



# Entiat River Habitat Farming:

Trading Fruit for Fish



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Three Columbia River fish species have been listed as either endangered or threatened under the Endangered Species Act.<sup>1</sup> Numerous agencies, boards, and conservation groups have attempted to recover the species—investing millions in programs designed to boost fish populations, to little avail.

Because these species occupy such a large range, the forces perpetuating their decline are numerous and varied. As a result, the traditional regulatory approach has failed to recover the Upper Columbia River steelhead, spring-run Chinook, and the bull trout.<sup>2</sup>

Realizing that habitat loss was one of the most significant contributors to the decline in fish numbers—and that fruit orchards planted along spawning waters caused much of that habitat loss—several landowners along the Entiat River, a tributary of the Columbia River Basin, developed a program that links conservation to economic

opportunity. The Habitat Farming Enterprise Program (HFEP) pays orchardists to replace their riparian fruit trees with a fish-friendly vegetative buffer.

The program is grounded in a landowner ethic of environmental stewardship, and it exemplifies how agriculturalists can capture conservation values and economic profits using traditional agricultural inputs such as water and land.

This case study explains why the HFEP is a model for agriculturalists and policy makers interested in an ecologically and economically profitable approach to water conservation.

## BACKGROUND

To understand the transition from growing fruit to growing fish, this case study begins with a brief history of the region and its relationship with fish.

### *The Upper Columbia*

Tree fruit has been the mainstay of Washington's Columbia River agricultural communities since the major irrigation projects of the early 20th century. Indeed, Wenatchee is known as the "Apple Capital of the World." This moniker is appropriate; the surrounding region has more than 170,000 acres of apple orchard and produces more than one-half of the total domestic apple production.

Despite this reputation, things are changing along the Upper Columbia River. Rising labor costs and increased competition from growers in China, Europe, and South America have reduced the profit margins on many orchards. Meanwhile, retirees and vacationers have flocked to the region because of its natural beauty and

relatively inexpensive property values. The result is a noticeable change in land use; single family homes and small ranchettes now dot the orchard landscape.

### *Endangered Fish*

Just as tree fruit characterizes North Central Washington, anadromous fish species that swim hundreds of miles inland to spawn in the Upper Columbia's tributaries symbolize the Pacific Northwest and its abundant natural resources. Unfortunately, the same factors that contributed to the success of the region's tree fruit industry have also contributed to the persistent decline in several fish populations. The most commonly cited causes for the decline include the loss of spawning habitat and the impact of hydropower operations on fish migration routes.

Given declining fish stocks, the National Oceanic and Atmospheric Administration (NOAA) listed three Upper Columbia River salmonid species for protection under the En-

dangered Species Act in the 1990s.

In response to these classifications, the state of Washington passed the Salmon Recovery Act, which established five regional Salmon Recovery Boards.<sup>3</sup> The Upper Columbia River Salmon Recovery Board develops the Salmon Recovery Plan that most directly impacts the bull trout, steelhead, and spring-run Chinook salmon. That Plan identifies habitat loss, hydropower, harvest, and hatcheries—collectively known as “the four H’s”—as the most significant causes of salmonid decline.<sup>4</sup> Yet little progress has been made toward de-listing these species.

### **HABITAT FARMING ENTERPRISE PROGRAM**

Ray Sandidge is an orchardist who understands the link between incentives and stewardship. His family owns 20 acres of pear and apple orchard along the Entiat River—prime spawning habitat for the endangered salmonid species.

Rather than a liability, Sandidge views salmon as an asset. Much like the grey wolves around Yellowstone, society places a high value on the recovery of these three fish species. Like most orchardists along the Entiat, Sandidge also understands that how he man-

#### **THE FOUR H'S**

**“The four H’s” of salmonid decline are habitat loss, harvest, hydropower, and hatcheries.** The Habitat Farming Enterprise Program has the potential to address all four, either directly through land management practices or indirectly through mitigation contracting.



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ages his riparian property greatly impacts fish—better spawning habitat means more fish, not just in the Entiat but all the way to the Pacific Ocean.

