



**FOREST  
RESILIENCE  
BOND**



WORLD  
RESOURCES  
INSTITUTE

**BLUE FOREST  
CONSERVATION**  
Financial Innovation for Sustainable Solutions

# Update on the Forest Resilience Bond (FRB)

Prepared for the Amador-Calaveras Consensus Group

February 19<sup>th</sup>, 2020

# North Fork, Feather River 1890-1993

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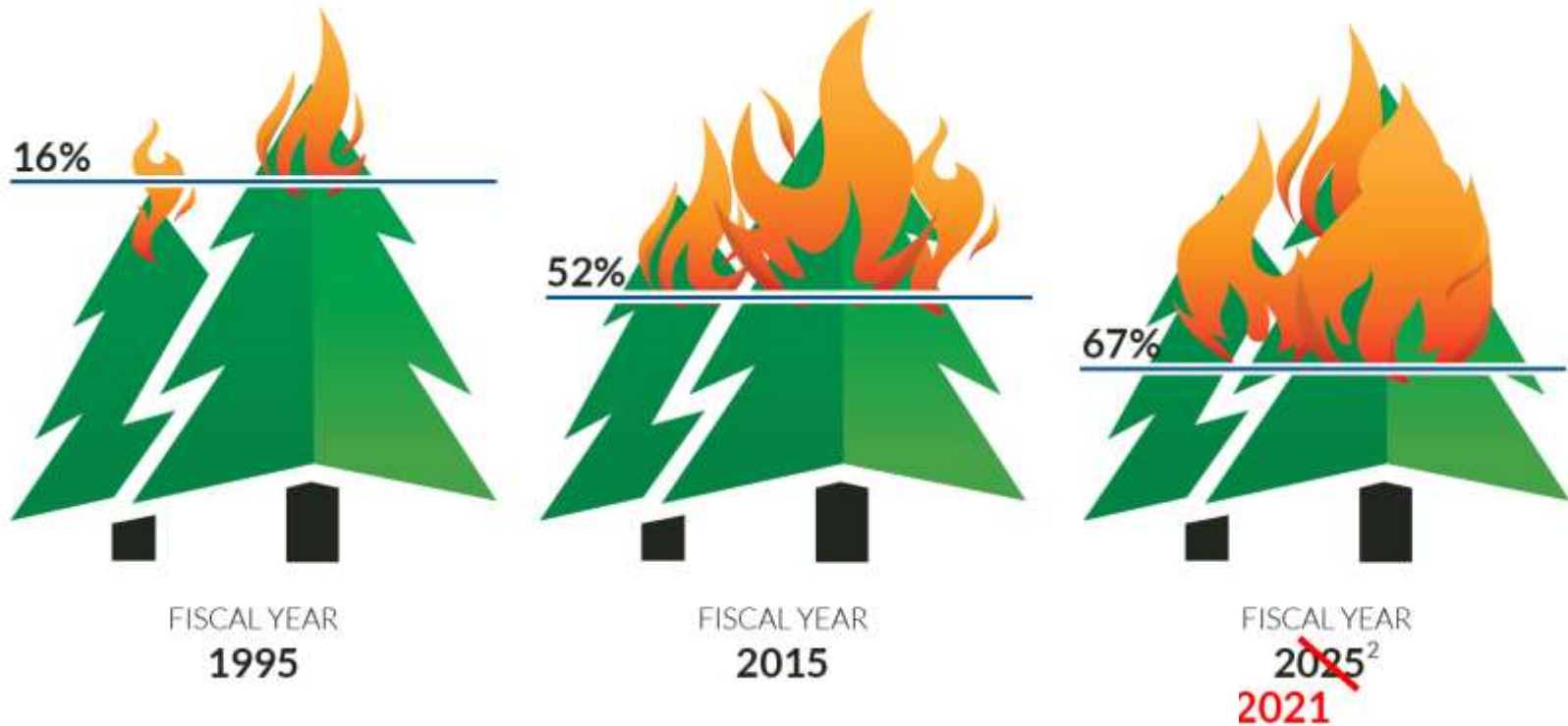


Photo Credit: George E. Gruell, Fires in the Sierra Nevada, 2001

# USFS: Rising Cost of Fire Suppression

## US Forest Service

Vicious cycle in which USFS is forced to pay for today's fires out of the funds designed to prevent tomorrow's





# Forest Restoration as a Solution

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**Overgrown**



**Restored**



# Collaboration Is Hard, Let's Make It Easier

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Financial resources are limited

