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TES

Diablo Canyon Land

Stewardship Program

Pecho Ranch Grazing

Capacity Report

1991

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Prepared for

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and
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Diablo Canyon Power Plant

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INTRODUCTION

The location, size, environmental setting, recent history of ownership, contemporary land use practices, and issues of concern for future management of the Pecho Ranch are identified in various reports and documents dating from the late 1970s (Stechman 1978, 1989; EIG 1989a, 1989b; Fry 1990; Erickson and Thompson 1990; Fry 1991 (draft only); Townsend 1992). The purpose of this report is to present the results of a grazing capacity study conducted on the Pecho Ranch during the 1990 - 1991 grazing season. This effort was requested by Nuclear Power Generation through the General Services and Nuclear Operations Support staffs. It serves as one step in the development of a comprehensive grazing management plan for this PG&E property. It also serves the goals of a developing Land Stewardship Program for all Diablo Canyon lands (Townsend 1992).

STUDY AREA DESCRIPTION

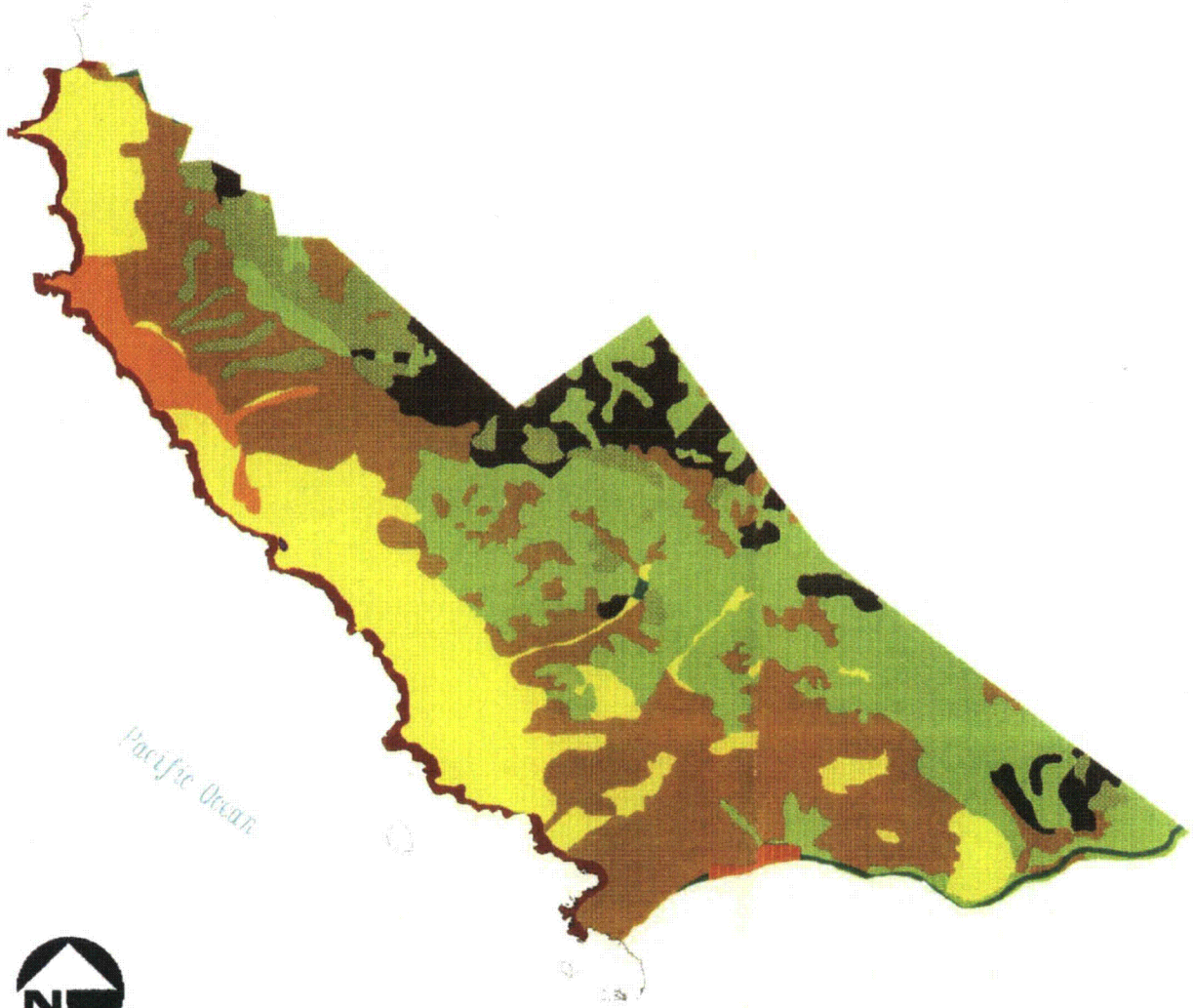
The Pecho Ranch consists of several contiguous parcels of land extending north approximately 4 miles along the San Luis Obispo County coastline from Diablo Canyon Power Plant to the southern border of Montana De Oro State Park, near Point Buchon. It is bounded on the west by coastal bluffs overlooking the Pacific Ocean and on the east by steep mountains rising to more than 1,500 feet above sea level. The Pecho Ranch includes 3,358 acres of land consisting of open grassland, coastal scrub, chaparral, oak woodland, and closed-cone pine forest vegetation (Figure 1). Wetland and riparian habitats are found along Coon Creek and, to a lesser degree, in association with several developed and natural springs throughout the property.

