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Objective Analysis

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Decision Making

GRP Rangeland Insurance for Montana

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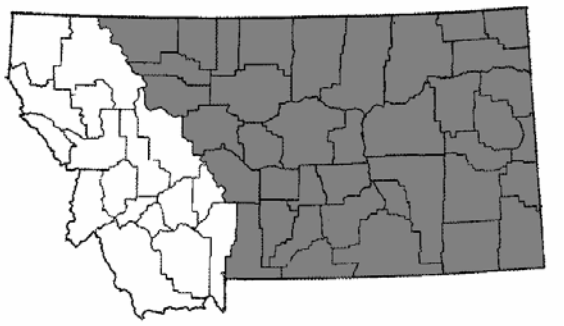
Introduction:

A new Group Risk Plan (GRP) Rangeland Insurance product is being offered by USDA's Risk Management Agency (RMA) in 39 Montana counties. For counties in which this insurance product is not offered, USDA's Farm Service Agency continues to offer the Noninsured Crop Disaster Assistance Program (See Briefing No. 14). The new GRP Rangeland Insurance product is intended to increase ranch managers' options for managing risk related to the loss of grazing from any of several causes.

GRP Rangeland Pilot Program:

The new GRP Rangeland Insurance product was first offered in Montana for the 2005 production year and continues to be offered in certain counties in 2007 (shaded counties in Figure 1).

Figure 1: GRP Rangeland Insurance Availability in Montana, 2006



The GRP Rangeland Insurance product provides risk protection against rangeland production losses resulting from multiple causes. An individual rancher's rangeland condition is not used for assessing losses and determining indemnities in this Group Risk Plan. Rather, an individual rancher's indemnity is determined on the basis of county-wide non-irrigated hay production which is highly correlated with rangeland conditions.

GRP Rangeland Insurance does not require rangeland to be planted to grasses, but it does require that a rancher insure all rangeland within a county in which a rancher has an interest. Only rangeland intended for harvest by grazing is eligible for this coverage. If a lease specifies the number of acres to be grazed, a rancher must insure those acres along with any owned rangeland acres. If a lease specifies the number of animal unit months (AUMs) to be grazed without specifying grazing acreage, then acres to be insured are determined by dividing the specified AUMs by a county's rangeland productivity factor (Table 1). Rangeland productivity factors are reported in RMA actuarial documents.

Basics of the GRP Rangeland Insurance Product:

GRP Rangeland Insurance uses historical and current annual production of all non-irrigated hay production in a county to determine range production losses. For each county, trigger "yields" are based on a county's historical net production of non-irrigated hay. Net non-irrigated hay production (also called Payment Yield) is calculated by subtracting hay harvested from CRP land and hay harvested from small grains from all non-irrigated hay production. Net non-irrigated hay production is used as a proxy for rangeland production because it is much easier to measure non-irrigated hay production than it is to determine range production directly. Moreover, the production of non-irrigated hay is highly correlated with range conditions.

GRP Rangeland Insurance is defined by the following concepts:

County Base Production*:* County Base Production represents the historical average annual net non-irrigated hay production in a county. The estimate is based on approximately 40 years of production data as reported by the Risk Management Agency (Table 1).

Coverage Levels: Producers may elect 70, 75, 80, 85, or 90 percent of a county's base production as their coverage level. In addition, Catastrophic Risk Protection (CAT) is available for GRP Rangeland Insurance. The CAT Coverage Level is set at the 65 percent level.

Trigger "Yield": An individual ranch's Trigger "Yield" is calculated by multiplying County Base Production by a producer's selected Coverage Level.

