Spring 2018

RIO GRANDE WATER FUND A Wildfire and Water Source Protection Project





200

May 2017



April 2018



Meeting Objectives

- 1. Learn about the impacts of thinning and other treatments on wildlife
- 2. Explore new ways to link forest restoration to water source protection
- 3. Learn about the 5 newly funded projects
- 4. Understand the RGWF network survey results
- 5. Join a topic table to discuss issues that hinder progress and coordinate future actions



Restore 600,000 acres over 20 yrs

Offer large-scale solution to forest health

Provide a new mechanism for collaboration, coordination & funding



Activities

















Bohannan & Huston









City of Santa Fe Water Division



Claunch-Pinto

CNM>

RONADO

ARCHITECTURE DESIGN INSPIRATION





LSS ALAMOS

MIDDLE RIOGRANDE

CONSERVANCI DISTRICT







Watershell h

STATE LAND OFFICE









Soil & Water Conservation District

LOR FOUNDATION



DEKKER

PERICH

SABATINI





PRESBYTERIAN

RECLAMATION Managing Water in the West



SIERRA

CLUB

FOUNDED 1892















US Army Corps of Engineers. Albuquerque District

United States Department of Agriculture Natural Resources Conservation Service







30,000 acres/year for 20 years

'17

18,000 acres

2015



Funding Trend







Joint Chiefs' Landscape Restoration Partnership Conservation Beyond Boundaries

ONKCS

U.S. Department of Agriculture

Natural Resources Conservation Service

Taos Valley Watershed Coalition \$403,800Isleta Project\$4,837,500

Working Towards More Informed Landscapescale Forest Restoration in the Southwest: Responses of Mule Deer, Elk, and Black Bears to treatments and wildfires

James W. Cain III

U.S. Geological Survey, New Mexico Cooperative Fish and Wildlife Research Unit, Department of Fish, Wildlife, and Conservation Ecology, New Mexico State







- 1. Introduction and Objectives
- 2. Methods
- 3. Preliminary Results
- 4. Conclusions and Implications









Introduction

- Historic management decisions and degraded forest conditions.
- Lots of small diameter trees.
- Severely reduced or absent understory.
- Increased likelihood of stand replacing fires.
- Reduced habitat quality for wildlife.



Introduction

- Wildfires and restoration treatments alter habitat conditions.
- Southwestern forests require active management and restoration.
- Data on long-term treatment impacts is limited for many species.
 - Limited duration of post-treatment monitoring.
 - Confounding post-treatment climatic conditions.



Introduction

- Need to determine:
 - Long-term treatment impacts on habitat conditions.
 - Time lag between treatment and changes in habitat conditions.
- Allow for more informed decisions about the timing, distribution and size of treatments.
 - Minimize the short-term negative impacts and maximize the long-term benefits.
 - Provide effective wildfire mitigation.



Project Area





Objectives

- Determine treatment effects on forage abundance.
- Estimate forage quality in treated and untreated areas.
- Changes in cover.





Objectives

- Determine habitat selection and space use patterns relative to wildfire and restoration treatments.
- Time between disturbance and changes in habitat use.
- Seasonal of use of treated areas.





Capture and fit with GPS collars (2012 – present) Elk n = 96Mule deer n = 35Black bears n = 51













- ~200 monitoring plots

 (stratified by treatment, vegetation type, canopy cover, fire history and aspect).
- Herbaceous and woody forage biomass.
- Forage samples for nutritional content analyses.







Bed and den site selection

- Bed sites Identified with GPS clusters
 - ≥2 consecutive locations ≤ 50m, ≤ 24 hrs
- Den sites Located by radio telemetry

Survey Habitat Characteristics

- Visibility
- Canopy cover and tree basal area
- Slope, elevation, aspect
- Distance to water and roads
- Vegetation type
- Herbaceous and mast producing forages
- Treatment type











Results-Black Bears

Bed site selection

- 47% untreated
- 40% wildfire
- 11% thinned
- 2% RX

-0.007	0 002	0 000
	0.002	0.002
0.013	0.005	0.004
0.047	0.023	0.041
	0.013 0.047	0.013 0.005 0.047 0.023

Model	Κ	Log-likelihood	AIC _c	ΔAIC _c	w _i
Visibility + Basal Area	2	-618.78	1242	0	0.644
Visibility + Mast	2	-620.88	1246	4.2	0.079
Visibility + Canopy + Basal Area	5	-618.50	1247	5.5	0.040
Basal Area + Slope	2	-618.78	1247	5.5	0.036