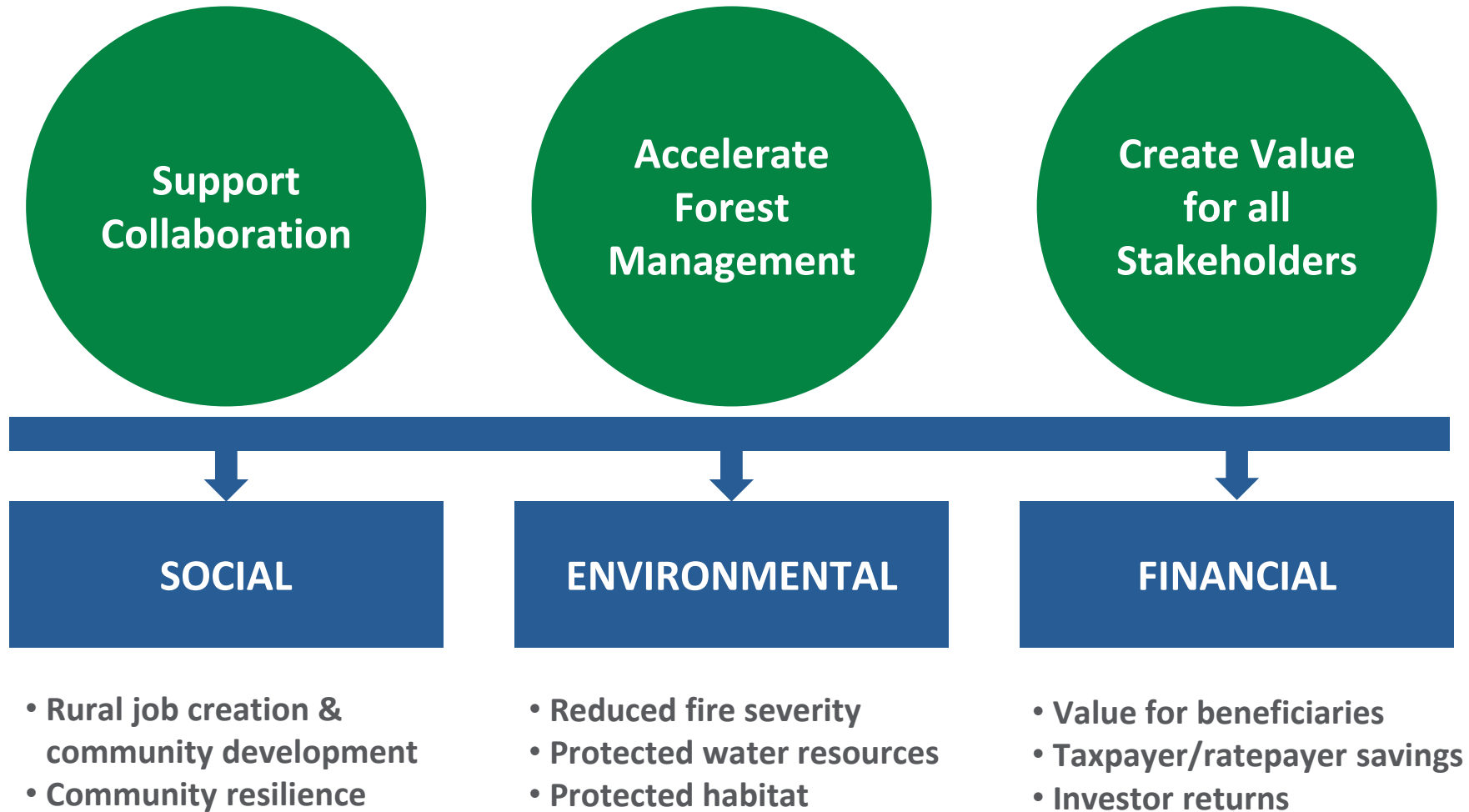
Human resources are stretched

Implementors rely on reimbursable public funds

Public/Private entities with different budgets, schedules, requirements, and definitions of success

# Goals of the Forest Resilience Bond

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# Utility Benefits of Forest Restoration

## Water Utilities

- Reduces fire risk to water quality and infrastructure
- Potential to increase water quantity

## Common Watershed Challenges

- Fire risk
- Infrastructure damage
- Water quality
- Sedimentation
- Declining yield
- Environmental regulations
- Regulated land use
- Insect and disease
- Timing of flows/runoff
- Flood control



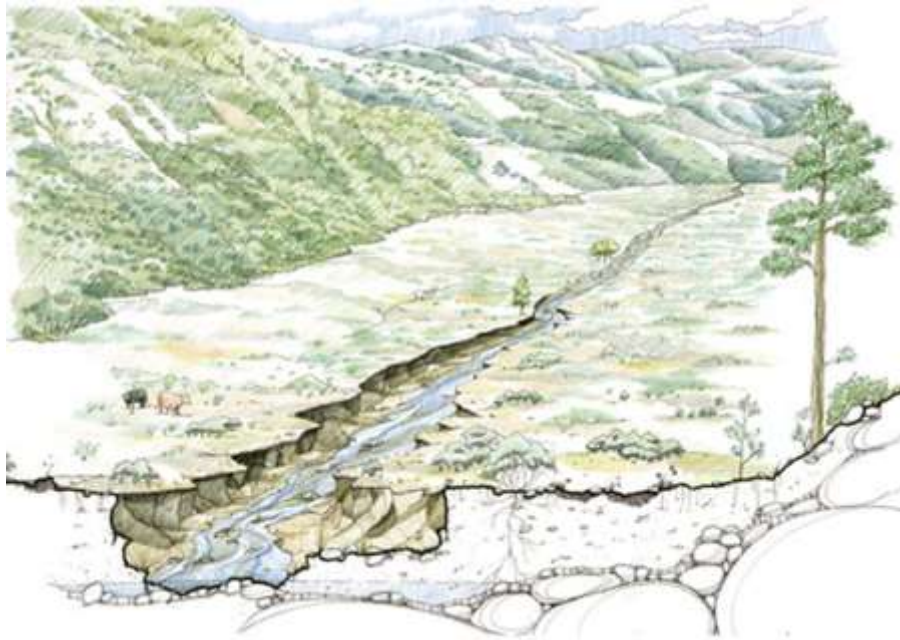
## Electric Utilities

- Protects against reservoir sedimentation
- Potential to increase utilization of cheap, carbon-free hydropower





