



Upper Mokelumne River Watershed Authority

Supplemental Agenda Materials Packet - July 28, 2023 -

Table of Contents

Agenda #	Agenda Item Title	Document Name
4	FPP-1 Implementation Work Plan Funding Strategy	1. Funding for Forest Health Treatments, Tapping the Carbon Market 2. Blue Forest Memorandum for UMRWA Board of Directors - Status Report: Upper Mokelumne Watershed Forest Resilience Bond Exploration

Members

Alpine County • Alpine County Water Agency • Amador County • Amador Water Agency • Calaveras County • Calaveras County Water District •
Calaveras Public Utility District • East Bay Municipal Utility District • Jackson Valley Irrigation District



Funding for Forest Health Treatments: Tapping into the Carbon Market

The need to scale up fuel treatments across California and beyond is increasing, but funding remains a major challenge. A new initiative is now advancing based on decade-long research on the greenhouse gas emissions implications of fuel treatments: tapping into the carbon market through avoided wildfire emissions (AWE). In collaboration with Climate Forward, a sub-platform of the Climate Action Registry, we at SIG, Anew, CAL FIRE and others are in the process of establishing a funding source for fuel treatments through the carbon market.



How it works

1. Gauge carbon-based funding for specific projects
2. Assess fuel treatment capacity to lower wildfire emission risks
3. Project-specific analysis based on fuel treatment location, type, and implementation status
4. Register project with Climate Forward
5. Carbon credits issued upon fuel treatment implementation; sale of credits through Anew

Potential funding through Anew is available to promising projects prior to implementation. Minimum data input required by implementing agency; AWE quantification by SIG.

How much funding is available?

Funding depends on project scale, location, fuel treatment type, and carbon market. Projects will be evaluated by SIG/Anew to determine funding opportunity prior to any commitment.

→ CONTINUED ON BACK

Frequently Asked Questions About AWE

1. What activities are eligible to generate AWE credits?

Prescribed burns, thinning, pruning, mastication, or mechanical removal of vegetation are all eligible for credit generation.

2. Is there a minimum project acreage size?

Some factors like location and treatment type impact this number, but generally total treatments in excess of 1,000-3,000 acres will be viable. These treatment areas do not have to be contiguous or even occur in the same year as long as they are within three years of each other.

3. Can projects take place on federal, state, and/or private land?

Yes, yes, and yes. Unlike traditional forest carbon projects, ownership is irrelevant to AWE credit generation; eligible entities must only implement or oversee implementation of fuels treatments.

4. How long does it take to go from contracting to receiving funds?

While it takes 12-18 months to calculate carbon benefits, achieve confirmation with the registry, and get credits issued, Anew will begin marketing your project's credits as soon as a contract agreement is in place, ensuring that credits sell at, or shortly after, credit issuance. Proceeds are returned to our partners within 30 days after sale to end users.

5. What happens if my project area burns due to wildfire after treatments occur?

There are no ongoing monitoring or reporting responsibilities after a project is approved, and accordingly, there is no liability to you for wildfire emissions. Because emissions reductions are calculated and credited conservatively over the ensuing 40 years, near-term emissions are factored in.

6. What is the added time/cost to me for pursuing funding from carbon markets?

Upon agreeing to commercial terms, your only obligation is reporting of treatment areas and treatment timing to Anew as activities occur. We will handle every intermediate step and expense and return the lion's share of credit sales proceeds to you as they are received.

Interested?
**Reach out to
learn more.**

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Anew / anewclimate.com

Anew Climate, LLC (“**Anew**”) is accelerating the fight against climate change by enabling any company or organization to align its goals for conservation and impact with actionable next steps. With a comprehensive solutions portfolio that includes advisory services, carbon credits, renewable natural gas, renewable energy credits, EV credits, plastic credits, and emission reduction credits, we lower barriers to participation in environmental markets for clients across the private and public sectors.

Spatial Informatics Group / sig-gis.com

Founded in 1998, Spatial Informatics Group, LLC (SIG) is a group of research scientists and applied thinkers with broad expertise in geospatial analysis, forestry, environmental and socio economic sciences. We use innovative spatial analysis methods to uncover new insights and provide guidance to solve challenging real-world problems in natural and urban landscapes.

