INSTRUCTOR:

LESSON: Wildland Fire Decision Support System

COURSE: S-520 – Advanced Incident Management

Emphasis: introduce concepts of WFDSS decision support and available tools that could assist in the fire environment. Introduce process and adherence to WFDSS decision in managing an incident.

OBJECTIVES:

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

1. Understand the need for sound decision making.
2. Describe the Wildland Fire Decision Support System (WFDSS).
3. Identify the multitude of support tools and how they can be utilized to support incident actions.
4. Identify the Incident Management Team (IMT) role in providing or utilizing information contained within WFDSS.

I. INTRODUCTION

Our response to wildfires on federal lands is governed by objectives established in the applicable Land/ Resource Management Plans, not some statutory authority. Most States & Local Governments do have statutory authority to suppress all fires.

Premade decisions vs. fire time decisions, the trend over the past 20 years is toward more fire time decisions, a trend that has accelerated over the past 10 years. Decision support tools are needed to gather and analyze information quickly in order for the agency administrator to make sound decisions quickly.

WFDSS is designed to establish a process for documenting strategic decisions, provides decision support, and facilitation of either short or long-term 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."

Because of process limitations, the evolution of multiple processes in wildland fire decision making, and policy goals of standardization, in June 2005, the then National Fire and Aviation Executive Board (NFAEB) chartered the WFDSS Phase 1 project to

> "develop a scalable decision support system for agency administrators that utilizes appropriate fire behavior modeling, economic principles, and information technology to support effective wildland fire decisions consistent with Resource and Fire management Plans."

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.

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. DECISION MAKING

Decision-making is not a science but an art. It requires judgment not calculation. There is no unit of measure which can weigh the substantive consequences of a decision against the political consequences, or judge the precise portions of public opinion and congressional pressure, or balance short-range against long-range, or private against public considerations.

Decision Support Styles:

- **Bootstrapping:** Traditional thinking. Generally this method is based on historical precedents. This method often fails to recognize how current conditions are different.

- **Professional Judgment:** Personal knowledge. This method is often subjective and based on personal experience and intuitive input that may be limited scope.

- **Formal Analysis:** Quantitative approach. This approach is theory-based and provides the clearest and most definable results that are science based.

All of the different styles should be sought when making a decision.

IV. 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.

V. YOUR ROLE IN WFDSS

As an IMT you may be asked to provide input to develop, amend, or implement the WFDSS decision. Knowledge and understanding of the risk decision processes will be critical. Type I IMT'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 data may be missed. While the team may have been delegated authority to manage the incident, 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.

Try to gauge the local unit's capability early on. Watch for issues, unrecognized risks or inadequate risk assessment. Are there political concerns, cooperator feedback, issues raised on IC conference calls? WFDSS should help drive communications with Agency Administrator's and local unit personnel. The IMT should not take on the Agency Administrator's responsibilities

for WFDSS, it is important that the IMT work together with the Agency administrator to outline a course of action.

Examples of WFDSS responsibilities that may be delegated to an IMT.

- Updating or uploading fire perimeters

- Providing input to update the Periodic Assessment, input to development of Management Action Points (MAPs), input for modifying the course of action, updates or estimates to incident costs.
- Ordering or managing of staff to provide additional assessment such as running fire behavior models and/or completing long-term assessments.

On large, complex wildfires the Strategic Operational Planner (SOPL) position may be assigned to the Incident Management Team 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).

It is essential that you understand the decision and operate within its guidelines as it truly represents the unit's management strategy and should be the reference with which you manage the incident. It is important to understand that in some cases a WFDSS decisions may be ongoing when the team assumes command of the incident and the team must make tactical decisions based on the unit's management strategy.

VI. 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 contains,

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, Landscape Data Source, Geographic Area, Responsible Unit at Point of Origin, Incident Cause, and Jurisdictional Agency at Point of Origin.

Situation
Purpose: Provides situational and risk assessment information to support strategic decisions and development of course of action. Information on fire weather, features, values, fire danger, and more can be accessed. The situation map enables visual Information evaluation. The information obtained here can help assess whether the pre-planned initial response is accurate or if additional planning is needed for the fire.

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 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.
The Objectives tab also lists specific management and incident requirements that will frame and influence strategic decisions and tactical implementation.

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.

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.

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.

VII. WFDSS SUPPOIRT 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

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 Significant Fire Potential
- View Strategic Objectives
- 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

VIII. STRATEGIC AND TACTICAL USES OF WFDSS

- Unified command – when to bring in additional jurisdictions: FSPro and Near Term fire spread can be overlaid with jurisdictions and current fire perimeter can demonstrate if or how soon the fire may reach additional jurisdictions.

- Evacuation planning and protection prioritization: FSPro and Near Term fire spread overlaid with structure layer can indicate the likely hood or how soon the fire may reach structures.

- MAPs: FSPro and Near Term fire spread overlaid with Management Action Points (MAP's) can indicate the likely hood or how soon the fire may reach a given MAP.

- Smoke: These tools can provide site-specific, time-specific smoke forecasts that can be used for public information, road/traffic management, and airport issues.

- Wind Ninja: Provides expected wind speed and direction (given gradient wind forecasts) at a specific location.

    - Firing operations: Ground personnel can use this information during tactical operations to avoid surprises associated with wind shifts.

    - Vulnerable portions of fireline: Channeling and acceleration of surface winds in complex terrain can indicate areas of fire line that may pose problems.

- Retardant Use (USFS only): Retardant Avoidance layer can be used in developing tactical plans to identify retardant avoidance zones.

- Wilderness Issues: The Wilderness layer can be used in conjunction with other layers and tools such as FSPro and Near Term fire spread to determine the likely hood or how soon tactics or resources may need to be modified for wilderness.

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 Editor, and Super Analyst. User roles can be granted in WFDSS Training without granting those same roles in Production.

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 on the Training tab. 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 Wesley 2012 WFDSS Decision look at the various decision elements. Determine if the elements are adequate and if sufficient information is provided to guide an Incident Management Team in managing this fire. 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 WFDSS is not available.

IX. 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 the decision analysis can be key in the success of managing an incident and providing for firefighter safety.