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Grazing Management Plan

Little Antelope Valley
Slinkard/Little Antelope Wildlife Area
California Department of Fish and Wildlife

Submitted to:

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1.0 INTRODUCTION

1.1 Recent Area History and Land Acquisition

The Little Antelope Valley property (Little Antelope), administered and managed by the California Department of Fish and Wildlife (CDFW), represents a separate and isolated parcel but remains an important component of the larger Slinkard-Little Antelope Wildlife Area (SLAWA). Comprising of 3,457 acres of the combined area of 11,364 acres, the Little Antelope Valley contains approximately 639 acres of improved irrigated pasture with the associated surface water rights (Figure 1). These irrigated pastures are managed primarily as lentic habitat for the benefit of migrating mule deer and riparian-dependent wildlife.

The greater SLAWA is located primarily in northern Mono County, California with a small western portion of the Slinkard Valley property located in Alpine County. Its northern-most boundary, Slinkard Valley Unit, is located within two miles of the Nevada State border near Topaz Lake. The southern-most boundary, Grouse Meadows, is approximately twenty miles northwest of Bridgeport. State Highway 89 (Monitor Pass Road) transects the northern end of Slinkard Valley and State Highway 108 (Sonora Pass Road) is three miles south of Grouse Meadows. U.S. Highway 395 and the communities of Walker, Coleville and Topaz are in Antelope Valley and comprise the SLAWA's eastern boundary.

All roads in this area are subject to winter snow closures. However, Highway 395 is a major north-south route and is mostly passable during all seasons. The agency field headquarters is located along Highway 395 midway between the towns of Coleville and Walker, California. The 3,457-acre Little Antelope Unit abuts and is located immediately to the southwest of the agency field headquarters.

The SLAWA, and surrounding lands, are an important migration route and winter range for the West Walker mule deer herd. This deer migration zone is diffused but extends from the high elevation summer ranges located in the Sierra Nevada to the lower elevation winter range located in Slinkard Valley, Little Antelope Valley, and along the eastern side of Antelope Valley at the base of the Wellington Hills and further east in Nevada (Taylor 1997). During the mid-1950's through the 1970's, landowners in the Slinkard and Little Antelope Valleys filed numerous formal complaints with CDFW claiming that large concentrations of deer were consuming privately owned livestock forage during the fall, winter and spring seasons.

The wildlife area was acquired by the Wildlife Conservation Board during the period between January 1979 and December 1986, utilizing grant funds from the State Urban and Coastal Park Fund (1976 Bond), Federal Land and Water Conservation Fund, Wildlife Restoration Fund, and the State Beach, Park, Recreational and Historical Facilities Fund of 1974. All the private properties in Little Antelope Valley were acquired by the State of California. The exception is a single 40-acre inholding located near the center of the Little Antelope Valley which is held by the US Bureau of Land Management (BLM).

The State Park funding utilized for these land acquisitions have several binding restrictions including the requirement that the lands remain available for public use and that livestock grazing be used only as a management tool to control vegetation. Management responsibility for all purchased properties was subsequently transferred to CDFW. The State Fish and Game Commission designated the acquired lands as the Slinkard-Little Antelope Wildlife Area in 1979.

60 AC
96-130 AUMs

7 AC

7.3

7.2

24 AC

6

Corral

5

7.1

110 AC
161-172 AUMs

37 AC

8 AC

101 AC
148-160 AUMs

3

Ranch Headquarters

Cabin

4

8 AC

3 AC

87 AC
170-232 AUMs

2

71 AC
104-115 AUMs

1

123 AC
180-191 AUMs

Legend

Gates

- Good
- Disrepair
- Minor Repair Needed
- # Pasture

Fence Lines*

- Good
- Disrepair
- Minor Repair Needed
- Little Antelope Valley

* Fence lines delineated using both GPS locations and Aerial Imagery

N W E S

0 375 750 1,500 Feet

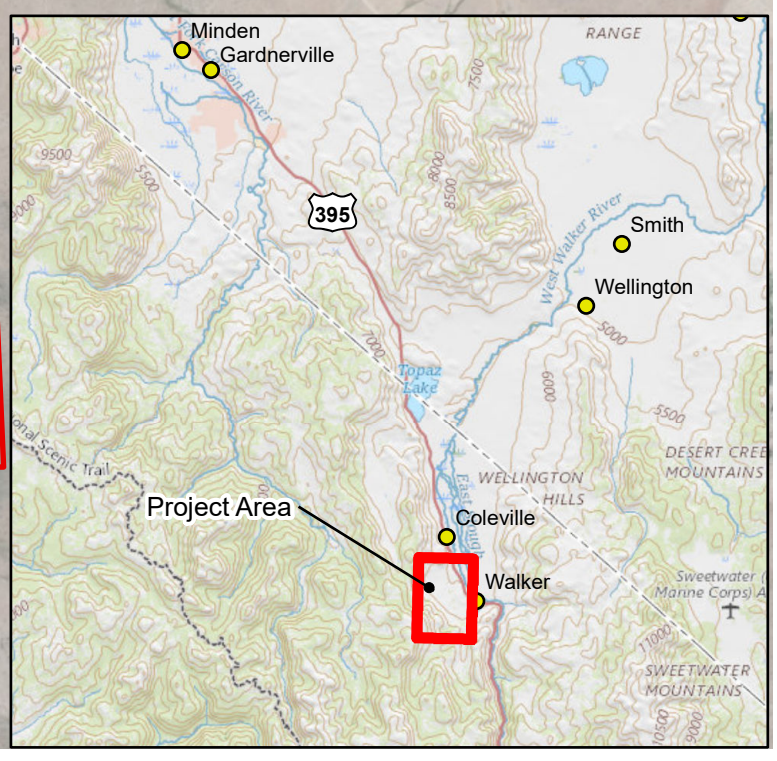

Figure 1
Little Antelope Valley
Infrastructure Map

7/11/2018

Source:
Esri Clarity Basemap
from 10/2010 DIgitalGlobe Imagry

Resource Concepts Inc

The property is managed by the Lands North Program of the Inland Deserts Region (Region 6) of the California Department of Fish and Wildlife in conformance with the agency's mission to, …."manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public."

1.2 Post-Land Acquisition Land Uses

Based on the CDFW mission, and the restrictions placed on the public funding sources utilized in land acquisition, the SLAWA is primarily managed for the conservation of mule deer habitat and seasonal migration; and, where compatible, regulated public access and use. Currently, hunting of deer, bear, certain predators, trapping, and hunting of upland game species occurs in season within the SLAWA. Catch and release fishing along a designated portion of Slinkard Creek is permitted August 1 through November 15 of each year. Other recreational activities such as birding and hiking are also allowed in the SLAWA. Permitted and prohibited uses are further defined in Sections 550 and 550.5, Title 14, of the California Code of Regulations.

In 1995, CDFW (formerly the California Department of Fish and Game) developed a draft Land Management Plan for the SLAWA (CDFW 1995). The plan provides direction and sets priorities for the management of habitats, species and programs to achieve the goals for the area consistent with the Purpose of Acquisition. Included in the plan are descriptive inventories of habitats and species, management goals for biological elements, a description of public uses and the administrative elements required to achieve the identified resource objectives.

The Grazing Element in the Land Management Plan identified the preference by mule deer to graze irrigated pastures during the winter and spring seasons when early green-up represented a critical component of their diets. Based on this initial finding, the plan specified that lease grazing could continue in the historically established pastures with developed irrigation. This initial management direction was conditioned based on development, implementation and monitoring of defined grazing plans to ascertain whether the identified desired future habitat conditions could be achieved on a sustainable basis under leased grazing agreement(s).

In 2011, the active grazing leases occurring in Slinkard and Little Antelope Valley expired and were not renewed since site-specific grazing plans had not been developed or applied in the leased pasture land as required by CDFW policy.

1.3 Plan Purpose and Scope

It is the intent and purpose of this grazing plan to meet the irrigated pasture habitat objectives identified in the Land Management Plan specific to the Little Antelope Valley. This grazing plan was developed to be consistent with the management direction and conservation objectives specified in CDFW (1995), as further clarified and updated by inputs from the involved CDFW staff. Management and habitat objectives specified in the Land Management Plan that relate specifically to Little Antelope are summarized in Section 2.0.

The prescribed practices included in this grazing plan are intended to either maintain or improve vegetation composition and vigor in the irrigated pastures, surface water quality and quantity, riparian and aquatic habitat, watershed function, quantity and quality of food and cover available for wildlife, and

the management of fine residual fuel loads for reducing wildfire hazards. Wildlife species of management interest include mule deer and upland game birds (primarily California quail).

Compared to other SLAWA properties, Little Antelope has more developed irrigation and consists of seven fenced pastures with a combined area totaling approximately 639 acres (Figure 1). Pasture 7 has historically not been included in previous Little Antelope grazing leases, presumably to protect the instream channel stabilization and grade control structures that have previously been constructed in the pasture. Due to this past practice, Pasture 7 was not included within the scope of the current grazing plan. However, if there is future agency direction to include Pasture 7 in the grazing lease, inclusion of this pasture could be accommodated based on the resource information contained in this plan.

Based on direction provided by CDFW staff and the Land Management Plan (CDFW 1995), this grazing plan focuses solely on the developed irrigated pastures and irrigation delivery system currently in-place at Little Antelope. The irrigated pastures included in this grazing plan are inclusive to Pastures 1-6 (Appendix 11.1).

Infrastructure improvements and vegetation enhancements in non-irrigated or upland sites, that could either achieve identified habitat objectives or to reduce the current wildfire risks, were also documented and noted during this analysis. These ancillary recommendations are documented and explained in Section 8.0 in this plan.

This grazing plan should not be viewed in isolation as future grazing plans are developed in other portions of the SLAWA. The opportunities afforded by increased scale, and the added grazing flexibility when separate or independently-managed sites are combined under a larger lease area, should be explored as the remaining SLAWA properties are considered in the development of future grazing plans.

