Restoring Idaho's Henry's Fork: A Case Study

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Abstract

The Henry's Fork of the Snake River in southeastern Idaho is historically one of Idaho's premier trout fisheries. Past land management imperiled the resource. A novel cooperative effort between The Nature Conservancy, private landowners, state and federal agencies, volunteer groups, and the University of Idaho is working to restore the riparian zone and quality of the river.

Keywords

restoration, trout, grazing, fishery, willow, water rights

Introduction

The Henry's Fork River begins in Idaho, just west of Yellowstone National Park. Historically, the Henry's Lake wetlands gave rise to the river that meandered through lush wetlands, meadows, and dense willow thickets, supporting a tremendous cutthroat trout fishery. During the 1930's and 1940's, the Henry's Fork was one of the most famous, popular, and exclusive trout streams in the western United States. With settlement of the Snake River Plain in southern Idaho and subsequent agricultural development, the first of two dams was built in 1920 on the Henry's Fork for irrigation storage. The dam prevented flow from the vast, shallow Henry's Lake and turned it into a 90,000- acre feet reservoir. Water was stored behind the dam during winter and spring, ensuring water for the irrigation season. In drought years, the Henry's Fork often went dry below the dam, resulting in fish mortality. Other signs of river degradation, caused by former and current land practices, included altered and fluctuating water flow, severely eroded streambanks, poor water quality, channel down-cutting, loss of riparian vegetation, sedimentation of spawning gravels, and lack of quality habitat. Nearly 90% of once prolific cutthroat trout habitat no longer supported fish. In addition, encroachment by subdivision and development on

large tracts of land further threatened habitat.

Taking Initiative

In spring 1994, The Nature Conservancy purchased the 1,450-acre Lower Flying R Ranch, located on the headwaters of the Henry's Fork, for $1.35 million. Renamed the Flat Ranch because of the topography, this parcel was key to initiating change for several reasons. First, the ranch, and over four miles of river and another four miles of spring-fed tributaries, were threatened by development. Second, The Conservancy could establish themselves as neighbors, legitimizing their role in working to resolve local issues, especially low winter stream flows. Third, continuing to operate a cattle ranch would increase credibility and trust among the ranching community and allow development of effective, sustainable, and demonstrative grazing practices. Fourth, acquisition would allow the Conservancy to rehabilitate habitat, provide public access, work with neighbors on common restoration activities, and launch a watershed-level conservation effort in the basin.

Using the Flat Ranch as keystone, the Conservancy initiated cooperation among neighboring ranches, private landowners, as well as the Idaho Department of Fish and Game, Natural Resource Conservation Service, the Henry's Lake Foundation, the Henry's Fork Foundation, the Island Park Sportsmen, U.S. Fish and Wildlife Service, North Fork Reservoir Company, Bureau of Reclamation (BOR), Bureau of Land Management, Trout Unlimited, and the University of Idaho. Major sources of financing included private contributions, corporate donations, and grants from foundations.

More Water – Better Water

Simply stated, the Conservancy's goal was to maintain and enhance the water-based ecosystem of the watershed. To meet the goal, the restoration program is structured by an adaptive management process that identifies the resource problems and limiting factors, designs and implements practical recovery applications, and monitors results of those applications. Three critical elements provided the foundation to this goal: natural hydrological function, proper land use management, and healthy riparian and wetland areas. To meet the goal, two things became obvious – more water was needed in Henry's Fork during winter to maintain a viable river ecosystem (natural hydrological function), and the quality of that increased water flow also needed to be improved and protected (proper land use management and healthy riparian and wetland areas).

More Water

Historically, the Henry's Fork had an average, minimum winter flow of about 45 cubic feet per second (cfs). After construction of Henry's Lake Dam, flows as low as 5 cfs occurred during drought years, but a minimum of 10-20 cfs is necessary to sustain a viable river ecosystem. Searching for a solution, Conservancy staff began meeting with neighbors, members of the North Fork Reservoir Company, and BOR. The crux of the problem was ensuring adequate water for irrigation and adequate water to meet minimum flow required for a healthy river. Through discussion, a compromise was found: BOR had purchased water storage rights on the Snake River and allocated this water for salmon recovery – BOR agreed to "move" 2,200 acre feet of this water into Henry's Fork for winter release. Farmers along the Snake River were still assured water, the North Fork Reservoir Company received water bank credit from water discharged during winter and subsequently not available for irrigation, and minimum winter stream flows again flowed in the Henry's Fork. The Conservancy is working to augment those flows by purchasing additional water rights in the watershed.

Better Water

Securing minimum winter flows through the upper Henry's Fork was critical to re-establishing a healthy river and sustaining a resident fishery. However, increased flows are of little benefit without maximizing quality habitat and improving the quality of that water. The Conservancy identified five elements necessary to improving water quality: livestock management, hydrologic function, riparian condition, upland condition, and monitoring. Because the five elements are interrelated, we will discuss improving water quality in two broad categories: grazing management and other rehabilitation efforts.

