

Tutorial B

How to Use Hazard Analysis Tools in IFTDSS for Prescribed Fire Planning

**Assessing Potential Fire Hazard Within and
Adjacent to a Prescribed Burn Unit**

Overview

This prescribed fire planning tutorial covers

- Acquiring LANDFIRE data and setting up a project in IFTDSS.
 - Reviewing and editing spatial landscape data.
- Creating a run focused on fire behavior across a landscape (IFT-FlamMap).
 - Establishing environmental parameters.
 - Reviewing spatial landscape input data and fire behavior output data.
- Examining data relative to points of interest and other geographic features using Google Earth.
 - Establishing a potential burn unit based on modeled fire behavior characteristics.
- Identifying potential fire hazard outside of a burn unit to help develop holding and contingency plans.

Introduction

The hazard analysis workflow provides tools to perform a current condition assessment of fire hazard within an area of interest.

The focus of this workflow is to identify areas that warrant further analysis based on potential fire hazard.

In IFTDSS, the user can assess potential fire behavior using a fire behavior mapping and analysis software application called **Calculate fire behavior across a landscape (IFT-FlamMap)**.

The module uses environmental variables, along with spatial landscape data, to compute potential fire behavior characteristics (such as rate of spread, flame length, and fireline intensity) for an entire landscape. You input constant weather and fuel moisture conditions to capture an instant in time.

High fire hazard is expressed by high potential fire behavior (e.g., flame length, rate of spread, and fireline intensity) and/or undesirable fire effects (e.g., tree mortality and emissions).

This tutorial walks through the steps needed to assess potential fire hazards within and adjacent to a burn unit using the IFTDSS.

Introduction

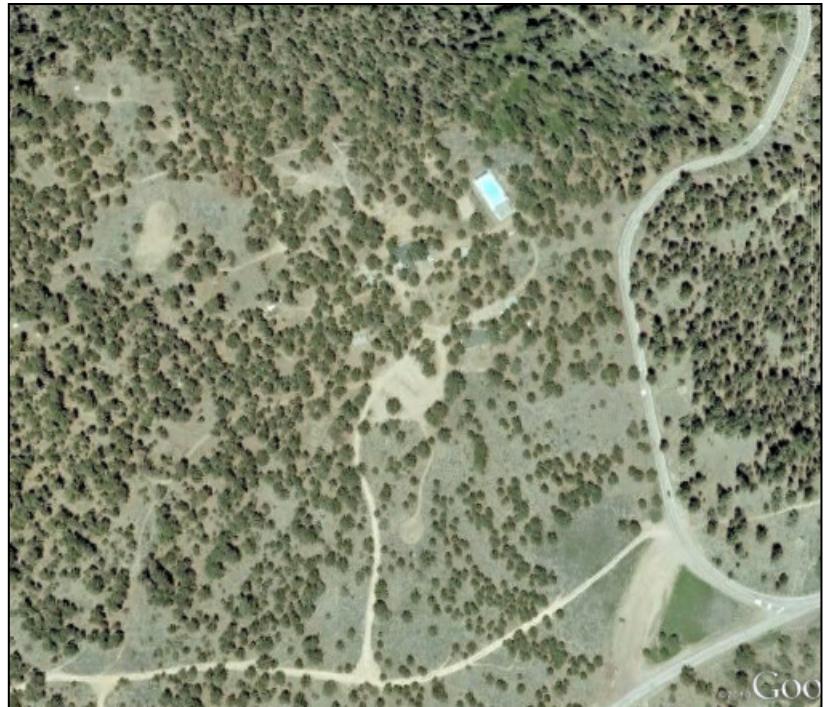
The output from a hazard analysis can be useful for

1. Identifying areas across a landscape where further fuels treatment analysis may be warranted.
2. Prescribed fire planning to assess the potential fire hazard in the areas within and adjacent to a planned burn unit.

This tutorial focuses on assessing potential fire hazards within and adjacent to a prescribed burn unit using the IFTDSS system.

Tutorial Objectives

- Walk step-by-step through a tutorial on hazard analysis for prescribed fire planning using IFTDSS.
- Review and edit spatial landscape input data as needed.
- Model a weather prescription that would produce high fire behavior (i.e., high limits) for the environmental parameters required to meet our Prescribed Fire Plan objectives.
- Provide information to help establish burn unit boundaries using
 - modeled fire behavior characteristics using the fire behavior across a landscape module (IFT-FlamMap).
 - fire behavior parameters.
- Identify potential fire hazards outside a burn unit to help develop holding and contingency plans.

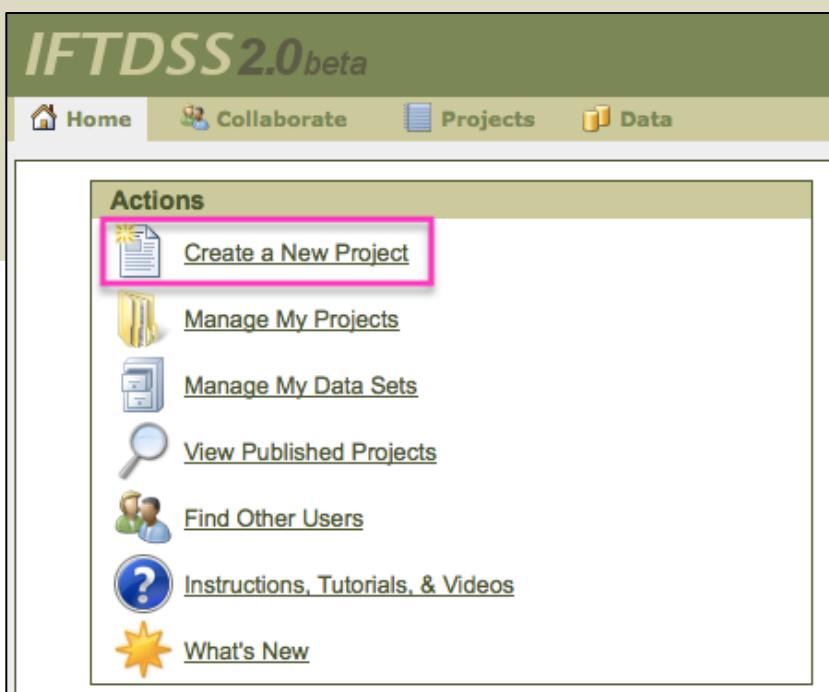


Getting Started

To begin, click **Create a New Project** under the Home tab.

- Choose a descriptive project name.
- If desired, fill in the optional information.

Choose **Next**.



Create New Project Help

Project Name
Tecuya Burn Unit

Optional Information:

Organization Name
Sonoma Technology, Inc.

Project Start Date 1/5/13

Project End Date 1/31/13

Project Size 400 acres

Treatment Type Hazard Analysis

Project Status Planned ▾

Description
Prescribed fire planning - hazard analysis.

Next

Getting Started

After creating a new project, you will see the page for **creating a new run**. The next step is to acquire LANDFIRE data, so we are going to navigate away from this page.

Access the project you created. In this example, we chose the **Tecuya Burn Unit** link.

The screenshot shows the IFTDSS 2.0 beta interface. At the top, there is a navigation bar with links for Home, Collaborate, Projects (which is the active tab), and Data. On the right side of the navigation bar, it says "Logged in as Banwell, Erin". Below the navigation bar, a green success message box contains a checkmark icon and the text "Created project 'Tecuya Burn Unit'." Underneath this message, the text "Choose the type of run you would like to create:" is displayed. A breadcrumb navigation bar shows "Start ▶ By IFTDSS Workflows ▶". To the right of this breadcrumb, there is a "Back" button with a left arrow icon. On the left side of the main content area, there are four category links: "Hazard Analysis", "Risk Assessment", "Fuels Treatment", and "Prescribed Burn Planning", each preceded by a folder icon. To the right of these links is a detailed description box containing text about the tools provided for Prescribed Burn Planning, Hazard Analysis, and Risk Assessment, explaining how they model fire behavior and develop burn plan documentation.

IFTDSS 2.0 beta

About Help Feedback Log Out
Logged in as Banwell, Erin

Home Collaborate Projects Data

Tecuya Burn Unit

Created project "Tecuya Burn Unit".

Choose the type of run you would like to create:

Start ▶ By IFTDSS Workflows ▶ Back

Hazard Analysis

Risk Assessment

Fuels Treatment

Prescribed Burn Planning

IFTDSS currently provides tools for Prescribed Burn Planning, Hazard Analysis, and Risk Assessment. The Prescribed Burn Planning tools allow you to model fire behavior and fire effects and develop burn plan documentation. The tools available for assessing hazard allow you to model potential fire behavior across a landscape to identify areas that may be potentially hazardous if a fire were to occur. The risk assessment tools allow you to predict the potential benefit or loss of values at risk across a landscape given current vegetation conditions and assumptions about fire weather.

Getting Started

Now, we will acquire data from LANDFIRE.

IFTDSS 2.0 beta

Home Collaborate Projects Data About Help Feedback Log Out
Logged in as Banwell, Erin

Tecuya Burn Unit [Create New Run](#)

Project Summary

Information [Edit](#)

Organization Name: Sonoma Technology, Inc.
Project Start Date: 1/5/13
Project End Date: 1/31/13
Project Size: 400 acres
Treatment Type: Hazard Analysis
Project Status: Planned
Description: Prescribed fire planning - hazard analysis.
Date Modified: 01/05/2013
Date Created: 01/05/2013

Area of Interest

Define your project area of interest by:

[Acquiring data from LANDFIRE](#) (highlighted)

[Manually defining the project area](#)

[Uploading a LCP file](#)

Runs

Getting Started

Next, select **Acquire data from LANDFIRE**, then choose **Next**.

The screenshot shows the IFTDSS 2.0 beta interface. At the top, there is a green header bar with the text "IFTDSS 2.0 beta". Below the header is a navigation bar with four items: "Home" (with a house icon), "Collaborate" (with a people icon), "Projects" (with a folder icon), and "Data" (with a bar chart icon). The "Projects" item is currently selected, indicated by a blue border around its button. The main content area has a light gray background and contains the following text:
Select a Data Set and an Area of Interest for your Project

Note that the data set you select will define the area of interest for your project.

There are three radio buttons for selecting a data source:

- Acquire data from LANDFIRE
- Use an existing data set: Mendicino NF (copy) ▾
- Upload a new data set

At the bottom left of the content area is a "Next" button, which is highlighted with a pink rectangular border.

Selecting a Project Area of Interest

Navigate to your desired location using one of these methods:

- (A) Using the navigation tools located in the top left portion of the map.
- (B) Using the mouse. Click and drag to move; double-click to zoom in.
- (C) Entering coordinates.

