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User feedback on the Interagency Fuel Treatment Decision Support System

Guest Writer
April 7, 2026

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Land and fire managers are often tasked to plan complex fuel treatments and apply the best available science across jurisdictions to prioritize, plan, and conduct prescribed burns and other fire mitigation tactics.

Decision support systems – information systems designed to support management decision making – are a key tool for fuel treatment planning.

What follows are the key findings from a recent report by the team that develops the system.

This article is first published in Wildfire Magazine – read the full edition.

Historically, models and systems for fuels management have been developed independently without a great deal of coordination, leading to varying degrees of overlapping functionality.

Additionally, as Gail Wells noted in the December 2009 issue of Fire Science Digest, the onus of reviewing, selecting, and using a specific tool often falls on the fire manager.

To increase efficiency, reduce redundancies, and make the tool-selection process easier for fire managers, a solution was needed that incorporated several fuels management tools in one framework.

The Joint Fire Science Program, a collaborative initiative led by US federal agencies and researchers to sponsor and deliver science to the fire management community, initiated a study to design a system to meet these needs. The result was the Interagency Fuel Treatment Decision Support System (IFTDSS). Initially, a proof of concept was developed by the consulting firm Sonoma Technology in concert with Joint Fire Sciences. Later, the system was approved for use by federal agencies in the United States and was redeveloped by IBM under the stewardship of the interagency Wildland Fire Management Research and Development Applications team in 2017.

BACKGROUND

In the United States, the National Cohesive Strategy in 2014 emphasized the importance of fuel treatments to proactively address wildland fire concerns. The Wildland Fire Crisis Strategy of 2022 built on this and other approaches by outlining a vision of large-scale fuel treatments over millions of acres of land of various ownerships, supported by funding from the Infrastructure Investments and Jobs Act passed the prior year.

In 2022, the National Prescribed Fire Program Review by the US Department of Agriculture recommended better training and incorporation of spatial modeling for contingency planning.

Fuel-treatment strategies often require detailed and collaborative planning across multiple agencies and ownerships. The importance of detail was underscored in the spring of 2022 when escaped prescribed fires in New Mexico burned several square miles and forced a 90-day pause on USDA Forest Service prescribed fires. The pause triggered a National Prescribed Fire Program Review and among its recommendations were better training and incorporation of spatial modeling for contingency planning.

WHAT IS THE IFTDSS?

The system uses a landscape planning cycle approach to fuels management to bring together tools for fuels planning and decision support, including national geospatial landscape data from the LANDFIRE program, fire behavior models from the Fire Modeling Services Framework program, and several geospatial references layers used by land management agencies to help inform decision making. For those tasked with monitoring on federal lands, the system also allows users to enter data into a Fuel Treatment Effectiveness Monitoring repository. All these are included in one convenient online system (Figure 1). Managers can model and examine results in a map, export data for planning documentation, and create stand-alone summary reports for documentation, presentations, and briefings (Figure 2).

Figure 1. The Interagency Fuel Treatment Decision Support System framework, pulling together tools from several sources.

In the United States users may also be familiar with decisions support systems designed to support multiple land management activities, such as Vibrant Planet's Land Tender or those intended to support wildfire such as the Wildland Fire Decision Support System (WFDSS). The Interagency Fuel Treatment Decision Support System differs from these applications in that it is purpose built for cross-boundary planning of fuel treatments and is developed by an interagency team of fire management practitioners who are experts in planning and implementation; this is reflected in the affiliations of the more than 8,000 user accounts in the system. Roughly 60 per cent of users are federal, state, and local government, with most being United States Forest Service users. The remainder are non-government users including non-profits, universities, utility companies, and others. The system may be used for public and private lands, and anyone may access the system regardless of their affiliation, at no cost; this facilitates interagency collaboration by removing any cost and agency-specific barriers.

LISTENING TO USERS

The development of the Interagency Fuel Treatment Decision Support System is ongoing and is informed by the needs of the fuels and wildfire management community, so user feedback is key. During the operational life of the system, feedback has been solicited in several ways. In 2023, a formal survey was commissioned through University of Idaho partners who conducted hour-long interviews with 47 system users from a variety of agencies and backgrounds.

The goal was to gain a better understanding of a) how users employ the system b) what they find valuable, c) what they would like to see changed, and d) how they prefer to learn to use the system. That information provides an overall snapshot of how the fuels management community learns and uses the system and how well it supports the needs of the users in the field.

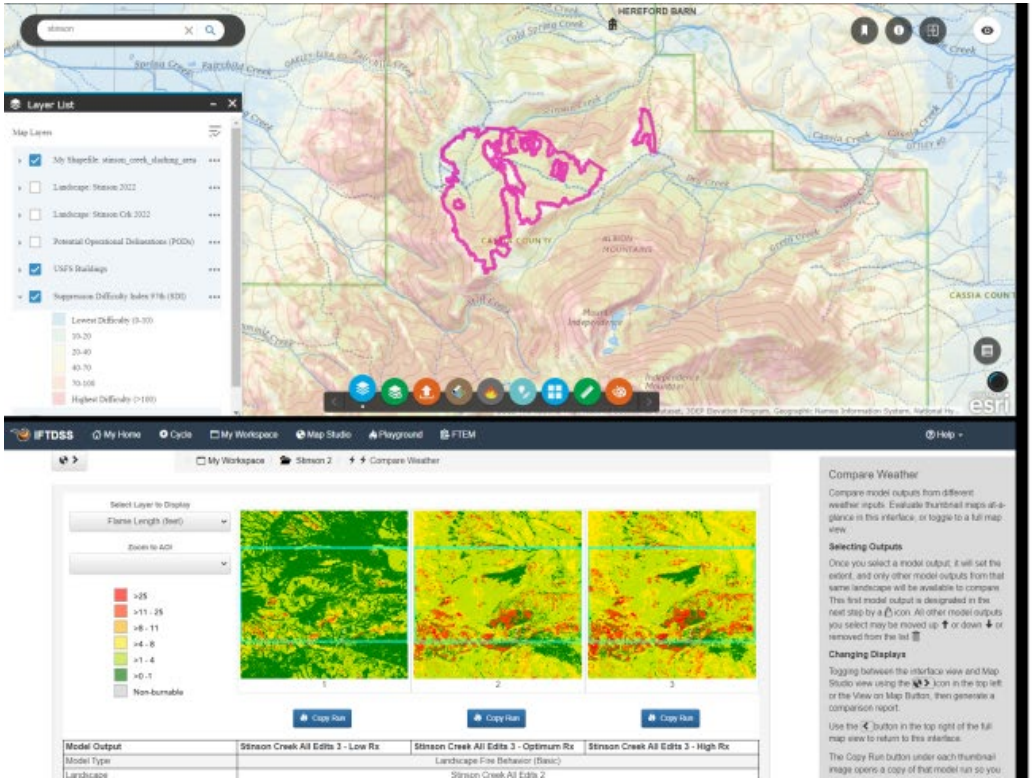
HOW THE SYSTEM IS USED

The most widely reported use of the Interagency Fuel Treatment Decision Support System among interviewees was prescribed fire planning and treatment planning, followed by National Environment Policy Act planning, and risk assessment (Figure 3).

Other uses included drafting community wildfire protection plans, developing prescriptions, assessing potential treatment impacts, and estimating contingency resources. Some interviewees also noted the use of the system in developing materials for funding or grant proposals to support fuel projects.

Participants in different positions tend to use the system for different goals. Those who worked as fire management specialists and assistant fire management officers tended to use the system more for prescribed fire planning and National Environment Policy Act planning, while those in fire management officer

positions use the system more for treatment planning and risk assessment. For those who worked in a private or consulting role, risk assessment was typically their primary goal.



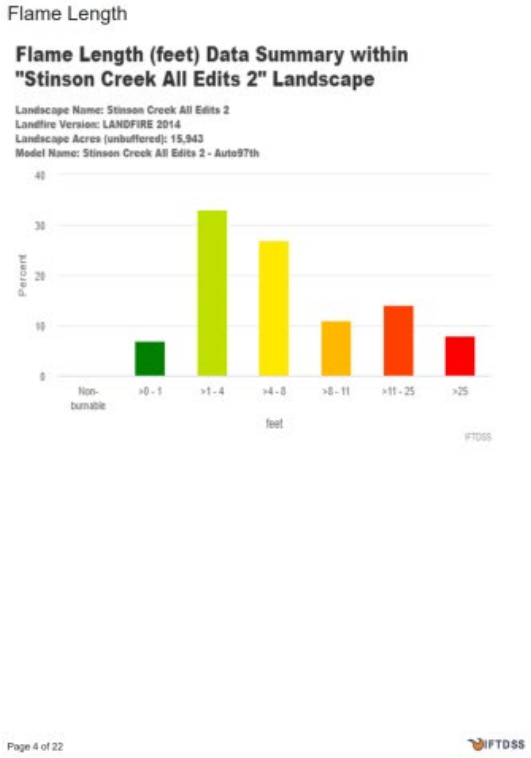


Figure 2. Common parts of the system interface.
– A treatment polygon overlaid on a landscape in Map Studio. – Fire behavior summary report indicating flame lengths.
– User interface for comparing fire behavior outputs under various weather conditions.

PERCEIVED BENEFITS

When participants described their use of the system, the primary aspects they found valuable included the following.

Ease of use

Participants described the layout of the system as simple and navigable, especially compared to existing modeling and mapping systems, an example being the way in which tasks were laid out in a process that approximates the landscape planning cycle.

"So, the way that the steps are set up, as in, it's pretty clear from the get go. You can get in there and say, 'start here'. Build the landscape, then do this, then do that, so the way that it's laid out leads you through the entire process pretty clearly."

The most common feature interviewees found useful was the relative ease of learning and using the system. Participants felt the quantity of data readily available in one system, combined with the relative ease of generating summaries, helped make the system easier to use. This was aided by the availability of helpful information in the system.

"There is an excellent set of resources and guides, along with [the system] that are very understandable in terms of what the inputs are, what inputs are required, what they mean and working through that is very good and easy."

Increased efficiency

Several interviewees indicated the system saved time. Time savings came from the ease of use discussed above, the availability of existing data within the system such as landscape layers, and the ability to quickly create summary reports. Instead of implementing multiple systems, participants could save time by using one.

"I don't have to go to Landfire and figure out an extent for a fire or project and then request that information. [The system] does that for me. It saves some time and saves some confusion with that."

Facilitating communication and collaboration

Communication was also among the top areas in which users found value. Interviewees often spoke positively of the visual aids produced by the system reports and their utility in communicating potential fuel treatment alternatives and the reasoning behind them. Fuels planning is often a collaborative effort in which multiple landscape values must

be discussed among experts from several fields. When discussing communication using the system, multiple participants noted the benefits of being able to visually demonstrate their plans and the reasoning behind them to convey information to planners and collaborators regardless of whether they had background in wildland fire.

"It has helped us defend our scale of treatments on the forest. By having the tool available to us, it allows us to defend why we want to do the treatments we want to do to the public and to internal, both."

"I really think that it's just such a better visual tool to communicate what we expect with fire behavior in both the burn unit and the adjacent fuels outside the burn unit. Hands down, it's just simpler and everyone can understand it regardless of specialty or training or education."

RECOMENDED CHANGES

When asked about what changes they would recommend, interviewees tended to focus on features to enhance analysis capabilities or better facilitate collaboration among individuals using the system.