A mediterranean-type climate, modified by the marine influence, results in mild dry summers and wet cool winters. Morning fog is common from May through October. Mean annual precipitation is about 14 inches, occurring usually from November through April. Green feed is available to livestock for six months from mid-November (germination) until mid-May. A detailed discussion of the soils and geology of the Pecho Ranch is found in Stechman (1978).

At present, the Ranch is divided into six fields by a combination of electric and non-electric fences. There are corrals at one location, west of the Bruno House conference center. Water has been developed for livestock use at 10 locations throughout the property. Light-duty, unpaved roads provide good access to more than 80 percent of the property. For reasons of security and public safety, all access to the property is strictly controlled.

DIABLO CANYON LANDS

Figure 1. Plant Communities of the Pecho Ranch



LEGEND

- Agriculture
- Bishop Pine
- Chaparral
- Coastal Bluffs, Rocks & Beaches
- Coastal Scrub
- Developed Areas
- Eucalyptus
- Grassland
- Grassland with Sparse Coastal Scrub
- Marsh
- Oak Woodland
- Riparian

Not to Scale

N

0 2000 4000 8000 8000 Feet

March 05, 1992

GRAZING PRACTICES AND DROUGHT MANAGEMENT

Cattle grazing is a land use of long standing on the Pecho coast, dating back to the Spanish colonial period. From 1978 to the present, the Pecho Ranch has been leased for this purpose by a single tenant who operates a diversified agricultural business that involves lands in other parts of San Luis Obispo County. In his first year on the Pecho Ranch, the tenant conducted a stocker steer operation. In subsequent years he has conducted a cow/calf operation exclusively. In 1978, the Field Family Trust, which then owned the Pecho Ranch, contracted the development of a grazing management plan for the property (Stechman 1978). The plan consisted of an assessment of current range conditions, recommendations for facility improvements (water and fencing), and an estimate of grazing capacity. The condition of the range at that time was judged to be good, and between 1978 and 1989 many of the recommended improvements were carried out by the tenant. During this time, however, the regional climate changed from above-average rainfall (1978 - 1983) to below average (1984 - 1990). The latter condition was prevalent throughout the state a result of the second major California drought in as many decades (McDougald, et al. 1991).

The Pecho Ranch was purchased from the Field family by PG&E in 1986. In 1989, PG&E retained the same consultant earlier used by the Field Trust to prepare an updated assessment of the Pecho Ranch (Stechman 1989). The consultant concluded that the property was properly and efficiently grazed, and noted that the tenant was voluntarily reducing his stocking rate to adjust for reduced forage caused by poor rainfall. By late summer 1989, stocking had been reduced from an average 140 head of cattle to 98 head. During the 1989 - 1990 grazing season stocking the tenant increased again to approximately 120 head, perhaps in anticipation of normal rainfall and forage production. However, actual rainfall was only about 54 percent of normal, which caused another poor forage year. The conception rate for the herd dropped from a previous norm of 95 percent to 50 percent. Supplemental feed was provided, but cattle continued to decline in condition. By the end of the grazing season, much of the Pecho Ranch had been severely over-grazed. This condition was noted during two independent rangeland assessments conducted by PG&E (Fry 1990; Erickson and Thompson 1990).

No significant rainfall occurred from October 1990 through February 1991. Although germination of annual grasses in California usually occurs in November of a normal rainfall year, no significant germination was apparent on the Pecho Ranch until near the end of February 1991. At the request of PG&E, the stocking rate was further reduced in 1991 to approximately 60 head, or 43 percent of normal.

ENHANCED LAND STEWARDSHIP AND GRAZING MANAGEMENT

In 1990, PG&E began to develop a Land Stewardship Program aimed at establishing guidelines for the management of natural resources and protection of cultural resources associated with 10,000 acres of land surrounding Diablo Canyon Power Plant (Townsend 1992). This program recognizes livestock grazing as a significant part of the economy of San Luis Obispo County. Furthermore, when best management

practices are employed, livestock grazing is compatible with the many other resource values of the Diablo lands, and may contribute to achieving fuel management, community outreach, public education and other goals of this comprehensive program.

In December 1990, a new five-year lease was signed between PG&E and its Pecho Ranch livestock tenant. The new lease identified the need to balance forage consumption with adequate residual dry matter (RDM) to promote a healthy range condition. It called for annual adjustments in stocking based on quantity of available forage and annual monitoring of RDM, and identified the need for a detailed grazing capacity study to help determine appropriate stocking rates. A grazing capacity study of the Pecho Ranch was conducted by Technical and Ecological Services Department during the grazing year 1990 - 1991.