2.0 GRAZING GOALS AND OBJECTIVES

A variety of resource information is included in the Land Management Plan, including resource objectives for the SLAWA and more specifically Little Antelope. The resource goals and objectives for livestock grazing are specified in the Grazing Element. In addition, discrete resource objectives and tasks are listed by resource or land use element. Due to the livestock grazing focus of this plan and improved irrigated pastures at Little Antelope, the identified resource objectives relating to irrigated pasture, and the plan elements for livestock grazing, facilities and water conveyances are summarized in Table 1, along with selected and relevant objective tasks or actions.

Table 1.
Little Antelope Resource Goals and Objectives (CDFW 1995)

Goal No.	Objective No.	Description/Direction
Aquatic/Riparian:		
1	1	Determine stability status of stream habitats.
1	2	Determine unimpaired hydrographs for Mill, Slinkard, and Lost Canon Creeks.
1	3	Restore unstable reaches.
2	1	Improve land management practices and uses.
3	1	Provide total protection for existing or potential riparian areas from unnatural perturbations.
4	1	As appropriate, re-water reaches of stream which have been dewatered.
4	2	Maintain adequate flow regimes in existing streams.
5	1	Meet or exceed Lahontan Regional Water Quality Control Board water quality requirements for surface waters.
6	1	Provide total protection for unique aquatic habitats.
6	2	Restore unique habitats as needed.
7	1	Lahontan cutthroat trout (LCT) recovery plan implementation.
7	2	Determine need for habitat improvement.
Irrigated Pasture:		
	1	Identify all irrigated pastures.
	2	Describe each pasture status.
	3	Review pasture history.
	4	Assess current uses and values.
	5	Evaluate impacts of historical and current uses.
	6	Assess potential for expanding / eliminating irrigated pastures.
	7	Develop plan to optimize pastures as sustainable productive habitat.
	8	Define requirements to implement this plan.
	9	Compare options and costs.

Goal No.	Objective No.	Description/Direction
Grazing Element:		
	1	Continue contract lease agreements for cattle grazing to maintain vegetation at preferred seral stages.
	2	Monitor grazing procedures and control grazing intensity to prevent negative impacts by rest-rotation, exclusions and other experimental techniques.
	3	Implement alternative vegetation control methods where ecologically justified, such as burning, mechanical and chemical, and compare effectiveness and efficiency of each.
	4	Use the funds generated by the grazing leases to support the operations expenses on the Wildlife Area.
Facility Maintenance Element—Fences, Corrals, Gates and Cattle Guards:		
	1	Identify existing fences, corrals, gates and cattle guards.
	2	Evaluate status of all improvements.
	3	Determine improvement needs and their environmental impacts.
	4	Develop plan to maintain all improvements.
Facility Maintenance Element Water Conveyances, Diversion Structures, Fish Barriers, Erosion Control Structures, and Habitat Improvement Structures		
	1	Identify all improvements and determine which are necessary for plan implementation.
	2	Plan to eliminate unnecessary structures and develop an operations plan for all others.
	3	Construct additional improvements as necessary for implementation of the management plan.

3.0 RESOURCE INVENTORY

3.1 Climate

The annual precipitation in the area surrounding Little Antelope ranges from 9 to 12 inches a year depending the elevation (NRCS 2003 and Sperling's 2018). Most of the annual precipitation occurs during the winter months or during the plant dormancy period. Average cumulative annual snowfall approaches 38 to 40 inches at the nearby towns of Coleville and Walker, respectively. The number of precipitation days approaches 38, while sunny days are estimated at 277 days (Sperling's 2018). The ecological site description for a Dry Meadow estimates an average growing season for this site is about 80 to 110 days (NRCS 2003). The duration of growing season can be extended when Dry Meadow sites are irrigated, like at Little Antelope.

The mean annual air temperature is 51 degrees F (CDFW 1995). At the towns of Coleville and Walker the average low temperature in January approaches 21 degrees F, while the average high temperature is about 89 degrees F in July (Sperling's 2018).

3.2 Land-Use History

The Final Draft Land Management Plan for SLAWA (CDFW 1995) provides a detailed description of the settlement in the Antelope Valley and then the subsequent land acquisitions used to form Little Antelope. Following land acquisition, the initial management objectives were to restore eroded streams and channels, rebuild the irrigation systems, restore habitats, and provide for public access. By 1995 many of the planned improvements had been completed, including repair of most irrigation ditches at Little Antelope. These actions both included the removal of ineffective fencing and construction of new pasture fencing to better control grazing distribution in the irrigated pastures and to improve deer movements across and within the property. Several ponds were created in low lying areas and marshes to increase habitat diversity for waterfowl and other wetland species. Some of these ponds remain fenced to provide ungrazed habitat.

At the same time, grazing levels were reduced from historic levels and leased grazing was continued in the irrigated pastures located at Little Antelope. Across the combined properties, records from the USDA Natural Resources Conservation Service (NRCS) indicate a 25 percent reduction when the current leased grazing levels were compared to historic levels applied in the 1950's. The most recent grazing lease for the Little Antelope, dated 2006, permitted cattle grazing up to 1,000 animal unit months (AUMs) during the period of May 15 to September 30 each year over a five-year period. An AUM represents the amount of feed consumed by a cow-calf pair for one month when the unweaned calf is less than six months of age. A stipulation in the 2006 grazing lease defined a cow-calf pair as 1.5 AUMs when a calf exceeded six months of age or weighed more than 500 pounds when it arrived for spring turnout at Little Antelope Valley. The estimated amount of forage consumed when an AUM is used totals 1,000 pounds on a dry-weight basis.

3.3 Soils and Ecological Site Descriptions

Of the 3,457 acres in Little Antelope, approximately 639 acres (or 18 percent) are irrigated and managed for irrigated pasture, lentic habitat, and leased grazing. Dominant soil map units found in the irrigated area are summarized in Table 2 and include: *Nohope loam, Grabbler mucky loam*, and *Lonecabin complex* (NRCS 2018).

Table 2.
Principle Soil Map Units and Correlated Ecological Sites
Little Antelope Valley

Soil Map Unit Name	Acreage		Ecological Site Name & Number	Ecological Site Description	
	Acres	Percent of Planning Area (%)		Species Name	Percent Composition (%)
Nohope loam, 4-8% slope	100	16	Dry Meadow R026XY055NV	Sandberg bluegrass Miscellaneous perennial forbs Sedge Meadow barley Rush Beardless wheatgrass Miscellaneous perennial grasses	50 15 15 5 5 5 5
Grabbler mucky loam, 0-8% slope	237	37	Dry Meadow R026XY055NV		
Lonecabin complex, 4-15% slope	234	37	Coarse Loamy 16-20 P.Z. R022AY044NV	Western needlegrass Mountain big sagebrush Antelope bitterbrush Miscellaneous perennial grasses Miscellaneous shrubs Miscellaneous perennial forbs	35 20 20 10 5 5
Other Minor Onsite Soil Map Units	68	10			
Totals:	**639**	**100**			

In a natural, undisturbed condition, the *Nohope loam* and *Grabbler mucky loam* soil map units are identified as soils supporting a Dry Meadow ecological site. Due to their landform locations, both soils are identified as hydric and developed under the influence of surface water streams and/or subterranean drainage from snow-melt contributed by mountain slopes. Both soils are deep with no restrictive layers within 80 inches of surface. However, both soils are characterized as being somewhat to poorly drained. For the *Nohope l*oam soil map unit this restriction relates to a near-surface ground water level within 6 to 18 inches of the soil surface. The estimated depth to water table in the *Grabbler mucky loam* unit is 20 to 30 inches; however, a sandy clay loam soil texture begins to become evident in the typical soil profile at a depth of 9 to 14 inches. Both soils have an irrigated land capability rating of *5w*, meaning these soil units are subject to little to no erosion but have limitations with soil wetness that can interfere with plant growth or cultivation (NRCS 2018).

The native plant species and their relative composition in an undisturbed Dry Meadow ecological site is summarized in Table 2. Annual plant production for both soils is estimated at 2,200, 1,700 and 1,300 dry-weight pounds per acre under favorable, normal, and unfavorable growing conditions (NRCS 2018).

The *Lonecabin complex* soil map unit represents an upland ecological site, Coarse loamy 16-20 P.Z., that naturally hosts a Mountain big sagebrush and bunchgrass plant community (NRCS 2018). This alluvial soil is also deep with a consistent profile of extremely stony sandy loam to loam. This soil complex is well drained and has no land capability rating for irrigation. The land capability rating under no irrigation is *6s*, meaning this soil unit has severe limitations (i.e., rocks and droughtiness) that makes it unsuitable for cultivation and restricts its use to upland grazing practices and wildlife habitat. The plant species that naturally inhabit this soil type, and ecological site and their composition under natural conditions, is listed in Table 2. Annual plant production for this soil map unit and ecological site is estimated at 1,600, 1,400 and 1,000 dry-weight pounds per acre under favorable, normal, and unfavorable growing conditions (NRCS 2018).

3.4 Vegetation

The irrigated pasture species in the Little Antelope grazing pastures have been expanded due to past water spreading from Lost Canon Creek and Rodriguez Creek. In addition, the CDFW, and possibly other past landowners, have previously worked with the NRCS to improve irrigation, stabilize channel erosion, and to plant improved pasture forage species. The latter may have even included seeding trials on this property. Unfortunately, past agency project records have not been located despite searches of CDFW and NRCS files.

Lacking previous documentation, a current plant species list was developed during forage production sampling on June 6, 2018 and other recent site visits. The resulting species list is presented in Table 3. With some exceptions, the compiled plant list coincides with the species listed in the corresponding ecological site descriptions (Table 2). Where these two lists differ in listed plant species, differences can likely be attributed to previous pasture seedings, drought, periods of limited irrigation application, and recent invasive weed infestations.

