



Questions from the Webinar - Cohesive Strategy in 2020: Dynamic Adaptation in a Novel World – the following questions were submitted through the chat box during the webinar but there wasn't time to have them answered live on the Webinar.

**Question 1 for Jason Kuiken:** *I like what I am hearing about the role of the CS and the interagency collaboration that is allowing each agency to contribute what they are best at, I agree we are making progress. However, I also see a lot of time wasted on process barriers and that hinders the ability to get to scale quickly. What do you propose to address these administrative barriers?*

- *Are these administrative barriers legislative or policy?*

**Jason's Answers:**

My belief is that the barriers are generally administrative as well as relational in nature. For good reason, states and federal agencies have some different policies in place, and yet how we execute those policies is through administrative means. In my view, this means we work together when there is no fire on the ground to identify pre-suppression strategies (Potential wildland fire Operational Delineations or PODs) and how to strengthen those plans through proactive fuels projects (on local/state/federal lands as well as through Firesafe Councils on private lands). It is feasible to have different strategies depending on the ownership of the land, but this works best when relationships are strong before fire starts and plans are in place to work as a unified team when an IMT shows up.

When unplanned fire is present, it is easy to recognize that our landscapes are connected, regardless of ownership. However, when we plan out pro-active projects, we often "forget" this interconnectedness and tend to focus on lands our individual agency manages (I'm guilty of this every day). While it is true that administrative barriers exist to some degree (generally in the form of NEPA and state environmental review processes), there are pathways to work cohesively across boundaries. Though challenging, these issues can be resolved through long-term cross-boundary planning, fitting the right process to the project (some larger scale environmental reviews, some shorter), and sharing staff and data across boundaries.

Responses to question 2 and 3 were a combined response from the Cohesive Strategy Regional Coordinators.

**Question 2:** *Are there examples of using this process at a more local level--such as neighboring cities, counties located in an urban WUI? I'm working with a coalition for community groups*

*interested in setting up a Regional wildfire prevention JPA because fire knows no boundaries and there seems to be little coordination in planning or implementation of wildfire prevention.*

There are several examples showcased on each of the Regional websites:

- <https://northeasternwildfire.net/category/successstories/> Eastern Region
- <http://wildfireinthewest.org/> Western Region
- <http://www.southernwildfire.net/> Southeastern Region

**Question 3:** *Where can I send local fire departments and or elected officials to better understand this:*

There are several brochures and information that can be found on the regional websites so you can grab the information that is best representative of your area. Please visit one of the regional websites for more information.

- <https://northeasternwildfire.net/> Eastern Region
- <http://wildfireinthewest.org/> Western Region
- <http://www.southernwildfire.net/> Southeastern Region

**Question 4:** *Good Morning to all and thank you for this amazing opportunity. We just created in Portugal The National Fire Management Agency. You have already 10 years old. Can you give us two or three main advices, based on your experience and knowledge, to be successful in here, once we have almost the same mission? Thank You once again.*

- 1st piece of advice: Choose leadership wisely, these leaders set the tone for the entire organization. Choose a diverse leadership group that the rank and file will follow, these leaders need to be as comfortable with the firefighters as they are in the boardroom. These leaders must have walked a mile in the firefighter's boots, this can't be overstated, and the firefighters will know quickly if someone has not been "one of them."
- 2nd: Have a balanced program, be able to address landscape resiliency to reduce the flammability of burnable acres; be able to have fire adapted communities that are ready for wildland fires and smoke; have a strong response capacity and ALWAYS include other agencies for an integrated response in an unified command situation. Train as you fight, fight as you train.
- 3rd: Customer service, your agency MUST have this as a core value and not just words. Your agency MUST be the FIRST one people think about when the subject of wildland fire and public safety comes up. Without superb customer service, your agency is just another agency.

