Investing in Our Rivers:

Are California's environmental water transactions paying off?

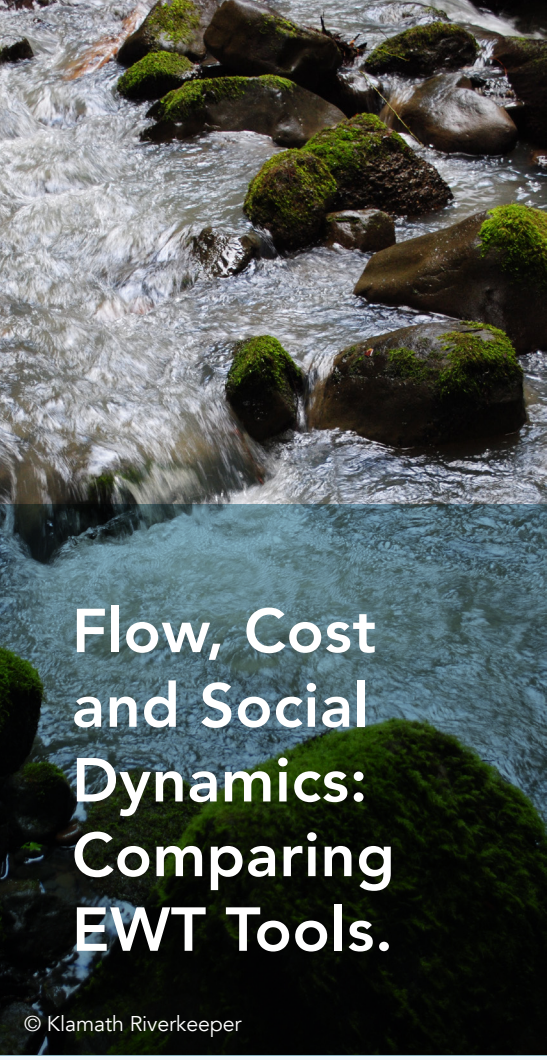
New tool will help maximize ROI to increase flows in over-tapped streams.

Water that sustains fish, wildlife, recreation, and tribal cultures is in short supply in California. In 2014, just five percent of juvenile Chinook salmon survived long enough to migrate from the Sacramento River to the Pacific Ocean. As flows are diverted for agriculture and other uses, many rivers no longer contain the rushing water that sustains millions of dollars in river recreation and tourism. One way government and conservation groups are working to rewater rivers is through a set of market-based tools collectively known as "environmental water transactions."

MAXIMIZING CALIFORNIA'S RETURN ON INVESTMENT.

In the coming years, hundreds of millions of dollars in Proposition 1 and other state funds will be invested in stream flow enhancement projects. Despite growing support for environmental water transactions (EWT), funding agencies do not have standards or guidelines to measure the cost effectiveness of these projects. We can help ensure that investments in EWTs are a good deal for taxpayers by evaluating potential projects through an economic lens, and measuring cost effectiveness as projects are implemented. The report, "Measuring Cost-Effectiveness of Environmental Water Transactions" aims to assist public funding agencies and project proponents to maximize the cost effectiveness of investments in projects intended to enhance the quantity of environmental flows. The report provides guidance and recommendations about cost-effectiveness metrics for environmental water transactions.

$200 million in Prop 1 funding for stream flow enhancements, including EWTs.



Flow, Cost and Social Dynamics: Comparing EWT Tools.