Table 3.
Initial Plant Species Listing Little Antelope Wildlife Area

Scientific Name	Common Name	Symbol
Dominant Grass and Grass-Like Species:		
Bromus inermis	Smooth brome	BRIN2
Bromus marginatus	Mountain brome	BRMA4
Bromus tectorum	Cheatgrass	BRTE
Carex nebraskaensis	Nebraska sedge	CANE2
Elymus lanceolatus	Streambank wheatgrass	ELLAL
Elymus trachycalus	Slender wheatgrass	ELTR7
Juncus articus	Baltic rush	JUAR
Leymus triticoides	Creeping wildrye	LETR5
Poa nevadensis	Nevada bluegrass	PONE3
Other Grass and Grass-Like Species:		
Agrostis stolonifera	Creeping bentgrass	AGST2
Dactylis glomerata	Orchardgrass	DAGL
Deschampsia cespitosa	Tufted hairgrass	DECE
Equisetum hyemale	Scouringrush horsetail	EQHY
Hordeum brachyantherum	Meadow barley	HOBR2
Hordeum jubatum	Foxtail barley	HOJU
Hordeum pusillum	Little barley	HOPU
Calamagrostis rubescens	Pine reedgrass	CARU
Poa pratensis	Kentucky bluegrass	POPR
Forb Species:		
Achillea millefolium	Common yarrow	ACMI2
Amaranthus reteroflexus	Red root pigweed	AMRE
Aster spp.	Aster	ASTER
Camelina microcarpa	Littlepod false flax	CAMI2
Chamerion angustifolium	Fireweed	CHANA2
Cirsium vulgare	Bull thistle	CIVU
Conium maculatum	Poison hemlock	COMA2
Descurainia pinnata	Western tansnymustard	DEPI
Galium spp.	Bedstraw	GALIU
Iris missouriensis	Rocky Mountain iris	IRMI
Lactuca serriola	Prickly lettuce	LASE

Scientific Name	Common Name	Symbol
Lepidium latifolium	Perennial pepperweed	LELA2
Potentilla spp.	Cinquefoil	POTEN
Rumex crispus	Curly dock	RUCR
Senecio integerrimus	Columbia ragwort	SEINE
Sisymbrium altissimum	Tall tumblemustard	SIAL
Taraxacum officinale	Common dandelion	TAOF
Tragopogon dubius	Yellow salsify	TRDU
Veronica anagallis-aquatica	Water speedwell	VEAN2
Verbascum thapsus	Common mullein	VETH
Vicia americana	American vetch	VIAM
Shrub Species:		
Artemisia cana	Silver sagebrush	ARCA13
Atremisia tridentata vaseyana	Mountain big sagebrush	ARTRV
Ribes aureum	Golden currant	RIAU
Rosa woodsii	Woods rose	ROWO
Salix exigua	Coyote willow	SAEX
Salix spp.	Willow	SALIX

In addition to this initial plant list, the CDFW Vegetation Classification and Mapping Program (VegCAMP) is presently developing a vegetation map, classification, and plant list for the entire SLAWA. Fieldwork for this effort began in the summer of 2017 and is planned for completion in the fall of 2018. When completed, the two compiled plant species listing can be compared, and a final plant inventory developed for the Little Antelope property.

An unanticipated field finding was extensive infestations of poison hemlock (*Conium maculatum*). This biannual plant is highly poisonous to humans, livestock and most mammals. It is a naturalized, nonnative species that occupies moist areas along streams and meadows typically at low densities, as it is not competitive with sod-forming perennial grass species. However, with its long taproot, it is theorized that poison hemlock has greatly expanded its previous density and spatial extent through the recent drought and limited pasture irrigation at Little Antelope. Presently, the spatial extent of dense hemlock that could cause livestock mortality is mostly confined to Pastures 3 and 6. However, a more thorough and intensive site inventory and mapping is needed to confirm this current understanding. In the meantime, careful observation is essential in pastures where grazing is applied. In other areas where high densities of poison hemlock are located, grazing should be excluded while these sites are treated for hemlock control.

Occupying a similar niche of moist to wet soils, bedstraw (*Galium* spp.) and pockets of perennial pepperweed (*Lepidium latifolium*) were also noted to be growing within the same areas as the poison hemlock infestations. The former represents an invasive and unpalatable understory meadow species, while the latter is a state listed noxious weed species regulated by the California Department of

Agriculture. Active control of perennial pepperweed is reportedly underway at Little Antelope with ongoing control treatments and field mapping. It is anticipated that the control of bedstraw will occur concurrent with control methods for the poison hemlock infestation.

3.5 Existing Irrigation Delivery System

Existing irrigation ditches and irrigation features are outlined on the area site map (Appendix 11.1). Ditches and check structures vary in condition and functionality. Of primary concern is overgrowth of vegetation in the conveyance ditches throughout the property. To efficiently and effectively spread water throughout the pastures, ditches must be cleaned periodically. See Section 7.2 for ditch maintenance suggestions. At this initial stage, new ditches or diversion structures are not recommended; only the upkeep of existing structures.

3.6 Existing Water Rights

Based on information provided by CDFW, as included in Appendix 11.2, water rights associated with Little Antelope Valley include:

- Water rights assigned by the Walker River adjudication (Federal Decree No. C-125) from Rodriquez and Lost Canon Creeks with a priority date of 1863, and a season of use from March 1 to September 15 annually allowing a diversion rate of 3.14 cubic feet per second (cfs) and a total irrigated area of 196 acres;
- Water rights assigned by the Walker River adjudication from Mill Creek with a priority date of 1861, and a season of use from March 1 to September 15 annually allowing a diversion rate of 5.12 cubic feet per second (cfs) and a total irrigated area of 320 acres;
- 260 shares with the Antelope Valley Mutual Water Company, each share being entitled to receive a flow of approximately 0.0159 cfs of the waters of the West Walker River (4.134 cfs in total);
- A water right (A018287, License 7086) for water from Rodriquez Creek with a priority date of 1958, and a season of use from April 1 to November 1 annually allowing a diversion rate of 2.7 cfs and a total irrigated area of 120 acres; and,
- A water right (A019384, License 9274) for water from an unnamed spring in Little Lost Canyon with a priority date of 1960, and a season of use from April 1 to November 1 annually allowing a diversion rate of 0.44 cfs, not to exceed 132 acre-feet per year, and a total irrigated area of 134 acres.

3.7 Fencing and Other Infrastructure

Pasture fences in the Little Antelope are generally in operable condition although minor routine maintenance is needed in short reaches of fence (Figure 1). Significant repairs were completed in the spring of 2018 by California Conservation Corps under the direction of CDFW staff. The exception is the east/west fence dividing Pastures 1 and 2. Large stretches of the fence are down and in need of repair. Small pastures near the ranch house and exclusion fences around water features are also in disrepair. At the pre-grazing season meeting between the lessee and CDFW, fence maintenance projects should be individually identified for follow-up prior to livestock turnout.

4.0 FORAGE INVENTORY

4.1 Site Production Sampling Methods

Initial forage production sampling was conducted at the Little Antelope on June 6, 2018. Double-weight sampling production methodology was followed as described in NRCS (1999) and BLM (1999a). Four, 100-meter forage production transects, comprised of ten plots each, were conducted across the irrigated project area. The production method was used to estimate total production for the herbaceous forage species that were present. All production estimates included ocular and dry weight correction factors. Clipped forage samples were collected, dried, weighed, and production estimates were corrected from green-weight estimates to dry-weights.

A minimum of two plots per transect were clipped and their measured values were averaged to produce a correction factor for ocular production estimates. Transect production (in dry lbs./ac) were then averaged for transects 1 and 4 to represent the "dry meadow" conditions found in Pastures 1, 2, 4, and 5. Production transects 2 and 3 were averaged to represent an "irrigated pasture" found in Pastures 3 and 6. All carrying capacity estimates were calculated based on an average 60 percent forage utilization rate. Pasture 7 was excluded from the production estimates.

4.2 Estimated Carrying Capacity

Grazing capacity is defined as the average number of livestock and/or wildlife that may be sustained in a management unit compatible with management objectives for the unit. In addition to site characteristics, carrying capacity is a function of management goals and management intensity (SRM 1998).

A range of estimated carrying capacities, reported in AUMs, is presented in Table 4. The low values presented represent estimated carrying capacity by pasture based on 2018 production sampling results. These values reflect a lower level of forage production since the plant community is currently restricted by thatch and irrigation has not been consistently applied the previous three years. Moving forward, grazable forage production is projected to increase with the implementation of active management.

For Pastures 1, 2, 4, and 5 "mid-range" values are also shown in Table 4. This column discloses the recommended carrying capacity levels for the four dry meadow pastures that are planned to be grazed over the first five years while poison hemlock is being controlled in Pastures 3 and 6. The increase in AUMs is attributed to the dense litter that is present. The mid-range of AUMs are recommended to help reduce thatch.

High range values for estimated carrying capacity on a pasture basis are also noted in Table 4. This column presents the projected forage production when thatch is significantly reduced, irrigation is normalized, and invasive weeds are controlled. The higher carrying capacity estimates were based on the 2006-2011 Little Antelope grazing lease that allowed grazing levels up to 1,000 AUMs. Since forage production levels vary between pastures based on the forage type present, a plus or minus 10 percent factor was used since the measured production indicated the irrigated pastures are 10 percent more productive than the dry meadow pastures. The total estimated carrying capacity of 1,000 AUMs was then propositioned by forage type and the pasture acreage to arrive at an upper estimate for carrying capacity by pasture.

Table 4.
Estimated Carrying Capacity by Pasture in Little Antelope Valley Project Area

Pasture No.	Forage Type	Acres	2018 Sampled Average Forage Production (dry wt. lbs./ac)	Estimated Annual Forage Production by Dry Weight		Targeted Forage Use Level (%)	Estimated Carrying Capacity (AUMs)		
				Pounds (lbs.)	Tons		Low Range	Mid-Range	High Range
1	Dry Meadow	123	2,225	273,675	136.8	60	180	198	191
2	Dry Meadow	71	2,225	157,975	79.0	60	104	114	115
4	Dry Meadow	101	2,225	224,725	112.4	60	148	161	160
5	Dry Meadow	110	2,225	244,750	122.4	60	161	177	172
3	Irrigated Pasture	106	2,437	258,322	129.2	60	170		232
6	Irrigated Pasture	60	2,437	146,220	73.1	60	96		130
Total:		**571**		**1,305,667**	**652.8**		**593**	**650**	**1,000**

It is important to recognize that the ranges presented are to be used for flexible stocking of the Little Antelope Valley from year-to-year. Precipitation, wildlife use, temperature patterns, and management will all influence plant production and estimates for carrying capacity and stocking rate.

