



National Advanced Fire & Resource Institute
Managed By The U.S. Forest Service

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File Code: 5100

Date: December 15, 2011

Subject: S-590 Advanced Fire Behavior Interpretation Course
March 12 - 23, 2012

To: S-590 Course Participant

Congratulations on your selection to attend the S-590 Advanced Fire Behavior Interpretation course to be held at the [National Advanced Fire and Resource Institute \(NAFRI\)](http://www.nafri.gov) in Tucson, Arizona.

This course begins on Monday, March 12, 2012 at 1500; it is mandatory that you are present. An optional computer configuration setup period will be held from 1300 - 1500. Please take advantage of this time to ensure your computer is running all required software and you are able to print on your printer and on the additional printers here at NAFRI. Computer support assistance will be available for only the first two days of the course. For those that can get it, be sure to obtain Administrative rights on your laptop before you leave your home unit, we will not be able to successfully troubleshoot, load print drivers or re-install required software without it. In the event of computer failure, NAFRI will have a few laptops available for loan that will have the necessary software and printer drivers loaded.

The [Pre-Course Work](http://www.nafri.gov) is posted on the [NAFRI](http://www.nafri.gov) website ([http://www.nafri.gov/](http://www.nafri.gov)). The S-590 Pre-Course Work develops knowledge and skills needed for the course. Do not wait until the last minute to complete the pre-course material.

You must complete the Pre-Course Work and bring it with you to the course.

The book, [How to Get your Point Across in 30 Seconds or Less](#) by Milo O. Frank, is part of the required reading for the course. This book has been mailed out to you.

The [Course Information Packet](#) will also be posted on the [NAFRI](http://www.nafri.gov) website. This provides you information concerning the course, the faculty, a list of fellow participants, and logistics information for the training center. If you find you cannot attend the course, please let us know as soon as possible so we may make any needed adjustments.

For course attendance, we ask that you come prepared with business casual dress as a minimum. Shorts, torn jeans and T-Shirts are acceptable for after hours and weekend wear, they are not appropriate dress while attending a national level course.

Course Information:

A BehavePlus Update will be held in the NAFRI Auditorium just after the opening, at 1700.

All WFDSS users must meet the IT Security requirements prior to being granted access to the system. Non-federal user must provide documentation of your agency IT Security to your GA Editor or complete the security requirements as defined at the following web link prior to requesting access to the system <http://www.wfmrda.nwcg.gov/wfdss-ga-editors.php>. If you are having difficulty finding the information or your GA Editor contact, please contact Marlena Hovorka at 505-238-6269.


This course runs two weeks, from March 12 through March 23, 2012. There are lessons or other activities scheduled on the first four evenings. You can expect long days, and many evenings of work.

We will break for the weekend at 1730 Friday, March 17. The second week of training will begin at 0800 Monday, March 19, and will end at 1100 on Friday, March 23.

This course generates a three-inch notebook along with additional handout material. Boxes will be provided to you so you can carry back these materials as part of your luggage, or for shipping if you provide a UPS or FedEx account number.

Many of the course materials will be stored on a terminal server and released for your use at appropriate times during the class. If you have a network cable please bring it in order to connect. You may also elect to download course materials onto your laptop or other storage device in lieu of carrying or shipping the notebook back to your home unit. A USB drive will be supplied for this purpose.

If you have any questions or require further assistance, please contact the S-590 Course Coordinator, Donna Kreiensieck at (520) 799-8745, (520) 342-6708 or email: dkkreiensieck@fs.fed.us.


MERRIE M. JOHNSON
Director

Pre-Course Work

Enclosed in this packet is pre-course work that must be completed prior to the beginning of the course. Please bring this pre-course work with you to the course, this work is designed to help you prepare for and successfully complete S-590. It is composed of five parts;

1. Required Reading
2. Student Presentation
3. Forecast Pre-Course Work Review
4. WFDSS
5. S-495 Recommended Online Course Review Material

Each of these parts will be expanded upon and tested during the course.

Additionally, because the S-590 course focuses on the interpretation of fire behavior information, the majority of instruction will assume you have a command of the knowledge taught in the prerequisite fire behavior courses (S-190 through S-490) and a rigorous understanding of the two-dimensional fire spread model. In addition, it is assumed you have a basic understanding of the inputs and outputs from FlamMap fire mapping and analysis system, *FARSITE* Fire Area Simulator, and FireFamilyPlus. During the course, you will operate these programs with faculty assistance in a group setting. **Interpretation of the various outputs is the primary focus.**

You will all be working with the Wildland Fire Decision Support System (WFDSS) during the course. All WFDSS users must meet the IT Security requirements prior to being granted access to the system. Non-federal user must provide documentation of your agency IT Security to your GA Editor or complete the security requirements as defined at the following web link prior to requesting access to the system. <http://www.wfmrda.nwcg.gov/wfdss-ga-editors.php> If you are having difficulty finding the information or your GA Editor contact, please contact Marlena Hovorka at 505-238-6269.

Pretest Information:

Information on pretest results are not provided beyond your selection to the course. Test results revealed that all students should review and polish their S-490, Advanced Fire Behavior Calculations skills. Mastery of these skills will be required for successful completion of S-590. Please take advantage of the time between now and the course to review your S-490 course materials, it will be beneficial to you during the course.

Material Review Resources:

Further review of the many tools used during the course can be found at the WFDSS home page in the related links section (upper left hand side) then scrolling toward the bottom of the list of references. Portions of the online S-495 material will also be made available to you for review. Interpreting these tools will be important to your success at the course, so reviewing the following information will be helpful.

WFDSS website, Related Resources link (left-hand menu)

- Training
 - Basic and Short-term Fire Behavior (pdf file of powerpoint, uses FlamMap)
 - Response Levels and WFDSS System Content Outline (suggestions for types of analyses as fire complexity and duration increases)
- Fire Behavior

- Comparison of FlamMap and Automated WFDSS Basic and Short-term Fire Behavior (table comparing inputs and outputs between the desktop version of FlamMap and the automated version used in WFDSS)
- FSPro Reference Guide (covers FSPro inputs and how to interpret outputs)
- Other
 - CRAFT – brief description of several fire behavior tools and their uses
 - BehavePlus – at <http://firemodels.fire.org/content/view/143/44/#Overview>

Recommendations and instructions for S-590 students are included in the word document in the root directory.

Other items to bring to S-590:

It is suggested you bring your Fire Behavior Field Reference Guide or Fireline Handbook Appendix B.

Computer Requirements:

All participants attending S-590 **must provide their own laptop and portable printer with the appropriate printer driver installed.** You will need to install the latest version of the following software prior to the start of the course. The software needs to be tested in a standalone environment (not connected to your network). You also need to test the connectivity of your portable printer by printing from the BehavePlus program to your printer. You will need to have the ability to obtain and keep administrative rights for your computer. Your laptop will be checked to see that you have virus monitoring software installed and running before use at the course. Please be sure you have current and updated virus software on your laptop.

It cannot be stressed enough that your laptop and printer must be configured correctly and all software and drivers are working properly. You will be completely dependent on them to be successful at the course.

