain or Grand Wash Cliffs sheep transmitters are functioning currently.

To date, 180 desert bighorn sheep have been transplanted in four areas on the Arizona Strip which historically supported populations. The long range goal sought by the BLM and AGFD is to manage for approximately 400 bighorn sheep on the Arizona Strip.

In addition, bighorn sheep funds were spent on the contract construction costs of three mule deer catchments. The reason for the expenditure of money on these catchments was related to prior commitments for catchment construction by the Arizona Game & Fish Department. Prior to receiving the bighorn sheep add-on dollars, AGFD had committed to constructing (labor only) three mule deer catchments on the Arizona Strip. When funding was acquired for the four bighorn sheep waters (too remote to be constructed cost-effectively by contract) AGFD opted instead to construct the bighorn catchments. Materials for the deer catchments had already been purchased from 4351 base funds and no allocation had been planned for contract labor for the deer catchments. Since these deer catchments were high priority, it was necessary to pay \$12,570 contract labor for their completion from bighorn sheep allocations. The expenditure was justified as the bighorn sheep program emphasis generated additional project costs on our 4351 base funds.

Desert Bighorn Sheep Projects - FY 86

Twelve habitat improvement projects should be built in FY 86 on the Arizona Strip (Table 2). The projects for FY 86 include wildlife water catchments (9) and springs developments (3). Feasibility work for seven of these projects--Cunningham, Grand Gulch Bench, Mustang Point, Ferguson Pockets, Pick Spring, Hacks Canyon No. 3 and Grama Canyon--was done in 1985. Feasibility work (Figure 10) involves site selection, designing the catchment on-site with district engineer or staff, and archaeological clearance with district archaeologist. Materials are figured, ordered and delivered to the site. Construction would be by AGFD, BLM, or contract.

Additional potential bighorn sheep work for FY 86 includes supplemental sheep transplants into the Virgin Mountain enclosure and into the Grand Wash Cliffs. Monies could be used to fund monitoring flights of the released bighorn as well as future sheep enclosure maintenance. Monies are also needed to purchase additional radio transmitter sheep collars which will provide needed habitat related information.

We believe this kind of funding arrangement is excellent and very much appreciated for the bighorn sheep restoration effort on the Arizona Strip District. There are serious problems, however, with the manner in which the funds are allocated. Funding levels need to be more timely. We need to know how much money we can expect no later than December 1 each year so that we can make plans, generate contracts, order materials, coordinate with AGFD and establish priorities in relation to our other ongoing project load.

When the final approval and the dollar amount is delayed until March or April, it severely hampers our ability to put the money to effective use. Especially at reduced funding levels, bighorn sheep habitat maintenance and

Table 2. Potential desert bighorn sheep habitat improvement cost summary on the Arizona Strip BLM for fiscal year 1986.

PROJECT	C O S T S		
	BLM	PRIVATE*	AGFD
<u>Water Catchments</u>			
Fisher Point	\$ 4,500	AWF/Conino Sportsmen	-----
Powell's Monument	8,500		-----
Paria Point	4,500		8,200
Hacks Canyon No. 3	4,000	-----	8,200
Cunningham	6,000		11,000
Mustang Point	8,000	-----	-----
Pick Spring	4,000	-----	5,500
Grand Gulch Bench	4,500	-----	8,200
Ferguson Pockets	8,000	-----	-----
Water Pockets	3,000	-----	-----
<u>Maintenance</u>			
Sheep Enclosure/Catchment	\$ 8,000	-----	-----
<u>Monitoring</u>			
Equipment	\$ 3,800	-----	7,800
<u>Transplant</u>			
Grand Wash Cliffs	\$30,000	30,000? (ABHSS)	3,500
<u>Workmonths</u>			
Seasonal Employee	\$10,000	-----	-----
TOTALS:	\$106,800	\$30,000	\$52,400

Figure 10. Feasibility trip to bighorn sheep water catchment site.



improvement are not currently high priority in the district. However, with the addition of funds specifically for bighorn sheep habitat restoration, the additional money would be used to expedite the effort that would otherwise take several years when weighed against funding levels and other priorities.

