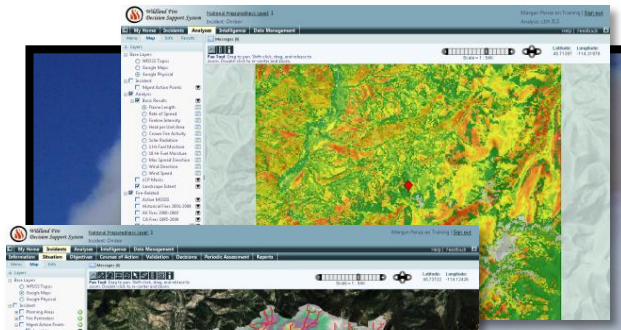
Wildland Fire Management RD & A - Annual Report, 2009



Integrating science, technology and fire management.

Wildland Fire Management RD&A

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Introduction

Transfer of research findings into useable applications for field implementation has long been an area of concern. Congressional studies reported in 1972 that the transfer of research findings to the field needed improvements and led to the establishment of Research, Development, and Application (RD&A) programs as a formal organizational approach to improve technology transfer. Later reports indicated that while actions to improve performance had been implemented, better evaluation, upward reporting, and adjustments to research programs based on actual experience were still needed. Specifically, opportunities to make the best possible use of research findings and to refocus research as needed to maximize benefits to land managers were identified as growth areas.

As Forest Service RD&A programs became established, they were structured to have certain basic characteristics, including abilities to:

- Respond to an urgent need to improve management practices and procedures,
- Integrate new science and technologies into management operations,
- Solve high-priority problems in a specific period of time,
- Coordinate with a variety of experts,
- Involve users and stakeholders,
- Implement a planned, financed program with responsibility and authority assigned collectively by program partners, and
- Achieve specific objectives established using an interdisciplinary approach.

Wildland Fire Management RD&A Program

Although new wildland fire management knowledge and applications continue to be developed, many of these advances are not being consistently or completely incorporated into routine business practices. Recent Research and Development strategic initiatives have articulated a need for improved methods to determine what information is of use, to whom, and the best way to partner with managers to achieve the integration of science into management.

The establishment of a dedicated program and formal process to ensure effective and timely communication between research and management and integration of new knowledge and processes into management was determined to be a sound option to enhance the application of the best science in wildland fire management. As a result, the Wildland Fire Management RD&A (WFM RDA) was nationally chartered in 2006. Principal areas of focus include:

- Sponsoring and guiding development and application of wildland scientific knowledge; developing decision support tools; and providing science application services to the interagency wildland fire community.
- Acting as a primary point of contact for communication between scientists and participating field managers, and an advisor to program administrators at local, regional, and national levels.

Wildland Fire Management RD&A – Program Description

Strategic Goals and Objectives

As a national program, the WFM RDA directly supports national strategic goals, mission statements from both R&D and FAM, and recommendations in the 2009 Quadrennial Fire Review (QFR). Goals, mission statements, and recommendations that are directly supported by the WFM RDA are shown in Table 1.

Table 1. Strategic goals, mission statements, and recommendations having direct relationships to the activities of the WFM RDA.

Source	Direction Applicable to WFM RDA
Forest Service Strategic Plan	• *Goal 1. Restore, sustain, and enhance the Nation's forests and grasslands.* *Goal 7. Provide science-based applications and tools for sustainable natural resources management.*
Forest Service R&D Mission	• *To develop and deliver knowledge and innovative technology to improve the health and use of the Nation's forests and rangelands – both public and private.*
2009 Quadrennial Fire Review-Mission Strategies: Fire Management's Next Decade, strategic elements	• *Expand risk management to enable a much greater involvement in fire management planning and implementation activities. Advocate and carry out investments in risk management commensurate with production pressures, expectation demands, and increasing accountability.* • *Promote inclusion of new models, new scientific knowledge, and other emerging information on human error, safety, risk management, and implications for safe and effective operations throughout all fire and aviation management activities.* • *Develop new outcome measures that place safety metrics on a level equal with post-fire resource impacts and cost efficiency.*
2009 Quadrennial Fire Review-Asymmetric Fire and Strategic Management Response	• *Improve wildland fire decision-making and implementation through the introduction of a system to document strategic decisions, facilitate access and use of the next generation of risk-informed decision support tools, and allow for the completion of a detailed set of implementation actions as needed. Realign decision-making to be more agile, flexible, and responsive to rapidly developing and changing conditions and retain relevancy over longer time periods.*

2009 Quadrennial Fire Review- Achieving "Fire Adapted Communities"	• *Incorporate understandable and demonstrable metrics on what fire-adapted means. Include these outcome metrics in strategic management response development.*
2009 Quadrennial Fire Review – Cross-cutting Strategies: An Integrated Fuels Portfolio in Support of Land management Objectives	• *Integrate fuels management investments and projects into larger land management priorities. Integrate management objectives and techniques with all natural resource management functional programs and expand to landscape-scale management capability.*
RMRS Strategic Priorities	• *Create credible, innovative, science-based solutions for resource management problems.* • *Identify relevant needs and quickly and efficiently convert science gaps into findings and products for managers and citizens.* • *Anticipate and respond to emerging issues.*

Wildland Fire Management RD&A Mission and Goals

The WFM RDA focuses its resources on development and application of tools which can be deployed to the wildland fire community, obtaining research services as needed from existing Forest Service research work units, universities, and the private sector across the country. The RD&A utilizes this expertise as necessary to accomplish priority work through various agreements and by providing funding where necessary and appropriate. Its mission will not be doing original research; rather it will be to identify research that shows promise for refinement into deliverable field applications. The WFM RDA has six objectives that guide its activities. These include:

Objective 1: Coordinate Fire Science Application. This element of the work program will focus on the delivery of existing and new wildland fire applications and knowledge. Establishment and maintenance of a well planned and executed program with emphasis on: improving participative, interactive application pilot and demonstration projects; conducting applied fire research issue sensing and evaluation; utilizing innovative communication and marketing techniques, and; the securing of beneficial and mutually productive partnerships between fire managers, line officers and researchers. Integration with current interagency efforts to improve science delivery will occur.

- **Interoperability and Delivery of Wildland Fire Decision Support Systems.** Fire research has resulted in a number of decision support models that are not designed to work together. Lack of interoperability results in inefficiencies, and often hinders adoption of models by users. In addition, spatial information (such as LANDFIRE) is increasingly important in supporting fire management decisions. Integrated suites of tools are needed to make the best use of decision support technology. This program will facilitate improvement of user interfaces and connectivity of existing applications and sponsor fire science applications that can be bundled and built with greater interoperability, resulting in more efficient use of resources, e.g. climate models linked with fire probability applications, or landscape fuels planning tools combined to provide an integrated suite as opposed to the current multitude of separate applications which often require repeated data entry.

Sponsoring the design and support for applications is based on the principle that future models or applications need to be bundled and built with much greater interoperability to shorten the often steep learning curve, reduce data entry required, and capitalize on model capability. The current "chaos" and uncertainty on model use, availability and release coordination needs to be improved. The future requires greater use of spatial information (LANDFIRE) to support wildland fire and other natural resource decisions. In order to ensure effective use of spatial data, applications need to be developed and coordinated in an integrated suite of tools. Jumping from model to model without interoperability contributes to user inefficiencies and wasted time, which leads to the lack of user adoption and reduces the application of current science. The RD&A Program will work to bring together identified useful applications and model developers with proven programmers (internal and external) for the expressed purpose of improving the user interfaces and connectivity between applications.

- **Science Liaison with Fire Program Analysis Project.** The Fire Program Analysis (FPA) project is tasked with developing an interagency budgeting and planning program for Federal fire management. A liaison with the fire science community is needed to facilitate the use of science in FPA model development as the project enters its second phase, encompassing extended attack, large fires, and fuels management, prevention and post-burn rehabilitation. This unit may provide the science liaison with the FPA Steering Committee and the Development Team during the model development phase, which entails identifying experts to provide advice and support on topics as needed and assisting in organizing scientific review of FPA modules.

Objective 2: Develop and Support a Wildland Fire Decision Support System. There is a pronounced lack of understanding of wildland fire economics relative to the risk attitudes by land managers and local officials responsible for managing wildland fires. Current costing evaluations are insufficient in fire situation analyses. There is a critical need to know more about the economic effects of wildland fire on natural resources, infrastructure, private landowners and communities, over both time and geography. Valuing land, natural resources and human improvements for planning purposes and economic evaluation is a pressing need. Also of importance is improving the understanding of the effects of policy on program expenditures, priorities and accomplishments. To support the foregoing economic analysis needs, there remains a continuing need to establish, maintain, and improve costs and values databases that can be effective in understanding the positive and negative resource, economic, and social impacts associated with wildland fire management.

The unit will focus on developing and supporting improved applications that will contribute information regarding fire spread probabilities, fire effects and economic aspects of wildland fire decision support. The current applications used to support decision making concerning the management of unplanned ignitions need to be updated with new research knowledge. This knowledge can be translated into new applications for use by land mangers of all Federal agencies and many states e.g. WFDSS.

Objective 3: Project Fire Season Costs. Continued emphasis must be given to integrating fire weather and severity forecasts into existing and new decision-support tools for both pre-season planning and in-season decision making. The program will contribute to this continued emphasis, by supporting and coordinating weather and climate modeling research and application development. Some topics of

interest are: improved long range forecast models, and managers' ability to understand and use them in strategic wildland fire planning in areas such as budget and resource allocation among wildland fires, severity forecasting, and resource pre-positioning.

Objective 4: Coordinate Scientific Efforts Associated with Wildland Fire Costs. Continue to coordinate the development of wildland fire economics knowledge and tools with emphasis on large wildland fire costs and benefits, providing economic data for analysis, establishing valuation tools for economic effects of fire on natural resources, effects on local economies of risk attitude by land managers and the public in managing wildland fire, and modeling to support costing and other economic analyses. In response to the key emphasis areas identified by the interagency advisory committee, the WFM RDA will assign resources to conduct studies and develop solution approaches via different methodologies like simulation models, cost-benefit analysis, survey questionnaires, and others deemed useful and applicable. For example, conducting economic analyses will require development of research grade information databases; addressing the issues of increasing large fire costs and its relationship to business practices will require development of statistical and simulation models; the large increase in investments directed at vegetation manipulation for fire hazard reduction will require improved methods to, plan, locate and justify the economic efficiency of those investments; understanding the influence of institutional, managerial, and public risk profiles on large fire costs will require decision science models; how agency and other Federal, State, and local policies affect the economics of doing business and other resource values will necessitate development of statistical and simulation models.

