RESTORING AND MAINTAINING RIPARIAN HABITAT ON PRIVATE PASTURELAND[1]

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Abstract: Protecting riparian habitat from livestock grazing on private land is a complex task that requires paying attention to sociological and economic as well as physical and biological factors. Six livestock exclusion fencing projects on private property in northwestern California are described. The importance of long term maintenance and the need for landowner incentives are discussed. Significant gains may be made via a statewide, coordinated effort to encourage the protection of riparian habitat on private property.

A muddy stream devoid of riparian vegetation and trampled by livestock is a raw wound, in the eyes of those knowledgeable of stream and stream-side ecosystems. The wound can be healed if fences are constructed to exclude livestock from the riparian corridor. The cessation of grazing allows existing or new vegetation to grow. Although there may be several physical and social challenges to creating a fenced riparian corridor on private property (Reichard 1984), once these are overcome, the benefits may be observable within months, due to the resilient nature of some riparian plant species.

The Natural Resources Services division of Redwood Community Action Agency (RCAA) constructed six livestock exclusion fencing projects on private property between 1982-1986. The long term success of these projects depends almost entirely conmaintaining an intact fence – simple inconcept but complex in practice.

This paper summarizes RCAA projects and recommends measures for improving riparian habitat protection.

The North Coast Setting

Because of topography and land use patterns, streams which flow through pastures in Humboldt and Del Norte Counties are almost entirely coastal. In this paper, "pasture" refers to a fenced plot of relatively level land used for grazing livestock, usually relatively intensive due to the limited size of the plot. Most pastureland in this region is used by dairy and beef cattle operations. Residential area streams may be impacted by numerous small pastures used for the "family" horses or cows.

Several dozen coastal streams in Humboldt and Del Norte Counties have reaches that lack riparian vegetation, due at least in part to livestock impact (Streamfellow and Reichard 1983). Many other stream reaches are bordered only by a residual canopy of vegetation. We have observed, as has Shanfield (1984) and others, that riparian stands to which livestock have free access usually lack understory vegetation.

Little work has been done to describe the ecology of North Coast riparian systems. In his thesis work on habitat relationships among riparian forest birds in the Eel River Delta, Kelly (1987) provides one of the only detailed analyses. Undisturbed, mature, North Coast riparian vegetation typically is comprised of a dense, diverse understory of herbaceous and woody plants. A canopy of deciduous and/or coniferous trees may include Sitka spruce *(Picea sitchensis)*, redwood *(Sequoia sempervirens)*, black cottonwood *(Populus trichocarpa)*, red alder *(Alnus rubra)*, bigleaf maple *(Acer macrophyllum)*, and willows *(Salix* spp.) Younger stands have less species diversity. Willows are typical pioneers in disturbed areas. (Kelly 1987, Ray and others 1984, Roberts 1984).

Projects Implemented by RCAA

The livestock exclusion fencing projects undertaken by RCAA have enclosed a total of approximately 37 hectares of habitat, along six different streams (fig. 1). Approximately 10 hectares are riparian and 5 are instream. The projects were funded by either the State Coastal Conservancy (SCC) or the Department of Fish and Game (DFG). Landowners and the California Conservation Corps (CCC) provided substantial in-kind contributions to several of the projects. At all of the project sites, most of the original riparian vegetation had been cleared at least a generation before the present landowners took charge. Some project characteristics are presented in table 1. Figures 2-5 depict typical pre- and post- project conditions and will be referred to later.

