



RANGE ANALYSIS SUMMARY
MONTGOMERY PASS WILDHORSE TERRITORY

The Montgomery Pass Wild Horse Territory (MPWHT) was analyzed in the fall of 1986 for various range analysis data. It is a remote area that up until now, has received little in the way of research. This includes comprehensive mapping, aerial photography, range analysis and soil inventory. The main objective of this study was to assess its grazing capacity as summer range for wild horses. The vegetation and soil of the key areas of the territory were examined for type, condition and trend, forage availability and grazing capacity.

The MPWHT is located east of Mono Lake in the southern portion of the Excelsior Mountains. It is bounded on the northwest by Hwy. 167 and to the southeast by the White Mountain Range from Bishop to Montgomery Pass. The elevation is approximately 7100 feet

Analysis, as described in the Forest Service Handbook (FSH 2209.21 R-4), includes the following: 1) delineation of vegetative types on aerial photographs, 2) inventory of vegetation within each type, 3) vegetative and soil condition and apparent trend determinations and 4) collection of soil information in each vegetation type.

METHODS

Mapping of vegetation types was done in the field on aerial photographs on the basis of the dominant vegetation on the site. The vegetation types found on the MPWHT are as follows:

- 2D - Dry Meadows - characterized by grasses and seasonally wet soil
- 2W - Wet Meadows - characterized by sedges and constantly wet soil
- 4T - Tall Sagebrush - typically Artemisia tridentata tridentata
- 4L - Low Sagebrush - includes Artemisia arbuscula and Artemisia nova
- 4R - Rabbitbrush - Chrysothamnus spp.
- 5 - Browse-Shrub - includes willow (Salix spp.)
- 8 - Barren - areas of sparse or absent vegetation
- 9 - Pinyon-Juniper - pure or mixed stands
- 16 - Desert Shrub - includes Menodora spinescens in the MPWHT
- 20(4T) - Cultural Treatment Area - areas previously burned and revegetating as tall sagebrush

The type symbols with the corresponding condition and trend symbols and acreage for each vegetation type were recorded on the photos.

Vegetative inventory information was obtained with data collected on the Site Analysis form R4-2200-13 (Appendix 1) and the Ocular Analysis Form R4-2200-10 (Appendix 2). Each analysis was given a write-up number which corresponds to the recorder's last initial and the number of the analysis. Site analyses are a plot-by-plot check of plant composition, vegetative production, percent cover of vegetation, litter and bare ground. Each site analysis consisted of ten





circular plots evenly spaced in a representative area of each vegetation type. The plot size is determined by the vegetation type. The sagebrush type is measured with a 9.6 sq. ft. hoop and the meadow types, a .96 sq. ft. hoop. The vegetation in the hoop was clipped off and weighed in grams with a hand-held scale. The grams measured were converted to pounds per acre using a mathematical formula created in conjunction with the plot sizes and numbers. Total vegetation present at the plot was determined by estimating the amount of forage consumed by animals and adding it to the amount of forage remaining in the plot.

A vegetation condition rating was given for each site analysis and transect run. The rating is based on a scale of 0 - 100 and consists of points given for composition and production. Composition accounts for 60% of the condition rating and is determined by the ratios of "desirable", "intermediate" and "least desirable" plant species occurring in the stand. The production rating accounts for the remaining 40% of the condition rating and is the quotient of the pounds per acre of preferred forage and the total estimated forage production potential of the site.

In addition to vegetation information, soil condition parameters were also measured. The percent cover of bare soil, pavement, rock and litter is determined. The slope of the terrain, the soil's permeability and current signs of erosion contribute to the soil condition rating. This was based again on a scale of 0 to 100. Fifty percent of the score is based on the percent of ground cover from vegetation, pavement and rock, and the remaining 50% was based on the current erosion index which accounts for soil movement due to water and wind. Adjustments in the soil condition ratings are made for areas of low rainfall, ie: low sagebrush and pinyon-juniper types.

Condition ratings for vegetation and soil are interpreted as follows:

81 - 100	Excellent
61 - 80	Good
41 - 60	Fair
21 - 40	Poor
0 - 20	Very Poor

Droppings of cows, sheep, deer and horses were also recorded at each plot. All droppings, old or new, were recorded if found within an 11.7 foot radius of the center of each plot. From these data, relative use can be determined for each class of animal.