**Questions 5 and 6 combined:** *These questions were sent to Mark Finney and Alan Agar for a more in-depth response.*

- *Who is leading these 'Fireshed' Analysis? Does it include both USDA and USDOJ? How is it funded? How much investment/funding has been spent to date? Is there opportunity to include third party engineers, data collection?*

- *Very little information on the internet about the "Fireshed Registry". A couple of pdf papers but that is about it...Any additional information to share?*

**Mark Finney's Feedback:** There are different approaches that can be used to produce a "fireshed" analysis. I know that Alan and his Scenario Planning software is capable of doing this. The objectives for such an analysis are varied – to implement landscape treatments that reduce fire impacts on natural resources, protect communities, produce timber, avoid constraints on land uses etc. There is no single analysis that covers all areas of the country and each must be tailored to the local objectives, weather, fire, land ownership and land use constraints, and opportunities. Given the questions, I thought it might be good background to explain a bit about firesheds etc.

The idea of a fireshed began decades ago in California – qualitatively defining the area from which fires can start and spread with impact to a particular place (e.g., a community etc.). In those days a few fires had to be simulated under conditions that were called the "problem fire" – those which are responsible for the most area burned under the extremes of weather. Then, fuel treatment units were placed by trial and error to both modify the landscape fire potential and achieve other objectives – timber, avoid ownership and species habitat restrictions etc. [https://www.fs.fed.us/psw/publications/documents/psw\\_gtr203/psw\\_gtr203\\_006bahro.pdf](https://www.fs.fed.us/psw/publications/documents/psw_gtr203/psw_gtr203_006bahro.pdf)  
[https://www.fs.fed.us/rm/pubs/rmrs\\_p041/rmrs\\_p041\\_185\\_192.pdf](https://www.fs.fed.us/rm/pubs/rmrs_p041/rmrs_p041_185_192.pdf)

Now, firesheds and fireplains can be readily defined for a large set of ignition and weather conditions from the national FSim database (see links below). By contrast to a fireshed, a fireplain is the area that fires can spread to from a particular ignition location under a variety of weather conditions (see 2<sup>nd</sup> link). Using these data it is possible to delineate the area in which fires start and then spread to a set of places. This can be done dynamically (i.e. specifying an area of concern it can show the area from which ignitions can impact it (fireshed), and also the area where fires to (fireplain)). We have software that can do this (WFIPS). Alan has used these data to produce a slightly different delineation of firesheds that he can explain, and these constitute the registry.

<https://www.fs.usda.gov/rds/archive/catalog/RDS-2016-0034>  
[https://www.fs.fed.us/rm/pubs/rmrs\\_p073/rmrs\\_p073\\_196\\_206.pdf](https://www.fs.fed.us/rm/pubs/rmrs_p073/rmrs_p073_196_206.pdf)

One of the key problems with any kind of analysis is that we **must specify our objectives**. For fire management, this has historically been ignored (i.e. what are our strategic objectives for fire management? – and I don't mean try to suppress every fire). For timber management, grazing, endangered species etc. we have quantitative objectives. We will need to specify quantitative objectives for fire and fuel treatments and the outcomes in order to use any fireshed type analysis. For example, reducing expected large fire sizes by half, or limiting high severity fire to 1/20<sup>th</sup> of the landscape in appropriate vegetation types, or reducing the expected probability of large fires to communities by 90%.