More modeling features and integration

Many participants wanted more weather and contingency planning features, such as querying weather data to generate fuel moisture and weather conditions within specific percentiles. Users also recommended having more control over which weather stations data was retrieved from, often expressing these as ways to better utilize data from within a single system.

Additional features for containment and contingency planning were also recommended. Participants explained the need to calculate resources needed to contain a prescribed fire in the event of an escape, an especially pertinent need following the prescribed fire escapes in 2022.

"So [containment] is the big one that's being promoted right now because of the prescribed fire- the lens that prescribed fire is being looked at through right now."

Landscape editing tools

The Interagency Fuel Treatment Decision Support System provided a way to easily edit landscape information by creating custom edit rules or using a simplified set of editing rules. These simplified rules were appreciated by users but were found to be lacking in availability. They could only be used with older landscapes and several users recommended updating and expanding these rulesets.

Suggestions included offering a wider range of thinning treatments to the rules and allowing them to project out for longer periods of time to help model fire behavior further into the future.

Collaboration

The ability to share data with other account holders, as can be done with the Wildland Fire Decision Support System (WFDSS) was another common suggestion. Participants suggested this would increase efficiency by reducing duplicated efforts among team members and ensuring everyone was working from the same dataset.

Figure 3. The most common uses for the system and the relative proportion of responses for each for each. Categories are not mutually exclusive.

LEARNING METHODS

Time isn't just spent using a system but also learning to use it. Interviewees commonly described the methods they used to learn the system such as videos, the system's online knowledge base, experiential learning, and online courses.

Videos were one of the most often cited learning methods that were used, preferred by users, and recommend for new users. Some participants found short videos focused on a specific task to be helpful, others found value in the way in which steps were laid out as part of a process.

"I'd have to say that's probably one of the things that I like about where [the system] has put effort and time, is in the training. I could find and watch a video. I've become a big fan of watching a YouTube video."

Experiential learning was another common method – logging into the system, exploring the interface, and running through various tasks. If needed, users would draw on additional learning methods such as an online knowledge base, videos, or consulting others. Some participants also noted the benefit of example tutorials to use as an overall framework into which they could substitute their own data and learn the system.

"I like watching things demonstrated, but I learned by doing and getting to really put that stuff together myself. I really like those step-by-step tutorials."

Courses and workshops, in-person or online, were the fourth-most cited way of learning the system for participants. When it came to recommended methods for new users, courses, workshops, and instructional videos were most frequently recommended. In-person classes and workshops tended to be preferred to online ones. Some valued the dedicated interruption-free time that comes with an in-person environment, others found it an easier environment in which to ask questions. Self-led methods such as the online knowledge base and tutorials were also mentioned here, but less frequently than classes, workshops, or the use of videos.

BRINGING THE FINDINGS TOGETHER

Interagency Fuel Treatment Decision Support System users interviewed perceived value in a system that is easy to use and enhances efficiency and communications. But more work is needed. Interviewees recommended additional capabilities in the system to help them perform their duties, allowing them to do more within a single system and better collaborate with others.

Interviewee feedback has been invaluable in better understanding the needs of the fuels management community. Because fuels management evolves over time, the system and other tools must do the same. As these needs evolve, continued dialogue with system users to involve them in development, will ensure newly developed features are addressing the users' needs and providing the services they require for collaborative fuels management planning and actions into the future.

To summarize key interview points:

- There were multiple reasons users employed the system, depending upon their roles.
- The aspects interviewees valued most from the system included ease of use, efficiency, and facilitating communication.
- The most recommended changes involved adding capabilities that would allow users to do more within the system, which would reduce the need to use multiple systems or models and provide more of a one-stop-shop approach.
- Multiple methods are used to learn the system, often in combination with each other.

The authors wish to thank all the interview participants who generously provided their time, input, and perspective to inform the development and enhancement of the Interagency Fuel Treatment Decision Support System for the wildland fire community.

Read the Full Report.

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