Near-Term Fire Behavior (NTFB)

Estimated time to complete: 50 minutes or more depending on how elaborate the user choses to make the simulation.

WFDSS Near-Term Fire Behavior (NTFB) is a two-dimensional fire growth model that is similar to the desktop fire modeling application, FARSITE. Like all WFDSS fire behavior models, NTFB is a web-based application that uses spatial information on topography, fuels, weather, and wind to model fire growth. NTFB incorporates existing models for surface fire, crown fire, spotting, post-frontal combustion, and fire acceleration. NTFB outputs are displayed as a modeled fire progression, which allows managers to visually observe how the modeled fire reacts to heterogeneous fuel and weather conditions for the duration of the simulation.

Unlike Short-Term Fire Behavior (STFB), environmental conditions do not have to be held constant with NTFB; the model reacts to the changes in weather and wind inputs throughout the duration of the simulation. Where STFB is best used for one or two burn periods to model a 'snapshot in time' for a particular weather event of concern, NTFB is most applicable for modeling mid-term periods (generally one to three, but up to seven days) under a variable weather forecast.

FSPro essentially uses hundreds of NTFB runs to create a probability analysis for long-term fires. Unlike FSPro, however, NTFB is deterministic, meaning you can relate simulation results directly back to your inputs. With the same NTFB inputs, you will get the same outputs every time (with the exception of spotting).

This deterministic capability makes NTFB useful as a calibration tool when analysts need to fine-tune their inputs for other models. Using NTFB beyond a period of four or five days is not advised because the forecast data are generally not as reliable, and over- or under-prediction by the model is compounded over time. FSPro is the best tool for longer-term modeling (generally one to three weeks) because it incorporates climatalogical probabilities and reduces compounding errors by running hundreds of scenarios.

In this exercise Fire Behavior Specialists and Super Analysts will become familiar with how to prepare for, run and interpret a basic Near-Term Fire Behavior (NTFB) model. This exercise is not intended to be a comprehensive guide to NTFB, but teaches the user basic skills to run the model. This includes:

- Creating an incident on their home unit, an area of equal familiarity, or recreate a past fire.
- Preparing to run the model by setting basic weather, wind, ignition and landscape parameters.
- Running the model and interpreting the results.

Before you begin:

- Ensure you have a WFDSS User Name and Password. For information on requesting an account see http://wfdss.usgs.gov/wfdss_help/WFDSSHelp_request_acct.html

- Have access to WFDSS Training site
- Have either Fire Behavior Specialist or Super Analyst user role. You will also need the Author user role to create an incident.
- This document contains electronic hyperlinks to WFDSS Help and related documents. The hyperlinks are Underlined, clicking on this text will take you to the help content or the related document. **Bold** text refers to specific text, buttons, tabs, pages, etc. in the WFDSS program.
- The **WFDSS 101** series found on the **Training** page of WFDSS is an excellent source for gaining basic skills in using WFDSS.

Creating a New Incident

You need to create an incident on the **Training** site of WFDSS for this exercise. This may be a fictitious fire or you may choose to recreate a past fire. See **WFDSS 101** Lesson 2 Creating an Incident or see Creating an Incident WFDSS Help.

1. Create your incident.

## Running Near-Term Fire Behavior (NTFB)

Now that you have an incident created see Running a Near-Term Fire Behavior Analysis (NTFB). You are ready to begin setting up your Near-Term Fire Behavior analysis.