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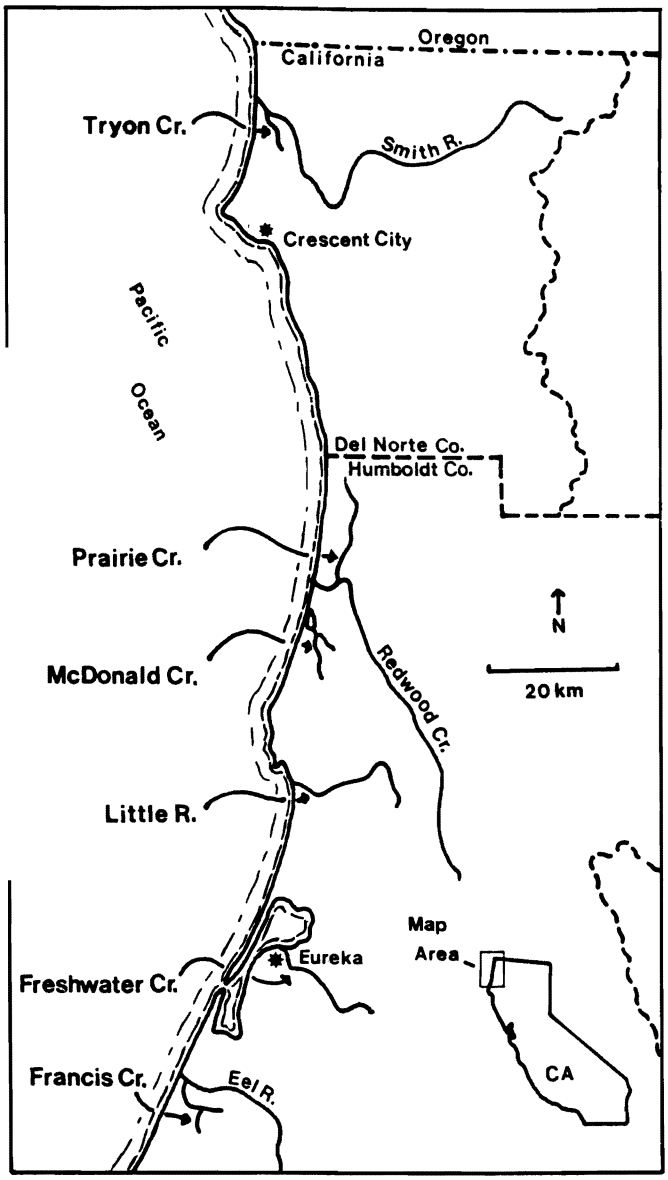

Figure 1– Location of RCAA livestock exclusion fencing projects.

All fences were constructed with split redwood posts and five strands of barbed wire. Vegetation was planted at all sites. Willow cuttings from on-site, red alder, and sitka spruce were planted predominantly, along with big leaf maple and redwood. The tree seedlings were obtained from commercial nurseries in northern California and southern Oregon.

Project sites are monitored informally by RCAA staff, except at McDonald Creek, where a monitoring project is under way as a part of the SCC contract. Observations at McDonald Creek are being made annually for a 5-year period, including stream channel cross sections, vegetation transects, and photographic documentation. Baseline data collected at project sites included stream reach maps of McDonald and Freshwater Creeks, and a year-long avian census on Tryon Creek.

Five of the projects have to date resulted in the exclusion of livestock from the fenced riparian corridor, and in the subsequent establishment and growth of significant numbers of native woody plants. Livestock have not yet been completely excluded from the Little River site.

Maintaining these projects is addressed in agreements that RCAA has executed with each of the landowners. Both SCC and DFG require that a license agreement between the landowner and the contractor (RCAA) be recorded on the landowner's property deed. In the agreement, fencing and planted vegetation are defined as "improvements." The landowner agrees to maintain the improvements and not to allow their alteration, for a period of 20 years for an SCC-funded project and 10 years for a DFG project. The agreements are recorded so that they will be effective even if the property changes ownership.

In practice, maintaining most of RCAA's projects has been a collaborative effort. The CCC has provided invaluable assistance with maintenance and improvements at the Tryon, Prairie, and McDonald Creek sites. A commercial fishing group has helped to maintain the Little River project. The landowners have played a minor to major role in project maintenance. Their attention to maintenance is proportional to their level of vested interest in the project, and can also vary, dependent on whether or not the landowner lives on the property, leases it, or has a caretaker.

Of all of RCAA's projects, Tryon Creek has the most supportive landowner. As a fish and wildlife enthusiast and a third-generation cattle rancher, the landowner had for several years wanted to reestablish vegetation along the stream. Financial support from the SCC made the project possible. Substantial instream habitat improvements were also made as a part of this project.