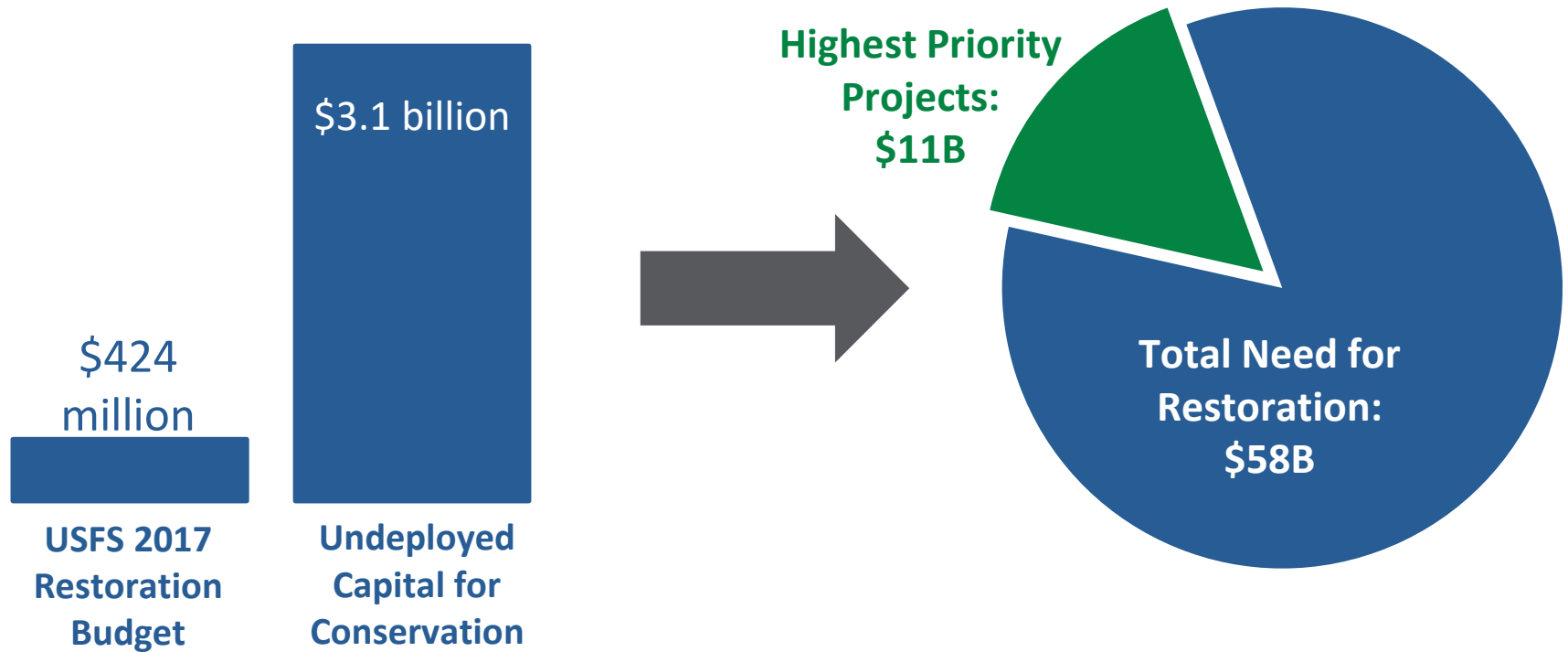
# Meadow Degradation and Restoration



Artwork by Restoration Design  
Group



# Opportunity for Private Capital



## Advantages of Private Capital

Infusion of  
capital

Cost sharing

Larger  
projects

Project  
catalyst

Ex-post  
payments

# FRB Projects Allow For Greater Efficiency

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Contractors paid on time

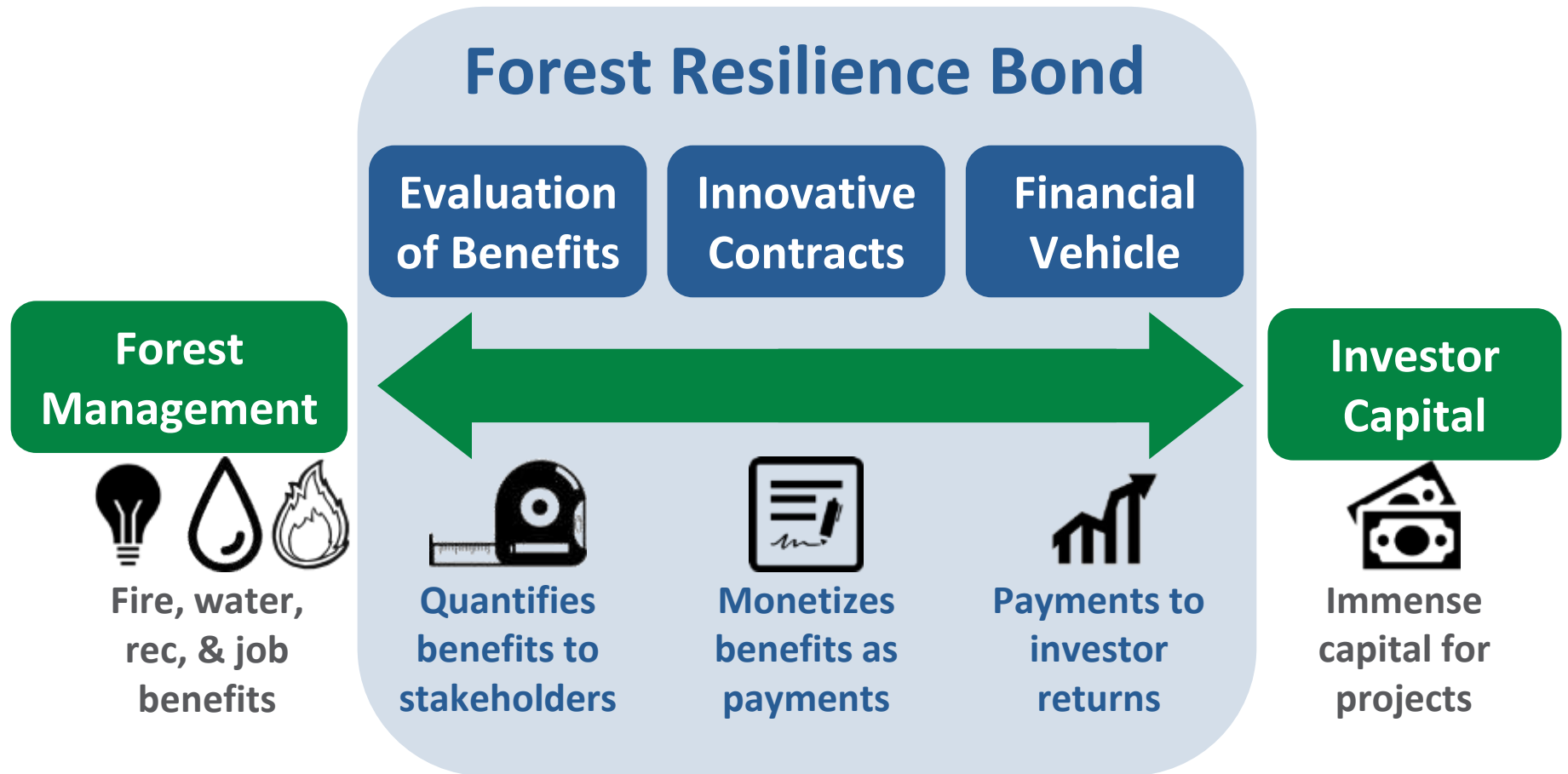
Larger projects enable concurrent biomass facility financing