Memorandum for UMRWA Board of Directors

Status Report: Upper Mokelumne Watershed Forest Resilience Bond Exploration

July 28, 2023

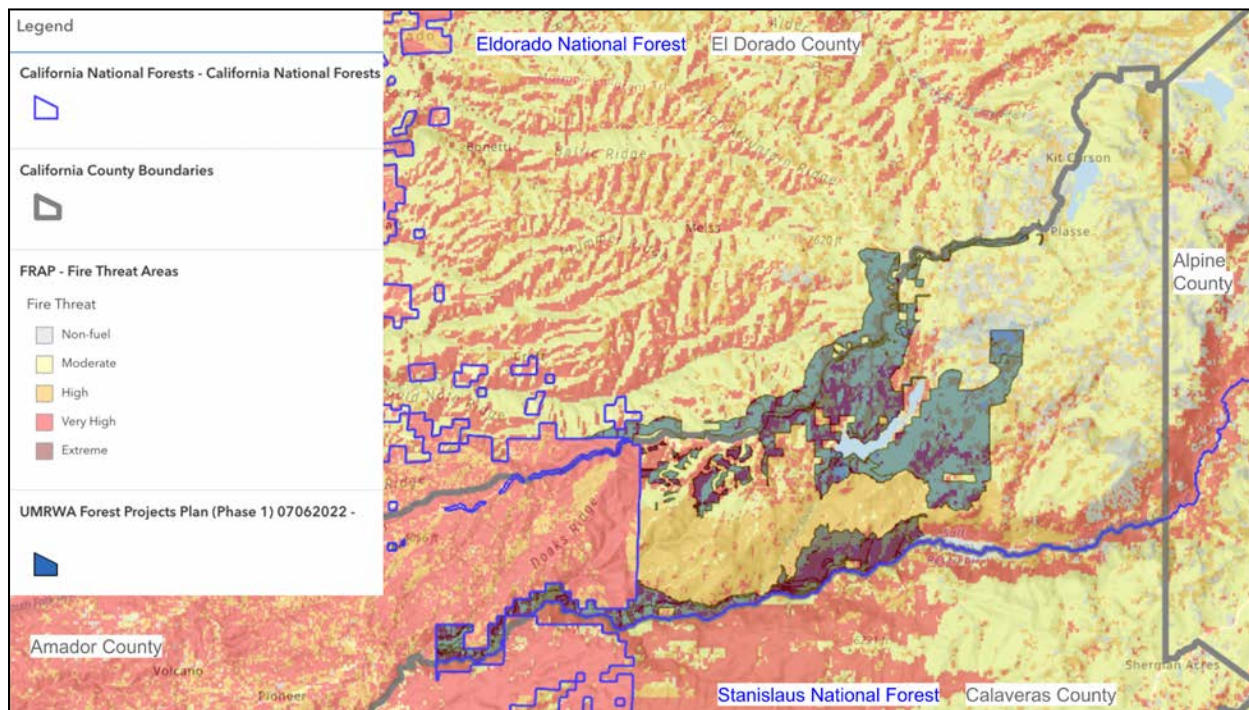
Purpose

Blue Forest and UMRWA have prepared this memo for the July 28, 2023 UMRWA Board meeting. The purpose of this memo is to provide an update about UMRWA and Blue Forest’s collaborative effort to develop a Forest Resilience Bond (FRB) to support implementation of forest restoration projects in the Upper Mokelumne River Watershed. This memo is a status report for informational purposes only - no decision or approval is required and discussion is welcomed.

Project Context

To address the growing threat of catastrophic wildfire in the Mokelumne River watershed, UMRWA, in collaboration with the Eldorado and Stanislaus National Forests, is planning over 225,000 acres of forest restoration and fuels reduction efforts on National Forest System land through the [Forest Projects Plan](#). Implementing these forest restoration projects will reduce the risk of catastrophic wildfire to local communities and water supply infrastructure, as well as provide a host of other benefits. Planning and permitting are complete for Forest Projects Plan Phase 1 (25,671 acres) and implementation will begin during fall of 2023 or spring of 2024 (Figure 1).

