The Value of Increased Forage from Improved Rangeland Condition

John P. Workman

Maintain Range Condition to Preserve Ranch Capital

Range managers have long advised ranch owners to conservatively graze private rangeland and to apply vegetation treatments (e.g., chemical brush control, prescribed burning) in order to maintain or improve range condition and livestock carrying capacity. The practical rationale for this advice, often unstated, is that maintained or improved range condition will help preserve or increase ranch capital value (equity). Recent research results support this advice (Rowan and Workman 1993). Sales of Utah rangeland show that rangeland tends to be priced on a per acre basis during the expansion phase of the business cycle but is priced on a per animal unit (AUM) basis during the deflation phase. Thus, rangeland owners should try to maintain or improve range condition and carrying capacity to preserve real estate values (and borrowing power) during deflationary times. However, there is little information available concerning the value of increased forage production.

Table 1. Increased forage production and increased returns (20-year life, 9% interest) from improved rangeland condition on 2 range sites.

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<td>57</td>
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<td>660</td>
<td>42</td>
<td>8.22</td>
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1From Mason, 1971.

How Much is Improved Range Condition Worth?

The increase in forage production on two Utah sites when rangeland condition is improved from fair to good is shown in Table 1. The 195 lb/ac increase on the upland loam site resulted in an increase of 0.30 animal unit months (AUM) per acre. This carrying capacity increase was valued at $6.95 per AUM, the 1990-92 average private range lease rate for the 16 western states of $10.37 per AUM (USDA 1993) reduced by 33% for the value of landlord services included in the private fee (Fowler et al. 1994). Thus the value of the increased annual carrying capacity was $2.09 per acre. If the life of the improved range condition is 20 years, the present value (PV) of good over fair condition, discounted at a 9% risk-included real rate (4% real borrowing or real opportunity cost plus 5% risk), is $19.08 per acre. Thus a ranch owner could afford to spend up to $19.08 per acre to improve a private upland loam range site from fair to good condition. Improving the less productive (and less responsive) upland shallow loam site from fair to good condition is worth only $8.22 per acre.

Best Sites First

If the cost of practices required to improve range condition from fair to good (e.g., prescribed burning, chemical brush control, cross-fencing, water development) was $10 per acre, the present values (PVs) in Table 1 indicate that the resulting profit would be $9.08 per acre on the upland loam site ($19.08-$10) but there would be a $1.78 per acre loss on the upland shallow loam site ($8.22-$10). Table 1 illustrates that the best (highest potential and most responsive) sites should be improved first. See Workman and Tanaka (1991) for an illustration of how this principle is applied to the allocation of revegetation efforts among range sites.

Improved Condition is Worth More on Private Rangeland

The uncertain tenure of federal and state grazing permits, along with the risks of public grazing fee hikes and allotment cuts, mean that it is worth more to a rancher to improve range condition on private rangeland than on public. In Utah, each
Table 2. Increased forage production from improved rangeland condition, upland loam range site.

<table>
<thead>
<tr>
<th>Herbage Utilization</th>
<th>Forage (lb/ac/yr)</th>
<th>Forage Increase (lb/ac/yr)</th>
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<td>Excellent Condition</td>
<td>1360 87 50</td>
<td>592 53</td>
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<td>Good Condition</td>
<td>1348 80 50</td>
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<td>1176 23 50</td>
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</table>

1From Mason, 1971.

additional federal AUM of long-term carrying capacity adds only $42.47 to total ranch market value, a little more than half as much as the $77.97 contributed by an additional private AUM (Rowan and Workman 1992).

