

Understanding Livestock Grazing Impacts: a decision support tool to develop goal-oriented grazing management strategies

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Introduction Managing grasslands in the western United States has become much more complex over the last few decades. A century ago the goal was to survive as a livestock producer, and grassland management involved using forage effectively and overcoming obstacles such as predators and shortages of water and feed. Today the successful grassland manager also needs to consider the diversity and health of the ecosystem as a whole. Livestock grazing can negatively and/or positively affect riparian areas, sensitive plants, and endangered wildlife. Since the impact on a specific factor will vary depending on the timing, intensity and class of livestock grazed, land managers need a decision support system that will help them simultaneously evaluate the affect of different grazing management strategies on a variety of environmental and economic factors. *Understanding Livestock Grazing Impact*, an interactive website, assembles and presents information on the impacts of livestock grazing in a way that is both comprehensive and accessible. This makes it easier for ranchers and land managers to analyse, compare and choose the grazing strategies that best achieve the goals for a given grazing unit.

Materials and methods Thirty individual environmental, economic and social indicators that are affected by livestock grazing on California's annual grasslands were identified. Environmental indicators include habitat for endangered species such as the kit fox, burrowing owl, checkerspot butterfly, and tiger salamander. Environmental indicators also include vernal pool habitat, hardwood riparian habitat, oak regeneration, water quality and water infiltration. Economic indicators include forage production, livestock gain per acre, need for supplemental feed and calving rate. Social indicators include recreation use. For each indicator statements of description, significance, rationale regarding potential grazing impact, monitoring methods and references are provided.

The grazing impact for each indicator is depicted graphically with a bar chart to illustrate positive/ negative or no impact with regards to grazing intensity, season of use and species of grazing animal. The bar charts were developed based on existing research findings. The interactive website allows managers to select the appropriate indicators for a site and evaluate the impact of grazing strategies that vary intensity, timing and species of livestock. Two workshops were held for grassland managers to test the use of this decision support tool before its development was finalized. This decision support tool has just debuted on the website www.grazingimpacts.info, and is in the University of California peer review process.

Results Grassland managers can use this decision support tool to determine the best grazing management strategy to work toward established objectives for a particular grassland site. Although the grassland manager will have to assign relative value to a list of selected indicators, he can use this tool to effectively evaluate multiple and conflicting impacts related to livestock grazing.

Conclusions *Understanding Grazing Impacts* uses the indicator concept (BLM, 2000) to predict grazing impacts from different grazing strategies (grazing intensity, time of use, and species of livestock) in annual grassland and oak woodland. Environmental, economic and social indicators could be added to make this decision support tool relevant in other regions and/ or across other ecotypes.

References

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