We suggest you bring any peripherals that will make you more comfortable with your laptop and printer setup. For instance, you might prefer using a mouse with mouse pad instead of using the laptop's toggle or touch pad. Don't forget to bring extra printer ink cartridges, a printer cable and a 3' or longer data cable.

Software to be installed prior to attending S-590:

- BehavePlus Version 4.0
- *FARSITE* Version 4.1.055
- FireFamilyPlus 4.1 **
- FlamMap 3.0

Available at www.firemodels.org

**** = BLM users that cannot load and use version 4.1, should load version 4.0.2.**

- WFDSS User Name and Password

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

All WFDSS users must meet the IT Security requirements prior to being granted access to the system. Non-federal user must provide documentation of your agency IT Security to your GA Editor or complete the security requirements as defined at the following web link prior to requesting access to the system. <http://www.wfmrda.nwccg.gov/wfdss-ga-editors.php> If you are having difficulty finding the information or your GA Editor contact, please contact Marlena Hovorka at 505-238-6269.

Logistics:

Course Facility

Our facility is next to the Tucson International Airport. You can find a map of the area at www.nafri.gov (<http://www.nafri.gov/>) and click on the "Location/Logistics" link.

Place: National Fire Institute (NAFRI)

Main Phone: (520) 799-8787

Address: 3265 E. Universal Way, Tucson, AZ 85756

Fax: (520) 799-8785

Travel Arrangements

NAFRI will open at 0800 on Monday March 12; computer support and setup assistance will be available starting at 1300. Please take advantage of this assistance to ensure your hardware and software are all working properly. The Introductions start at 1500. Travel should be scheduled accordingly. The course ends Friday, March 23 at 1100. When making your return flight arrangements, allow at least 15 minutes by car from NAFRI to the Tucson International Airport.

Lodging

For a listing of hotels near the National Fire Institute, please visit the 'Location/Logistics' menu the main [NAFRI](http://www.nafri.gov) website (http://www.nafri.gov). When making your reservations, please mention you are with NAFRI.

The hotels and inns located in the area of NAFRI and the airport provide a wide variety of amenities suitable for all visitors. The hotels and the National Fire Institute are within one mile of the Tucson airport. Other amenities may be provided based on the individual hotel properties. Be sure to confirm with the hotel when setting up your reservation.

Transportation

If you are not renting a car, the hotels can upon request provide shuttle service to and from NAFRI. NAFRI will be providing a van shuttle service to and from the hotels as needed for the course, once in the morning and again after class in the evening. Please call the NAFRI main number (520-799-8787) or use the Request Form located on NAFRI's Location & Logistics webpage <http://www.nafri.gov/pages/locationandlogistics.htm> to make arrangements.

Restaurants

There are plenty of lunch options within walking distance of the National Fire Institute. All of the hotels offer some version of continental breakfast.

Emergency Contact Numbers

If you need to contact someone at NAFRI due to unexpected travel difficulties please call one of the following:

Donna Kreiensieck – Course Coordinator

(520) 342-6708 cell (520) 799-8745 work

Lisa Elenz – Steering Co-Chair

(208) 954-4732 cell

Louisa Evers – Steering Co-Chair

(971) 322-7040 cell

NAFRI front desk

(520) 799-8787

PART 1 – REQUIRED READING

The ability to present a succinct, coherent briefing is a critical skill for a fire behavior analyst. Think of the long, rambling briefings you've had to endure. At the end of such briefings, did you know what you were supposed to do? Did you feel you had the critical information needed to complete your assignment while keeping everyone safe? During the course, you will be graded on your ability to pass on relevant fire weather/fire behavior information in a variety of settings to a variety of personnel – operations personnel, incident management teams, and agency administrators. During your time as a fire behavior analyst, you may also be required to conduct formal and informal briefings for resource specialists, cooperators, members of the public, legislators or their staff at several levels of government, and representatives of the news media.

The following readings are intended to provide you with a basis for conducting good briefings.

- A. [How to Get your Point Across in 30 Seconds or Less](#) by Milo O. Frank – this book has been mailed to the address on your nomination.
- B. [Effective Army Briefings](http://www.uc.edu/armyrotc/ms2text/MSL_201_L08a_Effective_Army_Briefing.pdf)
(http://www.uc.edu/armyrotc/ms2text/MSL_201_L08a_Effective_Army_Briefing.pdf)
- C. [Findings From the Wildland Firefighter Human Factors Workshop, 9551-2855-MTDC.](#)

You can find this publication on the Forest Service Engineering Publications Web Site at www.fs.fed.us/eng/pubs/. Go to: Search for Pubs. Select Pub Number and type 9551-2855.

- D. Additional information on effective briefings may be found on the [Wildland Fire Leadership](http://www.fireleadership.gov) website (<http://www.fireleadership.gov>).

PART 2

Student Presentations

You will be required to give a 5 minute presentation on a past fire behavior event that you experienced. These presentations will take place on Tuesday night, March 13. This is an exercise to help prepare you for the following two weeks and is not graded. It will be critiqued by your peers and your coaching group and used to help you tailor and refine your presentation skills. A maximum time of 5 minutes will be adhered to, so we suggest you “dry run” your presentation. Keep it simple and short.

Guidelines for 5 Minute Presentations at S-590

1. Address a past fire behavior event. It does not have to be an extreme fire behavior event – just something that sticks in your mind as being unique and/or something to be learned.
2. Pick the few key points from the fire behavior event you wish to convey to your audience. The objective of this presentation is to relay those key points as clearly as possible with your narration supported by photos, graphs, maps or other information.
3. Describe the conditions that led up to the event.
4. Describe the management or safety implications of the event (if applicable).
5. A five minute deadline will be enforced, similar to many S-590 exercises. Remember: This is a good opportunity for you to hone your speaking skills prior to the graded portion of the course. Your coaches will provide feedback on the content and style of your presentation (i.e. whether the key points were conveyed and supported adequately). A presentation style sheet has been attached – the same as will be used during the course for graded lessons.
6. You need to use an electronic presentation, such as Microsoft Powerpoint. This electronic presentation should focus on the main points of your presentation and make it interesting for the audience. **(Please save your presentation in an Office 2003 format.)**
7. Bring your presentation on a CD or Thumb Drive/Memory Stick. NAFRI will provide a laptop connected to a projector for your presentation.
8. Have fun and be creative.

S-590 Presentation Style Evaluation 2012

Student Name: _____ Exercise
Name: _____

Briefing (OPP, PL, AA, with number if appropriate): _____

Evaluate each of the following items based on presentation and style. Each item is scored 5 (low) to 10 (high).

Score

_____ Introduction: Self, position, and purpose.

_____ Eye contact with audience. Student didn't speak to the map or only one person.

_____ Understandable: clear, concise use of familiar terms.

_____ Use of maps and other visual aids.

_____ No distracting mannerisms.

_____ Overall organization and flow.

_____ Ability to accurately answer questions spontaneously.

_____ Time Management.

_____ Overall confidence in self and briefing.

_____ Overall effectiveness of briefing.

_____ Overall score

Comments: _____

Scored By: _____

PART 3

Operational Fire Behavior Forecast

Experience has shown that forecast writing has been one of the biggest challenges for many of the students of S-590. The reason for this vary; students will be expected to prepare a number of different types of forecasts, time will be an issue, some forecast types may be new to some, etc.