METHODS

The approach selected for use in determining grazing capacity was based on the method presented by Bowie and Pitcher (1986). This method relies on use of small livestock exclosures within which plant species composition and herbaceous biomass samples are taken. This approach is conceptually the same as the clip-plot method described by Heady (1967 and 1975). These techniques were employed only in range types dominated by grassland vegetation.

A vegetation cover type map (Figure 1) of the study area was produced using aerial photography and field reconnaissance. This information was later digitized and entered into a geographic information system (GIS) database. Similar information layers were also created representing topography (Figure 2) and soils (Figure 3). Soils data were digitized from U.S.D.A. Soil Conservation Service maps of the study area. Topographic data were obtained from a U.S. Geological Survey map of the study area (Port San Luis North Quad).

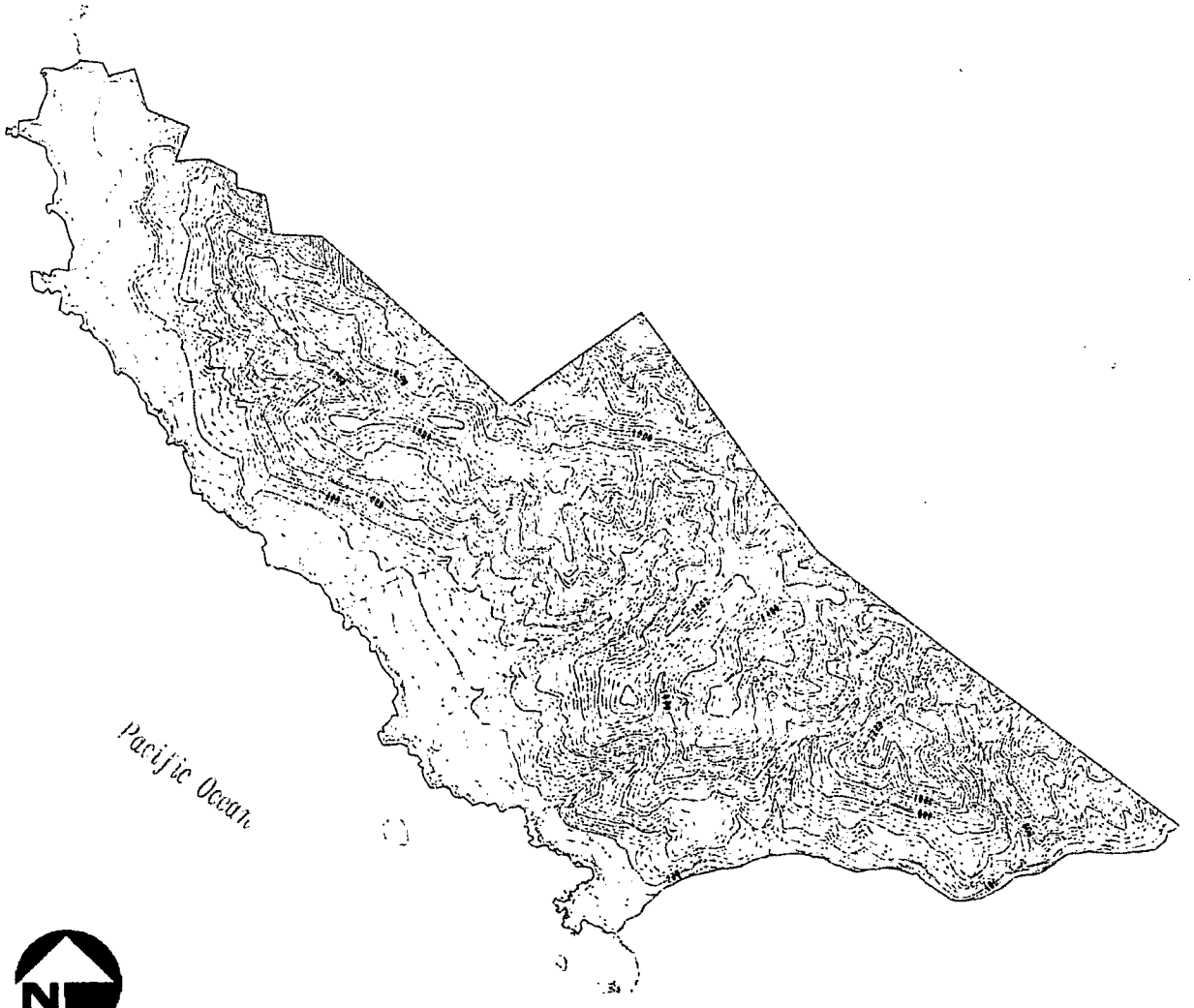
After mapping, the study area was stratified into range types. For the purpose of this study, a range type is defined as a unit of land characterized by slope, soil, and/or vegetation attributes that set it apart. Differences in forage production are expected to be greatest between range types and to vary least among samples collected within a range type. A total of seven range types were identified. Next, cattle exclosures were constructed and located in the field. Exclosures consisted of three 4 x 4 foot sections of welded wire cattle panels formed into a triangle and secured at each corner with a steel post (Figure 4). A total of 65 exclosures were systematically located throughout the seven range types to achieve representative coverage. All exclosures were in place by mid-December 1990. No significant germination had occurred by this time due to below-normal rainfall.