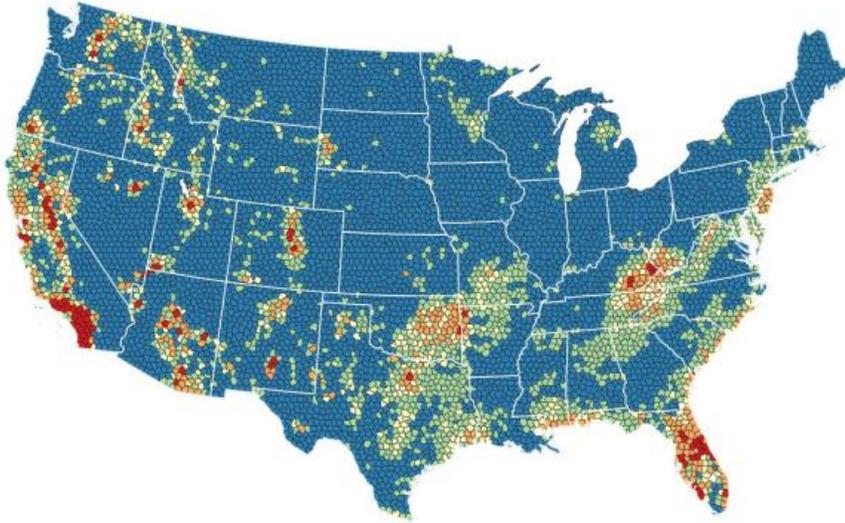
Another challenge for any of these analyses is quantifying the outcomes to large fires from doing various treatments over a long time – in other words ***the pace and scale***. We have ways of doing this through simulation too, but the issue is that the consequences of a treatment program must aggregate to a considerable percentage of the landscape in order to collectively be beneficial to large fire spread and behavior. That is, we must engage on a steady program of treatment for a decade or two before realizing the benefits. We've estimated that we need to achieve a treatment *scale* of at least 20-40% of the landscape (strategically, not randomly) in order to see reductions in fire sizes and impacts. At a constant rate or *pace* of treatment of say 1% of the landscape treated per year it would take 20-40 years *with maintenance treatments in between*. At an annual rate of 5% per year we could see results within a decade. The pace and scale will vary by ecosystem, with productive ones requiring maintenance more often.

We are nowhere near treating at the needed pace and scale of treatments to realize measurable landscape benefits. A fireshed analysis will not solve this problem but it will show the level of effort required if we should decide to try.

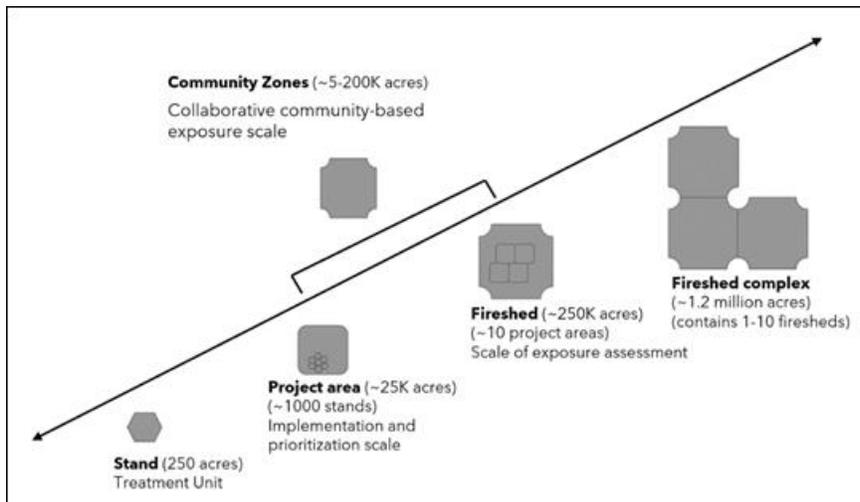
**Alan Agar's Feedback:**

- *Who is leading these 'Fireshed' Analysis? Does it include both USDA and USDOJ? How is it funded? How much investment/funding has been spent to date? Is there opportunity to include third party engineers, data collection?*

I can only answer these questions within the scope of our recent work with the Deputy Chiefs to create a fireshed planning and investment framework to address wildfire exposure to developed areas. They asked us to create an investment system to help organize how the agency allocates funding for hazardous fuels specifically to reduce wildfire risk to communities. In response, our group at the Missoula Fire Lab and collaborators created a national fireshed map [below] and a planning framework around these firesheds. Note this is not a risk map – the map identifies areas that are predicted to expose developed areas to fire based on the simulation data that Mark referenced in his email, and our analysis of it. It's a map of fire transmission to developed areas. It is ALL LANDS although in the registry you can see the individual contributions from various landowners.