During the course you will receive an excellent presentation on forecast preparation and have numerous opportunities to refine your forecast writing skills. Whether you know it or not, you are already an expert on forecasts. In the wildland fire positions you filled in the past you no doubt read, heard, briefed on, and reviewed a Fire Behavior. You know the type of information you needed as a user of the forecast, and chances are if you didn't read or hear something you thought you needed, you ask for it. This background is one of the strongest tools you have when it comes to transferring fire behavior information into a forecast or briefing.

This exercise is designed to reinforce the tie between your experiences as a user of fire behavior forecasts and the skills you will learn as an author of them. This is not a test, there are no right or wrong answers with this exercise. The intent is to begin focusing you on forecast preparation. If one of the forecast types is not familiar to you, don't worry, it will be by the end of this course. Rely on your prior experience and take your best shot.

Following are four fire behavior forecasts (Fire Behavior Forecast for Dirty Ike 1 & 2, and Shadow Lake 3 & 4). Each pair is essentially the same forecast written with a different emphasis.

Your Mission

1. Prepare a critique of each forecast from a user viewpoint. Place yourself in the position of a Strike Team Leader, Division Supervisor, SOPL or other position you are most familiar with (you pick) and evaluate the strengths and weaknesses of each forecast. Note the relevance, clarity, and level of detail (or lack thereof), organization, and format of each forecast. Be specific!
2. Locate a Forecast from your home unit or your past fire assignments. Conduct the same critique on this forecast.
3. Bring the forecasts and your critique to the course. We will be working with your pre-work during the first day of the course.

Forecast #1

FIRE BEHAVIOR FORECAST

NAME OF FIRE: Dirty Ike Fire

PREDICTION FOR: Day SHIFT

Unit: DNR - Montana

SHIFT DATE: 8-15-2003

TIME & DATE

FORECAST ISSUED: 8-14-2003 2200

FIRE BEHAVIOR ANALYST

WEATHER SUMMARY: Fire weather watch for Friday and Friday night, isolated mainly dry and a few wet thunderstorms, all with lightning.

The atmosphere is going to continue to destabilize, if the southeast winds have not surfaced by briefing this morning, they still are likely to be a factor later in the day, 10-15 MPH with gusts to 20 MPH. Maximum temperatures 94-101 degrees, minimum humidity 14-19%. Haines Index 5, moderate. Be prepared for the smoke to lift, the wind to blow and the fire to be active.

FIRE BEHAVIOR

GENERAL:

The smoke has held hot, dry air against the fuels for three days now, further intensifying the explosiveness of the vegetation. Trees torching in the interior of the fire are producing spots even without any wind, spot fires double in size within 10 minutes without ground forces to pound 'em out. Forecast winds carry a spotting distance of ½ to ¾ miles. If the winds come, and the smoke clears, expect the perimeter to move 1 mile in 45 minutes by profuse spotting. Flame lengths on the surface 6-8 feet, 60-80 feet in the crowns. Probability of ignition (a brand will start a spot fire) is 100% if the smoke clears.

SPECIFIC:

Division A: Conditions are favorable to strengthen and hold the constructed line. It is unlikely to spot if the smoky condition persists, and firing pattern allows the column to develop over the black. If the smoke lifts and the winds come up, expect spot fires to the northwest. Stay alert for thunderstorm development and gusty winds that could move the burnout operation into fresh fuels. For burnout, expect 2-3 foot flame lengths with backing fire, 6-8 feet with head fire.

Division B: Patrol and mop up the burnout from Thursday is good if you stay alert for changing conditions (Humidity below 15%, sustained eyelevel winds greater than 10 MPH, increase in spotting).

Division C: Opportunity to continue cleaning up line by burning out, mop up spot fires is good before lunch. The increasingly unstable air and forecast winds could cause spotting to the northwest.

Structure Protection: Spot fires will double in size by the time you put on your hard hat. Flanking attack with equipment is feasible.

AIR OPERATIONS:

Smokey conditions will persist through out the day. If a wind event comes through, and the fires begin to pick up visibility will be good but very turbulent.

SAFETY:

You can't see the main fire or are in contact with anyone who can? Adjust your lookouts, establish communications.

Forecast #2

FIRE BEHAVIOR FORECAST

NAME OF FIRE: Dirty Ike Fire

PREDICTION FOR: Day SHIFT

Unit: DNR - Montana

SHIFT DATE: 8-15-2003

TIME & DATE

FORECAST ISSUED: 8-14-2003 2200

FIRE BEHAVIOR ANALYST

WEATHER SUMMARY: Fire weather watch for Friday and Friday night, isolated mainly dry and a few wet thunderstorms, all with lightning.

Atmosphere becoming more unstable, otherwise conditions very similar to yesterday. Temps up 2-3, RH down 3-5, Haines 5.

FIRE BEHAVIOR

GENERAL:

Continued hot dry conditions, with the smoke holding dry air against the fuels for the past three days, has further intensified the explosiveness of the vegetation. Spotting distances up $\frac{1}{2}$ to $\frac{3}{4}$ miles possible. Torching trees and long range spotting expected to cause significant challenges today. Areas with reburn potential within $\frac{3}{4}$ mile of contained line pose a risk of spotting if winds develop this afternoon.

SPECIFIC:

All Divisions and Structure Protection.

Flame lengths of 4-6' in surface fuels, 60-80' if fire move into the crowns
ROS 5-15 Ch/Hr on the surface, up to 1+mph with torching and spotting
P(i) 100%

AIR OPERATIONS:

Smokey conditions will persist through out the day. If a wind event comes through, and the fires begin to pick up visibility will be good but very turbulent.

SAFETY:

You can't see the main fire or are in contact with anyone who can? Adjust your lookouts, establish communications.

