

## RIPARIAN STREAM MANAGEMENT

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**Abstract:** Since the 1930's, under better range management, the condition of rangelands has steadily improved. Unfortunately, riparian-stream portions of the ranges have not improved as dramatically. Many authors have demonstrated that improperly managed grazing animals have the ability to damage riparian-stream habitats. Other authors, however, have demonstrated that livestock grazing under well managed strategies can utilize riparian forage compatibly with riparian-stream environments. Grazing practices and strategies that hold promise in properly managing riparian-stream ecosystems include use of a riparian pasture, fencing streamside corridors, controlling class of livestock, using specialized grazing strategies such as rest-rotation and double rest-rotation, and winter grazing. There are grazing practices available that are compatible with riparian-stream ecosystems. These practices are likely to become more important to provide riparian systems capable of withstanding high runoff events.

Upon settling this great nation, European man soon recognized the potential of using the vast rangelands for livestock production. Cattle were initially stocked in the early 1500's with sheep arriving later. Animal numbers, however, did not peak until four centuries later. By the 1930's, livestock grazing was so heavy that many of these lands and the streams draining them were in poor condition. Since livestock are attracted to riparian areas adjacent to streams and lakes, that portion of the range was heavily used.

As the land management agencies and private range owners implemented improved grazing practices after the 1930's, rangelands began to improve. Busby (1979) states that rangeland conditions today are far better than the denuded, deteriorated ranges that existed in the early 1900's. I agree that rangelands have improved greatly, but contend, however, that studies leading to the interpretation of the improvement were based primarily on data collected from drier upland sites, and often did not take into account the condition of riparian areas (Platts 1979). Riparian areas may have recovered to some degree since the 1930's, but not nearly to the extent of other rangeland types. The reason for this is that we were not concentrating on managing riparian habitats -- we were managing conditions on a large scale.

Riparian habitats are productive and quite resilient. Even degraded habitats, under good management, can soon recover and contribute valuable multiple rangeland resources to the nation. The possibility exists to manage the nation's rangelands to increase fish populations by one order of magnitude during the next several decades. This article briefly, and in a generalized

fashion, describes the past and present situation in riparian-stream management and offers some suggestions of methods to move toward better riparian management.

#### SITUATION

It is clear from the literature that improper livestock grazing can affect the riparian-stream habitat by eliminating riparian vegetation, widening stream channels, causing channel aggradation through increased sediment transport, changing streambank morphology, and lowering surrounding water tables.

Many authors have demonstrated that improperly managed grazing animals have the ability to alter riparian-stream habitats. A literature review by Gifford and Hawkins (1976) showed that no grazing system consistently or significantly increased plant and litter cover on watersheds. In an intensive review of this literature, Meehan and Platts (1978) and Platts (1981a) were unable to identify any widely used livestock grazing strategies that were completely capable of maintaining high levels of forage use while rehabilitating damaged streams and riparian zones. As this report will demonstrate, headway has been made in identifying compatible grazing strategies.

Appraisals by the Bureau of Land Management (BLM) and Forest Service show that riparian lands are still in need of improved management. The BLM estimated that of their 536,825 acres of riparian habitat 447,473 acres (83%) were in unsatisfactory condition (Almand and Krohn 1978). Similarly, land use activities on the 2,300,031 acres of riparian wetlands on National Forest lands are exerting impacts that require prompt attention (Owen 1979).

It is estimated that all land uses have eliminated 70% to 90% of all natural riparian ecosystems in the United States (CEQ 1978). We are fortunate that on rangelands a much higher proportion of the riparian habitats still exist.

The high precipitation years of 1983 and 1984 resulted in flooding and high stream flows causing dramatic changes in many riparian-stream habitats in the Intermountain west (Platts et al. 1985). These authors showed that three basin-range streams in improperly managed watersheds were degraded by these storms, but in those reaches where streamside vegetation was in good condition, flood impacts were minimal. Floods are part of the reason that many of the West's riparian-stream habitats are in their present condition, but probably more important are the small annual degrading effects which accumulate over time (Platts et al. 1985). A century of these small additive effects has resulted in major impacts on certain riparian-stream habitats. The nation's riparian habitats are in dire need of better management (Behnke 1977). To initiate the needed rehabilitation, methods of better management must be constantly sought.

#### IMPROVED METHODS

The stream and its watershed function as a unit. Therefore, management must be applied on a basin approach. In addition, riparian habitats are much different from their adjacent drier sites and require site-specific types of management. Each grazing system, species of livestock, and type of land needs to be considered together. My research has begun to develop methods which are discussed here, but research must not stop here; it must move forward in developing better and more economical solutions to problems.

#### Riparian Pasture

One strategy we have tested that has excellent potential for bringing most allotments into successful management is the riparian pasture concept (Platts and Nelson 1985a). The riparian pasture is a smaller pasture within the allotment that encompasses the concerned riparian-stream area and will be managed independently to achieve the desired habitat responses. This pasture can also include sufficient surrounding uplands to obtain a proper balance of riparian and upland forage. Advantages of the riparian pasture include better control over animal distribution, grazing intensity, and timing, as well as increased vegetation production, which in

turn allows more management options for its use. Fencing the riparian pasture is expensive, and based on today's economy, is appropriate only when valuable resources such as salmon and steelhead trout spawning and rearing areas need improved habitat management.

