

Background

Many of the Sierra Nevada watersheds are with forests that are designated as high to very high risk of high-severity fire. Despite ongoing efforts to implement forest restoration treatments to reduce fuels, there needs to be a substantial increase in the number of acres of forest treatment occurring annually in order to significantly reduce fire threat and improve forest health. Lack of funding, complex processes and a shortage of biomass utilization infrastructure have resulted in an inability to treat the number of acres of forest per year necessary to restore forest health, impact the fire return interval and reduce the severity of fire.

To increase the pace and scale of restoration work, the Sierra Nevada Conservancy (SNC) has been working with a wide array of partners to address policy, process and funding issues. One key objective is to identify new investors that will also benefit from healthier watersheds. Some areas outside of California have been successful in establishing “Forest to Faucet” programs that create investment to improve forest health in watersheds that are critical to providing water to downstream users. Generally, these programs are established after a catastrophic fire occurs and the Region is faced with unanticipated post-fire costs. The SNC has joined in a partnership with multiple stakeholders to evaluate investment opportunities in the Mokelumne Watershed. This watershed was selected since its one of the few Sierra watersheds where the majority of the downstream water users can be easily identified. On an average year, about 40% of the river water is diverted by the East Bay Municipal Utility District for human use. Another reason is that this project builds off SNC’s work supporting the Amador Calaveras Consensus Group (ACCG), which has established a common understanding of both the watershed problems and the need for new investment to restore watershed health and local economic wellbeing.

There are three components to the work occurring in the Mokelumne Watershed and they share the following goals:

- 1) Reduce the risk of large damaging fire in the Mokelumne Watershed.
- 2) Restore the ecological function of the watershed.
- 3) Identify strategic investment for restoration of the Mokelumne Watershed.
- 4) Quantify the costs and benefits of increasing the number of acres treated by identifying costs avoided through watershed restoration efforts.
- 5) Identify specific areas in the watershed that are most important to restore for water quality and habitat.
- 6) Identify and evaluate other ecosystem services, that when restored, can improve the socioeconomic and environmental conditions of the area.

Below is a discussion of the three project components including the Environmental Benefits Program, Demand Analysis and Mokelumne Avoided Costs Analysis.

Environmental Benefits Program

The project includes partners from both the upper watershed and the valley portion of the watershed. This effort expands project involvement to include Sustainable Conservation, Environmental Defense Fund and diverse interests from both the valley and upper watershed. The Environmental Benefits Program is based on the premise that by measuring and tracking environmental outcomes from restoration and improved management practices, the program can substantially increase both the amount and effectiveness of watershed restoration activities. These metrics should help support work and investment throughout the watershed; however the initial measurement tool is being developed for the valley portion of the watershed. The riparian evaluation tool will be used to evaluate both project potential and progress. This tool will measure the improvements made to bird and salmon habitat, water temperature and quality, and downstream flood attenuation due to restoration work in the river riparian zone.

Demand Analysis/Water Forums

The Demand Analysis has brought together public and private sectors to develop and participate in a mutually beneficial partnership that rewards sustainable land management and watershed restoration in the Mokelumne River watershed and achieves tangible benefits to investors. The program has convened water forums with businesses that are large water users and/or for whom water quality is important to their end products. Some of these businesses include a large oil refinery, hotel chains, breweries, and beverage corporations. During these forums, land managers and conservation groups have discussed the linkage between the importance of restoring and protecting the natural resource base in the watershed, with a focus on water, and how this relates to ensuring long-term water source reliability and quality. In general, the business representatives were not aware of the impaired condition of the watershed and how this condition directly impacts water supply. Some have expressed interest in providing volunteer opportunities for their employees to help restore the watershed and further exploration into direct investment opportunities to protect the water source and to provide marketing opportunities for their businesses.

This program aims to demonstrate a more cost-effective and strategic way to achieve holistic stewardship of farms, ranches, and forests that produce services we all depend upon. Both public and private sector participants have expressed that this is the cost-effective and smarter alternative to investing in hard infrastructure or facing the huge costs of fire and other risks to these lands and waterways.

Avoided Cost Analysis

The focus of this report is the Avoided Cost Analysis since SNC has played the largest role in this project component by providing leadership, funding, and substantial staff time. The primary purpose of this project is to quantify the potential savings of investing in forest restoration and catastrophic fire prevention practices compared to the costs of suppression, restoration, destroyed infrastructure, clean up, and maintenance work following a catastrophic wildfire.