The Prairie Creek landowner was primarily interested in a project because he was losing pasture to streambank erosion. If he had been able to finance bank stabilization on his own, he probably would have used traditional, non-vegetative measures. He had, in fact, started to install some car bodies along the bank several years ago, but was halted by DFG.

He was willing to convert several acres of pasture into a protected riparian corridor in return for our publicly-funded services used to apply various bio-technical stabilization measures to his banks (figs. 2 & 3). Unlike many landowners RCAA has talked with, he recognized the role that vegetation can play in maintaining streambank stability. As a secondary benefit, he knew that streamside fencing would trap flood-borne woody debris, which he previously had to clear from his pastures after each flood.

Table 1– RCAA livestock exclusion fencing projects.

Stream name	Tryon	Prairie	McDonald	Little R.	Freshwater	Francis
Date completed	1986	1985	1983	1984	1986	1983
Funding source	SCC	SCC	SCC	SCC	DFG	SCC
Management[1]	Resident	Resident	Mgr.	Non Res	Mang'r	Resident
Fence length (m)[2]	4,100	2,650	2,440	79	610	335
Set-back(m)[3]	12	3	11	1	8	12
Hectares enclosed:[4]						
Riparian	4.8	0.8	2.8	0.	0.4	0.4
Active channel	1.2	2.4	0.8	[5]n/a	0.4	0.2
Total	6.0	3.2	3.6	0.	0.8	0.6
Water accesses[6]	1	2	3		1	1
Bank stabilization[7]	no	yes	yes	no	yes	no

[1]Property managed by, in order: resident landowner, res. manager, non res. landowner.
[2]Includes fence on both sides of stream, where applicable.
[3]Average, from edge of active channel.
[4]All acreages are approximations.
[5]Only one side of the channel was fenced. Stock have access to the stream from the other side.
[6]Barriers that allow access to or across the stream but not into the fenced corridor.
[7]Streambank stabilization measures applied as part of project.

Figure 2– Bank stabilization along Prairie Creek. Willow logs and hog wire were staked to what was a bare, eroding streambank. January 1984.

Both of these projects allowed the landowners and public-interest groups to work together to solve resource management problems and to learn from each other. Symbolic of these opportunities is the day at the Prairie Creek dairy ranch that a CCC crew of primarily urban kids from southern California, RCAA staff and the landowner planted several thousand trees, saw steelhead spawning, and watched a calf being born in the barn.

The McDonald Creek property was being managed for both agricultural and recreational uses. Establishing trees along the stream and improving fish habitat makes the area more attractive to visitors, which was an acceptable trade for the loss of pasture (figs. 4 & 5).

The initial project that RCAA implemented included fencing and planting only. Subsequently, we determined that streambank erosion was going to take out some of the fencing and vegetation before natural healing processes could take place within the corridor. Additional SCC funds and CCC labor enabled us to apply rock riprap and additional vegetation, which has effectively controlled most of the erosion.

Figure 3– Same site as in figure 2, June 1984. Note livestock exclusion fencing installed along top of streambank. As of 1988, willows and alders at this site were six to eight feet tall.

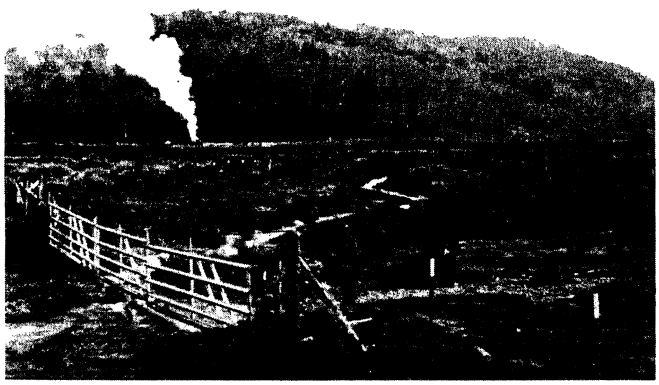

Figure 4– McDonald Creek, December 1982, just after fencing installed. View is looking up the perennial north fork, mainstem entering from right. Metal gates in the foreground are suspended from a cable, allowing water and flood-borne debris to pass under them, while preventing livestock from entering the protected corridor.