Forecast #3

FIRE BEHAVIOR FORECAST		
FORECAST NUMBER: #14	TYPE OF FIRE: Wildfire	
FIRE NAME: Shadow Lake	OPERATIONAL PERIOD: 9/14/2011 Day shift	
DATE ISSUED: 9/13/2011	TIME ISSUED: 18:30	
UNIT: OR-DEF	SIGNED: _____	
Printed: _____		
INPUTS		
<p>WEATHER SUMMARY: A very similar day today as yesterday with slightly cooler temperatures with slightly higher humidity. Winds will increase from the west in the afternoon which will raise humidity quickly. See the attached spot weather forecast for specific details for each division.</p>		
OUTPUTS		
FIRE BEHAVIOR		
<p>GENERAL: Fire behavior will continue to moderate as weather conditions become more seasonal. ERCs will remain near the 90th percentiles for the fire area but good nighttime humidity recoveries will continue to shorten burn periods. Minimal fire spread is expected due to secured fire perimeters in most areas of the fire. The western portion of the fire that has unburned fuel between the fire and fireline will have potential to spread and/or spot toward the fireline. Occasional tree torching will increase potential for spotting. The heavy lichen component will contribute to fire spread and spotting during peak burning periods.</p> <p>Burn out opportunities will be limited to a short window between approximately 11:00 and 15:00. Rh will increase rapidly with the onset of west winds, raising fuel moisture and hampering fire spread by mid-afternoon. No burn out opportunities are expected for the next 4-5 days due to the cool, moist conditions that are forecast.</p>		
SPECIFIC:		
	<u>Forecasted Conditions</u>	
Lichen (10 minute fuel)	Highly flammable, light & flashy	Threshold <25% Rh
10 hr time lag fuel moisture	6%	
100 hr time lag fuel moisture	8%	
Haines	4	
ERCG (Round Mt)	67	64 = 90 th percentile
<p>Div A/B/M – Interior islands well interior may continue to smolder and creep in surface fuels with occasional single and possible group tree torching. Minimal to no fire spread is expected firelines.</p> <p>Div N – Smoldering in ground fuels will continue from Big Lake west to the safety zone. Fire behavior will be more active in the western portions of the fire. Westerly winds may cause fire spread and/or spotting toward the 890 road as unburned fuels remain between the fire edge and the fireline. Occasional torching along with short crown runs with wind/slope alignment is possible.</p> <p>Div O – Fire spread into this division will continue to be mitigated by westerly winds for the near future. However, fuels within lava flows are extremely dry and receptive to spotting. Active backing to the west may occur where continuous fuels area present and where no suppression actions are taken (i.e. bucket drops).</p> <p>All Divisions - Potential spotting distance up to 0.3 miles is possible from multiple tree torching. Probability of ignition will be 70-80 % in un-shaded areas.</p> <p>Mop-up Techniques – Look, Listen, and Feel for heat; Always use a tool with water to increase effectiveness; Pair an experienced person with inexperienced to aid in the learning process; Use a fog nozzle to minimize water usage; Take pride in your work! Make sure it is done right the first time.</p>		
AIR OPERATIONS: Morning inversion will cause visibility issues due to smoke.		
SAFETY		
The early bird may get the worm, but the second mouse gets the cheese.		

Forecast #4

FIRE BEHAVIOR FORECAST	
FORECAST NUMBER: #14	TYPE OF FIRE: Wildfire
FIRE NAME: Shadow Lake	OPERATIONAL PERIOD: Day shift
DATE ISSUED: 9/13/2011	TIME ISSUED: 18:30
UNIT: OR-DEF	SIGNED: _____ Printed:
INPUTS	
WEATHER SUMMARY: Temps 75-83, RH 25-35%, Winds increasing from the west, 3-8 increasing to 15 by afternoon.	
OUTPUTS	
FIRE BEHAVIOR	
<p>GENERAL: Fire behavior will moderate by 10 to 20% over yesterday as weather conditions become more seasonal. ERCs will remain high for the fire area but good nighttime humidity recoveries should be in the 70% range. Unburned portions of the fire perimeter will have potential ROS's between 8-10 Ch./Hr and can expect surface FLs of 2-5'. Occasional tree torching will increase potential for spotting. Spread through crown fuels will continue to be problematic if RH's reach thresholds.</p> <p>Recommend completing any burnout efforts today</p>	
SPECIFIC:	
<p>Div A/B/M – Some interior burnout expected to continue</p> <p>Div N – this will be the active section of the fire today. Heads up for fire behavior similar to what you've seen the past few days in the afternoon hours – until the weather arrives we're not quite out of the woods.</p> <p>Div O - Fuels within lava flows are extremely dry and receptive to spotting. Active backing may occur where continuous fuels area present and where no suppression actions are taken (i.e. bucket drops).</p> <p>All Divisions - Potential spotting distance up to 0.3 miles is possible from multiple tree torching. Pi will be 70-80 % in un-shaded areas.</p> <p>Mop-up Techniques – Look, Listen, and Feel for heat; Always use a tool with water to increase effectiveness; Pair an experienced person with inexperienced to aid in the learning process; Use a fog nozzle to minimize water usage; Take pride in your work! Make sure it is done right the first time.</p>	
AIR OPERATIONS: Morning inversion will cause visibility issues due to smoke.	
SAFETY	
Don't assume things will be the same as they were yesterday, conditions are beginning to change, take the new conditions into account.	

PART 4

Wildland Fire Decision Support System

This lesson is designed to give students the opportunity to become familiar with the Wildland Fire Decision Support System (WFDSS). If you are already working in the system frequently you will be able to quickly complete the lesson. If you are a new user, it is strongly recommended that you become familiar with the system and the fire behavior tools available prior to the course. This material will be used during specific lessons during the course.

You will learn or review:

- What the Wildland Fire Decision Support System (WFDSS) is.
- What parts of WFDSS your products will be used and where different FB/Long term tools exist/reside in WFDSS.
- Identify the support tools and when they might be used in developing decisions and implementation actions.
- Identify the support tool used to provide information for WFDSS decisions and how they will be incorporated.

You will be asked to login into the Wildland Fire Decision Support System to:

- Review several incident decisions
- Download & review fire behavior KMZs
- Download decision pdfs to view where fire behavior products were used to support decisions
- Review the Incident Analyses
- Review Relative Risk

Incidents that you will be reviewing:

Incident Name	Unique Fire Identifier	Decision to Review
Little Beaver	2010-IDBOF-000499	08/14
Bald Bear	2011-MTLCF-001054	09/07
Copper Mnt	2011-MTBDF-000059	09/07
Wallow	2011-AZASF-110020	06/19
Las Conchas	2011-NMN6S-000451	07/09
Lutz	2011-MTBDF-000037	08/25

Focus on Copper Mnt, Wallow and Lutz to answer the pre-work questions at the end of this lesson. You will need to download and print the PDF from the Copper Mnt decision

that was published on 09/07. As you review the decision information and fire behavior outputs, consider the following questions:

1. Reviewing the Incident documentation and Analysis KMZ files, who do you think you would communicate this info too?
2. What products outside of wfdss might you use to support decisions?
3. After seeing the decision support information for Copper Mnt Incident vs. Wallow, do you think there is a reason the documentation was quite different between the two?
4. Considering some of the decision support tools that you reviewed in the various decisions, which tools might you use to help inform the Relative Risk charts?
5. List 5 decision support tools that you can identify from the decisions that you reviewed.