Relative percent composition of plant species and percent ground cover of vegetation was determined using a ten-point frame. The frame was inclined at approximately a 45 degree angle to avoid over representing broad-leaved species (Bonham 1989). Only first hits from each pin were used. Sampling was done inside each exclosure in April, after the vegetation had matured to a stage allowing positive identification. Plant identifications were made by a professional botanist.

Forage production samples were taken within 1-square-foot plots inside each exclosure. Plant material was clipped to a predetermined height that varied as a function of slope. Low to moderate slope areas were clipped to a height of 2 inches above the ground. Steeper sites were clipped to a height of 3 inches. These stubble heights approximate the quantity of residual dry matter (RDM) considered to be desirable for

DIABLO CANYON LANDS

Figure 2. Topography and Hydrology of the Pecho Ranch



LEGEND

Index Contour Lines

Secondary Contour Lines

Streams

N

0 2000 4000 6000 8000 Feet

April 28, 1992

DIABLO CANYON LANDS

Figure 3. Soils of the Pecho Ranch

LEGEND

- 107 Beaches
- 128 Cropley clay 2-9 % slopes
- 131 Diablo and Cibo clays 15-30 % slopes
- 132 Diablo and Cibo clays 30-50 % slopes
- 144 Gazos-Lodo clay loams 30-50 % slopes
- 156 Lopez very shaly clay loam 30-75 % slopes
- 177 Nacimiento silty clay loam 15-30 % slopes
- 178 Nacimiento silty clay loam 30-50 % slopes
- 181 Nacimiento-Calodo complex 30-50 % slopes
- 182 Nacimiento-Calodo complex 50-75 % slopes
- 194 Riverwash
- 195 Rock outcrop-Lithic Haploxerolls complex 30-75 % slopes
- 203 Santa Lucia shaly clay loam 30-50 % slopes
- 204 Santa Lucia shaly clay loam 50-75 % slopes
- 205 Santa Lucia very shaly clay loam 5-9 % slopes
- 206 Santa Lucia very shaly clay loam 9-15 % slopes
- 208 Still gravelly loam 9-15 % slopes
- 209 Still gravelly sandy clay loam 0-2 % slopes
- 210 Still gravelly sandy clay loam 2-9 % slopes
- 211 Still gravelly sandy clay loam 15-25 % slopes
- 221 Xerorthents-Xerolls-Urban land complex 0-15 % slopes
- 223 Xerorthents, escarpment

N

0 2000 4000 6000 8000 Feet

April 28, 1992

Figure 4. **Using a Ten-Point-Frame to Assess Plant Species Composition Inside a Cattle Exclosure.**

rangelands with climate and other site conditions similar to those of the study area. Clippings were placed in individually labeled paper bags, dried at 65°C for 48 hours, and weighed to the nearest 1/10 gram.

Clippings should be taken when the grass seed is in the dough stage, which in the study area usually occurs from mid-April to mid-May (Lindquist 1988). Little or no rainfall through February of 1991, followed by unusually high rainfall in March, led to much speculation regarding the timing of forage samples. When conditions appeared right in mid-April, a decision was made to collect the samples. However, more rain fell in late April and May resulting in additional growth of grasses. Therefore, steps were taken to adjust the forage data to account for this additional growth. Plant height data, collected at the time of clipping, was used along with sample weights in a linear regression analysis. The results of this analysis, along with additional height data taken in the field during May, allowed an estimate of total forage yield.

Adjusted sample weights and species composition data, by range type, were analyzed using PG&E's Range Quality Computer Database System (Timossi 1990).

RESULTS

GRAZABLE ACRES IN GRASSLAND RANGE TYPES

Approximately 795 acres of grassland range were identified within the limits of the Pecho Ranch lease. This includes approximately 98 acres of grass with sparse coastal scrub. Line-intercept sampling showed the shrub canopy closure to be about 5 percent. This area was treated as a unique range type and herbaceous forage production was measured by clipping, as described earlier. Total forage production was based on an adjusted acreage figure of 93 acres to account for non-productive shrub cover. This brings the total productive acreage to 790. Of this, 650 acres (83%), representing seven distinct range types, were included within the area sampled using the clip-plot technique. Figure 5 shows the distribution of range types within the area sampled.