Supports rural economic development

Long term predictable employment



# Connecting Investor Capital to Conservation

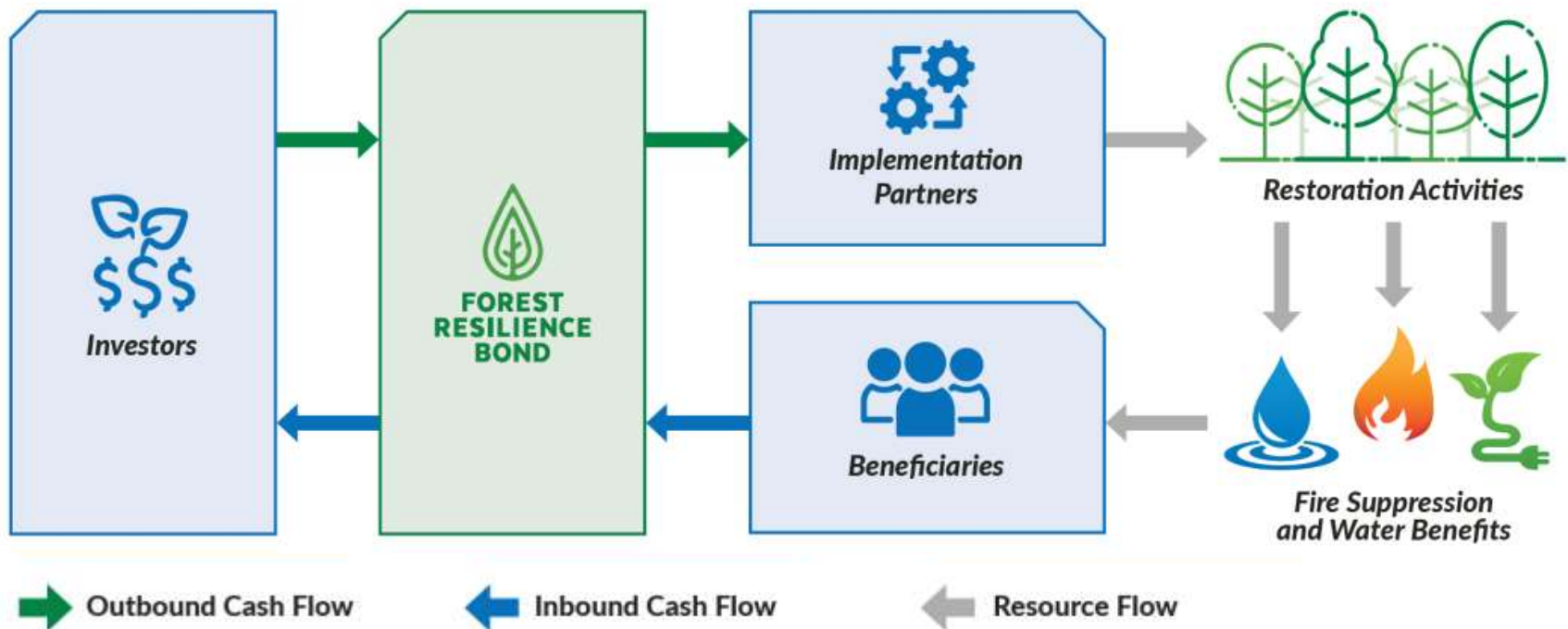


# The Forest Resilience Bond & Collaboration





# How the Forest Resilience Bond Works



# Sources of Repayment

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**Principal** + **Interest** = **Utility Contract** + **State/USFS Contributions**



# Criteria for Success

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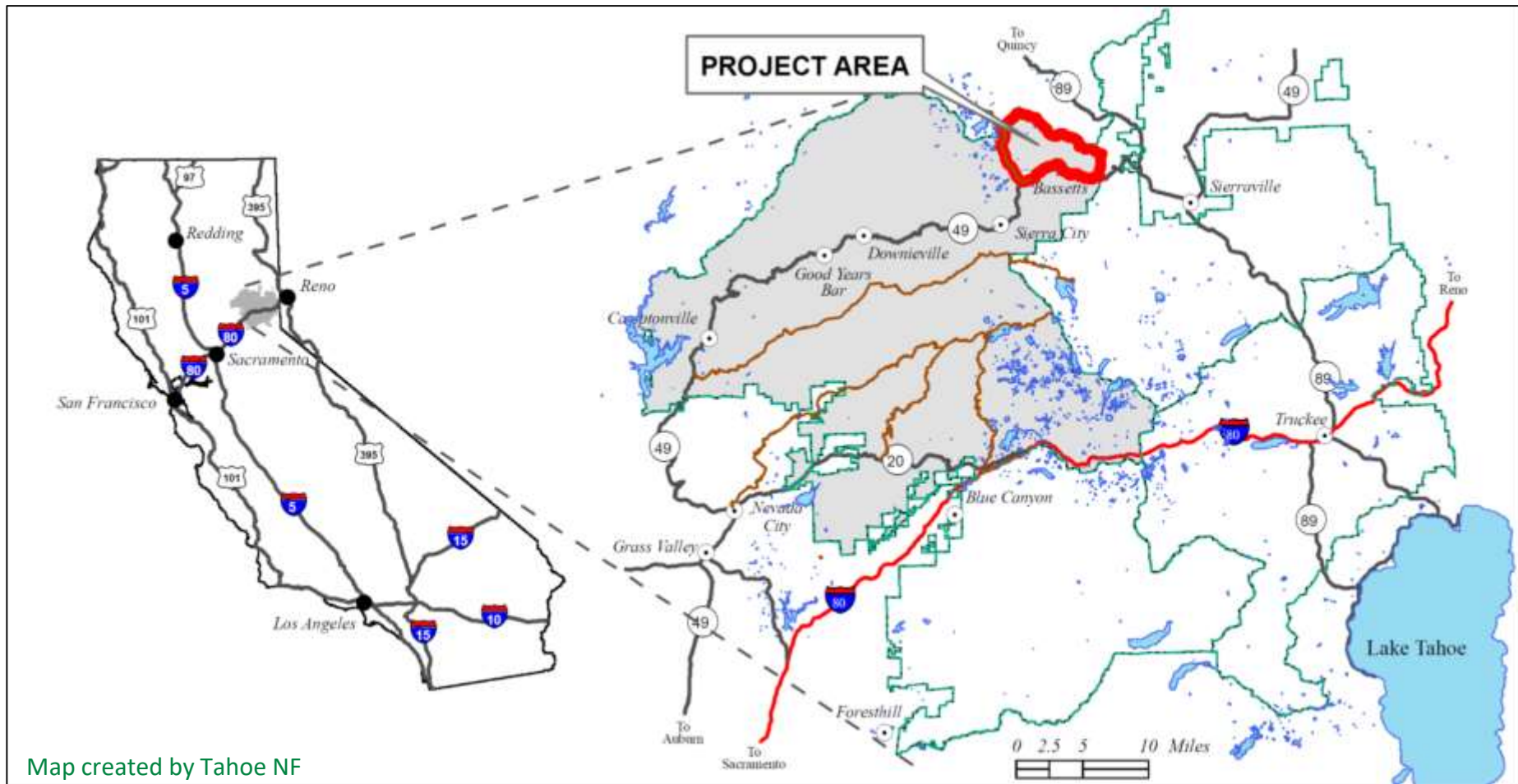
<b>Landscape</b>	NEPA-ready landscape
	Identified need for forest restoration (high fuel load, wildfire risk, etc.)
	Existing plan to implement forest restoration
<b>Leadership</b>	Strong FS leadership, with interest in innovation at multiple levels
	Champions at other beneficiaries
<b>Collaboration</b>	Compelling business case for involvement of multiple beneficiaries
	Existing local collaborative structures with history of success
	Strong cross-boundary relationships
<b>Capacity</b>	NF with capacity to prioritize partnership-building for the FRB
	Project implementer(s) with capacity and expertise to undertake restoration
<b>Data</b>	Baseline ecological and economic data in place
	Ability to quantify future ecological and economic outcomes