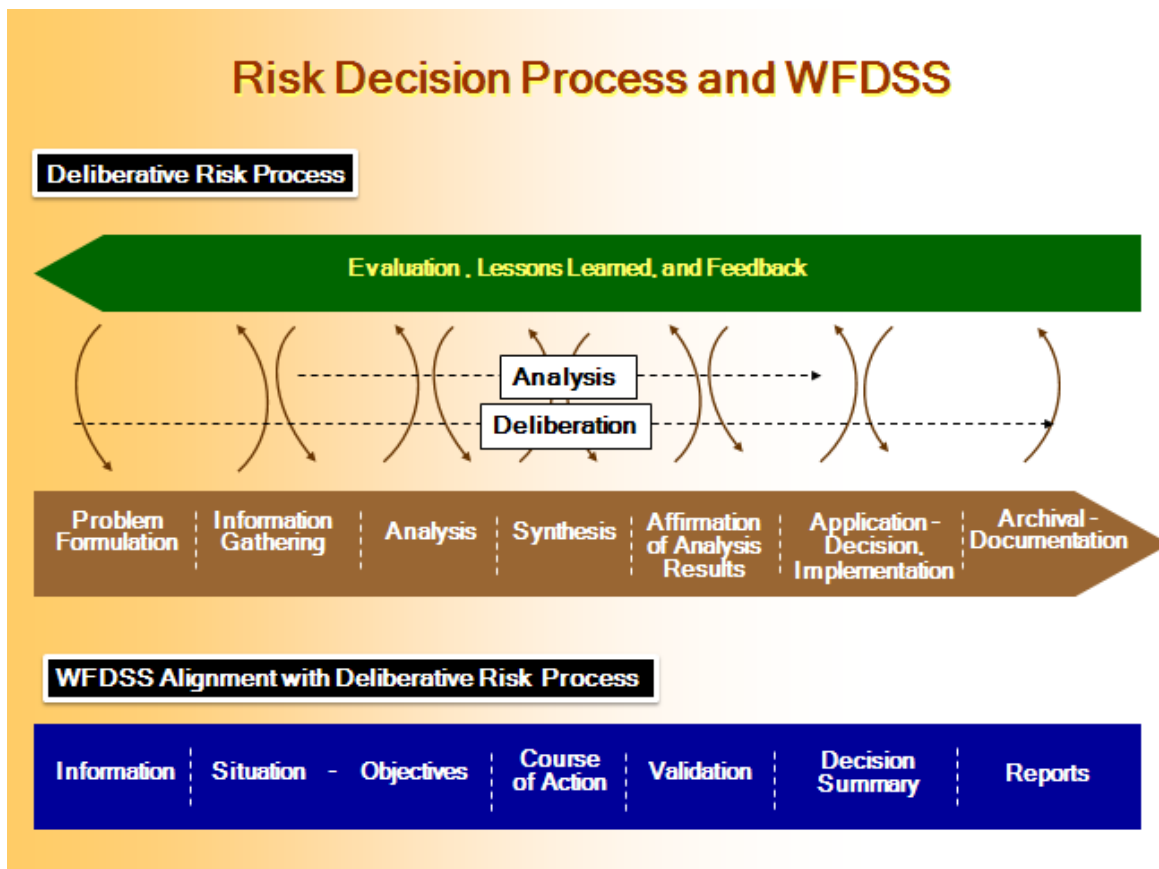
I. What is WFDSS?

WFDSS is the Wildland Fire Decision Support System (<http://wfdss.usgs.gov>) developed to assist fire managers and analysts in making strategic and tactical decisions for fire incidents. It has replaced the WFSA (Wildland Fire Situation Analysis), Wildland Fire Implementation Plan (WFIP), and Long-Term Implementation Plan (LTIP) processes with a single process that is easier to use, more intuitive, linear, scalable, and progressively responsive to changing fire complexity. WFDSS integrates the various applications used to manage incidents into a single system, which streamlines the analysis and reporting processes. WFDSS provides the following advantages over previous systems:

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

WFDSS is a deliberative risk process used to develop a decision. Risk-informed decision making requires two distinct but linked processes: analysis and deliberation. Analysis involves the rigorous, replicable methods to provide information about factual questions. While analysis brings new information into the decision making process, it

informs the deliberation. Deliberation is the discussion, reflection and persuasion to communicate, raise issues, collectively consider issues, increase understanding, and facilitate substantive decisions. New analyses framed as deliberation brings new insights, questions and problem formulations. The outcome of this deliberation and analysis is the ability to make an informed decision. This decision can then be modified or updated as additional information is gathered, questions are asked, deliberation occurs, and analysis are updated.



The above image shows, a risk informed decision process through analysis and deliberation (top). The blue strip at the bottom of the slide shows the WFDSS decision flow process and how it lines up with the deliberative risk informed decision process.

In WFDSS the INFORMATION tab is the Problem Formulation of risk informed decision making. SITUATION and OBJECTIVES provide the Information Gathering and Analysis of the risk informed process. The COURSE OF ACTION is the Synthesis. VALIDATION is the Affirmation of Analysis results. DECISION SUMMARY is the Application-Decision Implementation. REPORTS tab aligns with the Archival Documentation.

As the LTAN/FBAN, you are integral in the deliberative risk process. You provide the synthesis and analysis to inform the decision for the decision maker(s). Your products may support any portion of the Decision: Assessment, Objectives, Course of Action, Validation, or Rationale.

If you are unfamiliar with WFDSS, please take the time to read the additional overview information provided.

II. Request a WFDSS Account

Before you can use the WFDSS application to track incidents, you must have an account. Once you set up an account, you can access both the production and the training application using the same user name and password, though your user privileges might be different in each system.

Federal employees must provide a government email address with one of the following domains:

- *bia.gov
- *blm.gov
- *fs.fed.us
- *fws.gov
- *nifc.gov
- *nps.gov

Non-federal employees are approved as needed to support the interagency fire management mission, but are required to provide proof of security awareness training. You can access the Request Account page from the WFDSS Website Home Page (<http://wfdss.usgs.gov>).



To request an account:

Note: Fields marked with an asterisk (*) are required.

1. Go to the WFDSS website home page at <http://wfdss.usgs.gov>.

2. Click **Request Account**. The Request an Account page opens.
3. Enter a User Name (at least six characters, preferably your first and last name with no spaces).
4. Enter your First and Last Name.
5. Enter your Telephone Number and primary Email Address.
6. If you have a cell phone number and secondary email address, enter that information.
7. Enter your security question; enter your answer; confirm your answer.
8. Select your Geographic Area, Agency, and Unit.
9. Click **Submit**.

Once your request is approved, you will receive an email confirming your user name and password. If you don't receive an email with your password within a couple of hours of submitting your request, please contact the WFDSS help desk (866.224.7677 or helpdesk@dms.nwcg.gov).

III. Login into Production

You can access the login page from the WFDSS Website Home Page (<http://wfdss.usgs.gov>).



IV. Navigate to an Incident on the Incidents tab



As LTANs and FBANs we may be required to provide information to support decisions. You will be reviewing several incidents to learn where decision support information may be included in the decision. As you review the incidents below, observe where the

analyst included their fire behavior assessment information to support the decision. Consider why you may want to include information in various portions of the decision.