Objective 5: Participate in Developing Hazardous Fuels Planning Applications. With the emphasis to increase hazardous fuels treatments by all of the wildland fire agencies there exists a need to develop new applications that can be used by fuels managers and their partners. The scale of the problem is such that in order to implement projects that will achieve the desired results in affecting large fire outcomes spatial landscape planning applications need to be provided to managers. Validating the economic, ecological and fire behavior impacts of treatments requires improvement of existing tools. Applications currently exist to help fuels specialists and others in landscape level fuels planning. These tools have been developed separately with little ability to connect them or provide information as to how and why they differ. The WFM RDA will work to develop and support applications individually or in conjunction with others that improve the use and understanding of these tools by redesigning them into compatible suites.

Objective 6: Participate in and Manage the National Fire Decision Support Center. Large fire suppression costs within all wildland fire management agencies continue to grow dramatically each year. Efforts to control causes of rapid cost escalation are expanding and becoming more focused on improving initial strategic as well as subsequent tactical decisions. New efforts are being implemented to advance the capabilities of fire decision making in the Forest Service. These efforts are designed to:

- Improve the science basis for decision making,
- Improve fire management decision support tools and processes, and
- Improve agency capability to manage fire expenditures.

To accomplish these goals under a comprehensive effort, the National Fire Decision Support Center has been established. This Center will serve as a single focal point to support goals of improving strategic and tactical decision making for large fires by providing improved and consistent decision support information on large and long duration wildland fires, improving capability to make strategic decisions through a directed research program, and increasing awareness and application of decision support information in risk-informed decision making.

The NFDSC is a collaborative effort between FAM and R&D to provide corporate decision support information and monitoring on Forest Service wildland fires; directed research on strategic decision making capability and risk modeling; and improved awareness and application of decision support information in risk-informed decision making. The NFDSC is a virtual organization comprised of team members from multiple USFS research and management programs and potentially other cooperator organizations (figure 1). In support of the NFDSC goals, team members will be added as appropriate, by mutual agreement of the parties. The Rocky Mountain Research Station (RMRS) coordinates oversight and hosts a major portion of the NFDSC positions in the WFM RDA. Existing Forest Service units that will provide staff for integration in this effort include, but are not limited to: WFM RDA (RMRS and DOI involvement); Human Factors and Risk Management RD&A (RMRS); Fire Spread Research (Fire, Fuels, and Smoke Program, RMRS); Fire Economics Research (Human Dimensions Program, RMRS); and Fire and Aviation Management (Headquarters Office). Other research program areas may be involved as warranted and available.

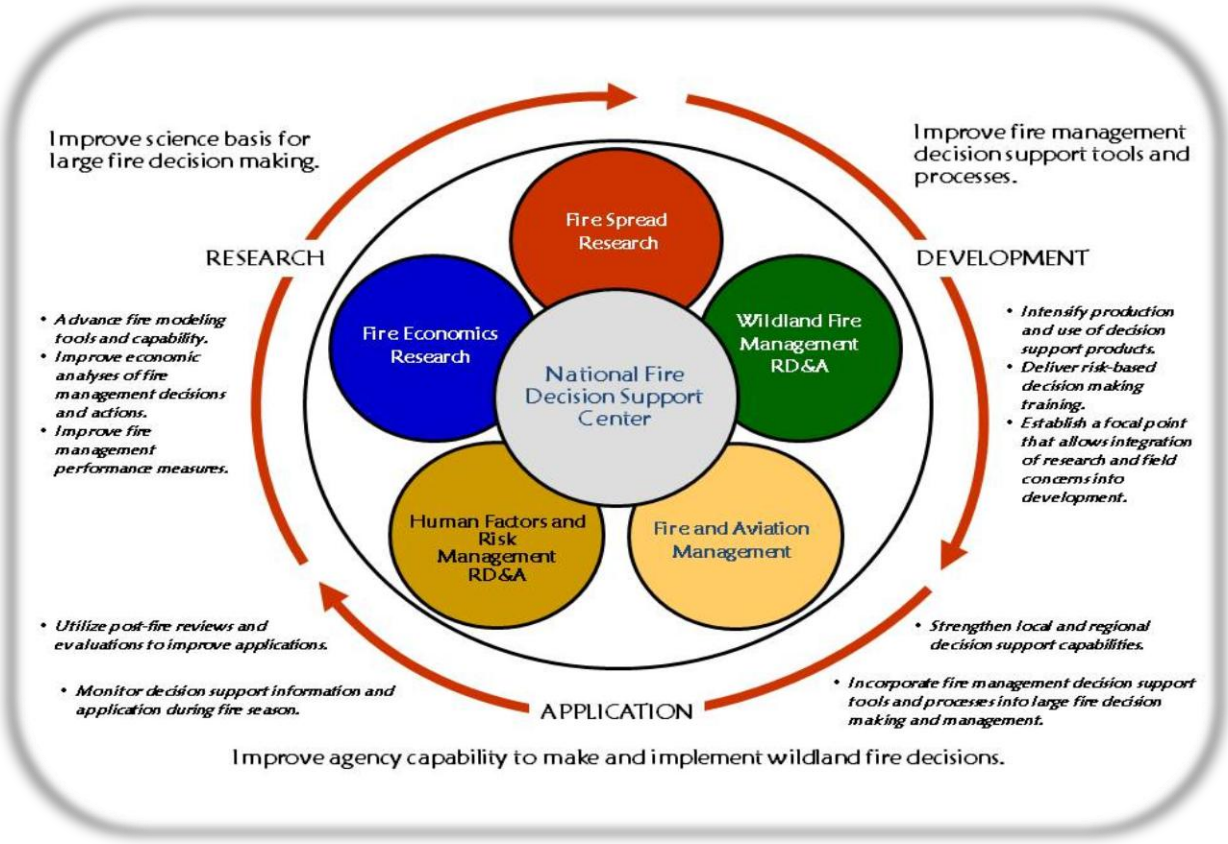


Figure 1. NFDSC composition showing collaborating programs.

The specific role of the WFM RDA in the NFDSC will be to:

- Conduct decision support analyses for large wildland fires under Forest Service jurisdiction,
- Develop, improve, and increase production and operational use of decision support products,
    - Increase Agency Administrator capability to use budget and risk tools in determining fire management direction.
    - Improve ability to rapidly prepare fire cost estimation for large fires,
    - Improve agency capability to better manage large fire costs,
    - Advance Agency Administrator and Incident Management Team understanding of the importance and value of risk-informed decision making,
- Provide practical mentoring and other means to strengthen decision support capacity at regional and field levels, and achieve refresher and currency training for non-NFDSC analysts,
- Develop a comprehensive plan for integrating new knowledge into existing wildland fire curricula,
    - Participate on national and regional training cadres for decision analysis, risk management, and other decision management training,
    - Develop and deliver new and existing training on use of risk-based decision making,
- Provide a primary point of contact for communication between scientists and participating field managers, and as an advisor to program administrators at local, regional, and national levels.
    - Conduct decision support application on large fire management and maintain an active involvement in a directed research program to advance the scientific basis for decision support tools,
    - Integrate new and existing science and technology into all wildland fire decision making levels,
    - Provide focused technical expertise to increase opportunities for operational implementation consultation,
- Strengthen post-fire reviews and evaluations to improve applications and develop lessons learned,
    - Monitor and review decision support information and application during fire season.

Program Scope

Activities carried out by the WFM RDA provide support to all levels of wildland fire management agencies and organizations, including national, regional/state/area (both internal and external), and local and incident levels, as shown in figure 2.

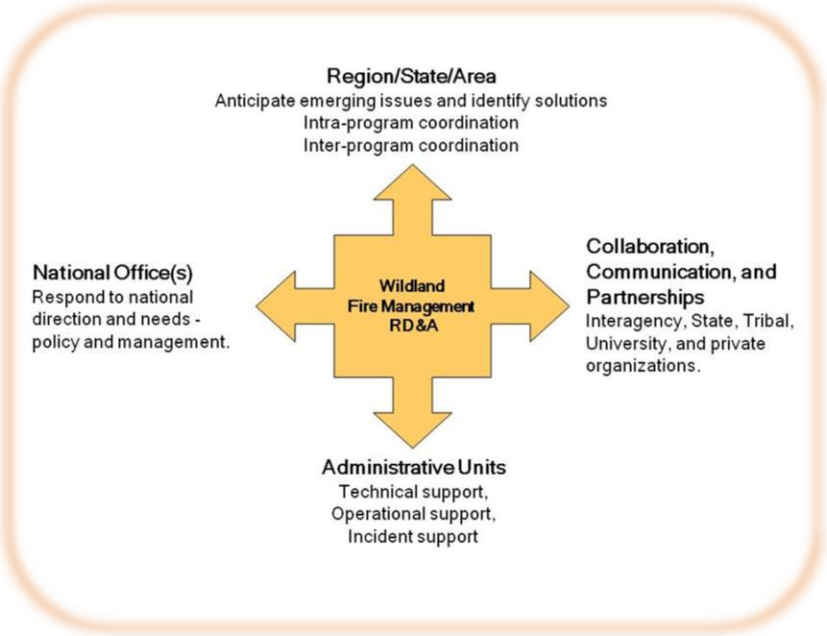


Figure 2. Wildland Fire Management RD&A levels of interactions and involvement.

Organization

The WFM RDA is organizationally situated as part of the Rocky Mountain Research Station (RMRS) but centered at the National Interagency Fire Center (NIFC). This location enhances opportunities for frequent, direct contact with wildland fire management leadership from the wildland fire management agencies and groups headquartered there. The WFM RDA is a national program having interagency implications and benefits and consists of multiple agency personnel representing diverse fire management program interests and concerns. This program has the capability to respond to interagency management needs and link national fire management research with all wildland fire management agency practitioners. The RD&A is made up of multiple groups of individuals working with specific focus on defined areas of responsibility (figure 3). These areas include: Fire Science and Decision Support System Development, participation in the National Fire Decision Support Center, and oversight of the Rocky Mountain Center.

Personnel from multiple organizations collectively staff these work groups. The RMRS hosts the RD&A Program Manager as well as four other permanent positions working in Fire Science and Decision Support Development (shown in white in figure 3). The National Park Service (NPS) and Bureau of Indian Affairs (BIA) provide two full-time detailed individuals in support of Fire Science and Decision Support System Development as a Data Coordinator and GIS Specialist (shown in purple in figure 3). The National Fire and Aviation Management (FAM) program provides seven full-time individuals to the RD&A as part of the NFDSC (shown in green in figure 3). The Department of Interior (DOI) through the Office of Wildland Fire Coordination (OWFC) will provide two positions (as NPS positions) to the RD&A for work in both Fire Science and Decision Support System Development and the NFDSC beginning in FY 2010 (shown in orange in figure 3). The Rocky Mountain Center Manager position (shown as red in figure 3) is an RMRS position beginning in the WFM RDA in FY 2010.

