

LIVESTOCK INTERACTIONS WITH FISH AND THEIR ENVIRONMENTS

A SYMPOSIUM SUMMARY

William S. Platts
U.S. Department of Agriculture
Ogden, Utah 84401

Abstract.

This report assesses the influences livestock have on aquatic and riparian environments, provides recommendations for more compatibility between livestock grazing and fisheries, lists management objectives for protecting, restoring or enhancing fish and riparian habitats, and describes beneficial management practices. The importance of recognizing the riparian ecosystem as a separate management unit within the range system, as defined by the Forest Service, was emphasized.

INTRODUCTION

In May 1977, scientists from the western United States attended a symposium on "Livestock Interactions with Wildlife and Fish and their Environments" in Sparks, Nevada.

At the symposium, which was directed by Dr. John Menke, Range Professor, University of California (Berkeley), a team of scientists from the range and fishery professions worked solely on the effects of livestock grazing on fish and their environments. The team was comprised of seven scientists affiliated with the Forest Service, two with universities, two with the Bureau of Land Management, two with State Fish and Game Departments, one with the Federal Fish and Wildlife Service. Nine members of the team were management scientists, and five were research scientists. Each participant had a working knowledge of livestock-fishery interactions.

The team assessed the influences livestock have on aquatic and riparian environments. From this assessment, the team developed recommendations for buffering detrimental influences and pointed out beneficial management practices.

The following commentary summarizes the scientists' report submitted for publication in the symposium proceedings.

PROBLEM ASSESSMENT

Land management agencies responsible for managing livestock grazing have not adequately considered the influence of grazing on streams and their riparian zones (Platts and Rountree 1972; Platts 1976). Land managers fail to recognize riparian ecosystems

as separate systems in their management programs. This inadequacy occurs even though studies have demonstrated that practices that protect streambanks from damage also enhance the potential of riparian vegetation to support other resources (Gunderson 1968; Vannote, in press; Marcuson 1977; Duff, in press). Healthy, well-vegetated, stable riparian zones enhance fish production, protect pasture or rangeland from erosion, increase forage for livestock and wildlife, maintain water table levels, and create a more esthetic environment.

Since livestock are attracted to the riparian zone, overuse has resulted. The importance of the riparian zone is demonstrated in Utah where within 21 million acres of lands managed by the Bureau of Land Management only one-tenth of one percent is riparian. These limited riparian habitats are key factors in supporting associated resources.

A large contrast exists between the riparian and adjacent upland environments that warrants the use of different land management strategies. Even within riparian ecosystems, there are extreme vegetative and soil variations that also require different types of management direction. These options are not now being adequately considered by land managers.

Different types of grazing systems, intensity of forage utilization, timing of livestock grazing, and changes in class of grazing animals alter riparian and aquatic habitats as shown:

<u>System</u>	<u>Condition of resulting riparian-aquatic habitat</u>
1. Yearlong grazing	Poor
2. Season-long grazing	Poor
3. Deferred grazing	Poor to Fair
4. Rotation grazing	Poor to Fair
5. Deferred-rotation grazing	Poor to Fair
6. Rest-rotation grazing	Poor to variable*
7. Short duration, high intensity grazing	Variable*
8. No grazing	Good to excellent

*Resource damage, especially bank cutting, within heavy use units may not be repaired within the grazing cycle.

Yearlong grazing may be more detrimental to aquatic habitats than some rotation systems. The most productive riparian and aquatic habitats occur in the absence of livestock grazing.

STATE OF PRESENT KNOWLEDGE

Documented information partially describes the effects of livestock grazing on fish habitats in the western States. Supplementary undocumented data exist, but are not readily available. Both types of information need to be assimilated and used to improve management practices.

Information is lacking within certain geomorphic and aquatic habitat types throughout the West, particularly within the Great Basin. Thus, additional studies are needed to assist land managers in evaluating the effects of present grazing systems. Two areas of needed research are to evaluate the benefits of controlling the timing of forage use on riparian habitats, and to determine the ability of streambanks to withstand different timing of forage use and intensities of forage use without breaking down.

SOLUTIONS

Aquatic, riparian, and fish habitat needs must be integrated into each livestock grazing program on an allotment or pasture basis. Some goals for integrating these habitat needs into allotment plans are:

1. A sufficient streamside vegetative canopy should be maintained to prevent unacceptable water temperatures.
2. Streambanks should be well vegetated to hold soil in place and to keep trampling damage by livestock to a minimum.
3. Overhanging streamside vegetation (within 2 feet of stream surface) should be maintained to provide needed fish cover.

Range management objectives to consider for protecting, restoring, or enhancing fish and riparian habitats are:

1. Complete rest for degraded riparian areas from livestock grazing for the length of time required to meet the above goals.
2. Deferred late fall grazing on streamside areas when possible.
3. Recognition of the specific needs of the different ecological units occurring in ranges or pastures. For example, hillside lands differ greatly from riparian areas in grazing suitability and potential for grazing damage, and it is unrealistic to manage these two habitats as a single unit.
4. Better off-stream distribution of livestock in areas bordering riparian zones.
5. Vegetative cover in the streamside zone for fish is allocated at the same time forage is allocated for livestock grazing.