GRAZING CAPACITY AND RANGE CONDITION ASSESSMENT

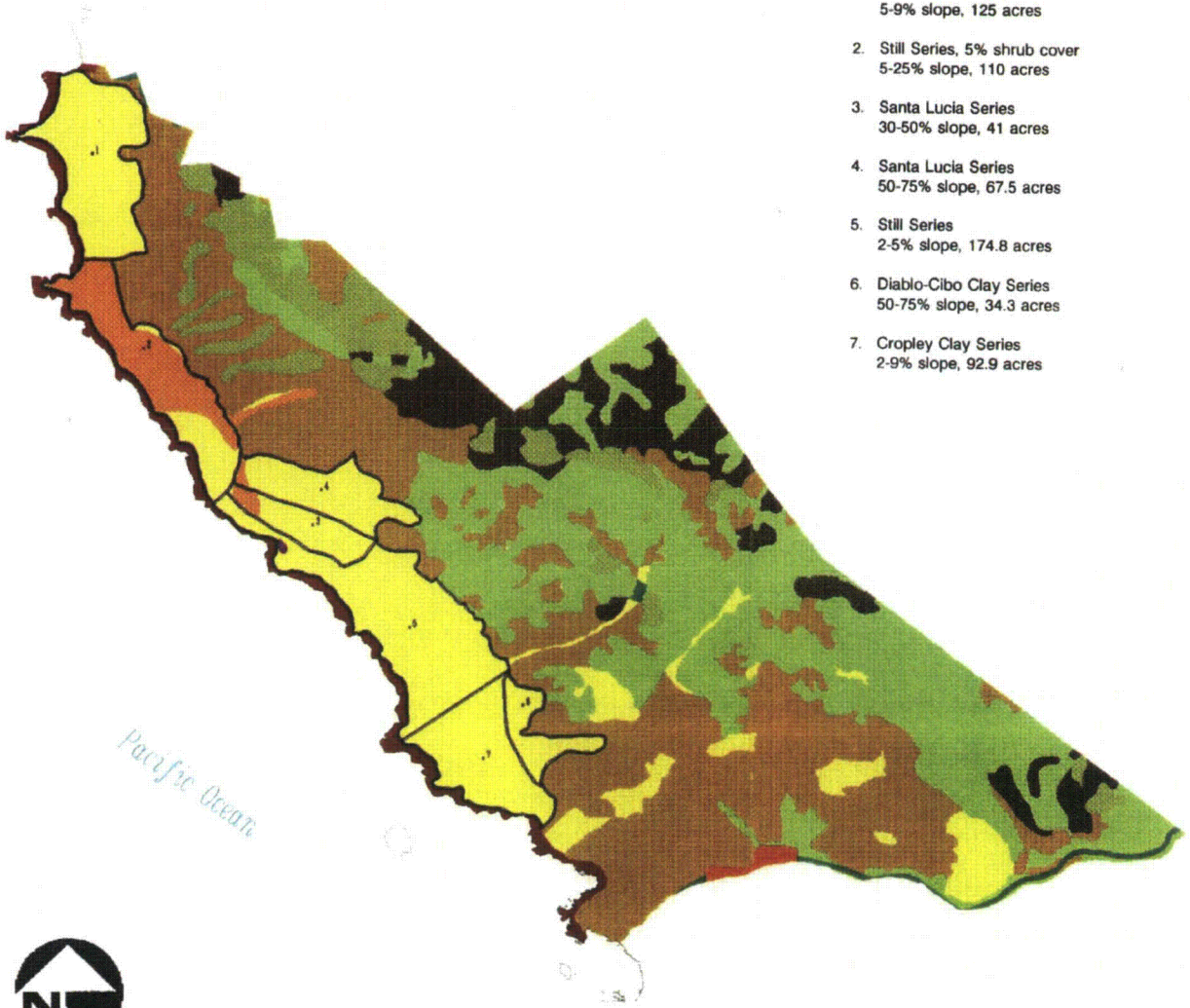
The appendix contains a series of tables representing each of the seven range types identified in Figure 5. These tables present average relative composition of plant species determined through use of the 10-point frame, as discussed earlier. A forage quality descriptor is used for each species to indicate its preference by livestock (desirable, less desirable, or undesirable). A Forage Condition Class rating is given and is based on the relative percentage of desirable, less desirable, and undesirable plants identified during field sampling. A value is also presented for average percent ground cover of live vegetation. Ground cover of live vegetation and percent slope were used to arrive at a Soil Erosion Hazard rating for each range type.

Table 1 summarizes grazing capacity and range condition data for the seven range types where sampling occurred. Animal Unit Months (AUM) totaled 1,444 for this 650-acre area. This is equal to 120 Standard Animal Units (AU) for a 12-month grazing season (95% confidence interval, 113 - 128 AUs).

The additional 145 acres of available grassland range lying outside the sampled area shown in Figure 5, contributes some additional capacity to the Pecho Ranch lease. These 145 acres are scattered about the steep interior canyons east of the terrace fields. The 1978 report by Stechman showed an estimated 1.4 AUMs/acre in this part of the property. Stechman's estimate was based on the Forage Acre Method (Stoddart and Smith 1955), which incorporates average production values by soil type as reported by the U. S. Soil Conservation Service, with information on relative percent composition of desirable, less desirable, and undesirable forage plants based on field surveys. The method is therefore, indirect but suitable for establishing approximate stocking rates. I have used a conservative figure of 1 AUM/acre, resulting in 145 additional AUMs. Therefore, total grazing capacity is estimated at approximately 1,589 AUMs, or 132 AUs for the 12-month grazing season.