The outlook for continuing to obtain matching funds is very good on the Arizona Strip. The bulk of the bighorn restoration work has been completed. Two more years at FY 85 funding levels for bighorn would bring us to monitoring and maintenance actions which should not be too expensive. The AGFD is committed to the implementation of the bighorn sheep HMPs and contributes labor in the construction of sheep projects as their share of matching funds. The Bighorn Sheep Council is also very active in this area; it is expected that funding will continue to be available from them for the next few years.

Expenditures from base funds for bighorn sheep in FY 85 were minimal. Maintenance of sheep projects and workmonths associated with that maintenance were the main expenditures. Without the additional funding allocation the emphasis would not have been on bighorn sheep habitat restoration.

APPENDIX I

MIRAGE WILDLIFE CATCHMENT (PROJECT NO. 5029)

LOCATION: T39N R15W Sec. 34 NWNW, SW Virgin Mountains, Arizona

CONSTRUCTED: July-August 1985 by Arizona Game & Fish Department crew and BLM

COSTS:	<u>Labor</u>	<u>Materials</u>	<u>\$</u>	<u>Other</u>	<u>Totals</u>
BLM	\$ 500	\$ 4,500	\$ -----	\$ 5,700	\$ 10,700
Private	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
AGFD	\$ 11,000	\$ -----	\$ -----	\$ -----	\$ 11,000
Total					\$ 21,700

DESCRIPTION/BENEFITS:

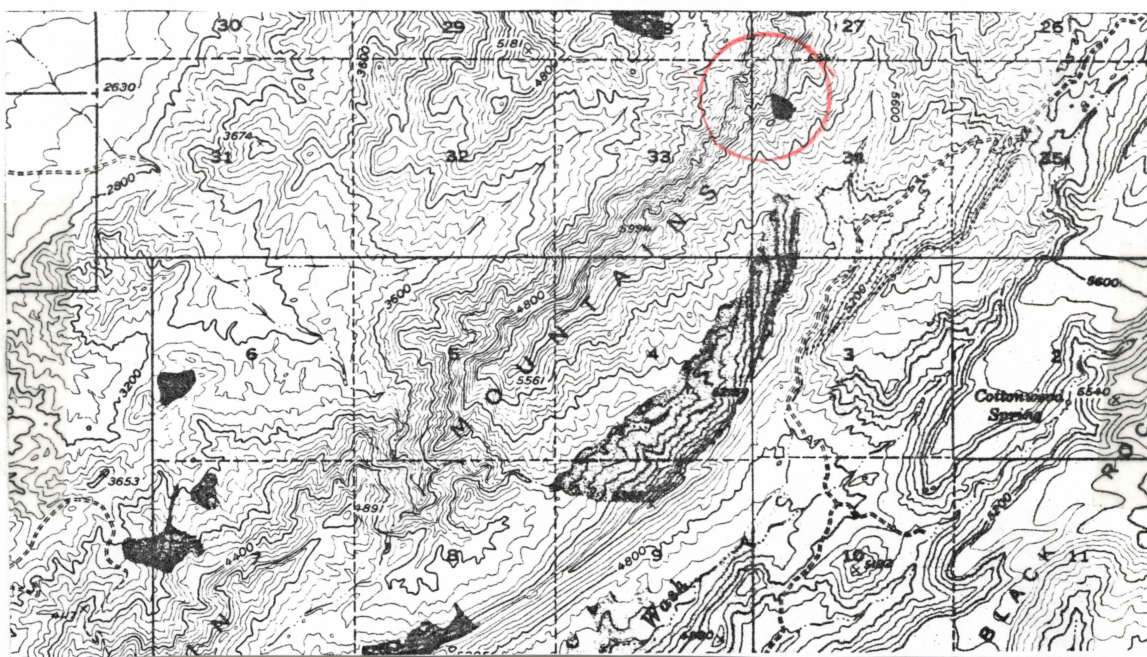
This water catchment consists of a 1,500 ft² aluminum apron, two 2,150-gallon fiberglass storage tanks and a ground-level drinking trough. This project was identified during revision of the Black Rock HMP. Materials, tools, supplies and the AGFD crew were flown into and out of the site using a Bell 206III Jet Ranger helicopter. Bighorn sheep had been seen within ½ mile of the site prior to project feasibility. The storage tanks were partially full of water within one week of project completion. The BLM personnel ferried materials and painted the apron and storage tanks a camouflage pattern. Tanks were placed below the ridgeline and the apron among trees to minimize visual impacts. The facility was fenced on two sides to eliminate livestock access to the site.