# The Yuba Project, Tahoe NF





# Yuba Project



Map created by Tahoe NF



United States Department of Agriculture

# TAHOE NATIONAL FOREST

## Fire Risk

### Legend

#### Fire Risk Index

- 1 - Very Low
- 2 - Low
- 3 - Moderate
- 4 - High
- 5 - Very High
- 6 - Extreme

#### Land Status

- Tahoe N.F.
- Adjacent National Forest
- Wilderness
- County
- Other/Private

#### Transportation System

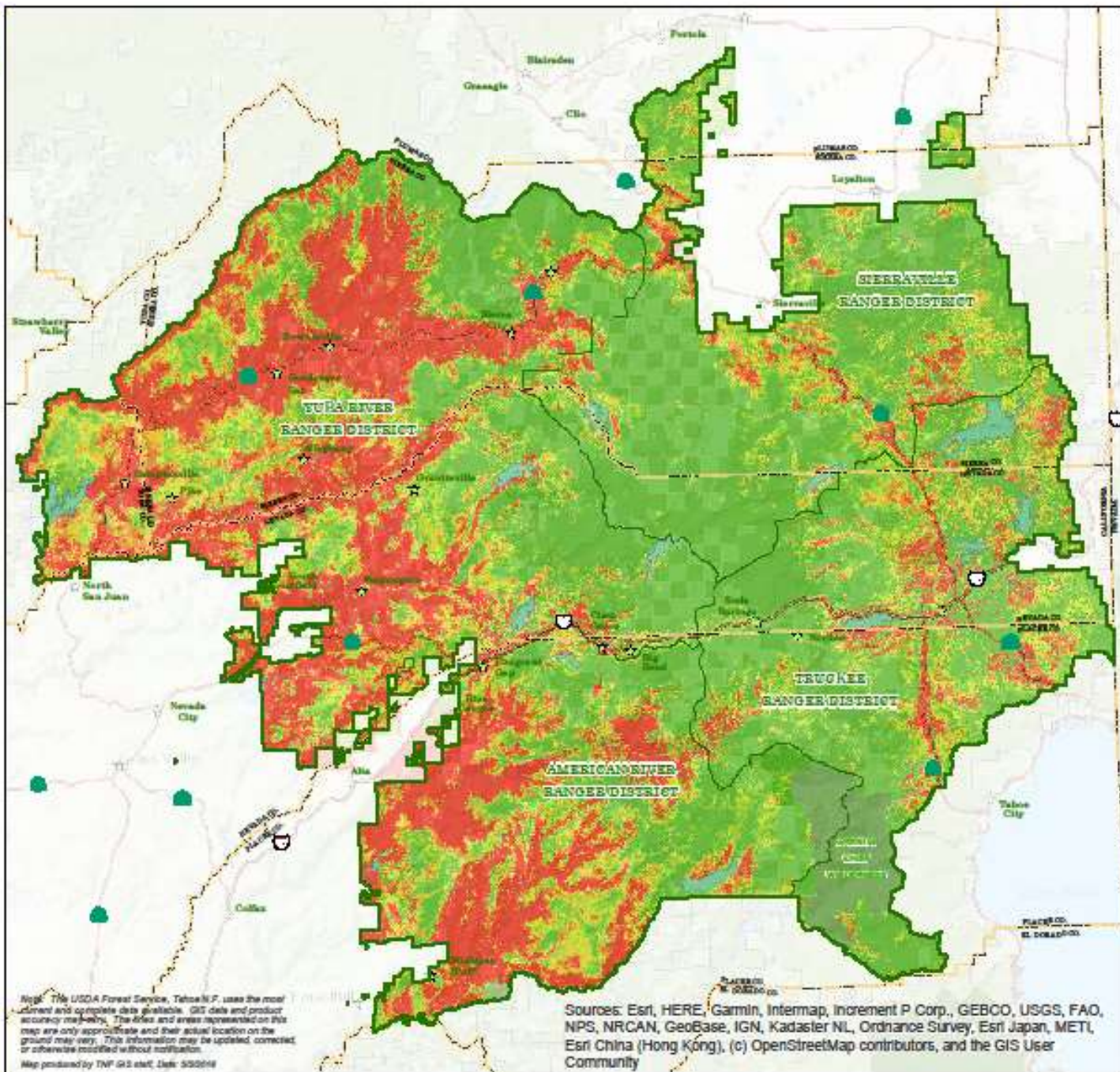
- State Highway
- Interstate & US Highway