Table 1: Montana County Base Production, Rangeland Productivity Factors, and County Base Revenue Per Acre

County	County Base Production (tons)	Rangeland Productivity Factor (AUMs/acre)	County Base Revenue Per Acre (dollars/acre)
Big Horn	43,639	0.45	7.29
Blaine	18,334	0.38	6.16
Carbon	16,407	0.39	6.32
Carter	45,068	0.35	5.67
Cascade	55,909	0.47	7.61
Choteau	16,409	0.40	6.48
Custer	19,719	0.35	5.67
Daniels	13,466	0.32	5.18
Dawson	21,808	0.32	5.18
Fallon	30,607	0.31	5.02
Fergus	125,989	0.43	6.97
Garfield	14,084	0.30	4.86
Glacier	17,108	0.39	6.32
Golden Valley	8,240	0.36	5.83
Hill	8,462	0.35	5.67
Judith Basin	47,625	0.42	6.80
Liberty	4,190	0.38	6.16
McCone	19,496	0.33	5.35
Meagher	8,363	0.39	6.32
Musselshell	11,125	0.32	5.18
Park	12,474	0.47	7.61
Petroleum	6,011	0.35	5.67
Phillips	27,991	0.36	5.83
Pondera	10,992	0.41	6.64
Powder River	42,058	0.37	5.99
Prairie	9,374	0.33	5.35
Richland	28,924	0.36	5.83
Roosevelt	29,066	0.36	5.83
Rosebud	17,446	0.33	5.35
Sheridan	20,459	0.33	5.35
Stillwater	37,768	0.42	6.80
Sweet Grass	12,916	0.38	6.16
Teton	15,122	0.40	6.48
Toole	6,290	0.37	5.99
Treasure	6,386	0.40	6.48
Valley	22,762	0.36	5.83
Wheatland	8,508	0.39	6.32
Wibaux	13,791	0.32	5.18
Yellowstone	19,818	0.38	6.16

Net Hay Production: Net Hay Production in the insured year is measured by net non-irrigated hay production in a county for that year. Net non-irrigated hay production (also called Payment Yield) is calculated by subtracting hay harvested from CRP land and small grains from all non-irrigated hay production.

County Base Revenue Per Acre: County Base Revenue Per Acre is calculated by multiplying the private grazing fee per AUM as reported by the Montana Agricultural Statistics Service by a county's rangeland productivity factor. The statewide rate applicable to the 2007 grazing year is $16.20 per AUM.

Maximum Protection Per Acre: Maximum Protection Per Acre is calculated by multiplying County Base Revenue Per Acre by a producer's selected Coverage Level.

Note that this Coverage Level is the same as that used to calculate "Trigger Yield."

Price Election Percentage: Producers may select a Price Election Percentage between 60 and 100 percent**.** Producers generally select the 100 percent Price Election Percentage level. The Price Election Percentage is set at 45 percent for CAT coverage

Dollar Amount of Protection Per Acre: The Dollar Amount of Protection Per Acre is calculated by multiplying Maximum Protection Per Acre by a producer's selected Price Election Percentage.

How GRP Rangeland Insurance Works: An Example

Consider a rancher with 10 sections of rangeland (6,400 acres) in a county where County Base Production equals 20,000 tons (Table 2). The applicable state-level AUM grazing fee is $16.20 per acre, and the county range productivity factor is 0.35 AUM per acre. Thus, the County Base Revenue Per Acre is $5.67 ($16.20 per acre x 0.35). If the rancher selects a Coverage Level of 90 percent, the ranch's Trigger "Yield" will be 18,000 tons (20,000 tons x 0.90 Coverage Level). This