It is anticipated that 25-35 sheep may eventually use the new water source in the previously unwatered bighorn habitat. A single bighorn sheep hunting permit was recently auctioned in Arizona for \$30,000. Mule deer and other wildlife will also use this particular catchment.

CONTINUING FUNDING NEEDS:

AGFD has the maintenance responsibility for Mirage WLC. However, should major reconstruction be needed or significant helicopter time be required, it is likely BLM could be asked to share the maintenance costs. It is unlikely this cost would exceed \$5,000 during the next 10-15 years.

APPENDIX I (CONT.)



Location Map: Mirage Wildlife Catchment



Mirage Catchment near completion prior to camouflage paint.
Note topography and AGFD construction crew.

APPENDIX I (CONT.)

OVERLOOK WILDLIFE CATCHMENT (PROJECT NO. 5030)

LOCATION: T34N R14W Sec. 31 NENE, Southern Grand Wash Cliffs North of Pigeon Canyon, Arizona

CONSTRUCTED: August 1985 by Arizona Game & Fish Department crew and BLM

COSTS:	<u>Labor</u>	<u>Materials</u>	<u>\$</u>	<u>Other</u>	<u>Totals</u>
BLM	\$ 700	\$ 4,500	\$ -----	\$ 9,400	\$ 14,600
Private	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
AGFD	\$ 11,000	\$ -----	\$ -----	\$ -----	\$ 11,000
Total					\$ 25,600

DESCRIPTION/BENEFITS:

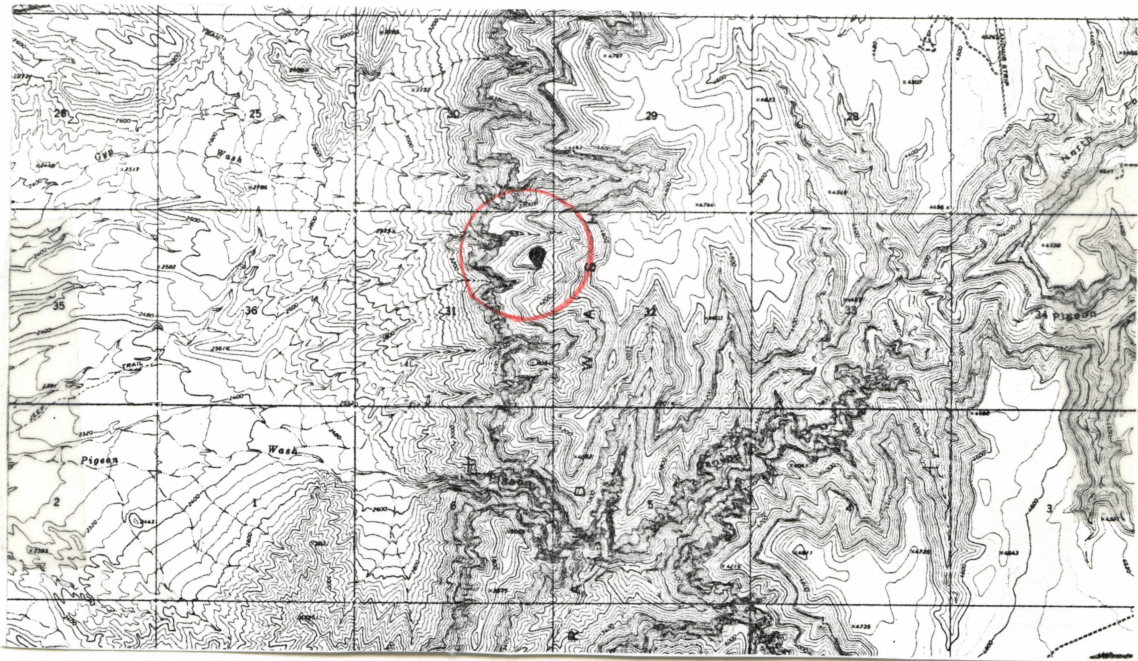
This water catchment consists of a 1,200 ft² aluminum apron built over a 5,000-gallon bolt together steel tank with a Hypolon™ liner. A ground-level drinking trough is included in the project. This project was built under the Parashaunt HMP. Materials, tools, supplies and the AGFD crew were flown into and out of the site using a Bell 206III Jet Ranger helicopter. Bighorn are known to use the cliffs nearby the catchment site. The BLM personnel ferried materials and painted the apron and all above-ground facilities a camouflage pattern. The facility was placed near escape sheep cover and in the least visible location.