The hierarchical planning framework looks like this. It is similar to the classification of hydrological processes into basins, watersheds, sub watersheds etc.



The work is funded through the National Fire Decision Support Center at the Missoula Lab, I suppose the investment to date is about \$50k, and there are opportunities for third parties involved (they are already). I view the work as an experiment with our management community to improve the way they spatially organize their work on one particular issue. For instance, the hydrologists use the watershed condition framework to prioritize and track their investments. The terrestrial condition framework uses a spatial framework of LTA's for the same purpose. The fireshed framework provides FAM a uniform set of containers to prioritize treatments and monitor wildfire exposure to developed areas.

The map is one product from a multiyear effort to map and understand cross boundary fire in response to various all lands initiatives including the Cohesive Strategy. A recent reference and results of various assessments is here:

[https://www.fs.fed.us/rm/pubs\\_series/rmrs/gtr/rmrs\\_gtr392.pdf](https://www.fs.fed.us/rm/pubs_series/rmrs/gtr/rmrs_gtr392.pdf) A precursor to the fireshed map is in the Towards Shared Stewardship document.

A major finding from this and prior work is that the area around communities that potentially expose them to fire is in general about 5 to 50 times larger than the CWPP boundaries (omitting the CWPP's based on county boundaries). Thus there is a scale mismatch between the current community planning efforts and the scale of the disturbance that potentially affects them. This finding led to several papers that argue for coupling the social and biophysical aspects of mitigation planning in an all lands framework.

The fireshed boundaries and tons of data about them are loaded into an ArcGIS online portal (Fireshed Registry) as explained in the attached briefing paper. The fireshed spatial data are also published in the Forest Service data repository. We can make both of these available if people email me a request. [alan.ager@usda.gov](mailto:alan.ager@usda.gov)

The ArcGIS online Fireshed Registry provides an interactive system to view information on:

- Context (Ownership, Fuels, and Buildings)
- History (Fires and Treatments)
- Projected wildfire risk (Simulated extreme fire events)
- Planned future treatments (5-year action plans)
- Outputs from scenario planning models
- Predicted community exposure to wildfire

During FY20, data in the Fireshed Registry was used in varying degrees for various national prioritization efforts and related assessments including:

- USDA Forest Service National Investment Strategy for Reducing Fire Risk
- Response to Executive Order 13855 Promoting Active Management of America's Forests, Rangelands, and Other Federal Lands to Improve Conditions and Reduce Wildfire Risk
- FY21 Hazardous fuels allocation
- Development of Shared Stewardship performance metrics
- Draft charter for an integrated Scenario Investment Planning Platform for Shared Stewardship investments
- Prioritization of USDA Forest Service and NRCS Joint Chiefs' Restoration Partnership Projects
- Collaborative Forest Landscape Restoration Projects (CFLRP)

## **The Fireshed Registry: Prioritizing forest and fuel management investments to reduce wildfire risk to developed areas**

*Contacts: Tania Ellersick [tania.ellersick@usda.gov](mailto:tania.ellersick@usda.gov), Alan Ager [alan.ager@usda.gov](mailto:alan.ager@usda.gov)*

### **Overview**

Recent extreme wildfire seasons in the US have rekindled policy debates about the underlying drivers and potential role of forest management can play in reducing fuels and future wildfire impacts to developed areas. However, detailed assessments that map and schedule the type and amount of treatments needed and the associated cost are not available for US national forests (i.e. a plan), thereby making policy discussions about investments difficult. To fill this gap, we developed two interlinked decision support systems, the Fireshed Registry and the Scenario Investment Planning Platform. This briefing paper describes the former, while a companion paper describes the latter.

The Fireshed Registry is a geospatial dashboard and decision tool built in ArcGIS online. It provides an interactive system to view a wide array of information about firesheds (see below) and monitor progress towards risk reduction from management investments. The Fireshed Registry is the geospatial data warehouse for the Forest Service Scenario Planning Platform. The system integrates available data into a series of panels that address specific question related to risk to developed areas. While the Fireshed Registry was organized around fire risk to developed areas, the framework does not preclude integrated assessment of other resource management priorities such as protecting water, wildlife habitat, and recreation opportunity. The all lands geography of the fireshed registry makes it a useful platform for shared stewardship as well.