Table 2: An Example of GRP Rangeland Insurance

Contract Data	Value	Calculation
County Base Production	20,000 tons of all non-irrigated hay	**RMA:** This value was established for and accepted by RMA.
Coverage Level	90 percent	**Producer:** The producer may choose 70, 75, 80, 85 or 90 percent of the county base production.
Trigger "Yield"	18,000 tons of all non-irrigated hay	20,000 tons x 90 percent
Actual Net Hay Production	8,000 tons of all non-irrigated hay	**NASS**
County Base Revenue Per Acre	$5.67/acre	**RMA:** ($16.20/acre) x (0.35 AUMs/acre).
Maximum Protection Per Acre	$5.10/acre	$5.67/acre x 0.90
Price Election Percentage	100 percent	**Producer:** 60 to 100 percent
Dollar Amount of Protection Per Acre	$5.10/acre	$5.10/acre x 1.00
Per Acre Indemnity	$2.83 per acre	[(18,000 tons- 8,000 tons)/ (18,000 tons)] x [$5.10/acre]
Total Indemnity	$18,133	6,400 acres x ($2.83/acre)

rancher will receive an insurance indemnity if Net Hay Production in the county is less than 18,000 tons in the insured year. Furthermore, the rancher's Maximum Protection Per Acre will be $5.10 ($5.67 County Base Revenue per acre x 0.90 Coverage Level). A per acre insurance indemnity also depends upon a producer's selected Price Election Percentage. If a producer selects 100%, then the Dollar Amount of Protection Per Acre is also $5.10 ($5.10 Maximum Price Protection per acre x 1.00 Price Election).

A per acre indemnity is calculated using the following formula:

[(Trigger "Yield" - Net Hay Production) / Trigger "Yield"] x [Dollar Amount of Protection Per Acre]

If, for example, Net Hay Production is only 8,000 tons in the insured year, then the ranch would receive a gross insurance indemnity of $2.83/acre or $18,133 ([(18,000 tons - 8,000 tons)/18,000 tons] x $5.10).

GRP Rangeland Insurance Premium Calculation:

Per acre premium rates and subsidies are linked to Coverage Levels. Per acre premiums are calculated as:

Total Premium: [(Dollar Amount of Protection Per Acre) x (Premium Rate for the selected Coverage Level)].

Premium Subsidy: [(Total Premium) x (Subsidy Rate for the selected Coverage Level)].

Producer Premium: [(Total Premium) - (Premium Subsidy)].

The Producer Premium represents a rancher's out-of-pocket expenditure for the insurance. The Premium Subsidy is provided by the Federal government. Premium and subsidy rates by Coverage Level are presented in Table 3.

Table 3: Premium and Subsidy Rates by Coverage Level, for GRP Rangeland Insurance, 2006

Coverage Level (%)	Unsubsidized Premium Rate (%)	Subsidy Rate (%)	Administrative Fee ($)
70%	7.4	64	$30
75%	8.5	64	$30
80%	9.6	59	$30
85%	10.9	59	$30
90%	12.4	55	$30

CAT coverage is only available at a 65 percent Coverage Level and a 45 percent.

Price Election Percentage. CAT coverage requires a $100 administrative fee per contract – but no additional premium.

Premium rates are lower for lower Coverage Levels and subsidy rates are lower for higher Coverage Levels. In addition to per acre premium rates, a $30 administrative fee is charged for each GRP Rangeland Insurance contract. In the above example, the premium rate for the 90 percent Coverage Level selected by the rancher is 12.4 percent, and the premium subsidy for that Coverage Level is 55 percent. Per acre and ranch-level premiums for this example are presented in Table 4. This producer would have paid $1,851 (a $1,821 insurance premium plus a $30 administrative fee) to insure 6,400 acres of rangeland. In this example, the ranch would have received a gross indemnity of $18,133 (Table 2). The rancher's net indemnity (the gross indemnity less the premium and administrative fee) would have been $16,282.

