

## FSPro (Fire Spread Probability)

**Estimated time to complete: 90 minutes or more depending on how elaborate the user chooses to make the simulation.**

FSPro is a geospatial probabilistic model used as a strategic decision aid tool – looking at fire risk as it is determined by uncertainty in the weather. Greater uncertainty is present in weather as we go further into the future. A way of dealing with this uncertainty is to model a large sample of possible weather scenarios and see how that affects the variability in fire growth. FSPro is generally used for long term decision making (more than 5 days). FSPro calculates two-dimensional fire growth and maps the probabilities of a fire reaching each point (cell) on the landscape.

In this exercise Fire Behavior Specialists and Super Analysts will become familiar with how to prepare for, run and interpret a basic FSPro model. This exercise is not intended to be a comprehensive guide to FSPro, 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](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 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](#).

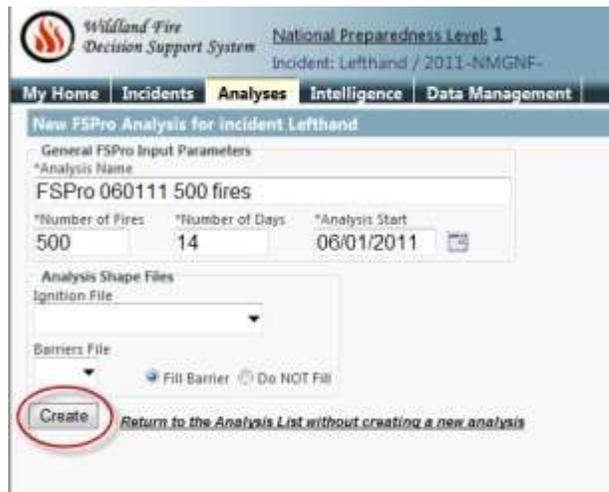
1. Create your incident.

### Running FSPro

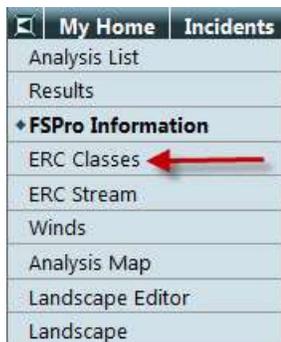
Now that you have an incident created see [About General FSPro Input Parameters](#). You are ready to begin setting up your FSPro analysis.

**To run a FSPro model:**

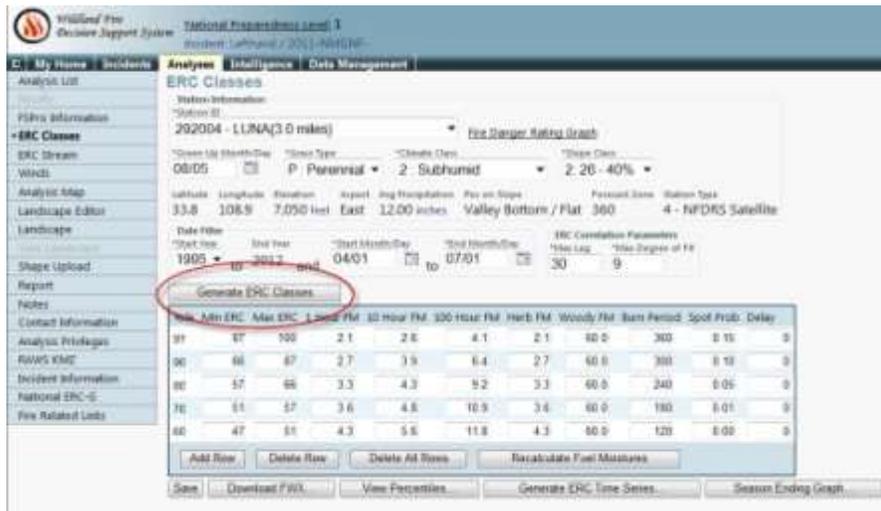
1. From the **Incident Analyses** tab for your incident select the **FSPro** radio button under **New Analysis** and click on **Create Analysis for Incident**.
2. Follow the Help instruction to enter General Parameters.  
**Note:** If you are running this simulation in the winter or other off fire season times, use an **\*Analysis Start** date from a past fire season so the weather data the model selects is conducive to fire growth.
3. The **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.