Tip: For this example, the coordinates are:

- **North:** 34.8462701863
- **East:** -119.084138535
- **South:** 34.8401768816
- **West:** -119.091562889

The screenshot shows the 'IFTDSS 2.0 beta' software interface. At the top, there are tabs for Home, Collaborate, Projects, and Data. The Projects tab is active, showing a sub-menu for 'Landscape Hazard Analysis'. Below this, the main content area is titled 'Set Up Project Area of Interest'. It contains a form with fields for 'Data Set Name' (empty), 'LANDFIRE Data Layer' (set to 'LANDFIRE 2008 (v 1.10)'), and 'Fuel Model' (set to 'Scott and Burgan 40'). To the right of the form is a text box with instructions about defining the area of interest using a draw box or coordinates, and a note about data acquisition limits. Below the form is a map of North America with a yellow rectangle highlighting a specific area. A legend at the bottom left shows navigation icons (A) and a draw box icon (B). A text input field (C) is also present on the map. The map has a scale bar indicating 1000 km / 600 mi and a resolution of 30 meter resolution.

Selecting a Project Area of Interest

Name the data set.

Select a [LANDFIRE data layer](#) (LANDFIRE 2008 v 1.10 or LANDFIRE Refresh v 1.05).

Select a fuel model type ([Scott and Burgan 40](#) or [Anderson 13](#)).

Set Up Project Area of Interest

Data Set Name

LANDFIRE Data Layer

Fuel Model

North
34.8462701863

West
-119.091562889

East
-119.084138535

South
34.8401768816

Define the area of interest for your project by using the Draw Box tool to select an area on the map below or by using the

Click on the plus sign (+) in the upper right corner of the map to view different base layers (imagery, topo map, or street map).
accommodate larger landscapes in future software releases.



Selecting a Project Area of Interest

Choose **Next** to import LANDFIRE data.

There will be a short wait while the LANDFIRE data is imported.

Tip: Select a large data set area. By creating a large project area, you can view landscape data, and model fire behavior and effects, inside and outside the burn unit.

Maximum area: Currently, acquisition of LANDFIRE data is set to a limit of 400,000 acres.

Note: Once you select a data set, the project area cannot be changed. To change the project area, you must create a new project.

acres; however, this size limit will be increased to accommodate larger landscapes in future software releases.

Set Up Project Area of Interest

Data Set Name: Tecuya Project Area
LANDFIRE Data Layer: LANDFIRE 2008 (v 1.10)
Fuel Model: Scott and Burgan 40

North: 34.8462701863
West: -119.091562889
East: -119.08413853
South: 34.8401768816

Selected area: 117.65 acres
30 meter resolution

Back **Next**

Creating a New Run

After acquiring the LANDFIRE data, you are returned to the **Project Summary** page.

For use in spatial modules, you now have

(A) a Project Area of Interest

and

(B) a Project Data Set.

For your next step, choose **Create New Run**.

A

Project Summary

Information

Organization Name: Sonoma Technology, Inc.
Project Start Date: 1/5/13
Project End Date: 1/31/13
Project Size: 400 acres
Treatment Type: Hazard Analysis
Project Status: Planned
Description: Prescribed fire planning - hazard analysis.
Date Modified: 01/05/2013
Date Created: 01/05/2013

Area of Interest

Northeast corner:
Latitude: 34.8463966°
Longitude: -119.0840188°
Southwest corner:
Latitude: 34.8401769°
Longitude: -119.0915629°
Resolution: 30.0m x 30.0m

Total Area:
117.65 Acres
476,100 m²

[Import Landscape data from LANDFIRE](#)
[Import Fuelbeds from LANDFIRE](#) [Upload Landscape Data Set](#)

Runs

Run Name	Pathway	Date Modified	Date Created	Actions
No data available in table				

Filters: (all) (all) (all)

[Create New Run](#)

Project Data Sets

Data Set Name	Date Modified	Date Created	Status	Actions
Tecuya Project Area	01/05/2013	01/05/2013	Ready	(all)

B

Creating a New Run

Choose the type of run you would like to create by **choosing the following links:**

Hazard Analysis

↳ Fire Behavior

↳ Calculate fire behavior across a landscape (IFT-FlamMap)

In this **run**, you will

- a. Select an area of interest.
- b. Input your environmental parameters.
- c. Review the spatial landscape data.
- d. Review the fire behavior output data.

Choose the type of run you would like to create:

Start ▶ By IFTDSS Workflows ▶

↳ Hazard Analysis

↳ Risk Assessment

↳ Fuels Treatment

↳ Prescribed Burn Planning

Choose the type of run you would like to create:

Start ▶ By IFTDSS Workflows ▶ Hazard Analysis ▶

↳ Fire Behavior

↳ Fire Effects

Choose the type of run you would like to create:

Start ▶ By IFTDSS Workflows ▶ Hazard Analysis ▶ Fire Be

▶ Calculate burn probability across a landscape (IFT-RANDIG)

▶ Calculate fire behavior across a landscape (IFT-FlamMap)

▶ Calculate minimum travel time (IFT-MTT)

Selecting an Area of Interest

Tip: Give your runs descriptive names for future reference.

The next step is to select an area of interest within the project boundary. In this example, we selected the entire project boundary.

Selecting the entire project boundary is useful if you want to model fire behavior before defining a burn unit, and/or you want to model fire behavior for an entire project area.

After selecting an area of interest, choose **Next**.

Create New Run: Calculate fire behavior across a landscape (IFT-FlamMap)

Run Name: Tecuya Burn Unit

Coordinates:

North	34.8463966
West	-119.0915632
East	-119.0840188
South	34.8401769

The extent of the box in the map window shows the project area that you have selected for this run. To change the area for this run, use the Draw Box tool to select a smaller area within the box shown in the map window.

Currently, the project and run areas are limited to 150,000 acres; however, this size limit will be increased to accommodate larger landscapes in future software releases.

Selected area: 122.76 acres

Map controls: Navigate Map, Draw Box

100 m
500 m

N

Next

Selecting a Data Set

Select the “Tecuya Project Area (100%)” data set and choose **Next**, which takes you to the **Inputs** step.

The screenshot shows the Tecuya Burn Unit software interface. At the top, there is a navigation bar with steps: Configure (highlighted in green), Inputs, Review Landscape Data, Outputs, Classify, Classified Outputs, and Run S ▶. Below the navigation bar, the title bar reads "Tecuya Burn Unit. - Calculate fire behavior across a landscape (IFT-FlamMap)" with Help and Tools dropdowns. The main content area has a green header "Select Landscape Data Set". It displays "Available Data Sets: Tecuya Project Area (100%)" with a dropdown arrow. A note below says, "Percentages next to data set names indicate the percent that the data set covers the selected run area. Data sets below 100% coverage will display a smaller area of data than the selected run area." Another note states, "A copy of the data set that you select will be made for this run. Changes to the original data set will not affect the data in this run. If you would like to re-import the selected data set into this run, return to this step later and click the Edit button." At the bottom left is a "Next >" button.

Configure Inputs Review Landscape Data Outputs Classify Classified Outputs Run S ▶

Tecuya Burn Unit. - Calculate fire behavior across a landscape (IFT-FlamMap) Help Tools

The fire behavior across a landscape module computes potential fire behavior characteristics at a landscape level. Users can upload a spatial dataset or define the spatial extent manually. Input variables include environmental (moisture and wind) characteristics. Output variables include various fire behavior parameters, such as flame length, rate of spread, and fireline intensity. [Click here](#) for more information about this module.

Select Landscape Data Set

Available Data Sets: Tecuya Project Area (100%) ▾

Percentages next to data set names indicate the percent that the data set covers the selected run area. Data sets below 100% coverage will display a smaller area of data than the selected run area.

A copy of the data set that you select will be made for this run. Changes to the original data set will not affect the data in this run. If you would like to re-import the selected data set into this run, return to this step later and click the Edit button.

Next >

Inputting Environmental Parameters

The screenshot shows the Tecuya Burn Unit software interface. At the top, there is a navigation bar with buttons for 'Configure', 'Inputs' (which is highlighted in green), 'Review Landscape Data', 'Outputs', 'Classify', 'Classified Outputs', and 'Run S ▶'. Below the navigation bar, the title 'Tecuya Burn Unit - Calculate fire behavior across a landscape (IFT-FlamMap)' is displayed, along with 'Help' and 'Tools' dropdown menus. A large green header bar labeled 'Properties' contains the 'Crown Fire Calculation Method' set to 'Finney Method' and 'Generate Gridded Winds' set to 'No'. The main content area is divided into sections: 'Fuel Moisture' and 'Weather'. The 'Fuel Moisture' section has a table with five rows:

Parameter	Unit	Simulation #1
1-hr Fuel Moisture	percent	6
10-hr Fuel Moisture	percent	7
100-hr Fuel Moisture	percent	8
Live Herbaceous Fuel Moisture	percent	60
Live Woody Fuel Moisture	percent	90

The 'Weather' section has a table with two rows:

Parameter	Unit	Simulation #1
Wind Direction	deg	290
20-ft Wind Speed	mi/h	15.00

At the bottom of the interface, there are buttons for '< Back' and 'Next >', and dropdown menus for 'US Customary Units' and 'Change Units'.

Now you are on the **Inputs step. The input fields are pre-populated with default values (the low moisture scenario from Scott and Burgan 2005).**

Definitions and possible value ranges will display when a mouse cursor is hovered over the underlined parameters.

The next step is to input custom fuel moisture and weather information.

These inputs are covered on the next page.

Inputting Environmental Parameters

Select the crown fire calculation method and input dead and live fuel moisture, and wind speed and direction.

Tip: Create multiple runs to test different weather prescriptions that can produce

- Low fire behavior
- High fire behavior
- Extreme fire behavior

For this example, we are interested in modeling a weather prescription that would produce high fire behavior (i.e., high limits) for the environmental parameters required to meet our Prescribed Fire Plan objectives.

Choose **Next**, which takes you to the Review Landscape Data step.

Properties		
Crown Fire Calculation Method	Finney Method	<input type="button" value="Change"/>
Generate Gridded Winds	Yes	<input type="button" value="Change"/>
Fuel Moisture		
Parameter	Unit	Simulation #1
1-hr Fuel Moisture	percent	<input type="text" value="4"/>
10-hr Fuel Moisture	percent	<input type="text" value="6"/>
100-hr Fuel Moisture	percent	<input type="text" value="8"/>
Live Herbaceous Fuel Moisture	percent	<input type="text" value="60"/>
Live Woody Fuel Moisture	percent	<input type="text" value="90"/>
Weather		
Parameter	Unit	Simulation #1
Wind Direction	deg	<input type="text" value="180"/>
20-ft Wind Speed	mi/h	<input type="text" value="20"/>

NOTE: Finney is the recommended crown fire calculation method when using Refresh LANDFIRE data layers.