Why Excellent Condition Rangeland is Hard to Find

In Rich County, Utah, private upland loam rangeland was generally in higher condition than State of Utah or Bureau of Land Management upland loam sites (Loring and Workman 1987). However, while none of Rich County private upland loam sites were in poor condition (one-third were in good condition and two-thirds were in fair condition), none were in excellent condition either. Table 2 helps explain why. Improving upland loam from poor to fair condition increased forage production by 155% (209 lb/ac). Further improvement from fair to good condition yielded a 57% increase (195 lb/ac). Finally, improving range condition from good to excellent increased forage production by only 10% (53 lb/ac). Thus the effort, time, and funds (for brush control, grazing deferment, conservative stocking, etc.) required to improve range condition from good to excellent are as great as those required to improve range condition from poor to fair, the resulting increase in usable forage was only about one-fourth as large (53 lb/ac compared to 209 lb/ac).

The relationship between usable forage and range condition is illustrated in Figure 1. The slopes of the lines indicate the rates of increased forage production due to improved condition. The line is steep when range condition improved from poor to fair, is slightly less steep when range condition improved from fair to good, and is much flatter when range condition improved from good to excellent.

Applying the present value (PV) calculations of Table 1 to the Figure 1 forage responses reveals that it would be highly profitable to improve the upland loam site from poor to fair condition but improving from good to excellent condition is not. Annual value of the additional 209 lb/ac usable forage when range condition improved from poor to fair (.32 AUM/ac priced at $6.95/AUM) was $2.22/ac. Discounting (20-year life, 9% risk-included real rate) resulted in a PV of $20.27/ac. Subtracting $10/ac improvement costs (brush control, grazing deferment, etc.) yielded a net profit of $10.27/ac. In contrast,
the annual value of the additional 53 lb/ac usable forage increase when range condition improved from good to excellent (.08 AUM/ac priced at $6.95/AUM) is $.56/ac. Discounting yields a PV of $5.11/ac and after improvement costs of $10/ac were subtracted resulted in a net loss of $4.89/ac. These net profits help explain why relatively little private rangeland is in excellent condition.

Summary

Range managers have long advised ranch owners to manage their private rangeland so as to maintain or improve range condition and livestock carrying capacity. Such advice appears to be sound but there is little information concerning the value of increased forage production.

Improving Utah range condition from fair to good was highly profitable on a high potential range site (upland loam) but not on a less responsive site (upland shallow loam), illustrating the principle of improving the best sites first. Due to the uncertainty associated with public land grazing permits, ranchers gain more by improving condition of private rangeland than by improving the condition of public rangeland.

None of the private upland loam sites sampled in Rich County, Utah, were in poor condition but none were in excellent condition, either. This probably reflects the fact that it costs as much to improve range condition from good to excellent as it does to improve range condition from poor to fair, even though only about one-fourth as much increased forage production results from improving range condition from good to excellent.

(Continued from EVP column page 35).

Beginning in 1996, the Board will not meet during the day that committees meet (Saturday, February 10) to allow BOD representatives to attend committee meetings. The Board, Chairs and Chair-elects will meet that evening in a strategic planning session. Then on Thursday morning, BOD representatives will meet with their clusters and new committee chairs will present their 1996 Action Plans to the cluster to facilitate information exchange.

Be watching for changes in the 1996 Preconvention Trail Boss (PTB). It will be attached to October Rangelands. We hope to have it attached in such a way that you can easily remove it and have your own copy of the PTB. The basic reason for this change has to do with the rules and regulations of the U.S. Postal Service. But it may have some other advantages and perhaps reduce the cost.

The BOD also approved, upon recommendation of the finance committee, an increase in Life membership fees. A Life membership will cost $750 beginning January 1, 1995 (life membership is currently $600). Life Family membership will remain at $800.

The BOD also approved, at the recommendation of the Endowment Fund Board of Governors, a silent auction for the 50th anniversary meeting in Rapid City, South Dakota. No other auctions will be allowed at the meeting. All of the proceeds from the auction will go to the Endowment Fund. The Board of Governors is anticipating some very nice items for the auction. Also 25% of any proceeds from the use of the 50th anniversary logo would go to the Endowment fund except that derived from student fund raising activities. Bob Gartner is the point of contact for all planned activities for the 50th anniversary.

Literature Cited


Mason, L. 1971. Yield and composition of Utah’s range sites. USDA-SCS. Portland, OR.