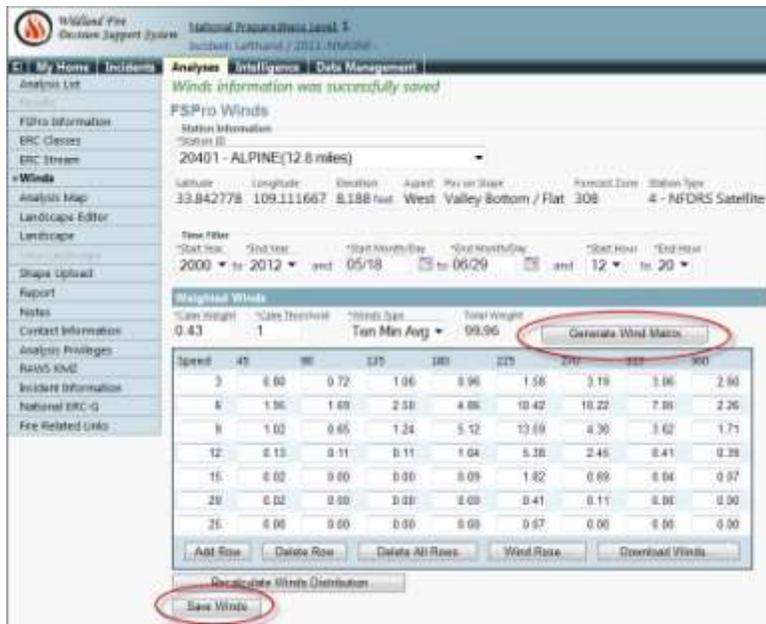
4. After creating your analyses, use the menu options at the left to navigate to **ERC Classes**.



5. Select the appropriate weather station from the drop-down list. See [Selecting a Weather Station for ERC Classes \(FSPro\)](#). Set the **Date Filter** (see [About the Date Filter \(FSPro\)](#)) and click **Generate ERC Classes**.



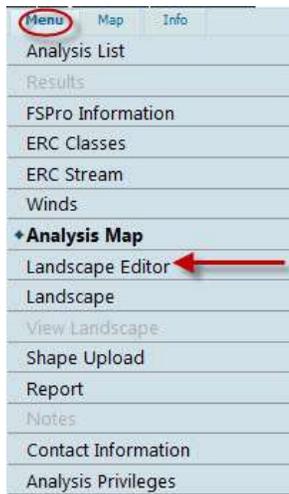
6. Once your ERC classes are generated you may modify these parameters. See [About ERC Classes \(FSPro\)](#), [ERC Classes Menu Option \(FSPro\)](#), [Modifying Fuel Moisture for Fire Behavior Analysts](#), [Modifying Fuel Moisture \(FSPro\)](#), [Burn Period](#), [Spotting Probability](#), and [About the ERC Time Series Graph \(FSPro\)](#). You may generally set your parameters based on observed conditions on the fire in the ERC bin that your fire currently falls into and adjust the other bins up or down from that point. Default values are fine for this simulation. Click **Save** when you are finished.
7. When you click save you are taken to **ERC Stream**. Review the ERC Stream data and make changes if necessary. See [About the ERC Stream \(FSPro\)](#) and [ERC Stream Menu Option \(FSPro\)](#). You can add forecasted data to your FSPro simulation if you chose. Doing so gives , you a current forecast. If you are using a past \***Analysis Start** date, the forecast has no effect. See [Getting NDFD Forecasts \(FSPro\)](#). Typically you want to limit your forecast data to no more than 33% of your simulation duration. Once your ERC stream and optional weather forecast is set click **Save Stream and Forecast**.
8. Navigate to **Winds**, you may chose a different weather station from the one you used for ERCs, in some cases you may have to choose a different one. See [Selecting a Weather Station for winds \(FSPro\)](#). Set the **Time Filter** , click **Generate Wind Matrix**, **review** the data if it appears correct, and click **Save Winds**. See [Setting up FSPro Winds](#). There are several options on this page to manipulate and analyze the wind data. See [Editing the FSPro Wind Matrix](#).