The upper Mokelumne watershed is managed by a number of land management entities including, but not limited to, the US Forest Service, Bureau of Land Management, industrial and non-industrial forest landowners, and water and power utilities. Like many forested watersheds, this watershed delivers a significant amount of benefits to downstream users, but its health and resilience have become degraded by decades of aggressive fire suppression and a lack of adequate forest treatment. Because of this, resource managers project that the chances of catastrophic fire in the watershed are high, and, in its current condition, when a fire does occur there will be significant adverse consequences to the watershed and the quality of services it provides.

The first phase of the project analyzes how upper watershed restoration treatments, primarily fuel hazard reduction and forest health management, benefits downstream beneficiaries and reduces operational costs of energy and water delivery agencies. The project also analyzes how these treatments can benefit socioeconomic and environmental conditions to watershed habitants and local resources. The backbone for these analyses is a rigorous computer modeling effort that linked numerous models together in a series, which were then run under both a current conditions scenario and a future treatment scenario. Bark beetle mortality modeling informed the development of the fire model, the outputs from which were used in three different sediment models. Three different sediment models were necessary to capture the distinct, but additive, post-fire erosion mechanisms: regular surface erosion (sheet and rill), gully formation, and debris slides.

Current Status

The project scope and work approach was developed by the SNC, U.S. Forest Service and The Nature Conservancy. Very early into the process the following key project partners were included: Bureau of Land Management, East Bay Municipal Utility District (EBMUD), Pacific Gas and Electric (PG&E), Department of Forestry and Fire Protection, Department of Water Resources, a local tribe, local conservation groups, and other local stakeholders. Both an Advisory Committee and Technical Committee have been formed with members from all participating organizations. The technical expertise and the complexity of this project required the hiring of four consultants: Fire Model Consultant, two Sediment Modelers, and Project Managing Consultant. This effort is being coordinated with the watershed-wide Environmental Benefits Program, as described above. The project cash budget for the first two years totals \$242,000 and includes \$137,000 from the Sierra Nevada Conservancy, \$100,000 from the Forest Service, and \$35,000 from The Nature Conservancy. It also includes an in-kind match of over \$1 million consisting primarily of the project management team and the Advisory and Technical Committee's time and technical resources.

To date, the modeling efforts are complete and the results indicate a significant fire and post-fire sedimentation risk. Under today's conditions, the models verify what is widely known: the water from this watershed is of high quality. However, the introduction of

large damaging fire can increase the sedimentation rates from burned hillsides by sometimes over 100 times, and flame lengths in certain areas are predicted to reach over 60 feet in height. A review of the treatment scenario modeled for the Analysis demonstrates that the treatments greatly reduce the impact of the fire on the landscape. The modeled treatment scenario included approximately 100,000 acres of treatments, which tests the effectiveness of treatments across the range of habitat and human use found within the fire-prone areas of the watershed. This inclusive treatment scenario was chosen to help the team determine where the greatest cost/benefit areas are located, so that future planning efforts can build upon and refine this work.

At the time this report was prepared, the Project Management Consultant team was performing a detailed review of the results and assigned cost and damage values to the model scenarios, which is the basis of the avoided cost calculations. Based upon the fire model results, the local fire history, and forecasted fire trends for the Sierra Nevada, the consultants have teased five (5) probable fire ignitions and burn perimeters out of the fire modeling data. Based on the perimeters, comparisons can be drawn on the extent and intensity of the fire under treated and untreated conditions. Based on those differences, damage to assets (e.g. power lines and parcels), suppression costs, and sediment erosion rates, among others, can be quantified and compared between treated and untreated. The Committees are actively reviewing each of the eight chapters developed for the final report, as well as ground-truthing the quantified values produced by the consultants.

Next Steps

The Project Management Consultant will work with the Advisory and Technical Committees to finalize and approve the Final Report, which will include an Executive Summary. Future actions will be based upon the findings in the Final Report and the identification of the organizations that would most benefit from the reduction of fire threat within the watershed. Outreach to organizations in the East Bay, as well as the development of the entire Environmental Benefits Program will continue. The avoided cost analysis report is scheduled to be completed in mid-December.

Recommendation

This is an informational item only; no formal action is needed by the Board at this time, although Boardmembers are encouraged to share their thoughts and comments.