5.0 GRAZING MANAGEMENT PLAN

5.1 Season of Use

May 15 to October 15 is recommended as the annual grazing period for the entire unit. May 15 was the turnout date from the 2006-2011 lease agreement which avoids interference with deer migration. By extending the grazing period into October, the opportunity for flexible dormant season grazing increases. Since there is a significant cheatgrass component in many of the upland areas within the dry meadow pastures, dormant season grazing is recommended to target the annual grass and reduce fuel loads and fire risk.

The CDFW Wildlife Habitat Supervisor has also expressed concern about heavy use by the public during upland bird hunting season. To avoid negative impacts to livestock distribution and safety, an October 15 livestock removal date was recommended to precede the opening day of upland game season which occurs on the third Saturday of October.

5.2 Stocking Rate

Stocking rate is defined as the estimated number of animals that can graze a given area based on the carrying capacity for the area and the duration of the grazing period. As recommended in Section 5.1 the duration of grazing at the Little Antelope could extend from May 15 to October 15 or a five month period. The carrying capacities for the Little Antelope pastures were estimated under various scenarios in Table 4 Since the rate of forage consumption varies by the size and weight of the grazing animal, animal unit (AU) equivalency values for the specified livestock or animal classes are also utilized in the determinations for stocking rate. The AU equivalent values used to estimate stocking levels at the Little Antelope were derived from NRCS (1999) and are listed as a reference in Table 5.

Larger grazing animals such as a mature bull or horse would have an AU value approaching 1.35 and 1.25 respectively, while a cow-calf pair or one dry cow has an estimated AU value of one (1.0). Smaller grazing animals such as an ewe-lamb pair, a mature sheep, or a mature mule deer have an AU value of 0.2 or one-fifth of an AU (Table 5). These equivalence values can be used to estimate stocking rates for a given area where the carrying capacity and grazing duration is known or estimated. For instance, if a pasture had an estimated carrying capacity of 100 AUMs, by utilizing these conversion values you could derive the initial estimates to graze either 74 mature bulls, 100 cow-calf pairs, 167 yearling steers, or 500 ewe-lamb pairs in that pasture for period of one month. These examples would be reduced by half if the grazing duration in the pasture was increased to a two month period.

It is important to realize the stocking rates for each class of livestock were estimated based on a single class of livestock at any given time. Multiple classes of livestock can be grazed in the same pasture at the same time, but appropriate numbers of each type of livestock must be calculated based on the corresponding AU equivalence value, the duration of grazing period, and estimated carrying capacity for the grazing unit.

Table 5.
Animal Unit (AU) Equivalent Values for Selected Grazing Animals*

Kinds / Class of Animal	Animal Unit (AU)
Cow-calf pair	1.00
Cow, dry	1.00
Bull, mature	1.35
Horse, mature	1.25
Cow, yearling	0.60
Ewe-lamb pair	0.20
Sheep, mature	0.20
Mule deer, mature	0.20
Goat, mature	0.15

* Adapted from NRCS (1999)

The stocking rates estimated in this grazing plan vary when the first five-year grazing cycle is compared to future issued grazing leases due to the poison hemlock infestations discovered in Pastures 3 and 6. The infested pastures should not incur grazing until poison hemlock is controlled due to animal health concerns. Projected length of poison hemlock treatment is five years (see Section 5.5 for further information on weed control). Once all pastures are deemed usable and weedy species are suppressed, carrying capacity in the Little Antelope lease is expected to increase considerably. It is important to realize that active monitoring, visual observation and adaptive management is vital to initiating different stages of the grazing plan. An effective grazing plan remains flexible and conforms to conditions apparent onsite.

Table 6 outlines suggested stocking rates for Pastures 1, 2, 4 and 5. The lower AUM value represents the estimated carrying capacities by pasture based on field sampling, while the mid-range is 10 percent greater. The mid-range value is recommended during the first five years of grazing to reduce thatch buildup.

The stocking rate (for the first 5 years or until Pastures 3 and 6 become usable) for Pastures 1, 2, 4, and 5 is 130 cow-calf pairs for the five-month grazing season (Table 6). Again, it is important to remember that the suggested stocking rate is 10 percent higher than the actual field estimate to reduce excessive thatch levels.

Table 6.
Estimated Five Month Stocking Rates for Dry Meadow Pastures: 1, 2, 4 and 5
First Five Years (or until poison hemlock suppression is achieved)

Pasture No./ Livestock Class	Carrying Capacity Low Range	Carrying Capacity Mid-Range
1	180 AUMs	198 AUMs
2	104 AUMs	114 AUMs
4	148 AUMs	161 AUMs
5	161 AUMs	177 AUMs
Totals:	593 AUMs	650 AUMs
Estimated Stocking Rates by Livestock Class (in Number of Head or Pairs)		
Cow-Calf Pairs or Dry Cows	**119**	**130**
Ewe-Lamb Pairs or Sheep	**593**	**650**
Mature Goats	**791**	**866**
Mature Horses	**95**	**104**

After poison hemlock is suppressed and CDFW and the lessee have jointly agreed that Pastures 3 and 6 are safe to be grazed, all pastures (except Pasture 7) will be included in the planned grazing rotation. A low and high range is represented in Table 7 to forecast the expected increase in forage production. The higher values account for production increases after irrigation is normalized, poison hemlock is controlled, and thatch is reduced; and is based on the permitted level of grazing use allowed in the 2006-2011 Little Antelope lease agreement. The higher rate provides a projection as to where forage production values are expected be after this plan is fully implemented.

The stocking rate (for years 6-10 or when Pastures 3 and 6 become usable) is 171 cow-calf pairs for the five-month grazing season or 200 pairs on the high end. Again, the high AUM value is the projected production level after active management is in effect for several years. Stocking rates will be set after annual monitoring is conducted and pre-grazing season meeting have occurred between CDFW and the lessee.

Table 7.
Five Month Stocking Rate for Little Antelope Valley
(After poison hemlock is suppressed and Pastures 3 and 6 are utilized)

Pasture No./ Livestock Class	Carrying Capacity Low Range	Carrying Capacity Mid-Range
1	180 AUMs	191 AUMs
2	104 AUMs	117 AUMs
3	170 AUMs	210 AUMs
4	148 AUMs	167 AUMs
5	161 AUMs	182 AUMs
6	96 AUMs	120 AUMs
Totals:	857 AUMs	1,000 AUMs
Estimated Stocking Rates by Livestock Class (Number of Head or Pairs)		
Cow-Calf Pairs or Dry Cows	**171**	**200**
Ewe-Lamb Pairs or Sheep	**857**	**1,000**
Mature Goats	**1,143**	**1,333**
Mature Horses	**137**	**160**

5.3 Pasture Rotations

Livestock will be moved in accordance to a deferred grazing rotation. In the proposed plan, each pasture will be grazed every year. However, no pasture will be grazed at the same time for two consecutive years. This variability in grazing allows plants to complete their life cycles in different growth stages which leads to a mosaic of plant diversity across the planning area.

Rotations are not based on a set time frame due to variability in plant growth from year-to-year. Since thatch build up is a restricting factor to favorable forage growth, thatch management is of interest when considering triggers to rotate livestock. A 3 to 4 inch stubble height average is recommended across a pasture to trigger livestock rotation into a new pasture and to maintain appropriate litter levels.

The progression of pasture rotations depicted in Table 8 will advance each year until Year 4 is reached. At Year 5 the cycle will repeat again provided that continued monitoring suggests repetition of the cycle.

After poison hemlock is suppressed and Pastures 3 and 6 are safe to graze, the rotation sequence in Table 8 is recommended. Pastures 3 and 6 are reserved for late season grazing consistently because they are the best irrigated, and as a function of soil moisture, plants stay greener longer and plant communities are more resilient compared to the remaining pastures.

5.4 Grazing Contingency Options

If the annual forage production does not appear to be adequate due to less than favorable plant growth, reassess the planned stocking rate and timing and adjust the pasture rotation sequence accordingly. This annual adjustment can be made during the pre-grazing lease meeting or during the planned grazing season following a joint CDFW-lessee meeting and agreement.

Should thatch build up continue to remain an issue under the grazing plan, consider either increasing the stocking rate or initiating a dual or repeated grazing rotation where the first pasture in a yearly rotation is grazed both at the beginning and the end of the grazing season. Under the dual grazing rotation, no two pastures should be grazed at the same part of the growing season in consecutive years.

If sheep or goats are selected to graze Little Antelope Valley a herder will be necessary to keep animals in the leased area and appropriate pastures because of the existing three-strand fencing currently in use. If a herder is not actively managing goats or sheep, the existing fencing will need to be significantly revised and reconstructed. Woven field fencing may represent a better option for containing and controlling smaller grazing animals.

Table 8.
Annual Pasture Rotations Under the Recommended Deferred Grazing System

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Rotation 1	Pasture 1	Pasture 2	Pasture 4	Pasture 5	Pasture 1	Pasture 5	Pasture 1	Pasture 2	Pasture 4	Pasture 5
Rotation 2	Pasture 2	Pasture 1	Pasture 5	Pasture 4	Pasture 2	Pasture 4	Pasture 2	Pasture 4	Pasture 1	Pasture 4
Rotation 3	Pasture 4	Pasture 5	Pasture 2	Pasture 1	Pasture 4	Pasture 1	Pasture 4	Pasture 5	Pasture 2	Pasture 1
Rotation 4	Pasture 5	Pasture 4	Pasture 1	Pasture 2	Pasture 5	Pasture 2	Pasture 5	Pasture 1	Pasture 5	Pasture 2
Rotation 5						Pasture 3	Pasture 6	Pasture 3	Pasture 6	Pasture 3
Rotation 6						Pasture 6	Pasture 3	Pasture 6	Pasture 3	Pasture 6

5.5 Other Recommended Agricultural / Cultural Practices

Actions mentioned under this section represent suggestions for consideration. Before a contractor or CDFW acts on large scale weed control, site-specific weed control specifications should be developed, approved, and followed carefully.

Poison Hemlock

For livestock to safely graze the irrigated pasture portions of the Little Antelope Valley, poisonous plants must be significantly reduced to avoid animal mortality. Poison hemlock (*Conium maculatum*) is toxic to humans, cattle, horses, sheep, goats, and swine. The current infestations are the most dense and expansive in the wettest pastures (i.e., Pasture 3 and 6). Deferral of grazing is mandatory in these pastures until this extremely toxic plant is effectively controlled.

