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HIGHLAND RANGE

Wildlife

Habitat Management Plan



SK
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1969

FAT HANSEN



Bighorn sheep are the wildlife species with the highest public demand for recreational harvest and aesthetical values in the Highland Range Habitat Management Plan area.

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ID ~~8801924~~ 88025666

SK
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M937
1969

PREPARED by: (Lewis H. Myers)
Wildlife Specialist

WITH ASSISTANCE AND IN COOPERATION WITH:

Gary Ferrier
University of Nevada, Las Vegas

CONCURRED by: Nevada Department of Fish and Game

APPROVED by: 12/3/69 John D. Nelson
Date Regional Supervisor

12-3-69 James E. Hill
Date District Manager

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Las Vegas District Office, Las Vegas, Nevada
(1969)



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HIGHLAND RANGE

Wildlife

Habitat Management Plan

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Abstract: The Highland Range Wildlife Habitat Management Plan identifies wildlife habitat conditions and needs for the Highland Range, south of Las Vegas, Nevada. First, an intensive inventory of habitat characteristics and wildlife species requirements was conducted (available at BLM Office in Las Vegas). Then, based upon the inventory findings, this Habitat Management Plan was developed as an action thrust to implement the plan. Recommended habitat management practices and development projects are listed.

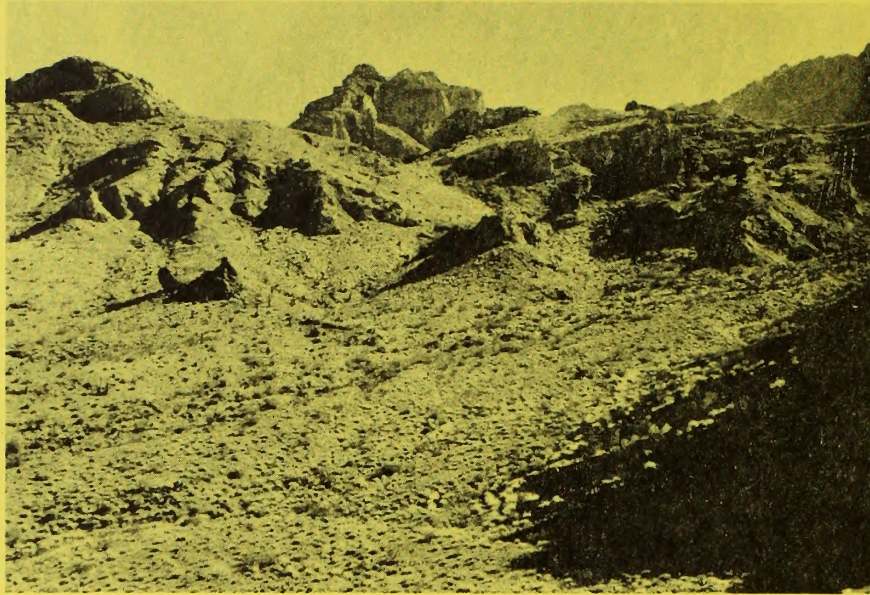


Figure 1. The Highland Range is sparsely vegetated, lacking in an abundance of water, but valuable habitat for native desert bighorn sheep and other wildlife species.



Introduction:

The Highland Range is situated about five miles west of Highway 95 between Nelson and Searchlight, Nevada. The range is oriented north-south, and extends from the valley floor at 3,000 feet to elevations slightly less than 5,000 feet. It is an extremely rough, rocky range of volcanic origin. The Highland Range supports a rather high density bighorn (Ovis canadensis nelsoni) population (about 10 per square mile in summer habitat) in comparison to other habitat areas in southern Nevada. It is the author's opinion that it also comprises a rather unique, small, intact bighorn herd unit area.

Gambel's quail (Lophortyx gambeli) constituting "hill" populations occur in large numbers in good years, and insignificant numbers in drought or "bust" years (Gullion, no date). Chukar partridge (Alectoris graeca) have been released in the area and remain in small numbers.

Mourning doves (Zenaidura macroura), in small numbers, make summer use of the area. Reptiles are common, and include two species, the desert tortoise (Gopherus agassizi), and gila monster (Heloderma suspectum), proposed for consideration as rare or endangered (U.S. Bureau Sport Fisheries and Wildlife, 1968). The area supports a variety of non-game birds, mammals, and reptiles; but no known populations of amphibians or fishes.

Objectives:

- A. Extend bighorn crucial summer habitat (within two mile radius of permanent water) an additional 6,000 to 7,000 acres in the north-eastern portion of the Highland Range. This can be accomplished by provision of new permanent water sources.
- B. Maintain bighorn forage resources in the northeastern portion of the Highland Range, proposed as new summer habitat, in their present good forage condition by a policy of "not permitting livestock water developments" in this area.
- C. Reduce livestock-bighorn forage competition in summer habitat areas near existing springs to an unknown extent, depending upon livestock forage and water potential (to be determined in an Allotment Management Plan) in the adjacent valley and the McCullough Range.
- D. Increase bighorn numbers from the estimated present population of 40-65 to 70-105.
- E. Increase summer habitat for quail (and possibly chukar) by 200-300 acres, and improve about 50 acres near three springs.
- F. Improve and maintain all existing waters.

Methods:

A. Wildlife Use

Bighorn harvest (mature trophy rams) can be increased by the Nevada Department of Fish and Game when justifiable.

B. Habitat Development and/or Improvement

1. Natural tank development. A natural water storage basin can be developed in SW $\frac{1}{4}$, Sec. 22, T. 26 S., R. 62 E. Development would permit storage of several thousand gallons of water. A small concrete dam is required. A sketch with dimensions is included in Appendix 5. The dam is situated in a rock formation providing runoff without soil or rubble. The site is believed to be inaccessible to livestock due to smooth, steep rock surfaces. If shown to be accessible to stock, the mouth of the small ravine, including the site, could be fenced with sheep or hog wire. Drilling into the bedrock would be advisable, along with light steel rod reinforcement. Standard trucks and vehicles can drive within about 400 feet of the site via the new power line road. A water truck with pump will be necessary to pump water, for concrete mixing, to the site. All efforts should be made to avoid establishing a new road to this site.

2. Big game guzzlers (water catchment devices). Both proposed big game guzzler sites are accessible with 4X4 vehicle. It is imperative to the success of the projects that roads not be established to these sites. Drivers must be instructed to evoke minimal damage and disturbance to soil and vegetation when constructing these devices. Drivers should use washes only for access, since flash floods will soon eliminate tracks, and travel will not be encouraged for off-road vehicular travel enthusiasts, etc.

One big game guzzler will be constructed in NW $\frac{1}{4}$, Sec. 34, T. 26 S., R. 62 E. This is a small valley on the eastern slope of the Highland Range. The guzzler should be situated as near the slope as possible, in an open area safe from flash flood runoff. This guzzler area should be protected from livestock use by fencing two passes. This will require about one-half mile of fence (Appendix 1). Fence material must be sheep or hog type, 32 inch woven wire mesh. Under no circumstances, will barbed wire fence construction be permitted here. Woven wire mesh will prevent bighorn from entangling their horns. Bighorn are expected to either jump the fence (40 inches high), or walk the short distance to the fence tie-off point. The proposed fence location will offer negligible resistance to bighorn travel.

A suggested guzzler design is provided in Appendix 7. Alterations or improvements to fit the local situation are encouraged.