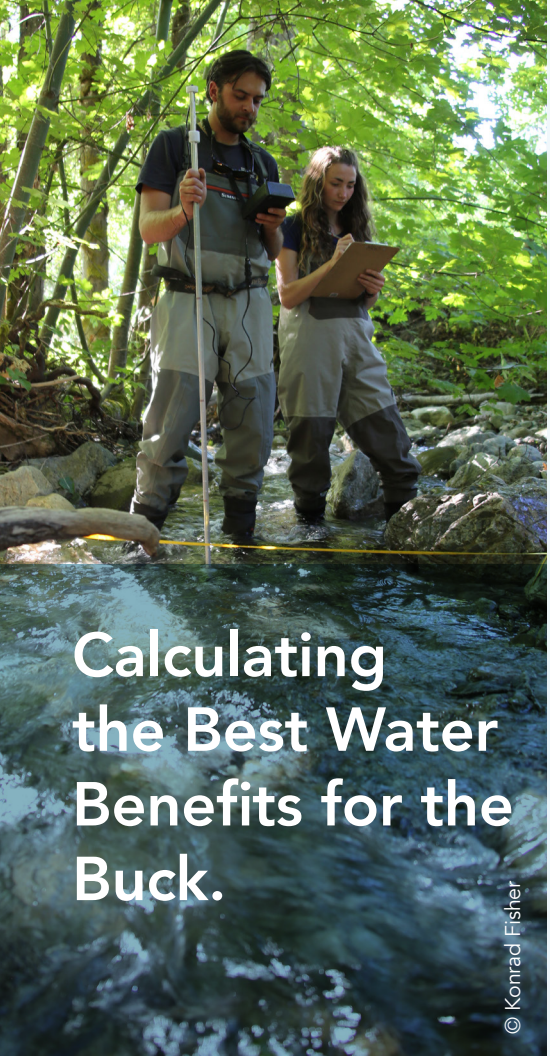
Comparative Analysis of Environmental Water Transaction Tools

Environmental Flow Benefits	Water Cost	Social / Community Dynamics
Lowest Flow Benefit	Lowest Cost	Lowest Risk of Opposition
Temporary Transfers	Short-term Partial Season Temporary Transfers	Short-term Partial Season
Conserved Water Long-term Transfers Short-term Partial Season Fallowing	Long term Transfers Permanent Transfers Land/Water Purchase	Temporary Transfers Conserved Water Land/Water Purchase
Land/Water Purchase Permanent Transfers	Conserved Water	Long-term Transfers Permanent Transfers
Highest Flow Beneift	Highest Cost	Highest Risk of Opposition

WHAT'S THE BEST EWT TOOL FOR CALIFORNIA? The report describes and evaluates five transaction tools under the California Water Code. These include: temporary environmental flow transfers, short-term partial season forbearance agreements, long-term and permanent environmental flow transfers, water conservation projects (increases in water use efficiency), and fee title acquisition of land and water rights or land conservation easements, which dedicate water rights, or portions thereof, to environmental flow. Each of the tools reviewed has advantages in certain scenarios and drawbacks in others; no clear overall "winner" emerged.

THE REPORT SUGGESTS that tools with the highest potential flow benefits also come with potentially higher water and transaction costs, as well as potential for social and community opposition. The converse is also true. Often the tools with the lowest potential environmental benefits (in this case, primarily due to their lack of durability) also have the lowest prospective costs and risk of opposition. Another useful way to think about this general finding is to consider it from a programmatic perspective. The process of building an EWT program often involves early phase projects that have low costs and low risk of opposition under the theory that these projects help build trust in skeptical communities, thus paving the way for deeper investments in more effective tools and longer-term projects with a higher potential for more substantial flow benefits.

Roughly 80% of California's developed water supply is used for agricultural irrigation.



Calculating the Best Water Benefits for the Buck.

