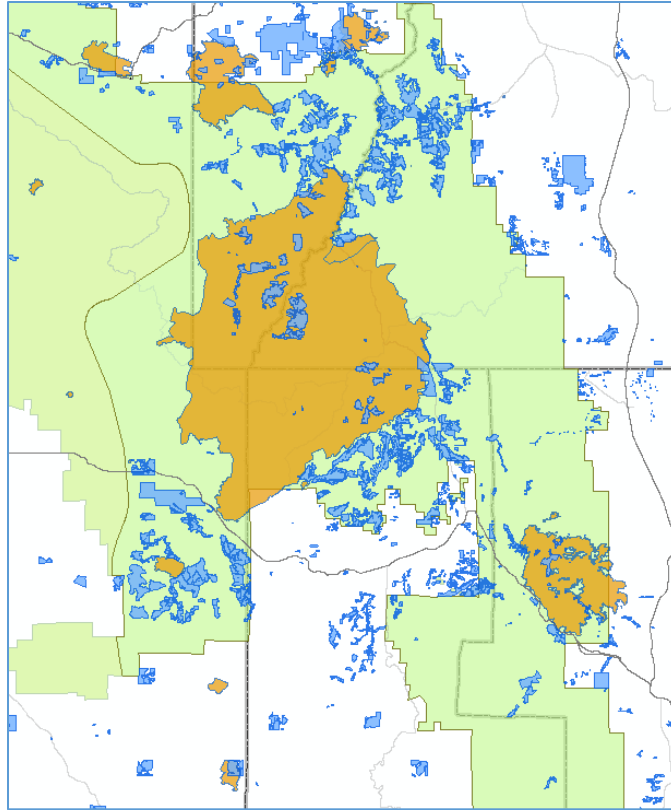


Front Range Round Table 2016 Interagency Fuel Treatment Database



Technical Report Prepared by the Colorado Forest Restoration Institute at
Colorado State University on behalf of the Front Range Round Table

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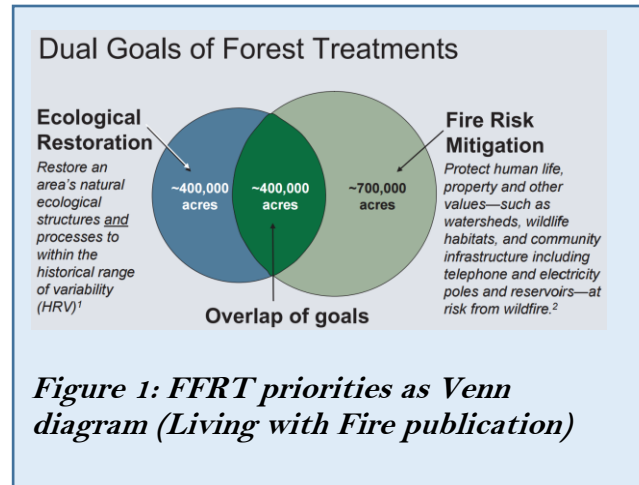


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Background and Overview:

This paper describes a geospatial database of hazardous fuel reduction and forest management activities conducted by members of the Front Range Round Table (FRRT) on a variety of private, local, state, and federally managed land across the Front Range of Colorado. The FRRT, originally convened in 2004 as the Front Range Fuel Treatment Partnership Round Table, consists of over 30 organizations including academic and scientific communities, local governments, and federal and state agencies from across the Front Range of Colorado. Throughout this time the FFRT has engaged communities and stakeholders to collaboratively develop a vision and long-term plan for restoring forest health and protecting communities. The FRRT documented these two partially overlapping priorities in its 2006 publication *“Living with Fire: Protecting Communities and Restoring Forests.”* As part of this publication, a spatial analysis was conducted by overlaying socioeconomic and biophysical characteristics to identify and prioritize those areas of wildland urban interface communities in need of protection, and those areas of lower elevation ponderosa pine dominated forests in need of forest restoration, cumulatively totaling over 1.5 million acres (figure 1).



Since 2006 the FRRT has promoted interagency efforts, and the participating agencies have responded by implementing a variety of restoration treatments and hazardous fuel reduction projects across the Front Range. The Fuel Treatment Database and associated analysis discussed below provides an opportunity to track and evaluate interagency fuel treatment and restoration accomplishments throughout the multijurisdictional landscape. Further, we describe the rationale for developing the database, data collection and database development efforts, data protocols and analysis, and database availability. The database currently has compiled data from 10 organizations, with 14,514 treatments totaling 337,095 acres, indicating the cooperators in the FRRT are making steady progress towards the goals identified in 2006. In order to increase the value of the

spatial fuel treatment dataset for accomplishment tracking and evaluating effectiveness, CFRI recommends the FRRT update the dataset on a regular schedule, and develop protocols to standardize spatial data attributes for fuel treatments and restoration activities.