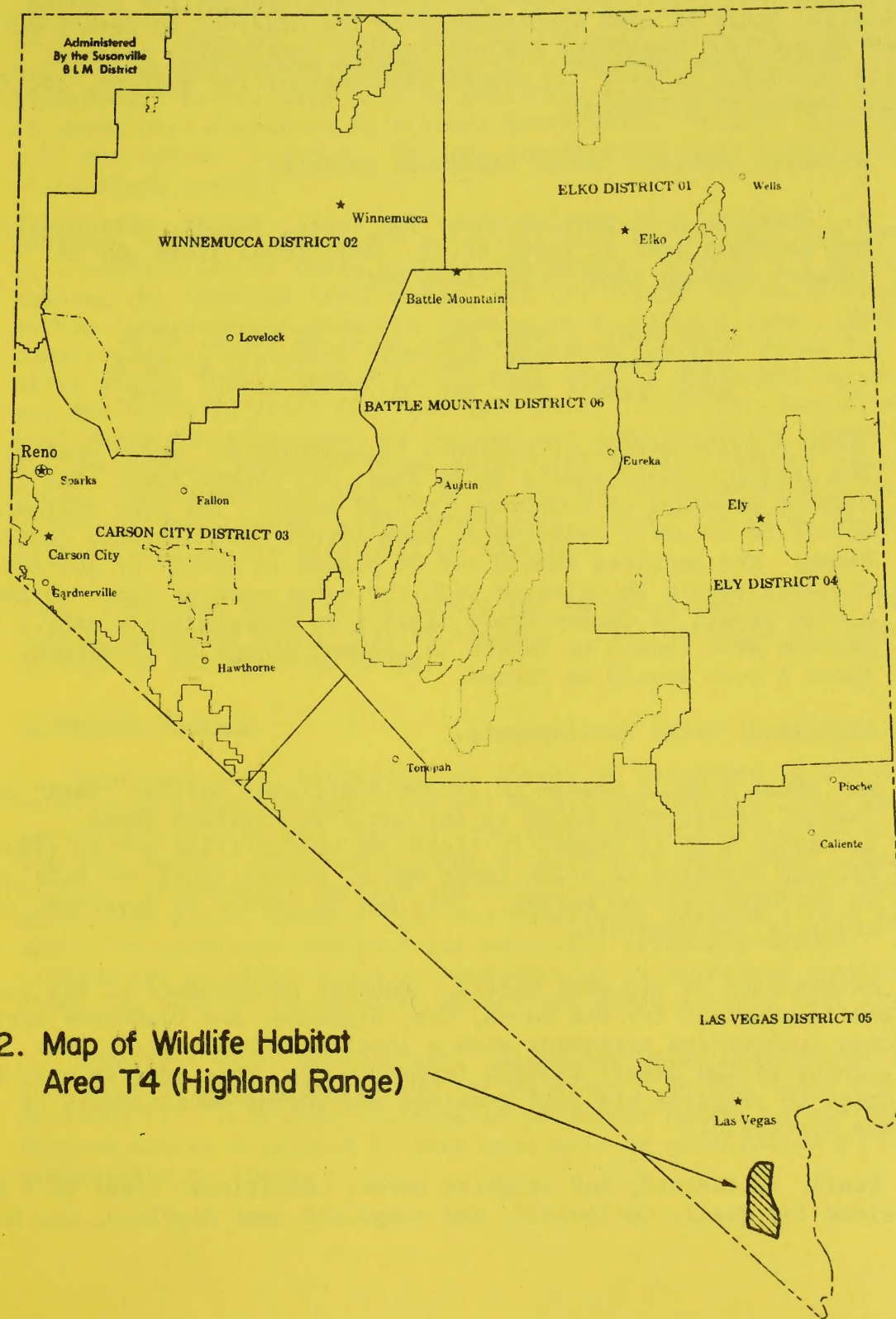


Figure 2. Map of Wildlife Habitat Area T4 (Highland Range)

A second big game guzzler will be constructed in the SE $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 3, T. 27 S., R. 62 E. The guzzler should be constructed as close as possible to a rough, rocky slope. Livestock will be excluded from this guzzler by a 2" x 4" rail fence (Appendix 8). One side of the fence will be left open, if possible, on a slope too steep and rocky for livestock. This rail-type fence is experimental for bighorn. A similar fence is used successfully in the District to permit mule deer (Odocoileus hemionus) and elk (Cervus canadensis) passage, while excluding cattle. If proven unsuccessful for bighorn, modifications should be attempted.

3. Wildlife guzzlers (water catchment devices).

a. Guzzlers will provide water for quail, chukar, cottontail, and possibly dove at three sites. Additional sites may be located through additional field work.

Site one: SE $\frac{1}{4}$, Sec. 6, T. 28 S., R. 63 E.

Site two: SW $\frac{1}{4}$, Sec. 36, T. 27 S., R. 62 E.

Site three: SW $\frac{1}{4}$, Sec. 2, T. 28 S., R. 62 E.

Basic guzzler design is provided in Appendix 6. Apron size for a 900 gallon cistern should be at least 365 square feet. The illustration provides no anchorage for the apron. The wood framework should be securely fastened at each corner with a buried concrete block. The guzzlers should not be placed in washes or gullies. Guzzlers should be oriented with the water opening faced northward. A site should be chosen where digging is comparatively easy. The guzzler area should be fenced to prevent damage by livestock. About $\frac{1}{2}$ acre should be fenced.

4. Additional water developments.

a. About $\frac{1}{2}$ MM is needed to locate additional natural "tank" or "basin" development sites in the northern Highland Range.

b. About $\frac{1}{2}$ MM is needed to locate an unidentified spring (Thomas Spring) reported to occur (Gene Myers, Searchlight) one mile or so northeast of Cow Spring. This spring should be developed for wildlife, if possible.

5. Maintenance of big game waters. Routine maintenance of big game waters is provided for Ora Hanna, Cow, Highland, and Deadhorse Springs through cooperative agreement with a local sportsmans group, the Fraternity of the Desert Bighorn (Appendix 3). This program will be extended to proposed big game guzzlers and spring developments if proven successful.

6. Quail, cottontail, and songbird cover. Additional cover will be provided for quail, cottontail, and songbirds near Highland, Ora Hanna,

Cow, and Deadhorse Springs (Appendix 1). Quail brush (Atriplex lentiformis) will be planted in drainages. Transplant stock and seed can be obtained from the Nevada Department of Fish and Game. Transplanting of seedlings, if available, is preferred to planting seed. Transplanting should be done in winter following the first good rain. This will permit root development and establishment. Quail brush was chosen because it is relatively unpalatable to livestock. Transplants will be protected individually by a hoop of sheep wire supported by a steel fence post. Initial planting will not exceed 50 acres. Natural reproduction will extend this plant along washes.

Roosting cover for quail and songbirds will be improved for quail by a combination of three methods (MacGregor, 1950): (1) McMillan roosts, (2) anchored brush piles, and (3) piling and tying brush within open-branched mesquite growing in suitable places. McMillan roosts consist of a pipe framework platform elevated about 5-6 feet above ground level. Sheep or hog-type wire is stretched across the top and brush is piled and tied upon this. This type should be used where roosting cover is lacking and open branching mesquite is not available. Anchored brush piles will provide most of the cover needs. These are constructed by piling and tying brush and branches about a firmly planted steel fence post. About two brush piles per acre in each spring area will be adequate.

Quail cover and brush piles should not be established within 100 feet of watering sites used by bighorn. This includes all known springs in the Highland Range.

C. Livestock Grazing

1. Livestock use. Livestock use should be increased in the southern McCullough Range, between Pine and McCullough Springs, thus reducing forage utilization and bighorn-livestock competition in the adjacent Highland Range. This can be done by providing additional livestock waters. Undeveloped springs are thought to occur along the eastern McCullough slope, between Pine and McCullough Springs. This area should be carefully searched for potential livestock waters. An alternative solution would be construction of livestock reservoirs along the base of the eastern McCullough slope in this same area.