FIGURE 1: UMRWA PROJECT AREA & FIRE THREATS



Forest Projects Plan Phase 1 implementation will cost an estimated \$63.4 million. To date, UMRWA has engaged the State of California to secure two grants from CAL FIRE for \$5 million and \$6.4 million to support implementation activities, leaving a remaining unfunded balance of \$52 million. Planning for future phases of the Forest Projects Plan is currently underway and will expand forest restoration activities across the Upper Mokelumne River watershed landscape for even greater benefits, which will require additional funding and support.

UMRWA's Collaboration with Blue Forest

UMRWA is a strong local non-profit leader with a shared interest in protecting this region alongside the USDA Forest Service and other watershed stakeholders. To explore innovative funding approaches for the Forest Projects Plan, UMRWA partnered with Blue Forest in March 2021 (through an MOU) to explore the development of a Forest Resilience Bond (FRB) for the Mokelumne River watershed. UMRWA has demonstrated excitement and support for using the FRB model to expedite and scale forest restoration to reduce the risk of catastrophic fire on this landscape.

About Blue Forest

[Blue Forest](#) is a nonprofit founded in 2015 to finance natural infrastructure projects to address the growing threat of wildfire in the Western United States. We are a small interdisciplinary team of scientists, finance and policy experts, foresters, engineers, and communication professionals. We use [conservation finance](#) to sustain resilient landscapes, ecosystems, and communities. Blue Forest has a Challenge Cost Share Agreement with the USDA Forest Service and is a trusted partner working to support the implementation of landscape-scale resilience projects.

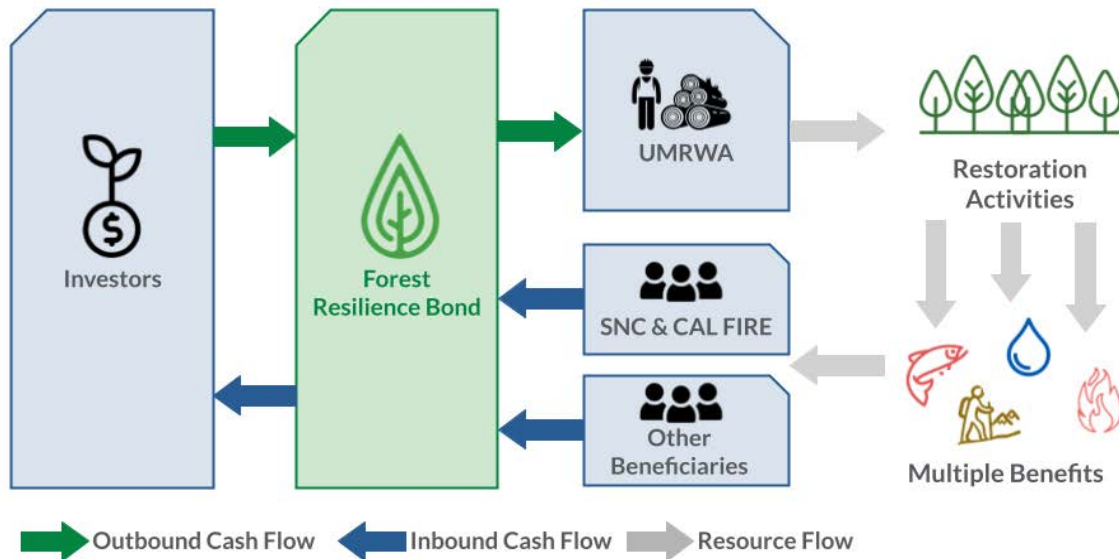
About The Forest Resilience Bond

Blue Forest and its partners developed the [Forest Resilience Bond](#) (FRB) to overcome barriers to forest restoration and accelerate investment in forest health and watershed protection. The FRB is a public-private partnership financing tool that provides up-front capital to implement critical restoration projects at a faster pace and scale, and supports implementation partners (like UMRWA) by building institutional and workforce capacity. The FRB secures low-interest private market capital from organizations such as pension funds, foundations, and impact investors to provide up-front funding for forest restoration. This financing model is not new – it resembles infrastructure finance used to build public facilities like bridges and water treatment plants. The FRB applies the financing approach in new applications to protect and enhance natural infrastructure like forests and watersheds.

