

## A Powerful New Planning Environment for Fuels Managers: The Interagency Fuels Treatment Decision Support System

*The Joint Fire Science Program, the National Wildfire Coordinating Group Fuels Management Committee, and Sonoma Technology, Inc. are unveiling the prototype of a new planning environment that will help fuels specialists negotiate the confusing array of planning tools. The new framework, dubbed the Interagency Fuels Treatment Decision Support System, or IFT-DSS, organizes fuels-planning software and data into a seamless user environment. IFT-DSS offers users access to powerful modeling software from within a well-designed, intuitive graphical user interface, and it provides a common platform for the further development of fuels-planning software tools. The name may not slide easily off the tongue—you might vocalize it as “Ifty-Diss”—but the framework itself promises to revolutionize the way fuels planners do their jobs. It will smooth and simplify the fuels-treatment decision process by minimizing planners’ struggles with unfamiliar models and hard-to-use databases. IFT-DSS will make fuels-treatment decision making less time-consuming, more scientifically rigorous, and easier to explain to stakeholders.*



IFT-DSS will support fuel managers in their planning and implementation of treatments.

## Too much of a good thing

It takes a bad fire season to turn the problem of fire-prone forests into a public crisis. With last summer's widespread fires near Los Angeles—all the more tragic because of the loss of two firefighters—people were shocked once again into acknowledging the dangerously flammable condition of millions more acres that didn't burn, at least not this time.

For fuels managers, the urgency is perpetual. More than anyone else, they understand—are driven by—the need to treat hazardous fuels before another major conflagration erupts, taking with it more homes and human lives.

"We've got a pretty good fuels-treatment program here," says Ben Jacobs, fuels-management specialist at Sequoia and Kings Canyon National Park. "But like everywhere in the West, we've missed a lot of fire-return intervals, and we have a lot of fuels built up as a result. I doubt if we can catch up any time soon. Probably not in my career."

Deciding where, when, and how to conduct fuels treatments is time-consuming under the best of circumstances. Fuels-treatment plans, which can run to tens or hundreds of pages, must be based on good data and good science. They must comply with environmental law. Managers must be able to explain to stakeholders why a particular parcel is being treated in a particular way and to predict how much the treatment will reduce the risk of uncharacteristic wildfire.

Over the past couple of decades many software tools have been launched to help fuels specialists with this critical task. Today the fuels-treatment community has at its disposal literally hundreds of computer programs and databases. These tools are there to help them gather and store vegetation data, calculate the volume and location of fuels needing treatment, figure out the most effective spatial layout of treatments, plan prescribed burns, simulate fire behavior and effects, estimate smoke output, conduct monitoring and evaluation, and do all the other tasks required to produce a scientifically defensible National Environmental Policy Act-compliant fuels treatment plan.

This proliferation of tools has come in response to various funding initiatives, with no guiding central control or vision. All these tools can be effective in the right hands and for the appropriate purposes. Yet, for most fuels planners, the sheer bewildering profusion

of them has become too much of a good thing. The overwhelming choice is actually making their jobs harder.

Beth Corbin is a fire ecologist on the Uinta-Wasatch-Cache National Forest in Utah. "One of my pet peeves," she says, "is the proliferation of fuels and vegetation modeling tools out there. There are so many available, and each requires a substantial amount of time to learn and keep up with. Simply sorting through the choices available is a daunting task."

Jon Wallace, prescribed-fire specialist at Florida's Loxahatchee National Wildlife Refuge, uses fire to treat close to 50,000 acres per year of Everglades sawgrass and invasive plants such as Melaleuca. He's competent with the four or five software packages he relies on to estimate fire behavior and smoke output. Smoke is a particular issue because of the many elderly people living in nearby Palm Beach and Fort Lauderdale. But he'd welcome a framework like IFT-

DSS to streamline the planning process. "Right now we have several different steps, and we're doing a lot of it in our heads. A one-stop shop where we could go in and input the parameters—we could use something like that."

## Frustrated

In March of 2007, after consultation with the National Wildfire Coordinating Group (NWCG) Fuels Management Committee and many others, the Joint Fire Science Program (JFSP) initiated the Software Tools and Systems study. For its project manager, the JFSP chose Mike Rauscher, a recently retired Forest Service decision-support system expert. Rauscher spent his 30-year career with the Forest Service's North Central and Southern Research Stations working on the theory and application of decision science to natural resource management. "Mike is the shepherd of this baby—our guiding star," says JFSP's communications director Tim Swedberg.

The JFSP fuels-treatment working group and Rauscher have spent the last 2 years talking to fuels managers, educating themselves about software architecture, and deepening their understanding about what isn't working. Early on in the project, the JFSP commissioned a study from Carnegie Mellon University's Software Engineering Institute. The study team acknowledged the chaos of the current situation and recommended organizing and streamlining the existing tools. What was needed, they said, was a

*"We've got a pretty good fuels-treatment program here."*

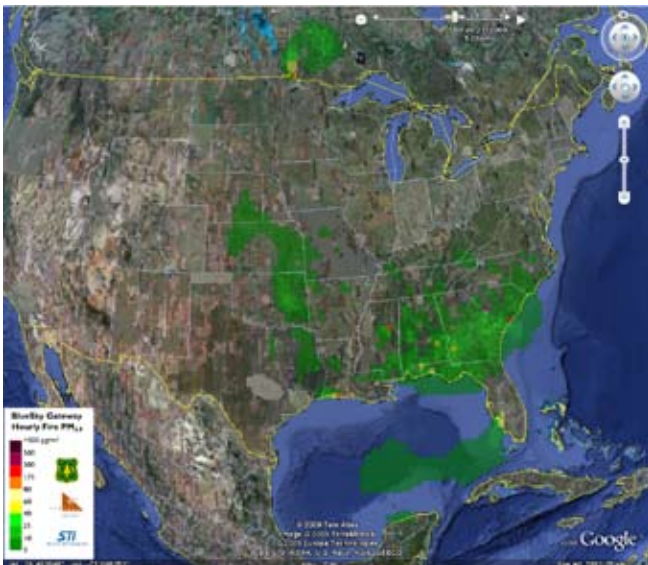
sophisticated, collaborative system that would function as a communications broker for current and future software tools.

As an example of the desired concept, the study team pointed to a software framework called BlueSky, a well-received smoke-modeling package developed jointly by the USDA Forest Service AirFire team and Sonoma Technology, Inc (STI). BlueSky links several independent models of fuel loading, fire consumption and emissions, and smoke dispersion and assembles them under a common web-based user interface. Users can select their own analysis pathways by combining data and science models specific to the question at hand.

In early 2008, the JFSP surveyed fire and fuels specialists, asking them what software tools they were using and whether they felt these tools served their needs. The fuels managers had diverse ways of doing their planning, but they felt strongly about one thing, says Swedberg: “They all said, ‘Do not give me another tool.’”

The planners were frustrated at not only having to learn a whole suite of software tools—and some of them are difficult to master—but at having to figure out, without much help, which ones work best for which purposes.

What makes it harder says STI’s Tami Funk, is that most fuels planners are responsible for numerous tasks, and many of them spend only a few weeks doing the planning for the whole year. Funk manages environmental data analysis at the Petaluma, California-based environmental research company that is developing the IFT-DSS proof-of-concept prototype.



Example smoke prediction product from the BlueSky Framework (Hourly PM<sub>2.5</sub> concentrations from fires on 2/23/09).

**“Do not give me another tool.”**

“They’re often out fighting fires in season and doing their planning in the off season,” she says, “and they have other tasks on their plate as well.” As a result, even the most computer-savvy fuels planners have to relearn often-complicated programs every season.

This makes it tempting for them to reach for familiar tools, whether or not they are the most appropriate ones for the job. For example, the JFSP’s survey revealed that most fuels planners rely heavily on the venerable and easy-to-use fire-behavior model BEHAVE. BEHAVE is an excellent model and a useful tool for estimating point fire behavior, but, lacking spatial capability, it cannot easily produce maps of fire-prone spots on a given area of interest. Several other tools, such as FlamMap, are capable of explicit spatial analyses, but they are more difficult to understand and use, and, often just as important, they require a lot of input data.

“BEHAVE was the state of the art when it was developed 30 years ago and still continues to be the single most frequently used software tool today,” says Swedberg. “But computing technology has advanced by quantum leaps since then. We have capabilities such as web-based mapping that weren’t available even just a few years ago. There’s a lot of user demand for these new technologies.”

The beauty of IFT-DSS lies in its potential to tap into the capabilities of fire-behavior and other models and enable them to interact with one another from a common interface. The IFT-DSS framework will be designed so that different software tools can be plugged into it, enabling seamless communication among them.

A set of development standards and a new-tool registry system will equip IFT-DSS to adapt and change to accommodate ongoing improvements in modeling and visualization technology, as well as the ever-changing demands of users. The ultimate vision is a system that will let scientific software developers improve the guts of the IFT-DSS framework—revising or replacing their models according to changing science—with minimal fussing with the interface.

## Old clothes, new closet

The fully functional IFT-DSS will offer these key problem-solving features:

- a framework architecture that enables users to integrate data and scientific models from a

common web-based graphical user interface to support project-level fuels treatment planning

- structured guidance through the most common planning scenarios, enabling users to work with multiple models and data structures
- enough power and flexibility to enable users to customize problem-solving strategies by assembling their own data and specifying their own chain of modeling processes
- tools that will allow fuels-treatment planners to collaborate and share planning methods

One thing IFT-DSS is decidedly not: it's not just one more piece of software to throw onto a growing pile. Rather, IFT-DSS is a framework that organizes and manages the most-used software and database tools according to the functions most needed by fuels specialists. You might think of it figuratively as a new closet organizer that sorts your existing wardrobe in ways that enable you to pull together an outfit easily.

Unlike a closet, however, IFT-DSS is not passive storage but an active system of links among models and data. These links enable navigation through sequences of fire-behavior and fire-effects modeling processes without ever leaving the IFT-DSS framework.

The fodder for these processes is data—lots and lots of data. There are weather data, climate data, topographical data, historical weather and fire data, and vegetation data describing both the current and potential future vegetation. You can access data from a variety of sources in a variety of formats through IFT-DSS, you can upload your own data in several different formats, or you can combine data from different sources within some predefined limits.

IFT-DSS supports the visualization and manipulation of data in both vector (point, line, and polygon) and raster (gridded) formats. This feature makes it easy to take the output from one process step and input it to the next, relying on the system to perform the needed conversions behind the scenes. This makes it possible to transmit properly formatted data from one process step to the next.

In this way, IFT-DSS helps solve one of fuels planning's biggest headaches. Planners often must cope with data at the wrong scale, or at too coarse a resolution, or in incompatible formats. They have to figure out how to work with old data, missing data, questionable data, inaccessible data, or data that works

in one model but not in another.

To turn output data from one modeling run into input data for the next, the user must often write specialized computer routines. Or else he or she must manipulate the data by hand—perhaps translating the contents of a huge database from one data format into another, one field or record at a time. “If 90 percent of your time is spent wrangling your data,” says Tami Funk, “it's a pain even if you're good with computers. And if you're not, it's a nightmare.” By making all this wrangling unnecessary, IFT-DSS will save the user a lot of time.

## Innovative architecture

IFT-DSS is patterned on a concept called service-oriented architecture (SOA), which arose to meet the challenges of managing a multitude of data types, data formats, and software tools in the business and research communities. Essentially, SOA integrates disparate software systems and applications by breaking down business processes into distinct units, or services, that users can access, combine, and reuse as needed.

SOA architecture is part of a larger strategic vision for software systems in the fire and fuels management community. Two key examples of web-based SOA frameworks are BlueSky, the smoke-modeling framework developed by the Forest Service and STI, and the just-completed Wildland Fire Decision Support System (WFDSS), a Forest Service framework that helps fire managers and analysts manage a fire in real time. Like IFT-DSS, BlueSky and WFDSS streamline a host of modeling and data-handling processes under a single web-based system.

Although they're set up to do different things, IFT-DSS, BlueSky, and WFDSS use many of the same models and data tools, and thus there is considerable potential for overlap. The developers of all three SOA systems are exploring ways to share services and resources.

Three other packages draw together models and data in a somewhat similar way, although they are not, strictly speaking, SOA systems. The three are ArcFuels, INFORMS, and IFP-LANDFIRE. These systems are powerful and very useful in the right circumstances, but all have issues that limit their wide usability for fuels-treatment planning. First, not being web-based, they are inaccessible to a wide range of interagency users. Second, they are individual software tools with different interfaces, different functional processes and analyses, and different data requirements. Finally, none of them was designed

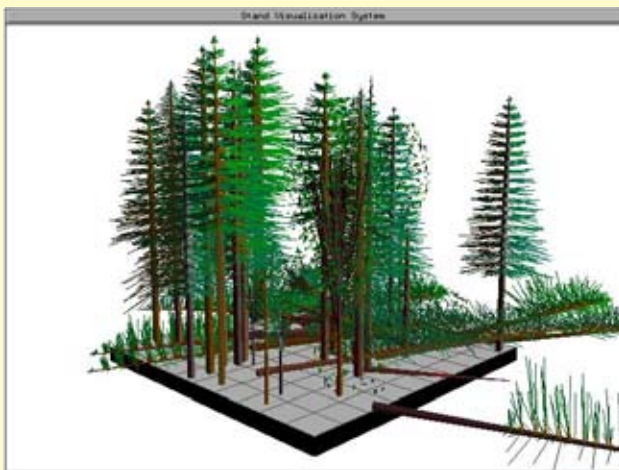
## Show Me the Data

Data issues present enormous challenges to effective fuels-treatment planning. Mike Rauscher likes to tell the story about a USDI BLM fuels specialist who worked in the same building as a USDA Forest Service fuels specialist. The BLM person wanted some data in the FS Veg database, but that database is restricted to Forest Service personnel. So the BLM person had to ask the Forest Service person to run a query for the required vegetation data and download the results on a disk.

“The inefficiencies are real,” says Rauscher. “Forest Service employees can access FS Veg data, but nothing else. National Park Service (NPS) employees can access DataStore databases in FFI format, but nothing else. BLM employees can access data in FIREMON/FFI format, but not the NPS data in FFI format. You get the idea.” Despite some talk about making government data sources more widely available, none of the federal agencies has so far accomplished it.

Moreover, in many areas there may not be any up-to-date data. Collecting vegetation data on the ground is expensive and time-consuming, and because a forest grows and changes year to year, a current picture of its vegetation is a moving target. For all these reasons and more, a fuels-treatment specialist rarely has all the needed vegetation data on hand at the appropriate scale for a given analysis.

One partial solution to the vegetation-data access problem is the nationwide, gridded data layers available in LANDFIRE. The LANDFIRE database is accessible to anyone in the fuels-planning community regardless of agency employer. It provides vegetation and fuelbed data for every 30-meter square of every state in the Union, including Alaska and Hawaii.



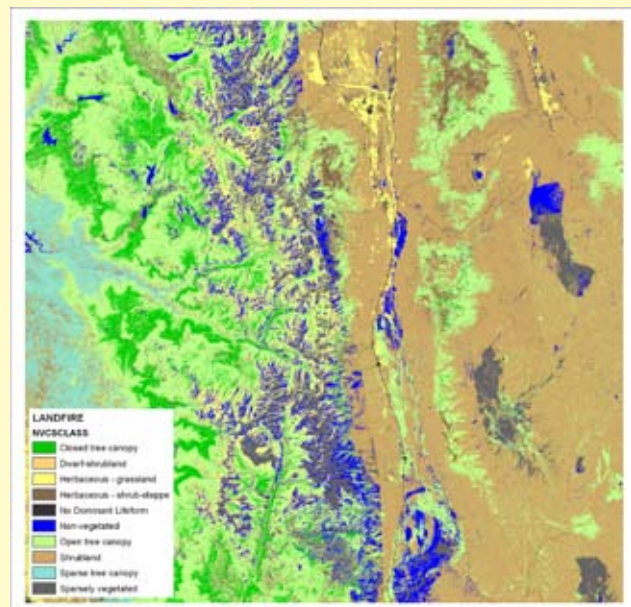
Example of polygon-based treelist data.

The LANDFIRE database sometimes has the only comprehensive vegetation data available. But the data layers are old (they represent conditions circa 2000, although they are being updated), and their scale and accuracy are not always suitable for project-level fuels-treatment analysis.

Many fuels-treatment specialists prefer to use vegetation inventory data gathered locally within the area of interest. This is the type of data stored in the USDA's FS Veg database and the FIREMON/FFI databases. Local inventory data are generally more scale-appropriate for fuels-treatment planning, but data are usually not available for every acre in an area of interest, and even if they are, the measurements are likely to be 5, 10, or even 15 years old.

To bring the data to an estimate of today's conditions, the planner must first use a vegetation growth model such as the Forest Service's Forest Vegetation Simulator (FVS) to “grow” each acre to the current year. A second simulation program must be used to infer, or impute, the vegetation condition from known areas to unknown areas. These simulations necessarily compromise the accuracy of the resulting area-wide vegetation map, because simulated data are never as good as the real thing.

These data-related issues are complex, difficult, and expensive to resolve, but they need to be resolved, says Rauscher, because models are only as good as the data that go into them. For IFT-DSS to be most effective, the quality and availability of the supporting vegetation data will need to be improved.



Example of LANDFIRE gridded data.



Examples of IFT-DSS displays.

and engineered to be a comprehensive software engineering solution using SOA methods to organize the existing chaos in fuels management software tools.

That is the very solution IFT-DSS is providing. In fact, to make sure the good work done by the ArcFuels, INFORMS, and IFP-LANDFIRE projects is used to its fullest advantage, IFT-DSS plans to offer users a choice to run the functional equivalent of all three of these comprehensive systems within the IFT-DSS interface. “We are working closely with the developers of each of these three systems,” says Rauscher, “to ensure we get it right.”

## Six scenarios

When Sonoma Technology, Inc. entered the IFT-DSS project in April of 2008, the project team spent a lot of time analyzing the JFSP survey results and having their own conversations with fuels specialists. Says Tami Funk: “We found that there really wasn’t any standard operating procedure. People were using different tools, different reporting formats, and different ways of organizing the planning.”

That disparity made it all the more important to capture the essential planning steps accurately. STI took users’ feedback and distilled it down to the sequences of the most common processes. From this research, six core work flow scenarios emerged:

**Data acquisition and preparation.** Collect and prepare the vegetation data needed for input to fire-behavior and fire-effects models.

**Strategic planning.** Identify high-fire-hazard areas within an area of interest to determine where further analysis may be warranted.

### Spatially explicit fuels treatment assignment.

Simulate the placement of fuels treatments in areas of high fire hazard and simulate post-treatment influences on potential fire behavior and effects.

### Gauging fuels treatment effectiveness over time.

Evaluate the temporal durability of fuels treatments—that is, how long, in years to decades, a treatment will continue to lower potential fire behavior and fire effects.

**Prescribed burn planning.** Provide the information needed to plan, document, and conduct a prescribed fire.

**Risk assessment.** Provide a probabilistic risk assessment for fuels treatment planning.

Early in the fall of 2009, the JFSP, the Fuels Management Committee (FMC), and STI unveiled the prototype for IFT-DSS to a group of test users.

The prototype offers a limited demonstration of the features that will be present in the final product. Specifically, STI is preparing limited-functionality versions of three of the work flows: prescribed-burn planning, data acquisition and preparation, and strategic planning. The fully functional IFT-DSS, with all six supported work flows, is expected to be released in 2012.

*“We found that there really wasn’t any standard operating procedure.”*

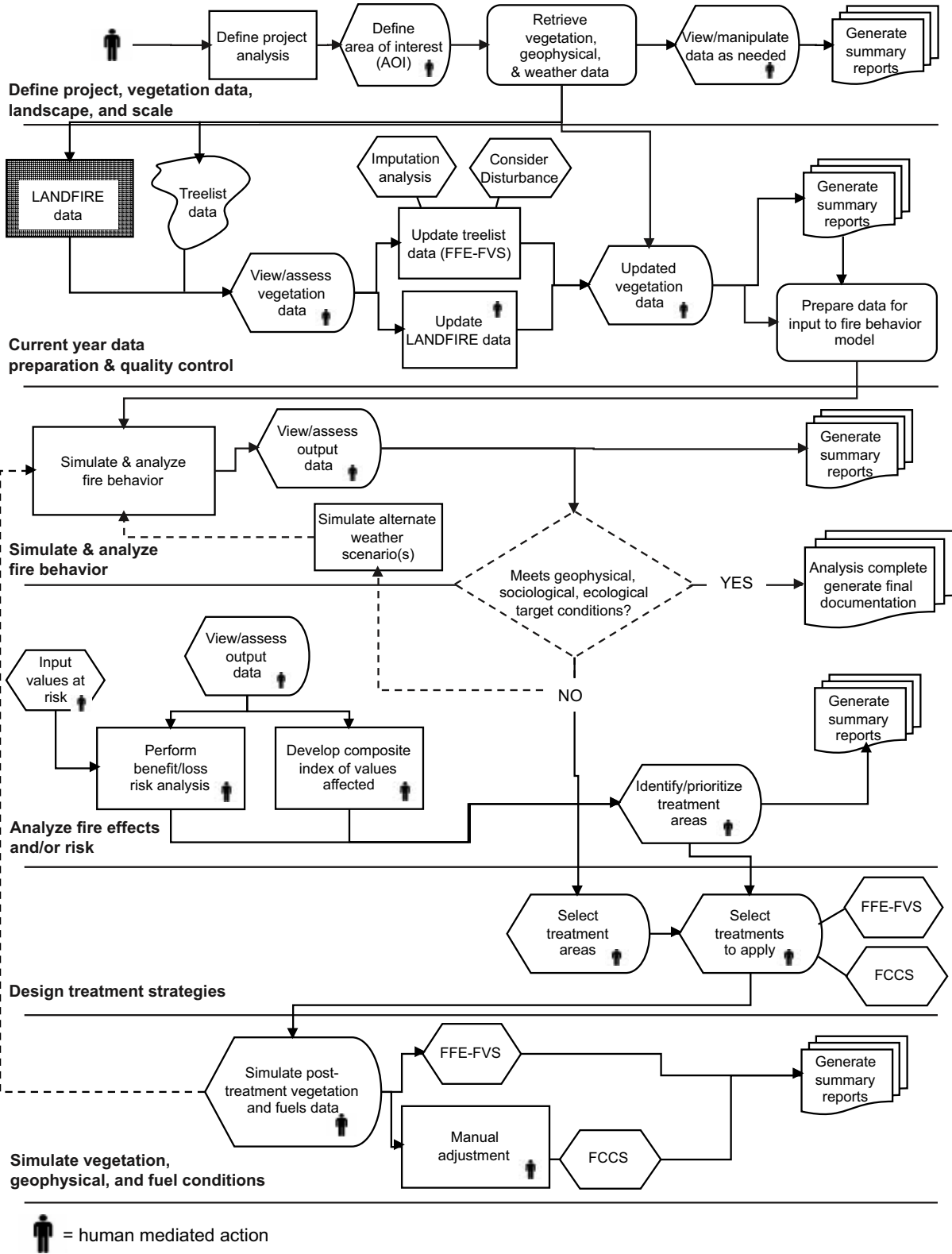
## Bread crumbs

IFT-DSS aims to be both accessible and powerful. “We’re using a two-tiered approach,” says STI’s Sean Raffuse, who is working with the software-developer and database-steward communities and STI’s software engineers to design the user interface. The fully functional system will provide a set of structured process flows—a guided tour, if you will—that won’t let you perform analyses that aren’t appropriate or don’t make sense. At the same time, says Raffuse, “if you have the skills and interest, you’ll be able to access deeper processes that will let you customize your analysis.”

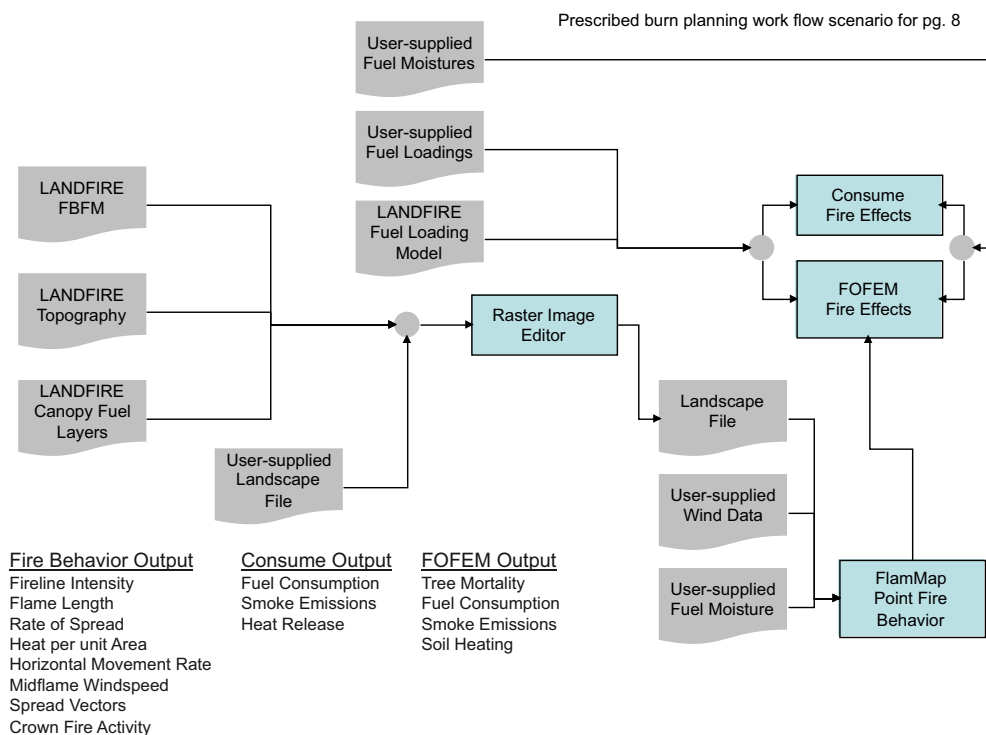
Users at both levels will work from within a set of interface screens that give a consistent look and feel to every software tool the system invokes. Especially for the beginning or occasional user, this makes things much easier—you don’t have to negotiate each model’s unique user interface.

To illustrate, Raffuse shows the IFT-DSS screen from which the user can set up a run of the fire-behavior model FlamMap. Then he shows the FlamMap user interface for setting up the same

### Fuels Treatment Planning Decision Support Process



This figure shows a work flow diagram illustrating the steps in the fuels treatment planning decision support process. The overall process involves six general steps. The first step is defining a project area and acquiring and preparing vegetation data for fire behavior modeling. Next, the fuels treatment planner simulates fire behavior, effects, and/or risk and determines if the results are acceptable or if an area warrants some type of fuels treatment. Treatment strategies are then developed and applied to determine how changes in vegetation (treatment strategies) change fire behavior, effects, or risk. This process might be performed iteratively until the treatment strategies result in acceptable outcomes.



IFT-DSS proof of concept prescribed burn planning work flow scenario: Option 1, the FlamMap pathway. Initial functionality will provide fire behavior output for prescribed burn planning. As functionality is increased, the ability to estimate fire effects using CONSUME and FOFEM will be supported. (Adapted from SA Drury, HM Rauscher, SM Raffuse, TH Funk. 2009. *Refined Work Flow Scenarios and Proposed Proof of Concept System Functionality for the Interagency Fuels Treatment Decision Support System*, Figure 3-2, p.39.)

run. The difference is striking. “With IFT-DSS, the entry-level user is offered only the choices that are meaningful and necessary,” Raffuse says, “and everything else is set to a reasonable default.”

His point is that a model’s native interface may offer choices that the user does not need for the particular task at hand. IFT-DSS is specifically designed to meet the needs of fuels planners, so it emphasizes the options within each software tool that fuels planners are most likely to need and de-emphasizes the rest.

The interface also provides “bread crumbs” in the form of a “you are here” map that shows the user which step he or she is on at any moment. The system documents the steps the user has taken to perform the analysis and allows him or her to save past analyses and use them as templates for future work.

For the advanced user, IFT-DSS will present the more-advanced choices offered in FlamMap (for one example), not just those pertinent to fuels planning. The user will be able to exercise these choices from the IFT-DSS user screens. The interface will allow the user to run the model as though he or she were operating the original program. In other words, IFT-DSS puts a consistently friendly face onto all the

different products that are accessible from within its framework.

## Wrappers

The suite of software and data tools that IFT-DSS will offer are not, in their native version, compatible with the IFT-DSS framework. STI’s programmers are making them compatible by writing “wrappers” for them. Wrappers are software routines that allow the products to plug into the framework, in much the way an electrical adapter allows you to use your laptop computer in Scotland. The complete IFT-DSS framework will also be capable of accessing additional databases and other resources on the web.

Another key strength of IFT-DSS is that it can export the output from modeling runs to a variety of common reporting or display formats such as Word, Excel, and PDF. This feature makes it easy for managers to document and explain their fuels-treatment decisions to regulators, stakeholders, and the public.

Fuels planners are the first beneficiaries of the IFT-DSS framework, but not the only ones. IFT-DSS will be a boon to scientists and software developers,



too. It will give them a standard to guide them in designing new products or upgrading old ones, and it will offer a ready market for their work. In addition, scientists won't need to design user interfaces for their applications. This will allow them to spend more time doing science and less time developing software.

## Dropping the ego

IFT-DSS's developers know how important it is to be ultra-sensitive to user needs. In fact, that's something of a market niche for STI. "Many of our clients come to us after working with a software engineer who may have given them a great final product, but who really didn't understand how the client would use it," says Funk. "That's something we're good at. We're scientists who understand what users need." For Paul Nuss, who manages STI's software engineering team, the operative term is "egoless programming." He says, "Dropping the ego and listening to others—that's a real important part of our business."

The company's initial conversation with fuels managers has extended into the conceptual development and prototype stages, says Stacy Drury, a forest ecologist and STI's liaison with the fuels-planning test users. "The human systems part of this whole enterprise is huge and up-front," Drury says. "The user community has to be kept engaged throughout the process." Once the proof-of-concept is up and running, Drury will send it to between 50 and 100 fuels specialists for the second-round test drive.

## Advance team

As STI assembles the IFT-DSS framework, the JFSP and the FMC are becoming the advance team, working hard to prepare the larger fuels-management world for the arrival of a new way of doing business.

Getting fuels-treatment specialists on board is a great first step, says Mike Rauscher, but much more is needed. "Research in software delivery to stakeholder communities teaches us that it's rarely enough to engage only the end users," he says, "because they rarely have the support or the staying power to move a technology from innovation to institutionalization."

Besides, there are obstacles to the widespread adoption of IFT-DSS—restrictions on data access is a key example—that can't be solved at the technical

level. Such issues will need to be addressed within the whole arena of stakeholders, which includes all the people who have an interest in effective fuels treatment.

"Recognizing that fuels-treatment planning needs to be better supported," says Rauscher, "and recognizing that the software tools need to be better organized and orchestrated so that they truly support each other rather than conflict with each other—that's a goal that all stakeholder communities can rally around."

The IFT-DSS project is planning for a coordination team to monitor the framework as it develops and to guide the network of users and stakeholders into full understanding and acceptance. This part of the project may be the most challenging of all, says Rauscher. Not that the technological solutions are simple, "but changing the way people perceive their roles—how they're inclined to interact with each other—that's going to be tough."

He and the JFSP are working with all interested communities—governance, information technology, software developer, database steward, and field operations—to clarify what is important to them in fuels-treatment planning, and then to find ways to incorporate those priorities into the social environment within which the IFT-DSS software will need to operate. "We've found that the needs of these different communities of stakeholders are actually compatible and supportive," Rauscher says.

The complete proof-of-concept prototype will be released in the summer of 2010.

## The human framework

To continue to be useful, IFT-DSS will need ongoing support. The functionality of the system will need to expand to accommodate revised and new software modules, and that means continuing software engineering. Help-desk support will be needed to respond to user problems, and training, including web-based seminars and face-to-face classes, will need to be offered.

Neil Wheeler has been down this road before. Wheeler is a senior vice president at STI and an expert in atmospheric modeling and systems development. In a previous job, he got a lesson in how not to roll out a package as comprehensive as this one. "It was back in the 1990s, when I was working on a project for the

*"The human systems part of this whole enterprise is huge and up-front."*

## FAQs

**Q. Why do we need more software to support fuels-treatment planning? There are too many packages to keep track of already?**

**A.** *IFT-DSS is not just another fuels-treatment model with hard-wired data and software systems. Rather, it's an organizing framework for existing models and datasets. IFT-DSS guides the entry-level user through any of several common planning pathways, and it allows an experienced user to select from a suite of tools to create a customized solution path. To coin an analogy, IFT-DSS is not like buying a new outfit of clothes; it's like buying a new modular closet system to organize the clothes you already have.*

**Q. Why doesn't IFT-DSS include models for planning for wildlife habitat or ecosystem processes? And why doesn't it address climate change?**

**A.** *The purpose of IFT-DSS is to help planners analyze the impacts of fire as an agent of landscape change. For the initial development of IFT-DSS, we had to limit our focus fairly tightly. Once the proof-of-concept prototype gains acceptance, we'll move toward fuller implementation of the six fuels-planning scenarios. Eventually, it would be within our scope to include models that examine the effects of fire on air quality, soil, water, flora, and fauna. Climate-change scenarios could also be built into the framework. We like to think of IFT-DSS as a pioneering template for other open-architecture frameworks supporting other types of land-management planning.*

**Q. I don't see BehavePlus listed among the models IFT-DSS will provide access to. How come?**

**A.** *BehavePlus wasn't included because its developer needed more time to rework the software code so that it could support the separation of the user interface from the underlying equations. Without this separation, we cannot incorporate BehavePlus into the IFT-DSS framework. The key fire-behavior models to be included in the initial releases of the framework are FlamMap and NEXUS, which use the same equations as BEHAVE, although they implement them in different ways to provide similar (and additional) outputs. So IFT-DSS does provide the same modeling capability as BEHAVE, plus many other useful capabilities.*

**Q. Which agencies will have access to IFT-DSS?**

**A.** *Anyone in the interagency fuels-treatment community will be able to access IFT-DSS on the web. Agency employment will not be a condition of access. We're encouraging land-management agencies to embrace the IFT-DSS framework and support their employees in using it.*

**Q. How can I take IFT-DSS for a test drive?**

**A.** *Email Mike Rauscher at [mrauscher@bellsouth.net](mailto:mrauscher@bellsouth.net), or Tim Swedberg at [Timothy\\_Swedberg@nifc.blm.gov](mailto:Timothy_Swedberg@nifc.blm.gov).*

EPA [Environmental Protection Agency],” he says. “I was part of the prototype development team for the Environmental Decision Support System, or EDSS.” Like IFT-DSS, EDSS was a forward-looking system that used a service-oriented architecture framework. But there was one critical difference, Wheeler says: in the end, its developers didn't pay enough attention to organizing and empowering the human framework of users, managers, and developers who would need to work together to keep the system updated and useful. The result was that “eventually the models and the framework parted company, and a lot of work on decision-support tools and visualization got abandoned.”

In Wheeler's view, the IFT-DSS effort is different. “The user engagement, the connection with the community—that's one thing [JFSP Program Manager John] Cissel and the JFSP have really nailed.”

Says Cissel: “It's critical that we get this right. We have to make sure this is going to make life better for folks in the field. The best way to do that is to involve end users from the beginning and listen carefully. We also need to make sure we meet the needs of model developers, the IT community, and those ultimately responsible for system governance.”

However the IFT-DSS rollout proceeds, one thing seems certain: the need for fuels-treatment planning is only going to increase. If managers are to reduce hazardous fuels in the nation's forests to any meaningful extent, fuels planners will have an ongoing need for reliable and robust tools so that they can develop the best possible treatment plans. For now, the IFT-DSS framework looks like a big step forward.

### Interagency Volunteers Help Craft IFT-DSS

A tireless group of interagency volunteers plays a vital role in the ongoing development of IFT-DSS. The JFSP's fuels-treatment working group is made up of these specialists: Brad Reed, fuels specialist for the U.S. Fish and Wildlife Service (USFWS); Dave Peterson and Mark Finney, researchers for the Forest Service; Dennis Dupuis, fire manager for the Bureau of Indian Affairs; Eric Christiansen and Glenn Gibson, fire managers for the USFWS; Michael Beasley, former fuels specialist for the National Park Service now with the Forest Service; Randi Jandt, fuels specialist for the Bureau of Land Management; and Tessa Nicolet, fuels specialist for the Forest Service.

### Suggested Reading

For more-detailed information about IFT-DSS, the reader is urged to review the various documents generated by the JFSP Software Tools and Systems Study, available at [frames.nbi.gov/jfsp/sts\\_study](http://frames.nbi.gov/jfsp/sts_study). This site is organized into three phases: I, II, and III with study reports of interest within each phase.

#### Phase I (April 2007–April 2008)

- The Carnegie Mellon Software Engineering Institute Phase I Final Report (Palmquist, 2008)

#### Phase II (April 2008–April 2009)

- Findings of the Current Practices and Needs Assessment for the IFT-DSS (Funk et al., 2008)
- Summary of Fire and Fuels Specialists Software Tools Survey (Rauscher, 2009)
- Summary of Data Related Issues as they Affect the JFSP IFT-DSS Development and Deployment (Rauscher et al., 2008)
- The Interagency Fuels Treatment Decision Support System Conceptual Design (JFSP Fuels Treatment Working Group, 2009)
- The Application of Service Oriented Architectures in the Fuels Treatment Community (Larkin et al., 2008)
- The Interagency Fuels Treatment Decision Support System Software Architecture (Funk et al., 2009)

#### Phase IIIa (May 2009–April 2010)

- Phase IIIa Project Plan (Funk, 2009)
- Refined Workflow Scenarios and Proposed POC Functionality for the IFT-DSS (Drury et al., 2009)
- Summary of Fuels Specialists Feedback on the IFT-DSS POC Functionality (Drury, 2009)
- Final Software Design Specification Document (Wheeler et al., 2009)
- Web-based Graphical User Interface (GUI) Mockup ([staging.sonomatech.com/iftcss/](http://staging.sonomatech.com/iftcss/))

More information about BlueSky is available at

<http://www.airfire.org/bluesky/>.

More information about the Wildland Fire Decision Support System (WFDSS) is available at

[http://wfdss.usgs.gov/wfdss/WFDSS\\_Home.shtml](http://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml).



Eli Lehmann, USDA Forest Service, Fire Management Today

National Interagency Fire Center  
Joint Fire Science Program  
3833 S. Development Ave.  
Boise, ID 83705-5354

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#### Credits

Writer – Gail Wells  
Gail Wells Communications

Managing Editor – Kathy Rohling  
*Kathy\_Rohling@blm.gov*

Design and Layout – Jennifer Kapus  
*Jennifer\_Kapus@blm.gov*

Tim Swedberg  
Communication Director  
*Timothy\_Swedberg@nifc.blm.gov*  
208-387-5865

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**John Cissel, Program Manager**

**208-387-5349**

**National Interagency Fire Center**

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