Producers also have the choice of purchasing catastrophic risk protection (CAT) coverage. Rather than a per acre premium, CAT coverage requires a $100 administrative fee for each GRP Rangeland Insurance contract. The CAT Coverage Level is set at 65 percent and the Price Election Percentage is set at 45 percent

Table 4: Total and Producer Premiums for a GRP Rangeland Insurance Example

Contract Data	Value	Calculation
Total Premium per Acre	$0.6324	**RMA:** ($5.10/acre) x (0.124 premium rate)
Total Premium for Ranch	$4,047.36	**RMA :** ($0.6324/acre) x 6,400 acres
Premium Subsidy per Acre	$0.3478	**RMA:** ($0.6324/acre) x (0.55 subsidy rate)
Premium Subsidy per Ranch	$2,225.92	**RMA:** ($0.3478/acre) x 6,400 acres
Producer Premium per Acre	$0.28	**RMA:** $0.6324 - $0.3478
Producer Premium per Ranch	$1,821	$4,047.36 - $2,225.92
Administrative Fee	$30/contract	**RMA**

The net indemnity for the example ranch is $16,282 calculated as $18,133 - $1,821 - $30.

Decision Criteria for Purchasing GRP Rangeland Insurance:

Ranchers must decide whether or not to purchase GRP Rangeland Insurance. The preceding example illustrates a situation in which the decision to purchase insurance resulted in a positive net indemnity for a specific year. However, rangeland losses do not occur every year, and when they do occur, they vary in severity.

Consider a specific Montana county -- Carter County. Over the 40-year period, 1965 through 2004, the RMA-specified County Base Production of all non-irrigated hay (excluding CRP and small grain hay) was 45,068 tons (Table 1). Non-irrigated hay production in Carter County for the 1965-2004 period as reported by NASS is presented in Appendix Table A.1. These data include both CRP and small grains hay production because separate data were not gathered for most of that period. Non-irrigated hay production averaged 60,045 tons over the 1965-2004 period. The County Base Production is 75.06 percent of average non-irrigated hay production. The last column in Appendix Table A.1 presents an estimate of Net Hay Production obtained by multiplying total non-irrigated hay production by 75.06 percent. The resulting estimates approximate RMA's County Base Production values. In future years, CRP and small grains hay production data will be collected and subtracted from all non-irrigated hay production to determine Net Hay Production.

Carter County Trigger "Yields" at CAT (65), 70, 75, 80, 85, and 90 percent Coverage Levels are presented in Table 5. The years in which estimated "Net Hay Production" fell below Trigger "Yields" for each Coverage Level are identified in Table 6.

Table 5: Trigger "Yields" for Carter County, MT

Coverage Level (%)	Trigger "Yields" (tons/year)
CAT (65)	29,294
70	31,548
75	33,801
80	36,054
85	38,309
90	40,561

Table 6: Years For Which Estimated Net Hay Production Was Less Than Trigger "Yields" For Each Coverage Level, Carter County, MT, 1965-2004

Coverage Level	Number of Years Estimated Net Hay Production Was Less Than Trigger "Yield"	Years In Which Estimated Net Hay Production Was Less Than Trigger "Yield"
CAT (65)	8	1966, 1980, 1985, 1988, 1989, 1990, 2002, 2004
70	9	1966, 1968, 1980, 1985, 1988, 1989, 1990, 2002, 2004
75	11	1966, 1968, 1974, 1980, 1985, 1987, 1988, 1989, 1990, 2002, 2004
80	12	1966, 1968, 1973, 1974, 1980, 1985, 1987, 1988, 1989, 1990, 2002, 2004
85	15	1966, 1968, 1973, 1974, 1977, 1980, 1985, 1987, 1988, 1989, 1990, 1992, 2000, 2002, 2004
90	18	1966, 1967, 1968, 1969, 1973, 1974, 1976, 1977, 1980, 1985, 1987, 1988, 1989, 1990, 1992, 2000, 2002, 2004

Suppose a rancher had the opportunity to purchase GRP Rangeland Insurance each year during the 1965-2004 period, and selected a 90 percent Coverage Level in every year. The ranch would have paid a premium in each of the 40 years.[1] The ranch would have received an indemnity in 18 of the 40 years (Table 7). In three of these years (1967, 1969, 1976) per acre indemnities were smaller than per acre premiums. The last row of Table 7 shows the per acre total premiums paid and total indemnities received over the entire 40 years. Total per acre indemnities of $28.03 exceed total per acre premiums of $11.19.