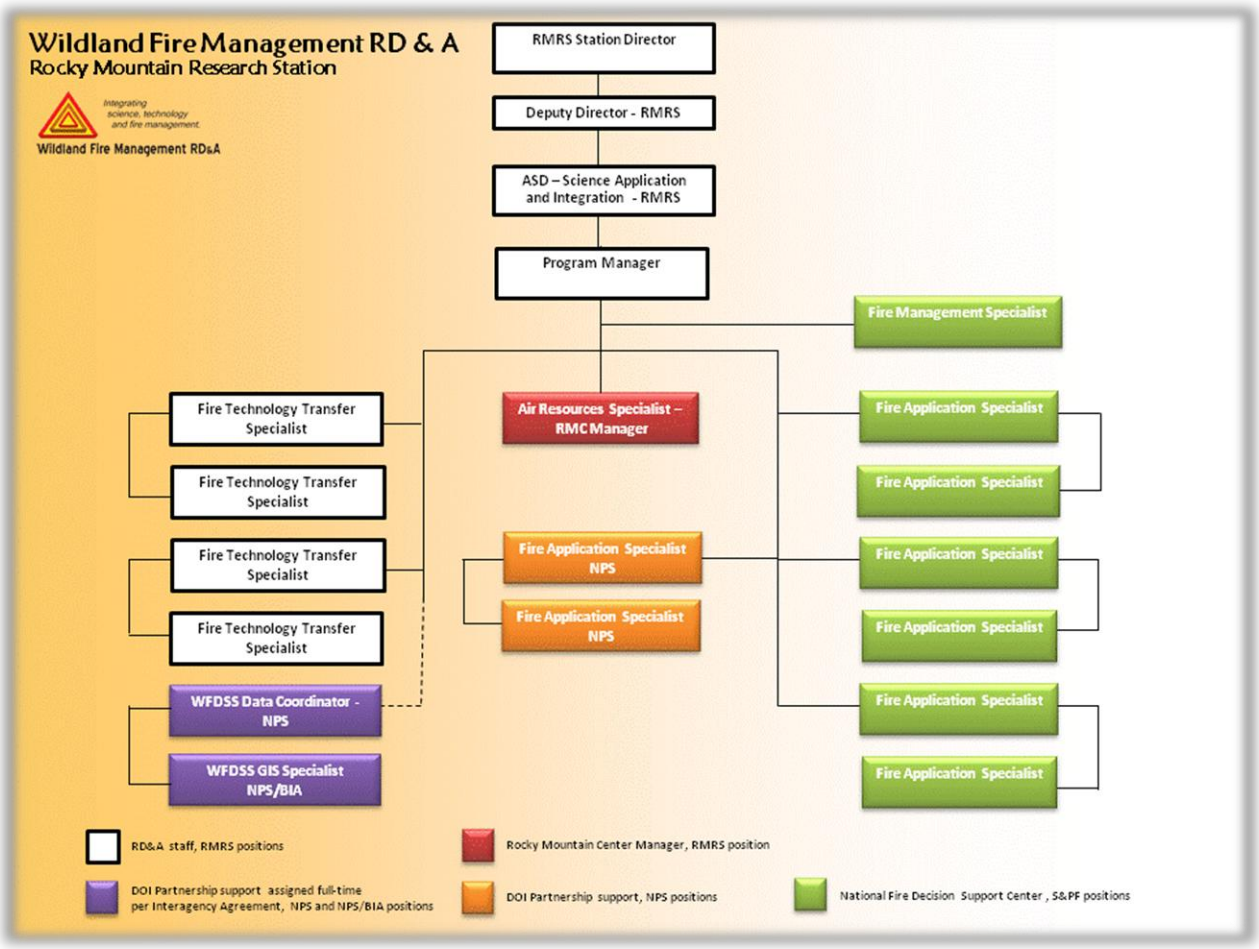


Figure 3. WFM RDA working organization.

An Advisory Group for the RD&A provides guidance, assists in development of the annual work plan, recommends the annual work plan, ensures funding within the agreed framework, and provides accountability oversight. This group is made up of individuals from FAM, WO R&D, and RMRS.

Partnership Activities

The WFM RDA is actively involved in partnerships and cooperative arrangements across a wide range of Federal, state, university, and private partners in support of the overall objectives. Cooperating organizations include, but are not limited to:

- Fire, Fuel, and Smoke Science Project, RMRS, http://firelab.fire.org
- Human Dimensions Project, RMRS
- LANDFIRE Program, http://www.landfire.gov
- Airfire Program, PNWRS, http://www.airfire.org
- Fire Program Analysis Program (FPA), http://www.fpa.nifc.gov
- Wildland Fire Science Partnership (WFSP)
- University of Idaho Wildland Fire Science Program
- FRAMES – University of Idaho, http://frames.nbii.gov

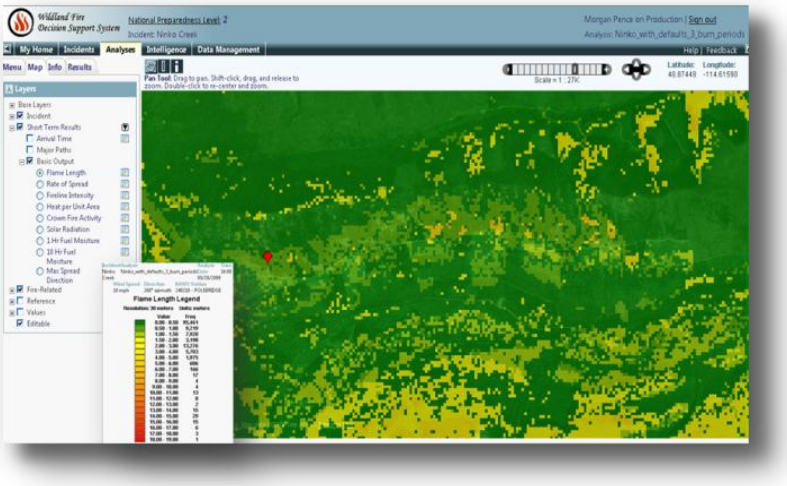
- National Center for Landscape Fire Analysis (NCLFA) - University of Montana, http://firecenter.umt.edu
- Humboldt State University Fire Science Program
- Technical Fire Management (TFM), sponsored by the Washington Institute http://www.washingtoninstitute.net
- Desert Research Institute, http://www.dri.edu
- Department of the Interior – Office of Wildland Fire Coordination (OWFC), http://www.doi.gov/pmb/owfc
- Bureau of Indian Affairs (BIA)
- Bureau of Land Management (BLM)
- Fish and Wildlife Service (FWS)
- National Park Service (NPS)
- US Geological Survey (USGS)
- Joint Fire Science Program (JFSP), www.firescience.gov
- National Wildfire Coordinating Group (NWCG), www.nwcg.gov
- National Predictive Services Program (NIFC)
- USFS Fire & Aviation http://www.fs.fed.us/fire/
- Pacific Southwest Research Station
- Pacific Northwest Research Station
- The Nature Conservancy (TNC)

2009 Accomplishments

The WFM RDA was heavily involved in a number of activities during FY 2009, but the majority of efforts were focused on work associated with staffing vacant positions, developing and delivering WFDSS, and establishing the National Fire Decision Support Center. Specific efforts involved oversight of the IBM contract for WFDSS, delivery of the system to the field in April 2009, completing training and information dissemination to expand user knowledge and ability to use the system, direct support to wildland fire management, and development of procedures and standards for the NFDSC. The following sections describe 2009 accomplishments in detail as they pertain to the WFM RDA objectives.

RD&A Position Management

Two additional Fire Technology Transfer Specialist positions were recruited and filled which fully staffed the fire science and decision support system development portion of the RD&A. These positions are RMRS positions. Seven positions were established in the RD&A to work in the National Fire Decision Support Center. Four of these positions were recruited and filled including a Fire Management Specialist and three Fire Application Specialists. Three additional Fire Application Specialists were advertised but in order to clarify working situations, these positions were re-advertised and will be staffed during FY 2010. Movement of the Rocky Mountain Center from the Fire, Fuel, and Smoke Science Project into the WFM RDA necessitated recruitment of a Manager for the RMC. This position has been forwarded to Human Resource Management and will be staffed during FY 2010.



Coordinate Fire Science Applications

The WFM RDA worked to develop and deliver existing and new wildland fire applications to management to help improve fire management programs by participating in formal submissions to JFSP RFA's, collaborating in application pilots, supporting fire research issue sensing and information dissemination, investigating innovative communication and marketing techniques, establishment of beneficial and mutually productive partnerships between the RD&A and other groups, and integrating with current interagency efforts to improve science delivery. Areas of directed work are shown in table 2.

Table 2. WFM RDA fire science application activities.

Work Area	Activity
Support for fire research issue sensing and information dissemination	• Participation in formal submission of proposals to JFSP RFA for establishment of regional consortiums for fire science and delivery and outreach: ❖ Northern Rockies Wildland Fire Science Partnership: Science Delivery and Outreach. ❖ The Southwest Consortium for Fire Science Delivery & Outreach. ❖ FRAMES-IPF proposal for the Southwest Consortium. • Submission of multiple letters of support for JFSP proposals.
Investigating innovative communication and marketing techniques	• Development of continuous improvement techniques for delivery of training and communication of information regarding decision support systems. ❖ Use of webinar process for training (see WFDSS Training and Information Dissemination section). ❖ Use of Content Management System for providing on-line help and information dissemination in WFDSS. • Expanded use of FRAMES for collaborative and communication services, including: establishment of an RD&A community site, staff information sharing, and data storage.
Establishment and function of beneficial and mutually productive partnerships between the RD&A and other groups	• Continued partnership with Rocky Mountain Research Station Fire, Fuel, and Smoke Science and Human Dimension Projects. • Continued participation in the Wildland Fire Science Partnership (WFSP). • Continued partnership with the FRAMES program, University of Idaho. • Continued partnership efforts with the National Center for Landscape Fire Analysis, University of Montana. • Expanded cooperation with the Desert Research Institute. • Increased collaboration with the Airfire Program, Pacific Northwest Research Station. • Managed RD&A/WFDSS investments at Fire Sciences Lab, Forestry Sciences Lab, Missoula Tech Center, and Western Threat Center. • Continued on-going possible collaborative area discussions with Riverside Fire Lab – Pacific Southwest Research Station. • Provided direct support to wind modeling studies and purchase of wind modeling software for field fire behavior analysts and modelers in conjunction with Fire, Fuel, and Smoke Science Project.

