
INSTRUCTOR:

LESSON: Wildland Fire Decision Support System

COURSE: S-495 Geospatial Fire Analysis Interpretation and Application

Emphasis: introduce concepts of WFDSS decision support and available models and tools that could assist in informing managers of risk associated with various decisions.

OBJECTIVES:

Upon completion of this lesson, participants will be able to:

1. Describe the Wildland Fire Decision Support System (WFDSS).
2. Identify the multitude of support tools and when they might be utilized in developing decisions and implementation actions.
3. Identify the student role in providing information for a WFDSS decision.

I. INTRODUCTION

WFDSS is designed to establish a process for documenting strategic decisions, providing decision support, and facilitating development of either short- or long-term operational management plans. The WFDSS process is linear, scalable, and progressively responsive to changing fire complexity and provides a consistent decision analysis and documentation process for all types of wildland fires. WFDSS provides a platform for risk-informed decision-making.

Documentation and analysis of wildland fire management decisions has been required by federal agency policy for nearly 30 years. The 2009 Policy Implementation Guidance requires-

“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.”

The Wildland Fire Decision Support System (WFDSS) has been developed to meet this need. The Forest Service (FS), Fish and Wildlife Service (FWS), and Bureau of Indian Affairs (BIA) enter all fires into WFDSS, regardless of size. National Park Service (NPS) and Bureau of Land Management (BLM) enter fires into WFDSS only when it escapes initial attack. At 98% initial attack success, there may not be a lot of need for analysis to inform decisions. However, as incidents escape initial attack or are managed for multiple objectives more analysis is needed to inform the decision.

Decision making is best accomplished when the maximum amount of information is available regarding the decision and its implications. While there are different approaches to decision making, there are also different types of decision support information. Decision support can be multi-dimensional, subjective or objective, qualitative or quantitative.

Decision-making associated with managing wildland fire can have critical impacts. It is important to make the highest quality informed decisions possible. Decision-making is facilitated by factual information and prediction of the range of outcomes and associated consequences of the decision.

II. WHEN A WFDSS DECISION IS NEEDED

It is recommended that a decision be considered if:

- Wildland fires are no longer following the initial action defined by the Land and Resource Management Plan (LRMP), or the Fire Management Plan (FMP), or
- Fire continues to actively spread beyond a few burning periods, or
- Wildland fires are being managed or considered for multiple objectives, or
- Prescribed fires exceed prescriptions and are declared wildfires

Decision-making associated with managing wildland fire can have critical impacts. It is important to make the highest quality informed decisions possible facilitated by factual information and prediction of the range of outcomes and associated consequences of the decision. 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.

III. WHAT IS WFDSS?

WFDSS is designed to be consistent with accepted models of risk-informed decision making. WFDSS is a web based 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 associated documentation. To accomplish this, WFDSS maximizes the use of appropriately-based deliberation as well as analysis. It is an iterative, information-goal directed process.

- **Risk-informed decision making** - requires two distinct but linked processes:
 1. **Analysis:**
 - Rigorous, replicable methods to provide information about factual questions.
 - Brings new information into the process – **informs deliberation.**
 2. **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.**

Examples of decision making at this level involve developing a strategic alternative and objectives for a wildfire incident; consider a range of values, hazards and probabilities and focus on longer time periods. They are usually completed at least once, but may require revision, adjustment or a completely new decision as the incident evolves and conditions change.

IV. YOUR ROLE IN WFDSS

As a Geospatial Analyst (GSAN) you may be asked to provide analysis to support the development, amending, or implementing the WFDSS decision. Knowledge and understanding of the risk-informed decision-making process will be critical. GSAN's are inherently involved in longer duration events where risks, values, costs, and probability of success all must be weighed in developing management strategies. Without your understanding of these processes and involvement in the strategic planning process relevant information may be missed. Wildfire decisions are inherently complex, and decisions made from a single perspective and single base of knowledge without supplemental input cannot hope to capture and address that complexity.

On large, complex wildfires the Strategic Operational Planner (SOPL) position may be assigned to the Incident to work with the Operations and Planning Sections in developing a long-term course of action. SOPL's are specifically trained in developing long-term plans for wildland fires, and are useful on any wildland fire lasting more than three days regardless of the incident's strategic objectives (protection and/or resource benefit). As a GSAN you may be asked to work with or directly for a SOPL.