Results-Black Bears

Den site selection

- 61% untreated
- 31% wildfire
- 8% thinned
- 0% RX

Covariate	Estimate	SE	Р
Visibility	-0.102	0.004	0.006
Slope	0.014	0.007	0.057
Canopy	0.004	0.008	0.562

Model	κ	Log-likelihood	AIC _c	ΔAIC _c	w _i
Visibility	1	-49.965	102	0	0.675
Slope	1	-52.038	106.1	4.15	0.085
Slope + Canopy	2	-51.869	107.9	5.91	0.035
Slope + Basal Area	2	-52.015	108.2	6.21	0.030









Results-Forage

Herbaceous forage

Veg type	Mean (g/m²)	SE	95% CI		
			Lower CL	Upper CL	
Aspen	51.27	8.42	34.72	67.81	
Grassland	111.12	4.19	102.91	119.34	
Oak	38.68	13.25	12.65	64.70	
Pinyon-juniper	39.18	10.46	18.64	59.72	
Ponderosa	42.29	3.75	34.94	49.65	
Mixed conifer	52.08	4.55	43.16	61.01	
Not treated	46.45	2.57	41.40	51.50	
Prescribed burn	47.29	11.59	24.52	70.05	
Forest Thinning	47.42	8.68	30.38	64.47	
Wildfire	65.92	3.06	59.90	71.93	



• Woody (oak) browse

Veg type	Mean (g/m²)	SE	95% CI		
_			Lower CL	Upper CL	
Aspen	32.56	25.31	-17.39	82.50	
Grassland	26.30	30.01	-32.92	85.53	
Oak	149.84	8.17	133.72	165.96	
Pinyon-juniper	34.07	13.02	8.38	59.76	
Ponderosa	27.03	8.49	10.27	43.79	
Mixed conifer	26.69	10.43	6.11	47.27	
Not treated	34.34	13.15	8.39	60.30	
Prescribed burn	15.92	14.50	-12.68	44.53	
Forest Thinning	47.82	17.68	12.93	82.71	
Wildfire	63.51	10.61	42.57	84.46	



Results-Mule Deer

Elevation + Slope + Slope2 + Roads + Edge Vegetation type + Wildfire + RX + Thin





Results-Mule Deer

Elevation + Slope + Slope2 + Roads + Vegetation type + Edge + Wildfire + RX + Thin





Results-Elk

Elevation + Northness + Eastness + Roads + Water + Wildfire + RX + Thin





Results-Elk

Northness + Slope + Eastness + Vegetation type + Roads + Edge + Wildfire + RX + Thin





- Wildfires
 - Increased forage availability and nutritional quality.
 - Higher herbaceous biomass than treated and untreated areas.
 - Browse may take longer to recover, provide less foraging opportunities, and reduced cover.
 - Mule deer avoided wildfire-burned areas.
 - Sampling bias.
 - Elk had strong selection for recent wildfires.
 - Black bears readily used recent wildfires for bed sites.





Prescribed fires

- Burn at lower intensity .
- Previous studies show an increase in forage quality, especially 1-2 years post burn.
- Increased nutrition and forage production decreases over time.
 - No effect on herbaceous biomass and decreased woody biomass
- Mule deer and elk selected for prescribed burns.
 - <2 years post-burn selected more strongly by mule deer.
- Lack of understory cover limited bear use for day bed sites.







- Thinning
 - Mule deer mostly avoided thins <5 years old.
 - Strongly selected thinned areas >5 years after treatment.
 - Recovery of browse component.
 - Many older thins also treated with prescribed fire.
 - Elk generally avoided thinned areas.
 - Most thins available to collared elk <2-3 years old.
 - Black bears did bed and den in thinned areas
 - Residual areas with horizontal cover provided bed sites.





- Vegetation treatments for restoration, fire mitigation and targeted habitat treatments are common.
- Treatment effects are often assumed
- Limited and or contradictory data.
- More informed planning requires:
 - Magnitude of treatment effects
 - Time lag between treatment and changes in habitat quality
 - Duration of treatment effects
 - Cumulative impacts







Acknowledgments

- Graduate students and Technicians
 - Sarah Kindschuh, Tanya Roerick, Caleb Roberts, Kamal Humagain, Susan Bard, Sharon Smythe
- Funding agencies





Acknowledgments

Thank you



Protecting Rural Water Sources with Forest Restoration

RIO GRANDE WATER FUND A Wildfire and Water Source Protection Project




1. Define "source water protection" for public water systems

2. Provide examples of how we are working to restore forests by linking drinking water systems to wildfire

3. Offer recommendations on moving forward together



Source Water Protection

- SWP is a voluntary process designed to help prevent pollution of the primary sources of drinking water
- Forested watersheds improve water quality.
- In New Mexico, an often overlooked threat to drinking water is wildfire
- Protecting New Mexico's drinking water means restoring healthy watersheds