	• Provided direct support to fire economics studies with Human Dimensions Project. • Provided direct support to Airfire Program for smoke management and dispersal prediction application.
Integrating with current interagency efforts to improve fire science application	• Cooperative work with the LANDFIRE Program to validate fuel models for annual updates into WFDSS. • Cooperative work with fire behavior researchers in FSPro validation. • Participated in *Firelab Software Summit*, *Managing the Research Assets.* Missoula, MT. • Participated in *Google Earth Meeting,* with Google and Federal Engineers and MTDC. Missoula MT
Interoperability and Delivery of Wildland Fire Decision Support Systems	• Established liaison with Interagency Fuels Treatment – Decision Support System project (IFT-DSS) to ensure appropriate links and interoperability can be established and maintained. • Worked with DRI and Airfire to establish links (air quality portal) to connect WFDSS and smoke dispersal models for improved decision support on wildland fires. • Worked with Fire System Applications programs to establish links to provide WFDSS data to Fire Systems applications (fire reporting, fire code, etc.).
Science Liaison with Fire Program Analysis Project	• Coordinated with FPA project as needed and provided presentations to FPA staff as requested.

Develop and Support the Wildland Fire Decision Support System

Background. The WFM RDA has the lead for the development of the Wildland Fire Decision Support System (WFDSS) for the federal (and potentially State) wildland fire agencies. This effort was chartered through the National Fire and Aviation Executive Board (NFAEB) to "develop a scalable decision 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." Since this time, the NFAEB has evolved into the new National Wildfire Coordinating Group (NWCG) which supported the development of "a single process for all wildland fires that replaces the earlier processes of the Wildland Fire Situation Analysis (WFSA), Wildland Fire Implementation Plan (WFIP), and Long-Term Implementation Plan (LTIP) and meets all current WFSA user need."

In conjunction with the 2009 modifications to the Federal Wildland Fire Management Policy, the continued development of WFDSS is also supported by the Wildland Fire Leadership Council (WFLC) in their policy implementation direction that "e*very wildland fire will be assessed following a decision support process that examines the full range of responses and the system currently under development is the Wildland Fire Decision Support System (WFDSS)."*

WFDSS is intended to assist line officers, fire managers and analysts in decision making, planning, and management of wildland fire incidents. The WFDSS project evolved from the need to streamline and improve wildland fire decision-making processes, as well as take advantage of improvements in technology, fire modeling, and geospatial analysis.

It is a web based system that documents decisions, supports analysis, and allows for the completion of an operational plan. Textual and spatial information from land management and fire management plans are preloaded into WFDSS and provide the sidebars for the decision space. Fire behavior modeling, fire spread probability, value assessment and cost estimation tools are incorporated into the system. Information is spatially oriented and graphically displayed thereby reducing text input requirements.

The ease of access to planning documents, spatial data and modeling information provides an outlet for risk-informed decision making that is both analytical and deliberative. This process is linear and no longer requires the use of alternative comparisons or the development of decision trees. Decision makers are able to follow a progressive decision process that can be scaled, adapted, and be responsive to changes in the wildland fire environment. Through WFDSS, information is assembled, consolidated, and processed among decision makers in a system that fosters collaboration and, ultimately, provides the federal wildland fire organization the opportunity to provide significant improvements to large wildland fire strategic decision making.

The decision support system itself is constantly evolving, incorporating additional data and adding enhancements. As future technological advancements are made in the fields of wildland fire science and technology they will continue to be integrated into WFDSS. The following sections describe accomplishments in the areas of WFDSS delivery, FY 2009 use, training and information dissemination, WFDSS helpdesk and feedback activities, WFDSS data management milestones and infrastructure, and IBM development infrastructure.

WFDSS Development and Delivery Milestones: April 1 - October 1, 2009. Routine meetings and conference calls with the IBM programmers resulted in significant milestones being met throughout this first year of development and production, including:

April WFDSS delivered and usable by field units. The ability to create a decision document within the application was available although users were required to manually add or enter all portions of the content required. Users were able to create a planning area and a corresponding values inventory and import external images.

May Users were able to have Fire Weather Forecast, Strategic Objectives, Management Requirements, Incident Objectives, Incident Requirements and Course of Action automatically attached to their decision documents. Attachment of external images to the decision document was improved. System was made more robust with adjustments to the geospatial data handling.

July Management Action Points (MAPs) were made available. Users were able to create MAPs spatially and textually within the application. There were modifications made to the user interface to enhance the intuitiveness of the decision documentation process.

September Analyst Assisted Fire Behavior added to the application. This allows an analyst to adjust inputs to create a runs to depict either a snapshot in time or a short term run over a period of time. Map pages allow users to view layers with transparency and change fire

behavior legend output formats. The capability to download a constructed cost spread sheet and upload incidents from WILDCAD were also added.
As of September 1st, 2009, the use of WFDSS was fully implemented by the USFS. Implementation schedules varied among other agencies.

October Overall system robustness was improved. User database security requirements were implemented. The decision document process was improved throughout the season with feedback from the field. The map pages within the application were enhanced and made uniform throughout the season. Filtering features for Incidents and Analyses were also improved continually. Users can now filter utilizing unit names, dates, incident names, author names, and analyst names.

WFDSS Use Statistics. WFDSS was available for use in creating decision documents on April 1, 2009. Statistics to the end of the fiscal year showed approximately 6500 incidents documented in the system with all agencies represented (figure 4).

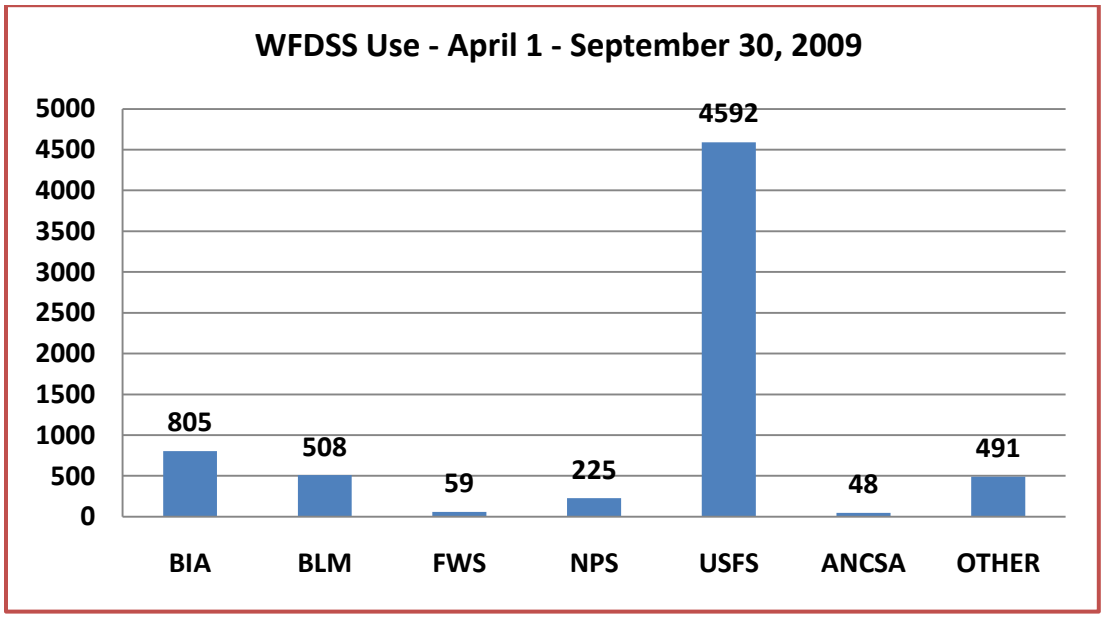


Figure 4. Wildland Fire Decision Support Use, April 1 - September 30, 2009.

The Forest Service was the only agency directed to use the system for fires escaping initial attack and for those being managed for multiple objectives with full implementation on all fires by September 1, 2009. The BIA implemented similar direction, except that WFDSS would be used on all wildfires after October 1, 2009. Although other agencies were not required, use statistics show that all agencies moved forward in using the tool to document decisions. Additionally 491 fires were documented by other agencies in 17 states including Alaska (the principal State user), Arizona, California, Colorado, Florida, Idaho, Kentucky, Minnesota, Montana, Nevada, New Mexico, North Carolina, North Dakota, Oregon, South Dakota, Utah, and Wyoming.

Direct Support to Wildland Fires and WFDSS Use. Throughout the fire season, WFM RDA staff members provided direct support to offices at multiple levels in support of WFDSS use, decision support analysis, and decision documentation during wildfire management activities. Support was provided throughout

the United States in every geographic area, and although the fire season activity was not extensive or prolonged, it provided a significant opportunity to provide on-the-job training and practice in the use of WFDSS. The Alaska wildfire season was very active and the RD&A provided a decision support analyst to work on Alaska fires on-site for several weeks.

WFDSS Training and Information Dissemination. WFM RDA staff members conducted numerous WFDSS training sessions, attended meetings and completed presentations on WFDSS and decision analysis, presented papers at conferences, and delivered instruction in training courses. Training new users of WFDSS immediately before and during a fire season is a daunting task. With five federal agencies involved and multiple individuals potentially working on various aspects/roles within WFDSS, numbers of individuals needing training can be estimated to be in the thousands. This volume dictated that traditional training practices would not facilitate delivery of materials to the necessary numbers of individuals. In fact, reliance on face-to-face lesson delivery would result in either far less numbers of individuals being trained or huge time commitments to meet demands and travel costs that could reach millions of dollars. This fact, combined with recent information (Business.com, Inc. 2009. *2009 Business Social Media Benchmarking Study*) that shows that webinars and podcasts clearly have the greatest value in providing trainees the ability to learn new skills and/or research industries, products, and services without the time and expense of traveling to conferences or other offline events led to a focus on conducting training through the use of Webinar and Go-To-Meeting technology.

During the April to September 2009 time period, multiple webinar sessions were completed. Approximately 3,000 people participated in these meetings and presentations. It is difficult to know exactly how many people were reached through these media avenue as login counts were collected but do not reflect how many individuals may have been participating through one login. Multiple coworkers can group together to view presentations on one screen and as a result the total number is likely much greater than 3000.

WFDSS Training Sessions.

- **Agency Administrator Roles (1).** Interagency.
- **Alaska Geographic Areas (1).** NPS/FWS/BLM/State.
- **Basic and Short-term Fire Behavior** (9). Interagency.
- **Data Manager Role (4).** Interagency.
- **Decision Document (4).** Interagency.
- **Decision Process (11).** Interagency.
- **Dispatcher Role (2).** Interagency.
- **Fire Reporting Group (1).** Interagency.
- **Geographic Area Editor (1).** Interagency.
- **How to Create an Incident (2).** Interagency.
- **How to Draw and Upload Shapes (3**). Interagency.
- **Introduction to WFDSS (7).** Interagency/States.
- **Management Action Points (6).** Interagency.
- **WFDSS Overview (2).** Bureau of Indian Affairs, Bureau of Land Management, National Park Service.
- **R8 WFDSS Intro (1).** US Forest Service.
- **South Florida Deep Fire (1).** Fish and Wildlife Service, National Park Service.
- **WFDSS Updates and Release (3).** Interagency.
- **R2 Forest Supervisor's Video Conference**, USFS.