The vision for the Fireshed Registry is to create a living atlas of the recent past, present, and potential future forest conditions - weaving together many different spatial data to provide a time slice of land conditions, recent wildfire activity, predicted wildfires, exposure to communities, and treatment scenarios derived from 5-year action plans and the Scenario Investment Planning Platform.

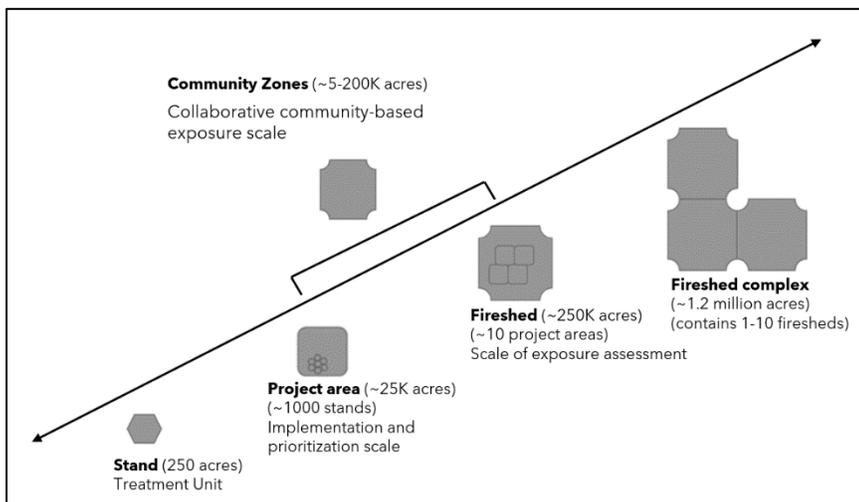
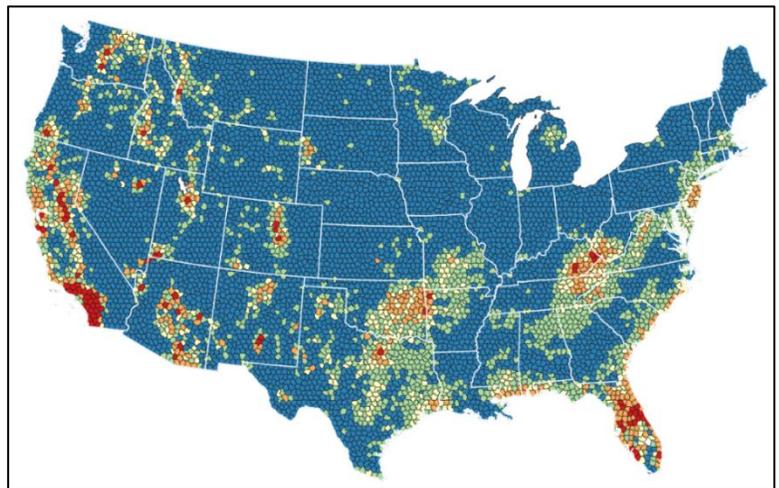
The **Fireshed Registry** is a unique approach to bring together a time window of information - past, present, and predicted future - to describe risk trajectories on lands where destructive wildfires are likely to originate:



### What are Firesheds?

Firesheds are containers built around hotspots of wildfire transmission to communities. The average around 250,000 acres in size and contain ~25,000-acre planning areas within them. They are built to organize landscapes around risk to developed areas.