Grazing Program

As on all ranches in the Henry's Fork Basin, cattle historically grazed Flat Ranch. When managed poorly, livestock can have a large and often detrimental impact on riparian zones, as was the case with Flat Ranch. The Conservancy believes grazing is a legitimate and important land use for the local economy and community, and grazing can be economically viable when managed in an environmentally sensitive manner. To assure a successful marriage of grazing and environment, the Conservancy's grazing management plan had five goals: 1) protect stream banks by rotating pasture use; 2) restore and maintain riparian/wetland pastures with full diversity of native plants; 3) generate grazing revenue to pay for annual management, maintenance, and program monitoring; 4) promote successful waterfowl/shorebird nesting during early summer; and 5) make pasture rotation compatible with other restoration activities.

Rather than develop new grazing systems, the Conservancy customized existing systems to meet their goals and site-specific objectives. Most of the Conservancy's experience in grazing management involves cattle in a contractual lessor/lessee format, which is the case on Flat Ranch. To be successful, it is necessary for the lease to meet the Conservancy's and lessee's objectives at a price fair to both. The Flat Ranch adapted a holistic short-duration intensive grazing program that divided the ranch into 12 pastures. All cattle, 450 to 500 cow/calf pairs, are in a single pasture at one time (relatively high density), but can be moved on and off pastures on short notice. Short-duration intensive grazing gives land managers a high degree of control over cattle and subsequent impacts on the landscape. When forage utilization targets are reached (6-inch stubble height for riparian pastures and 3-inch stubble height for meadow pastures), animals are moved to the next pasture in the rotation. Cows become conditioned to this rotation (a "grass is always greener" mentality) and can be moved with minimum effort. Through cooperation with the lessee and intensive management, the Conservancy can integrate the grazing program with conservation efforts that help protect sensitive habitats and the wildlife that depends on that habitat.

Other Rehabilitation Efforts

Once the Flat Ranch implemented a holistic resource management plan, other rehabilitation efforts could be initiated. Of particular interest was improving the physical elements that support a healthy and sustainable aquatic system (i.e., sediment trapping, bank-building and maintenance, water storage, flow energy dissipation, and primary biotic production).

These physical elements were meshed with vegetation aspects and six primary goals were set: 1) improve riparian and wetland vegetation density; 2) restore and enhance wetlands by raising the water table; 3) stabilize and restore eroding streambanks and pasture gullies with bioengineering and revegetation; 4) encourage beaver activity; 5) work with neighbors to improve riparian habitat through fencing, revegetation, and conservation practices; 6) monitor and evaluate the first five goals.

Willow Establishment

Three years of intensive grazing management and construction of 16 miles of riparian exclusion fences allowed riparian and wetland vegetation to rebound dramatically. Unfortunately, tall woody vegetation, necessary to provide shade to keep water temperatures favorable for fish, were lacking on several reaches of the river and its tributaries. Patches of existing willows were augmented by planting non-rooted and rooted cuttings. Cuttings taken from on-site native willows (*Salix geyeriana* Anderss. and *S. boothii* Dorn) were sent to the University of Idaho (UI) for propagation into rooted cuttings for outplanting. Prior heavy grazing resulted in plants with little annual shoot growth—most stems were old and woody. When introduced into the UI nursery system, cuttings from browsed willows rooted poorly (≈50%). Subsequent low yields increased nursery production costs and threatened the Conservancy's replanting schedule. About 150 rooted cuttings from the first nursery crop were used to start a stooling bed. The following year, half of the stooling bed yielded more than 6,000 cuttings. Cuttings rooted at a 99%+ rate, thereby lowering nursery production costs and allowing the Conservancy to have excess planting material available for other sites in the basin—essentially accelerating the revegetation schedule. To date,

over 8,000 rooted cuttings have been planted on Flat Ranch and in the Henry's Fork Basin.

Monitoring Willow Survival and Growth

We established monitoring programs to assess the success of restoration and revegetation efforts. The Conservancy's *Flat Ranch Revegetation Monitoring Program and Upper Henry's Fork Riparian Habitat Assessment Survey* were implemented to track success of planted rooted cuttings of willow and establish a mapping program to monitor and record changes in the stream channel and associated riparian habitat (see Acknowlegdements). Monitoring and evaluating land use applications on Flat Ranch provides critical information useful in maintaining conditions that sustain biodiversity and support healthy fish and wildlife habitat. Conclusions from these evaluations are used for management and planning purposes, and in particular, for determining management actions and establishing new or revised management objectives.

In fall 1995, volunteers and Conservancy staff planted several hundred rooted cuttings of willow along the Upper Henry's Fork and its associated riparian corridor. Four representative plots were located and surveyed during summer 1996 to evaluate success of the plantings. Plots were permanently marked and GPS (global positioning system) coordinates recorded and survival was determined. Survival of UI-produced willows planted in 1995 exceeds 90%.