The Scott-Reinhardt crown fire method may be more appropriate when using unmodified LANDFIRE data.

The Scott-Reinhardt method will result in modeling more crown fire in the landscape. We suggest you make multiple runs using each of these crown fire initiation methods and evaluate which is more appropriate for your local fuels based on fire behavior from historic fires.

Introducing the Map Toolbar

- Pan
- Zoom to initial extent
- Zoom in
- Zoom out
- Go back to previous pan/zoom
- Go forward to next pan/zoom
- Draw polygon
- Modify polygon
- Polygon advanced edit
- Point edit
- Advanced edit
- Save map image

Now you are on the Review Landscape Data step.

The map toolbar, located at the top of the map, provides tools for viewing and editing data.

Hover your cursor over each tool for a brief description of that tool.

The screenshot shows a map application interface. At the top is a toolbar with icons for Pan, Zoom, Draw polygon, Modify polygon, Polygon advanced edit, Point edit, Advanced edit, and Save map image. Below the toolbar are three tabs: Layers, Point Edit, and Exports. The Layers tab is selected, showing options for Base Layer (Street Map, Topo Map, Imagery) and Overlays (USA Federal Lands, Drawn Polygons, Data Set Boundary, Fire Behavior Fuel Model, Elevation, Slope, Aspect, Canopy Coverage, Canopy Height, Canopy Base Height, Canopy Bulk Density). The main map area displays a satellite view of a forested area with a network of roads. A large rectangular selection box is overlaid on the map, divided into smaller colored segments representing different fuel models. To the right of the map is a legend titled "Drawn Polygons" and "Fire Behavior Fuel Model" with a list of categories and their corresponding colors. An orange callout box in the bottom right corner contains the tip: "Tip: Click on Fuel Models under the Help dropdown menu to read a description of the environment and fuels for each fuel model."

Now you are on the Review Landscape Data step.

The map toolbar, located at the top of the map, provides tools for viewing and editing data.

Hover your cursor over each tool for a brief description of that tool.

Base Layer

- Street Map
- Topo Map
- Imagery

Overlays

- USA Federal Lands
- Drawn Polygons
- Data Set Boundary
- Fire Behavior Fuel Model
- Elevation
- Slope
- Aspect
- Canopy Coverage
- Canopy Height
- Canopy Base Height
- Canopy Bulk Density

Drawn Polygons

Fire Behavior Fuel Model

NB1: Urban/Developed
GR1(101)
GR2(102)
GS1(121)
GS2(122)
SH2(142)
SH7(147)
TU2(162)

Tip: Click on Fuel Models under the Help dropdown menu to read a description of the environment and fuels for each fuel model.

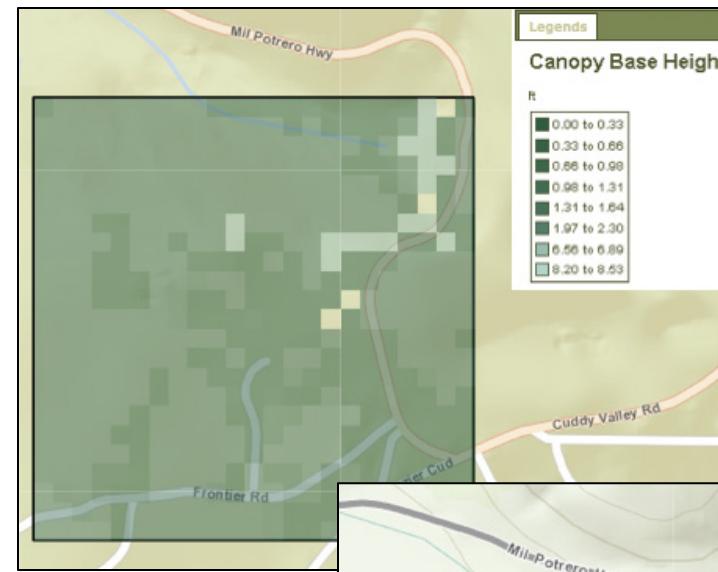
Reviewing Spatial Landscape Data

You can view the project area by the following LANDFIRE data:

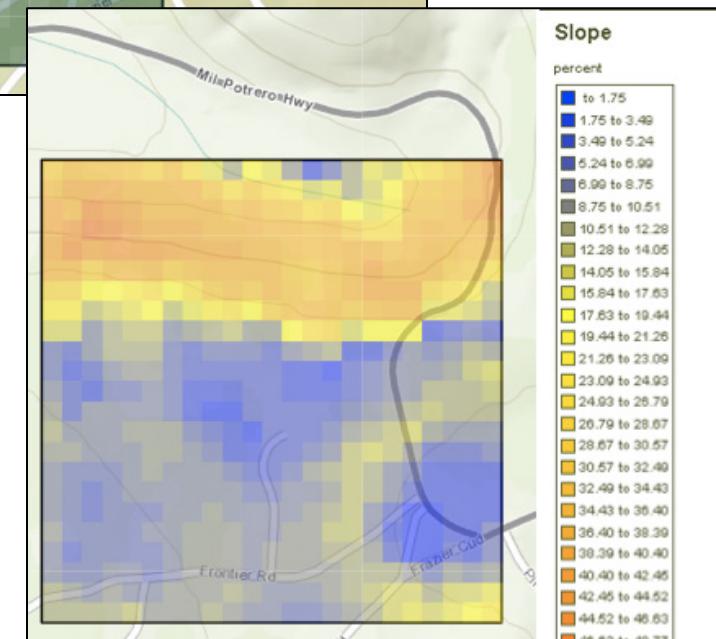
- Fuel Model
- Elevation
- Slope
- Aspect
- Canopy Coverage
- Canopy Height
- Canopy Base Height
- Canopy Bulk Density

You can also view the project area using imagery, topography, or street maps within IFTDSS. Toggle between these layers under the Base Layer section on the Layers tab.

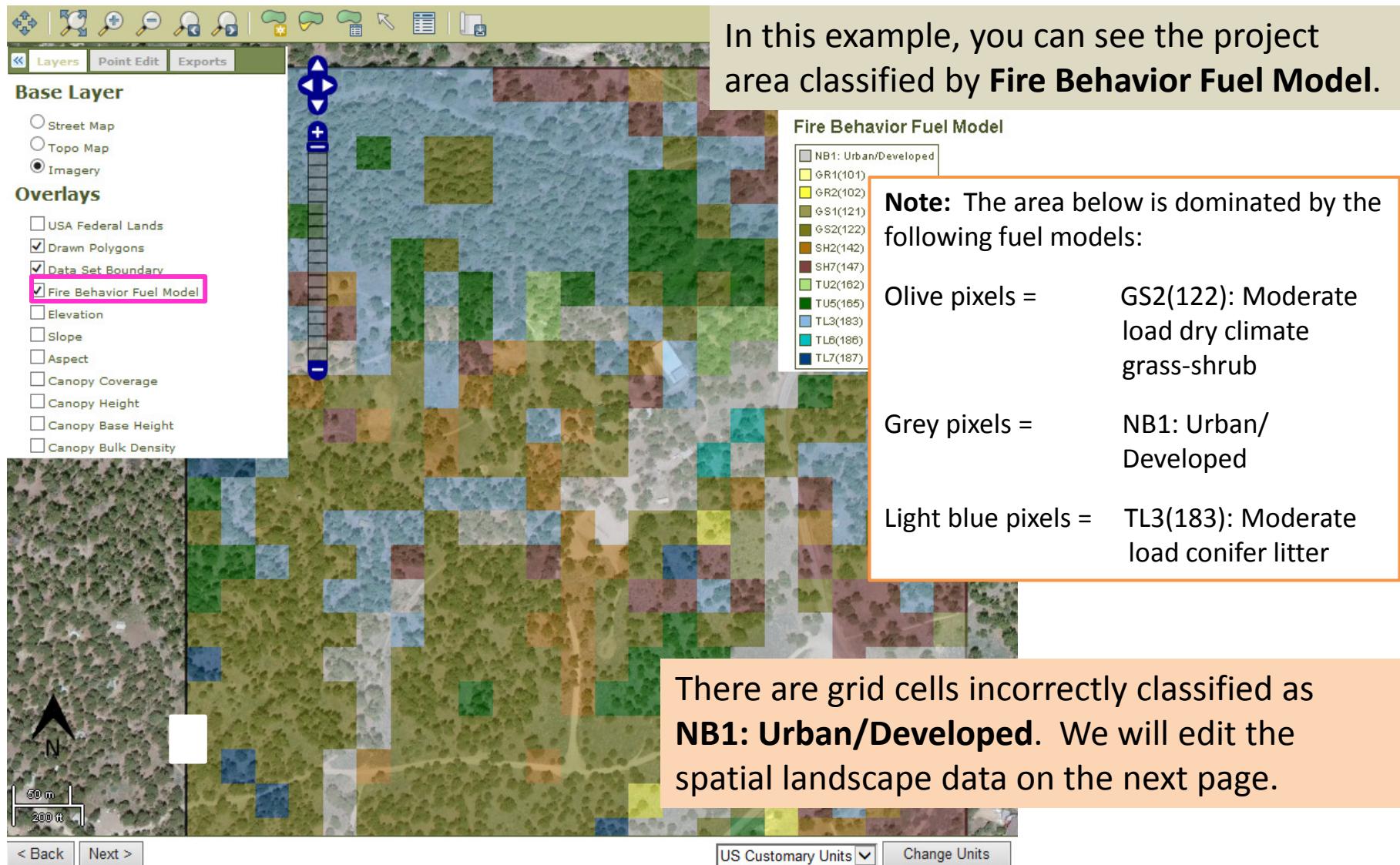
Canopy Base Height (street view)



Slope
(topo view)



Reviewing Spatial Landscape Data



Editing Spatial Landscape Data (One Grid at a Time)

After reviewing our data, we found grid cells incorrectly labeled as **NB1: Urban/Developed**. There are three editing tools on the map toolbar.