*National map of 7,688 firesheds created from wildfire transmission data. The fireshed boundaries were created with a process that delineates hotspots of fire transmission.*



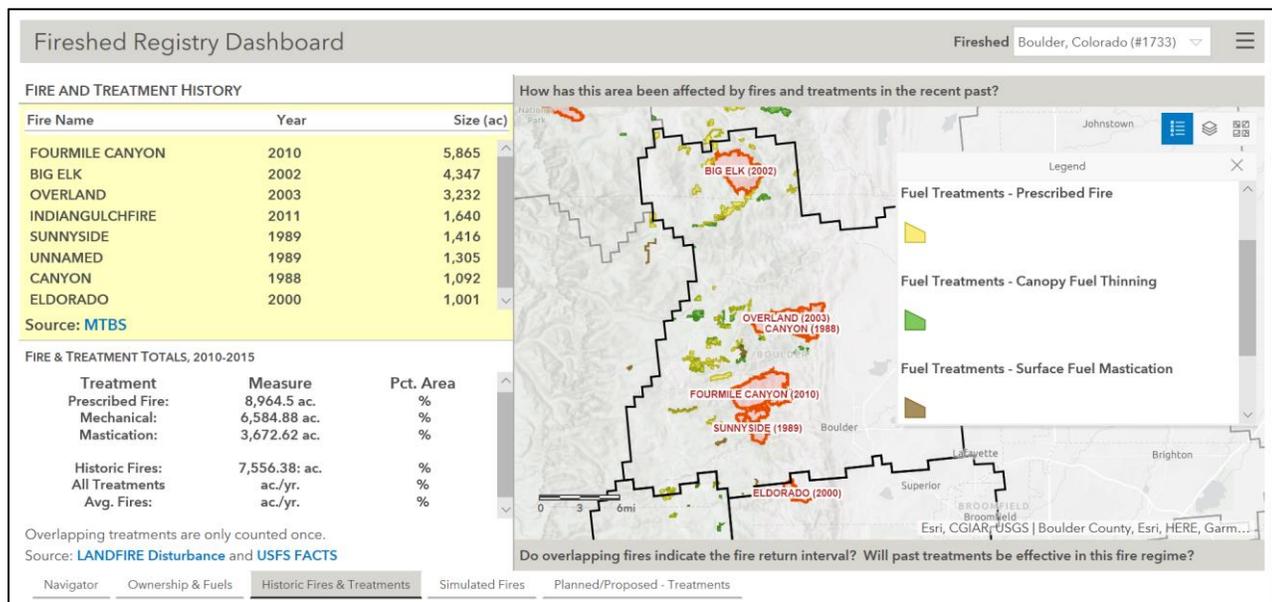
*The Fireshed Registry uses a multiscale planning framework organized around wildfire risk to communities. Finer-scale polygons are nested within a coarser scale and range from stands, project areas, firesheds, and fireshed complexes.*

## Data in the Fireshed Registry

The ArcGIS online Fireshed Registry provides an interactive system to view information on:

- Context (Ownership, Fuels, and Buildings)
- History (Fires and Treatments)
- Projected wildfire risk (Simulated extreme fire events)
- Planned future treatments (5-year action plans)
- Outputs from scenario planning models
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The images below are screenshots of the Fireshed Registry showing ownership, fuels, and buildings (top) and historic fires and past fuel treatments (bottom).



## Current Applications

The Fireshed Registry is being used in several ongoing efforts as a tool to help prioritize investments in lands that are predicted to be problem areas in terms of spreading wildfires to developed areas. The concepts and framework have the potential for wider application and integration with other assessments and models.

During FY20, data in the Fireshed Registry contributed to various prioritization efforts and related assessments including:

1. USDA Forest Service National Investment Strategy for Reducing Fire Risk
2. Response to Executive Order 13855 *Promoting Active Management of America's Forests, Rangelands, and Other Federal Lands to Improve Conditions and Reduce Wildfire Risk*
3. FY21 Hazardous fuels allocation
4. Development of Shared Stewardship performance metrics
5. Draft charter for an integrated Scenario Investment Planning Platform for Shared Stewardship investments
6. Prioritization of USDA Forest Service and NRCS Joint Chiefs' Restoration Partnership Projects
7. Collaborative Forest Landscape Restoration Projects (CFLRP)

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