List of Incidents to Review:

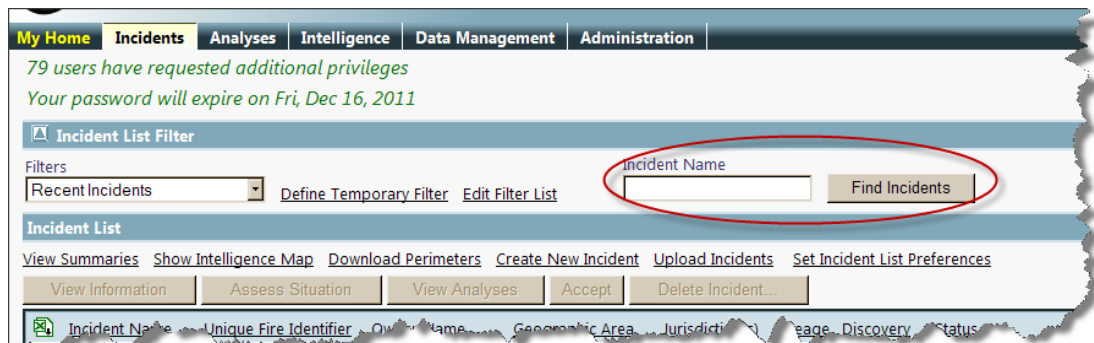
Incident Name	Unique Fire Identifier	Decision to Review
Little Beaver	2010-IDBOF-000499	08/14
Bald Bear	2011-MTLCF-001054	09/07
Copper Mnt	2011-MTBDF-000059	09/07
Wallow	2011-AZASF-110020	06/19
Las Conchas	2011-NMN6S-000451	07/09
Lutz	2011-MTBDF-000037	08/25

Focus on Copper Mnt, Wallow and Lutz to answer the pre-work questions at the end of this lesson.

Finding the Incident

- Incident Name Filter

Type in the name of the incident in to the filter. You can use this feature to look for fires that occurred in the last 365 days. You can look up the 2011 fires using this feature.




- Defining Temporary Incident/Intelligence Filters-You will need this to find the Little Beaver Incident from 2010

Temporary Filters enable you to quickly search a long list to find the specific information you need. For example, if you have been asked to review a decision for a fire in a neighboring district, you can use the temporary filter to find the incident in WFDSS.

These filters are not saved permanently, and will be lost if you create or view a new filter or if you log out of WFDSS.

To define temporary filters:

1. Open the Define Temporary Filter page:
 - From the Incident List, click Define Temporary Filter. The Define Temporary Filter page appears.
 - From the Intelligence map, choose the **Map tab > Define Temporary Filter**.
2. Click Clear to remove the current filters on your list.
3. If necessary, expand the filter lists to view your selections. (Click the  next to the filter heading.)
4. Select the Date Filters related to the incidents you are filtering for.
5. Select the appropriate Other Filter options.

Use the check boxes, radio buttons, and drop-down lists as appropriate to make your selections. To use the slush buckets (Geographic Area, for example), click >> next to the item you want to include in your list. Selections appear in the right-hand bucket. To remove an item, click <<.

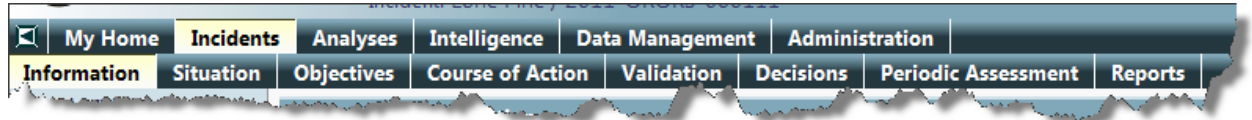
 - Incident privileges
 - State
 - Decisions
 - National Significance
 - Acreage
 - Geographic Area
 - Jurisdiction
6. Enter a comma-separated list of Unit IDs to filter on (e.g., CACND, CAALT, NCNCF).
7. Enter all or part of the Incident Author name and click **Apply Filter** to limit your list to names that match your search criteria, then click >> next to each person you want to include in your criteria. The names appear in the right-hand slush bucket.
8. To view specific incidents, enter the Incident Name or click >> next to the incident names you want to include in your criteria.
9. Click **Apply**. The Incident List reappears showing only those incidents that met your criteria, sorted by most recent Discovery Date.

If the Incident List is empty, no incidents met all of your criteria. Go back to the Define Temporary Filters page and verify that you selected the correct criteria. Try removing some of your more restrictive criteria.

V. Once you have located your incident:

You will need to download or view the decision dates referenced to answer questions provided on the last page.

1. Click radio button next to the incident name.
2. Click VIEW INFORMATION.
3. You will see a series of tabs related to the Incident-Information, Situation, Objectives, Course of Action, Validation, Decision, Periodic Assessment, and Reports.



4. Navigate to the Decisions tab to View or download the recommended decisions to review.

List of Incidents to Review:

Incident Name	Unique Fire Identifier	Decision to Review
Little Beaver	2010-IDBOF-000499	08/14
Bald Bear	2011-MTLCF-001054	09/07
Copper Mnt	2011-MTBDF-000059	09/07
Wallow	2011-AZASF-110020	06/19
Las Conchas	2011-NMN6S-000451	07/09
Lutz	2011-MTBDF-000037	08/25

Downloading an HTML or PDF File

Any WFDSS user can download a published decision in either HTML or PDF files formats by clicking the appropriate button from the Decision Tab within an incident. The process for downloading a published decision in HTML or PDF format is the same.

To download a HTML or PDF file

- i. Navigate to your incident.
- ii. Click **View Information**.
- iii. Click **Decisions** tab.
- iv. Click the radio button next to the Published Decision that you want to download as an HTML or PDF file.
- v. Click either **PDF** or **HTML**. A green message displays at the top of the screen letting you know the file was sent for processing.
- vi. Click the **Decisions** tab to refresh the screen.

- vii. Click next to the published decision you want to download as an HTML or PDF file.
- viii. Click either **PDF** or **HTML**. The File Download box appears.
- ix. Click **Save** to save the file to your local hard drive.
- x. Open file from your local hard drive.

You can now review the decisions to determine what fire behavior information was utilized to support the decision and where it was placed in the decision.

VI. Download an Incident KMZ and Analysis KMZs

You can download Incident KMZs and Analysis KMZs. The Incident KMZ allows you to review accepted analyses in Google Earth. The Analysis KMZs allows you to review results from an individual analysis. They can be valuable tools for briefings.

Downloading an Incident KMZ File for a Published Decision

While every effort has been made to make WFDSS a system that meets all of your geospatial needs, we recognize that, occasionally, you might need to analyze and view spatial information outside of WFDSS. You can download data in several formats:

- shapefiles (in meters and degrees)
- ASCII grids
- KMZ files (Keyhole Markup Language Zip file is a file format that is used to display geographic information, such as KMZ files in GOOGLE Earth.)

Any WFDSS user can open and view an incident KMZ file for a published decision directly from GOOGLE Earth, or download it to a computer. When viewing incident KMZ files from GOOGLE Earth, the KMZ file contains all mapping information (planning, MAPs, objective shapes, fire perimeter, and accepted fire behavior analysis) from the Incident folder, except for the unit shapes.

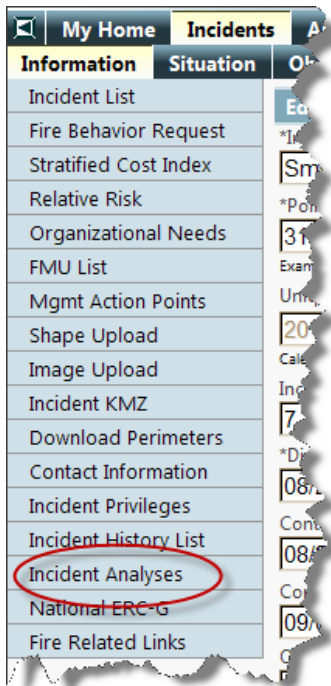
To download an incident KMZ file for a published decision:

1. From the Incident list, select the incident > click **View Information**. The Edit Information page appears.
2. From the left menu, choose **Download KMZ**. The File Download box appears.
3. Click one of the download options:
 - **Save** to download the KMZ file to your desktop. Specify the location to save the file. Click **save**. Once the file is downloaded to your computer, you can double-click the file to open it in Google Earth.
 - **Open** to display the KMZ file in Google Earth. The KMZ file name appears in the My Places pane in Google Earth. You can view the information by clicking the + to expand the list.

