COLLEGE OF AGRICULTURE & LIFE SCIENCES
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Economic Impact of Cooperative Extension Efforts in Rangeland Management for a Northern Arizona Ranching Allotment

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Background

The University of Arizona Cooperative Extension's efforts in rangeland management bring together private ranchers, public land managers, and Extension agents and specialists to promote rangeland health, conservation, and preserve productivity and profitability for land users, basing management decisions on best available science. University of Arizona Cooperative Extension Specialists were involved in a project to address proposed changes to a rancher's grazing allotment permit on federal land in Northern Arizona.

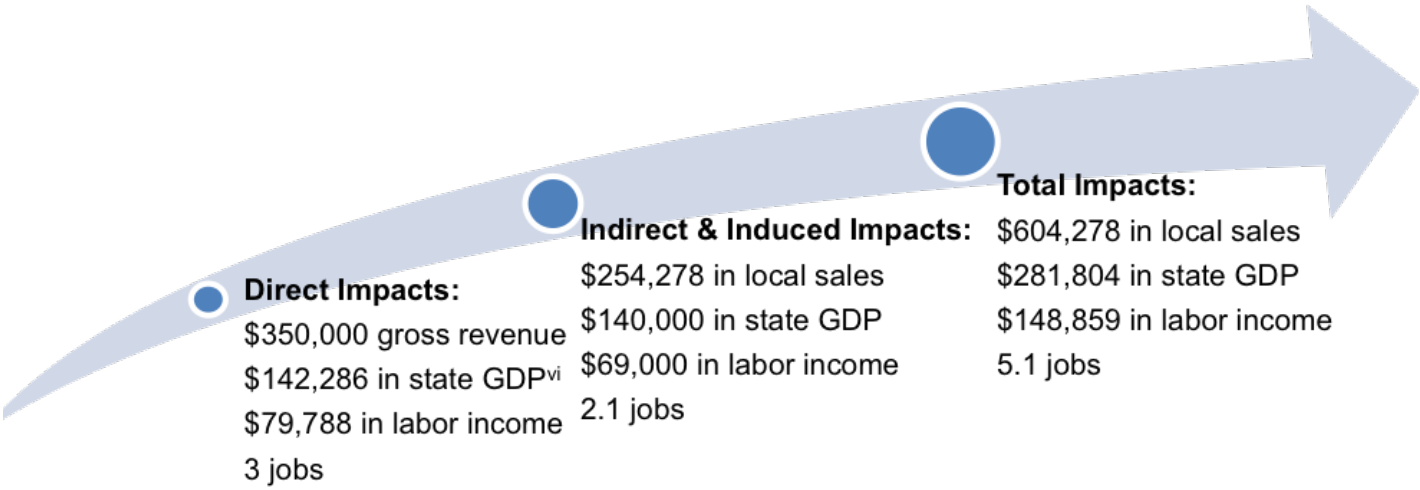
- The proposed reissuance of the 10-year grazing permit would have reduced the permitted herd from nearly 600 to 200 animal units (AU). This proposed reduction in herd size was avoided with the assistance of Cooperative Extension specialists.
- These changes were proposed to address declining rangeland heath, suggested to be a result of drought, fire, burros, and existing grazing management.
- University of Arizona Extension Specialists analyzed a 30-year rangeland monitoring dataset for the allotment including data on plant community dynamics and soil cover. They concluded that grazing animals (wild or domestic) were not the main causal agents for Standard 3 (Desired Resource Conditions) of the Rangeland Health Evaluation not being met. Rather, drought and persistent impacts from rangeland fire were concluded to be the more likely causal agents of declining rangeland health.

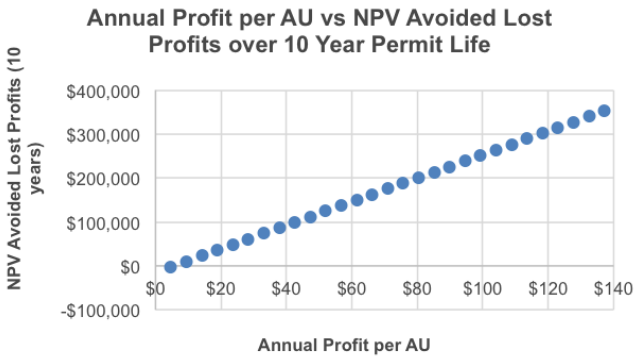
Benefits of Working with Cooperative Extension

