



Developing Treatment Alternatives

Management Scenario

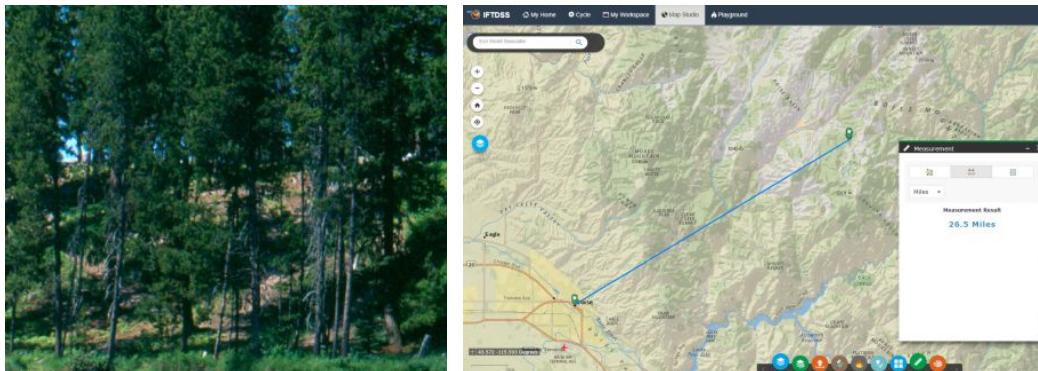
You are a Fuels Technician on the Idaho City Ranger District, Boise National Forest, about 30 miles northeast of Boise, Idaho. In this scenario you will use IFTDSS to plan a hazardous fuels reduction project.

Through observation and based on Forest Plan direction, you see a need for some sort of fuels reduction treatment in the mixed conifer stands in Granite Creek drainage, approximately 4 miles east of Idaho City. The area hasn't been treated in decades and the understory and surface fuels could contribute to uncharacteristically intense fire behavior. This would not only pose a hazard to the community of Idaho City and adjacent private land, but also cause undue mortality in this fire-adapted low elevation Ponderosa pine ecosystem that thrives on frequent but low severity fires.

Your objectives are to:

- Reduce surface fuel loading and the overall horizontal and vertical fuelbed continuity to reduce the fire hazard to adjacent private land and the community of Idaho City
- Return low intensity fire to fire adapted vegetation communities.
- Locate areas where treatments will be most effective
- Evaluate what type of treatment will help achieve these objectives
- Generate reports and document analysis findings regarding treatment recommendations to members of the district interdisciplinary (ID) project planning team.

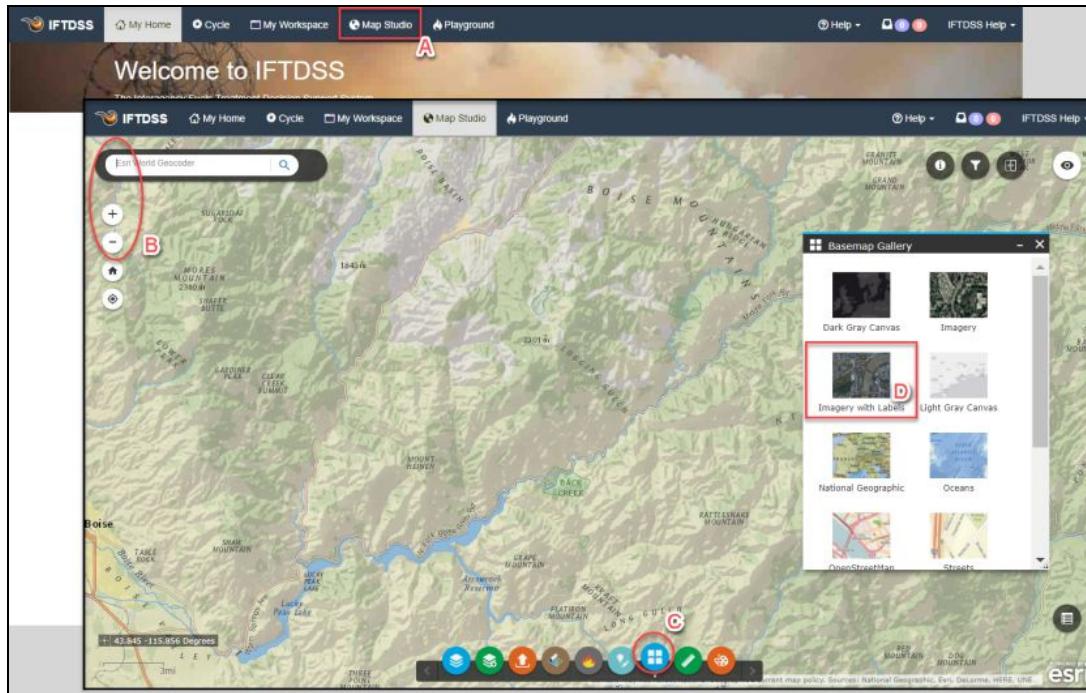
You will use IFTDSS to develop recommendations to support these objectives.





