the Tech. Spec.

Wildland Fire Management RD&A Quarterly Newsletter

Fire Season 2018 – WFM RD&A Supports the Field

In 2018, the Wildland Fire Management RD&A has been busy supporting the field in fire decision-making and fire analytics as we have done every year since 2009. We've spent time on over 50 wildfires as LTANs, FBANs and SOPLs, staffed regional decision support centers, and provided RMAT support. Others on the staff have covered the home front continuing to work with research and the field to develop and improve decision support tools and work with Agency Administrators to make headway on better fire management practices. We also answer phone calls, Help Tickets, and Feedbacks from users every single day of the year related to WFDSS, IFTDSS, IRWIN and other fire management applications. So far, in the last 12 months we have had _over 3600 interactions with the field_ in all of the capacities above, and our support continues as of the date on this newsletter.

Here's to all of _your_ hard work so far in 2018! It's time to slide out of fire season and prep for "meeting season." As always, we welcome your ideas and suggestions for improving our decision support operations.

We are excited to bring you Issue #2 of the Tech. Spec. Visit us at https://wfmrda.nwcg.gov for more information.

In This Issue…

A Message From Tim

I'm pleased to report that there's lots of good news regarding WFM RD&A personnel. First, we've finally filled the Deputy Program Manager vacancy left by Lisa Elenz two years ago when she accepted a promotion to the Forest Service Assistant National Fire Director for Capabilities Integration & Information. Several highly qualified individuals made the selection difficult. I congratulate Mark Hale on being selected, and he is busy getting settled in Boise. Additionally, we converted Nicole Vaillant's long-term detail position to a permanent position; she will continue to lead our effort to develop the risk module for IFTDSS. We are also in the process of recruiting and filling two Lead Analyst vacancies (vice Hale and vice Hovorka), as well as a long-term detailer to manage day-to-day WFDSS needs behind Mitch Burgard. Mitch is not leaving, but is now assigned to prototype a new service-oriented architecture (REST) to serve up fire behavior modeling systems and data. _(cont'd on page 2)_

A Message From Tim continued... This REST service enables fire modeling systems to be run from one central location rather than served up via individual apps (e.g. WFDSS, IFTDSS). This allows other apps to connect to the models, and also allows enhancements to modeling systems to occur in one place. There is potential for fewer "bugs" when REST is implemented, and other services could be served up, like gridded weather, or new geospatial data layers. IFTDSS is currently testing this REST prototype and, if successful, REST will provide the foundation for the Next Generation WFDSS, a Scientific Modeling Framework, and others. We've also engaged the services of USDA Enterprise Applications Services and Noblis to prepare a statement of work and initiate re-coding WFDSS as preliminary steps in development of the Next Generation WFDSS. We are excited to investigate the possibilities that modernization of WFDSS may bring. In addition to new software architecture, there will be a review and revision of the entire decision process and the GUI that supports it. We will continue to work with RMRS and other USFS Research Station scientists to enhance decision processes as well as analytics and spatial and tabular data to inform the process. We have not assigned a team to work on "NextGen" yet, but we are establishing a foundation to move in that direction. Enjoy all of our other project updates in the newsletter.

WFM RD&A Support RMAT 2018

WFM RD&A staff provided support to the Forest Service's Washington Office Fire & Aviation Management effort called Risk Management Assistance Teams (RMAT) this fire season. RMAT focuses on assistance to line officers regarding decision quality and accountability. Efforts include improving decision quality, exploring decision support tools, using prototyped analytics, and trading off multiple fire strategies to compare risk-informed choices. WFM RD&A staffs filled operational and analytic roles.

RMAT Products

Analysts provided interpretation of multiple fire behavior analysis, aviation metrics, and management direction summaries for the RMAT team and to the local unit. WFM RD&A detailers Tessa Nicolet & Trevor Miller, Fire Application Specialists Sam Amato & Morgan Pence, and Tech Transfer Specialist Diane Rau provided virtual analytical support to over sixteen RMAT deployments this season in the form of three products: an Incident Timeline, a Ground Evacuation and Injury/Illness Summary, and a Management Direction Alignment Table. These products are used by RMAT in their work with local units to assist in risk management.