NM Community* Water Systems



*Serves at least 15 service connections used by year-round residents or regularly serves 25 year-round residents



Water systems serving population ranges



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Damages to drinking water systems due to wildfire

Difficulty reaching your water utility Loss of power Physical damage to well house or treatment plant Loss of telemetry/SCADA/Electrical components Long-term reduction in source water quality Short-term contamination of drinking water sources Need for additional water sampling Loss of source water Water demand in excess of production Loss of water pressure Disruption in service due to infrastructure damage Insufficient or inadequate staff access to facilities Loss of revenue from water sales Long-term reduction in source water quantity Damage to distribution system pipes Need for additional treatment Loss of water storage Problems repressurizing distribution system Other Contamination in distribution system Need to evacuate treatment plant(s) 2 8 10 12 0 6 4

Number of Respondents

14

Short and long term impacts on drinking water systems



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Protection Project

dfire and Water Source



Vallecitos MDWCA

- Carson National Forest
- NMRWA
- NM State Forestry
- NOAA
- Vallecitos MDWCA





Bonita Fire

Started: 6/3/2017 (lightning) Containment: 7/4/2017 Acres Burned: 7,495

Acres by Intensity:

- Low: 4,541
- Moderate: 1,635
- High: 170
- Unburned: 1,149





Effects of Bonita Fire on Vallecitos MDWCA

- Pump and infiltration gallery destroyed, and the treatment facility overwhelmed
- Drinking bottled water since August 2017
- Costs to the Association exceed \$15,000
- Funding and installation of new system at risk



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La Jara Water Users Association

- About Listening
- Cuba Ranger District, SFNF
- Cuba Soil & Water Conservation District
- Forest and Watershed Restoration Institute
- La Jara Community Ditch
- La Jara Residents
- La Jara WUA
- Natural Resource Conservation Service
- NMRWA
- Range Improvement Task Force
- Rio Puerco Alliance





La Jara Water Users Association

- La Jara Creek is the sole source of drinking & irrigation water for the community.
- Watershed is in SFNF and San Pedro Parks Wilderness





La Jara SWP meeting

Community members and agency representatives learn about intake and water treatment facilities

Rainfall simulator demonstrates relationships between soil health and runoff



La Jara forest restoration continues

 2017 - La Jara Phase III

RIO GRANDE

Protection Project

Idfire and Water Source

- 2018 CFRP
 Proposal
- Developing a formal La Jara Watershed Group





VTSV Region SWP Planning

- Amigos Bravos
- Carson NF
- NMED DWB
- NMRWA
- Pattison Trust LLC
- Rio Hondo Acequia Community
- Shopoff Realty Investments
- Taos Pueblo
- Taos Ski Valley Inc.
- Village of Taos Ski Valley





VTSV Region Planning & SWP

VTSV, Carson NF, and other land owners are involved in commercial, recreational, & residential development.

The risk of wildfire is high. VTSV is a Firewise community. Carson NF & TSVI are collaborating on forest restoration projects.





Recommendations for environmental & fire professionals

- Factor in drinking water system vulnerability
- Consider CWPP watershed boundaries
- Factor in long-term postfire effects when planning restoration projects and firefighting



Recommendations Where is the watershed?



The red star shows the general area of the intake for the Sandoval County CWPP (left) and Cram et al.'s postfire debris flow model (right)





Recommendations: Identify/locate PWS critical infrastructure

 NMED's EnviroMap provides coordinates and other information on all public water systems and other permitted/regulated facilities. Information should be confirmed with primary sources.





Recommendation: Water systems need to be proactive

- Introduce community & water system to the environmental & firefighting communities before projects or fires start
- Leverage vulnerabilities to upgrade the system
- Fire-adapt drinking water system & community (e.g., Firewise USA)





Acknowledgements

 Sincere thanks to the PWS, communities, agencies and NGOs that we work with on these issues.







inter state

ALANS.

-2

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1. 1,442,334 acres/year of forest need beneficial fire in NM and AZ.