To run a Near-Term Fire Behavior model:

1. From the **Incident Analyses** tab for your incident select the **NTFB** radio button under the **New Analysis** and click on **Create Analysis for Incident***.*
2. Follow the Help instructions to enter General Parameters.
    > **Note:** If you are running this simulation in the winter or other off fire season times, use an **Analysis Timeframe *Start Date** and ***End Date** from a past fire season so the weather data the model selects is conducive to fire growth. Near-Term Fire Behavior uses historical weather data if a past dates are selected.
3. An **Ignition File** will not exist at this point unless other analyses have created one. You can **Create** your analyses without one to save your general parameters. You will create one in the following steps. You may also create a **Barriers File** later.
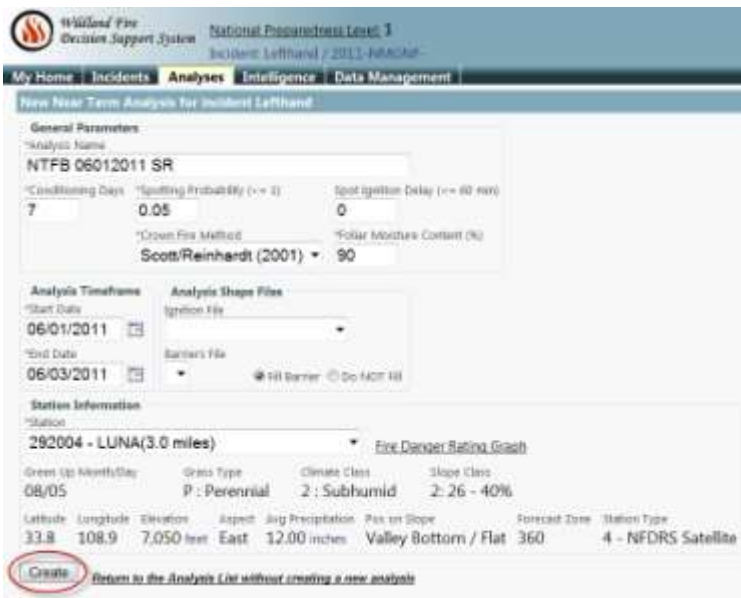
4. After creating your analyses, **Burn Periods, Initial Fuel Moisture, Weather,** and **Wind Stream** information appears below your General Information. Use the ▼ down arrow to expand each section. Adjust your **Burn Periods** see Setting Up Burn Periods for NTFB. Verify that your wind, weather and initial fuel moisture information is what you want to use, modify if necessary and **Save**. See Modifying Fuel Moisture for Fire Behavior Analysts, Modifying Weather Stream Data (Analyst-Assisted BFB & STFB, NTFB), Modifying Wind Stream Data (Analyst-Assisted BFB & STFB, NTFB)
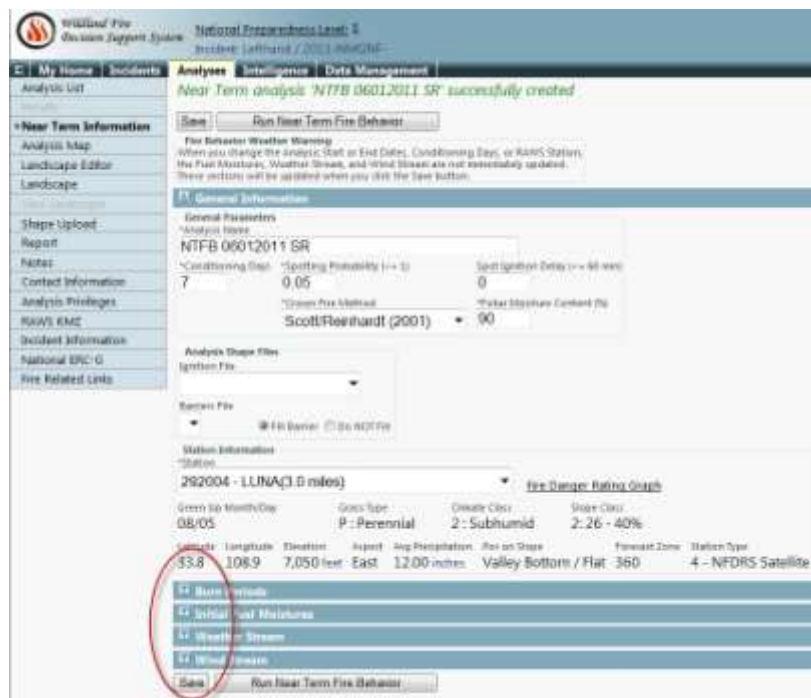