0 2.5 5 10 Miles

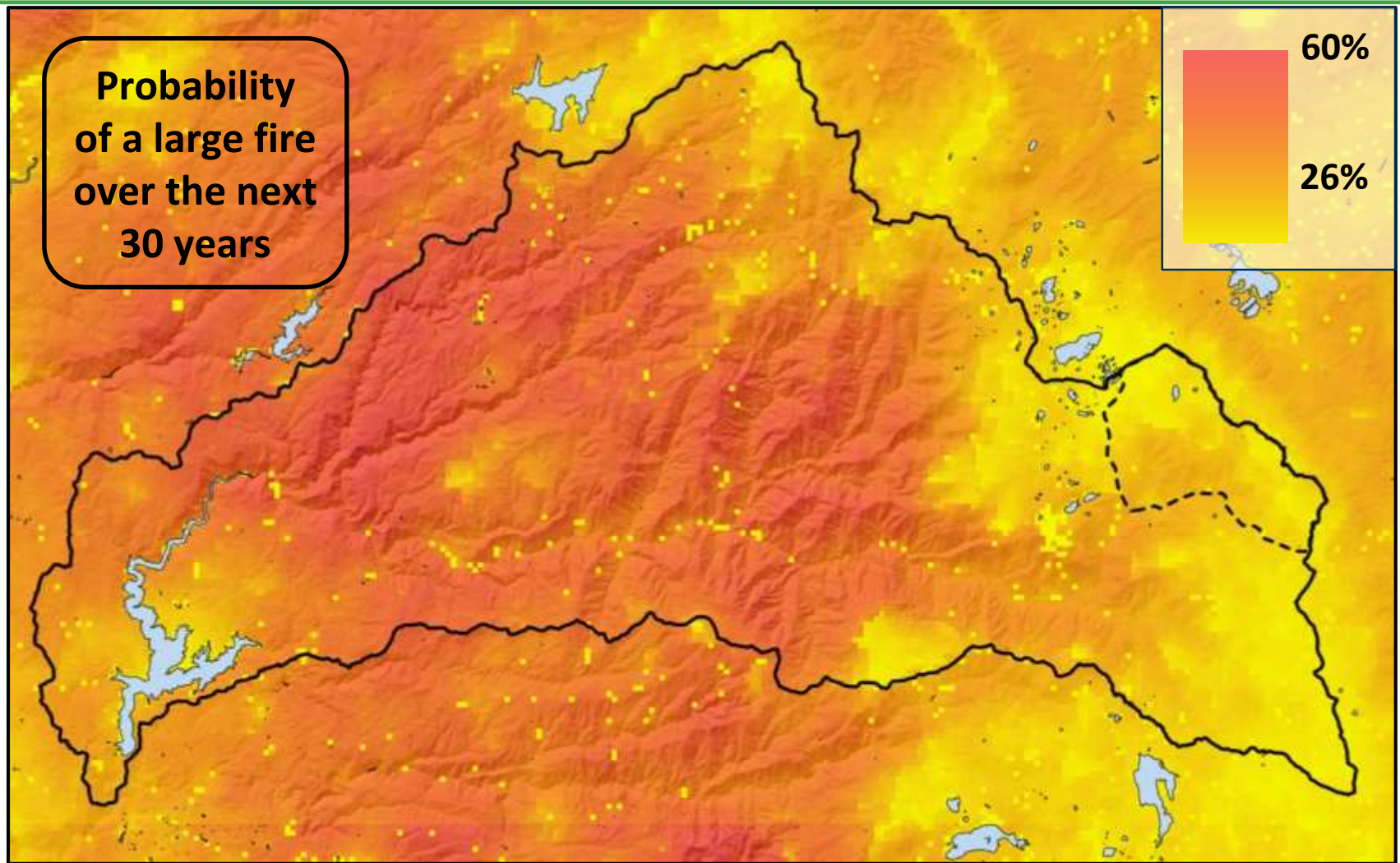


Forest Service  
Tahoe National Forest

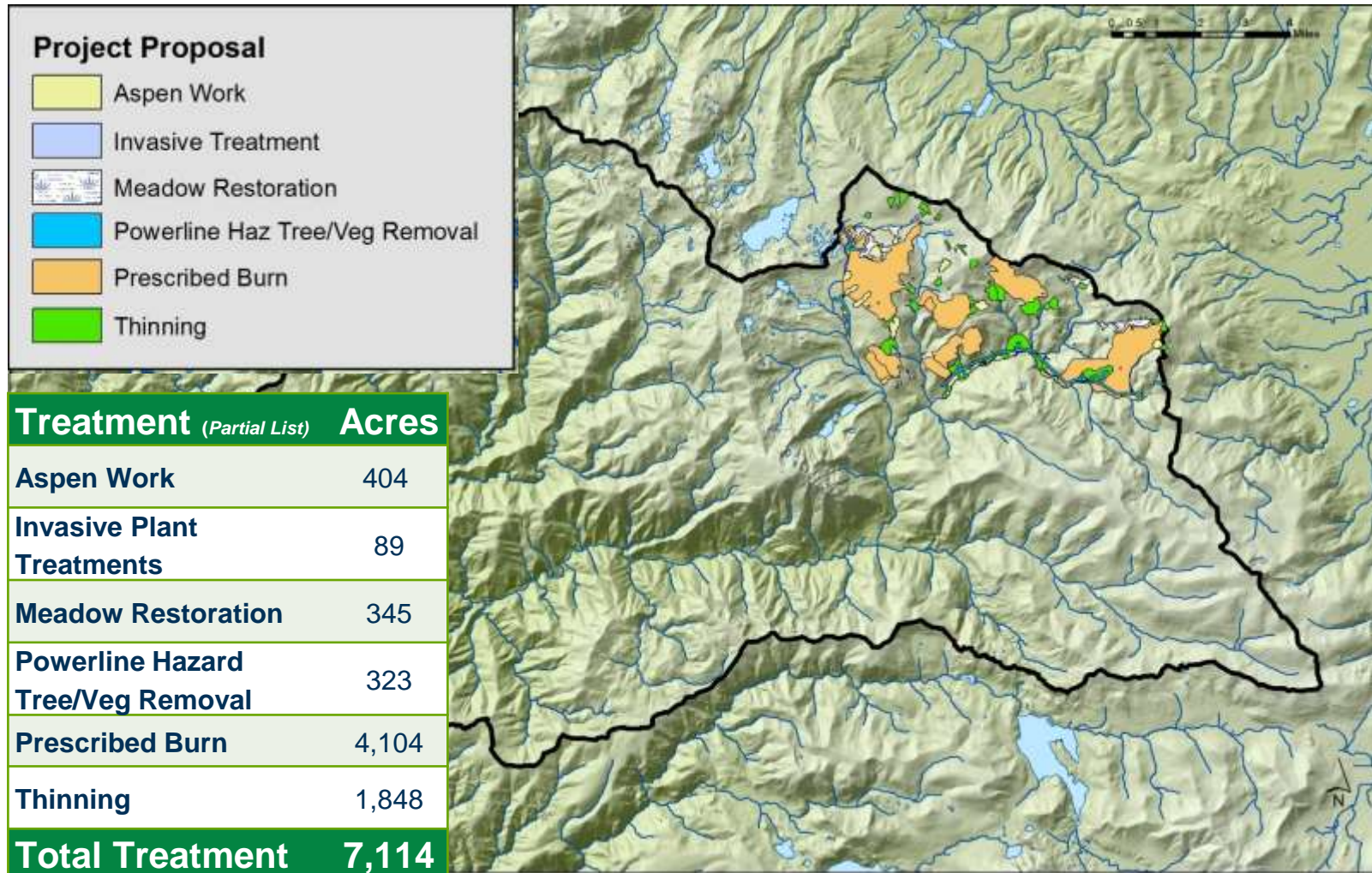




# North Yuba Wildfire Risk



# Yuba Restoration Project





# Forest Restoration Benefit to Yuba Water

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Reduced fire risk to infrastructure

Reduced woody debris flows

Job creation & economic security

Potential to increase and sustain  
water quantity

Protected water quality



Yuba River

# Partnerships of First Forest Resilience Bond

## Yuba Project Consortium: Participants



WORLD  
RESOURCES  
INSTITUTE



GORDON AND BETTY  
**MOORE**  
FOUNDATION



THE  
**ROCKEFELLER**  
FOUNDATION



**Stanford**  
Water in the West



**Brownstein Hyatt  
Farber Schreck**



# Yuba Project and Forest Resilience Bond

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Yuba Water pays back a portion of cost over time