The Ocular Analysis was used in vegetation types that are similar to previously analyzed vegetation types. It is a simplified form that uses estimated percent composition for the plant species present. The total weights of plant production were estimated on the actual amounts found in site analyses done in the same vegetation types. Vegetative condition and soil condition ratings were obtained as described above for the site analysis form. A minimum of one site analysis and one soil type inventory must be done for each two ocular analyses.

Apparent Trend in soil stability and vegetation was judged separately for each area on which condition has been determined. This was done with Apparent Range





Trend form R4-2200-25 (Appendix 3). The vegetation was rated on plant vigor relative to plants growing in similar locations, frequency of "desirable" and "intermediate" plants, distribution of age classes of favorable plants and the effects of grazing and/or trampling of plants by grazing animals. The soil was rated on ground cover dispersion (%), soil movement (light, moderate, etc.) and the presence or absence of wind or water-caused erosion. Apparent trend is a judgement based on soil and vegetative indicators observed while conducting the analysis and should not be confused with long-term trend ratings. Long-term trend is determined from repeated measurements on permanent benchmarks which is much more reliable than a one-time observation. Apparent trend ratings for vegetation are displayed as follows: ↑ upward, ↓ downward, → no apparent trend or stable.

The vegetative condition rating and the soil condition rating were recorded along with the trend indicators next to the vegetation type symbol. They were recorded as the quotient of the two scores with the vegetation on top and soil on the bottom. For example, 4T 55↑/80→ is a tall sagebrush type, the vegetation condition is fair and its trend is upward, the soil condition is good and its trend is stable.

An intensive soil inventory was done at each site analysis and sent to the Soil Conservation Service for taxonomic identification (Appendix 4). At the transect site, soil pits were dug to a depth of 40 inches or until a hardpan was reached. The soil horizons were identified by depth, texture, color, pH and permeability. The topographic location, percent slope, aspect and parent material were also noted. The comprehensive soil determinations are useful in determining vegetation information which is related to the soil type. For example, estimated forage production is directly related to the soil type.

The summary process involves the compilation of the data collected on the Tentative Grazing Capacity form R4-2200-24 (Appendix 5). Each analysis is listed by write-up number, vegetation type, number of acres per type and pounds per acre of forage plants produced in each type. The grazing capacity in days is determined by applying calculations as shown on the form, using figures found in the Range Analysis Handbook, 1981. The assumptions used from the handbook are as follows:

Dry Weight Allowance - 19 or 26 lbs forage/horse/day

Proper Use of Key Species - 35% to 55%, dependent on range type and condition

Utilization of Total Palatable Plants - 18% to 32%, dependent on proper use of key species.

RESULTS

A total of 39,453 acres were surveyed in the MPWHT. Approximately 1,588 acres were considered barren and/or unproductive (Type 8) and were, therefore, considered unsuitable. The remaining 37,865 acres of suitable habitat produce a range of 13 to 410 pounds of forage per acre.

There are several variables to consider when evaluating the data for tentative grazing capacity. It must be understood that tentative grazing capacity involves a mathematical calculation based on the pounds of usable forage growing on the suitable, primary range and that there are many variables which





can affect the accuracy of this method. Some of these variables include the delineation of the primary range, pounds of forage produced on the primary range, proper use criteria, and the pounds of forage consumed per animal month by the various classes and species of animals using the area. Several examples of varied interpretations are shown below.

1. Of the suitable acreage, 15,927 acres were used for calculating tentative grazing capacity. The additional 21,938 acres were not included in the calculations for tentative grazing capacity because they were producing less than 50 pounds of dry weight forage per acre at the time. There is a total of 811,798 pounds of forage available, assuming that the horses will utilize 25% of the available sagebrush. Given that a horse uses 26 pounds of forage per day, there are 31,223 horse days available. Assuming 30 days per month and use 6 months out of the year, the figures indicate a tentative grazing capacity of 173 horses for 6 months out of the year on the key summer range (Table 1).

2. Horse days were calculated on the basis of acreage producing more than 50 pounds per acre of forage, assuming that no sagebrush is used by the horses for forage and that each horse needs 26 pounds of forage per day. This yielded 17,348 horse days, 578 horse months and 96 horses for 6 months of the year.