Sandidge and other orchardists consulted fisheries experts who advised them that retiring riparian lands from orchard production and replacing the fruit trees with cottonwoods and other overhanging trees and shrubs would drastically improve spawning success in the Entiat River. This change in land use reduces the amount of direct sunlight hitting the water surface and, therefore, reduces the water

temperature to levels more suitable to salmonid spawning.<sup>5</sup> Because spawning fish prefer cool water to warm, even marginal reductions in water temperature can significantly increase spawning yields.

Retiring riparian portions of their orchards from tree fruit production would also reduce water consumption on the property and increase stream flows in the river. And orchardists willing to dig back channels off of the river's main course could further enhance the Entiat's spawning productivity by increasing the amount of spawning habitat

The challenge was to find a way

to compensate the orchardists for growing fish rather than fruit, and for shifting agricultural inputs such as land and water toward conservation outputs such as spawning habitat. Partnering with fish experts, fruit specialists, non-profits, and local government officials, Sandidge and other Entiat orchardists formed the HFEP working group to design a compensation program.

The working group's task was two-fold: first, to create a remuneration model that would determine the total cost of turning profitable orchards into endangered species habitat; and second, to

identify the “buyers” of salmon recovery who would fund that land use change.

### *The Remuneration Model*

The HFEP working group hired economic consultants to estimate the costs a landowner would incur by using his or her land and water to grow fish rather than fruit. To encourage broad participation among the orchard owners, the calculation had to include costs borne by the landowner. The list included: (1) the opportunity cost of using the land to grow fruit; (2) the removal costs of the fruit trees and installation costs of the vegetative buffer zone; and (3) the costs of maintaining the buffer over time.

Underestimating these costs would have threatened the program’s success by reducing landowner enrollment. As such, landowner input was critical to understanding the subtle changes that would occur on the property. In frost-prone North Central Washington, for example, one primary

concern is the reduced air-flow over the orchard created by the taller cottonwoods forming a barrier along the river. To address this concern, the remuneration model included a contingent payment for crop losses due to frosts and, in the most frost-prone orchards, the installation costs of fans that would circulate cool air and prevent crop loss. Other subtleties the model addressed were lost economies of scale and the age-specific profitability of the removed fruit trees.

The landowners also voiced concerns about how the remuneration is paid. The landowners’ preference is to enter long-term leases obligating them to remove a specified strip of riparian land from tree fruit production and maintain in its place an over-hanging vegetative buffer conducive to salmonid spawning, in return for regular lease payments. Structuring the deal in this way gives much needed certainty to the landowners as they consider enrolling their lands in the program.

### *Potential Funding Sources*

The second task for the HFEP working group was to identify potential funding sources for the program. The species’ ESA protections and their importance to the region’s various fishing interests means that the working group has several potential funding sources to pursue.

The most obvious beneficiaries of increased salmon numbers in the Upper Columbia River are the recreational, commercial, and tribal fishing interests. Several fisheries in the region have been closed since federal listing of the species so the demand for fishing in these areas is relatively high. Moreover, the state’s licensing system provides a low cost and straightforward method of linking the supply and demand for habitat improvements. For example, a fish stamp, similar to the state and federal duck stamp, presents a payment vehicle option that would be easy to administer.<sup>6</sup>

A second funding source is the region’s hydropower operations. The





**The Chelan and Douglass County Public Utility Districts signed a Habitat Conservation Plan ensuring that the Rocky Reach and Rock Island Hydro Projects have no net loss on mid-Columbia salmon and steelhead runs.**

Chelan and Douglass County Public Utility Districts (PUDs) signed a Habitat Conservation Plan (HCP) ensuring that the Rocky Reach and Rock Island Hydro Projects have no net loss on mid-Columbia salmon and steelhead runs. To mitigate the unavoidable mortalities associated with operating these hydroelectric projects (estimated at 2 percent of all fish passing through the projects), the PUDs have funded habitat restoration work along the Entiat River and other tributaries to the mid-Columbia River. The PUDs also have fish counting technology that would allow them to accurately

measure the marginal increase in fish stocks attributable to the HFEP, making them a valuable partner.

From the perspective of enrolled landowners, contracting directly with the PUDs has certain benefits over the fishing licence approach—namely the security of private contracts. By entering into long-term leases with the PUDs, the landowners would likely enjoy more certainty than if the compensation funds were generated by fishing license sales that are later distributed by the state. Given the fact that enrollment could require the removal of young and

profitable trees, such contractual security is important.

