How do treatments alter the density and distribution of large trees, snags, and coarse woody debris?

Coarse woody debris (CWD) at Rock Creek (left), recently burnt hillside with numerous snags (right, photo: FS Flickr)

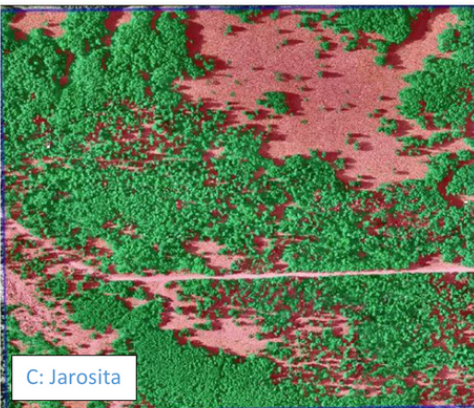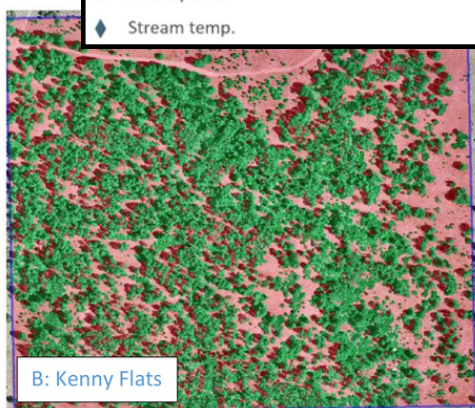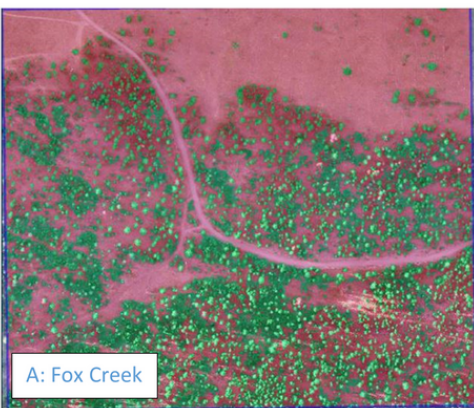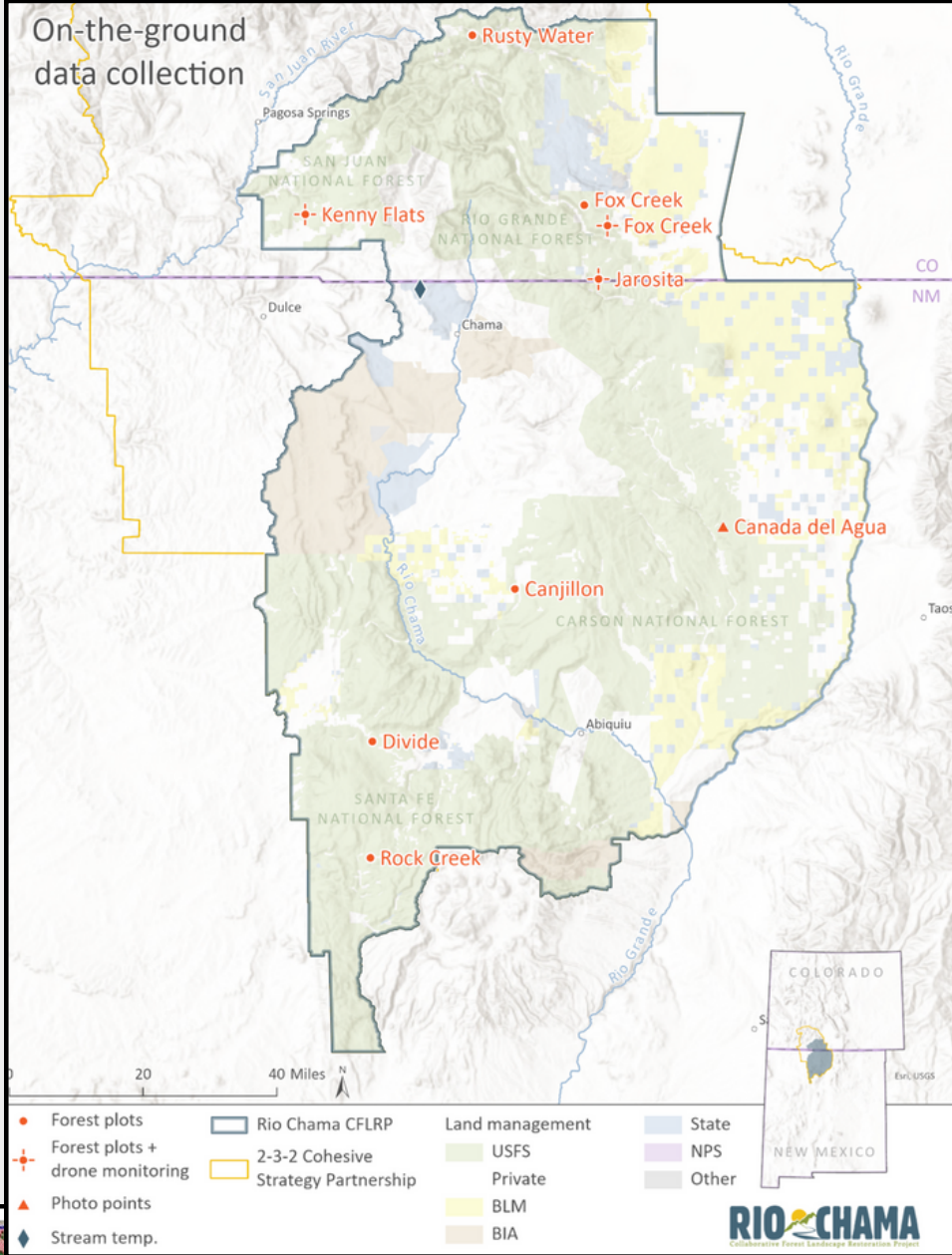| Intended monitoring:	Completed monitoring:
Evaluate forest health through community and practitioner site visits.	Discussions took place during 232 Partnership field visits. Community and practitioner site visits were not quantified. Qualitative evaluation of specific treatments/prescriptions did not occur.
Install monumented forest plots to measure TPA, BA, # of dead top trees, # of snags, coarse woody debris, and understory vegetation. Supplement with FIA plot data.	72 forest plots were set-up across the four national forests and four dominant forest types. Forest metrics were calculated utilizing pre treatment forest plot data and a 2022 FIA report.
Record visual change utilizing repeat photo points.	Two plot photos and four ground cover photos were taken at each forest plot.
Monitor patch size and the density of large trees and snags utilizing models and remote sensing methods.	N/A - not conducted in 2023. 2-3-2 Partners are working to track available aerial and remote sensing options.