5. Use the menu options at the left to navigate to the **Analysis Map.** This is where you will define the landscape extent, ignitions, barriers, and landscape masks if used. The ▦ Extent

tool is used to draw the extent of analyses landscape on the map. Draw a landscape extent that is just a little larger than you feel the fire will reasonably spread to within the specified **Analysis Timeframe**. You can also use the default landscape extent (green box) selected for you by WFDSS. See Drawing Landscape Extent.
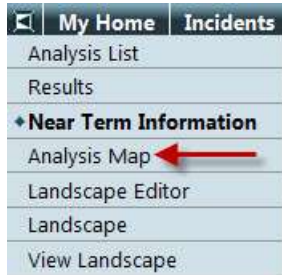
6. Create your **Ignition File** by clicking the **+** to the left of **Analysis** to expand analysis options. Click the green ⊕ to the right of **Ignitions** select the ◿ Draw a polygon tool and draw a small box around the point of origin. You are approximating the fires current perimeter. Other tools can be used for this purpose as well, such as the Draw a rectangle, Draw a line, or the Draw a point tools, although point ignitions can be problematic. It is best to begin with an ignition of two acres or more. Ignition files can also be uploaded (see Uploading Shapes) and existing shapes such as a fire perimeter on the map can be selected using the ⬉ Select features on map tool and saved as an ignition file. Once your ignition has been drawn or selected name it and click **Save.** See Creating an Analysis Ignition File, About Analysis Shape Files (Analyst-Assisted STFB, NTFB, FSPro).

7. **Barriers** can be created in the same manner as ignition files. The Draw a line tool may be appropriate for drawing a barrier along a highway or river.

    Note: NTFB only accepts one **Barriers File**, so separate barriers need to be combined into one file. See Creating a Barrier.

8. **Landscape Masks** are used to change landscape characteristics within a specific area such as fuel models within a burn area. Landscape Masks are created in a similar fashion to the ignition and barrier files. See Creating a Landscape Mask. The **Historical Fires** layer can be used to create landscape masks . See Copying Feature Information. GIS shape files can also be uploaded. See Uploading Shapes.

9. Use the *Menu* tab to navigate to the **Landscape Editor** if you want to make changes to the landscape, such as using any landscape masks you may have created. See Creating a Landscape Editor Rule**.**

10. Navigate to **Landscape** to create your landscape file from the extent you defined in Step 5. See Creating the Landscape File**.**
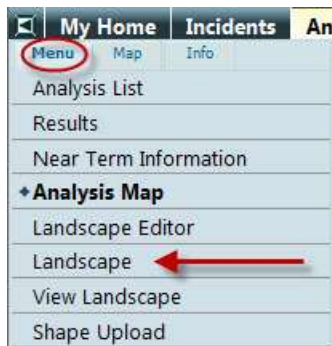
11. Generating the landscape takes a while. You may refresh the window by clicking on **Landscape** in the menu options*.* Once the landscape has been generated WFDSS displays a message at the top of the page indicating the landscape has successfully generated and the **Generate LCP Critique** button and **View Landscape** become available. These are good tools for assessing your landscape and any changes you may have made in Step 9. See Viewing the Landscape for Analysis, Generating a Landscape Critique.

> **Note:** You need to refresh the **Landscape** page after generating a Landscape Critique for the **Download LCP Critique** button to appear.

12. Once all the necessary inputs to the model have been added navigate back *to* **Near Term Information.** Use the drop-down box to select the **Ignition File** you created in Step 6 and the **Barriers File (**if you created one), and click **Save.**

13. To run the analysis, click **Run Near Term Fire Behavior** at the top or bottom of the page. A **Warning** message displays if you are missing inputs. You must complete the missing information before you can run the analysis.