RMAT Webinars for Line Officers

An effort is underway to help strategic decision-makers better understand the Agency Administrator/Incident Commander relationship during management of an incident. The conversation between these two individuals is critical to successful performance. Several webinars were held for line officers and fire management officers in the Southwest and Rocky Mountain regions of the Forest Service to outline a structure for these important conversations. The overall idea is that giving Agency Administrators better tools will lead to high-quality decisions and a well-informed risk tradeoff analysis. A video clip of Senior Fire Leader discussions is available HERE.

For RMAT information visit: https://wfmrda.nwcg.gov/RMAT.html

Detailers: Filling a Critical Need

The WFM RD&A often has a need for detailers to fill in behind vacant positions or assist with special projects or Decision Support during fire season. Meet some of the folks who are filling in at a critical time.

Trevor Miller

Trevor Miller completed a detail with the WFM RD&A this summer. His LTAN/FBAN/SOPL skills were used to assist with remote analytical support and on site wildfire support. He also supported numerous RMAT assignments to the Pacific Northwest Region and assisted with staffing the on-call phone, managing GAE communications, assisting with application testing (IFTDSS/WFDSS), and reviewed documents the RD&A manages and updates annually. Trevor is a district fuels Assistant Fire Management Officer for the Bend Fort Rock Ranger District on the Deschutes National Forest in Bend, Oregon.


Ulrick Fransisco

Ulrick Fransisco joined the RD&A this summer through the Thurgood Marshall Conservation Fellowship Program. Ulrick is a student at Navajo Technical University, where he is studying Geospatial Engineering Technology and Environmental Science. During his 8 week internship, Ulrick became familiar with the RD&A's data and decision support role during wildland fire preparedness levels 4 and 5. He assisted with preparing, maintaining, and documenting data in the Wildland Fire Decision Support System (WFDSS), and worked with Forest Service Fire and Aviation Management (FAM) Information technology staff to perform QA/QC on daily wildland fire data. We enjoyed getting to work with Ulrick this summer!

Allan Hepworth

Allan Hepworth is in a 120-day detail as the WFDSS Business Lead. Allan began his Forest Service career on the Caribou-Targhee in Idaho and has worked on handcrews, engines, and a T3 rappel crew before becoming an Assistant Fire Management Officer in Utah. He became the shared Fire Planner for the Savannah River and Francis-Marion and Sumter National Forests in South Carolina before moving to his current position as the Fire Planning Specialist for Region 8 in Atlanta. In his detail, Allan has been coordinating business needs between RD&A and the WFDSS contracting group while focusing on WFDSS Operations & Maintenance (O&M).
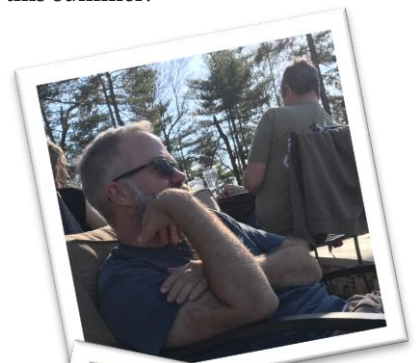
Jonathan Olsen

Jonathan Olsen joined the RD&A in a detail behind Mark Hale on August 20. Jonathan is the Forest Fuels Specialist on the Helena-Lewis and Clark National Forest in Montana and practicing LTAN. During the detail Jonathan is working on WFDSS Development and Enhancement (D&E). This includes testing new and improved functionality in WFDSS and working with developers in grooming new changes that have been recommended by WFDSS users. Jonathan will also be assisting with testing bug fixes and working with Spatial Fire Planning concepts.

The 2018 Fire Continuum Conference brought together more than 600 attendees in Missoula, Montana in May 2018.

The WFM RD&A contributed with partners and collaborators to develop workshops and give numerous presentations, highlighting the major focus areas we have been involved with for the last few years including fuels and fire management.

The Interagency Fuels Treatment Decision Support System (IFTDSS) team was represented by Brianna Schueller, Kim Ernstrom, Nicole Vaillant and Caroline Noble who gave a presentation on IFTDSS, and facilitated a workshop teaching students the fundamentals of the new functionality of IFTDSS. Nicole Vaillant, a long-term detailer with the WFM RD&A, gave a micro talk regarding the Forest Service hazardous fuels treatment program.

