

# San Juan-Chama Headwaters Return on Investment Study for the Rio Grande Water Fund

Executive Summary  
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*Special thanks to Steven Bassett of The Nature Conservancy whose fire modeling informed this study*

**PROBLEM: SEVERE WILDFIRE PUTS ASSETS AND VALUE AT RISK.**

Increasing risk of major wildfire threatens watersheds and the communities that depend on them.

- Landscapes in the Blanco and Navajo watersheds that supply the San Juan - Chama Project are degraded.
- This increases risk of large and destructive wildfire.
- With climate change, risk is increasing and fires will become more frequent, larger, and more intense.

**VALUE AT RISK:**  
**SAN JUAN-CHAMA HEADWATERS**  
**\$76 MILLION**

**NEED: MANAGEMENT SOLUTIONS TO ADDRESS RISK OF MAJOR WILDFIRE IN THE SAN JUAN - CHAMA HEADWATERS**

Forest conditions in the San Juan - Chama headwaters matter to Middle Rio Grande residents who depend on Project water.

**SOLUTION: RIO GRANDE WATER FUND (RGWF) FUELS TREATMENTS. AN INVESTMENT IN LANDSCAPE RESILIENCY/RESTORATION THAT PRODUCES CONCRETE CO-BENEFITS**

The RGWF invests in restoration of forested lands upstream in order to secure clean water for communities in these watershed and downstream.

Preventative thinning and other fuels treatments mitigate the risk from major wildfire.

- Smaller fires, easier and cheaper to fight.
- Reduced property damage.
- Reduced damage to roads and power infrastructure.
- Less economic harm.
- Protection of San Juan-Chama water imports from disruption from fire and debris flows.

**RGWF COST:**  
**SAN JUAN-CHAMA HEADWATERS**  
**\$9.2 MILLION**  
**FUNDS TREATMENT OF 17,000 ACRES**

**RESEARCH QUESTION: IS THE \$9.2 MILLION RGWF WORTH THE INVESTMENT? HOW DOES IT PERFORM AS A FINANCIAL INVESTMENT IN RISK REDUCTION? IS IT A PRUDENT INSURANCE POLICY?**

The theoretical benefits of the RGWF are clear. But how large are the benefits, what are they worth, and how does this compare to their cost? This report estimated the costs and benefits of two representative fires in the San Juan-Chama project headwaters.

**FINDINGS: BENEFITS OF RGWF TREATMENTS DRAMATICALLY OUTWEIGH COSTS FOR TWO MODELED WILDFIRES.**

For two modeled wildfires, the damages avoided through RGWF treatments were larger, in financial terms, than the cost of RGWF treatments needed to secure them (see full report for details).

**Blanco Fire (in the Blanco Basin)**

- Cost of RGWF Treatment: \$9.2 million\*
- Estimated Benefits: \$43.9 million
- Return on Investment: 375%

**RETURN ON INVESTMENT:**  
**SAN JUAN-CHAMA HEADWATERS**  
**246% - 375%**  
**(Oso Fire) (Blanco Fire)**

**Oso Fire (in the Navajo Basin)**

- Cost of RGWF Treatment: \$9.2 million\*
- Estimated Benefits: \$32.0 million

- Return on Investment: 246%

RGWF treatments in the San Juan - Chama headwaters would cost \$9.2 million\*. In the event of a fire, up to \$76 million is at risk:

- \$43.9 million in the Blanco Basin
- \$32.0 million in the Navajo Basin

\*\$9.2 million is the total cost for treatments in the Blanco, Navajo, and Little Navajo basins. Basin-specific treatment costs are not disaggregated in the ROI analysis because the location of future fires is not known and treatments cannot be precisely focused in advance.

**WATER RESOURCES AT RISK**

San Juan-Chama water allocations are at risk from both fires, though the majority of exposure is related to a diversion disruption in the Blanco Basin.

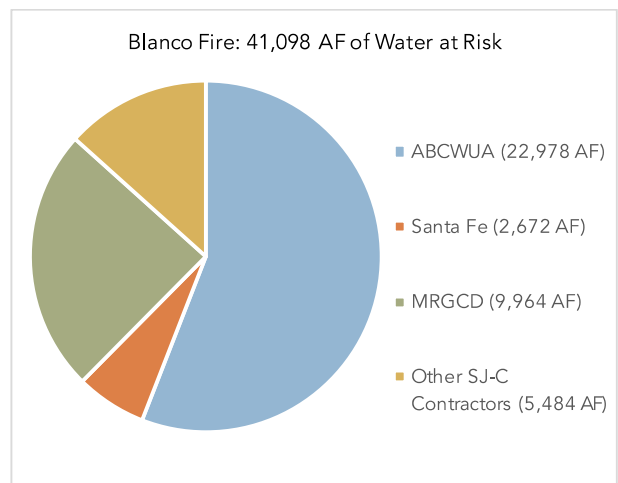
**Blanco Fire (Blanco Basin):**

- 41,098 AF of Project Water at risk
- \$13.9 million in value at risk
- Water benefit alone outweigh costs of RGWF for the modeled Blanco fire.