DIABLO CANYON LANDS

Figure 5. Range Types Identified on the Pecho Ranch



SAMPLED RANGE TYPES

1. Santa Lucia Series
   5-9% slope, 125 acres
2. Still Series, 5% shrub cover
   5-25% slope, 110 acres
3. Santa Lucia Series
   30-50% slope, 41 acres
4. Santa Lucia Series
   50-75% slope, 67.5 acres
5. Still Series
   2-5% slope, 174.8 acres
6. Diablo-Cibo Clay Series
   50-75% slope, 34.3 acres
7. Cropley Clay Series
   2-9% slope, 92.9 acres

LEGEND

- Agriculture
- Bishop Pine
- Chaparral
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- Coastal Scrub
- Developed Areas
- Eucalyptus
- Grassland
- Grassland with Sparse Coastal Scrub
- Marsh
- Oak Woodland
- Riparian

Not to Scale

N

0 2000 4000 6000 8000 Feet

May 06, 1992

Table 1

Grazing Capacity and Range Condition
Summary for the Pecho Ranch

Range Type	Acres	Total AUMs	AUMs/ Acre	Recomm. Residue (inches)	Forage Class	Soil Hazard
DIABLO-CIBO CLAY 50-75% slope	34.3	64	1.9	3.0	G - E	M
CROPLEY CLAY 2-9% slope	92.9	161	1.7	2.0	G	L
SANTA LUCIA 50-75% slope	67.5	16	0.2	3.0	P - VP	H
SANTA LUCIA 5-9% slope	125.0	285	2.3	2.0	G	L
SANTA LUCIA 30-75% slope	41.1	97	2.4	2.0	F - P	M
STILL SERIES 2-15% slope	174.8	518	3.0	2.0	F	L
STILL SERIES 5-25% slope	110.0	303	2.8	2.0	P	L - M
Totals:	645.6[1]	1444	---	---	-----	-----

[1] Total has been adjusted to account for a 5% canopy of shrub species in the still series, 5-25% slope range type.

E = Excellant Forage Condition
G = Good Forage Condition
F = Fair Forage Condition
P = Poor Forage Condition
VP = Very Poor Forage Condition

H = High Erosion Hazard
M = Moderate Erosion Hazard
L = Low Erosion Hazard

Additional grazing capacity associated with vegetation cover types dominated by woody plants (e.g., oak woodland, bishop pine, and chaparral) has not been estimated, but is assumed to be low and of little consequence at this time.

DISCUSSION

Stechman (1989) presented a summary of grazing history and precipitation for the Pecho Ranch. Table 2 is taken from that document and has been updated to reflect the most recent grazing and weather data. Unusually high rainfall was recorded from 1978 to 1983. This includes the last occurrence of the El Nino climate pattern, associated with coastal California (1981 - 1982). From 1983 to early 1991, however, rainfall generally dropped below average amounts. Only toward the end of this six-year drought was stocking significantly reduced on the Pecho.

Earlier range assessments conducted on the Pecho Ranch (Stechman 1978, 1989) coincided with uncommonly low stocking rates. The opinion at the time was that the ranch was in good condition and was properly grazed. However, by late summer to fall of 1990 the condition of the range had deteriorated from over-grazing by cattle, and a significant reduction in stocking was recommended to protect the soil from erosion.

Stechman (1989) gave an estimate of 120 standard units as the probable longterm grazing capacity of the Pecho Ranch. Further, he estimated that inclusion of the old pea fields area near Point Buchon (now grazed) would increase the grazing capacity to as much as 131 standard units. His estimates were based on a level of facility development designed to improve livestock distribution and forage use. Many of these improvements have been implemented and more are under development.

The estimate of grazing capacity developed during the present study (132 standard units over a 12 month season) was based on direct measurement of the standing crop of forage over 83% of the available acreage, and allows for an adequate amount of RDM. An earlier assessment was derived through an indirect method that uses regional values for average production (as reported by the Soil Conservation Service) and that adjusts for local species composition by applying a "proper use" factor on a species-by-species basis. Although the two techniques are fundamentally different, the results obtained were for all practical purposes identical. It should be noted that rainfall amounts during the 1978 study and during the present study were not greatly different (Table 2). Rangeland forage production in 1991 as reported by the County Agricultural Commissioner's office was normal.

Table 3 presents data that further compare the results of the current study with other findings. The first column lists the three soil series found within the sample area on the Pecho Ranch. Columns two through four show the forage production values derived for these soil types using the plot clip method (current study

results), published data from the USDA Soil Conservation Service, and a University of California range forage productivity data base (George and Jacobson 1987) respectively. All data taken from the published literature apply specifically to San Luis Obispo County under normal year conditions.