When developing FRBs, Blue Forest works with local project partners to identify and quantify project benefits and engage downstream project beneficiaries (such as utilities, corporations, and government agencies) that value the work and can help repay the FRB over time. For a conservation finance tool like the FRB to be successful, baseline ecological and economic data must be available and beneficiaries must be interested in the projected benefits. Strong cross-boundary relationships and existing local partnerships further support the opportunities and feasibility of the FRB. This collaborative and data-driven funding approach reduces project costs for any one entity and vastly increases the scale and pace of forest restoration. Blue Forest negotiates FRB contracts with beneficiaries that are designed with flexible repayment terms while providing modest returns to investors.

The FRB is also a helpful tool for attracting public funding to a project: participation from local beneficiaries often attracts additional state and federal funding, including US Forest Service (USFS) Infrastructure Bill 10-Year Strategy awards, Inflation Reduction Act (IRA) funding through the Water Source Protection Program, and funding via designation as Wildfire Crisis Strategy Priority Landscape.

FIGURE 2: STRUCTURE OF THE FOREST RESILIENCE BOND



Forest Resilience Bond Exploration for the UMRWA Project

UMRWA and Blue Forest are working to develop a pilot FRB to finance the first \$5-10 million of implementation costs for the Forest Projects Plan. The goal is to pilot the FRB model in 2024 and, if successful, to expand the FRB to support the larger project landscape over the next decade. Starting with a smaller pilot FRB will give stakeholders an opportunity to gain familiarity and confidence with the model and build relationships with one another, the Forest Service, and Blue Forest. This pilot-to-scale approach also enables beneficiaries to support the project with smaller initial funding commitments.

This envisioned FRB to implement the Forest Projects Plan would provide UMRWA with a comprehensive line of credit enabling rapid payment of contractors and alleviating cash flow constraints that can arise when funding a project with reimbursable grants alone (e.g. CAL FIRE grants). This ability to pay contractors quickly through an FRB (within 10 days) can reduce the price of project bids when UMRWA solicits proposals from contractors and will allow UMRWA to focus on meeting its annual goals for treatment instead of triaging cash flow constraints. Depending on its structure and available funds, an FRB may also provide additional grant funding to UMRWA to support restoration projects.

Forest Resilience Bond Progress To Date

UMRWA, the Forest Service, and Blue Forest have met monthly to discuss this project and develop a strategy for an FRB in the Mokelumne River watershed. These meetings have focused on confirming planned treatments to inform benefit analysis activities, confirming the benefits of financing for UMRWA, and refining economic analysis approaches. Based on these discussions, Blue Forest is actively engaging potential project beneficiaries, including East Bay Municipal Utility District (EBMUD), Amador Water Agency, and Calaveras County Water District.

Blue Forest has also partnered with World Resources Institute (WRI) to develop an economic model to analyze the watershed benefits of the project (described in the sections below). The model will be used to help beneficiaries understand the impact of forest management projects on their bottom lines and explore their interest in financially committing to an FRB.

Project Benefit Analysis

Much work has already been done to analyze and quantify the benefits of completing forest restoration projects in the Mokelumne River watershed. For example, the [2014 Mokelumne Watershed Avoided Cost Analysis](#) highlights several benefits of forest treatments for this landscape, concluding that a \$68 million investment in fuels treatments could yield between \$126-224 million in benefits for the State of California, federal government, residential private property owners (and their insurers), timber owners, and water and electric utilities (Figure 3).