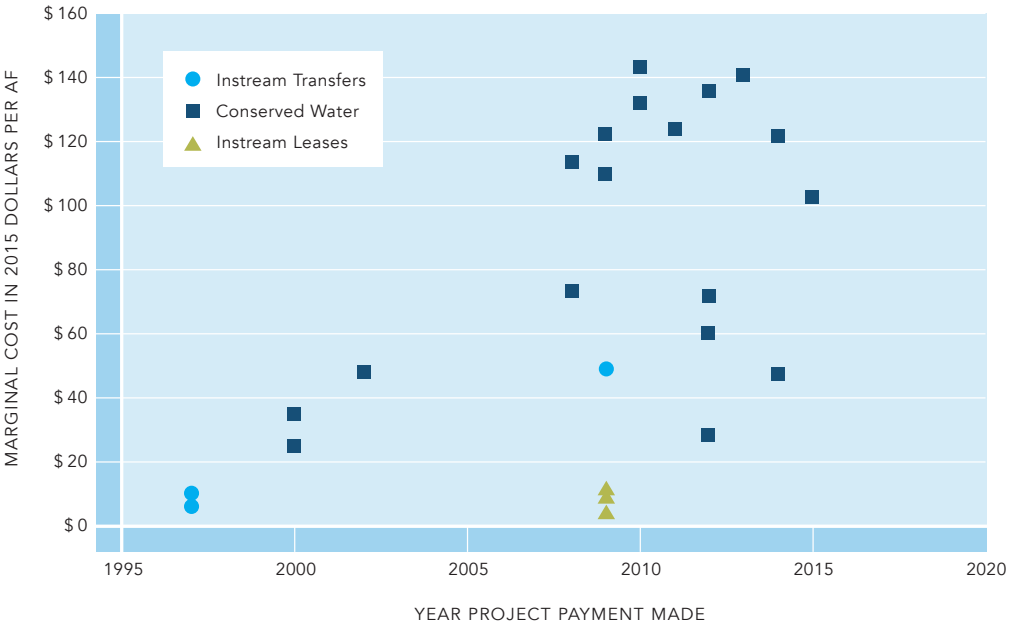
COST-EFFECTIVENESS (CE)

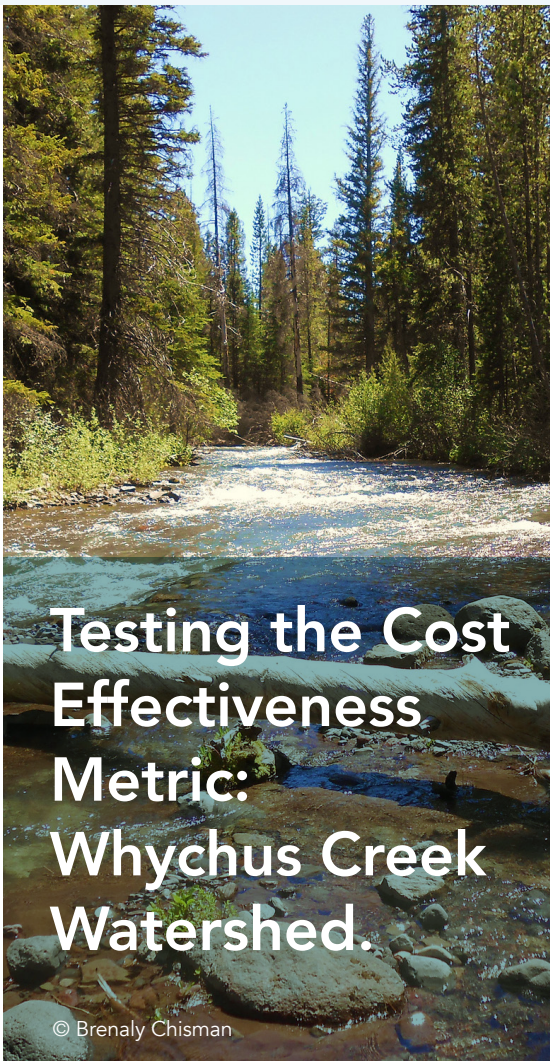
$$CE = \frac{\text{Inflation Adjusted Cost (\$)}}{\text{Wet Discounted EFlows (AF)}}$$

Transaction Water	Water Costs
↓	↓
Adjust to EFlows	Transaction Costs
↓	↓
Adjust to Wet Water	Total Costs
↓	↓
Discount Water	Adjust for inflation
↓	↓
Total Wet Discounted EFlows	Inflation Adjusted Cost

THE COST EFFECTIVENESS METRIC CALCULATES DOLLARS PER ACRE FOOT, evaluating in-stream flow benefits against project costs. It is designed to be practical and replicable, and applicable to both the project selection and planning stages across a range of transactions, as well as an ongoing performance measure for individual EWTs. Consistent use of this metric may help the groups and state agencies that fund environmental water transactions identify the projects which offer the highest water benefit potential for the buck. The metric gives practitioners cost effectiveness data they can use to improve their performance over time.