Feb. 2024

2-3-2 Cohesive Strategy Partnership Multiparty Monitoring Update

for the Rio Chama Collaborative Forest Landscape Restoration Program

Overview of results:

Example repeat transect photo point taken at the Fox Creek Fuels monitoring site (above).

On-the-ground data collection

Legend:
- Forest plots
- Forest plots + drone monitoring
- Photo points
- Stream temp.
- Rio Chama CFLRP
- 2-3-2 Cohesive Strategy Partnership
- Land management
  - USFS
  - Private
  - BLM
  - BIA
  - State
  - NPS
  - Other

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A: Fox Creek

B: Kenny Flats

C: Jarosita

Site	TPA		% Canopy Cover	
	Drone	Plots	Drone	Plots
A	65	62	37	41
B	73	129	51	53
C	170	228	59	49

NOTE: Some plots were moved if the plot location was not representative of forest stand (i.e., plot falls within meadow, on road, etc.). This likely accounts for some differences between drone and plot measures.

NOTE: 2-3-2 Partners are exploring the use of Structure from Motion analyses which use aerial drone images to map and measure individual trees. This would expand the metrics obtained from drone images and provide more information on the variability within a treatment (rather than focusing on averages).

Forest metrics comparison between 2-3-2 forest plots and FIA summary: (232 n=72, FIA n=603)

Forest Type	Basal Area (ft²/acre)		Trees Per Acre		Quadratic Mean Diameter (in)		Standing Dead (≥8") Trees Per Acre	
	232 Plots	FIA	232 Plots	FIA	232 Plots	FIA	232 Plots	FIA
Pinyon-Juniper	63.94	75.95	217	7	7.36	44.60	1	6
Ponderosa Pine	119.93	92.54	124	91	13.32	13.65	3	3
Dry Mixed Conifer	114.47	104.07	120	133	13.23	11.989	6	16
Wet Mixed Conifer	149.90	131.16	269	182	10.10	11.49	47	41
All	122.80	100.93	189	103	10.91	13.40	20	17

Forest type classifications:

- **Pinyon Juniper (PJ)** – Forest type is predominantly pinyon (PIED) and juniper (JUMO, JUSC2, and JUDE2). There may be ponderosa (PIPO) present in this system, but it is not a dominant component.
- **Ponderosa Pine (PIPO)** – Overstory contains ≥ 70% ponderosa (PIPO).
- **Dry Mixed Conifer (DMC)** – Composed primarily of pine (PIPO and PIST3), Douglas-fir (PSME), white fir (ABCO), and possibly aspen (POTR5). Overstory contains ≥ 1% and ≤ 69% PIPO.
- **Wet Mixed Conifer (WMC)** – Composed primarily of spruce (PIPU, PIEN) and fir (ABCO, ABLA) species and may contain POTR5 and PSME. Overstory contains no PIPO.

Notes from the field:

Forest plot data was collected at 72 0.1 acre plots (PJ n=9; PIPO n=18; DMC n=18; WMC n=27). Plot locations were determined by mapping a systematic grid (based upon USFS Forest Inventory and Analysis protocols) across the full CFLR. Anywhere a grid point (1 every 2000 acres) intersected a planned treatment, a 3x3 plot grid was installed (spaced one plot per acre). The grid clusters plots, increasing crew efficiency and standardizing the amount of data collected from each treatment.

FIA data was drawn from a 2022 CFLRP FIA report. The report included data from 2010-2019 across 603 2.5 acre plots. Since the report was run, the Rio Chama CFLRP footprint expanded slightly, and additional FIA plots are likely in future reports.

Forest Type	Fuels (tons/acre)			
	1000 hr	100 hr	10 hr	1 hr
Pinyon-Juniper	3.72	0.63	0.22	0.31
Ponderosa Pine	2.33	0.70	0.22	0.10
Dry Mixed Conifer	5.39	0.40	0.13	0.22
Wet Mixed Conifer	6.50	0.32	0.15	0.16

Large tree and snag data were not analyzed through aerial images or remote sensing. 2023 drone flights captured TPA and canopy cover at 3 of the 9 pre-treatment monitoring sites. Conversations are taking place regarding expansion of the drone monitoring program, with more drone flights expected over treatment sites in 2024.

Table summarizes adaptive management (AM) watch-outs as defined in Edition 1 of the 232 Partnership Multiparty Monitoring plan. AM watch-outs were determined by the 232 Partnership at the February 2023 meeting in Taos, NM. Yellow boxes indicate the watch-out was met, or not measured, and should be considered for collaborative discussion.

AM Watch-out	Commentary
Treatment areas are straying from desired or anticipated conditions.	Focused qualitative evaluation of treatments was not conducted.
Structural stage distributions move away from desired conditions.	Desired conditions are not quantitative.
Conclusions oversimplify or generalize diverse landscape.	Plot sample size is too small to extrapolate to landscape scale.
Trends in landscape fragmentation moving away from desired conditions.	Analysis not conducted

Monitoring Committee Recommendations and Takeaways

- Make sure we can answer monitoring questions with the data being gathered (invasives monitoring as an example).
- Utilize plots as data-rich sites for testing new scaling frameworks from plot to drone to satellite, leverage new data.
- Define "desired conditions" in AM watch-outs to provide metrics and goals for action.
- There is a lot of work to be done thinking about, and monitoring, large trees.
- Insect and disease monitoring needs to be incorporated into forest plot monitoring.
- Is it fair or useful to compare 232 data to FIA data?

Rio Chama CFLRP monitoring efforts and collaborative discussions are ongoing. Please direct comments and questions to cody@forestguild.org

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