2. Livestock water prohibition. Livestock water development of any kind will be prohibited in the northeastern Highland Range (see Appendix 1). This area contains no permanent waters or springs. Bighorn waters developed in this area will be constructed so as to be unavailable to stock.

This area includes all or portions of the following sections lying west of Highway 95: 19, 20, 28, 29, 30, 31, 32, 33, all in T. 26 S., R. 63 E.; and 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, all in T. 27 S. R. 63 E.; and 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36, all in T. 26 S., R. 62 E.; and 1, 2, 3, 10, 11, 12, 13, 14, 15, all in T. 27 S., R. 62 E. An attempt will be made to designate this area "The Highland Range Crucial Bighorn Habitat Area," per Title 43, Subpart 1727.

3. Spring development. Cow Spring waters (spring developed during FY 69) should be piped about two miles east, to alleviate livestock concentration. This development must be a float-valve equipped through to minimize waste. Water must remain available at the spring source.

4. An Allotment Management Plan should be completed during fiscal year 1972. Should this be postponed due to manpower constraints, a remedial effort to review all functional base waters should be completed immediately. Livestock forage capacity should then be identified within the service area of each water. This would then serve as a basis for judging yearly ephemeral forage production and licensing level for this "ephemeral type" allotment.

D. Access Development, Improvement, and Management

Access is adequate for sportsman utilization of game. Access should not be developed to big game water developments.

E. Land Acquisition, Classification, and Withdrawal

The entire area has been classified for retention and multiple use, with segregation against agricultural entry laws. No additional special classification or segregation is necessary.

F. Other

A brochure should be completed identifying major bighorn habitat areas. It should document the need for support of a bighorn management program and aim towards increased interest in bighorn welfare.

Management Evaluation:

Permanent vegetation trend sample plots should be established in bighorn crucial habitat. Status and trend of the bighorn population should be estimated each year by an interagency (NF&G-BLM) water hole census. All waters (depending upon available manpower) should be watched simultaneously for at least three days during a period when daily maximum temperatures exceed 100°F.

Impact of livestock grazing on forage condition and trend in the Highland and Cow Springs crucial habitat areas will be assessed by establishment



Figure 3. Site of the Highland tank water development as viewed from above looking down the watercourse. The project was developed during the 1970 fiscal year.

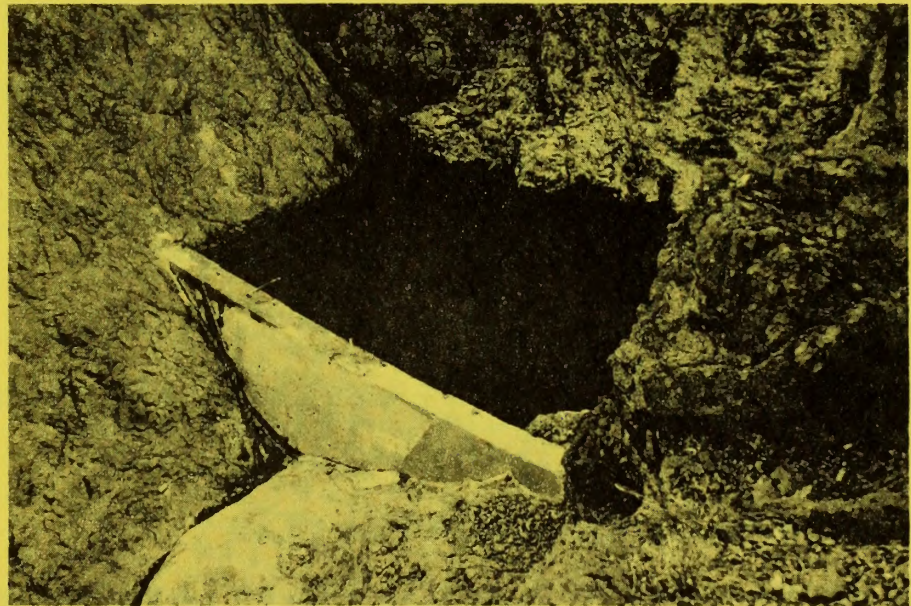


Figure 4. This concrete barrier was constructed to increase water storage for wildlife in an area formerly devoid of natural waters.

of permanent photo-plots. Two five by five foot plots will be established in each crucial area. Plots one and two will be located on the ridge top three-eighths mile east of Highland Spring. Plots three and four will be located on the saddle three-eighths mile north of Cow Spring.

Bighorn use at new water developments should be evaluated by observation and by use of new electronic vibration sensitive counters, which can be adjusted to animals in a particular weight range. This device was demonstrated at the 1969 Desert Bighorn Council. More information will be obtained on mechanics and purchase.

Implementation Schedule and Cost Estimate (Table 1):

A. Budget Year (for project costs, refer to page 9 , and for locations, Appendix I).

1. Improve quail cover on about 50 acres.
2. Complete brochure.

B. Program Year

1. Identify livestock waters in McCullough Range.
2. Cow Spring pipeline.
3. Construct tank for bighorn.
4. Identify additional bighorn watering sites.
5. Establish permanent trend photo-plots.

C. Program Year + 1

1. Evaluate developments and assist NF&G in bighorn inventory (includes \$1,000 for purchase of electronic equipment).
2. Construct two bighorn guzzlers.
3. Construct protective fence for guzzler number one.

D. Program Year + 2

1. Evaluate developments and assist NF&G in bighorn inventory.
2. Construct three wildlife guzzlers.

E. Program Year + n

1. Evaluate developments and assist NF&G in bighorn inventory.
2. Construct additional reservoirs or tanks.
3. Update HMP relative to non-game wildlife.

Provision for Review and Modification:

One man month will be devoted annually to evaluation of improvements and management objectives. Review records must be dated and placed in the HMP. Once an Allotment Management Plan is implemented, vegetative trend and condition will be measured annually in crucial bighorn habitat, which is used in common with livestock. Objectives for bighorn should be refined once the effectiveness of new water development is known. When District priorities permit, time should be programmed for field study of non-game species. HMP objectives should then be extended to include all wildlife species.

INSTRUCTIONS
Cost columns 4, 7, 10, 13
16, and 19 to be reported
in \$100's

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
PROGRAM PACKAGE INPUTS SCHEDULE

PACKAGE IDENTIFICATION

STATE	PY	TYPE	SERIAL

ACTIVITY CODE	PWE CODE	BUDGET YEAR			PROGRAM YEAR			PROGRAM YEAR+1			PROGRAM YEAR+2			PROGRAM YEAR+3			PROGRAM YEAR+4		
		UNITS (3)	COST (4)	MAN-MONTHS (5)	UNITS (6)	COST (7)	MAN-MONTHS (8)	UNITS (9)	COST (10)	MAN-MONTHS (11)	UNITS (12)	COST (13)	MAN-MONTHS (14)	UNITS (15)	COST (16)	MAN-MONTHS (17)	UNITS (18)	COST (19)	MAN-MONTHS (20)
(1)	(2)																		
1220	320					10	1												
1260	612				1	20	1												
1280	320					10	1		20	1	10	1		10	1			10	1
1280	420				1	30	1	2	50	2	3	30	1						
1280	430							1/2 mile	20										
1280	410	50	10	1															

References

- Blong, B. and W. Pollard. 1968. Summer water requirements of desert bighorn in the Santa Rosa Mountains. Calif. Fish and Game 54(4): 289-296.
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- Gallizioli, S. 1965. Quail research in Arizona. Arizona Dept. Fish Game, Phoenix.
- Gullion, G.W. (no date) The ecology of Gambel's quail in Nevada and the arid Southwest. Ecology 41(3)518-536.
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Highland Range HMP
Legend

- bighorn sheep habitat
- bighorn critical summer habitat
- bighorn critical fall-winter-spring habitat
- permanent water
- proposed bighorn water
- heavy stock utilisation

REAS
PW

Las Vegas 31 mi ↑

ALLOW NO STOCK
WATERS

McCullough Range



Form 6610-1
(June 1965)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COOPERATIVE AGREEMENT

WILDLIFE RESOURCE IMPROVEMENT PROJECT

- I. (Name of State Wildlife Agency) **Fraternity of the Desert Bighorn.**
hereinafter called COOPERATOR, and UNITED STATES OF AMERICA, by the Bureau of Land Management, hereinafter called the Bureau, for and in consideration of the mutual benefits hereunder, and in accordance with the Taylor Grazing Act (43 U.S.C. 315, 315a-315r), as amended do enter into this COOPERATIVE AGREEMENT for:
(Describe project)

Routine maintenance on wildlife water developments important to bighorn sheep

and collectively hereinafter called improvements, for the benefit of the wildlife resource on the public lands.