2. We are only returning fire to 300,000 acres/year! (on a good year)

3. We <u>need new</u> approaches to protect our forests and watersheds.



All Lands + All Hands = *†*acres, *†*capacity





- Federal
- Private
- Tribal and State





Training and Capacity



Focus on Training



Expand Workforce

RIOTRAMP TREY COPPER HILL RX MATRIX TRAINING TRAINGE TRAINER and Non man RONALE ECALINA RONALD ESTATE MAX HISSLA HEMR. summer tory Meriess Autor Like DEL DOMINISTE 1AT PIRAMUO The South essis Hening INSTAL LUCAN Variance Quin Betters Date Games Date LOPE Ter Daries mire BANK DAVY ELINE COMENTE CHAID SAYDER THE LARTINE WHAT PROPERTY AND TRAINER. THE DRILLINSKY Haws Dily an Boery In Ranwillo THERE MENTER DATENA DALLA CAMER BALL SHITTER OF DESAN Battaness Battaness annes Brine Indexer Real man Tori ma The Phatrypes MAR LORR Car Soupy errow time Mar Frendrich Tereva PROPERTY OF TAXABLE LIB. BH TRECO

Build Qualifications



Outreach





Faces of Fire





All Lands Burn Team: Who?

		the state of the second s
Carson National Forest	Cibola National Forest	Santa Fe National Forest
NM Game and Fish Department	Taos County	Picuris Pueblo
NM Prescribed Fire Council	Claunch-Pinto SWCD	Greater Rio Grande Watershed Alliance
NM State Land Office	Tesuque Pueblo	Taos Ski Valley
The Nature Conservancy	City of Santa Fe Fire Department	Santa Clara Pueblo
NM State Forestry	Rio Arriba County	Rocky Mountain Youth Corps
Chama Peak Land Alliance	Santa Fe County Fire Department	NM Forest and Watershed Restoration Institute
Forest Stewards Guild	Gravitas Peak Wildland Fire Module	r .



Learn and Adapt



Forest Restoration and Youth Workforce Development

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Project Overview

1. Young adult training and certification through project completion.

2. Land restoration on critical landscapes in the Taos Valley.





Three Tiered Approach

1. El Salto Unit



- Canon Forestry El Salto El Salto 2017 Blue El Salto 2017 Green El Salto 2017 Red TSWCD FP Complete Watershed Dynamics Unit Status
 - ////, Completed



Three Tiered Approach

Highway 150 Corridor Proposed Action Map Carson National Forest, Questa Ranger District

2. Rio Hondo Unit



1.5

0.75

Legend Treatment

WHEE

3 Miles

NA

ANTOIN

	Aspen Regeneration/Conifer Removal (58 acres)
0	Free Thinning (243 acres)
	Regeneration Patch Cuts/Free Thinning (158 acres
	Riparian Restoration (168 acres)
	Thin From Below to 9" DBH (189 acres)
	Highway 150 Corridor Project Boundary (873 acres

EROUX



Three Tiered Approach

ROCKY MOUNTAIN YOUTH CORPS

3. T-FIRE Program







Outcomes

- Up to **76** acres of forested land restored.
- **16** young adult Crew members trained and certified.
- **6** T-FIRE interns prepared for career in restoration.
- Up to **\$179,765** in Match leveraged

Timeline:

- Thinning work complete by September 2019
- T-FIRE internship August 2018


Cedro Creek Hydrological Restoration Project



Project Overview

1. Restore Hydrologic Function to Cedro Creek

2. Employment & Training for Albuquerquearea Youth





Ongoing Efforts

Cedro Landscape Restoration Project





Proven Methods





October 2013, Valles Caldera WildEarth Guardians

June 2015



Landscape Connectivity





Youth & Community Engagement



Sandia Forest Health and Protection Project



Sandia Forest Health and Protection Project Overview

- 1. Project Partners New Mexico Forest Industry Association and Sandia Ranger District - Cibola National Forest
- 2. Forest Health Protection Insect & Disease and Fuels Reduction
- 3. Project Status



- Douglas-fir tussock moth is highly visible on the east side of the Sandia Mountains
- Insect and disease activity includes mortality agents' fir engraver, Douglas-fir beetle, and defoliation by Douglas-fir tussock moth.