Again, we anticipate 25-35 sheep may use the facility; the location is near a planned supplemental transplant location planned for FY 86. Some mule deer and other wildlife use is likely.

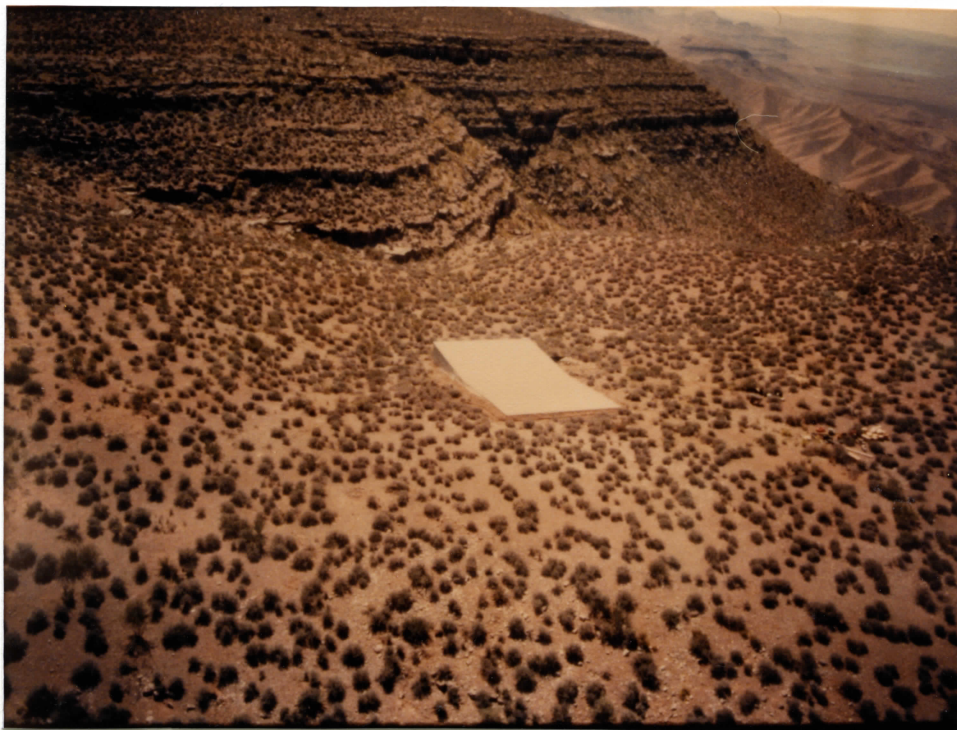
CONTINUING FUNDING NEEDS:

AGFD also has the maintenance responsibility for Overlook WLC. If major reconstruction or significant helicopter time should be required in the future, it is likely BLM could be asked to share those costs. It is unlikely these costs would exceed \$5,000 during the next 15 years.

APPENDIX I (CONT.)