Previewing the Landscape

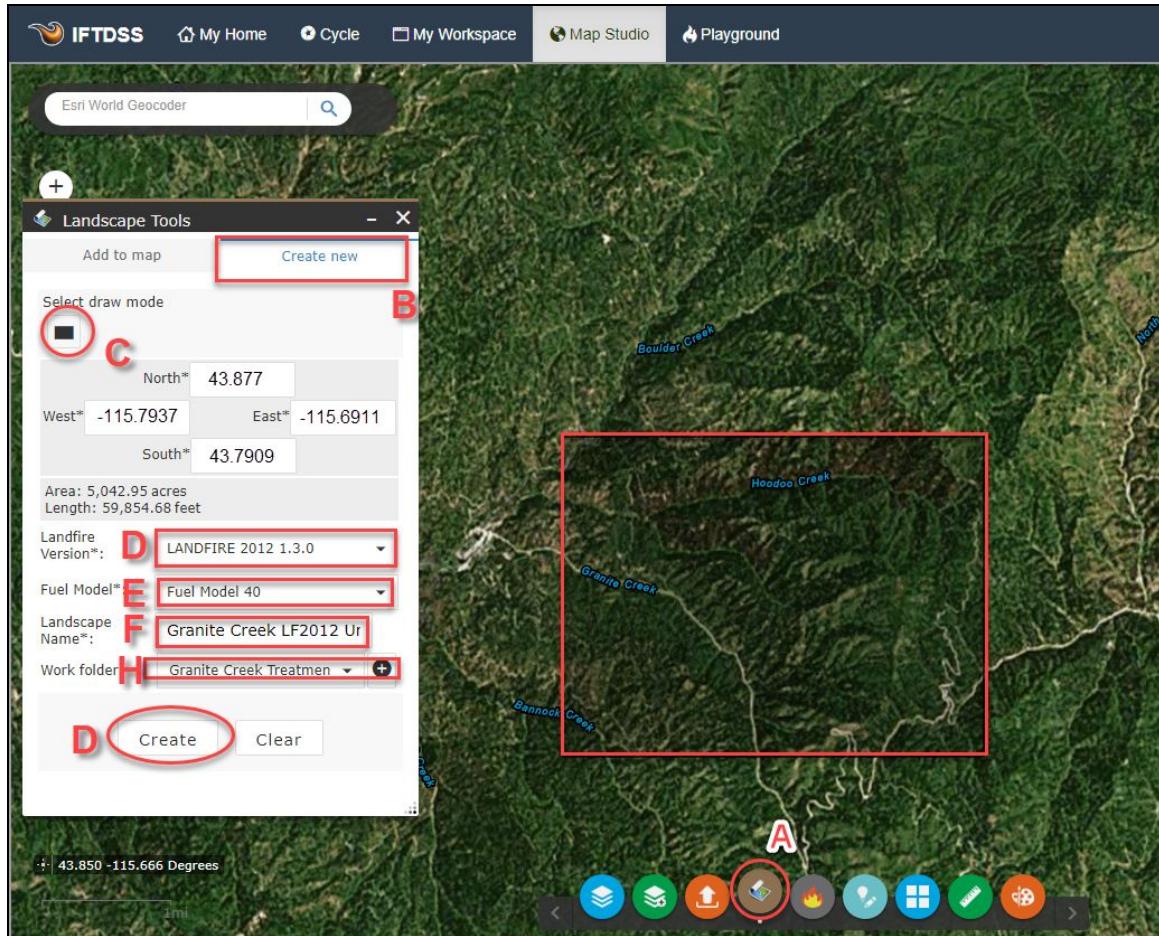
The first step will take place in Map Studio to get a good look at the area and create a landscape to start working from. To do this:



- A. Access Map Studio from the top navigation panel, visible on any page in IFTDSS.
- B. Use the **Zoom** buttons, and mouse, to the area. The location search box at the top of Map Studio can also be helpful.
- C. Open the **Basemap Gallery** to get a more detailed baselayer.
- D. Select "Imagery with Labels".