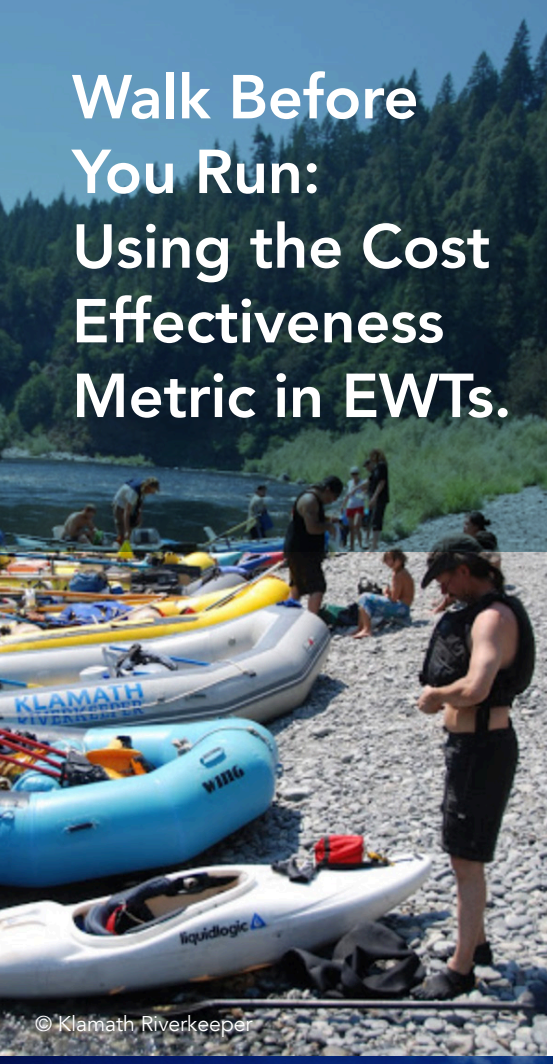
STREAMFLOW RESTORATION in Whychus Creek is critical to the ongoing reintroduction of migrating fish species to the upper Deschutes Basin in Oregon. Data from almost twenty years of transactions totaling almost $17 million and providing 35 cfs of in-stream flows was compiled and analyzed using the cost-effectiveness metric. The figure below plots cost-effectiveness over time. With a few exceptions, an upward cost trend can be seen in instream transfers and conserved water.





Testing the Cost Effectiveness Metric: Whychus Creek Watershed.

Walk Before You Run: Using the Cost Effectiveness Metric in EWTs.



THE COST-EFFECTIVENESS METRIC IS DESIGNED TO HELP public funding agencies and project proponents maximize the cost-effectiveness of EWT project investments for in-stream flows. Together, we can make the most of public funds for river and stream flow restoration.

THE FIRST STEP is to adopt and adapt the suggested dollar-per-acre-foot measurement tool to the needs of practitioners, funders, and advocacy groups.

PRACTITIONERS: The report survey revealed that though practitioners measure flows and track costs for EWTs, they are not yet preparing basic cost-effectiveness information to help select projects or to evaluate their performance. To assist practitoners, the report describes the data required for the cost-effectiveness calculation.

FUNDING AGENCIES: Many government agency funding programs do not evaluate cost-effectiveness when determining which projects to fund. The report suggests establishing standards or guidelines that include cost-effectiveness analysis in project selection.

NGOs: Advocacy groups and conservation organizations may use comprehensive cost-effectiveness data to compare the benefits of expenditures in different regions and on different transactions, and follow trends over time, fostering informed debate over public policy.

READ THE REPORT!

Measuring Cost-Effectiveness of Environmental Water Transactions

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