Location Map: Overlook Wildlife Catchment



Overlook Catchment just prior to final camouflage paint.
Note bighorn escape cover in background.

APPENDIX I (CONT.)

HACKS CANYON NO. 2 WILDLIFE CATCHMENT (PROJECT NO. 5056)

LOCATION: T36N R14W Sec. 3 SWNW, South Rim of Hacks Canyon, Arizona

CONSTRUCTED: November 1985 by Arizona Game & Fish Department crew

COSTS:	<u>Labor</u>	<u>Materials</u>	<u>\$</u>	<u>Other</u>	<u>Totals</u>
BLM	\$ -----	\$ 4,500	\$ -----	\$ -----	\$ 4,500
Private	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
AGFD	\$ 8,250	\$ -----	\$ -----	\$ -----	\$ 8,250
Total					\$ 12,750

DESCRIPTION/BENEFITS:

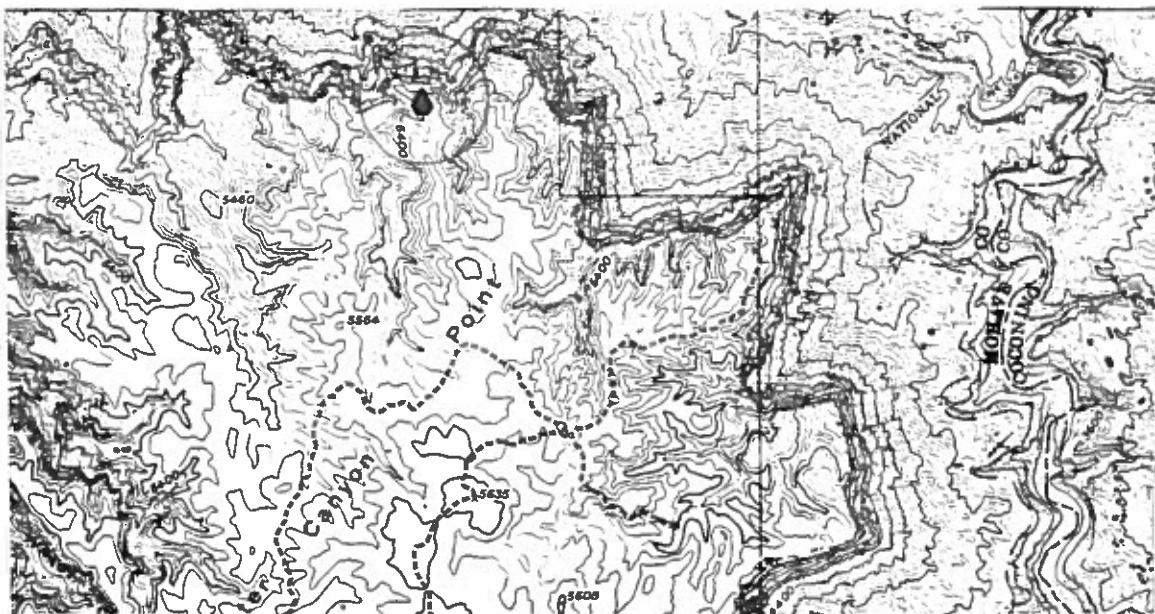
This water catchment has a 1,120 ft² sheet metal apron covering a 5,000-gallon bolt together steel storage tank with a HypolonTM liner. As the others, a ground-level drinker is also included. This project was built under the Paria-Kanab Creek HMP. Since this site was accessible by vehicle, the AGFD crew ferried materials to the site by truck and did all construction work.

Again, an anticipated 25-35 bighorn, some mule deer and other wildlife will use this water development.

CONTINUING FUNDING NEEDS:

AGFD has the maintenance responsibility for this development. Should major reconstruction be necessary, BLM could likely be asked to share those costs. It is unlikely this cost would exceed \$3,000 during the next 15 years.

APPENDIX I (CONT.)



Location Map: Hacks Canyon No. 2 Wildlife Catchment

No photo yet available to this date.