Create the Landscape

Next, you'll create your landscape, which will serve as a starting point for the rest of the analysis. To do this:



- A. Click on the **Landscape Tools** button at the bottom of the screen.
- B. Select the **Create New** tab to create a new landscape.
- C. Select **Draw Mode**, then drag across the area you'd like to analyze. For this example you can follow along by inputting the coordinates below directly:
 - o East: -115.5848
 - o West: -115.8096
 - o North: 43.8854
 - o South: 43.7675
- D. Select the version of LANDFIRE data, in this case 2012 1.3.0.
- E. Select the fire behavior fuel model type (13 or 40), here Fuel Model 40 was chosen.
- F. Name the new landscape "Granite Creek LF2012 unedited". Included the name, Landfire version, and its editing/treatment status to make it easy to discern this landscape from others once I start editing. Try to keep the entire name around 30 characters long to ensure it runs smoothly in future IFTDSS operations.

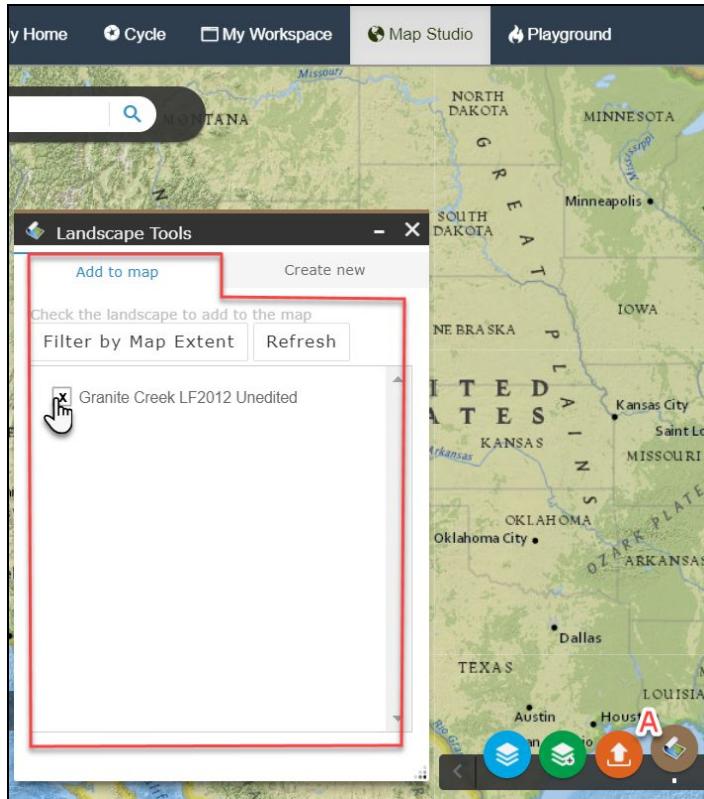


- G. Choose or create a new folder for this landscape, this is where the landscape will be stored in **My Workspace**. For this example, use the + button next to the folder name to add a new folder, name it "Granite Creek Treatments".
- H. Once everything looks good, click the **Create** button and wait a minute for the landscape to process. You may have to scroll down in your pop-up window to see the create button.