9. Navigate to the **Analysis Map**. This is where you 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](#).
10. 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 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 \(Analyst-Assisted STFB, NTFB, FSPro\)](#).
11. **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:** FSPro only accepts one **Barriers File**, so separate barriers need to be combined into one file. See [Creating a Barrier](#).
12. **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](#).

- Use the **Menu** tab to navigate to the **Landscape Editor** if you want to make changes to the landscape, such as any landscape masks you may have created. See [Creating a Landscape Editor Rule](#).



- Navigate to **Landscape** to create your landscape file from the extent you defined in Step 9. See [Creating the Landscape File](#).



- Generating the landscape will take little while. You may refresh the window by clicking on **Landscape** in the menu options. Once the landscape has been generated WFDSS gives you 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 the landscape and any changes you may have made in Step 13. 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.

- Once all the necessary inputs to the model have been added navigate back to **FSPro Information**. Use the drop-down box to select the **Ignition File** you created in Step 10 and the **Barriers File**, if you created one in Step 11, and click **Save**.

17. The **Run FSPro** button at the bottom of the page is available (not grayed out) if the model has all the necessary inputs to run. The **Run FSPro Status** box above the run button displays any missing information. When the **Run FSPro Status** box says **An FSPro Analysis can be run**, you are ready to run FSPro. Click the **Run FSPro** button.
18. You are returned to the **Analyses** page and can see your run with a status of **queued, In Process** or **Processing Results**. Processing may take several minutes. You need to refresh the **Analyses** page by clicking the **Analyses** tab. Once your run status changes to **Review**, you may view the results by clicking the **View Results** button. See [Monitoring FSPro Run Status from the Analysis List](#).
19. To help interpret analysis results, FSPro produces outputs that represent the probability of a fire burning a given area in the analysis timeframe. The discrete FSPro probability zones do NOT represent a fire progression, a fire perimeter, or fire sizes or shapes. However, the discrete FSPro probability zones (80-100%, 60-79%, etc.) cannot be interpreted as related to fire progress since there is no assumption about how long simulated fires take to reach each zone. An important point to remember is that any area in the probability output can be reached on the first day of the modeled period or the last day, and it could reach that point as a head, flanking, or backing fire. Because of these issues, FSPro output can be used to make informed decisions regarding strategy, but not tactics. See [FSPro Results – What do they mean?](#)
20. 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 analysisBy selecting **Analysis Privileges** on the **Menu** tab you can grant specific people viewer privileges to view your analysis without having to accept the run at this point. Your FSPro run is not available to anyone else except yourself and Super Analysts to view until you either grant them viewer or editor privileges or accept the analysis. See [Granting Analysis Privileges](#).
21. If you want to make modifications to your analysis, you may use the **Copy** feature on the **Analyses** page to create a new FSPro analysis with all the same parameters used in the copied run. This feature allows you to make any changes you wish to the parameters of the copy run. See [Copying an existing FSPro Analysis](#).

## 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 at Risk

You can obtain Values at Risk information associated with the FSPro probability classes.

See [Values at Risk Information](#)

Now that you have successfully completed an FSPro 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](#)
- [Downloading FWX Weather Files \(FSPro\)](#)
- [Downloading Winds \(FSPro\)](#)
- [Additional outputs from FSPro](#)
- [Downloading FSPRO output data from WFDSS to display in ArcMap](#)

## Related information on FSPro

- [FSPro Overview](#)
- [FSPro – What it is and Why use it?](#)
- [FSPro Model Limitations](#)

- FSPro – the How
- Interpreting FSPro Results
- Creating artificial weather scenarios
- Testing Your Understanding of FSPro Burn Probability Contours
- Review of FSPro Analyses Completed in 2010: Common Analytical Issues