Poison hemlock is a biennial non-native forb that generally grows between 4 to 6 feet tall. It takes two years to complete its life cycle and propagates from seed. A single plant can produce between 1,500 to 39,000 seeds which generates a seed bank in the soil. Seed banks can remain viable for 3 to 5 years and plants can germinate at any time during the growing season. In some cases, a limited percentage of the seed bank can survive up to six years (Schultz, 2015). Because of these plant characteristics, continuous intensive management is required each year to assure that poison hemlock does not set seed.

Livestock will typically avoid isolated plants when possible, but accidental consumption is of concern as first year poison hemlock plants are integrated into the understory component. Accidental consumption occurs most commonly in early spring when hemlock is the only available green forage. Moving hungry livestock into an infested area can quickly result in animal death loss. According to Schultz (2015) consumption as little as 0.25 percent of the animal's body weight can be lethal which warrants need for aggressive hemlock control and management.

In isolated populations, poison hemlock can be controlled through hand removal if protective clothing is worn since toxins can cause skin irritation. Inhalation of plant material should also be avoided due to irritable and harmful toxins.

Most of the infestation at Little Antelope is too vast to effectively control through manual means. Poison hemlock thrives in matted layers of thick thatch and takes advantage of idle pasture land since it can consistently produce seed without risk of defoliation. The first step to controlling the weed is reducing the thatch layer. Controlled burning would likely be the quickest method of removal and with thatch removal the entire seed bank would be more likely to express itself. If pasture-wide controlled burning is not possible, another option would be mowing and raking thatch and newly cut plant material with a dump rake. After cut biomass is piled with the dump rake it can either be jackpot burned or moved off-site for disposal.

Poison hemlock is expected to re-sprout following thatch removal but so are more favorable species that have been restricted by thick thatch layers. When the hemlock responds, it should be sprayed immediately while in the rosette stage with water-approved 2,4-D amine at a rate of 2lbs per acre with a boom sprayer. Following blanket herbicide application, spot spraying should be repeatedly practiced with a water approved 2,4-D amine as well at a rate of 1.28 fl. oz/gallon. Irrigation should also be restricted when herbicide is being applied to avoid water contamination and run-off. Carefully follow all

instructions on herbicide label. If poison hemlock begins to bolt despite herbicide application, plants should be mowed before seed-set, as low as possible, and re-sprayed.

If hemlock is found in a pasture that animals are already grazing, immediately construct exclusion electric fence and spot spray with water-approved 2,4-D amine at appropriate rates. Do not let animals graze the area until hemlock has dried and been removed from the site. Six weeks after application of herbicide is recommended.

Another important component to managing poison hemlock is promoting the health and vigor of favorable pasture species already present. Rhizomatous root systems of pasture grasses will compete with hemlock and reduce plant recruitment. Careful monitoring and normalized irrigation practices will promote in the establishment of favorable pasture species. See Section 7.2 for more details on recommended irrigation practices and pasture management, and Section 6.2 for invasive species monitoring and mapping.

Perennial Pepperweed

Perennial pepperweed or tall whitetop (*Lepidium latifolium*) is a broadleaved perennial nonnative invasive species. Shoots emerge early in the spring and by late spring, plants bolt, forming a white flower head. Average height of perennial pepper weed is 3 to 5 feet although it can grow taller in some instances. Due to its rhizomatous root system, it expands in a creeping mat. Additionally, it propagates by seed production.

Perennial pepperweed was found in isolated patches near the ranch house in Pasture 3. CDFW is currently mapping and treating infestations of this plant. No additional patches of this invasive species were noted during the field inventory associated with development of this grazing plan.

Early detection is key to controlling this species and immediate action is strongly recommended to suppress the weed before it spreads and builds a significant seed bank. Schultz, et. al. (2014) found that treatments using chlorsulfuron completely destroyed whitetop stands. The chemical was applied in combination in various seasons and with different mowing treatments. Chlorsulfuron applied at 1 oz/acre was consistently found to reduce canopy cover of whitetop to nearly zero regardless of supplementary treatment.

Bedstraw

Bedstraw (*Galium* sp.) is an aggressive native annual weed that can reduce livestock productivity if swallowed, contaminate wool, reduce crop yields, and become tangled in agricultural equipment. The plant has square stems, whorled leaves, and has a mint-like smell. The plant is unpalatable to grazing animals and is sticky to the touch. It propagates by seed production and has a seed viability of three years. Bedstraw is found in dense stands primarily in Pastures 3 and 6 and is contributing to thatch accumulation and the suppression of production by pasture species.

Pre-emergent herbicides and 2,4-D are found to be effective in controlling bedstraw. However, pre-emergent herbicides may also hinder favorable grass species expansion. According to the USDA plants database, bedstraw is also intolerant to fire. A combination of prescribed fire and spraying with water-approved 2,4-D may prove to be effective.

6.0 MONITORING AND EVALUATION METHODS

6.1 Mandatory CDFW-Lessee Coordination Meeting(s)

To determine which management actions are beneficial and which could be improved, two mandatory meetings between the CDFW and permittee should be held each year with one meeting occurring prior to the spring turnout date (May 15) and one after the conclusion of the grazing season (October 15). The purpose of these meetings is to first coordinate and plan livestock grazing during the coming grazing period followed by a yearend review to discuss the outcomes from that grazing period. The CDFW and lessee can then reach a consensus and understanding on what worked and did not work and identify what changes or facility maintenance requirements are needed prior to the initiation of grazing the following year.

6.2 Annual Monitoring Studies / Reports

Annual monitoring is essential to confirm that livestock grazing, and management actions occur as planned and plant communities are provided suitable conditions to trend toward the desired pasture species dominance (Table 9).

Stubble height monitoring is important to determine the pasture rotation triggers referenced in Section 5.3. The lessee is responsible for recognizing when a pasture reaches the 3 to 4-inch stubble height which triggers animal movement to the next pasture as identified in Table 7. Yearend pasture records for stubble heights should be submitted to CDFW staff for agency records and documentation, and to allow for independent field review and verification. Methods for monitoring and recording average stubble heights are found in Appendix 11.3.

Actual use reports should also to be completed by the lessee at the end of each grazing season and submitted to CDFW. Actual use is recorded with each pasture rotation and should include rotation dates, pasture name, and number of livestock turned in and out. Actual use records help to determine how grazing was conducted during the preceding grazing season and provides the information for documenting actual stocking levels applied at the pasture level. This basic information becomes critical when the resulting grazing monitoring data is evaluated for updating existing grazing practices and in the verification and adjustment of livestock stocking levels. RCI can assist CDFW in the selection or development of a suitable actual use form for the subsequent use and submittal by the lessee. The involved lessee may also have experience with an existing actual use form or report that they prefer to utilize.

Key species utilization measurements are recommended at the end of each grazing season by the responsible party selected by CDFW. Forage utilization estimates at the pasture level helps to confirm the intensity of forage consumption that occurred based on the applied stocking rate. At the minimum, ten forage use estimates must be recorded for each selected key forage species to produce reliable monitoring results. Utilization cages are placed in representative areas to define the annual forage production that occurred over the preceding growing year and to help calibrate ocular estimates of forage use in each grazed pasture. Forage utilization monitoring results will help determine if current management strategies are working as planned and in the confirmation of stocking rates at the pasture level. For further information on key species utilization see the Interagency Technical Reference, “Utilization Studies and Residual Measurements” (BLM 1999b).

Invasive species identification and mapping throughout the growth season is recommended to identify new infestations early on and to document resurgence of previously treated patches. Weedy species mapping should be used as a tool for developing ongoing weed control plans.

Table 9.
Annual Monitoring Seasonality and Location

Monitoring Method	Monitoring Season	Pastures
Stubble Height Monitoring	Throughout grazing season	In pastures that livestock are currently grazing
Forage Utilization	At the end of the grazing season	In every pasture grazed
Invasive Species Mapping (for poison hemlock and perennial pepperweed)	Throughout the growing season	In areas where previous infestations have occurred

6.3 Long-Term Vegetation / Habitat Trend Studies

Double-weight production sampling is recommended to determine long-term transitions in the plant community in terms of plant species composition and forage production. This method uses estimated plant weights by species to estimate species composition. An added by-product of this monitoring method is plant production estimates are also generated that can be used to either verify or adjust existing stocking rates.

Since plant composition changes slowly, long-term studies tracking plant species composition only need to be completed and analyzed every three to five years, or when an observed event occurs. Double-weight sampling should occur at permanently located sites so the sampling errors are minimized and results can be reliably compared across sample years. With three primary ecological sites representing the lease area, four to six permanently-located study sites (i.e., one site located in each grazed pasture) would will likely address the range of pasture conditions found at the Little Antelope Valley. Double weight sampling methods, like those employed in the development of this grazing plan, can be found in technical reference TR 1734-4 (BLM 1999a).

7.0 ROUTINE INFRASTRUCTURE MAINTENANCE CONSIDERATIONS

7.1 Fencing

Routine fence maintenance should include pre- and post-grazing season inspection by CDFW to determine needed actions from the lessee. Fence maintenance requirements should represent a discussion topic at each CDFW-lessee coordination meeting recommended in Section 6.1. Fences and gates should be kept tight and pastures free of unused fence materials. Fence maintenance is of utmost importance in Pastures 3 and 6 during the first five years of the plan due to extreme toxicity of poison hemlock and to reduce the risk from unintentional grazing.

7.2 Irrigation

Irrigation has been somewhat erratic in the past years on the Little Antelope; however, a strong plant recovery has been noted based on the irrigation applied in 2018. Normalizing the irrigation regime, as the water supply allows, will help establish perennial forage species and foster early green up for migrating mule deer. Irrigation using adjudicated water rights is permitted from March 1 to September 15 each year (Appendix 11.3). Late fall irrigation is recommended if water is available to promote plant re-growth and early vegetation green up the following spring.