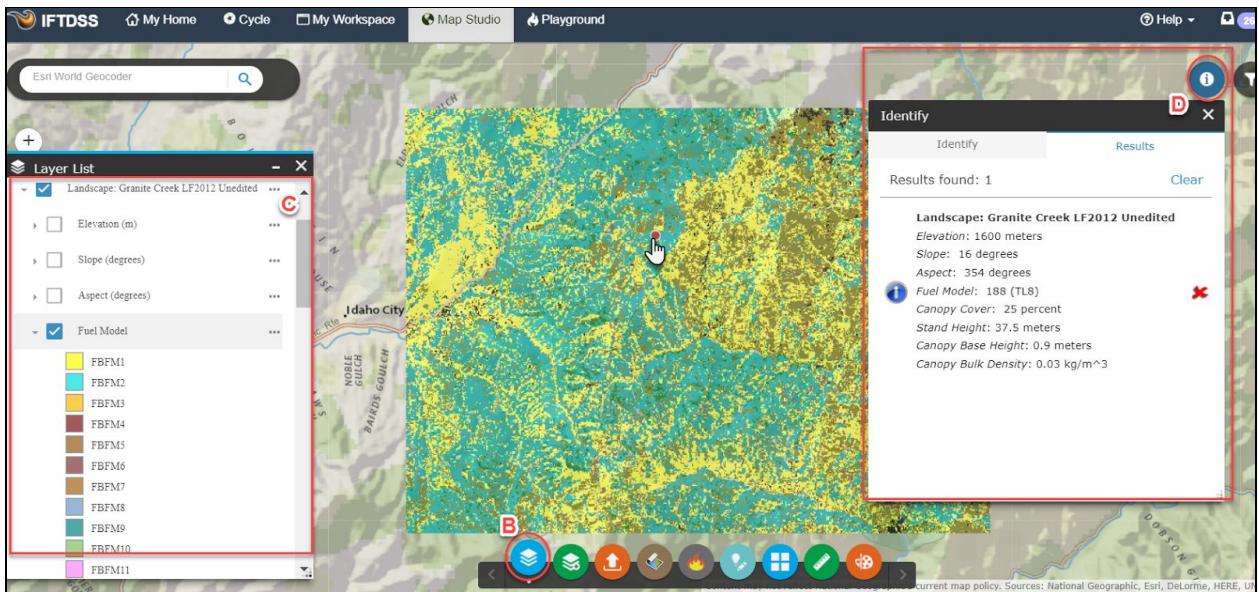
Assessing the Landscape

Identify Tool

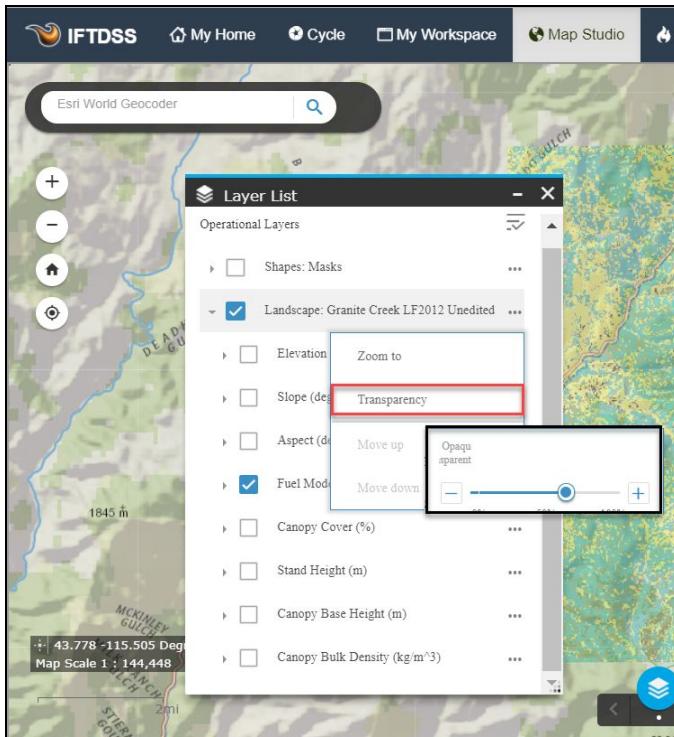
Assess the landscape in Map Studio, first by:



- A. Using the **Landscape Tools** button to check the landscape under the "Add to Map" tab, this adds the landscape to the map and the map's **Layer List**. These pop up "widget" boxes like landscape tools need to be manually closed to remove them from your view.