V. ELEMENTS OF WFDSS

WFDSS is designed to include models and tools to analyze and assess the incident. The outputs can then be used to support the decision and assist in driving strategies and future tactics. WFDSS is divided into 8 subsections represented by tabs within the program. These sections are: Information, Situation, Objectives, Courses of Action, Validation, Decisions, Periodic Assessment, and Reports. The WFDSS system is updated from time to time, so menu options may change, but the basic function of each tab will remain the same. A summary of the most recent revisions to WFDSS can be found on the WFDSS Home page.

http://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml

Tutorials, help files and contact numbers for WFDSS support can also be found on this page and do not require a WFDSS account password to access them.

Information

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

Information includes: Incident Name, Point of Origin, Unique Fire Identifier, Fire Code, Fire Perimeter / Incident Size, Discovery Date/Time, Containment Date/Time, Controlled Date/Time, Out Date/Time, Landscape Data Source, Geographic Area, Responsible Unit at Point of Origin, Incident Cause, Fire of National Significance, and Jurisdictional Agency at Point of Origin.

Situation

Purpose: Provides situational and risk assessment information to support strategic decisions and development of a course of action. Information on fire weather, features, values, fire danger, and more can be accessed. This tab features a map view to display most of the information in a spatially explicit format. Natural and manmade resource information can be toggled on and off to assess values at risk, including:

Map (sub tab) has several spatial layers available:

- Base Layers- USGS Topos, USGS Imagery, USGS Topo Imagery, WFDSS Topos, Google Maps, Google Physical, U.S. States;
- Incident- Planning Areas, Fire Perimeters, Management Action Points, Points of Interest, Objective Shapes, Point of Origin.
- Analysis- Ignitions, Barriers, Landscape Masks, Basic Fire Behavior, Short Term Fire Behavior, Near Term Fire Behavior, FSPro (Values at Risk).
- Fire Environment and Safety- Incidents (adjacent, within map view), Active Planning Areas (adjacent), Active MODIS 6, 12, and 24 hour and Year to Date, Estimated Ground Evacuation Time, Retardant Avoidance, Aquatic Retardant Avoidance.
- Disturbance History - Fires since January of current year, Historical Wildfires, Fuel Treatments.
- Fire Weather and Danger – Significant Fire Potential, Fire Weather Forecast Zones, Remote Automated Weather Stations (RAWS).
- Boundaries- Jurisdictional Agency, Responsible Agency, Federal Administrative Areas, The Nature Conservancy Lands, County lines, Landscape Source.
- Designated Areas- Wilderness, Potential Wilderness, Special, Other, BLM.
- Infrastructure- Facilities, Communication, Energy, Roads and Trails.
- Natural and Cultural Resources- Air Quality, Critical Habitat (T&E), Sage Grouse Habitat.
- Unit Fire Planning Shapes – Fire Management Units.

Objectives

Purpose: Defines objectives as stated in Land and Resource Management Plans (LRMP), and Fire Management Plans (FMP), and lists specific management and incident requirements that will frame and influence strategic decisions as well as tactical plan development and 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.

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.

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.

Decision Summary

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

Reports

Purpose: Enables you to create three types of reports for your incidents. These reports are useful for conducting inbriefs and other meetings, as well as for preparing after action reviews and post-fire reclamation plans.

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.

VI. WFDSS Support Tools and Resources

Numerous models and tools are available within WFDSS to analyze and assess the incident. The various outputs can then be used to support the WFDSS decision.

Models in WFDSS

- Automated Basic Fire Behavior (BASIC*)
- Automated Short Term Fire Behavior (STFB*)
- Analyst Assisted Basic Fire Behavior (BASIC)
- Analyst Assisted Short Term Fire Behavior (STFB)
- Near Term Fire Behavior (NTFB)
- Fire Spread Probability (FSPro)
- Stratified Cost Index (SCI)
- Wildland Fire Air Quality Tools Smoke Models

Most Models in WFDSS automatically pull in weather, landscape and fuel moisture data. The modeler can calibrate the LANDFIRE data for all models, except the Automated BASIC and Automated STFB. These models should be used to support decision making and are often incorporated in to the decision documentation. See S-495 WFDSS Attachment.