Cooperative Extension's efforts in working with the rancher and federal agencies yielded the following estimated impacts:

- **Avoided $350,000[i] loss in gross revenue** (sales) per year to one rancher. This equated to $2,229 in avoided loss of gross sales annually per hour of extension involvement.
- **Avoided the loss of 3 year-round jobs** and possibly additional seasonal jobs. **Including multiplier effects, 5 jobs and $148,859 in wages were preserved** within the local county annually.
- By avoiding $350,000 in reduced gross sales annually and the loss of 3 jobs, **Cooperative Extension's involvement helped to preserve $604,278 in annual sales for the local county economy**, including direct, indirect, and induced impacts[ii] of the cattle sales
- **Over the 10 year permit life, net present value (NPV) of avoided losses equal to $2,521,208,** net of initial $15,203 investment by Cooperative Extension in the form of hours worked, miles traveled, and overnight stays working with stakeholders.
- The NPV of the project amounted to **$16,059 per hour invested by Cooperative Extension.**[iii]
- **Avoids losses of $4,900 annually in grazing fees** split between the grazing board and the federal government.

Avoided Negative Economic Impacts





Modified Internal Rate of Return of Project

The return to the rancher in terms of avoided losses in profits over the 10 year life of the permit versus investment by Cooperative Extension can best be expressed as a modified internal rate of return (MIRR). MIRR captures distinct reinvestment and borrowing discount rates, and is an extension of the benefit cost ratio of a project[iv]. Over the 10-year life of the permit, at a 6% profit margin, the MIRR would be 32%.[v]

Except at very low levels of profitability per animal unit, the NPV of avoided losses of profits over the 10-year life of the permit are positive, assuming a discount rate of 8%. Profit margin can also be expressed as annual profit (nominal) per AU, and a corresponding NPV of the lost profits over the 10-year permit life associated with the reduction in herd size.

Conclusion

This analysis explores the impact that Cooperative Extension can have on regional economies by helping to avoid negative economic shocks. The avoided loss in cattle ranching revenue would have had an estimated impact of 5.1 lost jobs, nearly $150,000 in reduced labor

i Estimated reduction in gross value of production from rancher and corroborated using 2014 ERS Basin and Range Cow-calf production cost and returns data per cow. Assumes a 20:1 cow to bull ratio.

ii Direct impacts include the initial change in final demand for a good or service. Indirect impacts include changes in demand to suppliers of the affected business. Induced impacts include changes in economic activity resulting from changes in labor income of those individuals employed by both the directly and indirectly impacted businesses.

iii Using a discount rate of 8.0%

iv Source: Hurley, T. M., Rao, X., & Pardey, P. G. (2014). Re-examining the Reported Rates of Return to Food and Agricultural Research and Development. American Journal of Agricultural Economics, 96(5), 1492-1504.

v Calculations based upon the following assumptions: NPV discount rate of 8.0%, cost of capital rate of 4.2594%, interest on investment rate of 4.0%. Cost of Capital obtained averaging interest rates on outstanding bonds for the University of Arizona in their 2014 financial report, http://www.fso.arizona.edu/sites/default/files/fm/reports/cafr2014.pdf. Interest on investment set as reported average payout rate of UofA Endowment, as reported in 2014 financial report

vi Value added (a measure comparable to gross domestic product) measures total output net of intermediate expenditures and includes employee compensation, business income, and taxes.

vii Rimbey, N., Torell, L., & Tanaka, J. (2007). Why Grazing Permits Have Economic Value. Journal of Agricultural & Resource Economics, Vol 32, No 1.

income, a reduction in nearly $300,000 in regional value added[vi] (gross domestic product), and over $600,000 in reduced economic output (sales) per year, including direct, indirect, and induced effects. This, however, assumes that the ranching operation would have been economically viable at the proposed reduced levels. If forced to sell the herd, the negative local economic impact might have been greater than the estimates provided through this study. An additional potential loss not quantified in this study is the impact that the reissuance of the grazing permit at a reduced herd size would have had on the value of the rancher's grazing permit. Rimbey, et al (2007) estimate that in New Mexico, between 4% and 16% of the value of grazing permits was attributable to grazing[vii] . Not only would this represent a loss to the rancher, it could also impact the ranching enterprise's ability to obtain financing, thereby influencing the enterprise's operations and viability.

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