3. Using acreage included only in the southern part of the Key Range Area, there were 13,359 acres of suitable habitat. Since the Key Range is concentrated around known watering spots, acreage producing less than 50 pounds of forage per acre were included in these calculations. It was also assumed that no sagebrush was used in these areas. These assumptions yield 12,358 horse days, 412 horse months and 68 horses for 6 months of the year.

4. The northern and southern parts of the Key Range Area account for 16,618 acres of the study area. Of this, 11,199 acres are producing more than 50 lbs of forage per acre (Table 2). The values applied for proper use of key species and the utilization of total palatable plants were determined on the basis of vegetation type and range condition as shown below.

Proper Use of Key Species:

<u>Vegetation Type</u>	<u>Range Condition</u>		
	<u>good</u>	<u>fair</u>	<u>poor</u>
2D, 2W (Meadows)	55%	45%	35%
4T, 4L, 4R (Sagebrush)	45%	40%	35%

Utilization of Total Palatable Plants:

<u>Proper Use (%)</u>	
35.....	18%
40.....	21%
45.....	24%
55.....	32%

Assuming that the horses eat no sagebrush and that each animal consumes 26 lbs of forage per day, this area will support 14,273 horse days or 80 horses for 6 months of the year.

These mathematical indications are examples of interpretations that are possible with the given data. It should be realized that these are estimates



only and follow-up studies are necessary in order to verify the carrying capacity.

TABLE 1
SUMMARY OF RANGE ANALYSIS (TOTAL AREA)

<u>Vegetative Type</u>	<u>Total Acres</u>	<u>% Total Acres</u>	<u>Average lbs. Forage/Acre</u>	<u>Horse Days/Type</u>	<u>% Total Horse Days</u>
2D (dry meadow)	74	< 1	171	487	< 1
2W (wet meadow)	65	< 1	332	829	3
4T (tall sage)	11,123	56	52	22,377	72
4L (low sage)	644	3	28	709	2
4R (rabbitbrush)	142	< 1	35	190	< 1
5 (browse)	4	< 1	170	26	< 1
9 (pinyon)	4,071	21	22	3,477	11
16 (des shrub)	3,353	17	23	2,971	10
20 (treated)	304	2	13	157	< 1
Totals	19,780	100	x=41	31,223	100

Horse months (HM) = horse days \div 30

1,041 HM = 31,223 \div 30

Horses / 6 months = horse months \div 6

173 Horses = 1,041 \div 6

TABLE 2
SUMMARY RANGE ANALYSIS (KEY AREA)

<u>Vegetative Type</u>	<u>Total Acres</u>	<u>Suitable Acres</u>	<u>Avg. Lbs Forage/Ac</u>	<u>Horse Days/Type</u>	<u>%Total</u>
2D (dry mdw.)	51	51	178	349	2
2W (wet mdw)	66	66	435	1,104	8
4T (tall sage)	9,943	8,311	33	10,562	74
4L (low sage)	1,463	192	28	205	1
4R (rabbitbrush)	148	38	61	88	1
9 (pinyon)	2,327	41	27	42	1
16 (desert shrub)	2,500	2,500	20	1,923	13
20 (treated)	120	0	0	0	0
Totals	16,618	11,199	x=33	14,273	100

Horse months = 476

Horses/6 months = 80





TABLE 3

RANGE CONDITION SUMMARY

Greater Than 50 lbs./Acre Forage
Range ConditionLess Than 50 lbs./Acre Forage
Range Condition

Vegetative Type	Greater Than 50 lbs./Acre Forage Range Condition				Less Than 50 lbs./Acre Forage Range Condition				
	EX 81-100	GOOD 61-80	FAIR 41-60	POOR 21-40	EX 81-100	GOOD 61-80	FAIR 41-60	POOR 01-40	VERY POOR
28	:	49:	:	2:	:	:	:	:	:
2W	:	46:	20:	:	:	:	:	:	:
4T	:	5273:	1638:	1400:	:	435:	:	1197:	:
4L	:	192:	:	:	:	50:	1221:	:	:
4R	:	:	7:	31:	:	:	:	:	110:
9	:	41:	:	:	69:	1476:	485:	:	283:
16	:	:	2500:	:	:	:	:	:	:
20	:	:	:	:	:	:	:	120:	:
Totals	:	5601:	4165:	1433:	69:	1961:	1679:	1317:	393:

Grand Totals 11,199

Grand Totals 5,419



FSM 2207 21

11/22/84

WRITEUP NO.	FOREST			RANGER DISTRICT	ALLOTMENT	EXAMINER	PHOTO NO.
	Riparian			10000	10000 T	10/17/84	1787
TRANSECT NO.	PLOT SIZE	PLOT INTERVAL	TYPE DESIGNATION	KIND OF LIVESTOCK	SLOPE	EXPOSURE	DATE
				horse	10%	337°	10/17/84
LOCATION		HABITAT TYPE NAME		LAND SYSTEMS I.D.		ELEVATION	
head of Jack's		Sage Canyon 2 1/2 miles W. of				1000	

SPECIES	% DRY WT.	PLOTS										TOTAL	OMIT IF SUMMARY FORM IS USED						
		1	2	3	4	5	6	7	8	9	10		*GREEN WT./AC.	TOTAL DRY WT./AC.	% COMP.	DESIRABILITY RATING			FORAGE DRY WT./AC.
																D	I	L	
Sibg	90	1	1						1		1	4	4	1	1				4
Eici	90								17	80		107	96	15	15				96
GRASSES																			
FORBS																			
Er um	90	4	3			2			1		2	12	11	2	2				11
Er ca	90		1									1	1						
Ph ho	90					1	1				1	3	3						
Ly sp	90										T	T							
BROWSE																			
Ar tr v	60	180	130	30		110	50	35	15			420	420	228	44	20	10	14	72
Pu tr	60					160		45	20		90	415	415	249	38	38			0
Ch vi	60								2			2	2	1					
TOTALS												1,024	1,024	653	xxx	76	10	14	123

% OVERSTORY (TREES)	0	0	0	15	0	0	0	0	0	0	2
% OVERSTORY (SHRUB)	50	30	15	40	20	35	60	5	30	0	29
% CROWN COVER (NET)											
% BARE GROUND	15	15	45	0	30	10	5	55	0	50	24
% PAV. (1/8"-3/4" DIA.)		10	0	0	5	5	5	5	0	5	4
% ROCK (3/4" >)	40	30	25	0	30	20	5	0	0	25	17
% VEGETATION	10	5	5	0	5	0	10	0	10	0	4
% LITTER & CRYPTOGRAMS	35	40	25	100	30	65	75	40	90	20	51
CHIPS horse (dry/wet)	11	30	0	1	0	0	2	0	1	0	4
PELLET GROUPS	0	0	0	0	0	0	0	0	0	0	0

CONDITION RATING	
Composition Rating	45
Production Rating	28
Vegetation Condition Rating	73 →
Ground Cover Index	41
Current Erosion Index	38
Soil Condition Rating	79 →
Apparent Trend: Veg	→
Apparent Trend: Soil	→
Browse: Condition	G
Apparent Trend	→

DEI PRODUCTION 562 LBS. PER ACRE (DRY WT.) EST. TOTAL POTENTIAL PROD. FOR SITE 800 LBS. PER ACRE (DRY WT.)

TREE SPECIES OCCURRING ON TRANSECT Pine

CURRENT TOTAL DRY WT. PRODUCTION IS 80 % OF SITE POTENTIAL

* Calculated by formula found on reverse of this form.

Soil Taxonomic Designation _____

Soil Surface Texture Loam **Thickness** 2" **pH** 6.8

Subsoil Texture Loam **Thickness** 8" **pH** 6.6

% Coarse Fragment Content by Volume Surface _____ **Subsurface** _____

Substratum Material 5 **Effective Rooting Depth** 20"

Remarks _____

Erosion Pattern: Surface Losses Average 1" **Inches Over** 50 **% of the Area** _____

Gullies Total Approximately 0 **Feet in Length and Average About** 0 **Feet Deep** _____

Remarks _____

Inherent Erosion Hazard Detachability Rating 4 **Surface Covered with Rock Fragments 3/4 Inches or Greater in Diameter** _____ **% Adjusted Detachability Rating** _____