The last column of Table 8 reports net indemnity calculations for the 70, 75, 80, 85, and 90 percent Coverage Levels. The largest per acre difference between total indemnities and premiums ($16.84) would have occurred if the rancher had selected a 90 percent Coverage Level. The smallest difference ($9.52) occurs for the 70 percent Coverage Level. Note that these calculations do not include the $30 annual service fee per contract that is required for the purchase of GRP Rangeland Insurance. If this service fee were applied to 1,000 acres in the above example, it would add $0.03 per acre to the insurance premium in each year (or a total of $1.20 per acre over the 40 years).

Suppose this same rancher had selected CAT coverage in each of the 40 years. The CAT Trigger "Yield" in Carter County would have been 29,294 tons (Table 5). Estimated "Net Hay Production" was less than the CAT Trigger "Yield" in eight years during the 1965-2004 period. Because CAT stipulates a 45 percent Price Election Percentage, the ranch would have received total gross indemnities of $5.11 per acre for those eight years of loss during the 40 year period. The ranch would have paid a total of $4,000 in administrative fees to purchase the coverage. If 1,000 acres of rangeland were insured in each year, the administrative fee for CAT coverage would have totaled $4.00 per acre over the 40 year period. The net indemnity would have been $1.11 per acre. Note that the per acre indemnity from CAT coverage is less that the smallest difference between indemnities and premiums for buy up levels ($9.52 per acre for the 70 percent coverage level in Table 8).

[1] It is assumed that the premium that existed in each year was equal to the 2005 level.

Table 7: Per Acre Premiums and Indemnities for the 90 Percent Coverage Level, Carter County, MT 1965-2004

Year	Per Acre Producer Premiums (dollars)	Trigger "Yield" (tons)	Estimated "Net Hay Production" (tons)	Per Acre Indemnities (dollars)
1965	$0.280	40,561	47,961	$0.00
1966	0.280	40,561	21,241	2.39
1967	0.280	40,561	39,630	0.12
1968	0.280	40,561	30,924	1.19
1969	0.280	40,561	39,405	0.14
1970	0.280	40,561	21,241	0.00
1971	0.280	40,561	47,211	0.00
1972	0.280	40,561	50,588	0.00
1973	0.280	40,561	51,189	0.69
1974	0.280	40,561	34,977	1.00
1975	0.280	40,561	42,407	0.00
1976	0.280	40,561	39,630	0.12
1977	0.280	40,561	36,177	0.54
1978	0.280	40,561	65,150	0.00
1979	0.280	40,561	41,507	0.00
1980	0.280	40,561	18,314	2.75
1981	0.280	40,561	50,288	0.00
1982	0.280	40,561	78,360	0.00
1983	0.280	40,561	60,571	0.00
1984	0.280	40,561	44,434	0.00
1985	0.280	40,561	12,234	3.50
1986	0.280	40,561	54,566	0.00
1987	0.280	40,561	33,025	0.93
1988	0.280	40,561	3,678	4.56
1989	0.280	40,561	28,071	1.54
1990	0.280	40,561	28,822	1.45
1991	0.280	40,561	51,039	0.00
1992	0.280	40,561	36,778	0.47
1993	0.280	40,561	58,544	0.00
1994	0.280	40,561	45,785	0.00
1995	0.280	40,561	79,560	0.00
1996	0.280	40,561	72,805	0.00
1997	0.280	40,561	71,679	0.00
1998	0.280	40,561	51,789	0.00
1999	0.280	40,561	110,334	0.00
2000	0.280	40,561	37,904	0.33
2001	0.280	40,561	72,805	0.00
2002	0.280	40,561	14,111	3.27
2003	0.280	40,561	50,814	0.00
2004	0.280	40,561	15,912	3.05
40-Year Totals	$11.19	not applicable	not applicable	$28.03