APPENDIX I (CONT.)

CHAMBERLAIN CANYON WILDLIFE CATCHMENT (PROJECT NO. 5054)

LOCATION: T36N R4W Sec. 26 NWSW, South of Hacks Canyon, Chamberlain Canyon, Arizona

CONSTRUCTED: October 1985 by Arizona Game & Fish Department crew

COSTS:	<u>Labor</u>	<u>Materials</u>	<u>\$</u>	<u>Other</u>	<u>Totals</u>
BLM	\$ -----	\$ 4,500	\$ -----	\$ -----	\$ 4,500
Private	\$ -----	\$ -----	\$ -----	\$ -----	\$ -----
AGFD	\$ 8,250	\$ -----	\$ -----	\$ -----	\$ 8,250
Total					\$ 12,750

DESCRIPTION/BENEFITS:

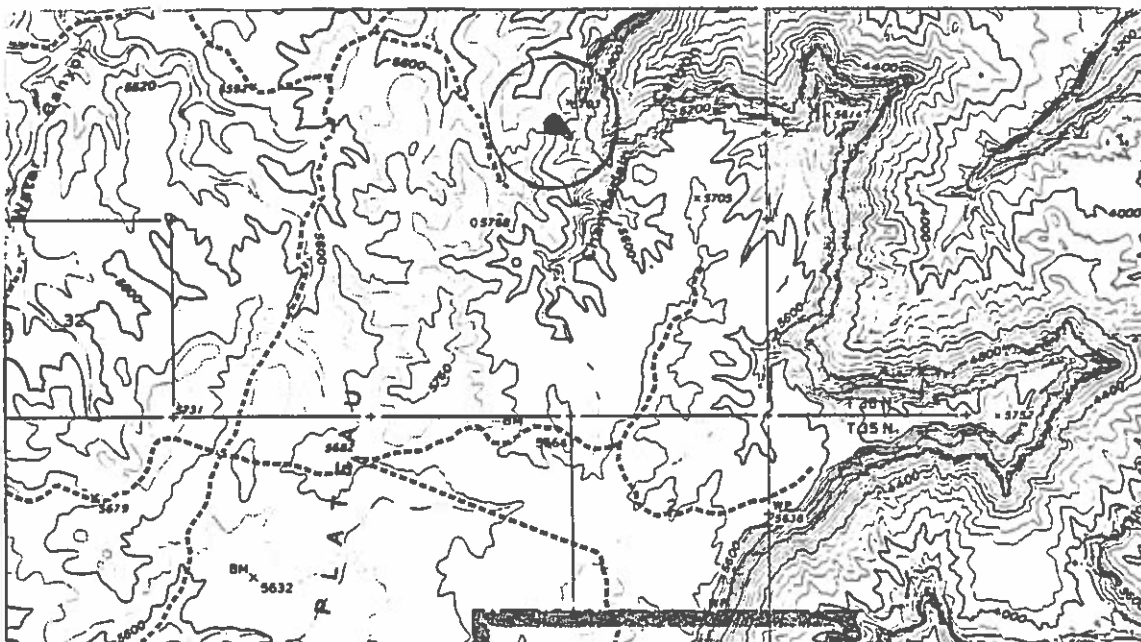
This water catchment has a 1,120 ft² sheet metal apron covering a 5,000-gallon bolt together steel tank with a Hypolon™ liner. As the other catchments, a ground-level drinker is included. The project was built under the Paria-Kanab Creek HMP. Since the site was accessible by vehicle, the AGFD crew ferried materials to the site by truck and did all construction work.

An anticipated 25-35 bighorn sheep may eventually use the water catchment, as well as mule deer and other wildlife.

CONTINUING FUNDING NEEDS:

AGFD also has the maintenance responsibility for this catchment. BLM would likely be asked to fund or share major reconstruction costs, if necessary. It is unlikely BLM costs could exceed \$3,000 during the next 15 years.

APPENDIX I (CONT.)



Location Map: Chamberlain Canyon Wildlife Catchment

No photo yet available to this date.