Profile Permeability Rating 6 **Soil Erodibility Index** _____ **Class** _____

Slope 2% **Inherent Erosion Hazard Class** _____

Soil Disturbance _____ **(None, Light, Moderate, Heavy) - Soil Compaction** _____ **(None, Light, Moderate, Heavy)**

Cover Dispersion Uniform _____ **Fairly Uniform** _____ **Variable** _____ **Highly Variable** _____

Ground Cover Percent 55%

Give Reasons for Suitability Classification _____

**AIR-DRY CONTENT OF GREEN FORAGE
GRASSES & SEDGES**

Just Before Heading	25 - 30%
Headed Out	35 - 40%
After Bloom	45 - 50%
Seed Maturity and Past	55 - 80%

FORBS

Very Lush	15 - 20%
Flowering	20 - 25%
Seed Time	30 - 35%

BROWSE

Lush Leaves (Snowberry)	30 - 40%
Fibrous Leaves (Oak) & Purshia	35 - 45%
Rabbitbrush & Sagebrush	40 - 60%

Herbage Production Estimates

Estimated Total Herbage Production - Lbs. Per Acre (Dry Wt.)	<u>500</u>
Estimated Total Production D and I Plants Lbs. Per Acre (Dry Wt.)	<u>300</u>
Estimated Total Potential Production (Total Herbage) - Lbs. Per Acre (Dry Wt.)	<u>200</u>
Estimated Forage Production Lbs. Per Acre (Dry Wt.)	<u>75</u>
	<u>.15 x 500</u>

ESTIMATED USE BASED ON DROPPINGS COUNT

CONVERSION FACTORS:

- 13 Pellet Groups Per Sheep Day
- 12 Chips Per Cow Day
- Plot Size 1/100 Acre
- A. 3.3 ft. on Each Side of Transect Line
- or
- B. Superimposed Circular Plot with an 11.7 ft. Radius

FORMULA FOR A:

$\frac{\text{Droppings Per Transect}}{\text{Chips Per Transect}} \times \frac{100}{12} = \text{Cow Days Per Acre}$

FORMULA FOR B:

$\text{Average Droppings Per Plot} \times \frac{100}{12} = \text{Cow Days Per Acre}$

CALCULATIONS

Cow Days Per Acre	_____
Sheep Days Per Acre	_____
Game Days Per Acre	_____

Appendix 3

FOREST Tongue DISTRICT 02 ALLOTMENT 118

Study Type:

Site Analysis

Trend Study

<input checked="" type="checkbox"/>
<input type="checkbox"/>

Study Name/Number X 6

By W. G. ... Date 10/10/...

By _____ Date _____

VEGETATION

Up or Stable

Down

1. Favorable frequency grouping and age classes of desirables, intermediates, and least desirables. _____
2. Forage plants not being pulled up or trampled out by grazing.
3. Vigor of key species high as indicated by leaf length, seed stock production, and normal color.
4. Browse species showing little or no hedging.

1. A disproportionate amount of intermediates and least desirables. Seedlings of better plants having difficulty in becoming established.
2. Forage species being pulled up and trampled out by grazing. _____
3. Low vigor of key species as indicated by reduced size of plant, reduced leaf length, lack of seed stalks, and off color (sickly yellow). _____
4. Browse species showing heavy hedging. _____

Up or Stable

SOIL

Down

1. Ground cover dispersion - uniform.
2. No detectable soil movement. _____
3. Soil cover continuous and intact.
4. No exposure of plant roots.
5. Stones and rock fragments where present, normal, and in place - no movement of rock fragments.
6. Lichen lines on stones and rock fragments extend to soil level. _____
7. No active gullies. _____
8. No recent soil deposits either alluvial or aeolian. _____
9. No wind-scoured depressions. _____

1. Ground cover dispersion - variable to highly variable. _____
2. Soil movement detectable.
3. Soil Cover broken and soil exposed. _____
4. Plant roots exposed. 1/ _____
5. Stones and rock fragments, where present, concentrating on surface as erosion pavement. Fragments loose and often moving downslope. _____
6. Lichen lines on stones considerably above soil surface - no lichens on rock fragments. _____
7. Active gullies - indicated by recent cutting and sloughing. _____
8. Recent soil deposits - alluvial or aeolian.
9. Wind-scoured depressions. _____

1/ At high elevations and on heavy soils some of this may be natural due to frost heaving.