- Treating three Recreational sites: Balsam Glade, Dry Camp & Nine Mile
- Three treatment types: Hand Thinning, Mastication and Feller buncher
- Three Contractors



- Landscape area is 5,020 acres
- 1,409 acres are NEPA ready
- This project will treat approx. 230 acres







Ensuring the conservation of mule deer, black-tailed deer and their habitat

Colleen Payne Regional Director – New Mexico Mule Deer Foundation

> Dave Wilson MDF Consultant Stewardship Works, LLC

Cunningham Gulch Restoration Thinning

Cunningham Gulch Restoration Thinning





- * Partnership between: The Nature Conservancy U.S. Forest Service The Mule Deer Foundation
- Phase I of a long term, landscape scale ecosystem restoration project



Rio Tusas - Lower San Antonio Landscape Restoration Project

San Juan-Chama Focal Area

160,000 acres analysis area

60,000 acres of restoration thinning and RX burning



Cunningham Gulch: P1 of Broader Landscape Treatment Seq. 700 acres of thinning ... Completes a 2,282 ac RX Burn Block

Pre-Commercial Aspen Thinning

Commercial Thinning

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Prescribed Burning

Setting of prescribed fires to improve composition, structure, condition and health of stands to improve wildlife habitat





Fuelwood Processing





Monitoring Update Steve Bassett, TNC



2018 Field Season

Tremendous
Accomplishments

Mismatched
Trajectories





Stand-level Outcomes

Monitoring Treatments

 Added Capacity with RMYC

≈500 plots planned≈60 completed





Economic Impact

Economic Outcomes

 Collaboration with USGS

Deep Dive on 2-3 Projects

Local Validation

28.7 job-years per \$1M\$2.5M econ. output per \$1M





Data Management System

Increasing Efficiency

- Database
- Tablet App
- Dashboard



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New Tools and Protocols



- Realtime Adaptive Management
- Remote Sensing





New Funding

\$150,000 from U.S. Endowment for Forestry and Communities

Directed towards scaling the RGWF monitoring program





2018 Survey Results

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Value Proposition

Q3. How well does the RGWF vision, goals and objectives align with your organization's vision & goals?



Aligns somewhat

Aligns closely

Does not align



Plans and Reports

Q5A: The RGWF Comprehensive Plan laid out a vision of direct and leveraged funding for restoration projects that is coming to fruition

Q5B: More details should be provided about the specific accomplishments of the RGWF (beyond information in the Annual Reports)

Q5C: Partner contributions to the RGWF successes are well recognized in the Annual Reports and other communications





Communications

Q6A: Discussion with people I meet at RGWF meetings is one of the primary reasons I attend

Q6D: I find the information I need at the RGWF websites

Discussion with people ... I find the information I see a need for increase...

Q6F: I see a need for increased communications and updates in the form of more frequent newsletters, emails and blog posts





Networking

Q7: Frequency of interactions between signatory partners, on a monthly basis



Q8: Coordination between signatory partners is adding value to projects and achieving better outcomes





Collective Action

As a RGWF partner I feel my time is used well and the resources I contribute are appreciated

The RGWF has consistent follow up on the action items discussed at the signatories meetings

I find it hard to stay informed about RGWF meetings, projects, funding and Studies

New partners know how to become charter signatories and participate in RGWF activities

The RGWF is not fully utilizing my contributions; I have more to offer and would gladly do so if there were a clearer way to participate

TRAL DISAGREE STRONG	NEUTRAL	AGREE	STRONGLY AGREE
7.32% 0.00% 0.00	7.32%	34.15%	58.54%
3 0	3	14	24
4.39% 0.00% 0.00	24.39%	56.10%	19.51%
10 0	10	23	8
2.20% 63.41% 14.63	12.20%	4.88%	4.88%
5 26	5	2	2
1.22% 4.88% 0.00	51.22%	36.59%	7.32%
21 2	21	15	3
4.39% 46.34% 21.95	24.39%	4.88%	2.44%
10 19	10	2	1


Topic Table

- A. Policy and legislation Jose Varela Lopez & John Kelly
- B. Monitoring and data Steve Bassett & Dave Gori
- C. Wildlife connectivity Anne Bradley & Teresa Seamster
- D. Stream, wetland & aquatic restoration Laura McCarthy & Rachel Meier
- E. Jobs and training Sarah Hurteau & Ben Thomas
- F. Biomass utilization Amy Miller & Kim Kostelnik
- G. Post-fire planning Collin Haffey & Susan Rich
- H. Communications Jackie Hall & David Norden





11:20 AM – 11:50 AM Round one at topic tables

11:50 AM – 12:00 PM Get lunch, switch tables

12:00 PM – 12:30 PM Round two at topic tables

12:30 PM - 1:00 PM

Check back for action items at first table



Follow Up

Use the Newsletter to report on progress

Have continued discussion at the Fall Meeting

Provide feedback on the process so we can evolve and improve



Discussion Guide

1. Review fall meeting list of problems that hinder progress

- 2. Review action items and progress
- 3. Identify changed conditions and emerging need
- 4. Develop new action items

5. Assign responsibility; decide on follow up process and accountability