Mechanical Stream Modifications

Sediment traps and basins were constructed on inside banks of meander bends to induce sediment deposition, encourage bank building, and improve sinuosity. Eroding stream-banks and pasture gullies were stabilized with bio-logs, buried willow bundles, bank-sloping, and/or a combination of all these techniques. The effects are dramatic (Figure 1). Woody debris was added to improve fisheries potential. The Conservancy encourages nature's bio-engineer as well; the beaver is quickly reclaiming positions on tributaries of the Henry's Fork, resulting in water being rerouted down historic meander channels.

Landowner Assistance

One novel aspect of this project has been the Conservancy's assistance to neighboring landowners both financially and technically. Flat Ranch neighbors have been partners in conservation easements, wildlife grants, range improvement projects, fish ladder construction, layout and construction of riparian fences, revegetation of spring heads and ponds, development of off-site watering devices for livestock, noxious weed control,

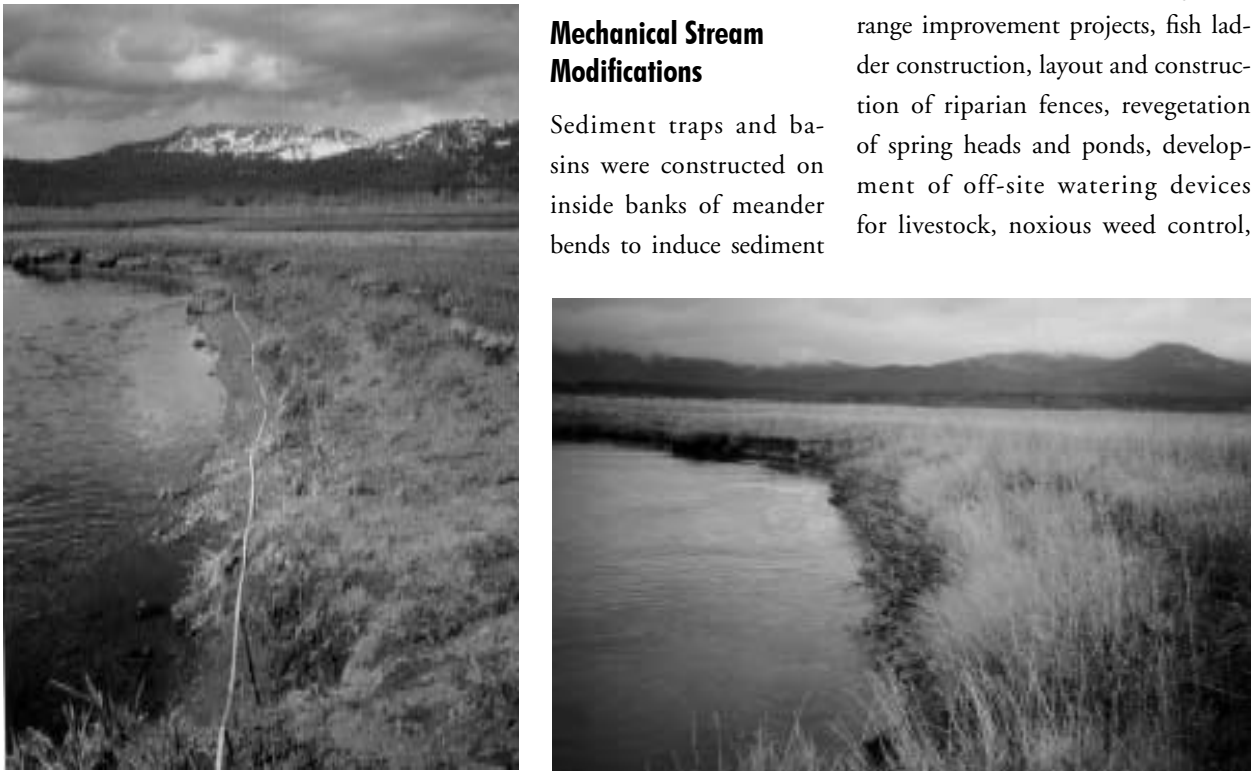

Figure 1. Streambank rehabilitation at Flat Ranch. Left: June 1997. Right: September 1998.

fish screens on irrigation diversion structures, and shoreline stabilization. Cooperative efforts help local private landowners improve their stewardship and profitability, and contribute to improved water and habitat quality in the Henry's Fork watershed.

Summary

By working cooperatively with landowners, ranchers, public agencies, and the community, the Conservancy has generated a solid foundation for sustainable conservation strategies that fit realistically into the local economy – illustrating that economically productive land uses are compatible with maintenance and enhancement of an area's ecological system. Conservation easements, riparian management agreements, rest rotation grazing plans, fencing, erosion control, weed control, monitoring, and habitat restoration are all tools that provide mutual benefits and protect the landscape from fragmentation.

The Conservancy's Henry's Fork project exemplifies how innovative solutions can be found for the extremely controversial issue of water allocation in the western United States. The Henry's Fork initiative, the first of its kind, provides a unique alternative to regulation and litigation. Agriculture and fishery restoration can coexist. The Henry's Fork initiative will directly benefit the future of many western streams.

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