- II. The improvements known as

Highland Spring and Deadhorse Spring

are located within Sections 16 and 28, Township 27S, Range 62E

Mount Diablo Meridian, County of Clark, State of Nevada

- III. It is mutually agreed that materials, labor, equipment, project installation, supervision, maintenance, etc., will be as follows:

a. The COOPERATOR will furnish: Routine maintenance and periodic checks during the spring and summer months to see that developments are functioning properly. Routine maintenance includes minor repairs associated with water developments such as leaks, plugged pipes, cleaning, and light storm damage.

b. The Bureau will furnish: All labor and materials of significant cost, i.e., replacement of tanks, troughs, and pipe etc., not normally associated with routine maintenance.

IT IS FURTHER AGREED:

- a. The improvements may be removed, in whole or in part, during the term of this agreement or any extension thereof, by mutual consent of the parties or by direction of the Bureau; such removal shall be made by the COOPERATOR, or by the Bureau at its option. Upon removal of the improvements, any salvageable material, after deducting an amount to compensate for the actual cost of removal shall be available for distribution to the parties subject to this agreement in proportion to the actual amount of their respective contributions to the initial construction of the improvements, as determined by the project records of the Bureau. The parties shall take possession and remove their portion of the salvaged material within 90 days after first notification in writing that such material is available; upon their failure to do so within the time allowed, the material shall be deemed to have been abandoned and title thereto shall thereupon rest in the United States.
 - b. During the course of salvaging the material, the United States assumes no responsibility for the protection or preservation of said material.
- V. Should the land upon which the improvements are constructed be included in application for classification and disposal under Sections 7 and 14 of the Taylor Grazing Act, or other public land laws, the Bureau agrees not to allow such application if allowance of the application or disposal is discretionary upon the Bureau unless allowance is determined to be in the public interest and until the applicant has agreed in writing to compensate the COOPERATOR for his loss of the improvements in an amount mutually agreed upon and payable separately to the Bureau and to the COOPERATOR; or, if the parties are unable to agree, the district manager will determine the present reasonable value of the improvements in accordance with 43 CFR 4115.2-5a(7) or 43 CFR 4112.3-5a, which-
- X. Special Conditions and Restrictions.

ever is applicable and determine the amount payable to the Bureau and to the COOPERATOR which shall be in proportion to the actual amount of their respective contributions to the initial construction of the improvement; or the Bureau may require the removal of such improvements under the provisions of Section IV(a) of this agreement.

- VI. The COOPERATOR'S use of the improvements will be in conformity with the regulations specified in 43 CFR 4110 or with 43 CFR 4120 whichever is applicable, or to the special stipulations included in this agreement, if any, or to the Management Plan, if any, for the area in which the lands served by these improvements are located, to the extent such rules, stipulations, and plans are applicable for the conservation, protection, and proper utilization of the improvements constructed hereunder.
- VII. This agreement shall not accord to the COOPERATOR any preference, privilege, or consideration not expressly provided herein.
- VIII. This agreement shall remain in full force and effect indefinitely 5 years 10 years other (specify) unless (1) sooner terminated by mutual written consent of the parties, or (2) is terminated by the Bureau after due notice in writing because of COOPERATOR'S violation of any of the terms of this agreement, or (3) in accordance with Section IV or V of this agreement.
- IX. Items II and III of this agreement may be modified or cancelled by written agreement of the parties, which agreement shall become a part hereof. Items IV through VIII may also be amended by mutual consent of both parties, but first must be approved by the State Director.

Routine inspections by Fraternity members will be reported to the BLM District office along with any observations deemed pertinent to bighorn habitat welfare.

State of Nevada

UNITED STATES OF AMERICA

Department of Fraternity of the Desert Bighorn

Bureau of Land Management

By *Dennis Selkington*

By *Dennis E. [unclear]*

President
(Title)

District Manager
(Title)

3-12-70
(Date)

6-5-69
(Date)

Form 6610-1
(June 1965)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COOPERATIVE AGREEMENT

WILDLIFE RESOURCE IMPROVEMENT PROJECT

I. (Name of State Wildlife Agency) Fraternity Of The Desert Bighorn hereinafter called COOPERATOR, and UNITED STATES OF AMERICA, by the Bureau of Land Management, hereinafter called the Bureau, for and in consideration of the mutual benefits hereunder, and in accordance with the Taylor Grazing Act (43 U.S.C. 315, 315a-315r), as amended do enter into this COOPERATIVE AGREEMENT for: (Describe project)

Routine maintenance on wildlife water developments important to bighorn sheep.

and collectively hereinafter called improvements, for the benefit of the wildlife resource on the public lands.

II. The improvements known as Ora Hanna Spring and Cow Spring

are located within Sections 5 and 26, Township 27 S., Range 62 E.,
Mount Diablo Meridian, County of Clark, State of Nevada

III. It is mutually agreed that materials, labor, equipment, project installation, supervision, maintenance, etc., will be as follows:

a. The COOPERATOR will furnish: Routine maintenance and periodic checks during late spring and summer months to see that developments are functioning properly. Routine maintenance includes minor repairs associated with water developments such as leaks, plugged pipes, cleaning, and light storm damage.

b. The Bureau will furnish: All labor and materials of significant cost, i.e., replacement of tanks, troughs, and pipe etc., not normally associated with routine maintenance.

IV. IT IS FURTHER AGREED:

- a. The improvements may be removed, in whole or in part, during the term of this agreement or any extension thereof, by mutual consent of the parties or by direction of the Bureau; such removal shall be made by the COOPERATOR, or by the Bureau at its option. Upon removal of the improvements, any salvageable material, after deducting an amount to compensate for the actual cost of removal shall be available for distribution to the parties subject to this agreement in proportion to the actual amount of their respective contributions to the initial construction of the improvements, as determined by the project records of the Bureau. The parties shall take possession and remove their portion of the salvaged material within 90 days after first notification in writing that such material is available; upon their failure to do so within the time allowed, the material shall be deemed to have been abandoned and title thereto shall thereupon rest in the United States.
- b. During the course of salvaging the material, the United States assumes no responsibility for the protection or preservation of said material.

V. Should the land upon which the improvements are constructed be included in application for classification and disposal under Sections 7 and 14 of the Taylor Grazing Act, or other public land laws, the Bureau agrees not to allow such application if allowance of the application or disposal is discretionary upon the Bureau unless allowance is determined to be in the public interest and until the applicant has agreed in writing to compensate the COOPERATOR for his loss of the improvements in an amount mutually agreed upon and payable separately to the Bureau and to the COOPERATOR; or, if the parties are unable to agree, the district manager will determine the present reasonable value of the improvements in accordance with 43 CFR 4115.2-5a(7) or 43 CFR 4112.3-5a, which-

X. Special Conditions and Restrictions.

Routine inspections by Fraternity members will be reported to the BLM District Office along with any observations deemed pertinent to bighorn habitat welfare.

ever is applicable and determine the amounts payable to the Bureau and to the COOPERATOR which shall be in proportion to the actual amount of their respective contributions to the initial construction of the improvement; or the Bureau may require the removal of such improvements under the provisions of Section IV(a) of this agreement.