Participation in Webinars varied among agencies and is shown in figure 5.

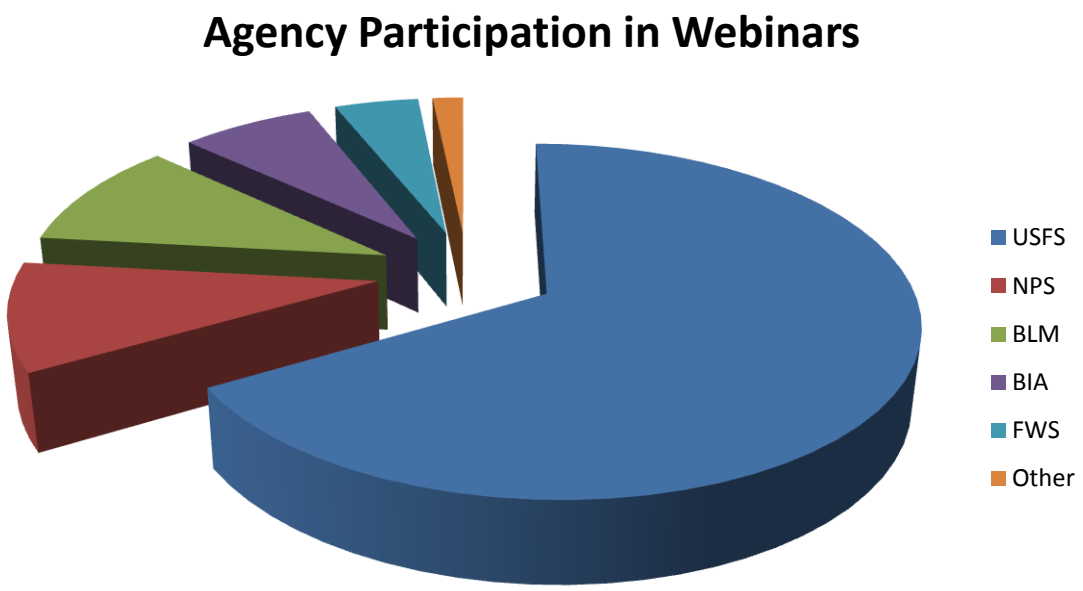


Figure 5. Agency participation in WFDSS webinars, in percentages.

WFDSS Presentations Completed.

- **North American Forest Commission, Fire Management Working Group.** *Wildland Fire Decision Support System (WFDSS) and Quadrennial Fire Review.* Banff, Alberta, Canada.
- **Fire Executive Council.** *WFDSS status and update.* Boise, ID.
- **National Predictive Services Meeting.** *Wildland Fire Decision Support System.* Redding, CA (via VTC).
- **National Geospatial Task Group (GTG).** *Wildland Fire Decision Support System.* Boise, ID.
- **National Wildfire Coordinating Group.** *WFDSS status and update.* Boise, ID.
- **National Multi-Coordinating Group (NMAC) and Geographic Area Coordinating Group (GMAC) Meeting.** *Wildland Fire Decision Support System - System Content and Element Descriptions.* Boise, ID.
- **USFS Region 1, Line Officers' Meetings (3).** *Wildland Fire Decision Support System*. Coeur d'Alene, ID (via VTC), Missoula, MT, Billings, MT (via VTC).
- **R1/R3 Fire Use Management Team Meeting.** *Decision Making and the Wildland Fire Decision Support System.* Santa Fe, NM (via VTC).
- **Office of Wildland Fire Coordination (OWFC), DOI.** *Wildland Fire Decision Support System*. Boise, ID.
- **BIA National Fire Management Meeting.** *Wildland Fire Decision Support System*. Boise, ID.
- **R2 FMO/Line Officer Meeting.** *Wildland Fire Decision Support System*. Denver, CO (via VTC).
- **BLM National Fire Management Meeting.** *Wildland Fire Decision Support System*. Boise, ID.
- **R4 Leadership Team Meeting.** *Wildland Fire Decision Support System*. Ogden, UT.
- **EFETAC Meeting.** *Wildland Fire Decision Support System*. Atlanta, GA. (via VTC).
- **R9 Forest FMO Meeting.** *Wildland Fire Decision Support System.* Traverse City, MI.
- **NIFC Staff Meeting,** *Wildland Fire Decision Support System*. Boise, ID.

- **Fire Use Module Meeting,** *Wildland Fire Decision Support System*. Boise, ID.
- **R3 Workshop,** *Wildland Fire Decision Support System*. Silver City, NM.
- **Coronado WFDSS Decision Documentation,** *Wildland Fire Decision Support System.* Douglas, AZ.
- **R3 Workshop,** *Wildland Fire Decision Support System*. Santa Fe, NM.
- **Tonto NF Decision Documentation,** *Wildland Fire Decision Support system.* Payson, AZ.
- **WFDSS Workshop,** *Wildland Fire Decision Support System*. Albuquerque, NM.
- **Gila Diamond Fire,** *Wildland Fire Decision Support System*. Silver City, NM.
- **BLM WFDSS Meeting,** *Wildland Fire Decision Support System*. Boise, ID.
- **Gila Forest FMO Meeting,** *Wildland Fire Decision Support System*. Silver City, NM.
- **Predictive Services Fall Meeting**, *Wildland Fire Decision Support System.* Estes Park, CO.
- **Predictive Services Spring Meeting**, *Wildland Fire Decision Support System.* Boulder, CO.
- **Forest FMO Meeting**, *Wildland Fire Decision Support System*. Atlanta, GA.
- **S580 Faculty Workshop,** *Wildland Fire Decision Support System*. Missoula MT.
- **R2 Fire Use Workshop**, *Wildland Fire Decision Support System*. Cheyenne WY.
- **R5 Line & Fire Management Officer Meeting,** *Wildland Fire Decision Support System.* Sacramento, CA
- **Catalonia Bombare – International,** *Wildland Fire Decision Support System.* Missoula, MT.
- **Fire Behavior Sub-Committee**, *Wildland Fire Decision Support System.* Ft. Collins, CO.
- **Payette National Forest,** *Wildland Fire Decision Support System Documentation and decision support*. McCall, ID.
- **R4 WFDSS Meeting,** *Wildland Fire Decision Support System*. Ogden, UT.
- **Salmon-Challis NF,** *WFDSS Feedback and Fire Support*. Salmon, ID
- **Interagency Fuels Treatment Decision Support,** *Worked with IBM and IFTDSS Teams to look for areas to cooperate and consolidate efforts with WFDSS*. Boulder, CO.

Training Course Instruction.

- **Local Fire Management Training.** *Decision Making and the Wildland Fire Decision Support System*. NIFC. Boise, ID.
- **S-520, Advanced Incident Command.** *Decision Support, WFDSS.* NAFRI. Tucson, AZ.
- **S-620, Area Command.** *Area Command Organization.* NAFRI. Tucson, AZ.
- **Fire Management Leadership**. *Decision Making and the Wildland Fire Decision Support System.* NAFRI. Tucson, AZ.
- **S-495. Geospatial Fire Analysis, Interpretation, and Application**. *Wildland Fire Decision Support System - The Larger Picture and the Future.* Wildland Fire Training Center. McClellan, CA.
- **F422, Wildland Fire Use. (Humboldt State University for R5 Training Academy).** *Wildland Fire Decision Support.* Wildland Fire Training Center. McClellan, CA.
- **S580,** *Wildland Fire Decision Support System*. Tucson, AZ.

Conference Papers Presented.

- **Pacific Coast Fire Conference: Changing Fire Regimes, Goals, and Ecosystems. Appropriate Management Response Session:** Supporting and Documenting Wildland Fires Decisions and Implementing Management Actions - The Wildland Fire Decision Support System. December 2008. San Diego, CA.

WFDSS Helpdesk and Feedback. The Fire Application Help Desk provided support to the WFDSS application starting in April. They assisted with troubleshooting decision documentation issues, providing feedback, facilitating user access and resetting passwords. They functioned primarily as first level help. However, by mid season, they were providing second level help as well. WFM RDA staff members, Rob Seli and Marlena Hovorka, provided elevated help assistance.

Feedback was received from the Fire Application Help Desk and the field. WFDSS has an internal feedback built into the system. Feedback features were utilized for both help and feedback. It allowed the developers to respond quickly to user issues and improve for system functionality. If changes to the application could not be "Hot Fixed", they were implemented in the next release of the application. User feedback has helped develop and improve the application.

WFDSS Data Management Infrastructure and Milestones. The WFDSS application is "data rich." It requires data which is spatially oriented and graphically displays information to support wildland fire and other natural resource decisions. Due to the type and number of interagency spatial data sets required in April 2009 an Interagency GIS Team was formed to provide data support for WFDSS. This Team was responsible for acquiring, consolidating, and validating their agency spatial and tabular data. In addition this Team developed and maintained communications among local, regional, and national agency personnel to improve the collection process and provide explicit guidance on data needs.

In addition to the following spatial data layers several national infrastructure layers were used from the Homeland Security Infrastructure Program (HSIP) data set.

- **National Fire History Layer.** A National fire history layer was completed and activated in WFDSS on June 18, 2009. The objective of the layer was to establish a starting point that could be expanded and built upon for future years. The layer encompasses those fires 100 acres and larger and from the time period of 2001-2008. No prescribed fires were used in this layer, only wildfires. The four data sources used in the development of this layer: GeoMAC (2001-2008), WFDSS fire history (2001-2007), AK fire history (2000-2008), and CA fire history (1996-2008).

- **National Surface Management Agency (SMA) data layer.** In August 2009 BLM provided a SMA data layer. This data layer portrays tracts of federal land for the United States and classifies these holdings by administrative agency. Each federal agency contributes and provides updates for the SMA layer to BLM.

- **NWCG Unit Identifiers.** NWCG Unit Identifier is used as a primary key in WFDSS which highlights the need to have an accurate NWCG Unit Identifier for all field units in WFDSS. The WFDSS GIS team continues to work within their agency encouraging the field offices to keep the NWCG Unit Identifier system of record current.

- **National USFS Structure Layer.** A national USFS structures layer (facilities and recreation sites) was created using the USFS Infrastructure Application (INFRA) database. Each USFS region was

queried individually. Latitude and longitude data was then used to create a shapefile. All regions were then merged to form a national layer.