- **Point Edit:** edit one grid cell at a time
- **Advanced Edit:** edit grid cells across the entire run area.
- **Polygon Advanced Edit:** edit all pixels within a user-drawn polygon

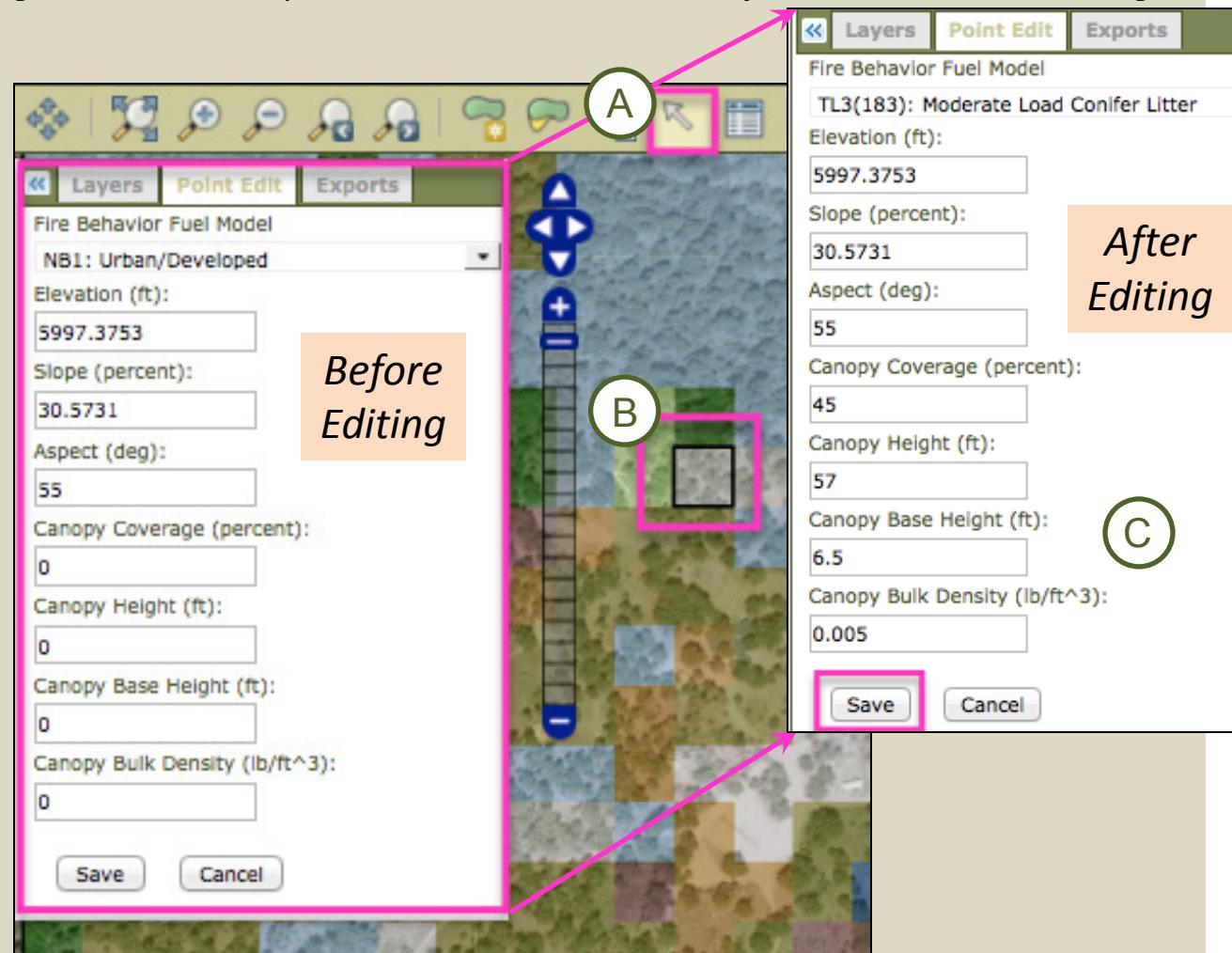
In order to edit one grid at a time:

A Select the **Point Edit** tool.



B Click on the grid cell you would like to edit, and the **Point Edit** panel appears.

C Edit the grid cell data and choose **Save**.



The next page shows how to edit the spatial landscape data using the **Advanced Edit** tool.

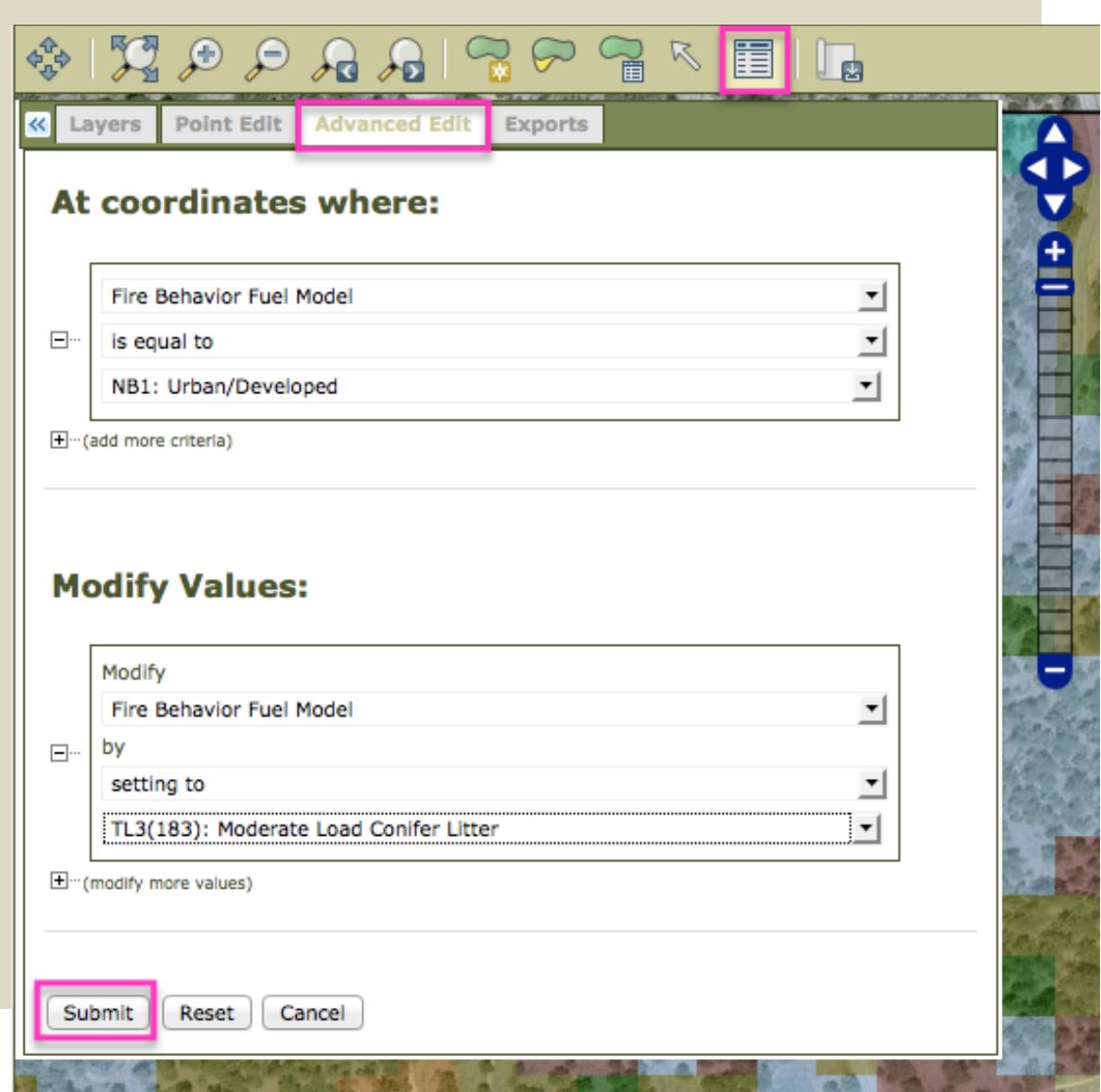
Editing Spatial Landscape Data (Multiple Grids across the Run Area)

In the previous example, we showed how to edit grid cells one at a time. You can also use the **Advanced Edit** tool to edit multiple cells at once.

To get started, select the **Advanced Edit tool**. The  Advanced Edit panel appears.

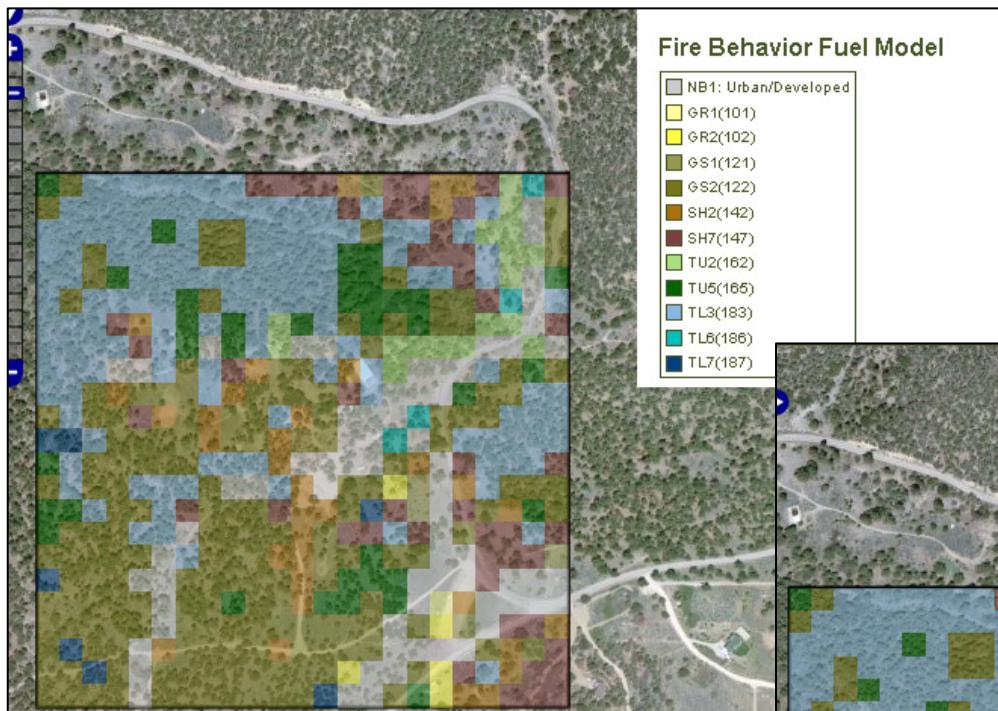
In this panel, you can modify any of the spatial data in query format so that multiple cells can be changed at once.

To learn how to edit pixels using the polygon advanced edit tool, see the tutorial, **How to Use IFTDSS to Acquire and Edit Spatial LANDFIRE Data**.