Tracking Accomplishments:

Since its inception, the FRRT has facilitated and leveraged local, state, and federal resources and funding for community protection and forest restoration projects across its 10 county area, and throughout the State. In 2015, the FRRT Executive Board identified the need to create and maintain a spatial database containing basic information about fuel reduction and restoration treatments on public and private lands along the Front Range. While similar efforts have been attempted in the past, maintaining the dataset has proven difficult because of the disparity in tracking systems between the multitude of public and private entities conducting land management activities, and because information quickly becomes out of date as new treatments are implemented and older treatments lose their effectiveness. In 2016 the FRRT Executive Board in conjunction with the Colorado Forest Restoration Institute (CFRI) revived this effort with the

goal of aggregating spatial data into one comprehensive database, maintaining it with regular updates, and making the dataset and associated analysis available to FRRT member organizations. CFRI contacted participating members of the FRRT to request spatial data on fuel reduction treatments and forest restoration activities, and plans to maintain the dataset by incorporating biennial updates. CFRI is making the database available to FRRT members upon request. Providing access to this database will facilitate agency and interagency landscape level planning, treatment prioritization, and accomplishment tracking to document forest management activities, and help effectively demonstrate the impacts of fuel reduction treatments and other investments on community protection and forest health. FRRT members or other stakeholders interested in acquiring the dataset are encouraged to do so for the purpose of conducting additional and or more targeted analyses based on individual needs.

Data Collection and Spatial Model:

Beginning in the spring of 2016, after a two month process collecting spatial data on forest management activities from data stewards in the respective land management agencies, local government, and conservation organizations, we summarized geospatial data by source (Table 1), and conducted minor reformatting and quality control efforts before aggregating data from each organization into one comprehensive database. We collected data from ten organizations totaling 14,514 unique treatment extents across 337,095 acres.

Contributing Data Sources	Treatments /	
	Features	Acres
United States Forest Service	7,618	224,114
Colorado Department of Natural Resources	2,901	46,080
Colorado Parks and Wildlife	188	32,177
Colorado State Forest Service	3,039	24,061
Jefferson County Open Space	173	3,360
Boulder County Parks and Open Space	157	2,495
Coalition for the Upper South Platte	393	2,365
Denver Mountain Parks	12	1,734
Jefferson Conservation District	33	709
GeoMac Historical Fires	44	323,448
Total treated acres	14,514	337,095
Total acres with fires	14,558	660,543

Table 1: FRRT Treatment database contributing agencies with number of treatments and total acres.

The individual layers within the FRRT Fuel Treatment Database, as submitted by the respective organizations, are each comprised of a unique set of attributes describing the treatments in those

locations. The treatment attributes contain varying degrees of completeness, and adhere to different data standards which likely resulted from various data collection methods, protocols, and reporting requirements employed by each organization. Although each contains a different attribute set, most fuels treatment records include information on date accomplished, treatment size, and treatment type. Common treatment types include thinning, cutting, harvesting, logging, mastication, pile burning, and broadcast burning. Also included in the database is a record of large historical wildfires on the Front Range. Records of wildfires within the Front Range were included in the database because wildfires represent important (and often extensive) events that, while not planned, are managed by incident command teams and can accomplish many of the same fuel reduction objectives as mechanical treatments.

After incorporating the individual datasets from various sources into the database, we merged all of the submitted layers and added two additional aggregated treatment layers (one with and one without wildfires) to allow for a comprehensive analysis of accomplishments. The merged layers incorporate the spatial attributes of each individual dataset while removing

duplicates, such as maintenance treatments occurring on the same piece of ground, and otherwise overlapping activities. Although the reformatting associated with the merging process necessitated the removal of non-spatial attributes, the merged datasets represent an estimate of the cumulative impact of fuel reduction treatments across the multijurisdictional landscape. After including some jurisdictional boundary layers into the database, we conducted a preliminary analysis to summarize the comprehensive accomplishments (Table 2).

	<u>Treatments</u>	<u>Acres</u>
Merged dataset	5,801	294,857
Merged dataset with fires	5,644	617,680

Table 2: Cumulative treatment statistics in Interagency Fuel Treatment Database

While most of the fuel reduction treatments conducted by the contributing agencies actually occurred outside of the priority areas identified by the FRRT, which likely resulted from individual agency priorities and opportunities that were broader than the priorities identified by the FRRT, 40% of the treatments did occur within the community protection or restoration priority areas. We then used a spatial model to assess cumulative treatment

accomplishments relative to those goals as set by the FRRT in 2006 by evaluating what portion of the community protection and restoration priority areas had been treated (including and excluding wildfire) (Table 3). Treatment percentages range from 7% to 37% of the priority areas, and indicate a higher percentage of the restoration zone has received treatments as compared to the community protection zone. While this summary provides a preliminary analysis and measure of accomplishment, additional analysis would be useful and could be aided by standardizing the attributes of spatial data aggregated in the FRRT treatment database.