FIGURE 3: ESTIMATED COSTS & BENEFITS FOR FUEL TREATMENT SCENARIOS

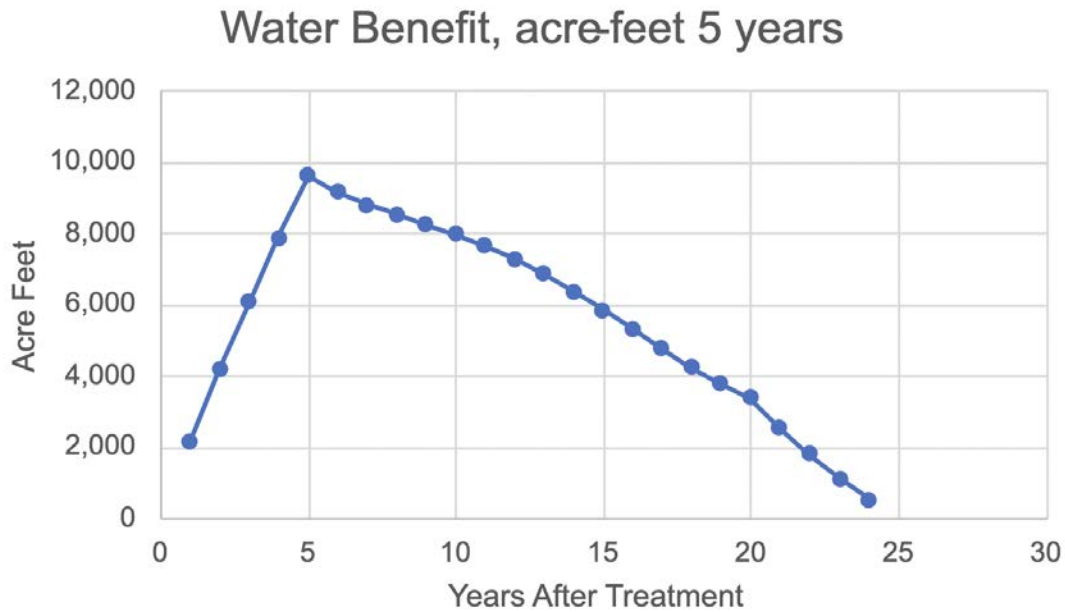
Costs		
Fuel Treatment	\$16,000,000	\$68,000,000
Benefits		
	Low	High
Structures Saved	\$32,000,000	\$45,600,000
Avoided Fire Cleanup	\$22,500,000	\$22,500,000
Carbon Sequestered	\$19,000,000	\$71,000,000
Merchantable Timber from Treatment	\$14,000,000	\$27,000,000
Avoided Suppression	\$12,500,000	\$20,800,000
Biomass from Treatment	\$12,000,000	\$21,000,000
Avoided Road Repairs and Reconstruction	\$10,630,000	\$10,630,000
Transmission Lines Saved	\$1,600,000	\$1,600,000
Timber Saved	\$1,200,000	\$3,130,250
Avoided Sediment for Utilities (water supply)	\$1,000,000	\$1,000,000
Total Benefits	\$126,430,000	\$224,260,250

Note: Values rounded to significant figures.

Source: 2014 Mokelumne Watershed Avoided Cost Analysis

To build on these foundational cost-benefit insights from the Mokelumne Watershed Avoided Cost Analysis, Blue Forest developed a water volume benefit model that incorporates findings from a growing body of peer-reviewed research demonstrating a positive relationship between fuels management projects and water yield in the central and northern Sierra Nevada. Blue Forest’s recent *Science Brief: Water Resource Benefits from Forest Fuels Reduction* (included in the July 2023 UMRWA Board meeting packet) provides an overview of the approach used to model anticipated water yield benefits of the Forest Projects Plan. Blue Forest’s water yield benefit model estimates that Forest Projects Plan Phase 1 will result in 133,940 acre-feet of additional runoff over a 25-year period from reduced vegetation water use (Figure 4). This expected additional water yield could be a significant source of value for water users within the Mokelumne River watershed.

FIGURE 4: PROJECTED WATER YIELD BENEFITS OF FOREST TREATMENTS



While Blue Forest’s benefit analysis of the Forest Projects Plan has focused on benefits with quantifiable economic implications, additional benefits of significance are likely to result from the project that can inform funding decisions by project stakeholders. A few of these benefits include:

- **Improved Forest Health** by restoring stand structure and species composition to better withstand wildfire, drought, and other disturbances.
- **Protected and Enhanced Habitat**
- **Reduced Carbon Emissions** that affect public health throughout the region and climate goals.
- **Stimulation of the Regional Economy** by protecting and generating jobs and safeguarding the region’s tourism and recreation appeal.

Economic Analysis & Beneficiary Engagement

In order to connect project benefits with potential funding contributions from beneficiaries, Blue Forest and World Resources Institute are working closely with East Bay Municipal Utility District (EBMUD) to develop an economic model that quantifies the benefits of the Forest Projects Plan Phase 1. The primary benefits analyzed in the economic model include additional water yield (for diversion and hydropower generation) and avoided sedimentation and woody debris impacts from catastrophic fire events. Early modeling results indicate the greatest watershed benefits and risk reduction outcomes are expected from mechanical fuel reduction and prescribed burning treatments.