Taxonomic Unit:

ID. No.:

No.	Horizon	Depth (in./cm)	Color		Mottles	Texture	Coarse fragments (% vol.)				Particle-size estimate (% vol.)				
			Dry	Moist			Gravel	Cobbles	Stones	2-5 mm	Sand	Silt	Clay	S > VFS	Curans
1	A11	0-2	10YR 6/5	10YR 4/3		LS	10								
2	A12	2-5	10YR 6/3	10YR 3/3		SL	10								
3	BA	5-9	10YR 5/3	10YR 4/4		L	20	5							
4	B11	9-13	10YR 4/4	10YR 4/5		C		80							
5	B12	13-18	10YR 4/5	10YR 4/5		C		90							
			Lumpian												

No.	Structure	Consistence			Cementation	CaCO ₃ and effervescence	pH	Estimated		Permeability (in./hr.)	Pores	Roots	boundary
		Dry	Moist	Wet				EC x 10 ³	ESP				
1	GR	LO	VFR	SO		EO	6.8			MS		100%	CS
2	CR	SO	FR	SS		EO	7.0			M		200%	CS
3	SFR	SH	FR	S		EO	7.0			MR		100%	CS
4	BK	SH	FI	S		EO	7.0			MR		100%	CS
5	BK	H	FI	S		EO	7.0			MR		100%	AS

PEDON DESCRIPTION

Area: MPW40		Date: 12-17-66	ID. No.: X-3	By: KUMMER	
Taxonomic unit: clayey-shaly, mixed, mesic, shallow xanthic duricrust				Mapping unit symbol: 9	
Location: HEAD OF JACK SPRINGS CANYON 2 km NORTH OF MCBRIDE SPR.					
Physiographic position: RIDGE TOP					
Parent material: BASALT VOLCANIC					
Native vegetation (or crop): PJ					
Average annual precipitation: 10"	Average annual air temperature:	Freeze-free season (32 F.):	Soil temperature (50 cm):	Length and shape of slope: 1000' CONCAVE	
Slope percentage: 10%	Aspect: 337°	Elevation (feet): 7800	Microrelief: D. ROLLING		
Drainage: MODERATE	Depth to water table: 76'	Runoff: medium	Floodings:	Profile permeability: moderate	
Dissection:	Present erosion: SLIGHT	Erosion hazard: slightly eroded	Erosion factors:		
Land use: WILDHORSE	Additional notes:				
Diagnostic surface horizons and depths:					
Diagnostic subsurface horizons and depths:					
Textural control section depth:	Clay in control section (%):	Coarse fragments in control section (% vol.):	> v/s in control section (% wt.):		
Control section particle size class:	Control section mineralogy:	Soil temperature regime:	Soil moisture control section depth:		
Soil moisture regime:	Depth to lithic contact:	Depth to paralithic contact:	Depth to hardpan: 18"		
Surficial gravel (% area): 4	Surficial cobbles (% area): —	Surficial stones (% area): 15	Total surficial coarse fragments (% area): —	Rock outcrop (% area): —	
Additional surface features:					

TENTATIVE GRAZING CAPACITY

Unit		Allotment	Forest	Ranger District				
Class of Stock		Grazing Operation	Dry Weight Allowance					
Writeup No.		A	B	C	D	E	F	G
Type Symbol	No. of Acres	Dry Wt. Prod. per Acre of Forage Plants (Lbs.)	Proper Use of Key Spec. (Percent)	Util. of Total Palatable D&I Plants (Percent)	Usable Forage per A. Dry Weight E = BxD (Lbs.)	Days per Acre	Days G = Ax F	Capacity in
38	4T ⁶² 66 →	46	124	45	24	30	1.1	53
310	9 ²¹ 27 →	684	70		24	17	.6	442
312	4T ⁴⁰ 42 →	310	7					
								495 HB
								$\div 30 = 16.5$ H01
								$\div 6 = 3$ H022
TOTAL								

* Cow or sheep (fill in the class of livestock that applies) days per acre is determined by dividing the usable forage per acre (column E) by the daily dry weight consumption of the animals involved.

** Fill in the kind of livestock in blank space provided.