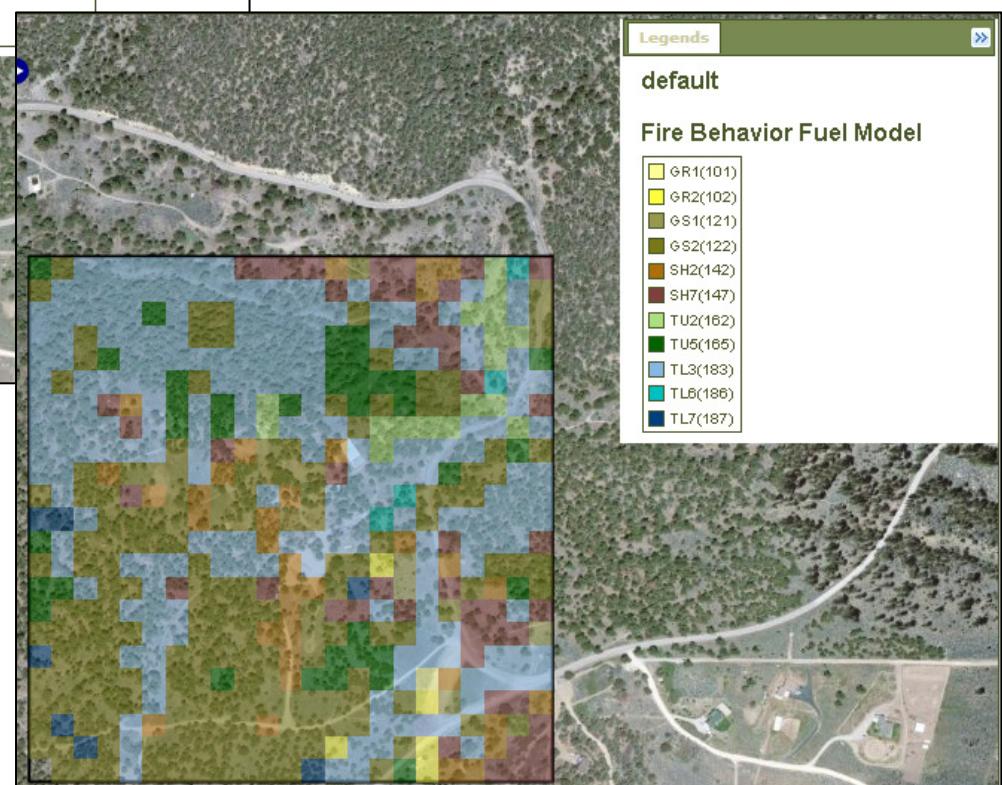


Editing Spatial Landscape Data

Before Editing



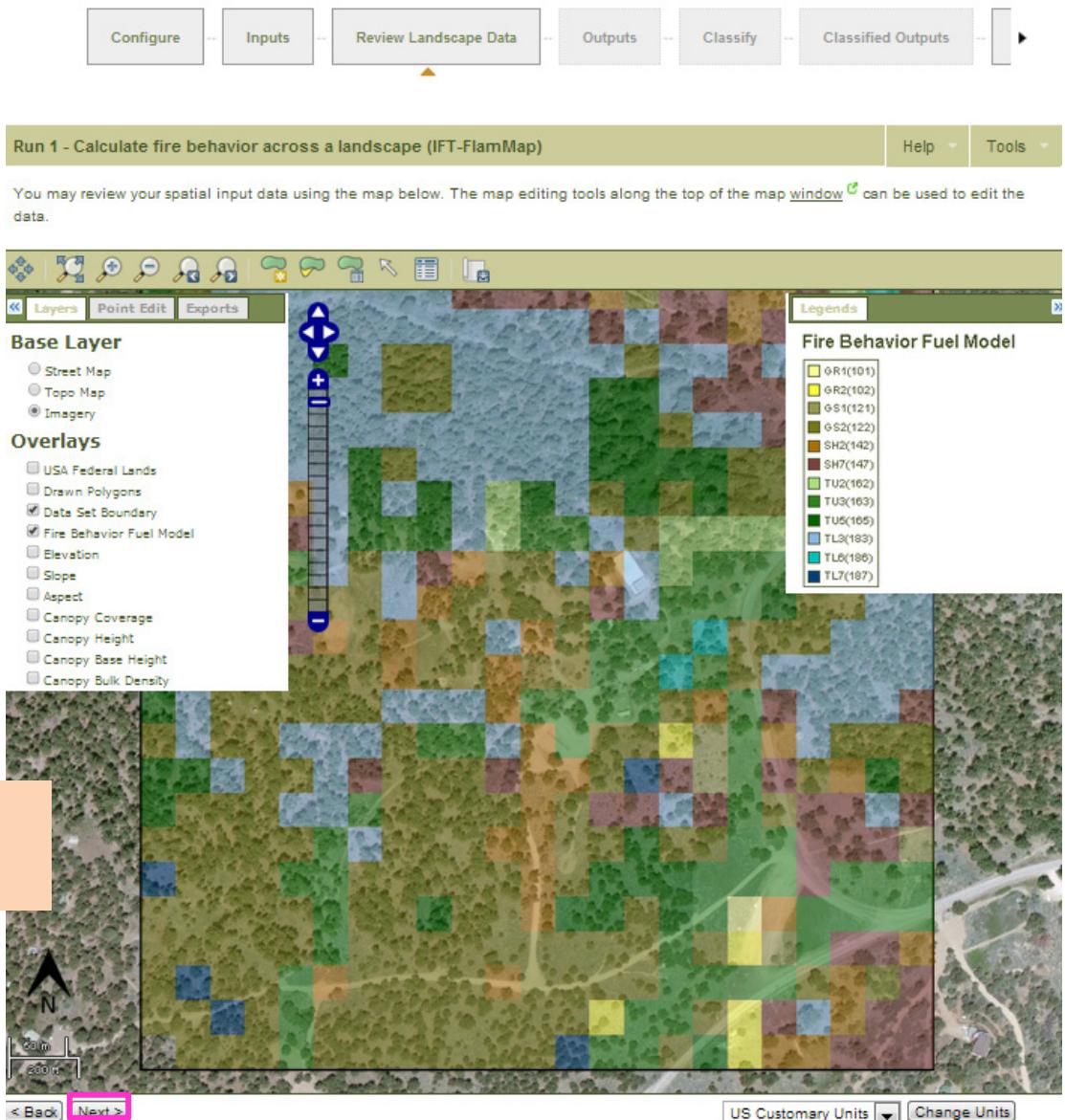
After Editing



Reviewing Spatial Landscape Data

After reviewing and editing the spatial landscape data, choose **Next**. This takes you to the fire behavior outputs step.

There is a short wait while the IFT-FlamMap module runs.



Reviewing Fire Behavior Output Data

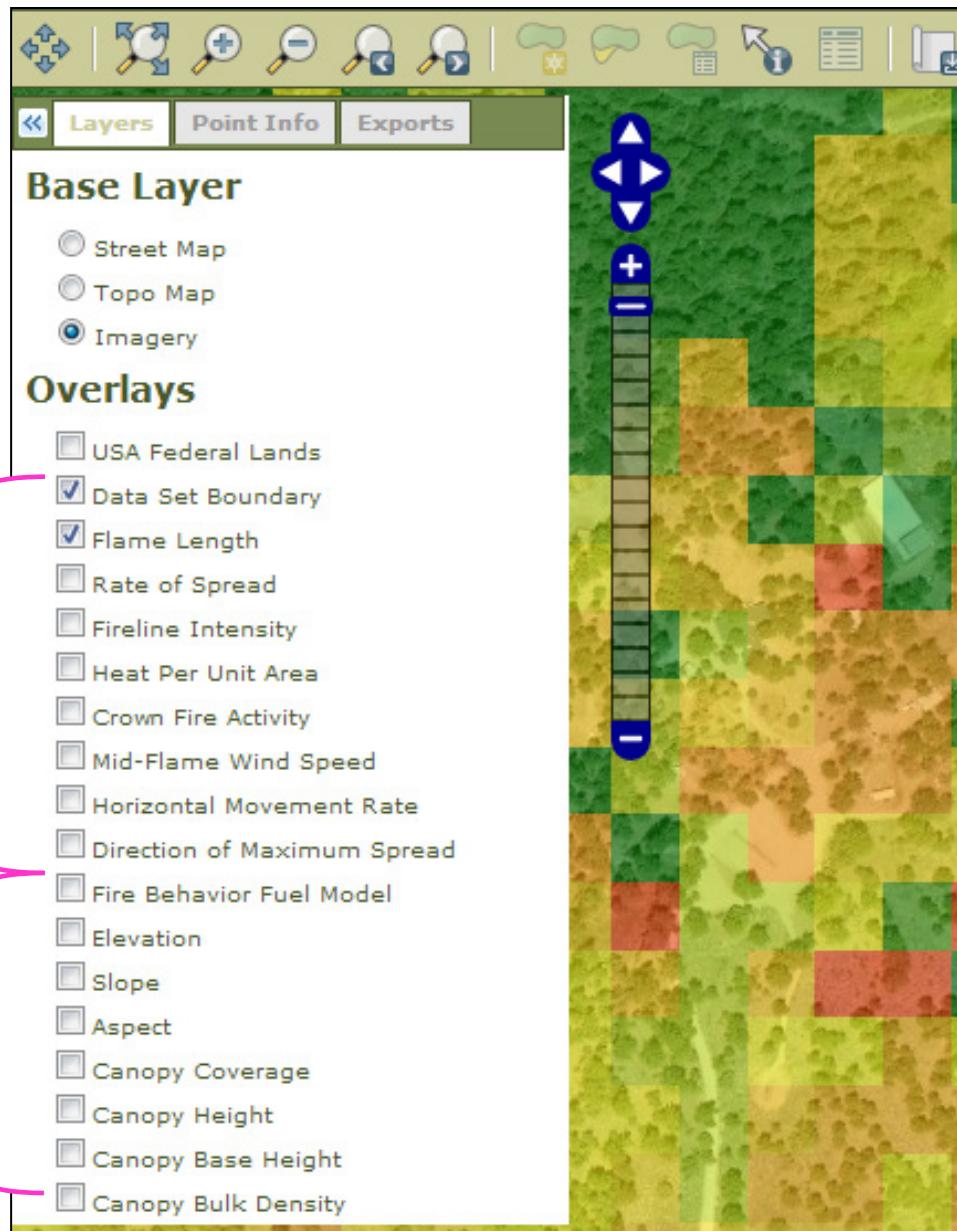
After running the module, you can review your spatial output variables using the map.

On this page, you can view both your spatial landscape input data and your spatial fire behavior output data.

Fire behavior output variables include:

- Flame Length
- Rate of Spread
- Fireline Intensity
- Heat per Unit Area
- Crown Fire Activity
- Mid-flame Wind Speed
- Horizontal Movement Rate
- Direction of Maximum Spread

Fire Behavior Output Data
Landscape Input Data



Reviewing Fire Behavior Output Data

To help outline a burn unit, you can use information derived from the modeled fire behavior, as well as fire behavior parameters.

We only want to consider a surface fire (no torching or crowning) and we want a majority of our burn unit to have flame lengths ≤ 4 feet.