14. When you click **Run Near Term Fire Behavior** you are returned to the **Analyses** page and be able to see your run with a status of **queued** or **Processing Results**. Processing may take several minutes. You need to refresh the **Analyses** page by clicking on the **Analyses** tab. Once your run status changes to **Review,** you may view the results by clicking the **View Results** button.

15. By clicking the radio button next to the 1 to 12 **hour interval** NTFB **Arrival Time**, fire progressions are displayed at that selected hour interval on the map. If the hour interval is greater than the burn period, it displays at the burn period interval. Clicking on the ⊞ Legend icon to the right of **Arrival Time** output brings up a Legend window for that output option. **Burn Periods** are displayed by black lines. **Other Characteristics** displays flame length, rate of spread and so forth, within the footprint of final fire progression similar to Basic Fire Behavior (BFB) outputs. For interpreting your results see Analyst - Assisted NTFB – What it means (interpretation)*.*

16. You decide when the run is valid and want to make it available to the decision, or the run is not valid and want reject it. From the **Results** tab you can **Accept** or **Reject** your simulation. Remember to add notes to the dialog box. This is your opportunity to explain to viewers:
   - Why the model run was made.
   - How it should be interpreted.
   - Assumptions and limitations of the run.
   - Potential shelf life of the run.

- Triggers for a new analysis.

   By selecting **Analysis Privileges** on the **Menu** tab you can grant specific people viewer privileges to view your model run without having to accept the run at this point. Your Basic Fire Behavior run will not be available to anyone else except Super Analysts to view until you either grant them viewer or editor privileges or accept the analysis. See <u>Granting Analysis Privileges</u>.

17. Copy Analyses, if you would like to make modifications to your run, you may use the **Copy** feature on the **Analyses** page to create a new Near-Term Fire Behavior analysis with all the same parameters used in the copied run. This feature allows you to make any changes to the parameters of the copy run. See <u>Copying an existing Near-Term Fire Behavior Analysis</u>.

Notes

A good Analyst keeps good notes. These notes help you as well as those who follow you to understand what you did and why. Each page in FSPro has **Notes** in the left-hand menu options. You may add Notes to each page to help remind you and tell others that follow you, what you changed and why on that page. These notes appear at the top of each page and can be changed or edited at any time.

Values Inventory

You can obtain values inventory information associated with a Near-Term Fire Behavior (NTFB) analysis. WFDSS uses the NTFB Arrival Time footprint to query the values inventory database. Click the ▼ down arrow to the right of your **Near Term Results** to expand the analysis information and click on the **Values Inventory**. This opens a new window with the values information**.** See <u>To access the STFB Values Inventory Information</u>
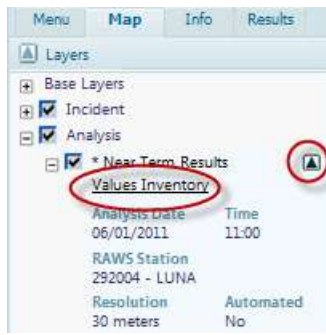
Now that you have successfully completed a Near Term Fire Behavior analysis and have acquired basic skills, we encourage you to practice and try more elaborate analyses. The links below provide further information that may be helpful as you develop your skills.

Reports & Downloads

- Viewing the Analysis Report

- Downloading an Analysis KMZ File

- Downloading a LCP File

- Uploading an LCP File

- Downloading a Landscape Critique

Further information on Near-Term Fire Behavior

- Analyst-Assisted – NTFB –What it is

- Analyst-Assisted NTFB – What it needs (inputs)

- Analyst-Assisted NTFB - What it does (outputs)
- Analyst–Assisted NTFB – Why use it (potential uses)
- Analyst–Assisted NTFB – Assumptions and Limitations