Table 8: Per Acre Indemnities and Premiums of GRP Rangeland Insurance Over a 40-Year Period for Selected Coverage Levels, Carter County, MT

Coverage Level (%)*	Total Per Acre Indemnity Over 40 Years (dollars/acre)	Total Per Acre Premiums Over 40 Years** (dollars/acre)	Total Indemnities Less Total Premiums (dollars/acre)
70	$13.67	$4.15	$9.52
75	16.44	5.11	11.33
80	19.63	7.02	12.61
85	23.48	8.46	15.02
90	28.03	11.19	16.84

* Catastrophic risk protection (CAT) has a fixed 65 percent Coverage Level and a 45 percent Price Election Percentage.
**There is $30 administrative fee per contract per year. On an annual basis, someone who insured 1,000 acres of rangeland would incur an annual fee of $0.03 per acre on average, or $1.20 over the 40-year period.

Important Dates for GRP Rangeland Insurance

The GRP Rangeland Insurance product has several important dates for producers:

Sales Closing Date: September 30, 2006
Acreage Reporting Date: April 15, 2007
Date Indemnity Payments Issued By: May 31, 2008

Summary

GRP Rangeland Insurance provides an opportunity for ranchers to manage downside rangeland production risks in 39 Montana counties. In the remaining Montana counties, ranchers must rely upon FSA's NAP program for rangeland risk management. GRP Rangeland Insurance bases indemnities on county-wide net non-irrigated hay production as a proxy for rangeland production. Actual range conditions on any single ranch have little influence on the probability of receiving an indemnity. In addition, the probability of receiving an indemnity (that is, experiencing range conditions which are poor enough to trigger an indemnity) varies by county.

Information on such probabilities for each Montana county is available by accessing the Western Risk Management Library website at http://agecon.uwyo.edu/riskmgt. The website offers county-specific data to help producers make informed decisions regarding the purchase of GRP Rangeland Insurance. After accessing the website, select "Production" at the left side of the page. Then, scroll down the alphabetical listing until reaching the link entitled "Rangeland Production Risk Management". Click on the link to access specific information on Montana counties.

A rancher's decision to purchase or not purchase GRP Rangeland Insurance depends upon the probability of experiencing range losses, a rancher's level of risk aversion, net worth, and cash flow situations.

References:

Johnson, James B. "Noninsured Crop Disaster Assistance Program." Briefing No. 14 (revised). Agricultural Marketing Policy Center, Department of Agricultural Economics and Economics, Montana State University, Bozeman. November, 2001.

Appendix Table A.1: Non-irrigated Hay Production and Estimated Net Hay Production Carter County, Montana, 1965-2004

Year	All Non-irrigated Hay Production (tons)*	Estimated Net Hay Production (tons)**
1965	63,900	47,961
1966	28,300	21,241
1967	52,800	39,630
1968	41,200	30,924
1969	52,500	39,405
1970	62,900	47,211
1971	67,400	50,588
1972	68,200	51,189
1973	46,600	34,977
1974	43,300	32,500
1975	56,500	42,407
1976	52,800	39,630
1977	48,200	36,177
1978	86,800	65,150
1979	55,300	41,507
1980	24,400	18,314
1981	67,000	50,288
1982	104,400	78,360
1983	80,700	60,571
1984	59,200	44,434
1985	16,300	12,234
1986	72,700	54,566
1987	44,000	33,025
1988	4,900	3,678
1989	37,400	28,071
1990	38,400	28,822
1991	68,000	51,039
1992	49,000	36,778
1993	78,000	58,544
1994	61,000	45,785
1995	106,000	79,560
1996	97,000	72,805
1997	95,500	71,679
1998	69,000	51,789
1999	147,000	110,334
2000	50,500	37,904
2001	97,000	72,805
2002	18,800	14,111
2003	67,700	50,814
2004	21,200	15,912
Average	60,045	45,068

* These data include hay produced from CRP acres and small grains.