#### Stream Corridor Fencing

Platts and Rinne (1985), in an extensive literature review, showed that riparian habitats benefited greatly after being fenced to eliminate heavy livestock grazing. My studies have documented rehabilitation results on Tabor Creek, Nevada, Big Creek, Utah, and Horton Creek, Idaho (Platts et al. 1983). In many areas, however, it is not economically feasible to fence every streamside corridor (Platts and Wagstaff 1984). Therefore, other strategies that regulate animal distribution and forage use must be developed.

#### Specialized Grazing Strategies

The goals of a specialized grazing strategy (one that is more sophisticated than continuous grazing) are to maintain or improve livestock performance while improving or maintaining rangeland conditions by controlling the numbers, type, and distribution of livestock. Proper grazing of riparian vegetation requires controlled animal distribution. Conventional allotment management strategies, tailored to extensive areas, may not achieve acceptable animal distribution in the highly preferred riparian zones. Platts and Nelson (1985b) found that in 23 of 25 cases on study areas in Idaho, Utah, and Nevada, streamside vegetation use by cattle was twice as heavy as overall pasture use.

These studies showed that on conventionally managed allotments using rotation, rest-rotation, deferred, and season-long continuous cattle grazing strategies, cattle continued to graze riparian range types more heavily than the uplands.

Season-Long Continuous -- Under season-long continuous grazing, livestock concentrate in riparian areas most of the year. Roath and Krueger (1982) reported that although the riparian zone constituted only 1.9% of the area on one allotment in Oregon's Blue Mountains, it produced 81% of the vegetation removed by cattle. Eckert (1975) found on an allotment in northern Nevada that livestock obtained up to 88% of their diet on the wet meadow range site that occupied less than 1% of the allotment. Based on our studies that were

In allotments using season-long continuous grazing (four study sites), it appears that this grazing strategy, under presently used intensities (60% to 95% of the riparian vegetation), has little chance of success for improving riparian vegetation and fish habitats.

Winter Grazing -- Based on my Otter Creek, UT, study results I believe that winter grazing does little damage to riparian areas where winters are cold, but snow fall is light (Platts and Nelson 1984). I could find few detrimental streamside effects and believe that the reasons were because streambanks were usually frozen and vegetation was dormant. In the few areas where winter use is feasible it can be continued but should not be a major factor in the overall riparian management problem in the West.

Rest-Rotation -- Any grazing strategy that allows a period of rest for a riparian-stream habitat to rejuvenate has potential benefits. Success lies in applying the amount of rest needed to match the stream's capability to repair past damage and also to maintain a vigorous riparian habitat. I could find no adverse riparian-stream impacts from a well-managed, double-rest-rotation grazing strategy on our study site on Johnson Creek, Idaho. Rest-rotation grazing by sheep can be very successful (Platts 1981b).

#### Species of Livestock

Different species of livestock graze watersheds in different ways. Herded sheep usually use slopes and upland areas, while unherded cattle prefer the lesser slopes or bottomlands. Our two Frenchman Creek, Idaho, study sites are in an allotment programmed for sheep grazing using a three-pasture, rest-rotation strategy since 1967 (Platts 1984). After eight years of study I found no significant changes in trends of any of the environmental factors measured. The stream and its riparian zone remained in a healthy condition and no significant changes were observed between the grazed and ungrazed pastures. Good management (proper herding, intensity, and timing) is undoubtedly the reason for the maintenance of the high-quality stream habitat. Herding allowed light forage use in streamside zones mainly after stream banks had dried out. This strategy could be useful throughout the Cascade, Rocky, and Sierra Nevada Mountains.

#### Riparian Rehabilitation

The restoration and rehabilitation of degraded riparian areas should receive the

highest priority for future research. We have demonstrated at Big Creek, Utah, that riparian areas can be artificially rehabilitated, though better techniques need to be developed (Platts and Nelson 1985c). Conversely, in other areas (Chimney Creek, Nevada, and Bear Valley Creek, Idaho) we have had little success with artificial rehabilitation. Research leading to successful rehabilitation of riparian-stream environments is in its infancy.

#### SUMMARY

Much of the water that falls on a watershed eventually must pass through the riparian area to reach the stream. Therefore, as the nation's riparian habitats go, so go the nation's streams. These riparian-stream habitats must be managed as separate entities, but always within a watershed perspective. In riparian management, it is time to stop looking at a small enclosure or a stream reach. Successful riparian management requires a basin or watershed approach. We agree with Behnke (1977), who has stated that rehabilitating riparian habitats is the most efficient way to increase salmonids in the Western United States.

We also need to look far into the future. Our streams, especially in the west, were not ready for the major storm events received in 1983 and 1984 (Platts et al. 1985). Because many riparian habitats were in poor shape going into this period, the additional degradation could add many years to their recovery. Some of the latest research indicates that even more drastic climatic changes may come in the future. Thus, future large storm events could put our streams under even more stress than they received during the 1983-84 storms. Healthy, well-managed riparian habitats are extremely resilient (Platts and Nelson 1985b) and offer excellent opportunities for maintenance of good habitats as well as restoration and rehabilitation of degraded habitats. Livestock grazing under well-managed strategies can utilize riparian forage in compatibility with riparian-stream environments. We need to further develop and understand these compatible strategies and move toward their acceptance in rangeland management.

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