- **National Fire Management Unit (FMU) Layer.** Collection of FMUs was focused on US Forest Service due to their WFDSS implementation schedule. Fire management units (FMU's) for 51 NWCG Unit ID's, or approximately 45% of the USFS, have been uploaded into WFDSS as of December 2009. Most of these units also have strategic objectives activated within the production side of WFDSS and are currently being spatially populated.

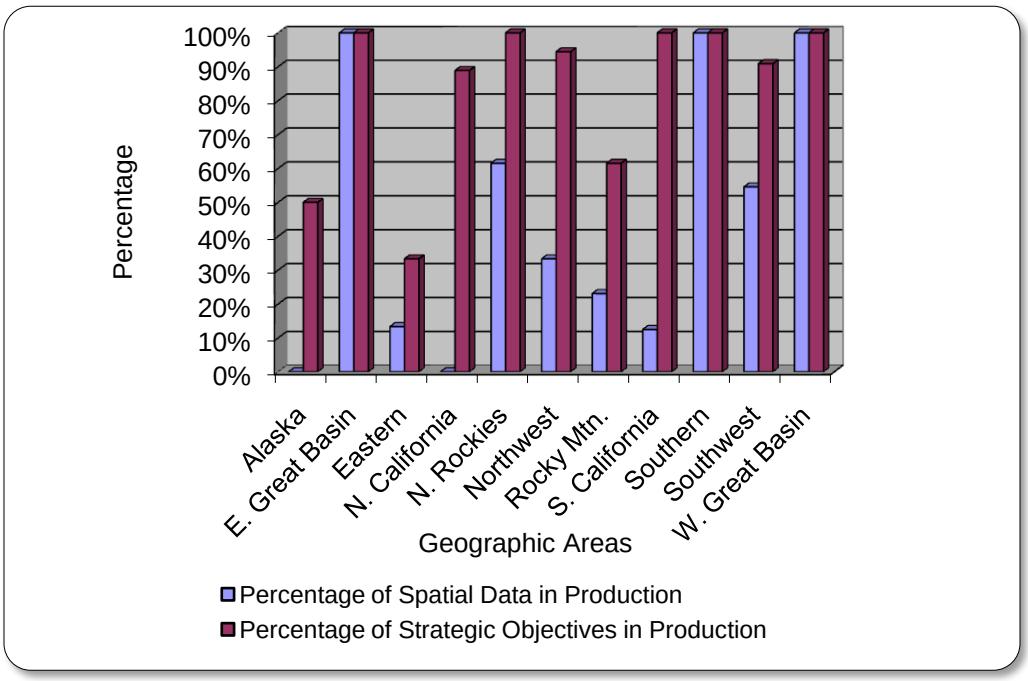


Figure 6. Geographic Area percentage of Spatial Data and Strategic Objectives in the WFDSS Production site.

- **National NPS Building Layer.** The NPS building layer contains buildings from the NPS Facilities Management Software System (FMSS). The FMSS tabular data and the spatial data for NPS buildings were joined. This layer is updated periodically.

Other Activities.

- Cadastral data for WFDSS is being managed and provided by the Missoula RAVAR team.
- Serve as member on the Fire Globe Project.
- Serve as member on the Enterprise Interagency Wildfire Geospatial Database Project.
- Maintain close coordination with Missoula RAVAR team to ensure the correct data is collected in WFDSS.
- Share WFDSS data layers with various efforts in the WFM RDA in support of the WFM RDA mission and goals.
- Serve as a member on the NWCG sponsored Interagency Wildland Fire Geospatial Governance Project developing an interagency wildland fire geospatial governance model.
- Participated in WFDSS GIS Meeting, Data Development and Strategy Meeting. Missoula, MT.

Project Fire Season Costs

The primary projection of fire season costs is completed by staff in the Human Dimensions Project in Missoula, MT and provided to the Fire and Aviation Management staff at the Headquarters Office. The WFM RDA contributed to this activity by:

- Supporting weather and climate modeling research and application development – discussions were initiated with the Rocky Mountain Center to further these efforts and cooperative working arrangements with the National Predictive Services Group will be accelerated in FY 2010,
- Supporting efforts to facilitate budget and resource allocation among wildland fires by participating on national work groups in this area.

Coordinate Scientific Efforts Associated with Wildland Fire Costs

The WFM RDA worked to coordinate development in the areas of wildland fire economics knowledge and tools with emphasis on large wildland fire costs and benefits, providing economic data for analysis, establishing valuation tools for economic effects of fire on natural resources, effects on local economies of risk attitude by land managers and the public in managing wildland fire, and modeling to support costing and other economic analyses by maintaining close coordination with the Human Dimensions Project in Missoula, MT and through fiscal support to this unit. This support enabled additional work on training, ongoing management of the Rapid Assessment Values at Risk (RAVAR) dataset, and preliminary work on fire intensity for use in the Fire Spread Probability Simulation Model (FSPro).

Participate in Developing Hazardous Fuels Planning Applications

The Joint Fire Science Program (JFSP), NWCG, and Sonoma Technology, Inc. are developing a prototype of a new planning environment that will help fuels specialists navigate the collection of fuels planning tools, called the Interagency Fuels Treatment Decision Support System (IFT-DSS). In September of 2009 lead representatives from WFDSS and the IFT-DSS met in person to discuss their respective programs. With both decision support systems sharing similar goals, the group decided that it was important to formalize a collaborative working relationship in order to share data and ideas and facilitate the free exchange of information between the two programs. Both teams feel strongly that the two programs should be interoperable (sharing a similar look and feel and generating outputs that, where applicable, can be easily imported and exported between the two systems).

In October, Sean Raffuse from Sonoma Tech (IFT-DSS) and Mitch Burgard from the WFM RDA were identified as liaisons for their respective work groups. Since that time, IFT-DSS has presented a demonstration version of the program that utilized elements from WFDSS to calibrate and display their data outputs. Additionally, the WFDSS team is collaborating less formally with developers of other online “service oriented architecture” programs for fire management. Currently, representatives from Bluesky, FFA, IFT-DSS and WFDSS are discussing the possibility of a joint meeting to share information and look for additional opportunities to integrate these systems.

Participate in and Manage the National Fire Decision Support Center

Planning for the establishment and operation of the NFDSC began early in FY 2009. An initial development meeting was held in Salt Lake City, UT in October 2008. Agreements on the concept and direction to proceed were outcomes of this meeting. Following this meeting, activities for the NFDSC

involved development of a formal operating proposal, transmittal of white papers to appropriate offices and individuals, communication about the Center to appropriate groups, program documentation, and position management.

The NFDSC was then formally established by the Chief in a memorandum dated May 24, 2009. This memorandum documented the collaborative effort between Fire and Aviation Management (FAM) and Research and Development and established functional goals and objectives. The NFDSC was created as a virtual Center with components located within numerous research projects and research, development, and application programs. Subsequent involvement by other research stations and agencies was stated as a potential growth area and identified as a desirable pursuit. A principal role was defined for the WFM RDA, located at the National Interagency Fire Center which is to manage the portion of the NFDSC that delivers the application of wildland fire science into fire management. Accomplishments during 2009 are focused around the areas of program documentation, position management, functional capability, program management, NFDSC presentations completed, and NFDSC interagency coordination.

Program Documentation. An amendment to the WFM RDA was completed and submitted to the Headquarters Offices for approval. The existing RD&A Charter presented program definition and guidance that directly supported NFDSC goals and provided a solid foundation for implementation of a national decision support center. Given the RD&A goals of providing science application services to the interagency wildland fire community and expanding management capacity in acquiring and applying decision support information, participation of the RD&A in the NFDSC was a logical extension. In order to fully document this participation, minor amendments to the current RD&A Charter were warranted. The Charter Amendment documented the addition of one goal to the existing set of goals. This new goal is, "Participate in and manage the National Fire Decision Support Center." Supporting objectives and tasks for this, definition of staffing levels, and funding procedures were also added to the RD&A Charter. Subsequent approvals and signatures for this Charter Amendment were obtained early in FY 2010. The signed amendment is on file at the WFM RDA in Boise, ID and at the RMRS Headquarters in Fort Collins, CO.

A Service Level Agreement (SLA) was also prepared to document the purpose, goal, funding, staffing, and focus areas of other programs participating in the NFDSC. The SLA is a formal agreement between the Washington Office Fire and Aviation Management and Washington Office Research and Development and provides a general implementation framework with specific objectives, staffing, and funding procedures. Subsequent approvals and signatures for the SLA were obtained early in FY 2010. The SLA is on file at the WFM RDA in Boise, ID and at the RMRS Headquarters in Fort Collins, CO.

Position Management. The WFM RDA NFDSC organization was established, clarified, and approved. Seven new RD&A positions are associated with this component of the NFDSC. Position descriptions were developed, classified, and vacancy announcements prepared. Four of the seven positions were filled in FY 2009 and work was completed to recruit and fill the remaining positions during the next fiscal year.

Functional Capability. Semi-operational status for RD&A production component of NFDSC was attained by August 15, 2009 and full operational capability is projected for March 1, 2010.

Program Management. WFM RDA staff members attended the development meeting, prepared two proposal papers, multiple briefing papers, talking points, Power Point presentation for FSRET Meeting, organizational structure; arranged organization of seven new positions; acquired all necessary equipment, space, and supplies for all staff, and clarified the funding arrangement.

NFDSC Presentations Completed. WFM RDA staff members delivered numerous presentations describing the NFDSC at the following functions:

- National Fire Directors' Meeting.
- NWCG Meeting(s).
- Regional AARs.
- National Interagency Fire Management Meetings.
- National Agency Fire Management Meetings.
- Training cadre and steering committee meetings.

NFDSC Interagency Coordination. Discussions with the DOI Office of Wildland Fire Coordination were initiated to determine interest and funding opportunities in support of the NFDSC and WFDSS implementation. The following opportunities for interagency participation and involvement were identified:

- DOI Partnership in the Research/Development/Application activities working in the interagency environment of technology transfer of fire science information focusing on the development and delivery of products.
- DOI Partnership in the National Fire Decision Support Center. This can be accomplished with primary support in the form of additional positions to expand the Center's capability to support fire management decision making for all agencies and to support capacity building in WFDSS use and decision analysis within DOI agencies, and
- Technical Capability including broad agency participation teaching the decision support approach of writing good decisions based on best available data to make decisions instead of going through a checklist. Capacity building will increase technical skills that can be shared across agency organizations.

An agreement was reached to initiate DOI involvement in the RD&A, starting in FY 2010. Additional information is provided in the 2010 Projects and Initiatives section later in this document.

Additional Activities

Publications.