VI. The COOPERATOR'S use of the improvements will be in conformity with the regulations specified in 43 CFR 4110 or with 43 CFR 4120 whichever is applicable, or to the special stipulations included in this agreement, if any, or to the Management Plan, if any, for the area in which the lands serviced by these improvements are located, to the extent such rules, stipulations, and plans are applicable for the conservation, protection, and proper utilization of the improvements constructed hereunder.

VII. This agreement shall not accord to the COOPERATOR any preference, privilege, or consideration not expressly provided herein.

VIII. This agreement shall remain in full force and effect indefinitely 5 years 10 years

other (specify) unless (1) sooner terminated by mutual written consent of the parties, or (2) is terminated by the Bureau after due notice in writing because of COOPERATOR'S violation of any of the terms of this agreement, or (3) in accordance with Section IV or V of this agreement.

IX. Items II and III of this agreement may be modified or cancelled by written agreement of the parties, which agreement shall become a part hereof. Items IV through VIII may also be amended by mutual consent of both parties, but first must be approved by the State Director.

State of Nevada

UNITED STATES OF AMERICA

Department of Fraternity Of The Desert Bighorn

Bureau of Land Management

By Signed/ Marvin Einerwold

By Signed/ Dennis E. Hess

President
(Title)

District Manager
(Title)

12-12-1968
(Date)

12-9-68
(Date)

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner L. Myers		KIND OF GRAZING ANIMAL *			SEASON OF USE		SECTIONS		TWP.	RGE.	MER.
Type 16 Cora Hiri		Bighorn			Spr. - Winter		S 1/2 4		27 S	62 E	MDM
Ac/AUM											
SPECIES	Bighorn Use	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF	
GRASSES											
Hiri	---	30									
Bocu	---	10									
STI	Light	10									
Arlo		10									
SUBTOTAL		60									
FORBS											
SPH	Light	10									
SUBTOTAL		10									
SHRUBS											
Epvi	Light	10									
Epne	Light	5									
Hali		10									
Enfr		3									
Yumo		2									
Cora		tr.									
SUBTOTAL		30									
TOTALS		100									

Av C PUF _____ × Av Den ^{15-18%} FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ × Av Den _____ = FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av D PUF _____ × Av Den _____ = FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ × Av Den _____ = FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

Hali Haplopappus linearifolius
No livestock use in this basin

Bocy Bouteloua curtipendula

Write up No. HR-2 (See map)
Date Sept. 26, 1968
Aerial Photo No. _____

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner		KIND OF GRAZING ANIMAL *		SEASON OF USE		SECTIONS		TWP.	RGE.	MER.
L. Myers		Bighorn-(Cattle)		Summer		NW $\frac{1}{2}$ SW $\frac{1}{2}$		27 S	62 E	MDM
Type 16 Cora Arlo						Sec. 16				
Ac/AUM										
SPECIES	Bighorn Use	% COMPOSITION	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF	
GRASSES	Arlo	Mod.	10							
	Stsp	Mod.	10							
	Hiri	Light	05							
	Brru	---	02							
	BOU	---	03							
SUBTOTAL			30							
FORBS	PEN	Heavy								
	SPH	Heavy								
SUBTOTAL			05							
SHRUBS	Cora	Mod.	30	Constant Nibbles						
	Enfr	---	01							
	Epne	Heavy	20							
	Hali	---	05							
	Gusa	---	07							
	Atca	Heavy	02	6 Minutes						
	Yumo	---	tr.							
	Opan	---	tr.							
	Rhgl	Light	tr.	Nibbles						
SUBTOTAL			65							
TOTALS			100							

Av C PUF _____ x Av Den 15% = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

*Livestock and major game species. (Other game species making inappreciable use are:

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner L. Myers		KIND OF GRAZING ANIMAL *		SEASON OF USE		SECTIONS		TWP.	RGE.	MER.	
Type	1(16) Hiri	Bighorn		F-W-Spr.		SW 1/4 27		26 S	62 E		
Ac/AUM											
SPECIES	Bighorn Use	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF	
GRASSES	Hiri	Mod.	10								
	Arlo		02								
	Boba		02								
	Trmu		05								
	Trpu		tr.								
	Mupo	Light	5								
	STI		05								
	Bocy		03								
	Boar		08								
	SUBTOTAL			40							
FORBS	SPH	Heavy	5								
	ANN		1								
	SUBTOTAL			6							
	SHRUBS	Epvi	Mod.	16							
		Erfa	L. flr stems	10							
		Ladi		5							
		Enfr	L. flr stems	10							
		Epne	Heavy	05							
		Unk		01							
		Same		05							
YUC			tr.								
Gusa		02									
SUBTOTAL			54								
TOTALS			100								

Av C PUF _____ x Av Den 10 = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

Same Salizaria mexicana

Write up No. HR-4
Date Nov. 18, 1968
Aerial Photo No. _____

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner	KIND OF GRAZING ANIMAL *		SEASON OF USE		SECTIONS		TWP.	RGE.	MER.	
L. Myers	Bighorn		F-W-Spr.		NW 1/4 34		26 S	62 E		
Type	Bighorn		F-W-Spr.		NW 1/4 34		26 S	62 E		
Ac/AUM										
SPECIES	Bighorn Use	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF
GRASSES	Hiri	40								
	Boar	23								
	Mupo	05								
	Trpu	01								
	Brru	01								
	Arlo	tr.								
	STI									
	SUBTOTAL		70							
FORBS	ANN	05								
	SPH	Mod.	05							
	SUBTOTAL		10							
SHRUBS	Ladi	10								
	Frdu	05								
	Epvi	05								
	OPU	tr.								
	Yumo	tr.								
	SUBTOTAL		20							
TOTALS		100								

Av C PUF _____ x Av Den 26% = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner L. Myers		KIND OF GRAZING ANIMAL *			SEASON OF USE		SECTIONS		TWP.	RGE.	MER.
Type		Bighorn			F-W-Spr.		SW 34		26 S	62 E	
Ac/AUM											
SPECIES	Bighorn Use	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF	
GRASSES	Hiri	Light	15								
	Bucu	Heavy	15								
	Sihy		01								
	Brru		01								
	Stsp	Mod.	10								
	STI	Mod.	10								
	SUBTOTAL			50							
FORBS	SPH	Mod.	15								
	Unk		05								
	SUBTOTAL			20							
SHRUBS	Epvi	Mod.	15								
	SAL	Heavy	10								
	Qutu		02								
	Ladi		02								
	HAP		01								
SUBTOTAL			30								
TOTALS			100								

Av C PUF _____ × Av Den 10-15 FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ × Av Den _____ = FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av D PUF _____ × Av Den _____ = FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ × Av Den _____ = FAF _____ × _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner <u>L. Myers</u>		KIND OF GRAZING ANIMAL *		SEASON OF USE		SECTIONS		TWP.	RGE.	MER.
Type		<u>Bighorn-Cows</u>		<u>Summer</u>		<u>SW 1/4 16</u>		<u>27 S</u>	<u>62 E</u>	
Ac/AUM										
SPECIES	Bighorn Use	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF
GRASSES	Stsp	Mod.	20							
	Arlo	Mod.	05							
	Hiri	Heavy	15							
	Brru	Mod.	05							
	Mupo		05							
	Boar		tr.							
SUBTOTAL			50							
FORBS	SPH	Heavy	16							
	CIRSIUM		tr.							
SUBTOTAL			10							
SHRUBS	Epne	Heavy	05							
	Yumo		15							
	Epy	Heavy	05							
	HAP		05							
	Erfa	Light	05							
	Cora	Mod.	05							
	OPU		tr.							
	Gusa		01							
	Rhgl	Heavy	tr.							
SUBTOTAL			40							
TOTALS			100							

