



# Restoration Benefits Overview of Concepts & Principles

## CENTER FOR ENVIRONMENTAL ECONOMIC DEVELOPMENT

Estimation of the benefits of restoration of the Klamath River is a complex task involving answering several questions:

### What are conceivable forms of restoration?

- Increases from current flow levels, up to and including full restoration of natural flows.
- Decommissioning up to full removal of dam (including replacement of electricity provided by dams).
- Habitat restoration—riparian and upslope of river.
- Fuel reductions and fire related work.
- Development of trails, forms of interpretation, nature tours, and heritage-based tourism.
- Improvements for sports fisherman.

### What are the benefits from restoring Klamath River?

This depends on level of restoration and what restoration is being compared to.



### How can those benefits be evaluated?

Benefits (and costs) include impacts on five forms of capital or wealth. The five forms of capital or wealth are:

**Constructed Capital** – comprised primarily of human-constructed facilities, buildings, equipment, machines, physical networks that provide a flow of products, outputs and services

**Human Capital** – the knowledge, skills and capabilities of people that can be deployed to create a flow of useful work for the economy and community

**Natural Capital** – generates the flow of natural resources and other environmental benefits (such as the rate at which human wastes can be assimilated).

**Social Capital** – “the stock of ‘civic virtues’ and networks of civic engagement, involvement, reciprocity norms and trust essential to democratic communities,” in other words, the reservoir of cooperativeness.

**Cultural and Heritage Capital** – the body of knowledge, stories, visions ... shared by people that provide the framework for how individuals [understand] the world and their proper place in it.

(adapted from Hackett, *Environmental and Natural Resource Economics*, 2001)

From this “stock” of each of these kinds of capital or wealth flows benefits and services over time (the value of the stock is related to the value of the flow of benefits).

Market and non-market benefits (use values such as enjoyment of hiking, and non-use or intrinsic values, existence, option, and bequest values). Ernie Niemi: “One doesn’t have to catch a fish to value it.”

# Klamath River Restoration Benefits Information

## Constructed Capital

**917 million kWh generated by Klamath River Dams in 1997** (cost) – value would be zero or negative if relicensing was not approved and PacifiCorp were responsible for the costs of decommissioning and removing the dams.



**Agricultural value of 240,000 acres irrigated by Klamath Project** (cost) – some of the crops grown are surplus for which subsidies are paid, the value would be less without these subsidies.

**Value of water for irrigation** (cost) – USGS research found that “...63 percent of the water withdrawn [in the Oregon portion of the Klamath Basin] later evaporated, seeped into the ground, or ran off irrigated lands and returned to canals, streams or lakes” (ECONorthwest, 2001). This would need to be taken into account when evaluating the worth of subsidized water delivered at below market prices.

## Human Capital

**Tribal employment, skills, training** (benefit) the value of this would depend on the number of jobs, amount earned and economic multiplier effects in the region.

**Other employment, fishing guides, tour leaders** (benefit) – also depends on number of jobs, amount earned and economic multiplier effects.

## Natural Capital

**Increases in salmon population** (benefit) - ECONorthwest cites a survey that showed Oregon and Washington residents say they are willing to pay about \$30 – 97 per household to protect Salmon. Historically, the Klamath Basin was the third most productive salmon river system of the west coast. A calculation could be made by multiplying the total number of west coast households by the lower bound of the above range and multiplying that total by the fraction of west coast salmon that came from the Klamath Basin historically.

The Coalition for the Klamath Basin states that an estimated 6,870 fishing related jobs have been lost as a result of salmon declines.

ECONorthwest estimates that a Klamath River fish is worth \$5-70 if it is commercially caught and \$200 if it is recreationally caught. Additionally, 1.5 jobs are created by every 1,000 fish commercially caught and 4 jobs for every 1,000 fish recreationally caught.

**Improvement of species in the ecosystem** (benefit) – improvement in sturgeon, suckers, and other plant and animal populations.

**Recreation values** (benefit): - USGS study estimated that restoring the Klamath could increase visitor trips 36%. It estimated the value of this for the Trinity and Klamath rivers as being in excess of \$3 billion. The magnitude of this estimate warrants further examination to establish if it is a reliable estimate.

Fisheries benefits are several, one significant market benefit often overlooked is described below:

*... [F]ishery-based economic benefits can arise directly and indirectly...Even small increases in very weak-population species, such as coho salmon, could indirectly benefit sport and commercial fishing on chinook if they caused a relaxing of restrictions on the harvesting of some of these far more plentiful species, such as Central Valley hatchery-origin chinook. **Thus small increases in ... salmonid populations could have large economic benefits to the commercial fishing industry and sport fishing business both directly and indirectly, potentially allowing harvest access to many more fish from these otherwise abundant stocks that are now off limits. These benefits would specifically include additional fishing opportunities (and thus additional fishing income and jobs) to coastal fishing towns...** [emphasis added.] .*

(Glen Spain in CEED, 2004).

## Social Capital

**Better working relationship between diverse groups in upper, middle and lower river.** At present there is relatively little communication and cooperation between upper, middle and lower areas of the Klamath River. Such communication and cooperation could improve.

## Cultural and Heritage Capital

**Progress towards a sustainable society.** Currently we do not live in an environmentally sustainable society, in terms of water use, habitat protection, and energy use. Restoration of the Klamath would foster a culture of environmental sustainability and social equity that helps insure the continuation of humans and other living things.

## Next Steps

A full scoping of issues and types of restoration contemplated needs to be completed.

A “business as usual” baseline scenario needs to be established.

Existing relevant documents need to be analyzed more closely to critique costs and benefit estimates.

Additional research defining the restoration program needs to be conducted.

Completion of a full Restoration Benefits Report, which could be put into different formats and disseminated to targeted audiences.





## Related Resources

**Economic Impacts of Removing or Re-regulating Various Klamath River Dams—Preliminary Analysis.** David Marcus. 2003.

**A Conservation Vision for the Klamath Basin.** Coalition for the Klamath Basin. 2000.

**Coping with Competition for Water: Irrigation, Economic Growth, and the Ecosystem in the Upper Klamath Basin.** Ernie Niemi, Anne Fifield, and Ed Whitelaw, ECONorthwest. 2001.

**The Klamath Basin: Restoring the Klamath Basin for Fishermen, Farmers, Native Americans, and Wildlife** (fact sheet). EarthJustice.

**Klamath River Dam Removal Investigation.** G & G Associates. 2003.

**Making Unbiased TCM Benefits Estimates with Klamath River Basin TCM and Contingent Use Data.** Aaron Douglas, USGS and Andrew Sleeper, Successful Statistics LLC. 2003.

**Ratepayer Rip-off: Electric Power Subsidies in the Klamath Irrigation Project.** Jim McCarthy, Oregon Natural Resources Council. 2002.

**Water Allocation in the Klamath Reclamation Project, 2001: An Assessment of Natural Resources, Economic, Social, and Institutional Issues with a Focus on the Upper Klamath Basin.** William Braunworth, Teresa Welch, and Ron Hathaway, Oregon State University. 2003.

Prepared for

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by

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