Figure 5– McDonald Creek, same site as in figure 4, September, 1987. Planted and volunteer red alder is the predominant vegetation.

The barbed wire fence constructed along the right bank of Little River does not prevent livestock from crossing the channel from another landowner's property on the left side during low water. Fortunately, because livestock are not always present on the left side and due to steep banks and pools in some areas, stock have not had a complete or continuous impact on the vegetation within the fenced corridor. Some of the planted red alders and Sitka spruce are thriving. The project was acceptable to the landowner primarily because the exclosed area is not high-quality pasture.

A proposal to fence the left bank, although acceptable to the (different) landowner, was met with resistance from the pasture lessee. A barbed wire fence was not acceptable because of the potential for injury to a spirited horse. A pump was not acceptable as an alternative source of drinking water for livestock because it would not be as reliable a water source as the river.

An electric fence powered by a solar charger was installed, but did not stand up to woody debris carried into it by streamflow, and dropped on top of it by beavers and overhanging trees. Several shorts were caused by growing vegetation which came into contact with the fence wires. The fence was removed when it became clear that with a sympathetic but absentee landowner, an unsympathetic lessee, and a need for frequent maintenance, it was not going to be effective.

As a partial substitute, we designed five "willow pods" – oval exclosures averaging 3 meters wide by 12 meters long. The exclosure fence was made with smooth wire and with live willow branches for fence posts. Willow cuttings were planted within the pods. After two years of growth, substantial die-off occurred, possibly due to an inadequate freshwater table and/or to contact with saline water (the site is along the upper part of the Little River estuary.) Cows were able to reach through the smooth wires to browse about two feet within the pods. This reduced the area of effectively protected vegetation noticeably in these relatively small nexclosures. Two pods are still functioning and growing.

A commercial fishing organization which operates salmon rearing and habitat restoration projects in the upper watershed planted big leaf maples along the right bank and is planning to construct a strong fence along the left bank in 1988. It is also maintaining contact with the landowner, to encourage the ultimate dedication or sale of the property for conservation purposes, so that livestock exclusion in this challenging location may ultimately be unnecessary (Farro 1988).

The Freshwater Creek landowner was willing to "contribute" pasture for the sake of aiding fisheries restoration. It was probably significant that the property was not a primary source of his income. The Francis Creek landowner agreed to a fencing project as part of a package that included streambank stabilization at an adjacent site.

The Challenges

The physical and biological challenges to restore riparian habitat on private pastureland are minor compared to a broader socioeconomic challenge: securing the stewardship of natural resources on private property when there is no legal or other institutional mechanism for restoring and protecting these resources. In California, the impact of livestock to riparian habitat on private land is virtually unregulated (Sommarstrom 1983). Unless that situation changes, protecting the habitat cannot occur without the voluntary cooperation of the landowners.

The total area of privately owned riparian habitat that is impacted by livestock may not be very large; however, along a given stream the damage may be significant. The great number of people involved is both a problem and an opportunity. Landowners with impacted streams can be directly responsible for restoring and protecting the natural resources on their land. Better strategies for encouraging that responsibility need to be developed.

Like other resource conservation measures on private land, there has to be incentive and means to implement, and the means and the will to maintain the improvements. Landowners may or may not perceive benefits to be obtained from an exclusionary fencing project. Besides those previously mentioned, benefits of cross-fencing and reduced livestock drowning hazard may be provided.

Livestock exclusion fencing will always cost the landowner, in reduced pasture acreage. A subsequent cost will be the maintenance of the fence. RCAA has negotiated for fencing projects with at least 12 landowners, all of whom sooner or later decided that the costs outweighed the benefits. In a few instances, persistance has paid off, particularly as landowners become more interested in playing a positive role in the salmon and steelhead trout restoration "movement."