All ditches will need to be cleaned to allow increased water flow and irrigation efficiency. Re-channelization of ditches may also be required to convey water effectively across the area as determined by CDFW and the lessee. Burning is likely the most effective option to clear ditches for water conveyance. CDFW should plan, organize, ensure the appropriate measures taken to control all prescribed burning in the Little Antelope Valley. No burning will be conducted without the express written permission by CDFW and appropriate permitting from Cal Fire. Ditches may also be cleaned mechanically with equipment if the use of prescribed fire is not feasible.

Vegetated irrigation ditches are known to represent habitat for quail. To avoid degrading upland bird habitat, two pastures are suggested to be cleaned each year under CDFW direction. New vegetation growth from cleaned ditches will provide forage for birds while uncleared ditches in the remaining pastures will provide cover.

7.3 Other

Gathering and loading corrals are located in the northwest corner of the property and at the ranch house (Appendix 11.1). Both are in disrepair and will require substantial investment in time and materials to bring them back to a safe and operational condition.

8.0 CONSIDERATIONS FOR FUTURE IMPROVEMENTS AND MANAGEMENT

8.1 Infrastructure Improvements

Alternative stock water sources should be considered and supplied apart from irrigation water in each pasture. By having supplementary water sources, such as troughs and stock tanks, livestock rotation will not be restricted by the irrigation regime. Eliminating or reducing the dependence on irrigation water as stock water also provides the option for scheduling irrigation for the purpose of reducing soil moisture content and soil compaction through hoof action. Stock water can be planned to be delivered to strategically placed troughs through a pipeline extending from an existing well. A strategically located trough can water up to 4 pastures at a time and also provide fresh water for wildlife utilizing the pastures.

8.2 Other Vegetation / Habitat Conservation Practices

Topics discussed below are preliminary suggestions that fall out of the scope of work for this grazing plan. To further develop and manage the surrounding upland sites at the Little Antelope further site analysis and planning would be needed to develop site-specific improvement plans.

Upland sites that surround the Little Antelope Valley irrigated pastures are in a late-seral, shrub dominated states. The sagebrush dominated communities have a significant annual grass component (i.e., cheatgrass), as well as a variety of perennial grass species. The sites are considered “at risk” due to likelihood of catastrophic fire that would severely affect the mature shrub overstory and perennial grass/forb understory alike. If fire were to occur, it is likely these residual shrub sites would shift toward an annual grass dominance.

In the interest of proactive wildfire mitigation, a mosaic brush removal pattern would be beneficial. Use of a Lawson aerator may prove useful as it will effectively reduce most brush species in one pass and leave behind soil indentations that facilitate seedling establishment and increased water capture.

If brush removal is practiced, suppression of the already present cheatgrass will remain an important point to consider. A pre-emergent herbicide treatment paired with brush removal and later followed with seeding (after the fallow period has passed with the pre-emergent herbicide), could significantly reduce fire fuel continuity.

Wildlife would also benefit from a mosaic effect resulting from brush removal and seeding. The “edge effect” would be increased between brush and treated areas along with improving the forage base for herbivores with an increase in production from perennial grass and forb species. This concept could also be applied along selected sagebrush perimeters to establish fuel breaks to reduce the existing risk of wildfire encroachment into the priority habitat sites.

9.0 REFERENCES

Bureau of Land Management (BLM). 1999a. Sampling Vegetation Attributes (TR 1734-4). USDI BLM National Business Center. Found at www.blm.gov/nstc/library/pdf/samplveg.pdf. Accessed June 4, 2018.

Bureau of Land Management (BLM). 1999b. Utilization Studies and Residual Measurements (TR 1734-4). USDI BLM National Business Center. Found at www.blm.gov/nstc/library/pdf/utilstudies.pdf. Accessed June 4, 2018.

California Department of Fish and Wildlife (CDFW). 1995. Final Draft Land Management Plan for Slinkard/ Little Antelope Wildlife Area. Dated September 1995.

Kelly, Troy. 2011. Deferral of Grazing at Slinkard/Little Antelope Wildlife Area for 2011. Internal memo to the Inland Deserts Region, Lands-North. Lands-North Manager. Dated February 3, 2011.

Lanini, W. T. 2010. Pest Notes: Catchweed Bedstraw Integrated Pest Management for Home Gardeners and Landscape Professionals (Publication No. 74154) (M. L. Flint, Ed.). Davis, CA: University of California Statewide Integrated Pest Management Program Agriculture and Natural Resources.

Natural Resources Conservation Service (NRCS). 2018. Custom soil resource report for Coleville-Bridgeport Area, Parts of Alpine and Mono Counties, California. Little Antelope Wildlife Area. U.S. Department of Agriculture. Developed through Web Soil Survey website found at www.websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed April 30, 2018.

Natural Resources Conservation Service (NRCS). 1999. National Range and Pasture Handbook. U.S. Department of Agriculture. Grazing Lands Technology Institute. Chapter 4, Inventorying and monitoring grazing land resources. Found at www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1043061.pdf.

Natural Resources Conservation Service (NRCS). 2003. Rangeland Ecological Site Description, Dry Meadow (026XY055NV). U.S. Department of Agriculture. Revision dated February 2003.

Schultz, Brad. 2015. Nevada's Priority Agricultural Weeds: Poison Hemlock. The Nevada Rancher. Pg. 42-45. Dated December 2015.

Schultz, B., E. Creech, and K. McAdoo. 2014. The Response of Perennial Pepperweed (*Lepidium latifolium*) to Physical and Chemical Mowing and Herbicide Treatment of the Regrowth. Geotechnical Special Publication. 14-02.

Society for Range Management (SRM). 1998. Glossary of terms used in range management, fourth edition. Edited by the Glossary Update Task Group, Thomas E. Bedell, Chairman. Found at https://globalrangelands.org/glossary/.

Sperling's. 2018. Best Places website found at www.bestplaces.net/compare-cities/coleville_ca/ walker _ca/climate. Accessed June 15, 2018.

Taylor, Timothy. 1997. West Walker Deer Herd Study Final Report. Report by consulting biologist prepared for California Department of Fish and Game, Bishop Field Office. Dated May 1997.

U.S. Forest Service. 2015. Field Guide for Managing Poison Hemlock in the Southwest (TP-R3-16-16, pp. 1-12). Albuquerque, NM: USDA Forest Service. Found at www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410121.pdf. Accessed June 11, 2018.

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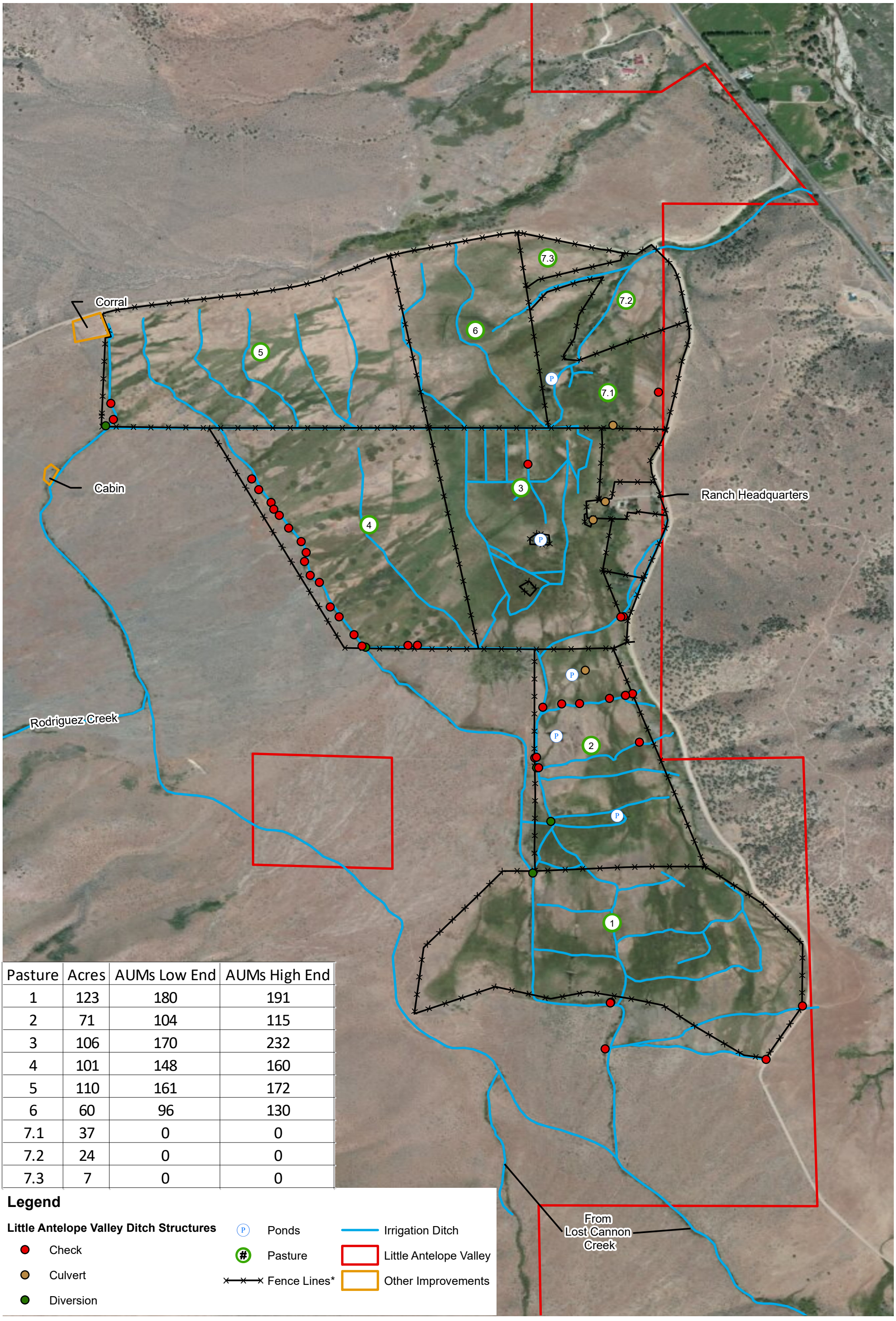
11.0 APPENDICES

Appendix 11.1

11.1 Site Plan Map



Pasture	Acres	AUMs Low End	AUMs High End
1	123	180	191
2	71	104	115
3	106	170	232
4	101	148	160
5	110	161	172
6	60	96	130
7.1	37	0	0
7.2	24	0	0
7.3	7	0	0

Legend

Little Antelope Valley Ditch Structures

- Check
- Culvert
- Diversion
- Ponds
- Pasture
- Fence Lines*
- Irrigation Ditch
- Little Antelope Valley
- Other Improvements

* Fence lines delineated using both GPS locations and Aerial Imagery

N W E S

0 250 500 1,000 Feet

Appendix 11.1
Little Antelope Valley Site Map

Source:
Esri Clarity Basemap
from 10/2010 DIgitalGlobe Imagry

7/11/2018

Resource Concepts Inc

Appendix 11.2

11.2 Water Rights Information

Summary of Pertinent Information from the Walker River Decree (C-125) and the 1940 amendment from the 9th Circuit Court:

From Rules & Regulations:

Division No. 6. That area consisting of lands served from the West Walker River and its tributaries above Topaz Lake Intake Canal and consisting principally of Antelope Valley.