<u>Treatments</u>	<u>Treated acres</u>	<u>Treated inc. fire</u>
Community Fire Protection Zone	49,527	72,547
Restoration Zone	37,425	147,412
CPZ Restoration Overlap Zone	32,158	84,249
Total	119,110	304,208

Table 3: Accomplishments in the three priority areas relative to 2006 FRRT goals depicted in above Venn diagram.

Database Completeness:

While it is difficult to capture all management actions across the Front Range or precisely calculate the completeness of the treatment database partially because all data was self-reported, we did receive data from most of the larger

land management agencies and estimate that we have captured at least 90% of acreage treated by fuel reduction and forest restoration activities that have occurred since 2006. While most of the data we collected for this effort relates to publically funded projects implemented by nonprofit organizations, local, state, and federal agencies, missing fuel reduction treatments likely include older treatments, smaller treatments such as defensible space around individual homes, and those treatments conducted on private land without the use of public funding or the technical expertise provided by outreach foresters. We believe database completeness and quality will improve with each iterative data request as 1) additional agencies, and organizations submit data in the future, 2) contributing agencies standardize data collection and reporting procedures, 3) the FFRT sets data quality standards by mandating a minimum core set of attributes to be included (e.g., treatment type, treatment date, objectives, silvicultural prescription, residual forest stand characteristics, or treatment effectiveness etc.), and 4) the FFRT implements quality control protocols requiring that fuel reduction treatments in the database meet certain ecological conditions or performance standards. While most agencies who

contributed data for this effort did so using actual treatment boundaries. In some cases due to federal reporting standards the Colorado State Forest Service (CSFS) submitted entire parcels when treatments only occurred on a portion of the property. The CSFS treatment layer included in the database is the original provided, however the total acres treated by CSFS as shown in table 1 reflect actual treated acres.

Assessing Effectiveness:

This dataset captured the physical boundaries of treatments conducted by a variety of agencies indicating some management action occurred at that location. However not every treatment polygon in the dataset includes additional information about treatment type, objectives, silvicultural prescription, activity fuels, residual forest stand characteristics, or treatment effectiveness. While the database provides an estimate of the impact of landscape wide management activities, and facilitates a comparison between accomplishments and previously established goals, additional data is likely needed for more detailed evaluations of treatment impact with regards to their effect on landscape restoration, watershed health, or fire behavior. However, if

treatment information was standardized and included more detailed information on treatment type, dates, or the aforementioned attributes, it may allow for additional analysis. Further, if the dataset is leveraged with remote sensing methods, other geospatial data, or field collected ecological monitoring data, the dataset could be used to better evaluate individual treatments, and facilitate comparisons between fuel mitigation and restoration treatments, and assess cumulative landscape scale effects on multiscale changes of spatial patterns of forest structure, fire behavior, and ecosystem services. This would further help the FRRT evaluate the impact of treatments across the landscape, better assess costs and benefits, promote transparency, and justify future investment.

by request by contacting Mike Caggiano at CFRI (<https://cfri.colostate.edu>.) CFRI will maintain this dataset and solicit regular data updates from project partners on a biennial basis.

Database structure, maintenance, and availability:

The FRRT database is comprised of spatial data from many FRRT members directly involved with implementing forestry treatments. The dataset includes individual layers as submitted by the partners noted in table 2, a historical fire layer, two cumulative/merged layers (one with wildfires and one without), and several jurisdictional boundary layers for reference (Table 4) The spatial database is available

FRRT_TreatmentDatabase_11162016.gdb	
	Agency Treatments
	Boulder County Parks and Open Space (BCPOS)
	Colorado Parks and Wildlife (CPW)
	Colorado State Forest Service (CSFS)
	Coalition for the Upper South Platte (CUSP)
	Denver Mountain Parks (DMP)
	Colorado Department of Natural Resources (DNR)
	GeoMac Historical Fires (GeoMac)
	Jefferson Conservation District (JCD)
	Jefferson County Open Space (JCOS)
	United States Forest Service FACTS (USFS)
	Merged Treatments
	Interagency treatments merge_06012016
	Interagency treatments merge with fires_06012016
	Reference
	Colorado Counties

Table 4: FRRT Fuel Treatment Database structure.