

Sierra Watershed Ecosystem Enhancement Project

Welcome to **SWEEP**! In our newsletters, we will explain the SWEEP project and highlight recent progress. In this edition, we will focus on ecosystem services; what they are and how SWEEP will incorporate them into project results. For more information and past newsletters, please visit the project website at: <http://ucanr.edu/sweep/>.

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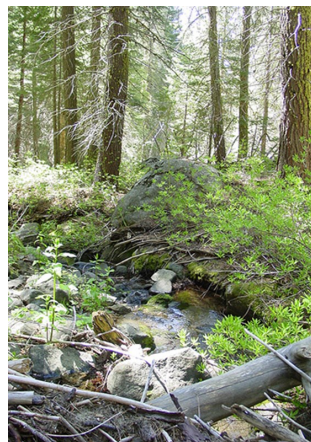
SWEEP Goals

SWEEP is a 4 year project with the goal of quantifying the physical and financial relationships in Sierra mixed conifer forests in terms of fire resiliency, carbon storage in trees, and water in streams. Much of the Sierra Nevada is covered with forests that are dramatically denser in trees per acre than before fire suppression policies led to extinguishing most wildfires. Today's denser forests are more prone to experiencing high severity fire in which most trees are killed and forest litter is consumed. These dense forests also use large amounts of water to sustain vegetative growth, resulting in less water in streams, rivers, and downstream in canals and the delta.

SWEEP's goal is to design and implement field level projects to quantify the interaction of forest biomass growth, fire risk, and water yield; understand how the forests function now; and the tradeoffs between different outputs. In collaboration with beneficiaries and stakeholders, we will then estimate the values different beneficiaries place on increases or decreases in fire resiliency, carbon storage, and water yield.

What are ecosystem services?

These are the benefits provided by the natural ecosystems that historically have not been treated as commodities but are still crucial for ecological and economic resilience. Examples include clean water supplies; smoke free air; naturally growing plants that can be harvested for food, fiber and building products; pollination by bees; flood and fire control; animal habitat; and plants that pull carbon out of the atmosphere. When natural systems do not provide enough of these ecosystem services, other systems that depend on them will decline unless they find alternative resources, sometimes at considerable cost.



The importance of Ecosystem

Services: Water as the driving force

Water is probably the highest-value ecosystem service associated with Sierra Nevada forests. California has worked hard to increase the value of water by creating an extensive network of turbines, reservoirs, canals and tunnels to get as much of the water in places and times where it has the highest value. As the ongoing drought is showing us, we did not have much of a buffer for bad years. There are numerous, expensive suggestions to coax more value out of California's precipitation and downstream water systems.



Forests are the first users of precipitation that falls on the Sierra Nevada. Water that is not used by trees, shrubs and grasses eventually flows downhill where water right holders can use it or divert it. Generating electricity from water flowing downhill provides much of the economic value of water runoff from the Sierra. With the probable increase in the value placed on carbon-free energy such as hydroelectric power and the reduction in water that can be diverted out of rivers and the Delta due to drought and other mitigating factors, the relative value of water from the Sierra may increase substantially.



For more information:
<http://ucanr.edu/sweep/>

How to establish water's social, ecosystem and financial values

Unlike water delivered through pipes in a home or in an irrigated field, the quantity and value of water used in a natural ecosystem is harder to measure and track. Water rights were given to water diverters but the rights and responsibilities related to natural ecosystems that use a lot of water like forests are not as clear.

Reducing water use by forests by removing some of the vegetation that also adds to the severity of potential wildfires has been suggested as another way to increase ecosystem services such as more water flowing into streams and less smoke in the air. There is considerably less agreement about who should pay for treatments even if we could all agree on the overall costs and benefits.

Quantifying, measuring and certifying ecosystem services

Some have suggested that putting specific prices on different ecosystem services is necessary for both public policies and private entities to prioritize their scarce resources towards specific investment and management opportunities.

If you are the paying party, paying for ecosystem services are similar to providing tax or user fee revenues to a parks district in addition to, or instead of, using the funds to pay for schools, bridges, police services, economic development projects. Another alternative is to change the political rules governing the services directly or actions that affect them so that other are required to guarantee a continued provision of the services for free.

If you are the supplying party, the key is convincing the current or potential users of ecosystem services that it is in their interest to pay more now to ensure the same of potentially increased level of services in the future. The alternative of withholding the services may not be technically feasible, may cost money, and will not result in any revenue in the short term.

In both cases, informed and mutually agreeable decisions will require transparent measurements about the different services and whether there are opportunities to 'grow the pie' with new investments and technologies.

SWEEP and Ecosystem Services

SWEEP's goal is to develop a case study of economic valuation for ecosystem services from forest management that includes:

1. A multiple services approach
2. Develop and test management recommendations that will potentially increase water discharge, heighten forest resilience, improve long term carbon storage, reduced fire risk, and reduced potential for fire caused sedimentation of waterways.
3. Clarify the questions of 'Who would benefit from thinning? By how much? Who could pay for it? Who will measure the changes in services caused by thinning and be able to draw valid conclusions? And How will stakeholders react?'
4. Consider whether considering forest management projects as water projects that historically had different and longer term institutional and financial arrangements could create new opportunities.

The final link will be to connect the beneficiaries of enhanced water storage and yield with the landowners providing them through new types of markets. In other words, water users that benefit from changes in forest management might be willing to pay upstream landowners to provide these services. That in turn would become a powerful financial incentive for landowners to invest in beneficial management practices.