**Oso Fire (Navajo Basin):**

- 3,951 AF of Project Water at Risk
- \$0.9 million in value at Risk

Water managers estimated that diversions in the Navajo Basin are at less risk than those in the Blanco Basin due to the physical location of the diversion and wide valley, which can mitigate debris flow impacts.



**OTHER BENEFITS**

RGWF treatments also deliver benefits unrelated to protection of San Juan-Chama water supplies. These primarily include the avoided cost of firefighting and property destruction from severe wildfire.

**Avoided Fire Suppression**

- \$10.1 million for the Blanco fire
- \$16.4 million for the Oso fire

**Avoided Damage to Land and Homes**

- \$12.8 million for the Blanco fire
- \$6.5 million for the Oso fire

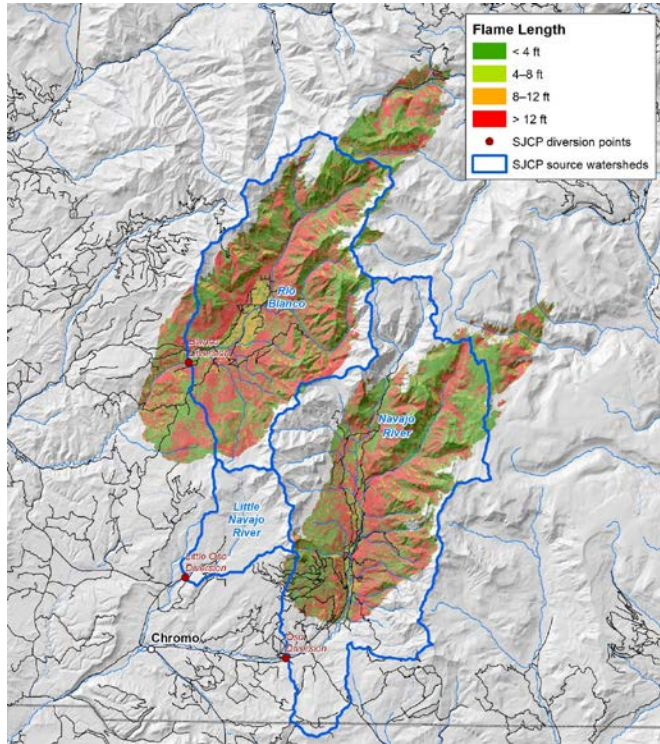
**Other Benefits**

- \$8.0 million for the Blanco fire
- \$8.2 million for the Oso

**THE RIO GRANDE WATER FUND’S PROGRAM OF FOREST TREATMENTS IMPROVES LANDSCAPE RESILIENCY AND FUNCTION AS A FORM OF NATURAL INSURANCE AGAINST THE ADVERSE IMPACTS FROM SEVERE WILDFIRE. BASED ON ANALYSIS OF TWO SIMULATED REPRESENTATIVE FIRES IN SAN JUAN-CHAMA PROJECT HEADWATERS BASINS, THE RGWF PRODUCES BENEFITS THAT VASTLY OUTWEIGH THE COSTS OF ITS IMPLEMENTATION, GIVING THE PROJECT A STRONG FINANCIAL RETURN ON INVESTMENT.**

# 1. Fire Modeling

FIRE SIMULATION: CURRENT LANDSCAPE CONDITIONS



Blanco Fire:

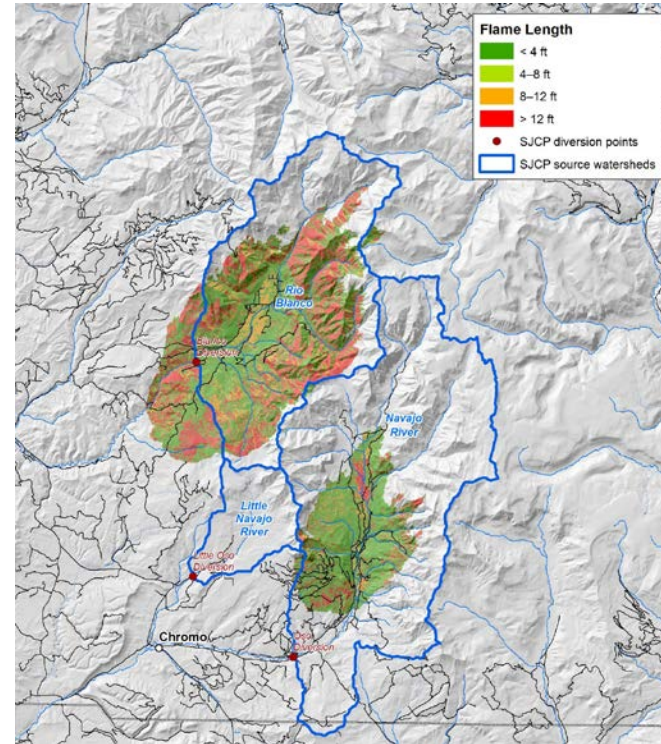
- 52,202 acres burned
- 25,552 acres burned flame length >8'

Oso Fire (Navajo Basin):

- 38,597 acres burned
- 17,571 acres burned flame length >8'

**RGWF Treatment Cost: \$9.2 million**

FIRE SIMULATION: AFTER RGWF TREATMENTS



Blanco Fire (after RGWF treatments):

- 37,335 acres burned (28% reduction)
- 16,348 acres burned flame length >8' (36% reduction)

Oso Fire (after RGWF treatments):

- 14,527 acres burned (62% reduction)
- 3,617 acres burned flame length >8' (79% reduction)

**RGWF Treatment Impact: 44% reduction in burned area**

## 2. Financial Model Detailed Results

### BLANCO FIRE (BLANCO BASIN): ECONOMIC IMPACTS UNDER CURRENT & RGWF TREATED CONDITIONS

Category	Present Value (2015\$m)		
	Current	Treated	Difference
<b>Forest Treatment</b>	\$0	\$9.2	-\$9.2
<b>Wildfire Suppression/ Recovery</b>	\$35.6	\$25.4	\$10.1
<b>Land Values/Residential Homes</b>	\$72.7	\$59.9	\$12.8
<b>Roads &amp; Transmission Lines</b>	\$2.7	\$1.6	\$1.1
<b>Archuleta/Rio Arriba Economy</b>	\$8.1	\$4.2	\$4.0
<b>SJ-C Surface Water</b>	\$13.9	\$0.9	\$13.0
<b>Reclamation Project Repairs</b>	\$0.4	\$0.0	\$0.4
<b>Public Health</b>	\$2.8	\$0.4	\$2.4
<b>TOTAL</b>	<b>\$136.2</b>	<b>\$101.6</b>	<b>\$34.7</b>

RGWF Return on Investment for the Blanco Fire: 375%  
Benefits outweigh cost by \$34.7 million

### OSO FIRE (NAVAJO BASIN): ECONOMIC IMPACTS UNDER CURRENT & RGWF TREATED CONDITIONS

Category	Present Value (2015\$m)		
	Current	Treated	Difference
<b>Forest Treatment</b>	\$0	\$9.2	-\$9.2
<b>Wildfire Suppression/ Recovery</b>	\$26.3	\$9.9	\$16.4
<b>Land Values/Residential Homes</b>	\$11.7	\$5.2	\$6.5
<b>Roads &amp; Transmission Lines</b>	\$3.3	\$1.5	\$1.8
<b>Archuleta/Rio Arriba Economy</b>	\$7.9	\$3.9	\$3.9
<b>SJ-C Surface Water</b>	\$0.9	\$0.0	\$0.9
<b>Reclamation Project Repairs</b>	\$0.0	\$0.0	\$0.0
<b>Public Health</b>	\$2.8	\$0.4	\$2.4
<b>TOTAL</b>	<b>\$52.9</b>	<b>\$30.2</b>	<b>\$22.7</b>

RGWF Return on Investment for the Oso Fire: 246%  
Benefits outweigh costs by \$22.7 million

### NOTES ON METHODS

1. “Representative Fire” methodology assesses the financial impacts of fire under current and RGFW treated scenarios in the event where a fire occurs
2. Analysis does not estimate the probability of a given specific fire; results will differ based on the number, size, location, and timing of actual fires.
3. All financial costs are distributed over a 20-year implementation period and discounted to present value at 3%
4. Values presented in 2015\$
5. Valuation estimates by category of benefit based on best available information
6. See full report for complete detail: Hartwell, R., Kruse, S. and Buckley, M. 2016. San Juan - Chama Headwaters Return on Investment Study for the Rio Grande Water Fund. Prepared for The Nature Conservancy, December 1, 2016.