Constructing a fence is only the first phase of protecting the streamside corridor. A fence must be inspected regularly and repaired promptly when damaged. Damage from hungry cows in the corridor for just one day can be substantial. (Cross-fencing within the corridor can limit such damage to the segment with the hole in the fence.) Platts (1984a) presents average costs of $60-$200 per mile per year for fence maintenance.

Using alternative grazing systems to provide riparian habitat protection in lieu of fencing (Platts 1984b) may have applications in some pastureland situations. Implementing and maintaining an alternative system on private property may be at least as challenging as a fencing project.

Recommendations

Protecting riparian habitat on private pastureland presents unique opportunities and challenges. A statewide, coordinated effort to identify and promote means to restore and maintain this habitat could be very effective, especially if it included landowner representatives.

Inventorying pastureland riparian habitat, identifying the potential for restoration, and assessing the costs and benefits of doing so, would help determine just how aggressively this component of riparian habitat restoration should be pursued and what the priorities should be.

Because of the nature of the problem, negative incentives – i.e. regulations – may not be very effective or manageable. As Sommarstrom (1984) put it, mandating fencing might be like trying to legislate morality. On the other hand, there is room for progress in developing and using positive incentives, ranging from education to tax benefits.

A compendium of information regarding conservation easements and tax considerations related to livestock exclusion would be useful for both landowners and promoters. Educational campaigns through agricultural, equestrian, and other organizations could make "riparian habitat" a household concept among riparian landowners.

Conclusions

Management of riparian habitat on private pastureland is a broadly interdisciplinary topic. Its complexity is both a blessing and a curse – solutions to the problems of protection are not simple, but they hold the promise of improved public/private cooperation. This area of riparian habitat management warrants special and focused consideration by those interested in seeing that the habitat is restored and protected.

References

Farro, Mitch. Little River Project Manager, Pacific Coast Federation of Fishermen's Association/Trinidad Fishermen's Marketing Association, Trinidad. Personal communication. 16 June 1988.

Kelly, John P. 1987. Habitat relationships among riparian forest birds in the Eel River delta, California. Arcata: Humboldt State University; 134 p. master's thesis.

Platts, William S.; and Wagstaff, Fred J. 1984. Fencing to control livestock grazing on riparian habitats along streams: is it a viable alternative? North American Journal of Fisheries Management 4:266-272.

Platts, William S. 1984. Riparian System/Livestock Grazing interaction research in the intermountian west. In: Warner, Richard E., and Hendrix, Kathleen M., editors. California Riparian Systems. Berkeley: University of California Press. 424-429.

Ray, Dan; Woodroof, Wayne; and Roberts, R. Chad. 1984. Management of riparian vegetation in the northcoast region of California's coastal zone. In: Warner, Richard E., and Hendrix, Kathleen M., editors. California Riparian Systems. Berkeley: University of California Press. 660-672.

Reichard, Nancy. 1984. Riparian Habitat Restoration: Some techniques for dealing with landowners, livestock, and eroding streambanks. In: Hassler, Thomas J., editor. Proceedings: Pacific Northwest Stream Habitat Management Workshop; 1984 October 10-12; Arcata, CA. Available from: Calif. Cooperative Fisheries Unit, Arcata, CA. 128-137.

Roberts, R. Chad 1984. The transitional nature of northwestern california riparian systems. In: Warner, Richard E., and Hendrix, Kathleen M., editors. California Riparian Systems. Berkeley: University of California Press. 85-91.

Shanfield, Allan N. 1984. Alder, cottonwood, and sycamore distribution and regeneration along the Nacimiento River, California. In: Warner, Richard E., and Hendrix, Kathleen M., editors. California Riparian Systems. Berkeley: University of California Press. 196-209.

Sommarstrom, Sari. 1984. Riparian regulations: random, redundant, or rational? In: Warner, Richard E., and Hendrix, Kathleen M., editors. California Riparian Systems. Berkeley: University of California Press. 275-280.

Streamfellow, Dwight; and Nancy Reichard. 1983. Humboldt-Del Norte coastal streams restoration project, final report, prepared for the California State Coastal Conservancy. Redwood Community Action Agency, Eureka, California. 30 p.