That for Diversion No. 4 and that portion of Division No. 6 above the Coleville gaging station the irrigation season shall extend from the first day of March to the fifteenth day of September of each year.

That for Divisions Nos. 4 and 6, the duty of water is 1.6 cubic feet per second of water for each 100 acres of land entitled to water thereunder,

That the points of diversion of water from the river in each of the divisions are designated to be as follows:

Division No, 6.
The Rickey Ditch
The Swauger Ditch
The Alkali Ditch
The East Goodnough Ditch
The Harney Ditch
The P. & T. Slough Ditch
The Powell Ditch
The West Goodnough Ditch
The Big Slough Ditch
The Hardy Ditch
The Main Canal
The Carney Ditch
Thu Taylor Ditch
The Rosaschi diversion from Lost Canon Creek

That pursuant to previous orders of this Board and in accordance with paragraph 14 of the Decree it is required that at all diversions in Divisions Nos, 2, 3, 5, and 6, there shall be established at the owners own expense a reliable, sufficient and easily operated lock regulating readgate and a measuring device of a type that meets with the approval of the Board of Water Commissioners. It has been held that Parshall Flumes, Calco Metergates or Rectangular Weirs are an approved type of measuring device and that all headgates must be equipped with screw type headgates for the regulation of the flow of water into the ditches.

Slinkard/ Little Antelope Wildlife Area
US Board of Water Commissioners Card #: 104900 (516 ac. combines Claims 193 and 222)
Mill Creek Unit: Portions of Sec 6, 7, 18, 29, 30 T7N R23E

Owner	Stream	Year of relative priority	Amount in cubic feet per second	No.of acres irrigated	Description of land
Terry, G. M.,					
(193)	Mill Creek (West Walker River)	1861	5.12	320	SE¼ of NE¼, E½ of SE¼, Sec. 6; E½ of E½, Sec. 7; NE¼ of NE¼, Sec. 8 NW¼ of SW¼, SW¼ of NW¼, Sec. 29; NE¼, NE¼ of SE¼, Sec. 30; NE¼ of NE¼, Sec. 18; T. 7 N., R.23 E.

Little Antelope Valley Unit: Portions of Sec. 12, 13, 14, 15, 16, 22, 23, 24, 25, 26, 27, 36 T8N R22E, 18, 19, 30 T8N 23E.

McKay, Eliza,					
(222)	Rodriguez and Lost Canon Creeks	1863	3.14	196	S½ of SE¼, Sec. 13; NW¼ of NE¼, NE¼ of NW¼, Sec. 24; T. 8 N., R. 22 E. NW¼ of NW¼, Sec. 19; T. 8 N., R. 23 E. NE¼ of NE¼, Sec. 24; T. 8 N., R. 22 E.

In addition to the adjudicated rights above, CDFW holds 260 shares with Antelope Valley Mutual Water Company. According to the 1969 publication *Water and Related Land Resources, Central Lahontan Basin, Walker River Subbasin, Nevada California,* "Shortly after the decree [No. 731] was signed [1919], the lands of the Antelope Valley Land & Cattle Company on the West Walker River were subdivided and sold to individual ranchers. In January 1926 the Antelope Valley Mutual Water Company was formed by the purchasers of the California irrigated land. The water rights adjudicated to these lands by Decree No. 731 were transferred to the water company, and exist this way today. The mutual water company issued one share of water company stock (.0159 cfs) for each acre of land held by the organizers. There are now 43 shareholders in the water company, holding 14,643 shares, which cover the major portion of the irrigated lands in Antelope Valley." Later Decree No. C-125 (1936) expanded the adjudication to include upstream water users and the rights of the US for the Walker River Indian Reservation. "All other rights under Decree 731 were confirmed, and the rights in all of the Bridgeport Valley and other tributaries not heretofore adjudicated were established". The decree did not address domestic rights, irrigation uses on USFS, and some private riparian rights in California.

NUMBER

284

INCORPORATED UNDER THE LAWS OF THE STATE OF NEVADA, JANUARY 6, 1926.

Antelope Valley Mutual Water Company

CAPITAL 14,643 SHARES WITHOUT NOMINAL OR PAR VALUE.

SHARES

260

This is to Certify that State of California, Department of Fish and Game

is the owner of Two Hundred Sixty Shares of the Capital Stock of Antelope Valley Mutual Water Company, transferable only on the books of the corporation in person, or by attorney, and the surrender of this certificate properly endorsed. No transfer will be made unless all assessments have been paid.

Each share of stock shall be entitled to receive its proportional share of all of the waters and water rights owned by the corporation, without priority, and to receive a flow of approximately .0159 cubic feet per second of the waters of the West Walker River, if and when the same are available. Waters shall be distributed, supplied and delivered only to the owners of the capital stock of this corporation, and such stock and water rights there-under shall be appurtenant to those certain lands described in that certain decree of the United States District Court for the District of Nevada in that certain cause entitled, "Pacific Live Stock Company (a corporation), (substituted as complainant, in the place and stead of Miller & Lux, a corporation) Complaint, vs. Thomas B. Rickey, et al., Original Defendants, Antelope Valley Lands & Cattle Company (a corporation) et al., Substituted Defendants, Harriett Estes, et al., Intervening Defendants", No. 731, at pages 43, 44, 45, 46 and the first three items on the top of page 47 of said decree; said lands being situate in Antelope Valley, Mono County, California. Also, other lands now owned by the Antelope Valley Land & Cattle Company, comprising about 1346.63 acres, situate in Douglas County, Nevada; said lands being fully described in the By-Laws of the corporation, certified copies of which are recorded in the County of Mono, State of California, and in the County of Douglas, State of Nevada.

The shares of stock herein evidenced and of this corporation shall be appurtenant to any of the said lands. The shares of stock shall not, however, be located on any particular lot or subdivision of said lands. The shares shall not however be appurtenant to any other lands, except those described in said decree, and described in the By-Laws of the Corporation.

The shareholder shall be entitled also to that proportion of any flood waters which may be diverted by the corporation as the number of shares held by him bear to the total issued shares of the company.

IN WITNESS WHEREOF, this corporation has caused this certificate to be executed by its duly authorized officers and the corporate seal of the company to be hereto affixed.

January 5, 1979

Baldo Giorgi
SECRETARY

Lyle S. Thornton
PRESIDENT

STATE OF CALIFORNIA—STATE WATER RIGHTS BOARD

License for Diversion and Use of Water

APPLICATION 18287 PERMIT 11945 LICENSE 7086

THIS IS TO CERTIFY, *That*

Freeman E. Fairfield
2848 Cherry Avenue
Long Beach 6, California

Notice of Change (Over)

has made proof as of June 10, 1963, *(the date of inspection) to the satisfaction of the State Water Rights Board of a right to the use of the water of* Rodriguez Creek in Mono County

tributary to West Walker River

for the purpose of irrigation and stockwatering uses *under Permit* 11945 *of the State Water Rights Board and that said right to the use of said water has been perfected in accordance with the laws of California, the Rules and Regulations of the State Water Rights Board and the terms of the said permit; that the priority of the right herein confirmed dates from* August 26, 1958 *and that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to the amount actually beneficially used for said purposes and shall not exceed* two and seven-tenths (2.7) cubic feet per second to be diverted from about April 1 to about November 1 of each year.

The point of diversion of such water is *located* :

South one hundred (100) feet and east one thousand four hundred (1400) feet from NW corner of Section 25, T8N, R22E, MDB&M, being within NE¼ of NW¼ of said Section 25.

A description of the lands or the place where such water is put to beneficial use is as follows:

40 acres within NE¼ of NW¼ of Section 24, T8N, R22E, MDB&M
40 acres within NW¼ of NE¼ of Section 24, T8N, R22E, MDB&M
40 acres within NE¼ of NE¼ of Section 24, T8N, R22E, MDB&M
120 acres total

Rights under this license are and shall be subject to existing rights determined by West Walker River adjudication, Federal Decree No. C-125 and such other rights as may presently exist on the stream insofar as said existing and adjudicated rights are maintained.

This license is conditioned upon full compliance with Section 5937 of the Fish and Game Code.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the State Water Rights Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

FORM 64

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: JAN 14 1965

L. K. Hill
L. K. Hill
Executive Officer

10-20-69 RECEIVED NOTICE OF ASSIGNMENT TO Joseph T Bauner, Frank E. Bosley & Ron Kincade;
9-8-72 Records chgd. to show alfred H Osborne & Frank L. Titus as owners
1-22-73 RECEIVED NOTICE OF ASSIGNMENT TO Dolbal allan Chamberger & Eugene J. Wait, Jr.