Yuba Water payment of \$300k per year for 5 years

Flexible repayment terms possible

Yuba Water pays below market rates while also benefiting from cost sharing with parties

# Project Investors

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# Media Coverage

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## Los Angeles Times

**BUSINESS**

Start-up Blue Forest secures funding for first privately financed forest fire bond



Leigh Madeira, left, and Zach Knight, center, two founders of Blue Forest Conservation, tour an area near Yosemite National Park scorched by the 2013 Rim Fire. (Marcus Yam / Los Angeles Times)



**CBS  
NEWS**

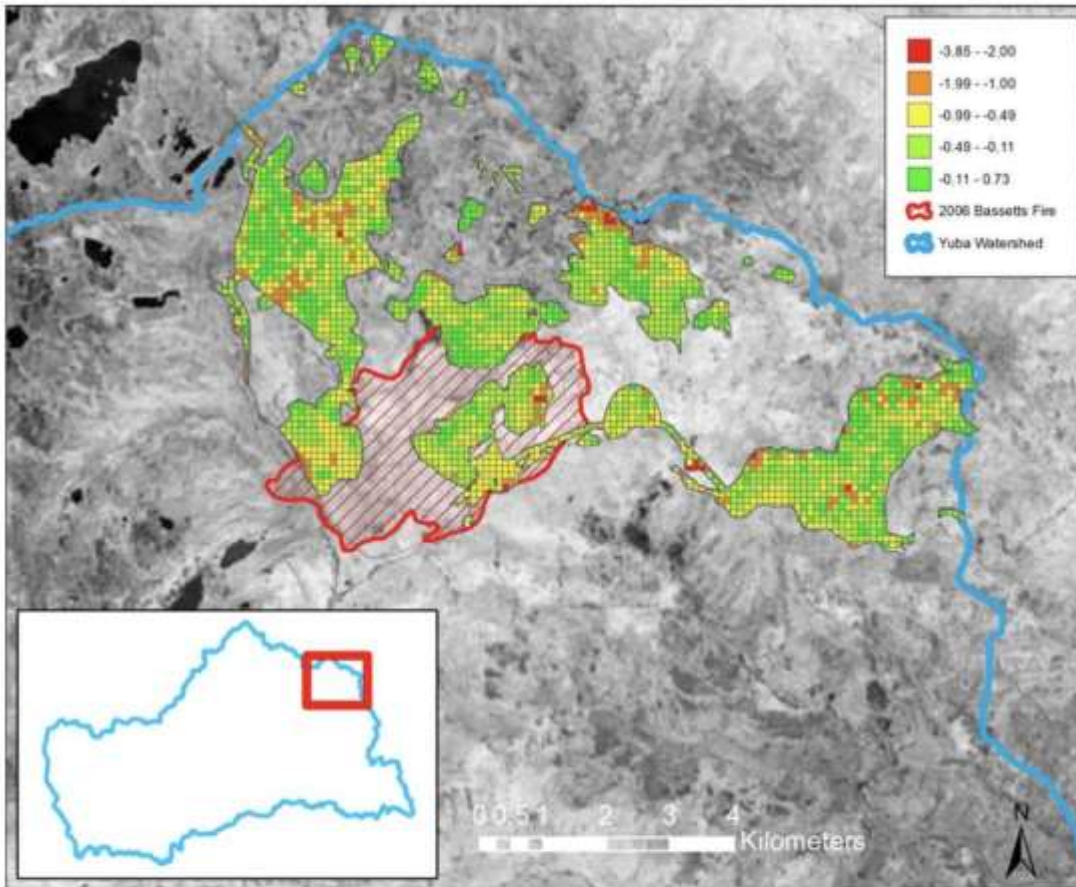


**THE  
HILL**

**THE SACRAMENTO BEE**



# Yuba FRB First Year Success - 2019



**Figure 3.** Probable Change detection for Yuba treatment areas in September 2019. Values are maximum negative standard deviations of the LandSat Normalized Vegetation Difference Index (NDVI) between treatment grid cells and adjacent untreated cells, with lower values indicating a greater likelihood of vegetation change.

## 2019 Activities

Fuels Reduction:	524 acres
Stream/Riparian:	3 miles
Invasive Plants:	5 acres
Road work:	3.4 miles
Biomass Utilization:	13,750 tons
Prescribed Fire Prep:	1,200 acres
Fire Control Line:	19 miles

# Efficiency of the FRB - More Than Finance

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## MORE THAN FINANCE: THE NON-MONETARY BENEFITS OF THE FOREST RESILIENCE BOND

*A finance tool at its core, the Forest Resilience Bond was developed to expedite the availability of funding for forest restoration on National Forest System lands. But as Blue Forest's pilot project on the Tahoe National Forest is already demonstrating, the benefits of this model extend well beyond finance.*