Av C PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Date **Nov. 20, 1968**
Aerial Photo No. _____

Examiner		KIND OF GRAZING ANIMAL *			SEASON OF USE		SECTIONS		TWP.	RGE.	MER.	
Type 16(1) Cora		Bighorn			YL		NE 1/4 9		27 S	62 E		
Ac/AUM												
GRASSES	SPECIES	TOTAL ALLOWABLE PUF	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF	
	Mupo		02									
	Trpu		tr.									
	Stsp											
	Hiri		05									
	Brru		04									
	Boar		04									
	SUBTOTAL			15								
FORBS	SPH		01									
	SUBTOTAL			01								
SHRUBS	Cora		60									
	HAP		10									
	Epsi		05									
	Epne		02									
	Gusa		02									
	Erfa		05									
SUBTOTAL			84									
TOTALS			100									

Av C PUF _____ x Av Den 15 = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM
 Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are: _____)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Write up No.
HR-9

Date
Nov. 21, 1968

Aerial Photo No.

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner L. Myers		KIND OF GRAZING ANIMAL *		SEASON OF USE		SECTIONS		TWP.	RGE.	MER.
Type		Bighorn				NE 1/4 4		27 S	62 E	
Ac/AUM										
SPECIES	TOTAL ALLOWABLE PUF	% COMPOSI- TION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF
GRASSES										
Hiri		09								
Brru		10								
Mupo		05								
Stsp		05								
Rocu		01								
SUBTOTAL		30								
FORBS										
Erin		05								
SPH		02								
ANN		11								
ERI	ANN	08								
SUBTOTAL		15								
SHRUBS										
Hym		08								
Erfa		05								
Cora		05								
Epne		02								
OPU		01								
Yumo		05								
MES										
Same		25								
Entr		02								
Mesp		02								
SUBTOTAL		55								
TOTALS		100								

Av C PUF _____ x Av Den 18 = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

Mesp Menodora spineseens

FORAGE SURVEY TYPE WRITE UP
(OCULAR RECONNAISSANCE METHOD)

Examiner		KIND OF GRAZING ANIMAL *			SEASON OF USE		SECTIONS		TWP.	RGE.	MER.
Type 16-1-Ladi-Hiri		Livestock-Bighorn					S½ 26		27 S	62 E	
Ac/AUM											
SPECIES	TOTAL ALLOWABLE PUF	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF	
GRASSES	Hiri										
	Brru										
	Boer										
	Stsp										
	Bocu										
	Mupo										
	Trmu										
SUBTOTAL		8									
FORBS	SPH										
	Erin										
	STI										
	Enfr										
	PHA										
SUBTOTAL		5									
SHRUBS	EPH										
	Lad										
	Acgr										
	Gusa										
	ERI										
	Eula										
	SAL										
	Atca										
	Epte										
	Same										
SUBTOTAL		87									
TOTALS		100									

Av C PUF _____ x Av Den 8 = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

FORAGE SURVEY TYPE WRITE UP
 (OCULAR RECONNAISSANCE METHOD)

Examiner		KIND OF GRAZING ANIMAL *		SEASON OF USE		SECTIONS		TWP.	RGE.	MER.
Type		Livestock-Bighorn				SE 1/4 27		27 S	62 E	
Ac/AUM						NE 1/4 34				
SPECIES	Bighorn Use	% COMPOSITION	CATTLE PUF	COMP. X C PUF	SHEEP PUF	COMP. X S PUF	DEER PUF	COMP. X D PUF	PUF	COMP. X PUF
GRASSES	Stsp									
	Boey	Mod.								
	Boar									
	Btru									
	Eral									
	Irpl									
	Mupo									
	Hiri									
SUBTOTAL		6								
FORBS	Enfr									
	PHA									
	SPH									
SUBTOTAL		7								
SHRUBS	Cora	60								
	Yumo	10								
	Opb	2								
	HYM									
	Atca	Mod.								
	EPU	8								
	HAP	5								
	SAL									
ERI	5									
SUBTOTAL		94								
TOTALS		100								

Av C PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av S PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

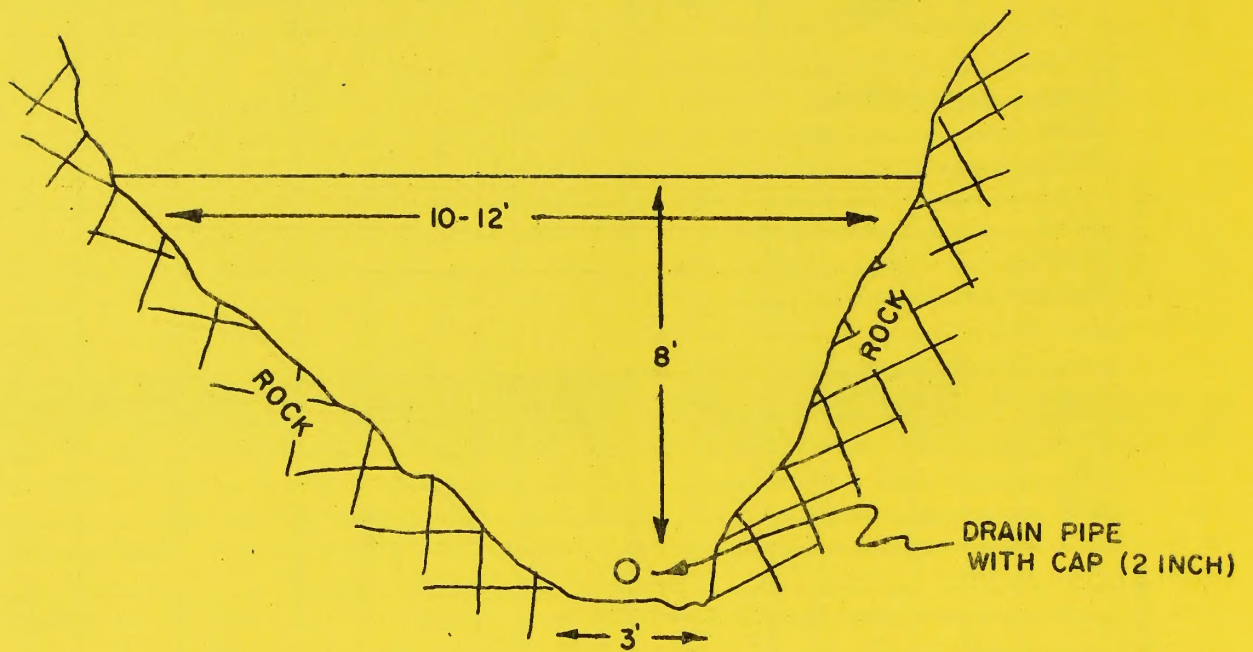
Av D PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Av PUF _____ x Av Den _____ = FAF _____ x _____ % Util = Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

Total Net FAF _____ ; FAR _____ ÷ Net FAF _____ = _____ Ac/AUM

* Livestock and major game species. (Other game species making inappreciable use are:

Heavy livestock use



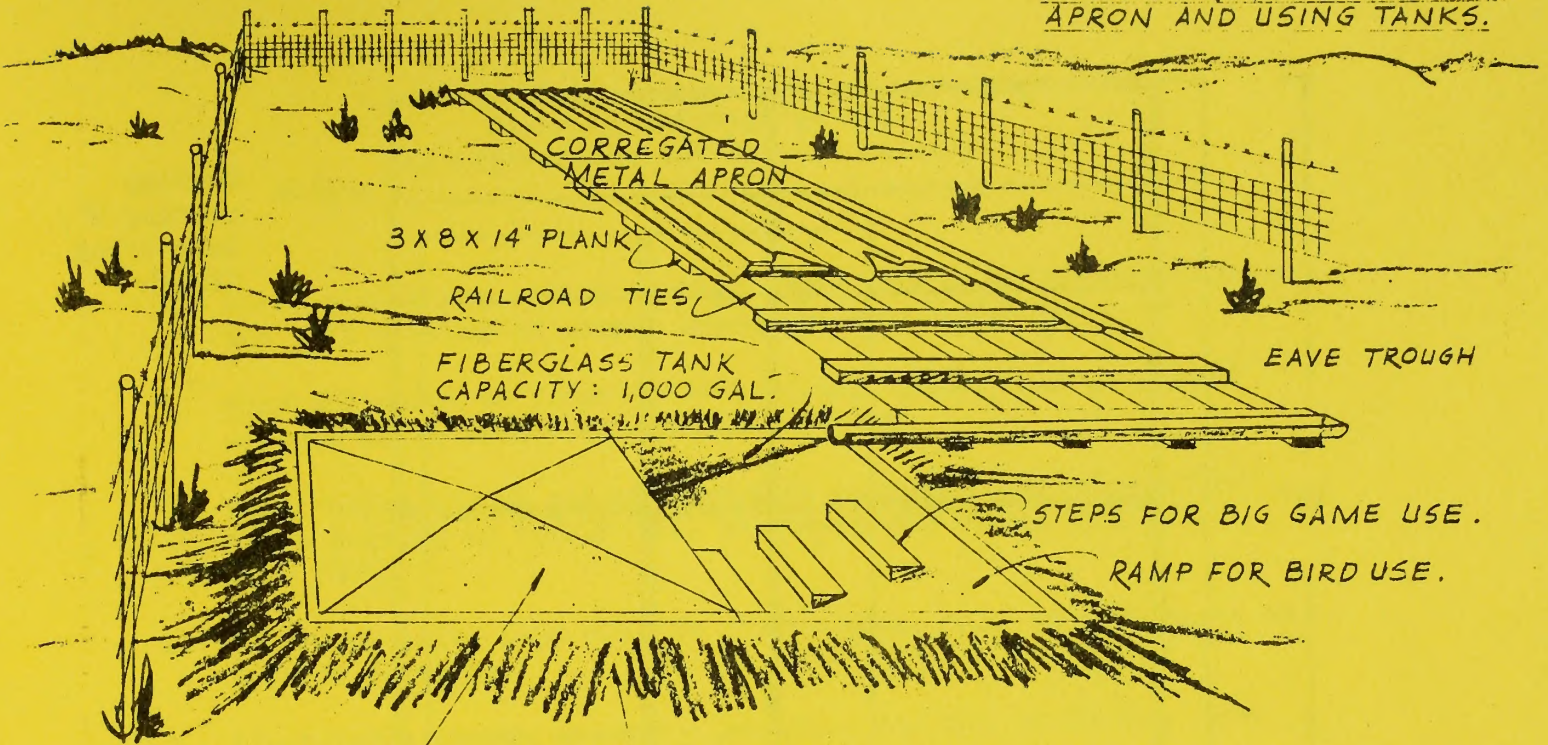
Notes:

- (1) Drill anchor points into rock on each side
- (2) Light steel rod reinforcement
- (3) Pump water to site and mix pre-mix concrete (55 sacks)
- (4) Dam depth 8 inches at top tapering to 12 inches at bottom

Bighorn Tank Construction

SITE LOCATED TO TAKE ADVANTAGE OF SLOPE FOR DRAINAGE.

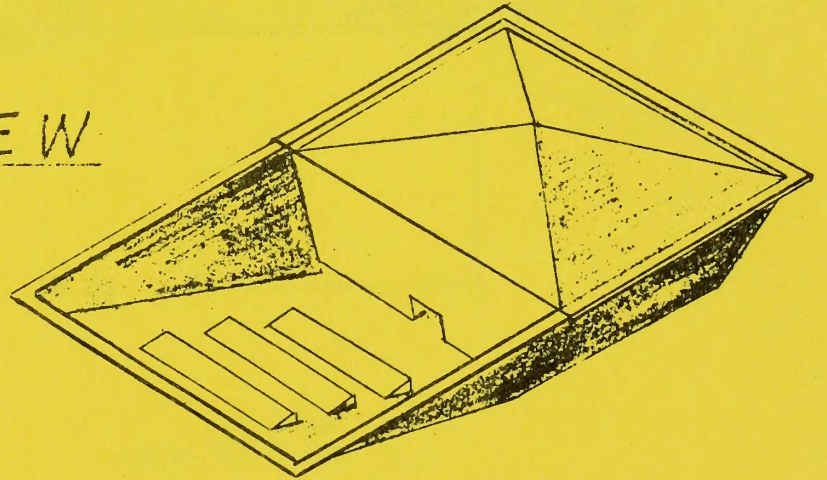
FENCE TO KEEP LIVE-STOCK FROM DESTROYING APRON AND USING TANKS.



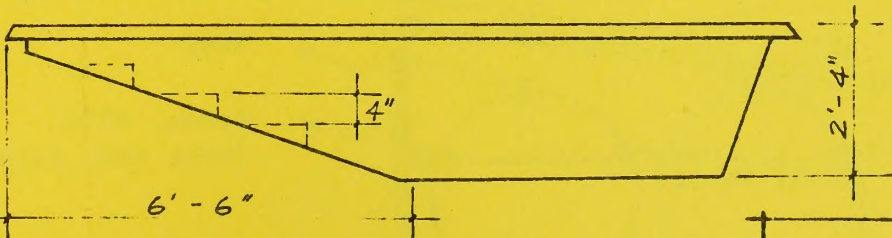
FIBERGLASS TANK COVER TO CUT DOWN EVAPORATION AND IS EASILY REMOVED FOR YEARLY CLEANING.

PARAPET BUILT UP FROM EXCAVATION DIRT TO ADEQUATELY SUPPORT TANKS AND KEEP IT FLUSH WITH THE GROUND LEVEL.