Desired parameters:

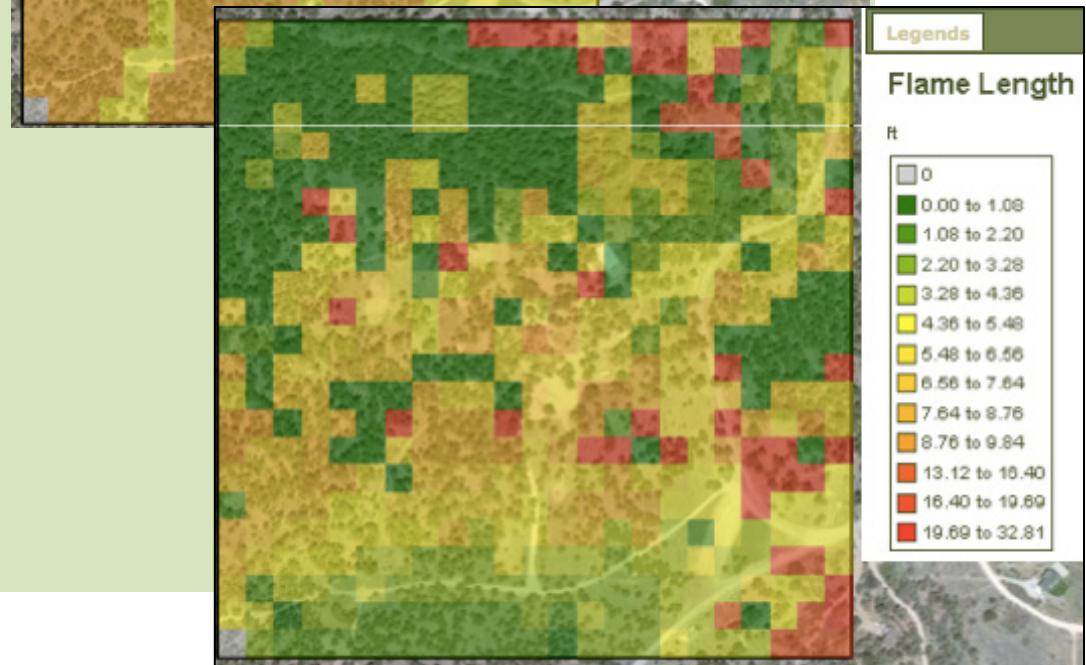
- Surface Fire (minimal torching)
- Flame Lengths ≤ 4 feet

Next, we discuss how the output data for each of the fire behavior parameters is divided into bins and relative bins.

Crown Fire Activity



Flame Length



Classifying Outputs

On this page, you can determine how you want to group, or classify, your outputs into more meaningful bins for analysis and display.

For example, you might want to bin potential flame lengths using the fire suppression techniques commonly referred to as the haul in chart, which classifies fire behavior parameters by potential fire suppression tactics (Table below; IFTDSS defaults). IFTDSS provides the ability to classify four fire behavior outputs: flame length, rate of spread, fireline intensity, and heat per unit area.

The default classification thresholds can be changed by entering the **minimum** values for each parameter class. The Low class for each parameter is not directly editable. It is determined by the value you enter for the Medium class. In the flame length example provided (right), flame lengths would be binned into the following classes: low (0 to 4 ft), medium (4 to 8 ft), high (8 to 11 ft), and very high (>11 ft).

Once you have set all minimum values, you have defined the range of each of your fire parameter bins.

Fire Suppression Interpretations		
Flame Length Class	Flame Length	
Low	< 4 feet	Fires can generally be attacked at the head or flanks by persons using hand tools. Handline should hold fire.
Medium	4 to 8 feet	Fires are too intense for direct attack on the head by persons using hand tools. Handline cannot be relied on to hold the fire. Bulldozers, engines, and retardant drops can be effective.
High	8 to 11 feet	Fires may present serious control problems: torching, crowning, and spotting. Control efforts at the head will probably be ineffective.
Very High	> 11 feet	Crowning, spotting, and major fire runs are probable. Control efforts at the head of the fire are ineffective.

Classify Parameters		
Parameter	Unit	Simulation #1
Medium Flame Length	ft	4.00
High Flame Length	ft	8.00
Very High Flame Length	ft	11.00
Medium Rate of Spread	chains/hr	20.00
High Rate of Spread	chains/hr	90.00
Very High Rate of Spread	chains/hr	150.00
Medium Fireline Intensity	Btu/ft/s	100.00
High Fireline Intensity	Btu/ft/s	500.00
Very High Fireline Intensity	Btu/ft/s	1,000.00
Medium Heat Per Unit Area	Btu/ft ²	100.00
High Heat Per Unit Area	Btu/ft ²	500.00
Very High Heat Per Unit Area	Btu/ft ²	1,000.00

Classifying Outputs

In the **Classify** step, you can also adjust the weights of the five relative data subsets for each parameter.

Using this functionality, you can narrow your search of high risk areas to areas with the highest flame length, rate of spread, fireline intensity, or heat per unit area.

In this example, we will reduce the output range for the Highest category of each parameter from 20% to 10%.

Note: The sum of all five weights *must* be 100%.

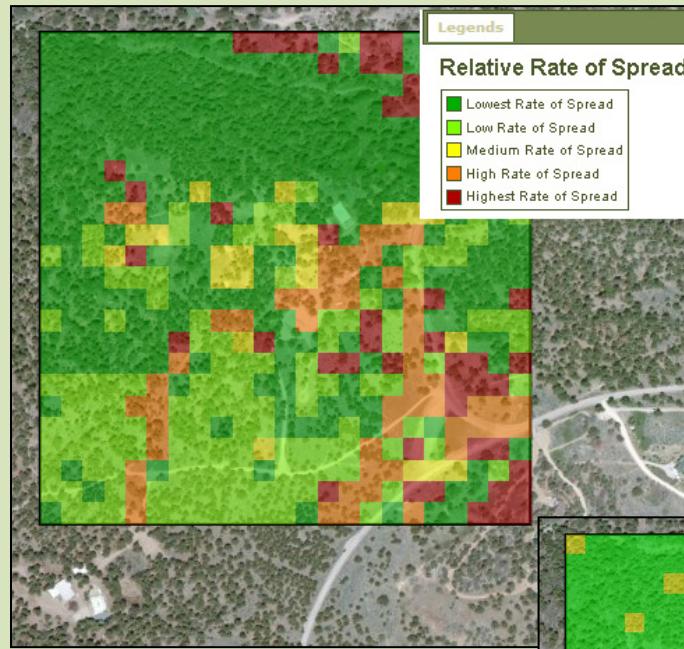
Relative Flame Length Category Percentage	
Lowest Flame Length	20
Low Flame Length	20
Medium Flame Length	20
High Flame Length	20
Highest Flame Length	20
Relative Flame Length Category Percentage	
Lowest Flame Length	50
Low Flame Length	25
Medium Flame Length	5
High Flame Length	10
Highest Flame Length	10

To view the user-binned parameters, choose **Next**.

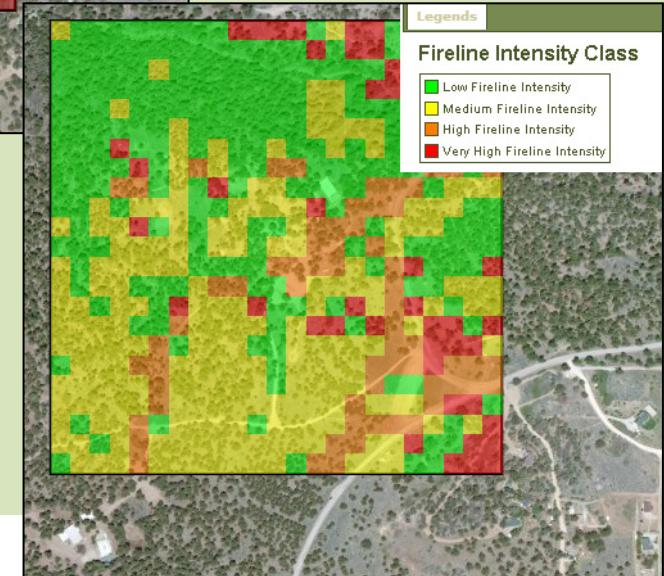
Reviewing Classified Fire Output Data

Now that fire behavior data have been categorized into bins, potential high fire hazard areas can be more easily identified across a landscape.

Relative Rate of Spread



Fireline Intensity Class



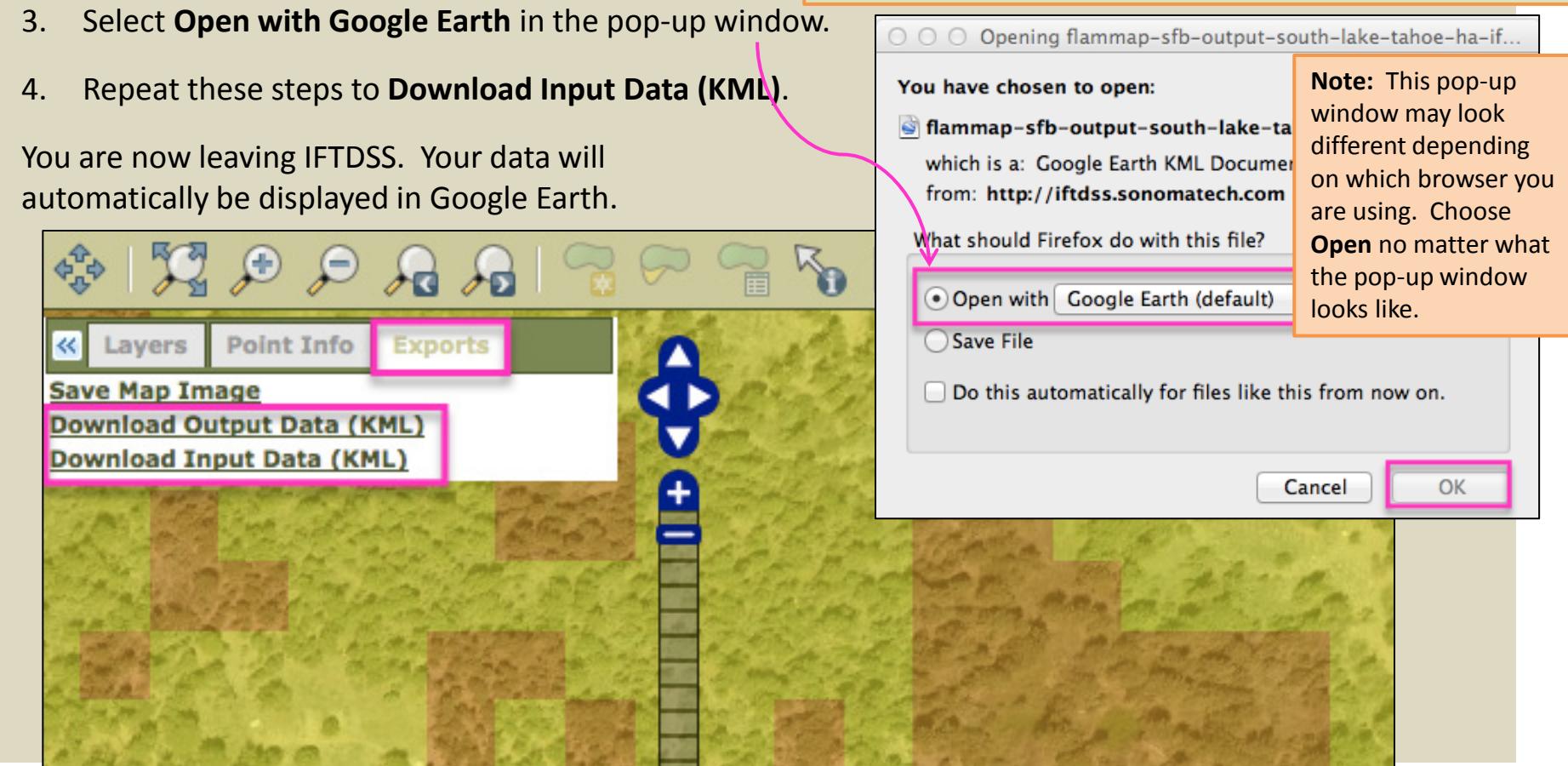
You can export IFTDSS inputs and outputs to Google Earth to examine data relative to other geographic features, and to create burn unit polygons.