- **Cancel** to exit the File Download box and return to WFDSS.
Once you download the KMZ, you can use it outside of WFDSS; examples include training, briefings, or data management.

VII. Review the Incident Analyses

Review the Incident Analyses for the list of incidents provided by using the button located in the left hand menu. Click Incident Analyses and it will navigate you to the Analysis tab and display all the analyses for the incident. You can view all your analyses. You can only view ACCEPTED analyses of other analysts, unless you are a Super Analyst within the WFDSS application.

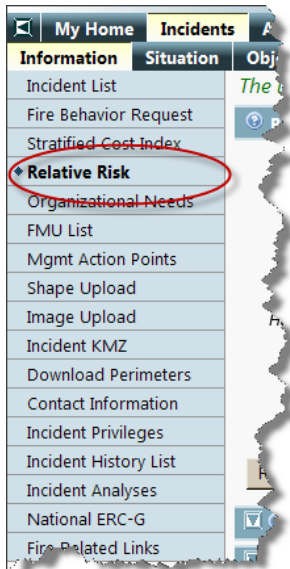


Click the following link to view the WFDSS online help for the Analysis page:
http://wfdss.usgs.gov/wfdss_help/WFDSSHelp_About_Analysis_List.html

What analysis tools are available in WFDSS to use for decision support?


VIII. Review the Relative Risk

For the list of incidents provided note the analyses available in WFDSS to use to support the inputs for the Relative Risk. What other tools do you have to support the relative risk inputs?



The Relative Risk is located in the left hand menu. Once the relative risk opens, review the inputs and notes. As a FBAN/LTAN could you provide information for some of the inputs?

You can click the link below to access the WFDSS online help for relative risk:
http://wfdss.usgs.gov/wfdss_help/WFDSSHelp_Calc_Relative_Risk.html

You can also click the  icon on the light blue bars to access additional help for each section.

IX. Questions:

1. Considering the Incident and Analysis KMZ files you reviewed, who do you think you would communicate this info too?
2. Considering the decisions that you reviewed, what products outside of wfdss might you use
3. Considering the decision support information for Copper Mnt Incident vs.Wallow, do you think that one fire had more decision space than the other?
4. Considering some of the decision support tools that you reviewed in the various decisions, which tools might you use to help inform the Relative Risk charts?
5. List 5 decision support tools that you can identify from the decisions that you reviewed.

PART 5

Online Portion Guide for S590 Students *S-495 Geospatial Fire Analysis, Interpretation, and Application*

Course Outline

The S495 online course materials have been provided for S590 students for review. These materials can be found at the FRAMES website

http://www.frames.gov/portal/server.pt/community/fire_behavior/212/s-495/2840

Recommended Units and Lessons for S590 Students

Course Pre-work (Lessons 2 and 3)

Unit 1: Overview of Geospatial fire analysis (Lesson 2)

Unit 3: Weather and Climate (Lessons 2, 5, 7, 8)

Unit 6: FlamMap (Lessons 1 and 4)

Unit 7: FARSITE (Lessons 1 and 7)

Unit 8: FSPro (Lesson 2 * This lesson suggests that you can open the FSPro analysis you completed in Lesson 1 but since this lesson includes graphics from FSPro you do not need to have completed an analysis to read this lesson.)

While a few modifications have occurred, most lessons have not been modified for the S590 student. Any reference to Blackboard, quizzes, evaluations, and individual lesson instructors should be disregarded.

- Exercises have two documents, the exercise and then the answers. If a lesson has an exercise, the lesson number is followed by (ex).
- A complete course outline and description of the each lesson is also provided with recommendations to the S590 students listed below in bold/italics.
- Several units have reference materials which include many scientific publications.
- The recommended lessons will provide the basic information about geospatial analysis and interpreting model results. However, correct understanding and interpretation requires an understanding of the inputs, limits, and assumptions. Many of the lessons in this course address these.

While many lessons are presented in a pdf textbook type document, several lessons are available as powerpoint and some as camtasia presentations. For these lessons you can view the presentation or look at the accompanying pdf version. Lessons with these formats are noted in italics.

S495 Online Material Course Outline

Items highlighted in Yellow are Recommended for S590 students

Course Pre-work

Lesson 1 - History of S-495, Course Outline, Evaluations, and Working in the Blended Learning Environment

Overview: This lesson provides an overview of how we arrived at S495, what is included, how students are evaluated and some information on working on Blackboard, the delivery system for S495.

S590 status: Informational if interested in the history of the course.

Lesson 2 – File Structure

Overview: Because the course and geospatial fire analysis uses a lot of data and information, file structure is critical to success. This lesson walks through setting up a file structure to help keep S495 materials organized. You may be surprised how important this is.

S590 status: Recommended if planning to download much of the S495 materials

Lesson 3 – Computer Requirements, Obtaining Software, and Establishing Internet Log-ins

Overview: Download all the software used in the course.

S590 status: Recommended to make sure you have all the current software.

Lesson 4 – Using Help Functions

Overview: This lesson walks through the help functions available in the software programs.

S590 status: Informational

Course

Unit 1 - Introduction to Geospatial Fire Analysis, Interpretation, and Application

Lesson 1 – Introduction to the Use of Geospatial Fire Decision Support Systems

Overview: This lesson discusses the philosophy of modeling in the context of fire and the geospatial fire decision support systems used in the course.

S590 status: Informational to get an introduction to modeling philosophy, some limits and assumptions and basic understanding of the tools.

Lesson 2 - Geospatial Fire Decision Support Systems

Overview: This lesson discusses some of the basic tenets of the various fire modeling systems and provides a comparison between Behave, FlamMap, FARSITE, and FSPro along with some limits and assumptions.

S590 status: Recommend slides 22 – 68 for comparison of fire modeling systems (Lesson 2 extracted). Other slides are additional information on the basics of the systems.

Unit 2 –Descriptive Statistics and Probability & Risk Assessment in Wildland Fire Management

Lesson 1 (ex) – Descriptive Statistics in Wildland Fire Management

Overview: Lesson discusses basic statistics used in fire management: central tendency, histograms, deviation from normal, box-plots, and variability

S590 status: Informational

Lesson 2 (ex) - Probability and Risk Assessment in Wildland Fire Management

Overview: Define and calculate various types of probability and look at risk and probability as used in fire.

S590 status: Informational

Unit 3 - Weather and Climatology

Unit 3 Introduction

Overview: Introduces the 10 lessons in the unit

S590 status: Informational

Lesson 1 – Evaluating Large-Scale Trends in Weather, Fuels, and Fire Occurrence

Overview: This lesson looks at fire season characteristics across the US, regional critical fire weather patterns and extreme situations, and weather leading to fire slowing or season ending periods.