Tools in WFDSS

- Wildland Fire Risk & Complexity Assessment
- Values Inventory
- Values at Risk (associated with FSPro)
- KMZ downloads
 - Incident KMZ
 - Analysis KMZ
 - Pending Incident KMZ
- Map Capture
- Fire Danger Graphs
- Weather forecasts

Map Pages: Situation & Analysis

WFDSS has a Situation map and an Analysis map which function similarly. Things you can do:

- Download shapefiles for modeling***
- Upload shapes for modeling-ignition, barrier, landscape mask***
- Draw shapes for modeling- ignition, barrier, landscape mask ***
- Draw an Extent for your analysis
- Query underlying LANDFIRE data
- View values
- View Fire Danger Rating Graphs
- View Fire Weather Forecasts
- View Smoke Dispersion

- Map Capture for decision support

Situation Map only:

- Run Automated BASIC and Automated STFB models

Analysis tab only:

- View Landscape
- Edit Landscape

*See “[BFB \(Automated\)](#)” and “[STFB \(Automated\)](#)” Automated fire behavior models can be run by anyone granted incident privileges. The automated versions select fuels, weather and wind for the user with few options for editing this data or which weather stations are used. The user has less ability to refine the model inputs.

***See “[About Shapes](#)” in WFDSS help for more detail about drawing, uploading and downloading shapes: http://wfdss.usgs.gov/wfdss_help/WFDSSHelp_About_Shapes.html

WFDSS User Roles and Incident Privileges

User Roles within WFDSS correspond to permissions which allow users to perform certain tasks within the application, such as creating an incident or conducting fire behavior analysis.

User Roles are: Viewer, Dispatcher, Author, Data Manager, Fire Behavior Specialist, Geographic Area Editor, and Super Analyst.

User roles can be granted in WFDSS Training without granting those same roles in Production.

Fire Behavior Specialist:

- Users requesting this role should have previous fire behavior modeling experience, including evaluating and modifying landscape files, historic climate, and forecasted weather.
- Conduct fire behavior analyses and modify inputs as needed.
- Accept (or reject) the results of the fire behavior analyses.
- Grant privileges to other specialists for analyses they have created.
- Interpret fire behavior analyses for other users.

Incident privileges are assigned at the time of (and are specific to) an incident. These privileges allow you to Own, Edit, Review, or Approve decision content. Modifying or uploading any data to the decision should be coordinated with the local unit or the individual responsible for maintaining the WFDSS decision.

Training aids are available on the WFDSS site.

http://wfdss.usgs.gov/wfdss/WFDSS_Training.shtml To help users become familiar with navigating in the program WFDSS 101 series is an excellent source for learning how to use WFDSS.

Exercise

Review the various decision elements from the Wesley 2012 WFDSS Decision. Is sufficient information provided to guide fire managers in managing this incident? It is recommended that you access the Wesley 2012 incident in the Production site on WFDSS

http://wfdss.usgs.gov/wfdss/WFDSS_Home.shtml After signing into WFDSS, click on the Incidents tab. Using the Incident List Filter, type in “Wesley” in the Incident Name box and

“2012” in the Incident Year box and click Find Incidents. Click on the radio button next to Wesley, then View Information. Click on the Situation tab to view the incident map. If the various elements are not visible they can be activated from the left Map Layers menu. The Objectives tab can be found at the top of the page in the second row of tabs. The Wesley_092212_1214_Decision PDF decision may be used if access to WFSS is not available.

VII. SUMMARY

Management of wildland fire represents one of the most complex and highest risk activities in land management. Decision support and its contributions to decision-making are vital to fire management success. Decision support tools range from subjective information to quantitative long-term analysis processes and provide information to decision-makers. These tools and processes incorporate science and technology to facilitate decision making based on the best available information.

Decision support gives managers the ability to reduce the amount of uncertainty surrounding the fire, understand the amount of difficulty that could be encountered during management and possible outcomes, develop management strategies and operational tactics, and provide a common understanding and clearer explanation of the situation.

Your understanding of and input to decision analysis can be key in the success of managing an incident and providing for firefighter safety.