CONCLUSIONS

The team reached seven conclusions as to how livestock influence the productivity of the riparian and aquatic systems:

1. Improper livestock grazing has an adverse effect on fish populations and their habitats.
2. Land managers have frequently failed to use a proper inter-disciplinary approach in coordinating livestock grazing with riparian and fish needs.
3. Livestock grazing severely changes the composition and productivity of the riparian vegetation.
4. Livestock grazing has changed stream geomorphology by altering streambanks, increasing channel sedimentation, and changing channel dimensions.
5. Livestock grazing streamside areas increase sediment transport, nutrients, and water temperature.

6. Rest-rotation grazing, without special protective measures for the stream and streambanks, will not maintain nor restore a healthy, productive riparian-aquatic zone.
7. Present grazing management practices that degrade aquatic and riparian habitats fail to fully use the potential of the stream to produce a fishery resource as well as the potential of the adjoining riparian habitat to produce forage for livestock and wildlife.

RECOMMENDATIONS

The team made seven recommendations to be relayed to land and water managers for integration into their management programs:

1. Aquatic, riparian, and fish habitats should be identified as separate management units. The management requirements of these units should be part of any livestock grazing program using the interdisciplinary approach.
2. Aquatic, riparian, and fish environments now degraded by livestock grazing should be rehabilitated by either improving the present grazing system or by excluding livestock.
3. Rangeland managers should keep their knowledge of aquatic habitat management up to date for use in restoring and maintaining productive fish habitats.
4. Public, legislative, and agency support should provide the direction and commitments necessary for more intensive management of riparian-aquatic habitats.
5. Demonstration areas should be established in a variety of aquatic and riparian habitat types to demonstrate how fisheries respond to improved grazing practices under different range management strategies.
6. Many unpublished studies and case histories reported in the western States should be summarized and the findings integrated into research design and land use planning.
7. Public and legislative support should be obtained to fund range management studies. Support is also needed to assure that results of pertinent studies are used in range management programs.

SUMMARY

Public rangelands must be managed on a true multiple use basis that takes into account the biological suitability and potential of each ecological land zone. To properly manage riparian and aquatic ecological zones, land managers must understand the cause and effect relationship between overuse of the range by livestock and degradation of riparian and aquatic habitats. When grazing overuse occurs, habitat degradation follows. Management strategies recognizing all resource values are needed to restore and maintain productive riparian communities.

If grazing is the only stress, proper livestock management will result in stable streambanks and stream channels, reduction of soil erosion and consequently reduced stream sedimentation, improvement of streamside vegetative cover, improved water quality, and increased riparian forage and fish production. Improvement of streamside vegetation will also increase the abundance and diversity of terrestrial wildlife.

Proper livestock management will increase resource values and, in turn, economic benefits to all users. There may be a short-term loss of forage for livestock when overused and degraded riparian communities are put under proper management. However, increased forage production should result in more forage for livestock use because of better resource management.

A multiple use policy resulting in highest economic and social values on public lands will be implemented when advisory boards are balanced so that members truly represent multiple resources. This balanced, interdisciplinary approach must provide grazing strategies that will allow realistic and effective livestock grazing while maintaining the integrity of riparian and aquatic resources.

LITERATURE CITED

- Duff, D.A. Livestock grazing impacts on aquatic habitat in Big Creek, Utah. Proc. Symp. on Livestock Interactions with Wildlife, Fisheries, and Their Environments (Sparks, Nevada, May 1977). Pac. Southwest For. and Range Exp. Stn., Berkeley, Calif. In press.
- Gunderson, D.R. 1968. Flood plain use related to stream morphology and fish populations. *J. Wildl. Manage.* 32(3):507-514.
- Marcuson, P. 1977. The effect of cattle grazing on brown trout in Rock Creek, Montana. Job Progress Rep. F-20-R-21-II-a, 26 p. Mont. Fish & Game Dep., Helena, Mont.
- Platts, W.S. 1976. Stream channel, streamside environment and thermal conditions of Bear Valley Creek, Idaho. USDA For. Serv., Intermt. Reg., Boise Natl. For., Boise, Idaho, 93 p.
- Platts, W.S., and C. Rountree 1972. Bear Valley Creek, Idaho aquatic environment and fisheries study. USDA For. Serv., Intermt. Reg., Boise Natl. For., Boise, Idaho, 53 p.
- Vannote, R.L. 1976. The river continuum: a theoretical construct for analysis of river ecosystems. *Bio Science*, Stroud Water Research Center, Acad. Nat. Sci., Avondale, Pa.
- Vannote, R.L. Thermal gradients in natural streams and aquatic insect strategies. *Proc. Phil. Acad. Nat. Sci.*, Stroud Water Res. Cent. Acad. Nat. Sci., Avondale, Pa. In press.