1-9-76 RECEIVED NOTICE OF ASSIGNMENT TO The Headlands Preserve, Inc. A Calif. Corp.
1-29-79 Assgd to Calif Dept of Fish & Game

LICENSE 7086
STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

LICENSE TO APPROPRIATE WATER

ISSUED TO Freeman E. Fairfield

DATED JAN 14 1965

47689 8-61 2M © SPO

2

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

License for Diversion and Use of Water

Notice of Change (Over)

APPLICATION 19384 PERMIT 12909 LICENSE 9275

THIS IS TO CERTIFY, *That* FRANK C. BOSLER, JOSEPH T. BANNER AND RON KINCADE P. O. BOX 633, FAIRFIELD RANCH, GARDNERVILLE, NEVADA 89410

HAVE *made proof as of* OCTOBER 15, 1969 *(the date of inspection) to the satisfaction of the State Water Resources Control Board of a right to the use of the water of* AN UNNAMED SPRING (LITTLE LOST CANYON) IN MONO COUNTY

tributary to AN UNNAMED STREAM THENCE WEST WALKER RIVER

for the purpose of IRRIGATION AND STOCKWATERING USES *under Permit* 12909 *of the Board and that the right to the use of this water has been perfected in accordance with the laws of California, the Regulations of the Board and the permit terms; that the priority of this right dates from* APRIL 25, 1960 *and that the amount of water to which this right is entitled and hereby confirmed is limited to the amount actually beneficially used for the stated purposes and shall not exceed* FORTY-FOUR HUNDREDTHS (0.44) CUBIC FOOT PER SECOND, TO BE DIVERTED FROM ABOUT APRIL 1 TO ABOUT NOVEMBER 1 OF EACH YEAR. THE EQUIVALENT OF SUCH CONTINUOUS FLOW ALLOWANCE FOR ANY 30-DAY PERIOD MAY BE DIVERTED IN A SHORTER TIME IF THERE IS NO INTERFERENCE WITH OTHER VESTED RIGHTS. THE MAXIMUM AMOUNT DIVERTED UNDER THIS LICENSE SHALL NOT EXCEED 132 ACRE-FEET PER YEAR.

THE POINT OF DIVERSION OF SUCH WATER IS LOCATED:

NORTH 3,000 FEET AND WEST 600 FEET FROM SE CORNER OF SECTION 36, T8N, R22E, MDB&M, BEING WITHIN SE1/4 OF NE1/4 OF SAID SECTION 36.

A DESCRIPTION OF LANDS OR THE PLACE WHERE SUCH WATER IS PUT TO BENEFICIAL USE IS AS FOLLOWS:

8 ACRES WITHIN SW1/4 OF SE1/4 OF SECTION 13, T8N, R22E, MDB&M
30 ACRES WITHIN NW1/4 OF NW1/4 OF SECTION 24, T8N, R22E, MDB&M
35 ACRES WITHIN NE1/4 OF NW1/4 OF SECTION 24, T8N, R22E, MDB&M
5 ACRES WITHIN SE1/4 OF NW1/4 OF SECTION 24, T8N, R22E, MDB&M
5 ACRES WITHIN SW1/4 OF NW1/4 OF SECTION 24, T8N, R22E, MDB&M
39 ACRES WITHIN NW1/4 OF NE1/4 OF SECTION 24, T8N, R22E, MDB&M
3 ACRES WITHIN NE1/4 OF NE1/4 OF SECTION 24, T8N, R22E, MDB&M
2 ACRES WITHIN SE1/4 OF NE1/4 OF SECTION 24, T8N, R22E, MDB&M
7 ACRES WITHIN SW1/4 OF NE1/4 OF SECTION 24, T8N, R22E, MDB&M

134 ACRES TOTAL

31087-983 4-69 3M ⓑ OSP

RIGHTS UNDER THIS LICENSE ARE AND SHALL BE SUBJECT TO EXISTING RIGHTS DETERMINED BY WEST WALKER RIVER DECREE, No. C-125, FEDERAL DISTRICT COURT OF NEVADA, AND SUCH OTHER RIGHTS AS MAY PRESENTLY EXIST ON THE STREAM INSOFAR AS SAID EXISTING AND ADJUDICATED RIGHTS ARE MAINTAINED.

IN ACCORDANCE WITH THE REQUIREMENTS OF FISH AND GAME CODE SECTION 5946 THIS LICENSE IS CONDITIONED UPON FULL COMPLIANCE WITH SECTION 5937 OF THE FISH AND GAME CODE.

Licensee shall allow representatives of the Board and other parties, as may be authorized from time to time by the Board, reasonable access to project works to determine compliance with the terms of this license.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: FEB 9 1970

STATE WATER RESOURCES CONTROL BOARD

K. L. Woodward
Chief, Division of Water Rights

T. 8. 72 Records slip to show assgd. H. Osborne + Scott S. Tatum as owners.

1-22-73 RECEIVED NOTICE OF ASSIGNMENT TO Allen Shumberger + Eugene D. Wentz, Jr.

1-9-74 RECEIVED NOTICE OF ASSIGNMENT TO The Headlands Passage, Inc. A Calif. Corp.

KHF 3/4/70

2

L 9274

1-29-79 Assgn to Calif Dept of Fish + Game

3

Appendix 11.3

11.3 Stubble Height Measuring Method (BLM 1999b)

B. Residue Measuring Methods

1. Stubble Height Method The concept of this method is to measure stubble height, or height (in centimeters or inches) of herbage left ungrazed at any given time. This method, because of its simple application, is becoming a well-accepted method for expressing rangeland use.

This method would be used after stubble height standards for specific plant communities had been developed. As an example, a stubble height of 4 inches might be specified to provide streambank protection, to trap sediments, and to rebuild degraded stream channels in riparian areas.

a Areas of Use Stubble height standards and measurements have been used primarily in riparian areas; however, this method may also be used for upland sites. Adequate stubble height on streamside areas is needed at the end of the growing season for maintenance of plant vigor and streambank protection.

b Advantages and Disadvantages Stubble height measurements are simple, quick, and accurate. This method can be used to monitor large areas in less time than is needed with traditional utilization study methods. Statistical reliability improves because numerous measurements can be taken in a relatively short time. Limitations of the method may stem from infrequent application in a variety of rangeland ecosystems. While stubble height has been used with great success in riparian areas, there needs to be more research in a variety of other plant communities.

c Equipment

- Study Location and Documentation Data form (see Appendix A)
- Stubble Height form (see Illustration 4)
- Tape measure

d Training Minimal training of examiners is needed to use this method. Examiners must be able to identify the plant species. This method requires measuring stubble heights of selected key species, which can easily be accomplished by agency personnel, permittees, or other interested individuals.

e Establishing Studies Careful establishment of studies is a critical element in obtaining meaningful data. Select key species and determine the number, length, and location of the transects (see Section III.B.7). Document the location and other pertinent information concerning transects on the Stubble Height form.

(1) Collect data using several pilot transects to determine the number of transects needed and the number of observations to be made on each transect. These data are needed to determine if a statistically valid sample has been collected (see Section III.B.7).

(2) At the beginning of each study, determine the transect bearing and distance between observation points. Select a prominent distant landmark such as a large tree, rocky point, etc., that can be used as the transect bearing point.

(3) Plot the transects on detailed management unit maps and/or aerial photos (see beginning of Section III).

(4) Permanently mark the location of each study with a reference post and study location stake (see beginning of Section III).

(5) Number studies for proper identification to ensure that the data collected can be positively associated with specific studies on the ground (see Appendix B).

(6) Document the location and other pertinent information concerning the study on the Study Location and Documentation Data form (see beginning of Section III and Appendix A).

f Sampling Process At specified intervals, measure the stubble height of the key species nearest to the toe of the right foot and record on the Stubble Height form (Illustration 4). Measurements should be in inches or centimeters of leaf stubble left. For riparian sites, sampling should be done along both sides of a stream segment. For upland sites and wet meadow riparian sites, measurements should be taken along a predetermined course or transect. In either situation, stubble height data can be collected using the linear or baseline techniques described in Section III.A.2.

g Calculations Use data from the Stubble Height form for calculating the average stubble height by species.

h Data Analysis Confidence levels should be calculated for the median. See Technical Reference, *Measuring & Monitoring Plant Populations*, for information on determining confidence intervals.

i References

Anderson, E. William and Wilbur F. Currier. 1973. Evaluating zones of utilization. J. Range Manage. 26:87-91.

Gierisch, Ralph K. 1967. An adaptation of the grazed plant method for estimating utilization of Thurber fescue. J. Range Manage. 20:108-111.

Lommasson, T. and Chandler Jensen. 1938. Grass volume tables for determining range utilization. Science 87:444.

——— 1943. Determining utilization of range grasses from height-weight tables. J. Forestry 41:589-593.

McDougald, Neil K. and Richard C. Platt. 1976. A method of determining utilization for wet mountain meadows on the summit allotment, Sequoia National Forest, California. J. Range Manage. 29:497-501.

Reid, E.H. and G.D. Pickford. 1941. A comparison of the ocular-estimate by-plot and the stubble-height methods for determining percentage utilization of range grasses. J. Forestry 39:935-941.

Page ____ of ____

Stubble Height

Study Number	Date	Examiner

Allotment Name & Number	Pasture

	1	2	3	4	5	6
Site (or)						
Species						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
Total						
Average						

(Record averages on back of form.)

Illustration 4

Stubble Height Summary			
Species	Total Stubble Height	Number of Plants	Average Stubble Height
Totals			

Notes:

Stubble Height

Study Number	Date	Examiner
HDQ 1	8/3/95	MJB

Allotment Name & Number	Pasture
East Fork 46045	Willow Spring

	1	2	3	4	5	6
Site (or)	HIMU 2	BOER 4	BOCU			
Species						
1	4	3	2			
2	7	5				
3	6	6	4			
4	8	4				
5	2	2	4			
6	5	1	4			
7	3	7				
8	6	4				
9	9		3			
10	4	3	5			
11	4	5	3			
12	3	6	6			
13	2					
14	5	2	4			
15	4	4	5			
16	2	4				
17	3					
18	6	6	2			
19	2	6				
20	7					
21	4	3	4			
22	5					
23	3	4				
24	6	3	4			
25	5	3	4			
26	3					
27	6	5	3			
28	6	7				
29	2	6				
30	5	4	2			
31	3					
32	5	2				
33	6	4	2			
34	4		2			
35	4	3				
36	5					
Total	165	112	63			
Average	4.6	4.1	3.5			

(Record averages on back of form.)

Illustration 4

Stubble Height Summary			
Species	Total Stubble Height	Number of Plants	Average Stubble Height
HiMU 2	165	36	4.6
BOER	112	27	4.1
BOCU	63	18	3.5
Totals	340	81	4.2

Notes: