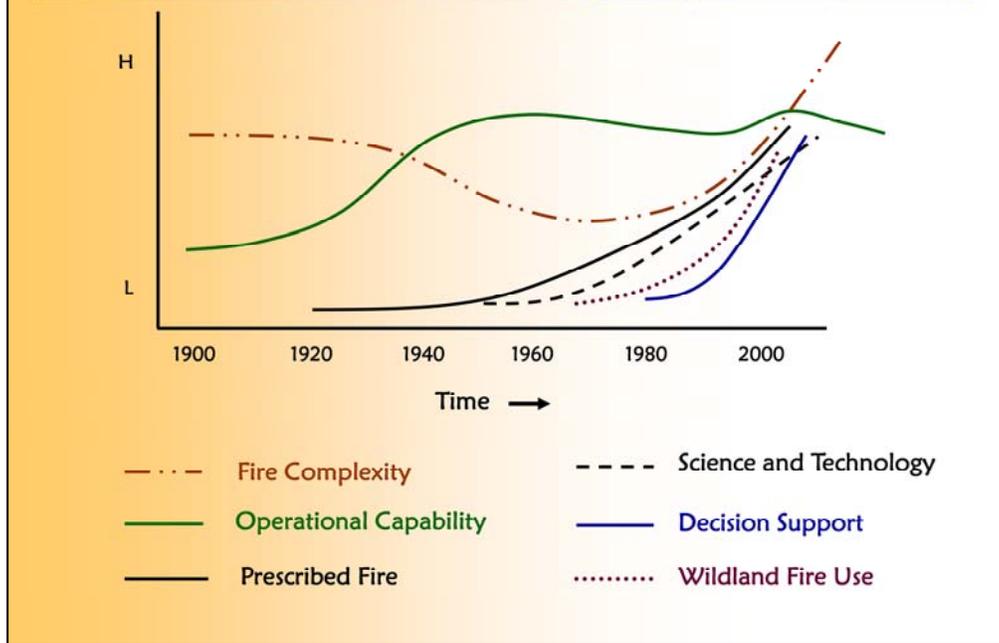
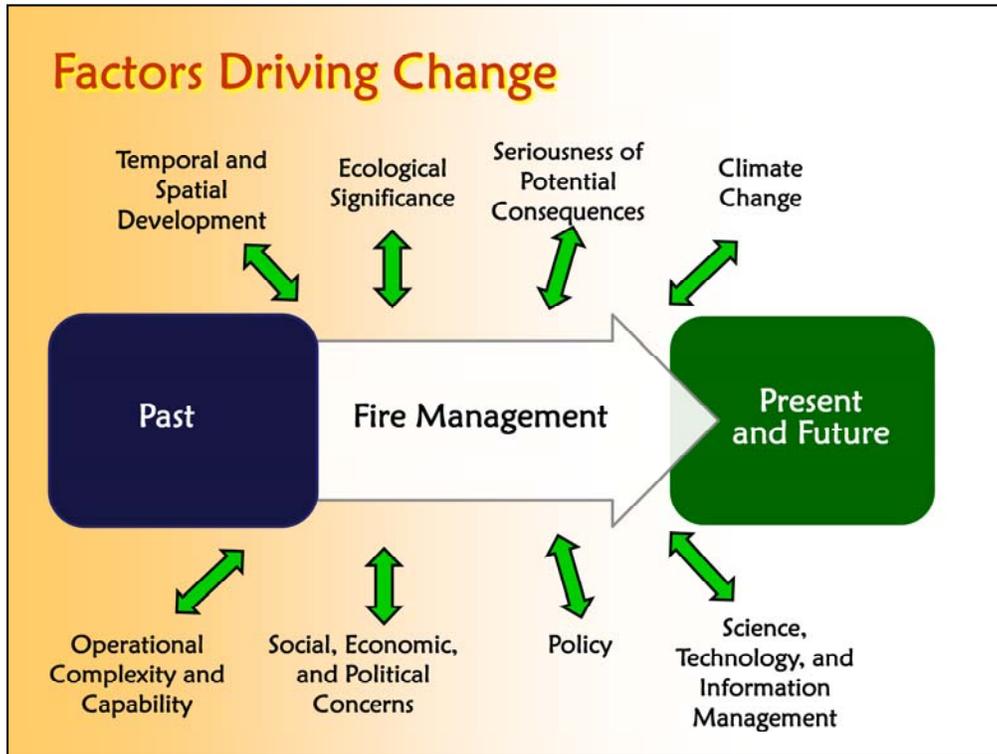




## Wildland Fire Management – Complexity and Capability



This graph depicts changes in fire management and complexity over time. As demands continue to increase, operational capability has not increased at the same rate. To meet the needs of today's environment we must make better use of science, technology and decision support.



As indicated in the previous slide, fire management is changing. As complexity and capabilities change so must our ability to respond to those changes and make sound decisions.

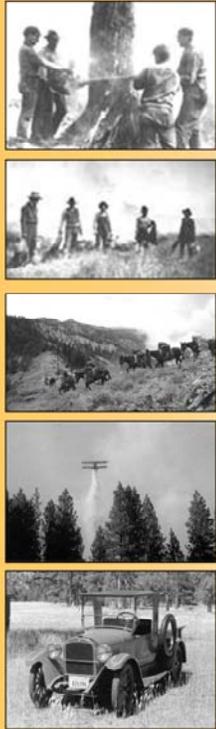


## Wildland Fire Decision Making



- Effective management is predicated upon decision making,
- Resource availability can no longer match large fire occurrence,
- Management of large fire costs becoming increasingly important,
- Smallest percentage of total wildland fires – large fires, accounts for largest amount of expenditures,
- Initial strategic response decisions are most important in terms of resource commitments and expenditures.

As described above and the previous three slides, wildland fire decision making is being influenced by many factors.



## Decision Support - Scale

- Incident level (tactical)
  - Short-term temporally and spatially
  - Fine scale
- Incident level (strategic)
  - Broader scale
- Unit or Area level (strategic)
  - Both short- and long-term scales
- National level (strategic)
  - Long-term scale

Fire decision making occurs at multiple administrative levels and spatial and temporal scales. At all scales, decision support tools must be available in real-time when managers are faced with making risk-based decisions.



## 2009 Policy Implementation Guidance



- A wildland fire may be concurrently managed for one or more objectives and objectives can change as the fire spreads across the landscape. Objectives are affected by changes in fuels, weather, topography; varying social understanding and tolerance; and involvement of other governmental jurisdictions having different missions and objectives.

Policy guidance allows for managing fires for multiple objectives or for objectives to be modified for an incident. This change in implementation guidance enforces the need for informed decision making and continually reassessing the situation. also on an incident over time.



## 2009 Policy Implementation Guidance

- Managers will use a decision support process to guide and document wildfire decisions. The process will provide situational assessment, analyze hazards and risk, define implementation actions, and document decisions and rationale for those decisions.



Policy guidance indicates that a decision support process is used to guide and document wildfire decisions. The Wildland Fire Decision Support System (WFDSS) has been developed to meet this need. All previous documentation methods are no longer being used (Wildland Fire Implementation Plan, Wildland Fire Situation Analysis, Long Term Implementation Plan, Strategic Implementation Plan) and can be addressed through the WFDSS.



## Principles of Decision Support

---

- Decision support processes provide information used by managers when they are making decisions,
- Decision support does not replace decision making,
- Decision support information comes from a variety of sources, ranging from experience to quantitative analysis procedures,
- Decision support information has applications across a range of scales and concentrations.



## Wildland Fire Documentation

Analysis and decision documentation of wildland fires is directed in the following situations:

- Wildland fires are no longer following the initial action defined by the Fire Management Plan, or
- Wildland fires are being managed for multiple objectives, or
- Prescribed fires exceed prescriptions and are declared wildfires.

Consider publishing a decision when a fire continues to actively spread beyond a few burning periods, increases in complexity or cost, or has a high relative risk.

Although policy guidance for each agency differs, it is recommended that a decision be considered if any of the listed criteria are met. Decisions are scalable according to the incident complexity. Simple fires do not need the extensive analysis and documentation a larger, complex or long duration fire would require. Publishing a decision provides documentation of the management action taken on the fire and the rationale behind it which will provide support if the fire is litigated in the future. Additionally, as the situation changes or more information is gathered for an incident a new decision can easily be published.



## What is WFDSS?



- A web-based system that provides:
  - risk and decision sharing simply and efficiently,
  - strategic decision documentation,
  - decision support analysis utilizing appropriate fire behavior modeling, economic principles, and information technology,
  - information for completion of an operational plan.



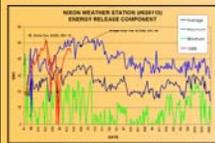
## What is WFDSS? (continued)



- A system that assembles, consolidates, and presents information to decision makers.



- An analytic – deliberative process that is an iterative, information-goal directed process.



- Is linear, scalable, progressive, and responsive to fire complexity,



- Is spatially oriented, graphically displayed, with no reliance on large text input requirements,



## What is WFDSS? (continued)



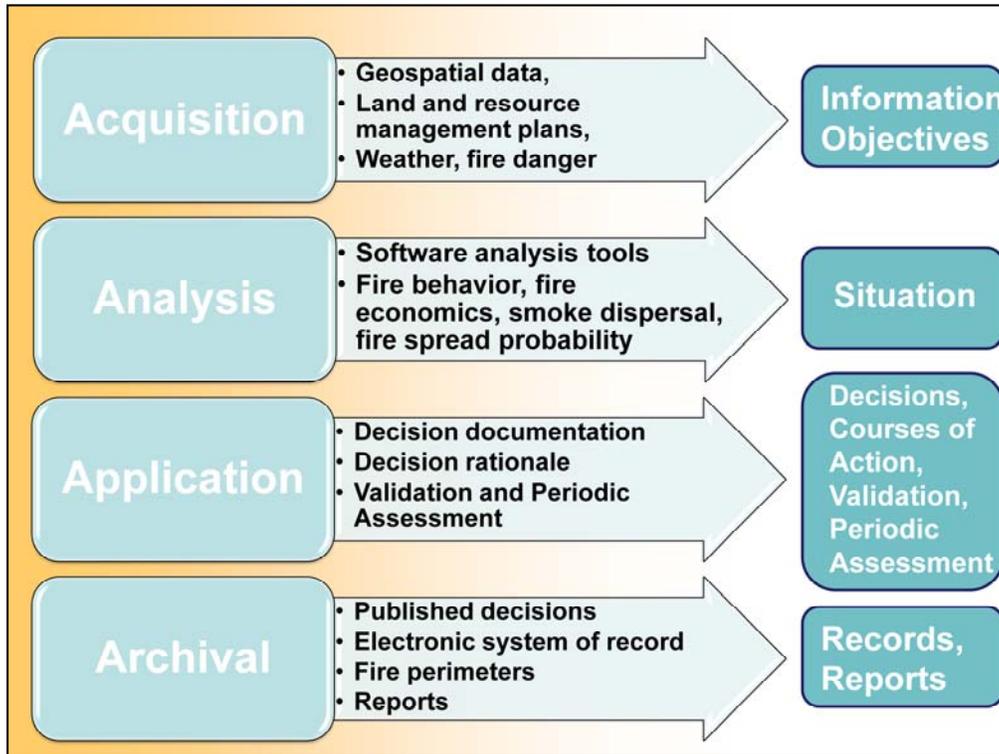
- A system that presents a risk characterization to support wildland fire decision making.
- A flexible system that matches different types and levels of analysis and deliberation with varying risk characterization and decisions.
- A system consistent with accepted risk-informed decision models making risk characterization intuitive, logical, relevant, understandable, and accessible.

## Wildland Fire Decision Support System - Attributes

Primary Role	Documents strategic decisions, facilitates long-term risk assessment - decision support, and allows completion of an operational plan, commensurate with fire complexity
Strategic Objectives	Resource Benefits and Protection
Management Action Focus	Strategic and Tactical
Temporal Scale	Short to long
Spatial Scale	Incident or Complex
Validation	Defined Frequency
Revision/Update	Continually in response to conditions
Tactical Responses	Full range of tactical responses available and built into Course of Action

As discussed above, decision support is needed and many levels and spatial/temporal scales. WFDSS is scalable to address this variation.

At 90 -98% initial attack success, we may not need a lot of analysis to inform decisions. As incidents escape initial attack or are being managed for multiple objectives more analysis is needed to inform decisions. Complex incidents may require fire behavior modeling (short term, near term, FSPro) to provide quantifiable information for the decision process and assist with ascertaining values information.



WFDDSS is a system that allows users to acquire information, analyze that information, apply that information to inform their decision and gain situational awareness, then to archive the decision and the documentation.

In the acquisition phase, this information is pre-populated in the system (geospatial data), by the user (LRMP / FMP). Or through the situation tab information can be obtained on fire danger, fire weather, etc. From this information it can be determined if the pre-planned initial response (FMP) will be successful or is accurate or if new objectives must be written for the fire.

Analysis can be completed within the system to again validate if the pre-planned initial response or to predict potential outcomes on the fire. This situational awareness combined with the above information acquired is a powerful tool to inform a decision on a fire and can continually be reassessed.

Applying the information within the system starts lending itself for developing new objectives, developing a course of action and documenting a decision.

Lastly, when the decision is published all information addressed in the decision will be archived.

# WFDSS - Intelligence

Wildland Fire Decision Support System National Preparedness Level: 1 | Sign out

Incident:

My Home Incidents **Analyses** Intelligence Data Management Help | Feedback

Information Situation Objectives Course of Action Validation Decisions Periodic Assessment Reports

Wildland Fire Decision Support System National Preparedness Level: 1 | Sign out

My Home Incidents **Analyses** Intelligence Data Management Help | Feedback

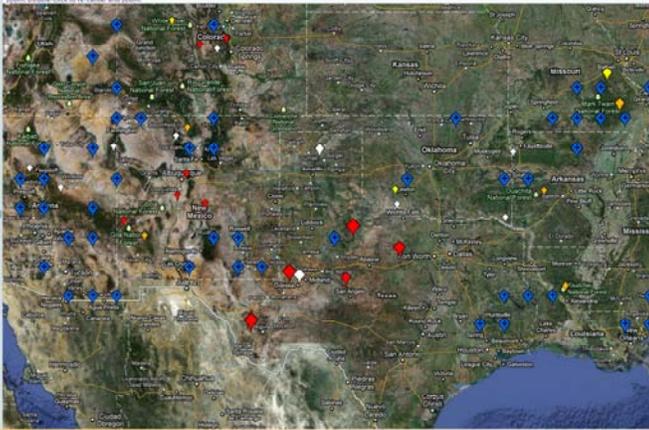
Use the Identify Tool (I icon) to click on the map. Pan Tool: Drag to pan. Shift-click, drag, and release to zoom. Double-click to zoom-in and zoom-out. Scale = 1:7M

Latitude: 38.72428 Longitude: -103.90861

Latitude: 38.72428 Longitude: -103.90861

Feature Information

Feature Information	Value
Elev. Contour	No Data
Smoke Dispersion	No Data
Strategic Objectives	No Data
Weather Forecast	No Data
System	Atkins LANDFIRE 1.0.0
Elevation	No Data
Aspect	No Data
Slope	No Data
Soil Model	No Data
No Data	No Data
Land Cover	Soil Color
No Data	No Data
Stand Height	Base Height
No Data	No Data



# WFDSS - Intelligence –Fire Weather

http://wfdss.usgs.gov - Fire Weather Forecast - Microsoft Internet Explorer provided by...

Wildland Fire Decision Support System

000  
FNUS54 KEPZ 191450  
FUFEFZ

FIRE WEATHER PLANNING FORECAST FOR NEW MEXICO  
NATIONAL WEATHER SERVICE EL PASO TX/SANTA TERESA NM  
750 AM MST FRI DEC 19 2008

.DISCUSSION...  
YESTERDAY'S QUICK HITTING TROUGH HAS EXITED THE REGION. TODAY AND THROUGH THE WEEKEND WESTERLY FLOW ALOFT WILL KEEP THE REGION FREE OF ANY STORM SYSTEMS. DESPITE PERIODS OF HIGH CLOUDS...DRIER AIR AT LOW AND MID LEVELS WILL MOVE IN TO TRIM RELATIVE HUMIDITY VALUES. NEAR BREEZY CONDITIONS EXPECTED SATURDAY. SUNDAY A BACKDOOR COLD FRONT WILL PUSH IN FROM THE EAST TO THE RIO GRANDE AND TO THE CONTINENTAL DIVIDE BY MONDAY MORNING. TUESDAY IS THE NEXT DAY WITH THE POTENTIAL FOR SIGNIFICANT WEATHER. AN UPPER LEVEL PACIFIC STORM SYSTEM WILL SWING ACROSS THE AREA. WINDY CONDITIONS ARE EXPECTED TO DEVELOP WITH THE DEVELOPMENT OF A DEEP SURFACE TROUGH. SCATTERED RAIN AND SNOW SHOWERS ARE ALSO LIKELY.

...PERCENTAGES SHOWN IN THE SKY/WEATHER PORTION REFLECT SKY COVER AMOUNT...

...MEAN ELEVATIONS USED TO OBTAIN MIXING HEIGHTS AS FOLLOWS:  
ZONE 110 - RESERVE (5900 FT)  
ZONE 111 - DEMING (4300 FT)  
ZONE 112 - LAS CRUCES (3900 FT)  
ZONE 113 - RUIDOSO (6900 FT)

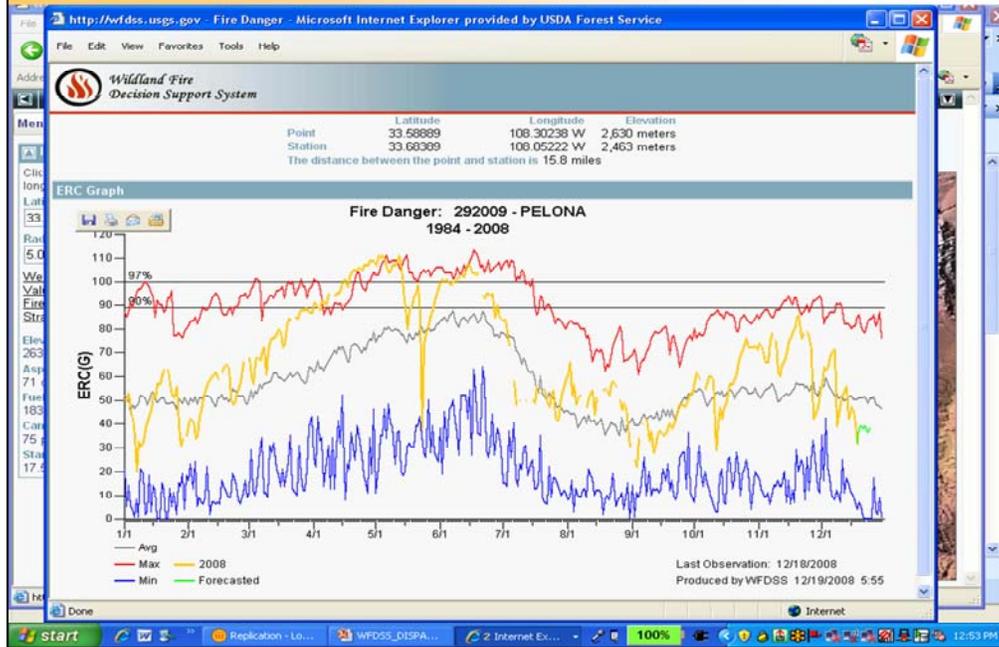
VENTILATION CATEGORIES ARE DETERMINED BY CRITERIA ESTABLISHED BY THE STATE OF NEW MEXICO.

Latitude: 34.19845 Longitude: -107.44837

ENNY 2503  
ECO 2503

start | Replication - Lo... | WFDSS\_DISPA... | 2 Internet Ex... | 100% | 12:51 PM

# WFDSS - Intelligence –Fire Danger



**WFDSS**

Wildland Fire Decision Support System

Home

About WFDSS  
Training  
Data  
FAQs  
Related Resources  
WFDSS Help  
Sign In to Production  
Sign In to Training  
Request Account

**WFDSS Help Desk**  
fire\_help@fs.fed.us  
+1 800-253-5559

**National Fire Decision Support Center**  
+1 208-473-8107

**Welcome!**

**Wildland Fire Decision Support System**

Welcome to the Wildland Fire Decision Support System (WFDSS)!

This system assists fire managers and analysts in making strategic and tactical decisions for fire incidents. It has replaced the WFS (Wildland Fire Situation Analysis), Wildland Fire Implementation Plan (WIP), and Long-Term Implementation Plan (LTIP) processes with a single process that is easier to use, more intuitive, linear, scalable, and progressively responsive to changing fire complexity.

WFDSS integrates the various applications used to manage incidents into a single system, which streamlines the analysis and reporting processes.

WFDSS provides the following advantages over previous systems:

- Combines desktop applications for fire modeling into a web-based system for easier data acquisition.
- Provides an easy way for fire managers and analysts to accurately document their decision-making process by allowing results of analyses to be attached to the decision point and included in the final incident report.
- Provides one decision process and documentation system for all types of wildland fires.
- Is a web-based application for easier sharing of analyses and reports across all levels of the federal wildland fire organization.
- Introduces economic principles into the fire decision process.

Last updated on 8/9/2010 2:06:46 PM.

Google Search

only search WFDSS website  
How to Search

**Latest Information**

- WFDSS System Maintenance April 22, 2011
- 3.13 Release Adds Unit Shapes
- 3.12 Release Updates
- WFDSS 3.11 Release Updates
- WFDSS RSS Feeds

**WFDSS**

LANDFIRE Ref-csh2008 1.1.0  
now has Southwest and Southern GA coverage-  
REMEMBER evaluate your LCP prior to use  
[Change] [Help]

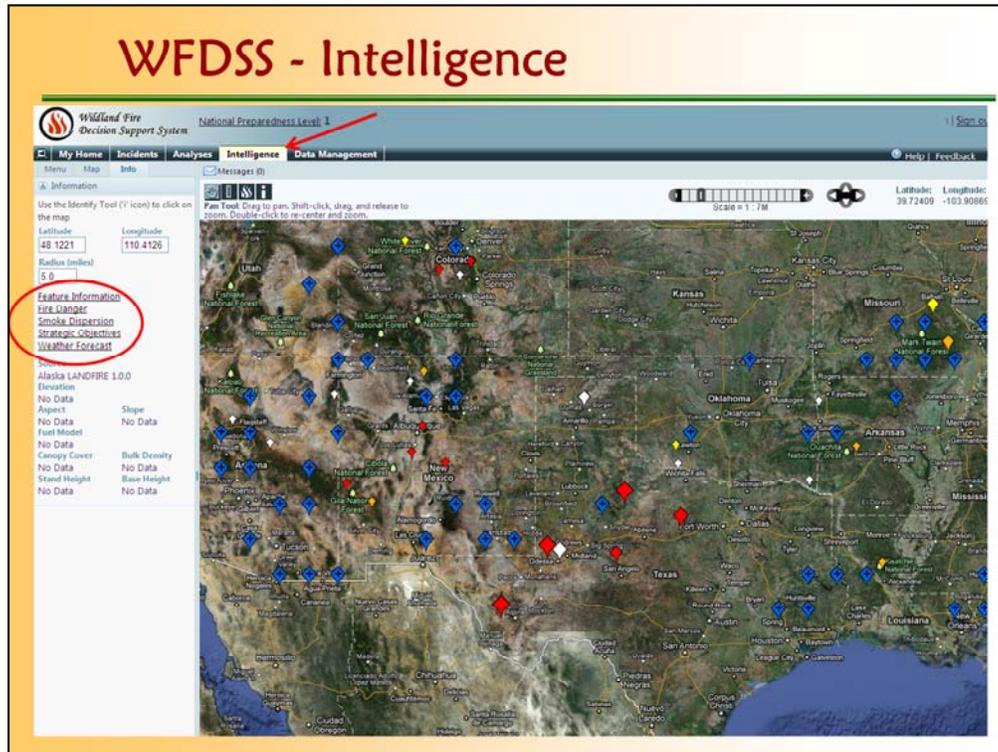
WFDSS unavailable April 22 to apply security upgrades. Maintenance begins @ 8:00am PDT & takes 2-4 hours to complete.  
[View Page] [Help]

Updated FMU/NPS Building layers, New Campground data layer for USFS and BLM. Update sys preferences under MY HOME  
[View Page] [Help]

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

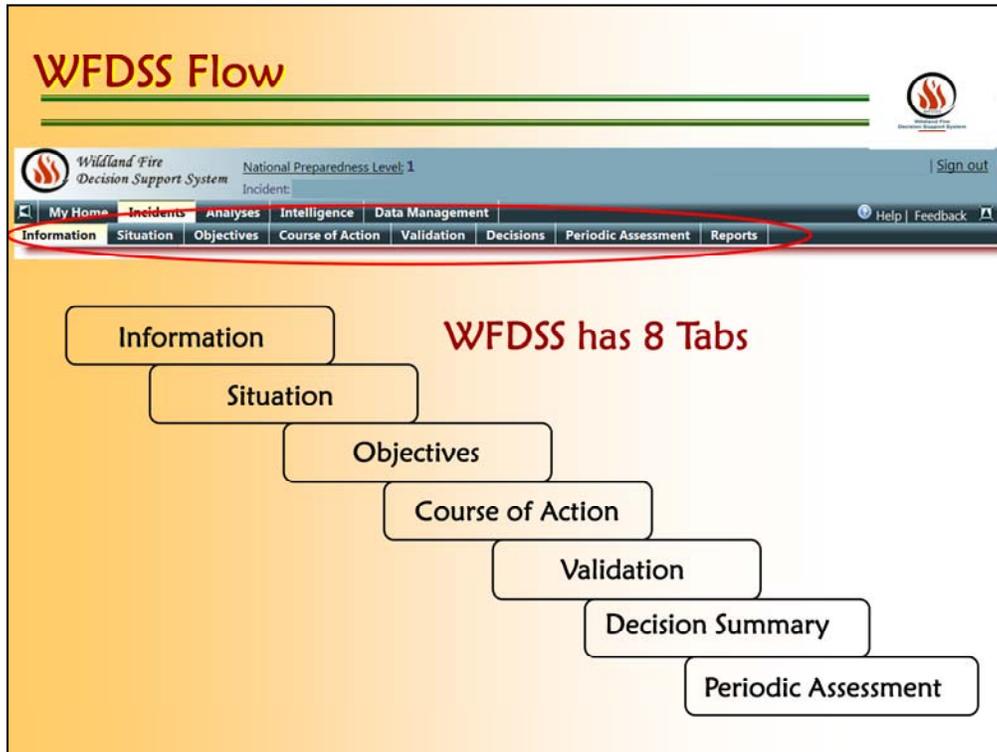
At the WFDSS home page you will see similar information to this. Note the red arrows and circles indicate locations to pay particular attention to as a user. On the right side, there are continual updates to information. Upper right are two excellent sources of help. The left menu training, related resources, and FAQs are continually updated with new information. Requesting an account is easy through the request account menu item. And when all else fails, call the WFDSS help desk and someone will assist you in finding the information you need.

# WFDSS - Intelligence

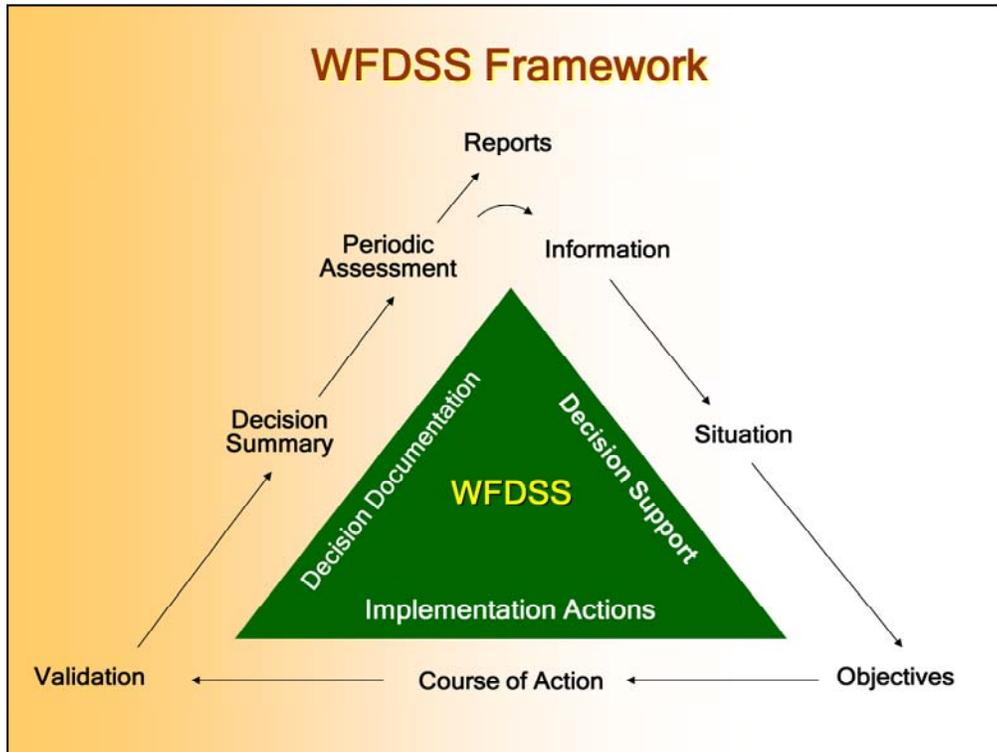


At the Intelligence Tab information can be obtained about the fire situation nationally or in a geographic area.

- The Info Tab (left menu) provides very valuable information.
  - The links (circled in red) provide additional information about the situation, a particular fire, or the map layer.
- To obtain information about a particular fire, click on the fire icon on the map.
- Using the Map Tab, (left menu) layers can be changed to display pertinent information to a fire area.



WFDSS has 8 Tabs although the seven emphasized here are what are used to develop and document a **risk-informed decision** through analysis and deliberation.



The WFDSS Framework relates the 7 tabs in the system to the decision and implementation. Information, Situation and Objectives contribute to Decision Support. Course of Action within WFDSS is the Implementation Actions. Validation, Decision Summary and Periodic Assessment are the parts of WFDSS that are the Decision Documentation.



## Decision Making: An Analytic - Deliberative Process



- **Risk-informed decision making** - requires two distinct but linked processes:
  - analysis
  - deliberation.
- **Analysis:**
  - rigorous, replicable methods to provide information about factual questions.
  - brings new information into the process - **informs deliberation.**
- **Deliberation:**
  - discussion, reflection, and persuasion to communicate, raise, and collectively consider issues, increase understanding, and facilitate substantive decisions.
  - brings new insights, questions, and problem formulations - **frames analysis.**

WFDSS will allow decision makers to make **risk-informed decisions** by providing a framework for analysis and deliberation.

## Subsection Areas and Information Flow Master Chart

Information

Situation

Objectives

Course of Action

Validation

Decisions

Periodic Assessment

Reports

*Purpose:* Documents the initial and continuing fire situation, and provides required information to complete administrative fire reporting.

### **INFORMATION –**

**Purpose:** Documents the initial and continuing fire situation, and provides required information to complete administrative fire reporting.

- This is similar to information that is gathered for a fire report.
- It can be loaded from WildCad directly if the dispatch unit is using that system.
- Recent changes include the ability for acreage to be updated automatically from a perimeter that is uploaded in the system.

## Subsection Areas and Information Flow Master Chart

Information

Situation

Objectives

Course of Action

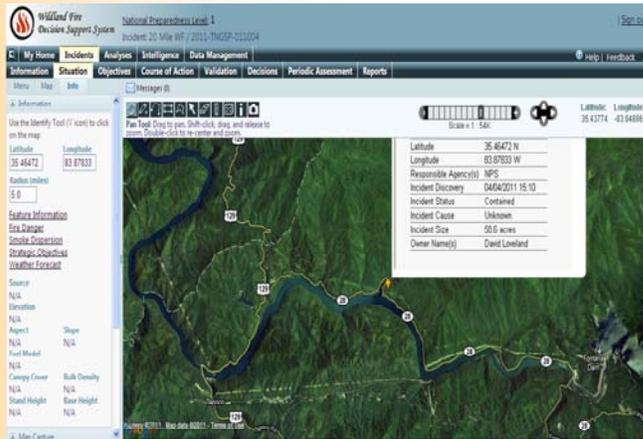
Validation

Decisions

Periodic Assessment

Reports

*Purpose:* Provides risk assessment and decision support information to support strategic decisions and development of course of action.



### SITUATION

***Purpose:*** Provides risk assessment and decision support information to support strategic decisions and development of course of action

Time should be spent using the information provided on this page. A vast amount of situational awareness can be obtained here.

- Info (left menu) is selected – therefore information on fire weather, features, fire danger, etc can be access.
- If Map (left menu) – can be used to assess values by turning on and off various layers, to draw a planning area, to upload features, view analysis, etc.

The information obtained here can help assess whether the pre-planned initial response is accurate or if additional planning is needed for the fire.

## Subsection Areas and Information Flow Master Chart

Information

Situation

**Objectives**

Course of Action

Validation

Decisions

Periodic Assessment

Reports

*Purpose:* Defines objectives as stated in Land, Resource, and Fire Management Plans and lists specific management and incident requirements that will frame and influence strategic decisions and tactical implementation.

The screenshot displays the WFDSS interface for Incident: 0385 BUCKHORN / 2010-08PND-000383. The 'Objectives' tab is active, showing a table of Incident Objectives/Requirements. The table has columns for 'Incident Objective', 'Type', 'Activated', 'Deactivated', and 'Objective Requirement'. Three rows are visible:

Incident Objective	Type	Activated	Deactivated	Objective Requirement
Inc Obj		07/28/2010		Avoids for public and firefighter safety. Minimize acres burned on private land and protect structures, including the FIRE pipeline.
Inc Req		07/28/2010		Minimize suppression impacts to resource values. Avoid dozer use along stream courses. Avoid retardant application along streams or riparian areas.
08PND-08PND02 Strat Obj		07/20/2009		The entire Lower Deschutes River has Wild and Scenic Designation. Maintain and protect Wild and Scenic River values.

## OBJECTIVES

***Purpose:*** Defines objectives as stated in Land, Resource, and Fire Management Plans and lists specific management and incident requirements that will frame and influence strategic decisions and tactical implementation

## Subsection Areas and Information Flow Master Chart

Information

Situation

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Validation

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Reports

*Purpose:* Defines objectives as stated in Land, Resource, and Fire Management Plans and lists specific management and incident requirements that will frame and influence strategic decisions and tactical implementation.

The screenshot shows the WFDSS interface with the 'Objectives' tab selected. The table below displays the following data:

Incident	Type	Activated	Deactivated	Objective/Requirement
Inc Obj		07/28/2013		Provide for public and firefighter safety. Minimize acres burned on private land and protect structures, including the FIRE pipeline.
Inc Req		07/28/2013		Minimize suppression impacts to resource values. Avoid dozer use along stream courses. Avoid retardant application along streams or riparian areas.
ORMP/ORP/COG	Strat Obj	07/20/2009		The entire Lower Deschutes River has Wild and Scenic Designation. Maintain and protect Wild and Scenic River values.

## OBJECTIVES

**Purpose:** Defines objectives as stated in Land, Resource, and Fire Management Plans and lists specific management and incident requirements that will frame and influence strategic decisions and tactical implementation

This information is loaded prior to the fire season as provided in the LRMP and FMPs. If spatially enabled, this list will be reflective of the fire location and the relevant plan information.

NOTE: When Data Managers are loading this information thought should be provided to address minimizing duplicate information and providing guidance that affect the decision and fire management.

NOTE: The left hand menu can be accessed at any time during the decision process. Important information can be accessed here such as **Relative Risk Rating**, Organizational Needs Assessment, Management Action Points, Stratified Costs Index, Shape Uploads, Image Uploads, etc.

## Subsection Areas and Information Flow Master Chart

Information

Situation

Objectives

Course of Action

Validation

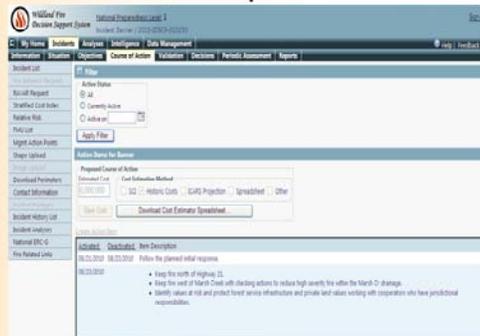
Decisions

Periodic Assessment

Reports

### *Purpose:*

- Defines a specific course of action ranging from a pre-planned initial response to an individualized response for a specific situation.
- Specificity varies with fire complexity and can include a defined planning area, management actions, resource commitments, and costs for the fire duration.
- When the current decision is no longer meeting objectives, it can include a set of actions to be used until a new decision is completed.



### Course of Action

**Purpose:** Defines a specific course of action ranging from a pre-planned initial response to an individualized response for a specific situation.

Specificity varies with fire complexity and can include a defined planning area, management actions, resource commitments, and costs for the fire duration.

When the current decision is no longer meeting objectives, it can include a set of actions to be used until a new decision is completed.

The initial course of action found in the system is populated generically and assumes the fire is within the Pre-Planned Initial Response Guidance in the plan. If initial attack is successful or other actions are defined in the FMP that allow other activities, this course of action will work for the fire. If other decisions are made that are outside of the scope of the initial response in the plan or longer term, a new Course of Action should be defined and a decision made.

At the Course Of Action Tab costs should also be addressed.

After a Course of Action is defined, Management Action Points (MAPs – left menu) may be used to support the decision or for long term planning.

NOTE: The left hand menu can be accessed at any time during the decision process. Important information can be accessed here such as Relative Risk Rating, Organizational Needs Assessment, **Management Action Points, Stratified Costs**

## Subsection Areas and Information Flow Master Chart

Information

Situation

Objectives

Course of Action

**Validation**

Decisions

Periodic Assessment

Reports

*Purpose:* Provides a review of the Situation, Objectives, and Course of Action to ensure that Objectives can be met, and in the event they cannot be met, the Validation guides the development of a new Course of Action.

The screenshot shows the WFDSS interface with the 'Validation' tab selected. The main content area displays a table with the following data:

Date/Time	User	Action	Comments
04/08/2011 21:05	Wamaad, David	Published	
04/08/2011 18:50	Kuhar, Kim	The proposed Course of Action will satisfy the Objectives	
04/08/2011 18:50	Kuhar, Kim	The proposed Course of action will satisfy the objectives	
04/08/2011 18:49	Kuhar, Kim	Created	

Below the table, there is a 'Validation' section with a message: "The current decision is still valid. No validation required as this time." The left-hand menu is visible, with 'Validation' highlighted in yellow.

### Validation

***Purpose:*** Provides a review of the Situation, Objectives, and Course of Action to ensure that Objectives can be met, and in the event they cannot be met, the Validation guides the development of a new Course of Action.

The Validation Tab provides an opportunity for the Incident Owner to note if the Initial Course of Action supports the FMP and LRMP objectives. If the answer is no, a decision will be needed.

After a new decision is made and a new Course of Action is defined, a Validation of that Course of Action will be necessary before publishing a decision.

NOTE: The left hand menu can be accessed at any time during the decision process. Important information can be accessed here such as Relative Risk Rating, Organizational Needs Assessment, Stratified Cost Index, Management Action Points, Shape Uploads, Image Uploads, etc.

## Subsection Areas and Information Flow Master Chart

Information

Situation

Objectives

Course of Action

Validation

**Decisions**

Periodic Assessment

Reports

*Purpose:* Documents the response decision, the rationale for that decision, and stipulates the timeframe for revisiting and reassessing the decision.

The screenshot shows the WFDSS National Incident Decision Support System interface. The main content area displays a 'Decisions List' table with the following data:

ID	Decision	Section	Status	Author	Created Date	Last Modified Date	Relative Risk
1	Pending Decision	available	Review	William	06/20/2010 10:12	06/21/2010 10:12	High
2	06/25/2010 14:39	Published	gusman, frank	06/24/2010 17:05	06/25/2010 14:39	06/21/2010	High
3	06/21/2010 18:05	Published	gusman, frank	06/21/2010 15:55	06/21/2010 18:05	06/21/2010	High
4	06/21/2010 21:03	Published	Grave, Chris	06/21/2010 21:09	06/21/2010 21:03	06/21/2010	High

### Decision Summary

***Purpose:*** Documents the response decision, the rationale for that decision, and stipulates the timeframe for revisiting and reassessing the decision

If an incident decision is required documentation within the decision editor is completed here. For additional information on considerations and what to put in the decision look at the WFDSS HomePage - Related Resources- WFDSS User Documentation.

NOTE: The left hand menu can be accessed at any time during the decision process. Important information can be accessed here such as Relative Risk Rating, Organizational Needs Assessment, Stratified Cost Index, Management Action Points, Shape Uploads, Image Uploads, etc.

## Subsection Areas and Information Flow Master Chart

Information

Situation

Objectives

Course of Action

Validation

Decisions

Periodic Assessment

Reports

**Purpose:** Provides a process to periodically review the current decision, response, and accomplishments to evaluate effectiveness and confirm accuracy or, if needed, indicate progression to a higher response level and associated planning activities.

The screenshot displays the Wildfire Decision Support System interface. The top navigation bar includes tabs for Information, Situation, Objectives, Course of Action, Validation, Decisions, Periodic Assessment, and Reports. The 'Periodic Assessment' tab is active, showing a table with columns for Date, Approver, Action, Comments, and Relative Risk. Below the table, there are sections for 'Next Assessment' (due on or before 04/12/2011), 'Number of days between assessments' (set to 14), and a 'Send me an email reminder' checkbox. A comment field is also present with the text 'In comment must be entered after a new decision is required.' The bottom section contains a series of questions for assessment, such as 'Are the Incident and Strategic Objectives being satisfied with the current Course of Action?' and 'Is the fire expected to remain within the Planning Area?'. A 'Yes/No' button is visible next to the first question.

### Periodic Assessment

**Purpose:** Provides a process to periodically review the current decision, response, and accomplishments to evaluate effectiveness and confirm accuracy or, if needed, indicate progression to a higher response level and associated planning activities.

The timeframe for the Periodic Assessment can be set up to 14 days. Fire activity and complexity should dictate this timeframe.

It is strongly recommended that the signing Line Officer provide comments about the fire and their decision each time the Periodic Assessment is completed.

## Subsection Areas and Information Flow Master Chart

Information

Situation

Objectives

Course of Action

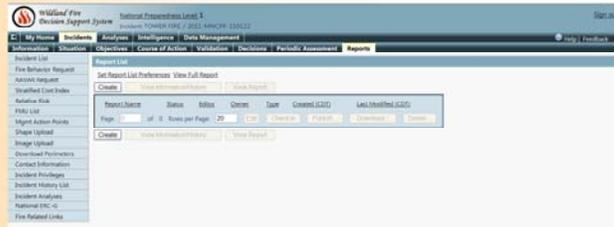
Validation

Decisions

Periodic Assessment

Reports

*Purpose:* Query the WFDSS database to pull information from the decision document. Standard and custom reports are available. MAP report is frequently used to provide information to the field.



### Reports

**Purpose:** Enables you to create custom reports about your incidents. These reports are useful for conducting in-briefs and other meetings, as well as for preparing after action reviews and post-fire reclamation plans.

Custom reports for Management Action Points can be very useful to provide to field personnel to ensure there is an understanding of the anticipated actions and trigger points for the fire.



## Decision Support – Added Value

---

- How fire may burn (intensity, spread rates),
- Fuel conditions, departures from average,
- Fire dynamics,
- Fire danger and weather analysis,
- Fire history reviews, area burned, type of past fires,
- Probability of a fire reaching a planning area boundary
- Probability of season-ending event,

Decision support tools provide added value to risk informed decision making.



## Decision Support – Added Value

---

- Indications of where the fire may spread, or total area that may be burned,
- How fast the fire will travel,
- How soon the fire may reach critical locations,
- Potential fire effects,
- Fire duration,
- Probability of fire impacting sensitive areas,
- Projections of values to be protected in the fire area and identification of values,
- Probability of where the fire will spread.

Decision support tools provide added value to risk informed decision making.

# Decision Support – Stratified Cost Index

The screenshot displays the Wildland Fire Decision Support System interface. The main content area shows the SCI Results for a fire incident. The results are presented in a table with columns for Acres Burned, 25%, 50%, 75%, and 90% percentiles. The values are: 10000 acres burned, with 25% at \$23, 50% at \$90, 75% at \$345, and 90% at \$616. The 25% value is highlighted in red, indicating it is the lowest cost per acre among the percentiles shown. A note explains that 25 percent of historical fires with similar characteristics had a cost per acre less than the value displayed in the 25% column of the table. Below the table are buttons for 'Accept' and 'Reject'. The SCI Parameters section includes fields for Latitude (33.3475), Longitude (105.5686), Ignition Date (04/03/2011), Model (USFS Western Model), and USFS Region (3). Other parameters include Aspect (South), ERC Station ID (290203), Distance out to Wilderness Boundary (0.0 miles), Fuel Model (H, R, E, P, U, or G (Timber)), Slope (percent) (2.4), Distance to Nearest Town (0 miles), and Elevation (1956). The Estimated Final Fire Size (acres) section has four estimates: Estimate 1 (10,000), Estimate 2 (12,000), Estimate 3 (16,000), and Estimate 4 (20,000). A note states that SCI is NOT valid for fire sizes less than 300 acres. Buttons for 'Save', 'Calculate SCI', and 'Return' are at the bottom.

Acres Burned	25%	50%	75%	90%
10000	\$23	\$90	\$345	\$616
12000	\$22	\$84	\$323	\$577
15000	\$20	\$77	\$298	\$532
20000	\$18	\$70	\$268	\$480

25 percent of historical fires with similar characteristics had a cost per acre less than the value displayed in the 25% column of the table. Likewise, 50, 75, and 90 percent of fires with similar characteristics had a cost per acre less than the values displayed in their respective columns.

SCI Parameters

Latitude: 33.3475 Longitude: 105.5686 Ignition Date: 04/03/2011 Model: USFS Western Model USFS Region: 3

\*SCI Name: SCI Initial Aspect: South

ERC Station ID: 290203 SMOKEY BEAT(6.8 miles) \*ERC Percentile: 97

\*Distance out to Wilderness Boundary (Miles): 0.0

\*Fuel Model: H, R, E, P, U, or G (Timber) \*Slope (percent): 2.4

\*Distance to Nearest Town (Miles): 0 \*Elevation: 1956

Estimated Final Fire Size (acres)

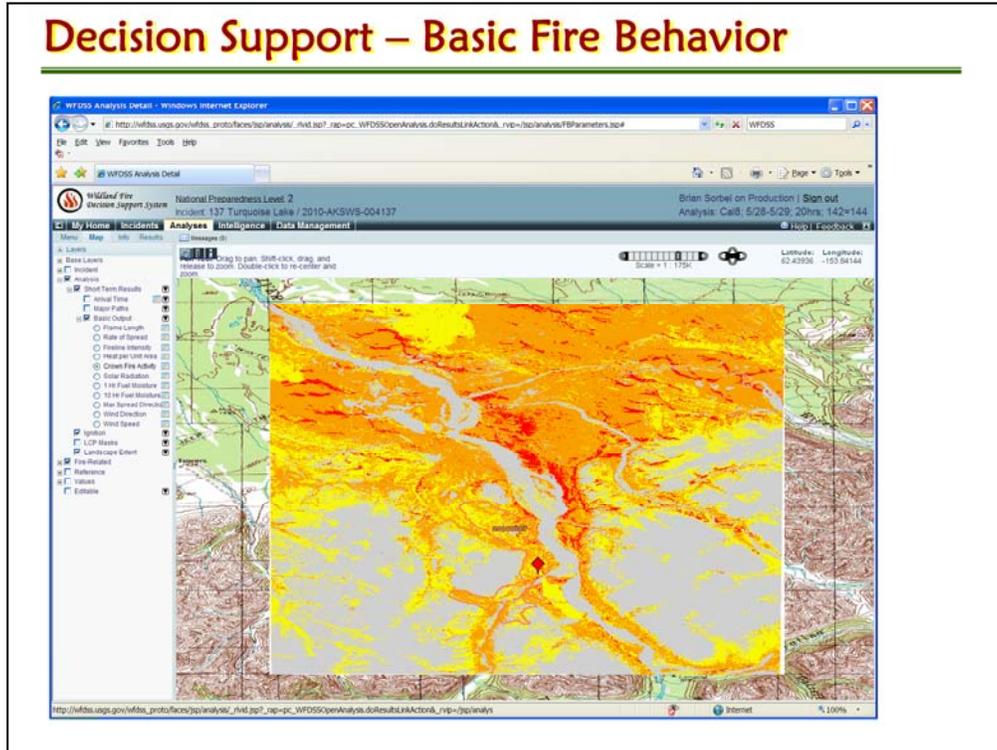
\*Estimate 1: 10,000 \*Estimate 2: 12,000 \*Estimate 3: 16,000 \*Estimate 4: 20,000

SCI is NOT valid for fire sizes less than 300 acres.

Buttons: Save, Calculate SCI, Return

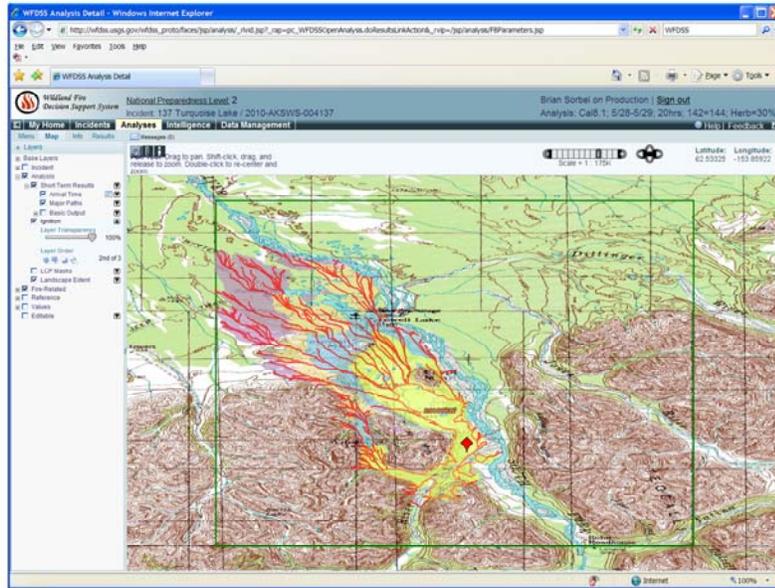
Sample of SCI – This slide depicts USFS costs.

## Decision Support – Basic Fire Behavior

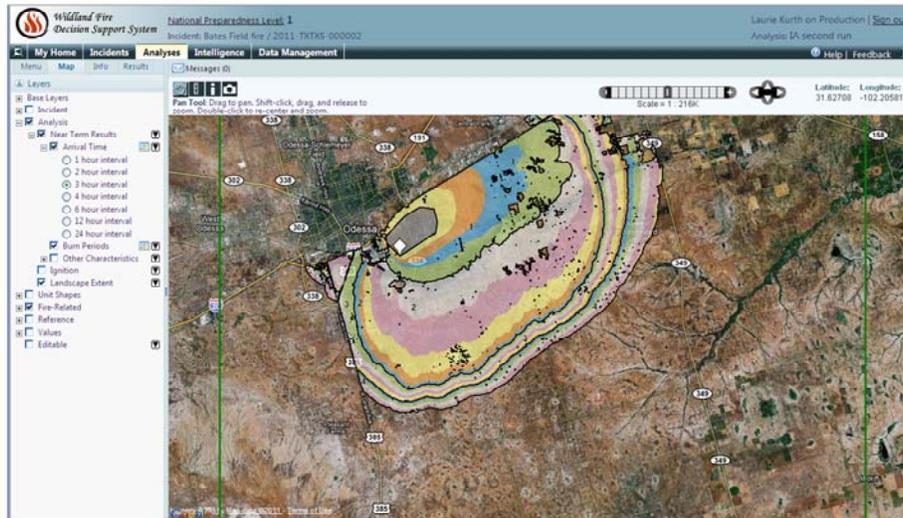


Basic fire behavior outputs can be produced by Dispatchers or Authors. This analysis runs on an un-calibrated landscape chosen on the fire information page. Example, folks in CA are directed to use the CA Landscape layer instead of the LANDFIRE layers available. The analysis also chooses weather from the closest weather station. Also available will be a minimum travel time product to show flow paths and expected arrival times.

# Decision Support – Short Term Fire Behavior



## Decision Support – Near Term Fire Behavior



NTFB is a spatial fire tool that is temporal and can model fire *growth*. This tool allows for hourly changes in weather/wind, daily changes in burn periods or several burn periods per day, and incorporation of wind or rain events. Unlike static weather in BFB and STFB, the modeled fire behavior in NTFB reflects hourly variation in wind and daily variation in weather. It is similar to the desktop version of FARSITE, but many user-features are eliminated due to the computer power available through the WFDSS System. The result of NTFB is a projected fire growth over a set time period. Because of the possible variation of results due to weather, burn-periods, and the landscape inputs, it is important to calibrate this tool and to use the best quality inputs to receive the best outputs.

## Decision Support – Values Inventory

Category	Value	Data Source	Currency	Coverage
Building Clusters: Baxter	no data	US Counties / FGDC Cadastral Subcomm.		Available counties in AZ, CA, CO, ID, MT, NM, NV, OR, UT, WA, WY. No data available for Baxter
County: Baxter	254 acres	Tele Atlas North America, Inc., ESRI	05/11/2010	National
Des Areas: Leatherwood Wilderness	236 acres	FWS, BLM, USFS, Wilderness.net	05/18/2010	National
Roads	0.1 miles	ESRI Data and Maps 2010	2010	National
Surface Mgmt Agency: USFS	254 acres	Various	July 2010	National

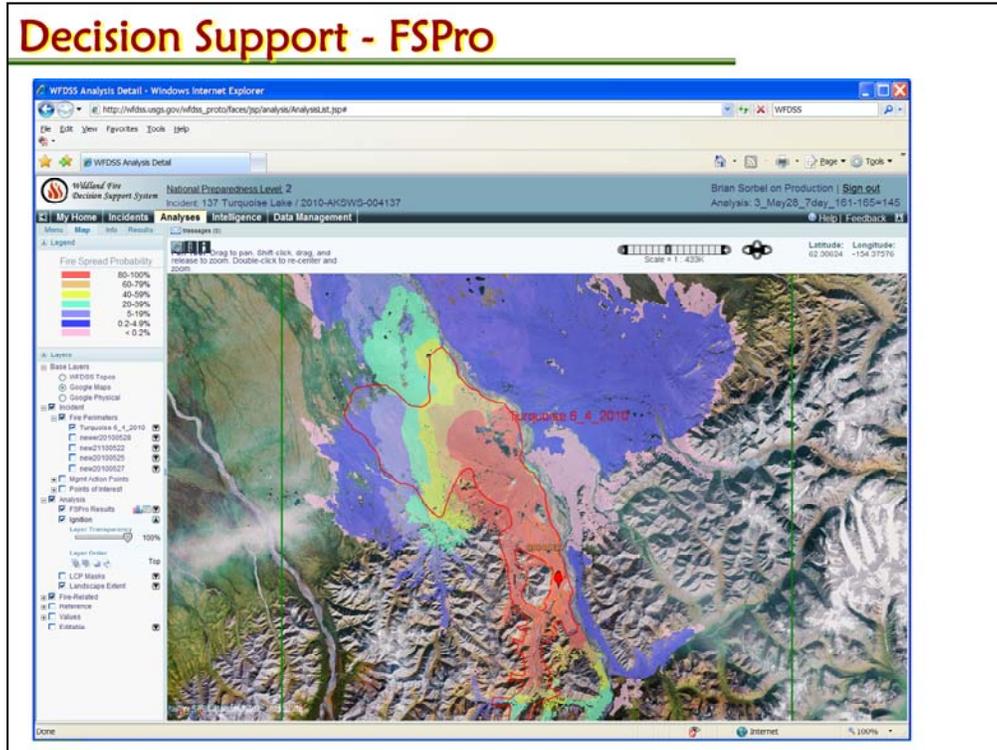
  

Category	Data Source	Currency	Coverage
BLM Buildings	GeoCommunicator / Other Sources	07/21/2010	BLM Lands
BLM Horse and Burro	BLM	11/17/2010	OR, ID, MT, WY, CA, NV, UT, AZ, CO, NM
BLM Oil / Gas Leases	BLM/NOC	Unknown	Western United States
BLM Range Allotments	BLM/NOC	2007	Western United States
Class I Airsheds	NPS Air Resources Division	Various	National
Communication Towers	FCC	08/08/2010	National
Electric Power Plants	HSP	02/2010	National
Electric Sub Stations	HSP	02/2010	National
Electric Transmission Lines	HSP	02/2010	National
Habitat	FWS Geospatial Services	01/2011	National
Mines	HSP	02/2010	National
NPS Buildings	NPS (INSC - Resource Information Services Division)	03/04/2011	National (incomplete)
Oil and Gas Pipelines	HSP	02/2010	National
Ozone Non-Attainment	EPA	2009	National
Particulates Non-Attainment	EPA	2009	National
Responsible Agency	USFS Region 5 GIS Clearinghouse	02/10/2010	California
Sage Grouse Key Habitat	BLM/NIFC	2009	Regional - OR, WA, ID, MT, ND, SD, NV, UT, CO, CA, WY
Sage Grouse Occupied Habitat	BLM/NOC	2008	Regional - OR, WA, ID, MT, ND, SD, NV, UT, CO, CA, WY
Trails	NPS, USFWS, USFS, appalachianrail.org	03/08/2011	National
USFS Buildings	USFS-INFRA	02/23/2011	National

Values Inventory is produced based on the Planning Area drawn or the Near Term Fire Behavior Analysis and depicts potential values that could be affected by the fire.

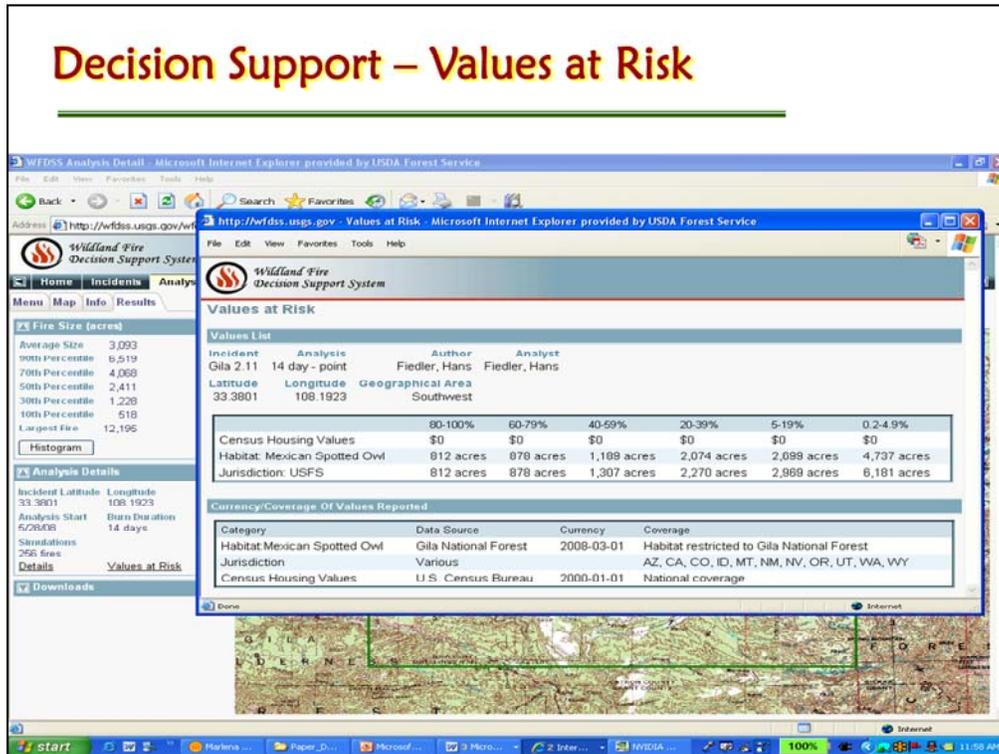
WFDSS Values Inventory provides lists and maps of values. WFDSS provides a map display intended to help users visualize data geographically. There are numerous national and interagency geospatial layers in WFDSS. WFDSS Values Inventory uses the geospatial data such as Class I Airshed and national infrastructure to quantify the values within a planning area or the STFB Arrival Time footprint as shown in Figure 39. This is intended as a strategic tool and is the fastest method to see and quantify values within the fire planning area. The report is a tabular product that gives the breakdown of values in quantity, miles or acres, depending on the value.

## Decision Support - FSPro

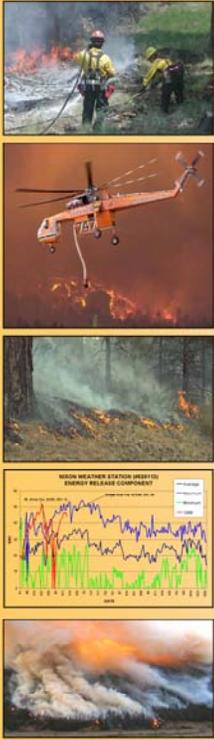


Fire Spread Probability (FSPro) is a spatial fire spread probability tool that uses current forecasted and historical weather as well as the landscape information used by the aforementioned tools. The resulting output does not show fire sizes or perimeters, but the probability that fire will burn a particular cell. It is not possible to extract fire behavior or fire growth information from FSPro output, nor is there a way to tell what type of fire burned an area (e.g. surface fire, crown fire). FSPro will produce numerous weather scenarios for the specified modeling period (7-30 days). Using these scenarios and the landscape information, 1000-4000 fires are modeled. Greater numbers of simulated fires increases the probability that FSPro will model a rare spread event. FSPro uses the final arrival time perimeters and overlays them to generate a probability surface. Because historic climatology plays such an important role in this tool it is important to make sure representative RAWS are selected for wind and weather. Having an analyst familiar with fire behavior modeling, and calibrating the model to the fire of interest is very important in obtaining quality outputs.

# Decision Support – Values at Risk



WFDDSS Values at Risk combines FSPRO outputs with reference to value layers to quantify the number, miles or acres of specific values within each probability contour. No economic values are associated with the outputs.



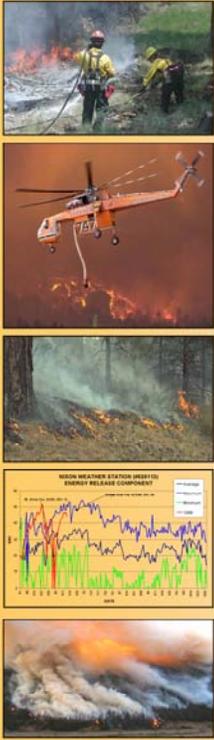
## WFDSS – User Roles



***Specific Roles Identified:***

- Viewer
- Dispatcher
- Author
- Data Manager
- Geographic Area Editor
- National Editor
- Fire Behavior Specialist
- RAVAR Analyst
- Super Analyst
- Help Desk
- Administrator

There are currently 11 user roles in the WFDSS application. Of the 11 roles, there are 3 important roles to the field users – DISPATCHER, AUTHOR, DATA MANAGER. The FIRE BEHAVIOR SPECIALIST is also important, however this role will require special skills. The access to the WFDSS application increase as users move down the list above.