Exporting to Google Earth

1. Access the **Exports** tab (located in the upper left panel).
2. Select **Download Output Data (KML)**.
3. Select **Open with Google Earth** in the pop-up window.
4. Repeat these steps to **Download Input Data (KML)**.

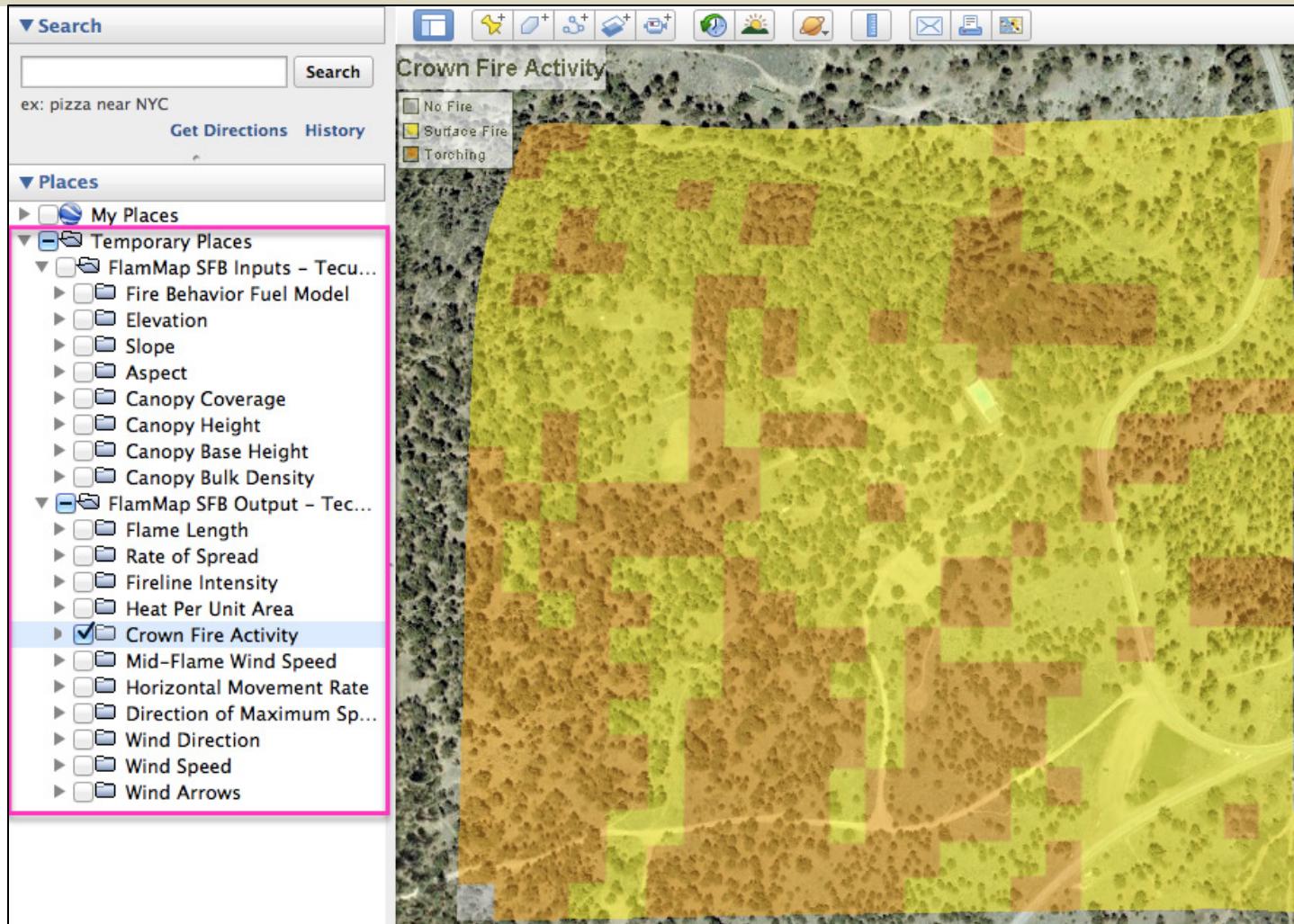
You are now leaving IFTDSS. Your data will automatically be displayed in Google Earth.

Note: To download Google Earth, follow this link:
<http://www.google.com/earth/download/ge/agree.html>

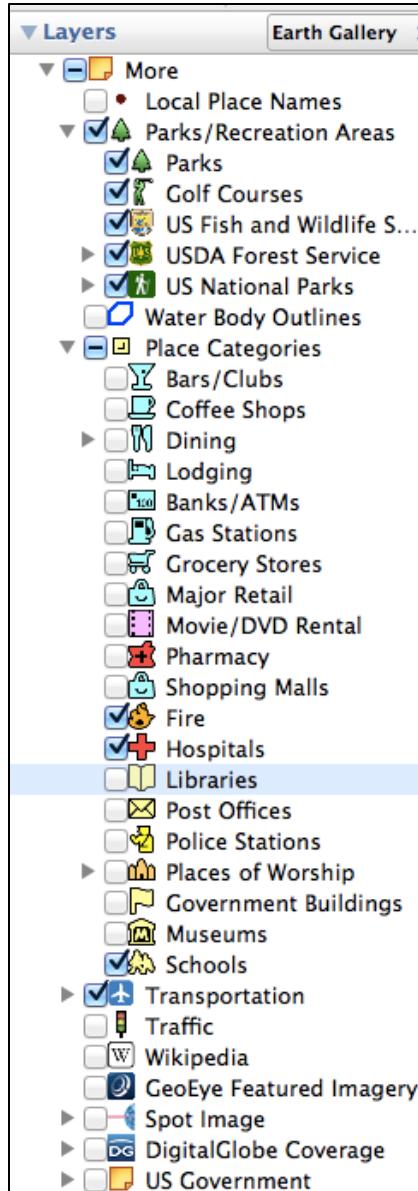


Evaluating Results in Google Earth

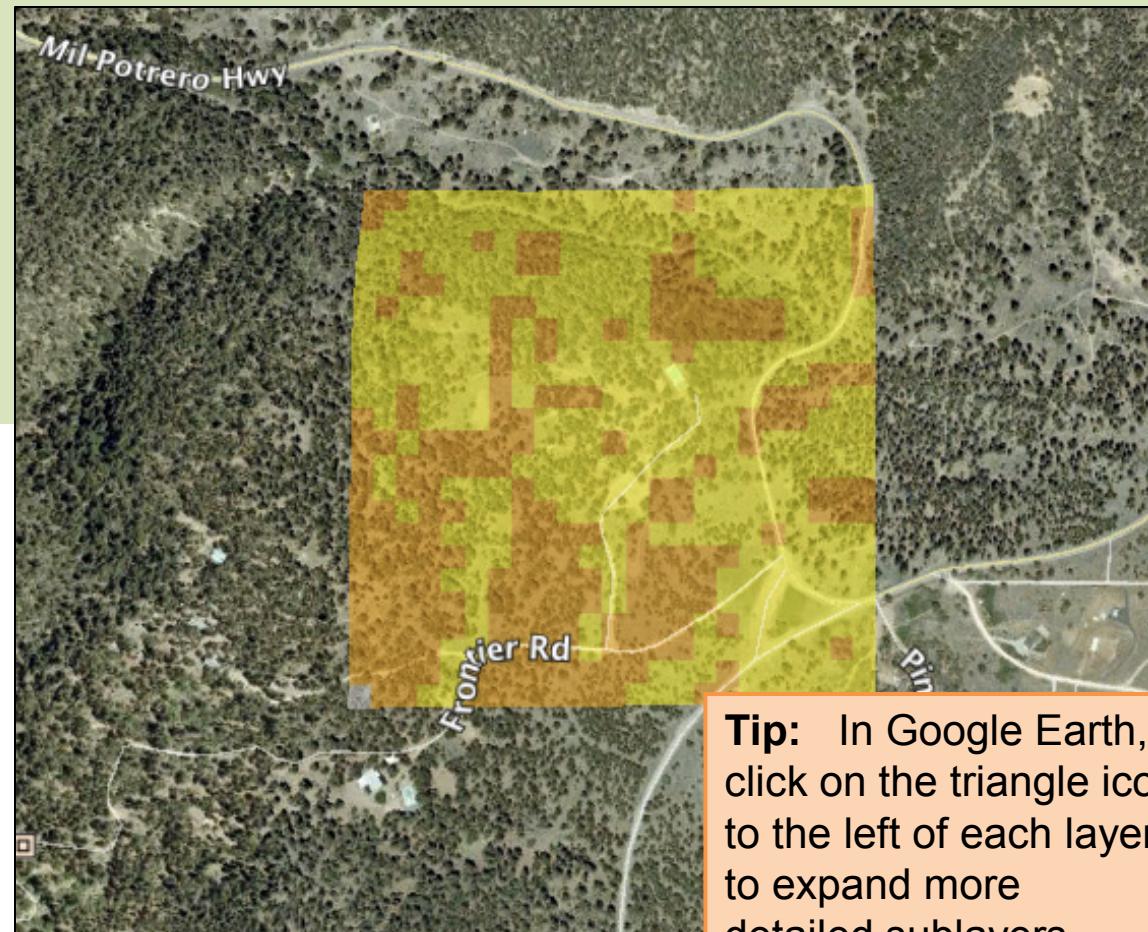
The input and output variables are now stored as layers in the “Temporary Places” folder within Google Earth. Unselect the fuel model and **Flame Length**, and select **Crown Fire Activity**.