- Zimmerman, Tom. 2009. Wildland fire management policy, learning from the past and present and responding to future challenges. Yellowstone Science. 17(2):31-34.
- Zimmerman, T. 2009. Wildland fire management policy—learning from the past and present and responding to future challenges [abstract]. Page 6 *in* R.E. Masters, K.E.M. Galley, and D.G. Despain (eds.). The '88 Fires: Yellowstone and Beyond, Conference Proceedings. Tall Timbers Miscellaneous Publication No. 16, Tall Timbers Research Station, Tallahassee, Florida, USA
- Zimmerman, Thomas and Tim Sexton. In Press. Organizational Learning Contributes to Guidance for Managing Wildland Fires for Multiple Objectives. Fire Management Today. 70(1):00.

Conference Papers Presented.

- **Pacific Coast Fire Conference: Changing Fire Regimes, Goals, and Ecosystems, Closing Plenary Session – The Future of Fire in Western Ecosystems – Integrating and Adapting Science and Management in a Changing Fire Environment:** *Wildland Fire Management and the Forest Service in the 21st Century: What Challenges are on the Horizon?* Dec 2008. San Diego, CA.
- **2009 Wildland Urban Interface Conference, International Association of Fire Chiefs.** *Challenges of the 2008 Northern California Fire Siege - Area Command Perspectives.* March 2009. Reno, NV.

Organizational Representation.

WFM RDA staff members participated in a variety of roles on the following groups, committees, and training cadres.

- **National Fire Directors' Meetings.** Participated as RD&A liaison.
- **Wildland Fire Science Partnership (WFSP).** Participated as member of WFSP, assisted in preparation of draft charter, briefing papers, accomplishments reports, and annual work plan.
- **S-520, National Incident Management Training Course Steering Committee.** Participated as member of S-520 Steering Committee, and Co-coordinator of S-620, Area Command Course.
- **S-580.** Participated as a member of training cadre for this course.
- **S-590.** Participated as a member of training cadre, Steering Committee, and served as Steering Committee Chair for this course.
- **National Fire Performance Measures Work Group.** Participated as member working group for State and Private Forestry.
- **National Wildfire Coordinating Group (NWCG).** Represented WO R&D as member of NWCG.
- **Homeland Infrastructure Foundation-Level Data (HIFLD) Work Group Meeting.** Coalition of Federal, state and local government organizations, supporting private industry partners involved with geospatial issues. Boise, Idaho

Other Task/Work Group Participation.

- Participated as member of the 2009 Quadrennial Fire Review Integration Panel.

2010 Projects and Initiatives

RD&A Position Management

Staffing for fire science and development positions is complete and no staffing issues are expected in FY 2010. The RMC Manager position will be recruited and filled during FY 2010. NFDSC staffing was a major focus during FY 2009 but not all positions were able to be filled. Three additional USFS Fire Application Specialists will be filled in FY 2010. Additionally, the Department of Interior will be providing two positions that will work directly for the RD&A and will be sponsored by the National Park Service. These two positions will be filled in FY 2010.

Coordinate Fire Science Applications

- Improve communications, information sharing, information dissemination, and education by establishing a website for the WFM RDA Program for housing programmatic and NFDSC information.
- Participate in Wildland Fire Science Partnership (WFSP). Participate as member of WFSP.
- Continue coordination with FRAMES, utilize file sharing, community collaborative sites,
- Potential support for Master's Thesis project with University of Montana on WFDSS tasks.
- Continue coordination with and support to Airfire Program for smoke dispersal decision support work.
- Continue coordination with Desert Research Institute for smoke modeling work.
- Coordinate with University of Idaho and Fire, Fuel, and Smoke Science Project staff members in the development of a fire severity data layer and map.
- Pursue support and coordination with University of Alaska for data management work.
- Continue coordination with the Joint Fire Science Program.
- Support an Operational System for Continental-Scale Evaluation and Verification of Fire-Weather Forecasts by the USFS Rocky Mountain Center.
- Coordinate and cooperate with the National Predictive Services Group.

Develop and Support the Wildland Fire Decision Support System

WFDSS Use to Date FY2010. In FY2010 WFDSS has been used for over 600 incidents. Given this trend, along with movement to WFDSS use on all fires by other agencies, overall use for 2010 is anticipated to be far greater than that in 2009. Figure 7 shows agency use of WFDSS to date in FY2010.

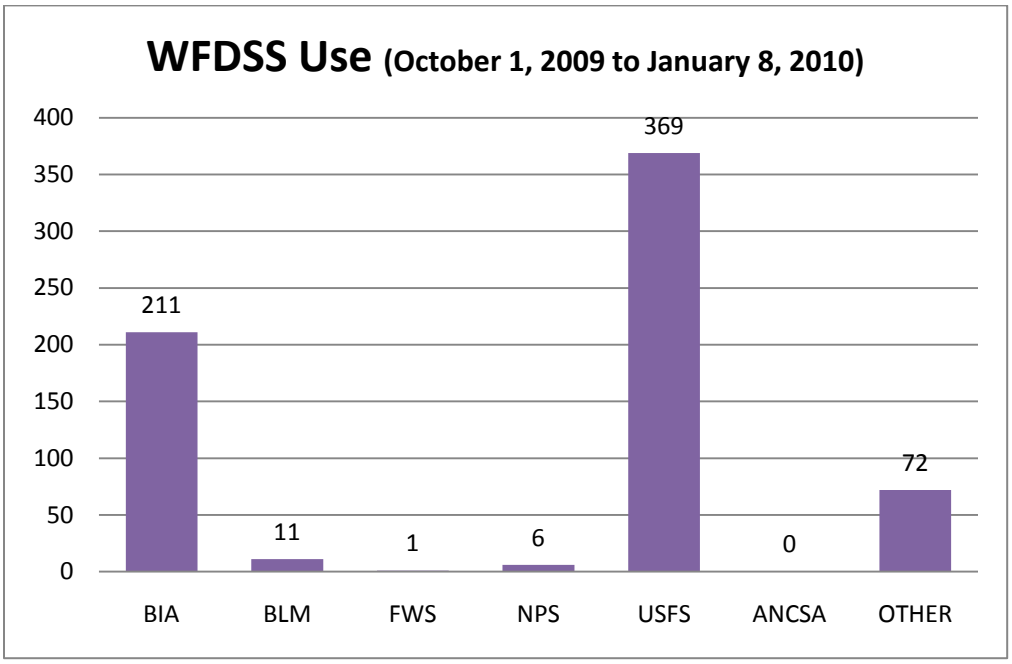


Figure 7. WFDSS use from October 1, 2009 to January 8, 2010.

Response to User Feedback in 2009. Information from geographic areas, agencies, and the national policy After Action Review provided valuable feedback to the WFDSS team for use in setting priorities for FY2010 program of work and future program revisions. This information was consolidated into a 16 page document sorting information into 40 categories with approximately 115 summary points. Of the 115 summary points many have already been completed or are on the work plan to be completed prior to the 2010 fire season. Some may not be addressed until future revisions to the program are made. Each summary point will be addressed and documented so users will know the status of their concern or feedback. The document will be posted to the WFM RDA website by early March 2010. Additionally, these meetings provided positive feedback to the system.

Planned Development Activities - FY 2010. Development for FY2010 will primarily focus on the WFDSS system reliability rather than development of new features within the WFDSS application. There are some technically challenging system needs that when addressed, will make the application more robust. These needs are related to the spatial and data aspects of WFDSS. Significant time has been spent in FY2010 working toward the implementation of the USDA security requirements to ensure all users meet the requirements.

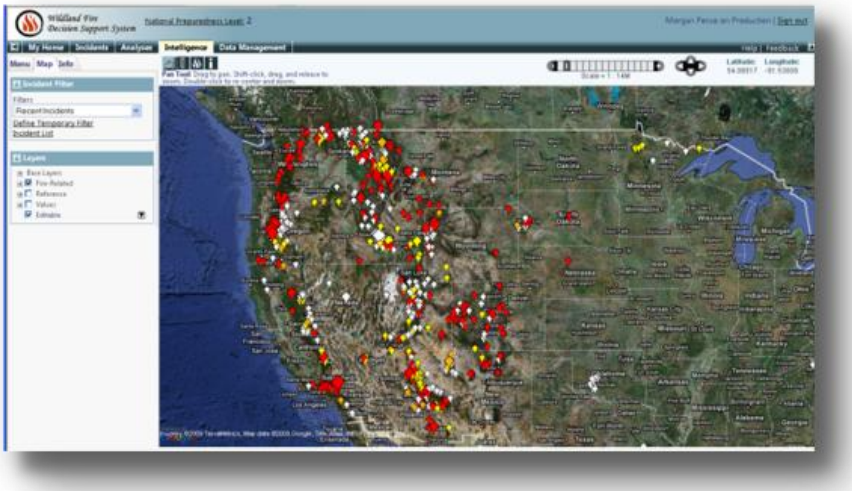
Some new features planned for FY 2010. These include:

- Addition of a medium term fire behavior model similar to the desktop application FARSITE.
- Addition of the current Relative Risk Charts. Once a user provides inputs to the chart, they will be provided with a Process Advisor to help guide them through the incident decision documentation.
- Addition of a means to link shapefile to Incident Objectives and Strategic Objectives.
- Ability to produce an Adobe PDF from a published report.
- Development has begun on a mobile device aware version of WFDSS with testing being done on a Droid wireless phone.

Data Requirements. WFDSS data requirements for 2010 continue to build on 2009 efforts. The WFDSS Data Team will refresh the 2009 spatial layers early spring. The Team continues to ask regions and/or geographic areas what regional and/or national layers they would like to see in WFDSS and the availability of the identified layers. Specific activities associated with data acquisition and management includes:

- **National Fire Management Units (FMUs).** Periodically update the national interagency FMU spatial layer as field units provide their FMU shapefiles.
- **National Fire History Layer.** Will refresh the national fire history layer and include 2009 fires in early spring.
- **NWCG Glossary and Data Standards.** Provide data terms to be included in NWCG glossary and participate in development of or updates to NWCG spatial data standards.
- **Enterprise Interagency Wildfire Geospatial Database.** The enterprise interagency geospatial database will provide an authoritative data source and central database for data to support wildfire operations and management. The group is focusing on five feature classes: fire perimeters, fire history points, fuel treatment areas, fire management units, wildland urban interface and cultural and archaeological resource areas. Various NWCG committees such as the Interagency Fire Planning Committee, WUI Mitigation Committee, Fuels Management Committee, Geospatial Task Group and Information Technology Committee will participate in the development of the enterprise interagency wildfire geospatial database.
- **Identify USFS 2010 WFDSS Data Priority Layers by USFS region**.
- **USFS Wilderness layer.** A USFS wilderness area layer continues to be worked on with the Missoula RAVAR Team. This layer is needed to update the current special designations layer used for SCI calculations within WFDSS.
- **LANDFIRE.** Continue to encourage agency field units to participant in LANDFIRE refresh data calls.
- **Metadata.** Maintain current metadata for WFDSS spatial layers.
- **WFDSS data available external to WFDSS.** Share WFDSS spatial data layers outside of WFDSS (if appropriate) on the FRAMES portal to encourage use of spatial data layers.
- **Interagency Wildland Fire Geospatial Governance Project.** Staff members will serve as a member on the NWCG sponsored Interagency Wildland Fire Geospatial Governance Project developing an interagency wildland fire geospatial governance model.
- **Fire Globe Project.** Participate on the Fire Globe Project.
- **NWCG Unit Identifiers.** Continue to encourage agency units to update their NWCG Unit Identifier in the NWCG Unit ID system of record.
- **Homeland Infrastructure Foundation-Level Data (HIFLD).** Engage with the HIFLD working group to develop and collect national interagency wildland fire spatial data layers.
- **Identify authoritative data sources for national federal infrastructure assets.** Continue to identify the authoritative systems for federal assets such as buildings, recreation sites, roads, trails, etc. to build national spatial data layers.
- **Spatial data coordination**. Work closely with FAM and R&D and other partners to develop national spatial data in support of the WFM RDA mission and goals.
- **Cadastral data**. Cadastral data for WFDSS will continued to be managed and provided by the Missoula RAVAR team.