The range in values indicated for the Santa Lucia and Still series soils is reasonably consistent. However, the Diablo-Cibo Clay and Cropley Clay series show unexpectedly higher values as reported by the SCS and University sources. Range condition surveys conducted as part of this study indicate that these soils support a higher proportion of desirable plants than all other types present on the Pecho Ranch. Assuming that these soils are capable of greater production, it must be concluded that some factor or set of factors has impacted that potential. The effects of a prolonged drought can not be ignored entirely, however, this factor should have had a similar effect on production for other soil types as well. Because of the superior quality of the forage produced on these clay soils, and the fact that grazing management on the Pecho Ranch has historically relied on season long continuous grazing, it is reasonable to speculate that these areas have received greater livestock use relative to other areas of the ranch. Though grazing pressure has not, at this time, had a serious impact on the quality of forage in these areas, suboptimal residue levels may have had an impact on production, particularly during a cycle of below normal rainfall. Quantitative information on recent RDM levels on the Pecho Ranch is lacking, however, the areas of clay soil were observed to be among the most severely over grazed in the year prior to this study (personal field observation of the author).

Table 2

History of Grazing Use and
Precipitation for the Pecho Ranch, 1978 - 1991[1]

YEAR	TOTAL INCHES PRECIPITATION	AVERAGE NO. COWS
1978 - 79	18.08	106[2]
1979 - 80	21.26	134
1980 - 81	13.11	160
1981 - 82	20.81	165
1983 - 84	10.08	158[3]
1984 - 85	10.02	147
1985 - 86	17.17	137
1986 - 87	12.29	143
1987 - 88	15.01	138
1988 - 89	10.88	117
1989 - 90	7.59	120
1990 - 91	19.38	60[4]

1 = All data derive from U.S.W.B. Morrow Bay fire station records, except 89-90 and 90-91 values, which were obtained from Diablo Canyon weather records.
2 = Cow equivalent to 354 head of 600 lb. steers grazed in 1979 only.
3 = Cow numbers peaked, varying from 176 - 191 during the summer of 1983.
4 = Stocking reduced in response to drought effects and very poor range condition.

Table 3

Normal Year Forage Production Expressed as Pounds/Acre (Dry Weight)

Soil Type	Clip Plot	SCS[1]	Univ. Calif.[2]
Diablo - Cibo Clay	1,900	5,400	4,000-6,700
Cropley Clay	1,700	NA	4,000-6,700
Santa Lucia (3 slope conditions)	200-2,400	1,700	1,500-2,100
Still (2 slope conditions)	2,800-3,000	2,800	2,000-3,800

NA - Not found

[1]USDA Soil Conservation Service, soil survey of San Luis Obispo County, California (coastal part) 1984.

[2]George, M.R. and E.A. Jacobson. 1987. Annual Range Land Data Base. Range Science Report No. 15, University of California, Davis, Dept. of Agronomy and Range Science.

RECOMMENDATIONS

I believe that with the water and pasture improvements currently under development on the Pecho Ranch, stocking at the rate of 132 standard units can be achieved. In periods of poor rainfall a 20 percent reduction in stocking is recommended. During above average years, increasing the stocking rate by 20 percent is also recommended. Periodic measurement of the standing crop under normal and extreme rainfall conditions, and careful monitoring of forage utilization, stocking rate, and residual dry matter, are strongly recommended.

The Santa Lucia series (50 - 75% slope) range type was found to be in poor to very poor condition and characterized by a high erosion hazard. This range type should be rested or only lightly grazed to facilitate its recovery, for one to two years. Some herbicide treatment to remove unwanted species like wild mustard and wild radish may also be necessary. Trends in species composition with improved pasture management should be monitored especially in the Santa Lucia series (30 - 50% slope) and Still series (15-25% slope) range types. Range condition, based on quality of forage, is currently fair to poor in these range types. Under rotational grazing and normal rainfall these areas may show signs of improvement. The Cropley Clay series and the Santa Lucia series (5 - 9% slope) range types were in good to excellent condition, based on quality of forage. Monitoring and periodic adjustments in stocking should be directed at maintaining this condition. Residue levels on the steeper ground must be monitored to avoid overuse. Helght of residues at the onset of new growth in the late fall, on both the Cropley Clay series (50-75% slope) and Santa Lucia series (50 - 75% slope) should average approximately 3 inches to provide adequate soil protection and mico-climatic conditions. Elsewhere, 2 inches of residue is recommended.