Adding Map Details in Google Earth



Using the **Layers** tab in Google Earth, you can add such things as park and recreation areas, water body outlines, schools, airports, and roads to your map.



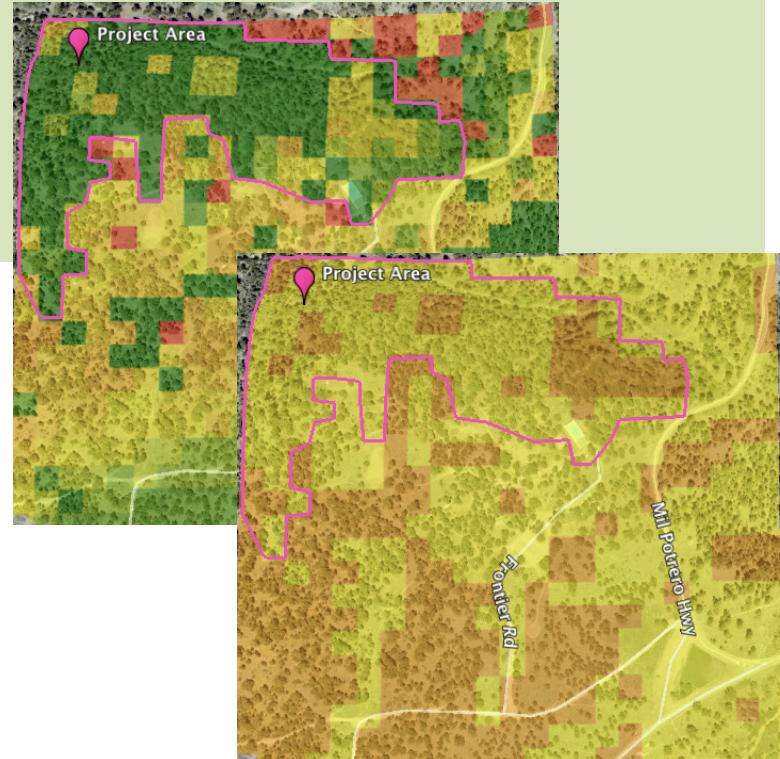
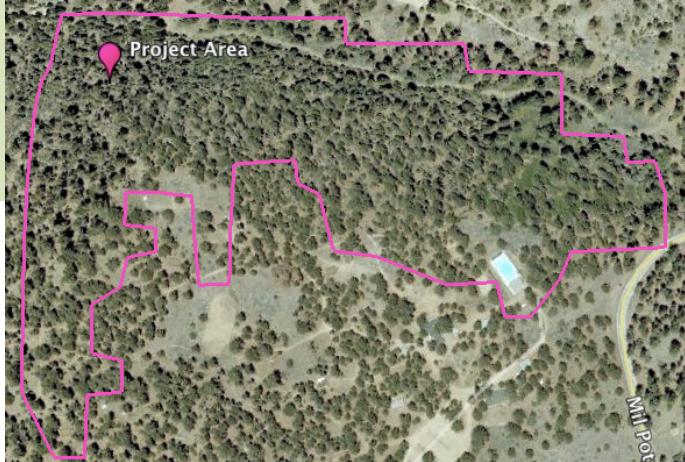
Tip: In Google Earth, click on the triangle icon to the left of each layer to expand more detailed sublayers.

Reviewing Results in Google Earth

In this example, we are going to view our project area with the modeled fire behavior.

Using the **New Polygon**  feature in Google Earth, we created a polygon around an area that we are interested in burning. We labeled this polygon “Project Area” using the placemark  feature.

Now, we will compare our desired fire behavior parameters (surface fire with minimal torching and ≤ 4 foot flame lengths) to the modeled fire behavior within and outside the project area.



Note: Pages 32-37 show module input and output variables in the Google Earth environment.

Reviewing Results in Google Earth

There are multiple patches of forest predicted to be “torching” fires (top – light orange) within and adjacent to our project area. There are also several areas where flame lengths are > 4 feet (bottom – yellow, orange, and red).

This information can help determine areas of concern inside and outside the burn unit.

Using this information, as well as natural and man-made fire breaks, we are going to create a new polygon within the project area. This polygon is now the potential Burn Unit.



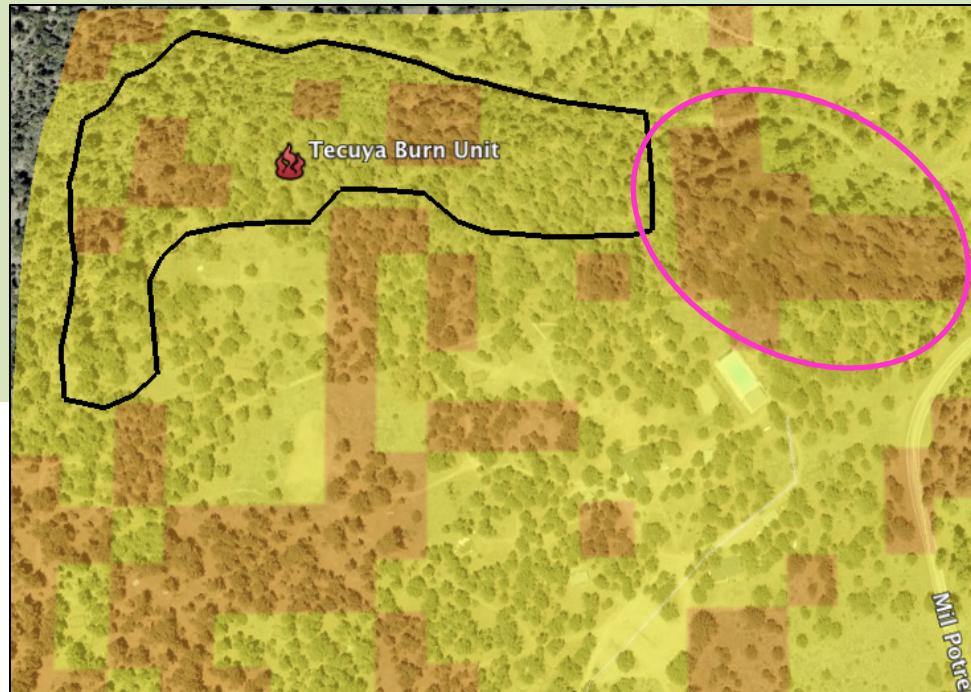
Reviewing Results in Google Earth

You can also view environmental and fire behavior characteristics outside the burn unit which can (1) help you locate critical holding points, vegetation changes, transportation routes, etc. and (2) aid in the development of contingency and holding plans.

In this example, there is a large patch of forest at risk for torching adjacent to the burn unit (circled). This information can help with the development of a holding plan.

Possible actions to reduce the risk of an escaped fire are to establish a wet line along the east boundary and to position a lookout in an area that allows for good viewing of the outside area at risk for torching.

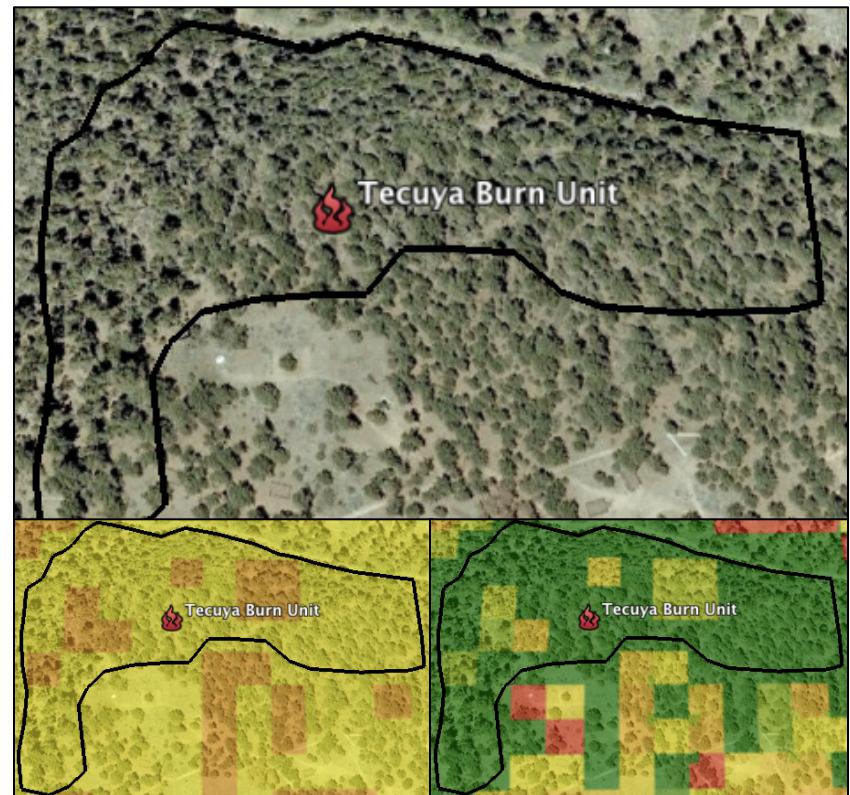
The small patches of forest at risk for torching within the burn unit may require fuels treatment prior to the burn.



Review

Using the Hazard Analysis work flow in IFTDSS, we were able to

- Review and edit spatial landscape data.
- Model “high limits” for the environmental parameters required to meet prescribed fire plan objectives.
- Establish potential burn unit boundaries using the modeled fire behavior parameters (IFT-FlamMap).
- Identify potential fire hazards outside the burn unit to help develop holding and contingency plans.



Additional Help

The screenshot shows the IFTDSS 2.0 beta interface. At the top, there's a green header bar with the title "IFTDSS 2.0 beta". Below the header are four menu items: "Home", "Collaborate", "Projects" (which is highlighted in blue), and "Data". On the right side of the header, there are links for "About", "Help" (which is highlighted with a pink box and a circled number 1), "Feedback", and "Log Out". Below the header, it says "Logged in as Lorentz, Kimberly".

To navigate to additional tutorials in the IFTDSS online help content,

- 1 Click the **Help** button
- 2 Then select **Getting Started (Tutorials and Videos)** from the side menu.

On that page, you'll find links to tutorials and videos on such topics as hazard analysis, prescribed burn planning, fuels treatment, spatial analysis across a landscape, and many more.

This screenshot shows a sidebar menu from the IFTDSS online help. The menu items are: "Interagency Fuels Treatment Decision Support System", "Getting Started (Tutorials and Videos)" (which is highlighted with a pink box and a circled number 2), "Concepts", "Hazard Analysis", "Prescribed Burn Planning", "Risk Assessment", "Fire and Fuels Application (FFA) Tools", "Reference Material", and "IFTDSS Compared with Other Systems".