The third potential funding source is the “existence valuers” of salmon recovery. Just as the wolf reintroduction posters captured the willingness to pay of individuals who may never see a wolf in Yellowstone, the HFEP could attempt to generate compensation funds by designing and selling a poster, t-shirt, or other memento, of the salmon species’ recovery campaign.

All of these funding sources have the potential to make water and fish conservation profitable for the Entiat River orchardists. In the

coming months, the HFEP working group will select the funding source that best meets the needs of the orchardists and begin land-owner enrollment.

## LESSONS FROM THE HFEP

Although the program has not yet launched, the early design and implementation of the Entiat River Habitat Farming Enterprise Program presents many lessons for farmers, ranchers, or policy makers interested in using agricultural resources to capture conservation values.

**1. Turn regulatory liabilities into economic assets.** The old adage of “if it pays, it stays” rings true when it comes to endangered species and critical habitat designations. If you are looking for profitable, self-sustaining conservation opportunities, look first to the endangered species in your area and, of those, look first at the most endearing. These have the highest commercial

value and, consequently, the best chance of driving a successful conservation program.

**2. Cast a Large Net.** When water and land are put into agricultural production, the beneficiaries are easy to identify: they are the people buying the agricultural products. But when these same resources are used to produce conservation values such as endangered species habitat or clean water, the list of individuals and groups willing to pay for those services is large. Chances are good that if you own the land or water, you can generate conservation values at low marginal costs. So when listing potential funding sources, consider: (a) who is currently enjoying the resource for free; (b) who is paying for the resource, but might be willing to pay for more of it; (c) who is legally required to mitigate for related environmental harms; and (d) whether you can capture existence (i.e., non-consumptive)

values by selling complementary products like posters.

**3. Water quality improvements can be as valuable as water quantity improvements.** In many regions water is abundant, meaning demand for water quantity improvements can be thin. By considering water quality, specifically water temperature, the Entiat River tree fruit growers are tapping into a demand for endangered salmonid species. Similar creativity in other regions could likewise prove profitable.

**4. Contractual certainty encourages participation.** Farmers prefer reliable profits to unnecessary risk, and they will likely jump at the chance to avoid the seasonal fluctuations of agricultural production. To scale a conservation program beyond a single parcel of land, one must be willing and able to spell out the revenues and expenses potential participants are likely to incur. Even better, if a reliable

funding source can be established, landowner enrollment will not likely be a problem.

**5. Independent scientific validation fosters deal-making.**

Without independent verification that the fruit growers are increasing fish populations, funding for the program would be difficult, if not impossible, to procure. Conservation buyers, particularly those paying for improvements in habitat or water quality, typically require some independent measure of production because water or habitat conservation can be difficult to observe.

**NOTES:**

1. The Upper Columbia River Salmon Recovery Plan approved by the National Marine Fisheries Service in October 2007 is projected to cost \$95 million and take 10 to 30 years to implement.
2. NOAA Fisheries Service's final recovery plan for the spring-run Chinook and steelhead identifies the main causes for the decline of the Upper Columbia River fish as: Human adaptation and destruction of habitat, the effects of hydroelectric operations, the effects of commercial, sport, and tribal fisheries, and the impacts of hatchery programs and practices. Notices, *Federal Register*, Vol. 72, No. 194, Tuesday, October 9,
3. Chelan County Natural Resources, Salmon Recovery Planning. [www.co.chelan.wa.us/nr/nr\\_salmon\\_recovery\\_planning.htm](http://www.co.chelan.wa.us/nr/nr_salmon_recovery_planning.htm).
4. Notices, *Federal Register*: Vol. 72, No. 194, Tuesday, October 9, 2007, 57305; "NOAA Fisheries Service Releases Its Final Recovery Plan for chinook and steelhead on the Upper Columbia River."
5. Spence, B.C., G.A. Lomincky, R.M. Hughes, and R.P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR.
6. The federal duck stamp program requires that waterfowl hunters pay a fee in addition to their basic hunting licence. The proceeds go toward waterfowl habitat conservation. The program links the supply and demand for habitat in a similar fashion to the Habitat Farming Enterprise Program.

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