Many stakeholders in the Mokelumne River watershed are positioned to benefit economically from forest restoration activities, including UMRWA member agencies, PG&E, and private corporations with sustainability, conservation, and watershed protection goals. As a next step, Blue Forest intends to engage and collaborate with these stakeholders to explore the unique economic benefits of forest restoration on their business operations with the goal of securing interest and funding commitments from a diverse group of beneficiaries to support an FRB for Forest Projects Plan Phase 1. Amador Water Agency and Calaveras County Water District have both participated in preliminary conversations to learn

more about the FRB. Amador water agency expressed particular interest in water quality benefits and both agencies expressed support for the FRB model.

Next Steps and Schedule

With UMRWA Board direction and with existing State of California grant funding, UMRWA will proceed with Forest Projects Plan Phase 1 implementation this summer. UMRWA staff will continue to work with Blue Forest to build momentum and structure for a pilot Mokelumne River watershed FRB (including beneficiary engagement) anticipated for UMRWA Board consideration by January 26, 2024. Blue Forest's next steps for continued FRB development include:

- Finalizing the economic analysis with EBMUD and discussing next steps
- Meeting with other UMRWA member agencies to discuss the economic benefits of the project and potential funding proposals
- Engaging corporations who may have interest in funding restoration efforts in the Mokelumne River watershed
- Confirming funding commitments to launch a pilot FRB

APPENDICES

Appendix A: Examples of Successful Forest Resilience Bonds

[Yuba Project FRBs](#) support holistic landscape-scale forest restoration in the Yuba River Ranger District of Tahoe National Forest, protecting a total of 75,000 acres. Benefits include:

- 19,830 acre-feet of water supply protected
- 19,600 metric tons of carbon dioxide emissions avoided
- 60,904 tons of biomass utilized for affordable and clean energy generation
- 24 total partners actively engaged in the Yuba River Watershed and FRB
- 92 jobs created (external, not Blue Forest positions)
- The Yuba FRB's catalyzed the formation of the North Yuba Forest Partnership
- To date, \$28.5 million in additional funding has been leveraged through the North Yuba Forest Partnership

[Rogue Valley FRB](#) in Southwest Oregon supports restoring this critical landscape to reduce fire risk, and protecting seven of the thirty most wildfire-threatened communities in the state. This FRB partners with the [Lomakatsi Restoration Project](#) to restore over 79,000 acres. The FRB provides much-needed upfront capital and organizational support, enabling Lomakatsi to grow workforce capacity and work at a faster pace and scale.

Appendix B: Forest Resilience Bond Criteria, Contracting & Diligence

A successful FRB requires the following foundational building blocks, which the Forest Projects Plan has:

- NEPA-ready project, planned and permitted by local partners
- Robust local leader and project implementer with capacity and expertise to undertake restoration
- Benefits and ecosystem services present a compelling business case for multiple beneficiaries
- Local collaboration structures and opportunities, and cross-boundary relationships
- Baseline ecological and economic data in place, ability to quantify future outcomes

Blue Forest administers the FRB through the following contracting and due diligence process which reduces financial risk and enables project partners to focus their capacity on forest restoration:

- *FRB Operating Agreement with Blue Forest* - Blue Forest establishes a project-specific FRB LLC as a non-profit enabling low interest rates and as an efficient way to distribute and move funds
- *Investor Agreement with FRB*
- *UMRWA (Implementation Partner) Zero Interest Loan (and Grant) Agreement(s)* - UMRWA repays FRB with grants, does not pay any interest
- *Beneficiary Repayment Agreements* - Beneficiaries like EBMUD & Amador Water Agency agree to repay the FRB over time with a small amount of interest, and some modest administrative costs.
- *Investors assume the financial risk*, not UMRWA or beneficiaries
- *Financial Due Diligence Process* - UMRWA provides financial and administrative documentation to Blue Forest, similar to what is required by federal and state grant and loan programs. This process ensures that the UMRWA is comfortable with the requirements of the FRB, and that Blue Forest takes appropriate care before extending the loan.