## WFDSS – User Roles, continued



**Viewer:**

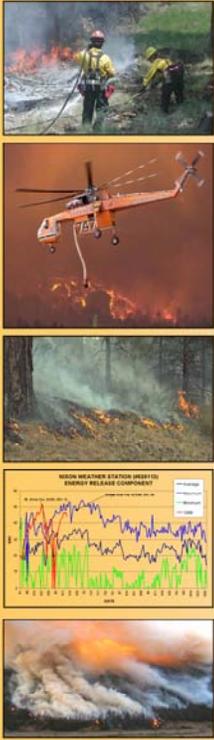
- Is the minimum level of access for all WFDSS users.
- View incident information for all WFDSS incidents and groups.
- Cannot edit.

**Dispatcher:**

- Enter information for a new WFDSS incident.
- Edit incident information for incidents they create.
- Run simple (unsupervised) fire behavior analyses.

Viewers have the least access to the system. Viewer role granted to anyone with a .gov government e-mail account. View incident information for all WFDSS incidents and groups. View completed analyses and reports. Cannot edit.

Dispatch role can do everything a viewer can plus they can create incidents. Dispatcher role – expected to be granted to those individuals responsible for the initial response, firecode and fire number. Enter information for a new WFDSS incident. Edit incident information for incidents they create. Run simple (unsupervised) fire behavior analyses.



## WFDSS – User Roles, *continued*

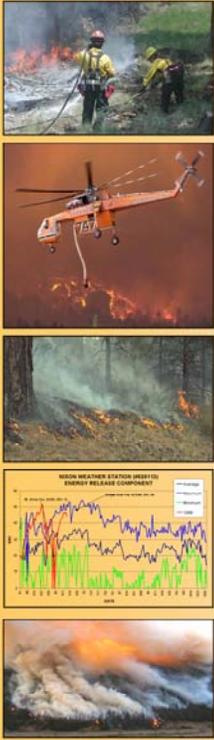


### Author:

- Enter information for a new WFDSS incident.
- Edit incident information for incidents they create.
- Grant privileges to other users for incidents they have authored.
- Run simple (unsupervised) fire behavior analyses.
- Request an analyst be assigned for fire behavior modeling and RAVAR analysis.
- Create a group or complex from individual incidents.

Author role – for individuals who will author decisions within the WFDSS application such as fire planners, AFMOs, FMOs, and “Ologists” who contribute to the documentation. Authors do everything the previous two roles do and they also document the decision and request analyses to support/inform the decision. Enter information for a new WFDSS incident. Edit incident information for incidents they create. Grant privileges to other users for incidents they have authored. Run simple (unsupervised) fire behavior analyses.

Request an analyst be assigned for fire behavior modeling and RAVAR analysis.  
 Create a group or complex from individual incidents.



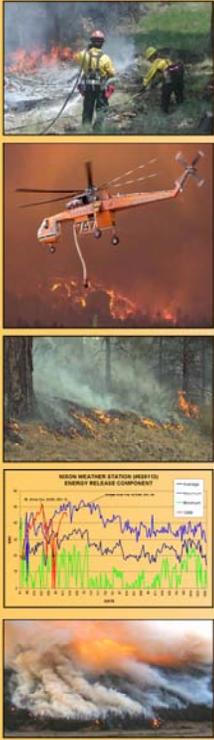
## WFDSS – User Roles, continued



### Data Manager:

- Enters and maintains strategic objectives / management requirements and fire management unit associations for individual agency units
- Enters and maintains Unit Shapes

Data Managers enters and maintains strategic objectives and fire management unit associations for individual agency units. Data Manager role would probably be assigned to the fire planner or the individual who contributed objectives to the fire management or land management plans.



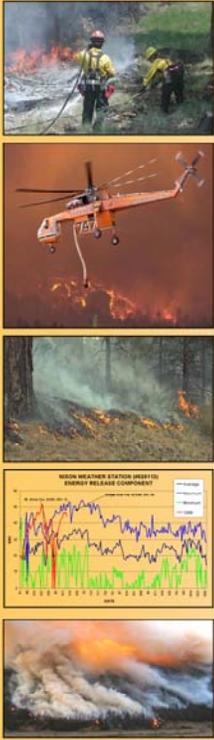
## WFDSS – User Roles, *continued*



### Geographic Area Editor:

- Edit WFDSS incidents within their geographic area (GACC).
- Request and cancel analyses for WFDSS incidents in their GACC.
- Prioritize analysis requests within their GACC.
- Authorize new Viewer, Author, Dispatcher, and Fire Behavior Specialist roles in their GACC.
- Does not have privileges specific to Fire Behavior Analysts, RAVAR Analysts, or Administrators.

Geographic editor role is intended to be one per region to promote interagency communication and provide accountability for incident prioritization and deletion. Edit WFDSS incidents within their geographic area (GACC). Request and cancel analyses for WFDSS incidents in their GACC. Prioritize analysis requests within their GACC. Authorize new Viewer, Author, Dispatcher, and Fire Behavior Specialist roles in their GACC. Does not have privileges specific to Fire Behavior Analysts, RAVAR Analysts, or Administrators.



## WFDSS – User Roles, *continued*



### National Editor:

- Has maximum authority relative to WFDSS incident management.
- Has all the capabilities of a Regional Editor, but at a national level.
- Delete incidents.
- Does not have privileges specific to Fire Model Analysts, RAVAR Analysts, or Administrators.

National Editors can determine fires of national significance. Has maximum authority relative to WFDSS incident management. Has all the capabilities of a Regional Editor, but at a national level. Delete incidents. Does not have privileges specific to Fire Model Analysts, RAVAR Analysts, or Administrators.



## WFDSS – User Roles, *continued*



### Fire Behavior Specialist:

- Formerly the FSPro Analyst role, but the name change reflects additional fire behavior tools available in WFDSS. Users requesting this role should have previous fire behavior modeling experience, including evaluating and modifying landscape files, historic climate, and forecasted weather.
- Conduct “supervised” fire behavior analyses and modify inputs as needed.
- Accept (or reject) the results of the fire behavior analyses.
- Grant privileges to other analysts for analyses they have created.
- Interpret fire behavior analyses for other users.

The FIRE BEHAVIOR SPECIALIST is also important, however this role will require special skills often found in LTANs (Long Term Fire Analysts). Formerly the FSPro Analyst role, but the name change reflects additional fire behavior tools available in WFDSS. Users requesting this role should have previous fire behavior modeling experience, including evaluating and modifying landscape files, historic climate, and forecasted weather. Conducts “supervised” fire behavior analyses and modify inputs as needed. Accept (or reject) the results of the fire behavior analyses. Grant privileges to other analysts for analyses they have created. Interpret fire behavior analyses for other users.



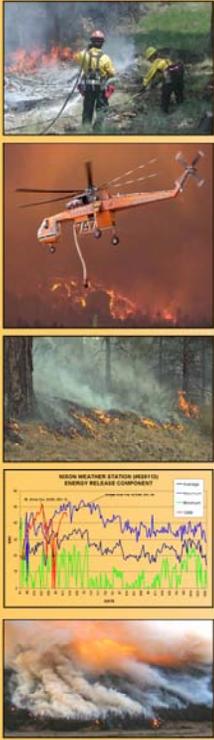
## WFDSS – User Roles, continued



### RAVAR Analyst:

- RAVAR analysis tool is not yet completely automated, some manual effort is required to complete a RAVAR analysis. This manual effort is provided by the RAVAR Analysts at the Forestry Science Lab in Missoula, so users should not request this role.
- Accept or reject a RAVAR analysis request.
- Post RAVAR summary documentation.

Although this role is still available, it is used very little given the Values Inventory and Values at Risk information is fairly automated.



## WFDSS – User Roles



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**Super Analyst:**

- Has maximum analysis authority, provides coaching and training to other analysts.
- Run, edit, and accept all types of analyses.
- Delete analyses.

**Help Desk –**

- This role is for the folks at the NIFC HELP DESK

**Administrator –**

- This role is for the system developers

### **Super Analyst:**

Has maximum analysis authority, provides coaching and training to other analysts. Run, edit, and accept all types of analyses. Delete analyses.

### **Help Desk:**

Located at the National Interagency Fire Center (NIFC) in Boise, Idaho. Assist other WFDSS users with technical questions associated with the system.

Access user profiles. Reset passwords. View "work in progress" from within the application.

### **Administrator:**

Comprised of the WFDSS core team and IBM developers. Authorize new users. Disable users. Assign and modify user roles. Reset passwords. Edit user profiles. Send WFDSS e-mails and broadcast WFDSS messages.



## Summary

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- Decision support is markedly important to fire management success and useful at all levels,
- Decision support tools provide a range of information, from subjective to quantitative long-term analyses,
- Decision support tools incorporate science and technology to reduce uncertainty, better understand complexity and risks, help develop management strategies and operational tactics, and define the situation,
- Decision support information does not make decisions, only facilitates them,

## Where to find WFDSS

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- <http://wfdss.usgs.gov>
- **Request your user account now!!**