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Appendix

RANGE CONDITION SUMMARY BY RANGE TYPE FOR THE PECHO RANCH

RANGE CONDITION SUMMARY BY RANGE TYPE

RANGE TYPE: DIABLO-CIBO CLAY SERIES, 50-75% SLOPE
GROUND COVER = 44% SAMPLE SIZE: 100 POINTS
FORAGE CONDITION CLASS: GOOD - EXCELLANT
SOIL EROSION HAZARD: MODERATE

SPECIES NAME	RELATIVE COMPOSITION	FORAGE QUALITY
*Erodium Cicutarium	41%	Desireable A
*Stipa Pulchra	18%	Desireable P
*Avena Barbata	18%	Desireable A
Calandrinia Ciliata	14%	Undesireable A
*Medicago Hispida	5%	Desireable A
Lupinus Bicolor	5%	Undesireable A

RANGE TYPE: CROPLEY CLAY SERIES, 2-9% SLOPE
GROUND COVER = 64% SAMPLE SIZE: 100 POINTS
FORAGE CONDITION CLASS: GOOD
SOIL EROSION HAZARD: LOW

SPECIES NAME	RELATIVE COMPOSITION	FORAGE QUALITY
*Bromus Mollis	37%	Desireable A
*Erodium Cicutarium	31%	Desireable A
Brassica Kaber	13%	Undesireable A
Hordeum Leporinum	11%	Less desireable A
Hordeum Geniculatum	4%	Less desireable A
*Medicago Hispida	3%	Desireable A
Bromus Diandrus	1%	Less desireable A

RANGE TYPE: SANTA LUCIA SERIES, 50-75% SLOPE
GROUND COVER = 32% SAMPLE SIZE: 50 POINTS
FORAGE CONDITION CLASS: POOR - VERY POOR
SOIL EROSION HAZARD: HIGH

SPECIES NAME	RELATIVE COMPOSITION	FORAGE QUALITY
Lupinus Bicolor	38%	Undesireable A
*Avena Barbata	31%	Desireable A
Brassica Kaber	13%	Undesireable A
Eschscholzia Californica	6%	Undesireable A
*Erodium Cicutarium	6%	Undesireable A
Calandrinia Ciliata	6%	Desireable A

RANGE TYPE: SANTA LUCIA, 5-9% SLOPE
GROUND COVER = 97% SAMPLE SIZE: 100 POINTS
FORAGE CONDITION CLASS: GOOD
SOIL EROSION HAZARD: LOW

SPECIES NAME	RELATIVE COMPOSITION	FORAGE QUALITY
*Erodium Cicutarium	66%	Desireable A
Bromus Diandrus	25%	Less desireable A
Stellaria Media	3%	Less desireable A
Vulpia Myuros	2%	Less desireable A
Hordeum Leporinum	2%	Less desireable A
Gnaphalium Palustre	2%	Undesireable A
Bromus Diandrus	1%	Less desireable A

RANGE TYPE: SANTA LUCIA SERIES, 30-75% SLOPE
GROUND COVER = 80% SAMPLE SIZE: 50 POINTS
FORAGE CONDITION CLASS: FAIR - POOR
SOIL EROSION HAZARD: MODERATE

SPECIES NAME	RELATIVE COMPOSITION	FORAGE QUALITY
*Erodium Cicutarium	49%	Desireable A
Hordeum Leporinum	18%	Less desireable A
Raphanus Raphanistrum	10%	Undesireable A
Calandrinia Cillata	10%	Undesireable A
Bromus Diandrus	8%	Less desireable A
*Elymus Glaucus	3%	Desireable P
*Avena Barbata	3%	Desireable A

RANGE TYPE: STILL SERIES, 2-15% SLOPE
GROUND COVER = 86% SAMPLE SIZE: 100 POINTS
FORAGE CONDITION CLASS: FAIR
SOIL EROSION HAZARD: LOW

SPECIES NAME	RELATIVE COMPOSITION	FORAGE QUALITY
*Erodium Cicutarium	43%	Desireable A
Amsinckia Intermedia	14%	Undesireable A
*Bromus Mollis	10%	Desireable A
Hordeum Leporinum	9%	Less desireable A
Bromus Diandrus	8%	Less desireable A
Lotus Micranthus	6%	Less desireable A
Vulpia Myuros	4%	Less desireable A
Calandrinia Ciliata	4%	Less desireable A
*Medicago Hispida	3%	Desireable A
*Avena Barbata	1%	Desireable A

RANGE TYPE: STILL SERIES, 5-25% SLOPE
GROUND COVER = 90% SAMPLE SIZE: 110 POINTS
FORAGE CONDITION CLASS: POOR
SOIL EROSION HAZARD: LOW - MODERATE

SPECIES NAME	RELATIVE COMPOSITION	FORAGE QUALITY
Hordeum Leporinum	38%	Less desireable A
*Erodium Cicutarium	19%	Desireable A
Vulpia Myuros	10%	Less desireable A
Bromus Diandrus	8%	Less desireable A
*Bromus Carinatus	7%	Desireable P
Eschscholzia Californica	4%	Undesireable A
Raphanus Raphanistrum	3%	Undesireable A
Gnaphalium Palustre	3%	Undesireable A
Convolvulus Occidentalis	2%	Less desireable P
*Bromus Mollis	2%	Desireable A
*Medicago Hispida	1%	Desireable A
Grindelia Camporum	1%	Undesireable A

* = indicates key management species
A = Annual, P = Perennial