Fire management issues were also well represented. Tim Sexton gave a plenary talk about the need for a modern analytical strategy for wildfire management, representing the concept of planning for wildland fires before they occur. Erin Noonan-Wright gave a plenary talk demonstrating ways to accomplish technology transfer of fire

behavior information during a wildland fire. She assisted a colleague at the Firelab, Chuck McHugh, with a workshop using FlamMap 6.0 to model wildland fires, which now incorporates both FarSite and FlamMap 5.0 functionality. Erin also presented the first part of her research project mining the Wildland Fire Decision Support System (WFDSS) database's Relative Risk data, including an in-depth look at how geographic areas are different in their perceptions of risk as related to the relative risk assessment data collected on each wildland fire in WFDSS from 2010 - 2017. The Conference Proceedings will be made available on the Fire Continuum Conference website, so be sure to check back for a comprehensive collection of the research and ideas presented at this event.

Off the Clock: Tonja Paints

Lest readers think we are all business and no play, we're going to highlight tidbits about our staff "*off the clock*" in this and future newsletters. Tonja has been painting fire scenes with watercolors for about eight years, earning recognition in state and national art shows. Several of her works have been displayed in exhibits and magazines, including the January-February 2016 cover of Wildfire Magazine. Most recently, two of Tonja's paintings were accepted to the traveling exhibit "Conversations Through the Smoke," an art show traveling throughout Idaho and Montana during the Fall of 2018. *For more information visit https://www.facebook.com/ConvosThruSmoke/*

"Wall of Flame" watercolor by T. Opperman

# New "Fire Timeline Generator" a Success in 2018

The RDA's recent web application, the Aeneas Fire Timeline was used this season as a visual depiction of how specific data elements of a fire change over time. The Timeline has many uses including: briefing incoming teams and resources to get a quick history of the incident, tracking what has occurred on the fire by a local unit, and regional and geographic area tracking of fire data elements. It is also a useful graphic for strategic planning discussions, providing a succinct picture of the history of resources, fire growth, personnel, costs, and strategy plotted on one graphic from a variety of information sources. Seeing all the data in one place helps managers understand where there may be misalignment in strategy or reporting of strategy.

Elements available for graphing:
- Incident Size
- Estimated Current Cost
- Percent Contained
- Personnel Assigned
- Incident Management Organization
- ICS 209 Strategy
- Percent to be Contained
- Structures Threatened
- Structures Destroyed
- Assigned Resources (handcrews, engines, helicopters, fixed wing, dozers, tenders, single resources)

Timeline Example from Klamathon Fire July 5 – 20th, 2018
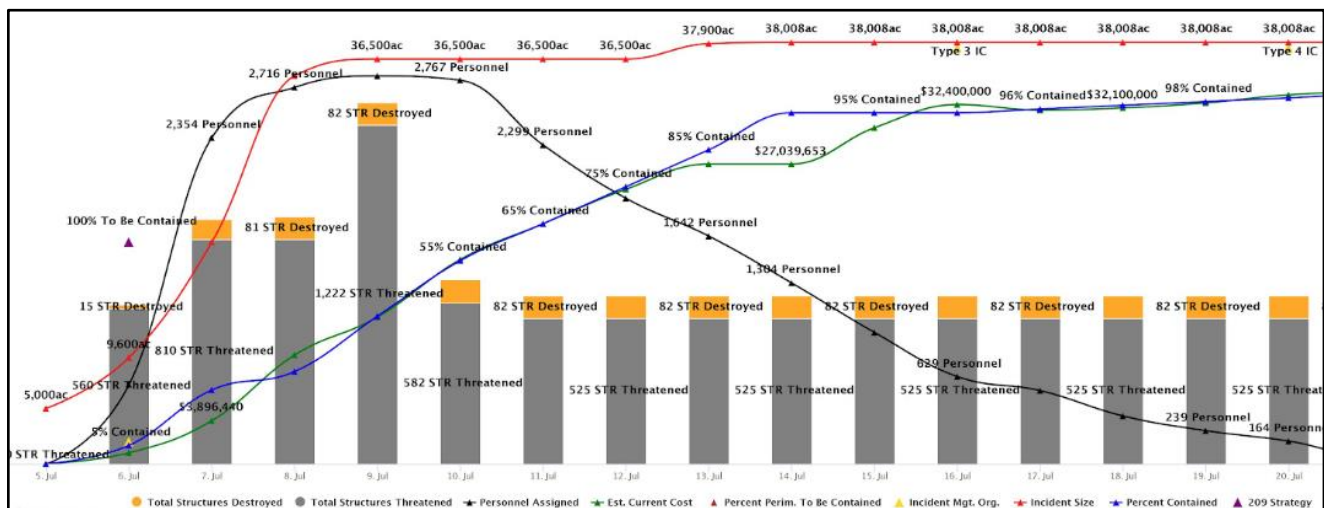
Timeline Data Acquisition

Data are acquired from the Integrated Reporting of Wildland Fire Information (IRWIN) system and WFDSS. Using IRWIN data ensures the Authoritative Data Source (ADS) is used for each data element. In 2016 and 2017 the Fire Timelines were created manually in Excel, which took a significant amount of time. In the spring of 2018 a prototype version of the application was created by Reggie Goolsby and launched.

The Fire Timeline Generator is simple to use; input an IrwinID or unique fire identifier and then graph elements by selecting checkboxes. Elements can be graphed alone or together. Users can upload their own custom data such as unified command or fire merging information by create an account. This fire season the Fire Timeline Generator was a staple product for the Forest Service RMAT effort, and used by multiple regions. During the off -season the RDA will be working to incorporate inputs and suggestions to improve the application.

To try the Aeneas Fire Timeline Generator, visit the site using the Chrome browser:
https://gtimeline.wfmrdax.com

PODS for Fire Management: Enhancing Preparedness, Communication and Responder Safety

Potential Wildland Fire Operations Delineations (PODs)

Many units across the country are using wildfire risk assessments coupled with Suppression Difficulty Index and Potential Control Locations to develop Potential Wildland fire Operations Delineations or PODs. Much of this work has been done by Kit O'Connor at the Rocky Mountain Research Station (see links below). The WFM RD&A has been investigating ways to utilize this process in fire decision-making. What are PODs and what do they mean for Spatial Fire Management?
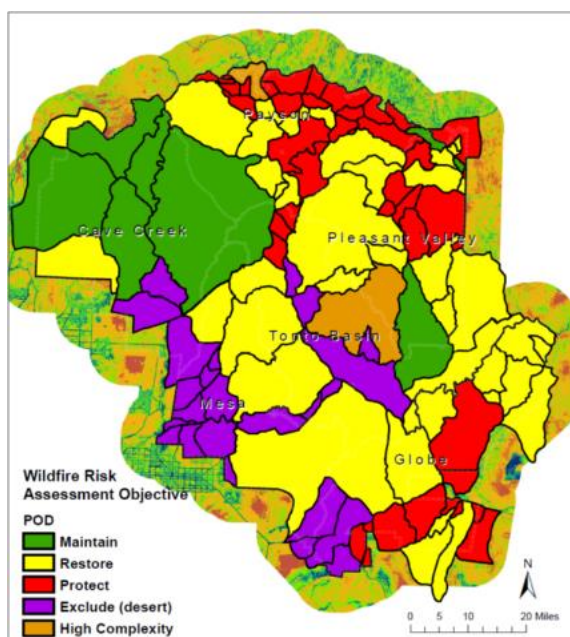
What are PODs?
Think: *container*, or *operationally relevant fire management unit*
Potential wildland fire Operations Delineations (PODs) are polygons with boundary features relevant to fire control operations (e.g., roads, ridgetops, and water bodies). PODs summarize wildfire risk to help plan a strategic response to unplanned ignitions. In an operational response context, POD boundaries can guide fire line placement. PODs may also prove useful for strategic fuels planning, with potential applications for designing controlled burn units, reinforcing existing POD boundaries, or prioritizing treatment opportunities. By vetting and mapping POD boundaries, we can formalize the knowledge of fire management experts.

Why use them?
A basic principle of risk management is to get ahead of problems one may face down the road. Doing so can help reduce time pressure, reduce uncertainty, and expand options – ultimately facilitating safer and more effective response. The Red Book embraces this idea, describing pre-season preparedness work as a key element of risk management that is critical to success when a fire starts. Pre-fire planning can provide a valuable means for building capacity within the organization, communicating hazards and opportunities with key stakeholders and partners, and sharing risks and responsibilities. The Red Book and the Forest Service Wildland Fire Risk Management Protocols both call for managers to collaboratively "predetermine" response strategies that balance protection of values at risk with firefighter and public exposure. Developing PODs, we think, is a good first step to meeting the intent of these requirements. Pre-fire planning with PODs is intended to provide actionable information and to expand flexibility, and not to make decisions.

Wildfire Risk Assessment Objective
POD
- Maintain
- Restore
- Protect
- Exclude (desert)
- High Complexity

Maintain: Current conditions are such that high values at risk are at low risk of loss from wildfire, and many natural resources may benefit from fire.
Restore: Current conditions are such that high values at risk are at a moderate risk of loss from wildfire. Wildfire should be used to increase ecosystem resilience and provide ecological benefits when conditions allow.
Protect: Current conditions are such that high values at risk are at high risk of loss from wildfire.
**Exclude**: Current conditions are such that high values at risk are at high risk of loss from wildfire. Primary protection objective is to minimize both suppression and fire damage to the ecosystem.
High Complexity: Current conditions are such that high values at risk are at high risk of loss from wildfire, depending on ignition location and weather conditions.

For further information follow these links: Application of Wildfire Risk Assessments in CA; Getting ahead of the Wildfire Problem; Potential Fire Control Locations; Modeling Fuel Treatment Leverage; Wildfire Risk Assessment Process or see Kit O'Connor's work at
https://www.fs.fed.us/rmrs/people/christopheroconnor

IFTDSS - Interagency Fuels Treatment Decision Support System Now Includes the Fuels Treatment Effectiveness Monitoring Database - FTEM

After a year of planning and development, the IFTDSS team in partnership with agency fuels leads and field testers released the newly updated Fuels Treatment Effectiveness Monitoring Database (FTEM) to the interagency fire community on **June 14, 2018.** The database is accessed through IFTDSS https://iftdss.firenet.gov. As of mid-September, 2018 over 250 users established accounts and are monitoring wildfires and fuels treatment interactions for the 2018 wildfire season. FTEM is designed as the authoritative reporting system for fuels treatment
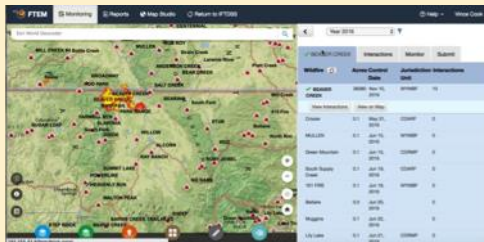

effectiveness for the five Federal Wildland Fire Agencies - USFS, BLM, NPS, BIA and FWS. The purpose of FTEM is to establish a single national interagency source to document the interaction of wildfires and fuels treatments.

The updated system provides an easy map-based interface to enter information about fire weather, fuels, and the ability to upload supporting documentation to detail the effectiveness of fuels treatments in reducing wildfire intensity and extent.

IFTDSS Begins Development of Workflow for Quantitative Risk Assessment (QRA)

The IFTDSS team is developing an interface to perform a QRA from the project to the unit scale following steps outlined in GTR-315, *A wildfire risk assessment framework for land and resource management*. IFTDSS is unique in that it will contain a comparison functionality allowing users to complete a QRA and compare defined treatment alternatives to understand the potential impacts on risk for each compared to no action. The QRA workflow will be integrated into the current IFTDSS application using existing tools, mapping and fire behavior modeling.

Wildfire simulation modeling will use "Landscape Burn Probability," a customized version of FlamMap developed specifically for use in IFTDSS. Users will be guided through the Highly Valued Resource and Asset (HVRA) characterization process to facilitate collaborative workshops for developing HVRAs, assign representative response functions, and assess relative importance prior to working in IFTDSS. Once in the Application, users will be able to choose from the national HVRAs or upload shapefiles for their own.
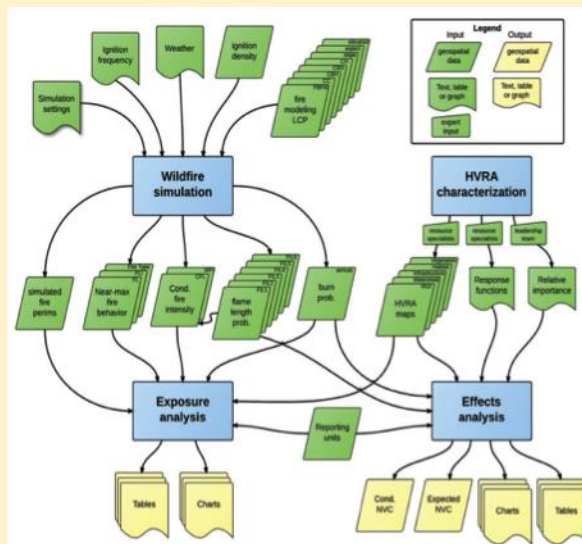
For the First Time EVER! Interagency Fuels Treatment Data Integration - a Success in FTEM

In the Interagency Wildfire World, federal fuel treatment data live in two unique databases. The USDA Forest Service uses FACTS and all DOI Bureaus use NFPORS. When it comes to entering and managing the data this is a perfectly acceptable solution. Each agency has their own reporting requirements and standards, and the individual databases allow for the appropriate level of customization and standardization.

However, when it comes to leveraging the data for interagency reporting such as FTEM, this "siloed" setup is riddled with challenges. For starters, pulling data from multiple systems to assemble a larger "integrated" data set is challenging because these data adhere to completely different schemas. Enter the **WFM RD&A's Fuel Treatment Integrator** - A tool that automatically pulls data from both systems, normalizes the attribution to meet the NWCG interagency data exchange standard, and performs quality assurance checks. After the heavy lifting is completed the Integrator pushes a copy of the combined data to ArcGIS Online where it lives as a regularly updated (nightly) feature data service available to applications like IFTDSS (FTEM), WFDSS, EGP and more.

Hats off to Ben Butler and Andrew Bailey for making this dream come true!

The Advanced Fire Environment Learning Unit (AFELU)

Becoming a skilled fire behavior or fire weather specialist requires specific courses as well as time spent learning from more experienced specialists in the field. Technology and techniques are changing rapidly. Staying current is challenging. **The Advanced Fire Environment Learning Unit (AFELU)** creates opportunities to share lessons learned, what works in the field, and exchange tricks of the trade. The AFELU facilitates knowledge sharing from people who have a lot of experience with those in earlier stages of career development as fire behavior and weather specialists.

The AFELU, a subcommittee of the Fire Environment Committee, offers a supportive network that encourages people to pursue fire analyst specialties, and works with other subcommittees such as Fire Behavior and Fire Danger to provide opportunities for continuing education and technology transfer to fire analysts and other specialists. To access webinar recordings and videos, visit: https://www.nwcg.gov/committees/advanced-fire-environment-learning-unit/resources

Save the date for the "Fire Season 2018 Hot Topics" webinar: November 7, 10 a.m. – 12 p.m. MST.

New Spatial Fire Planning Partners

Diane Rau visited Los Alamos National Lab (LANL) and Los Alamos County Fire Department (LAC) in July to game out a cooperative, spatial fire plan strategy for the two units. LANL has been severely impacted by past large fires (Cerro Grande 2000, Los Conchas 2011) without direct WFDSS representation compromising participation. A cooperative spatial fire plan with LAC enables the development of seamless objectives and response between the units and surrounding federal units: Bandelier National Monument, Santa Fe National Forest and the Northern Pueblo Agency. Initial planning begins soon. Lessons learned will be shared to benefit other, non-traditional units engaging with WFDSS in a similar fashion.

Announcements!

WFDSS Data Deadlines

Upcoming deadlines for changes to WFDSS FMUs are due to your agency by 10/31, and they will get it to us by 11/7. Find your agency representative at: https://wfdss.usgs.gov/wfdss/WFDSS_Data_Downloads.shtml

S-495 Starts Soon!

Nominations are due on October 19 for the next offering of S-495: Geospatial Fire Analysis, Interpretation, and Application. This course is required for those who want to become Long Term Analysts (LTAN), and is highly encouraged for FBANs wanting to round out their skillset. The class starts in November with eight online training units prior to attending the in-person course at NAFRI in April 2019. See our blog for more information: https://wfmrda.blogspot.com/

Wildland Fire Management RD&A

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