Training. It is the intent of the WFDSS development staff to have the training presented at the geographic/regional level as the training for the Wildland Fire Situation Analysis (WFSA) and the Wildland Fire Implementation Plan (WFIP) has been done in the past. There will be training material maintained on the WFDSS Training page (http://wfdss.usgs.gov/wfdss/WFDSS_Training.shtml). Training material will consist of PowerPoint presentations, short video clips, and Webinar schedules. When there is a new release of the application, webinars will cover new enhancements. The WFM RDA staff will be available to assist with the regional efforts.



Training Presentations Planned.

- National IC/AC Meeting.
- R3 Incident Management Team Meeting.
- S-520, Advanced Incident Command.
- S-580, Advanced Wildland Fire Management Applications.
- S-590, Advanced Fire Behavior Interpretation.
- Fire Management Leadership.
- Northern Rockies Dispatcher Workshop**.** *Wildland Fire Decision Support System.* Great Falls, MT.
- National Fire Use Module Meeting.
- M581 Fire Program Management. *Wildland Fire Decision Support System.* Tucson, AZ.
- S495 Geospatial Fire Analysis, Interpretation, and Application. *Wildland Fire Decision Support System Fire Behavior Tools.* Tucson, AZ.
- Technical Fire Management (TFM). *Wildland Fire Decision Support System and National Fire Decision Support Center*. Bothell, WA.

WFDSS Webinars and Go-To-Meeting Sessions Planned.

- **Southeast.** DOI Wildland Fire Decision Support System Overview.
- **Region 9**. Train the Trainer.
- **Interagency.** Geographic Area Leads (2).
- **Region 9.** Wildland Fire Decision Support System Workshop.
- **Interagency.** NWCG Geospatial Task Group.

Project Fire Season Costs

Activities associated with this objective will continue to be completed by members of the Human Dimensions Project in Missoula, MT.

Coordinate Scientific Efforts Associated with Wildland Fire Costs

Activities associated with this objective will continue to be coordinated with staff from the Human Dimensions Project, NFDSC, and collaborators.

Participate in Developing Hazardous Fuels Planning Applications

The WFM RDA will continue to maintain a liaison position with the IFT-DSS team. Attendance at several coordination meetings will occur. Coordination with JFSP staff regarding this effort will also take place on a recurring basis.

Participate in and Manage the National Fire Decision Support Center

- Advertise and fill three permanent Fire Application Specialist positions. These positions are FAM positions supporting the national Wildland Fire Management RD&A.
- Work with DOI Office of Wildland Fire Coordination to recruit and fill two permanent DOI Fire Applications Specialist positions. These positions are funded by the DOI and hosted by the National Park Service.
- Acquire remaining staff equipment (computers, printers, projectors, etc.) and office space.
- Stand up NFDSC by March 1, 2010 to implement decision support analyses for large wildland fires during western fire season.
- Develop Standard Operating Procedures for the NFDSC and organize staff work areas and operations to support this plan.
- Inform users of standard protocols for requesting decision support analysis preparation and opportunities for the NFDSC.
- Evaluate field use, output, and performance of decision support analysis tools. Provide appropriate feedback to research.
- Establish collaborative activities with universities, fire management groups, and other research projects to review and acquire additional decision support tools and evaluate 2010 operations. Collaborative efforts are underway with the Universities of Idaho and Montana; University of Nevada; Joint Fire Science Program; and Eastern Great Basin, Southwest, and National Interagency Coordination Center Predictive Services Units.
- Add NFDSC employees as cadre and steering committee members to national and regional training courses pertaining to decision support analysis, risk assessment, and incident management. Develop and prepare materials for training delivery in FY2010.
- Develop a formal process for training and refreshing future and current analysts from IMTs, field units, GACCs, etc. through detail assignments, direct field support, and other means as appropriate. FBAN/LTAN and technical specialist list for use by the NFDSC, Geographic Area Editors and Geographic areas for determining support and training opportunities.
- Conduct evaluation of 2010 fire season activities, review procedures and develop improvements as appropriate, and develop 2010 accomplishments and input for annual report.

Additional Activities

Planned Presentations. The Wildland Fire Management RD&A staff continues to be requested for presentations and participation in many meetings, presentations, and conferences in FY2010. Planned presentations include:

- **CalFire Meeting.** *Wildland Fire Decision Support System*. Riverside, CA.
- **DOI Office of Wildland Fire Coordination.** *Wildland Fire Decision Support System.* Boise, ID.
- **Fire Equipment Committee/Working Group.** *Wildland Fire Decision Support System and National Fire Decision Support Center.* Missoula, MT.
- **USFS Regions 2, 3, 4, and 10, Wildland Fire Decision Support System After Action Reviews**. Denver, CO. Gila, NM. Ogden, UT. Fairbanks, AK.
- **USFS Region 6 Fire Management Meeting.** *WFDSS and the Future.* Portland, OR.
- **BIA Wildland Fire Decision Support System After Action Review.** Billings, MT.
- **Predictive Services Meeting.** *Wildland Fire Decision Support System and National Fire Decision Support Center.* Lake Tahoe, NV.
- **USFS Region 3 Regional FFMO Meeting.** Wildland Fire Decision Support System. Santa Fe, NM.
- **International Fire Ecology Conference: Fire as a Global Process.** *Wildland Fire Decision Support System,* Savannah, GA.
- **International Fire Ecology Conference: Fire as a Global Process.** *BehavePlus Fire Modeling Workshop.* Savannah, GA.
- **Fire Behavior Subcommittee.** *Wildland Fire Decision Support System.* Tucson, AZ.
- **Strategic Incident Decision Support Round Table.** *Wildland Fire Decision Support System and the National Fire Decision Support Center*. Redmond, OR.
- **Fire Environment Working Team.** *Wildland Fire Decision Support System.* Reno, NV.
- **Fire Congress.** Catalonia Spain.
- **Alaska Interagency Coordination Group Meeting.** *WFDSS and the Future, AAR.* Fairbanks, AK.
- **National Predictive Services Meeting**. *WFDSS and the NFDSC.* Lake Tahoe, NV.
- **National Wildfire Coordinating Group.** *WFDSS status and update.* Boise, ID.
- **BLM National Fire Management Meeting.** *WFDSS and After Action Review.* Boise, ID.
- **R1, R3, R4, R5 Fire Behavior Workshops.**
- **WUI Mitigation Committee Meeting**. *WFDSS status and update*.
- **Regional BAER Coordinator Meeting.** *Wildland Fire Decision Support Overview*. Albuquerque, NM.

Meeting/Conference/Training Attendance.

- **S580 Advanced Fire Use Applications Planning Meeting.** Boise, ID.
- **S520 Advanced Incident Management Planning Meeting**. Boise, ID.
- **S590 Advanced Fire Behavior Interpretation Planning Meeting.** Tucson, AZ.
- **S495 Geospatial Fire Analysis, Interpretation, and Application Planning Meeting.** Tucson, AZ.
- **American Meteorological Society, Symposium on Fire and Forest Meteorology.** Kalispell, MT.
- **The Nature Conservancy Fire Learning Network Partnership Meeting.** Washington D.C.
- **WFDSS Interagency GIS Team Meeting.** Missoula, MT.
- **WFDSS Interagency GIS Team working meeting.** Boise, ID.
- **Pacific Northwest Fire Environment Working Team.** *Wildland Fire Decision Support System Trends.* Redmond, OR.

- **National Park Service Fire & Aviation Management Conference.** *Wildland Fire Decision Support System.* San Antonio, TX.
- **National Incident Commander/Area Commander Meetings.** *National Fire Decision Support Center, Roles of IMTs.* TBD.
- **Geographic Area IMT Meetings.** *Wildland Fire Decision Support System*. TBD.
- **International Association of Wildland Fire- Human Dimensions of Wildland Fire Conference**. *Wildland Fire Decision Support System.* San Antonio, TX.
- **National Incident Management Organization (NIMO) Team Meeting.** Boise, ID.
- **Homeland Infrastructure Foundation**-Level Data (HIFLD) Work Group Meeting. Boise, ID.
- **Interagency Fuels Treatment Decision Support System Meeting.**
- **Content Management System Training.** Palm Springs, CA.

Organizational Representation.

- **National Fire Directors' Meetings**. Participate as RD&A liaison.
- **S-495, Geospatial Fire Analysis, Interpretation, and Application.** Serve as member(s) of training cadre.
- **S-520, National Incident Management Training Course Steering Committee.** Serve as member of S-520 Steering Committee, and S-620, Area Command Steering Committee.
- **S-580, Advanced Wildland Fire Use Applications.** Serve as member of training cadre.
- **S-590 Advanced Fire Behavior Interpretation Steering Committee.** Serve as a member of the S-590 Steering Committee, cadre, and Steering Committee Co-Chair.
- **FML, Fire Management Leadership.** Serve as member of training cadre.
- **National Fire Performance Measures Work Group.** Participate as member of this working group for State and Private Forestry.
- **National Wildfire Coordinating Group (NWCG).** Represent WO R&D as member of NWCG at numerous meetings.

Special Assignments.

- Serve as Team Leader for Review of Escaped Prescribed Fire (Twin Prescribed Fire, Kaibab NF).
- Participate in RMRS Science Application and Integration (SA&I) Team Building Meeting.

Wildland Fire Support.

- Support wildland fire management activities as appropriate.