Leave it in grass or break it up?

Some people are faced with the question of whether to break up land that has been in CRP for the past 10 years and return it to small grain production, or leave it in grass and harvest it for hay. A three-year study in Roosevelt County sheds some light on the pros and cons of either choice.

In the study, conducted by USDA-ARS soil scientists J. Kristian Aase and J.L. Pikul Jr., and USDA-NRCS economist G.M. Schaefer, the objective was to compare the economics of returning land to wheat production that had been in crested wheat for about 15 years, versus leaving the land in grass and cutting hay. The three-year study started in April 1990 on a Dooley sandy loam south of Froid.

The three methods used to prepare the sod before seeding spring wheat were a five-bottom moldboard plow; a tool bar with 18-inch sweeps on 12-inch centers; and no-till using 1 quart of Roundup plus 1 quart of 2,4-D amine in 15 gallons of water per acre to kill the sod. The plots were left fallow until the spring of 1991. Beginning in 1991, the only mechanical tillage on the broken-out plots were sweeps immediately prior to seeding, except in 1992 when it was necessary to disk before using sweeps. All post-harvest weed control, if necessary, was done with a mixture of Roundup and 2,4-D.

The plots were seeded to spring wheat every year, and all were fertilized with 200 lbs/acre of 18-46-0 in 1991 and 1992. In 1993 and 1994, 30 lbs/acre of actual N as 34-0-0 was applied to all plots.

One set of grass plots was unfertilized, a second received 200 lbs/acre of 18-46-0 in 1991 and 1992, and 30 lbs/acre of actual N in 1993 and 1994.

Machinery costs each year were based on a typical 2,000-acre dryland farm in eastern Montana. Fixed and variable cost data for the machines were taken from a 1990 Machinery Cost bulletin and updated to 1994 costs. Local farm suppliers provided 1994 prices for purchased materials such as seed, fertilizer and chemicals. Statewide average yearly prices were collected for non-alfalfa hay and spring wheat, excluding durum, for 1991 through 1994. The average price for hay was $55.81 per ton.

Commodity program provisions for the 1994 crop were used. There was no Average Conservation Reserve requirement for wheat, but there was a Normal Flex Acre requirement of 15% of the crop acre base. The 1990 farm bill set the target price for wheat at $4. The 15% Normal Flex Acre requirement reduced the price received. Actual price received = 0.85 × target price + 0.15 × cash price = $3.91 per bushel.

Table 1. Average Costs and Returns for the 1990-94 Evaluation Period

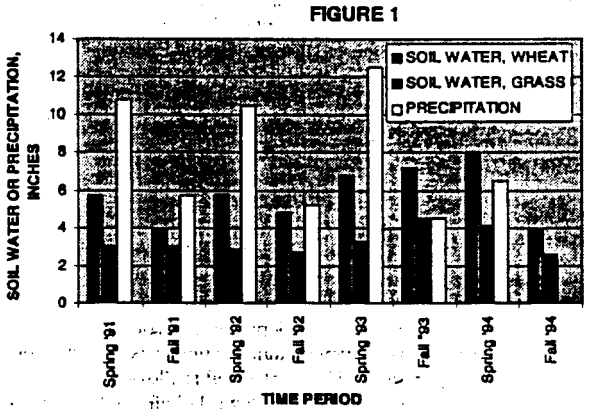
	TREATMENT				
	Plow	Sweeps	No-Till	Grass, Unfertilized	Grass, Fertilized
Gross return	$147.80	$147.80	$155.62	$46.13	$78.78
Material cost	44.73	44.73	63.04	—	20.40
Machinery: variable cost	16.32	15.05	14.35	8.04	8.04
Return over variable cost	86.75	88.02	78.23	38.09	50.34
Machinery: fixed cost	21.17	19.43	18.93	10.70	10.70
Net return to land, labor, and management	65.58	68.59	59.30	27.39	39.64

Figuring the bottom line

In all years, rainfall was above average some time during critical portions of the wheat growing season. The precipitation pattern did not favor cool season grass production in every year. Early season precipitation was particularly unfavorable for grass production in 1993.

Soil water content at time of spring wheat seeding and harvest, to a depth of four feet in the wheat plots is shown in Figure 1. Total precipitation for the spring wheat growing season and between harvest and the next spring are also shown. Soil water measurements did not coincide exactly with initiation of crested wheatgrass growth and grass harvest.

FIGURE 1



There were no statistically significant differences in soil water content among sod-breaking treatments, nor between fertilized and unfertilized crested wheatgrass treatments. There were statistically significant soil water content differences among wheat and crested wheatgrass treatments, except in the fall of 1991 and 1994.

There were no statistically significant differences in wheat yields among sod-breaking treatments. The yields in 1991, following fallow, averaged 41.5 bushels/acre, 12.5 bu/acre more than the county average following fallow in 1991. The yields in the three subsequent years were all "recrop" yields and averaged 11.8 bu/acre more than the county average of 25.7 bu/acre on "recrop" during the same years.

Fertilized grass made better use of available water, and averaged 1.4 tons/acre, versus 0.8 ton/acre for unfertilized grass. Stands of crested wheatgrass six years old and older can have yields reduced by as much as 70% compared with a two- to three-year-old stand. Obviously, fertilizer made up for some of the lost production of the old crested wheatgrass stand used in the study.

Monetary return from which to pay for the land, labor and management was the highest for sweep treatment at $68.59 per acre (Table 1). The plow treatment was next $65.58, followed by the no-till treatment at $59.30. Fertilized crested wheatgrass had a net return of $38.64, about 1.4 times that of the non-fertilized crested wheatgrass at $27.39.

There was a two-bushel average yield advantage for no-till wheat as compared to the other two wheat treatments, but that was not great enough to compensate for the increased chemical costs associated with no-till. A yield advantage for no-till wheat of 4.4 bushels over that of the sweep treatment was needed for the net return to have equaled that of the sweep treatment. Fertilized crested wheatgrass yield would have needed to be 1.9 tons, rather than 1.4 tons, to have equaled the net return of the wheat sweep treatment.

Another way to consider the differences is the fact that the wheat yields were high, especially considering that three out of the four years were "recrop" years. A wheat yield of 30 bu/acre would have equaled the net return from fertilized grass.

Wheat yields on summer fallowed ground in Roosevelt County averaged 32.8 bu/acre during the study years. That yield is based on a crop every other year, versus a hay yield every year. For summer fallow, reduce the net return to land, labor and management shown in Table 1 to account for costs, then divide by two to get an average yearly return to compare with the return from a yearly hay crop. Even using high yields similar to those from the study, net returns from wheat production would then be less than those from hay production.

The Roosevelt County average of 25.7 bu/acre and the experimental average of 37.5 bu/acre on "recrop" were both excellent yields. Although "recrop" is generally more economically advantageous than summer fallow, it is questionable such high yields can be sustained county-wide and be economically competitive with managed grass hay. Therefore, before returning CRP land to small grain production, consider carefully such variables as management practices, market conditions, total precipitation and its distribution, soil conditions, growth environment, and government programs.

For a complete copy of this study contact either J. Kristian Aase at 208-423-6544 or G.M. Schaefer at 406-587-6829.