PLAN VIEW



COVER & BASIN



SIDE VIEW
BASIN

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management

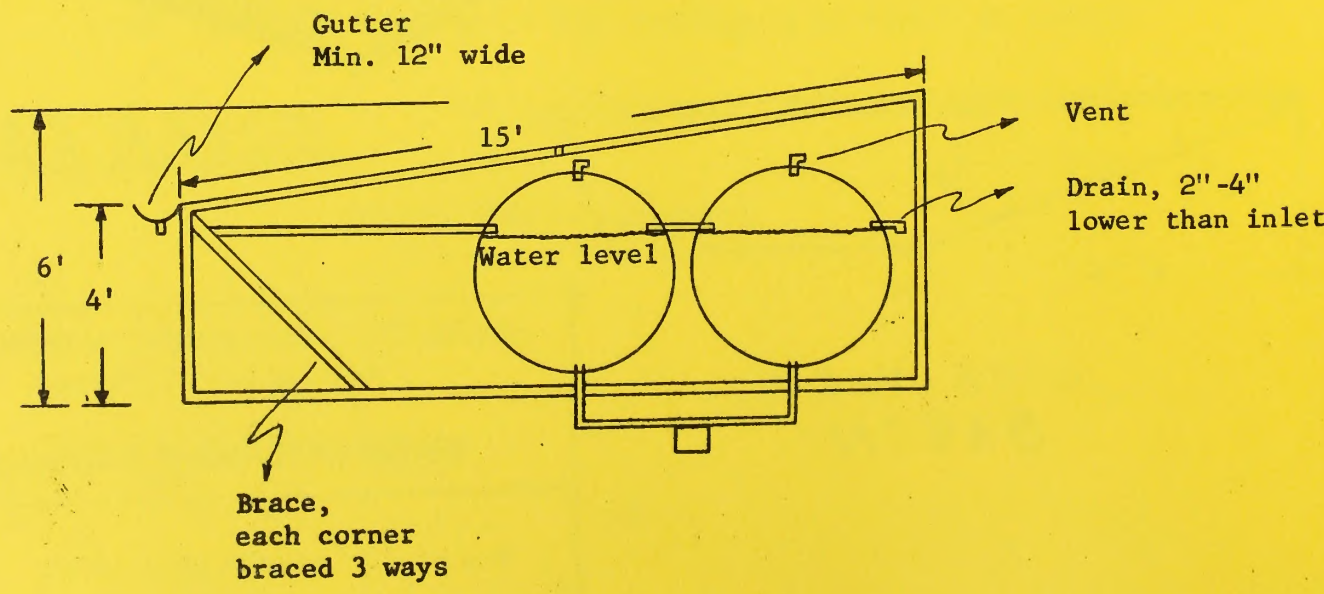
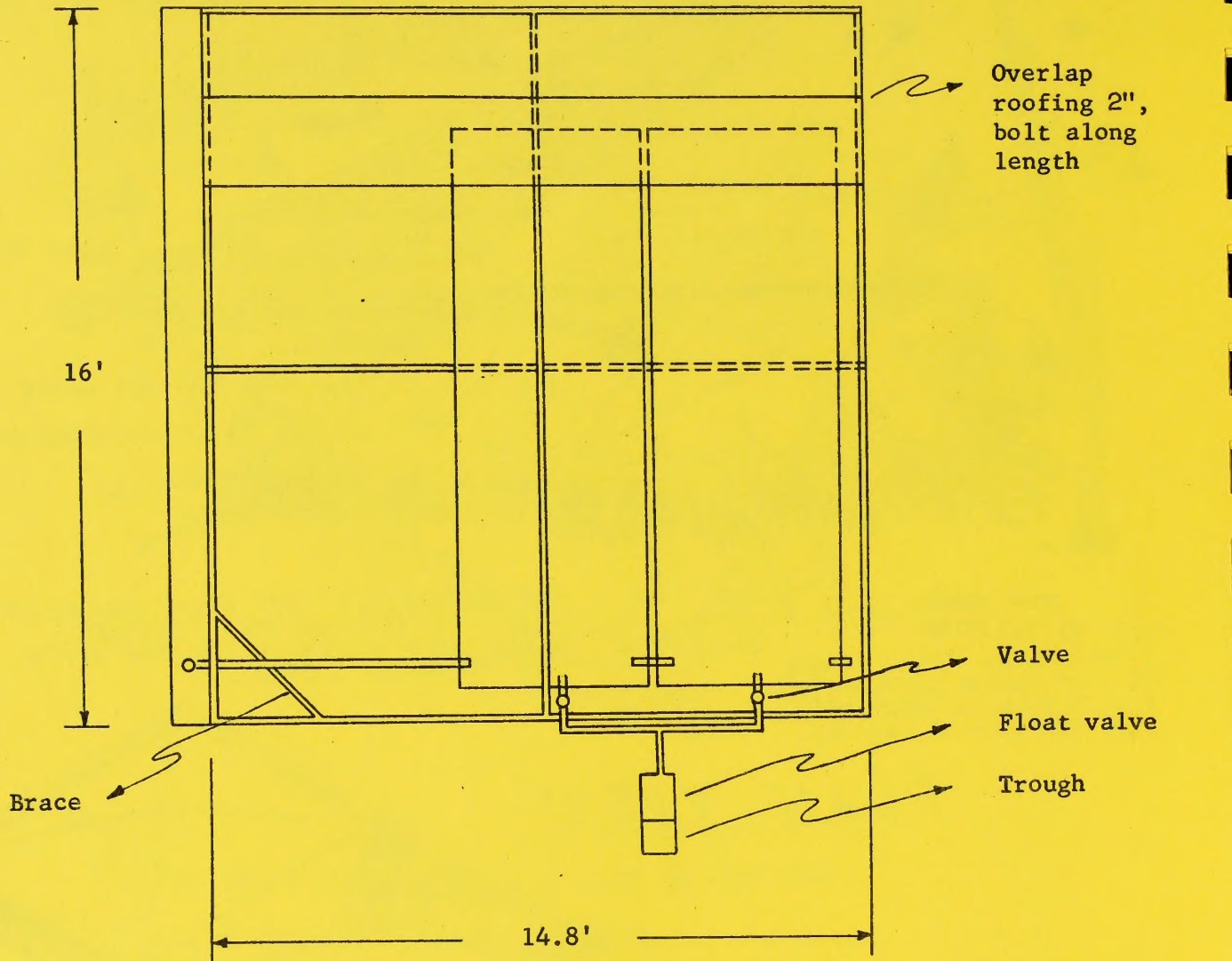
WATER CATCHMENT FOR WILDLIFE

2-12-64

NEVADA STATE OFFICE

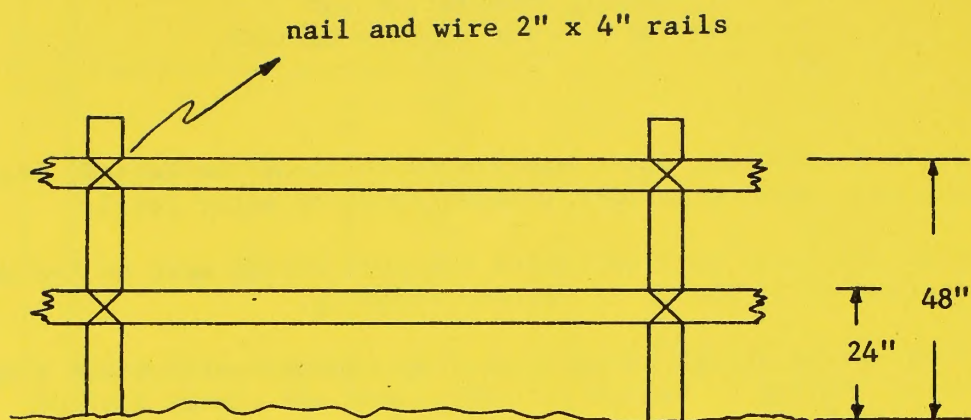
NSO-10

BIGHORN GUZZLER (Water Catchment) DESIGN



Planning Information and
Specifications for Bighorn Guzzler

1. Soils permitting, water storage tanks should be buried, leaving the tops showing to permit measurement of water level.
2. Pipe and valve to float-valve equipped trough must be buried minimum of 16 inches to prevent freezing.
3. Float-valve trough assembly must be equipped with drain plug. Valve leading to trough will be closed and trough drained each fall.
4. Catchment inlet pipe must be 2"-4" higher than run-off drain to prevent freezing.
5. Float-valve trough assembly should be minimum of 50 feet from catchment-tank assembly.
6. Two 400-500 gallon tanks or one 900-1,000 gallon tank may be used.
7. Entire assembly should be painted a dark, flat color to eliminate shiny metal surfaces.



Notes:

- (1) Livestock exclosure will measure about 400 linear feet (1/2 acre)
- (2) If bighorn do not pass through the fence successfully alternative livestock exclosures may be attempted as follows:

FENCE for guzzler to exclude livestock

ER'S CARD

dlife
t plan

	OFFICE	DATE RETURNED

(Continued on reverse)

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DATE DUE