Read More →

Aug 13, 2019



<https://www.blueforestconservation.com/#thoughts>

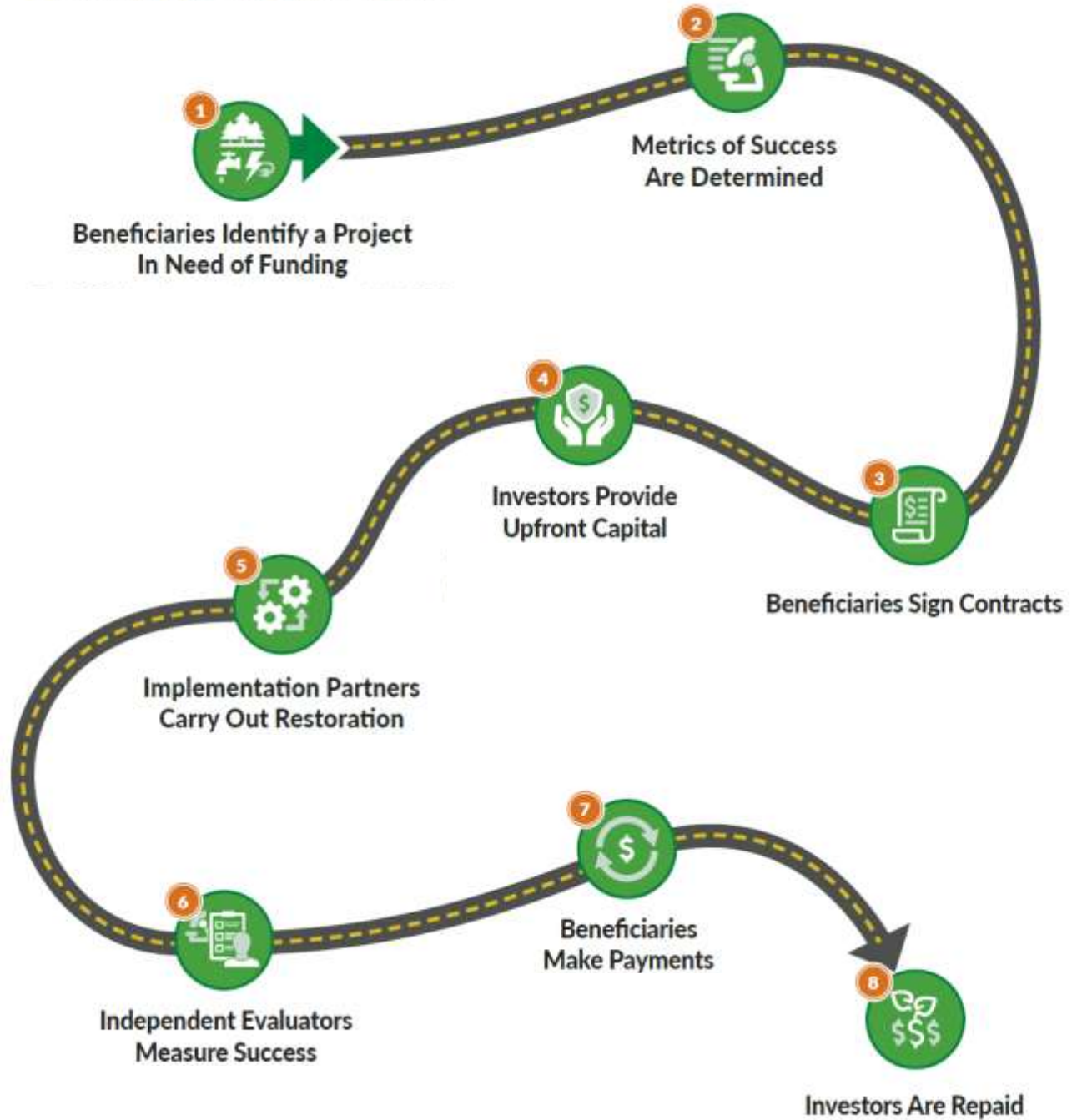
# Opportunities

## Amador-Calaveras Consensus Group





# How to Develop an FRB



# Questions to Create any FRB

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What is the project?

What outcomes are expected from the project?

Who specifically cares about those outcomes and who might be willing to pay?

# ACCG Topics of Interest

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Other financial opportunities like the FRB?

Engagement insights of key partners?

Status and implementation challenges?



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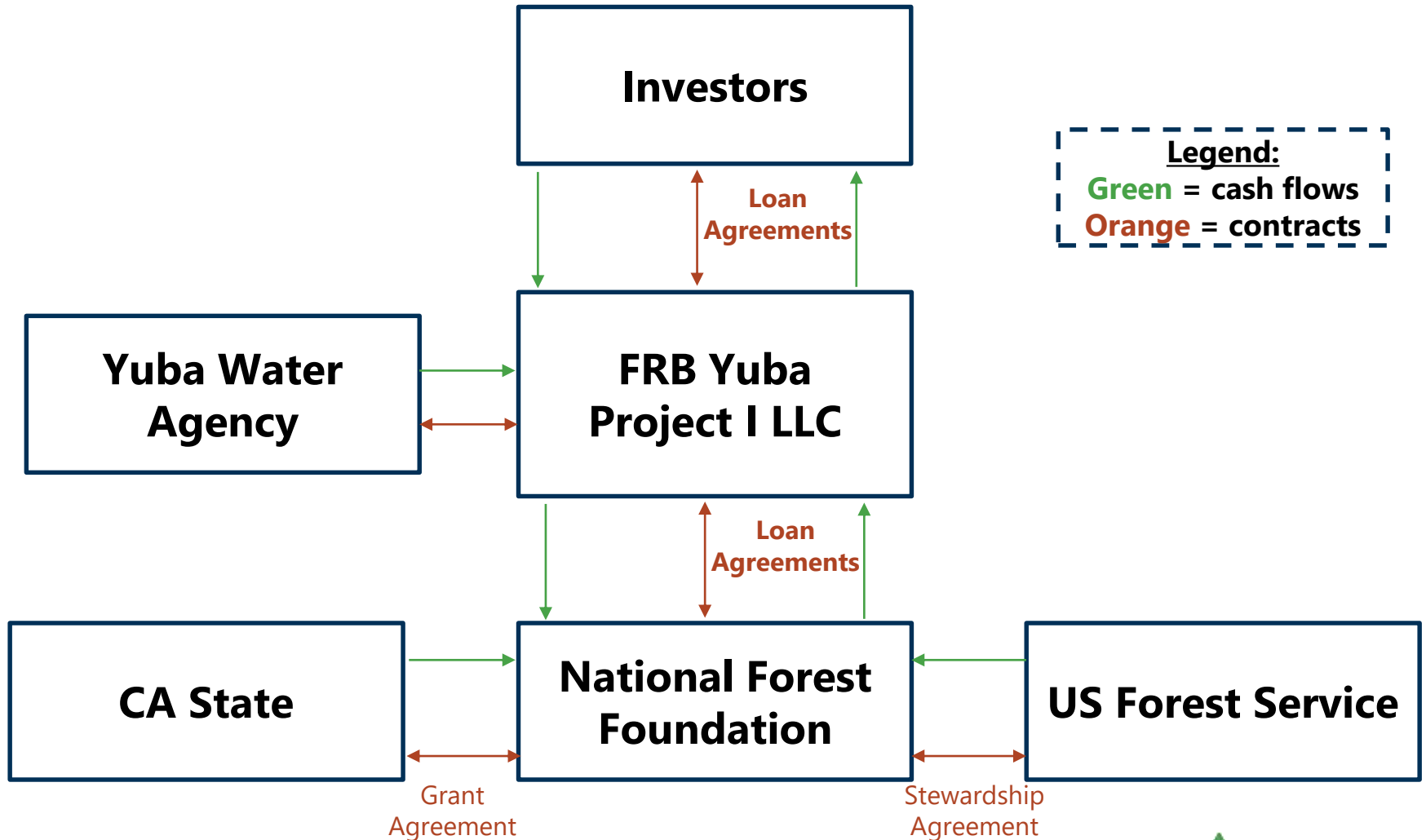
**Nick Wobbrock**  
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# Appendix



# Yuba Project Contracts and Agreements



# Example Contracts and Agreements