S590 status: Informational

Lesson 2 – Indicators of Fire Growth Potential

Overview: A comprehensive look at drought indices, live fuel moisture conditions, NDVI images, dead fuel moisture calculations and various fire danger indices in the National and Canadian fire danger rating systems.

S590 status: Recommended

Lesson 3 (ex)– Accessing and Retrieving Weather and Fire Data

Overview: Obtaining weather and fire data from FAMWEB, KCFast and WRCC. Build a database in fire family plus

S590 status: Informational

Lesson 4 (ex)– Critiquing and Correcting Weather Data

Overview: Use FireFamilyPlus and WRCC to view, assess, and correct weather data.

S590 status: Informational

Lesson 5 (ex) – Developing and Interpreting Climatology Graphs and Data

Overview: Build and interpret climatology graphs

S590 status: Recommended – Building climatology graphs, particularly ERC, is a skill used in S590

Lesson 6 – Completing a Wind Analysis

Overview: Use FireFamilyPlus and WRCC to assess wind conditions

S590 status: Informational

Lesson 7 (ex)– Evaluating Local Climatology and Current Season Severity Exercise

Overview: This exercise is a compilation of the previous lessons. You will look at the current season and various weather indicators of fire potential and then compare these with historic seasons.

S590 status: Recommended

Lesson 8 (ex) - Fire-stopping and Season-ending Events

Overview: Use FireFamilyPlus to determine events that may slow/stop a fire and ones that indicate the end of the season. Review bimodal fire seasons

S590 status: Recommended – extracted portion of lesson and exercise looking at Term in FireFamilyPlus. Other is informational.

Lesson 9 (ex)- Weather Forecasts and Outlooks

Overview: Look at different types of weather forecasts and how they may be used in fire models

S590 status: Informational

Lesson 10 - Developing FARSITE Weather and Wind Files

Overview: Learn how to develop wnd and wtr files used in FARSITE and FlamMap

S590 status: Informational

Unit 4 - Concepts for Working with Geospatial Data in Fire Analysis

Unit 4 Introduction

NOTE: A basic understanding of ArcMap is helpful, but not required for this unit.

Overview: Introduction to what you'll learn in unit 4

S590 status: Informational

Lesson 1(ex) - Geospatial Data Formats and Sources

Overview: Begin to understand the GIS language of different data types and sources as well as what is used in geospatial fire analyses. Explore vector and raster data, KML and KMZ files and the landscape file

S590 status: Informational

Lesson 2 (ex)- Understanding Coordinate Systems and Projections

Overview: Learn how to define a coordinate system and projections and their importance in geospatial analyses.

S590 status: Informational

Lesson 3 (ex)- Geospatial Data Exploration

Overview: Learn how to explore data through point-based queries, statistical analysis, histograms, selection, and cell-by-cell analysis.

S590 status: Informational

Lesson 4 (ex)– Raster Data Modification and Analysis

Overview: Learn how to modify data a variety of ways in ArcMap and FARSITE

S590 status: Informational

Unit 5 - Geospatial Fire Analysis

Lesson 1 – Considerations in the Use of Geospatial Fire Decision Support Systems

Overview: More detail on the data and sources of error in the context of fire and the geospatial fire decision support systems.

S590 status: Informational

Lesson 2 – Simulating Crown Fire and Spotting in Geospatial Fire Modeling Systems

Overview: Detail about the crown fire models used in the various geospatial fire decision support systems such as FARSITE, FlamMap, and FSPro.

S590 status: Informational

Lesson 3 - Fuel Moisture Modeling within Geospatial Fire Modeling Systems

Overview: Detail on how dead and live fuel moistures are handled in the geospatial fire decision support systems covered in the class: FARSITE, FlamMap, FSPro.

S590 status: Informational

Unit 6 - Short-term Geospatial Fire Analysis using FlamMap

Unit 6 Introduction

Overview: Brief introduction to the unit

S590 status: Informational

Lesson 1 – Introduction to FlamMap

Overview: The introduction describes the main functions of FlamMap, compares it to other systems, and discusses several uses of the program.

S590 status: Recommended

Lesson 2 (ex)- The Mechanics of Running FlamMap Basic

Overview: Walk through setting up a basic FlamMap run

S590 status: Informational

Lesson 3 (ex)- Using Optional Settings in FlamMap

Overview: How to use wind grids and model fuel moisture variation across a landscape.

S590 status: Informational

Lesson 4 (ex)– Critiquing the Landscape File and Calibrating FlamMap Inputs

Overview: Exploring the landscape and fire behavior outputs in FlamMap

S590 status: Recommended

Lesson 5 (ex)– Modeling Short-Term Fire Spread using FlamMap’s Minimum Travel Time

Overview: Work through using MTT to model fire spread across the landscape.

S590 status: Informational

Lesson 6 - Advanced FlamMap – East Creek Scenario and Exercise

Overview: This exercise works through obtaining a landscape and weather data, developing a basic and MTT run, calibrating the model and interpreting the results

S590 status: Informational

Unit 7 - Mid-term Geospatial Fire Analysis using FARSITE

Lesson 1 – Introduction to FARSITE

Overview: Discusses the history of FARSITE, the models used, the limitations, and uses of FARSITE

S590 status: Recommended – extracted file, remaining is informational

Lesson 2 - Understanding FARSITE Fuels and Landscape Data

Overview: Discussion of the landscape data required and optional for FARSITE

S590 status: Informational

Lesson 3 (ex)- Overview of FARSITE Inputs

Overview: Works through the various FARSITE inputs, discusses projects, and demonstrates file management

S590 status: Informational

Lesson 4 (ex)– FARSITE Model Parameters

Overview: Demonstrates the influence of various model parameters on the analysis.

S590 status: Informational

Lesson 5 (ex)- FARSITE Simulations and Bookmarks

Overview: Understand how to run a simulation, what a bookmark is, and work through doing an analysis

S590 status: Informational

Lesson 6 (ex) - Fire Behavior Models in FARSITE

Overview: Addresses dead fuel moisture, flame front spread rate (surface and crown), spotting, acceleration, and post-frontal combustion

S590 status: Informational

Lesson 7 (ex)- FARSITE Outputs and Interpretation

Overview: Demonstrates how to generate, view and interpret outputs

S590 status: Recommended – extracted file and extracted exercise, rest is informational.

Lesson 8 - Mallory Swamp Exercise

Overview: This lesson is an exercise in creating a landscape, establishing a FARSITE run and interpreting the outputs

S590 status: Informational

Unit 8 - Long-term Geospatial Fire Analysis using FSPro

Lesson 1 (ex)- Introduction FSPro

Overview: Gives good overview of FSPro and how the concept behind the analysis as well as an exercise to create and look at outputs.

S590 status: Informational

Lesson 2 – Overview of FSPro Outputs

Overview: Works through the various outputs in FSPro

S590 status: Recommended

Lesson 3 - FSPro Interpretation and Application

Overview: Discussion on the differences between FSPro and RERAP. Includes discussion of effects of various input choices.

S590 status: Informational