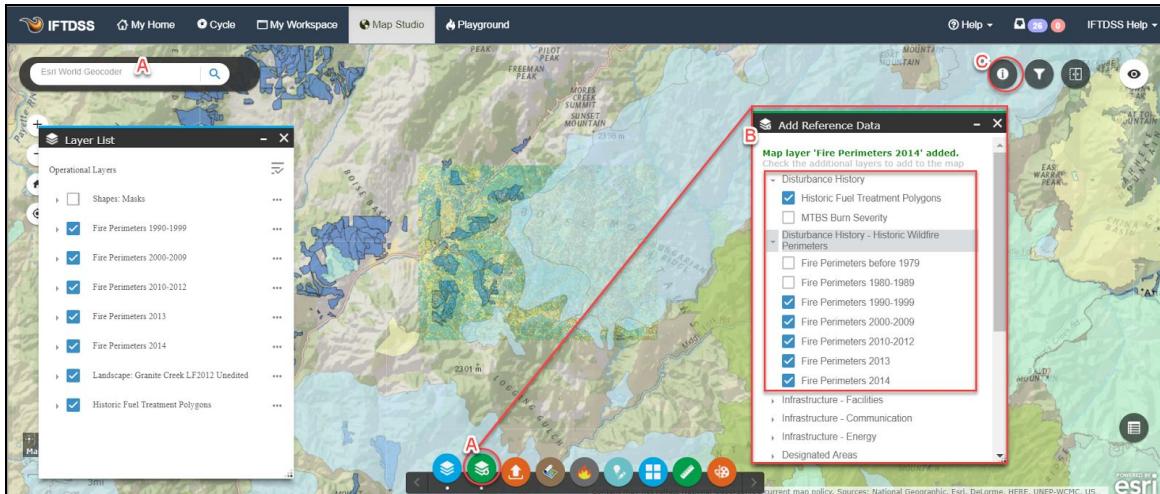
- B. After opening the **Layer List** button , ensure your landscape is checked, then check and uncheck the landscape layers you'd like to view. Elevation and aspect can be especially informative to look at.
- C. You'll want to look at the fuel models to make sure they correspond to what you are seeing on the ground in this area, so ensure that box is checked. Access more information for the landscape and subsequent layers via the small arrows next to the check boxes. In this case, check the box next to "Fuel Models", then click on the arrow to the left of the checkbox to dropdown to the Fuel Model layer legend.
- D. Click the **Identify** button in the upper right corner of the page to view more information for each pixel. In the identify tool pop up, select the layer you would like to view (Granite Creek LF2012 Unedited), then click on the landscape in an area you'd like to know more about. The "Identify information box" populates with the landscape information for this pixel. For example, by clicking you can see that the green-blue pixels on the map correspond to areas of Fuel Model 188 (TL8). Continue examining various areas of interest on the landscape to learn more about what fuel models are present and where. Notice that all of the landscape characteristics come up in the Identify box when you click on the landscape with the button, not just the characteristic you specified in your **Layer List**.



It may be helpful to adjust the transparency of the layer to better see roads, landscape characteristics, and other map features. To do this, click **More Options** to the right of the Landscape name in **Layer List**. A dropdown box of options opens. Choose **Transparency**, which opens a slider bar allowing you to adjust the transparency level for that layer.

Add reference data

Before doing a full assessment of the landscape characteristics, you will want to view previous fires that may have occurred in this area.





- A. Using **Add Reference Data** button  at the bottom of the screen, you'll see there are many options for additional data layers, including "Ownership" and "Critical Habitat Areas".
- B. For now, focus "Historic Wildfire Perimeters", and select the perimeters for years 1990-1999, 2000-2009, 2010-2012, 2013, and 2014. These will now appear in the **Layer List** and on the map.
- C. Use the **Identify** tool to identify the exact year of the Rabbit Creek and Bannock fires. Click the applicable Fire Perimeter layers on and off to compare the landscape and fuel models underneath. In this example we see they are reflective of these fires.

After doing an assessment of all the landscape characteristics (Elevation, Slope, Aspect, Canopy Cover, Stand Height, Canopy Base Height and Canopy Bulk Density) we determine that the Landfire 2012 data in this landscape is reflective of existing conditions, including previous fires. If there had been a more recent disturbance since this 2012 data was produced, such as a fire or fuels treatment that you would want to represent on this landscape, it could be easy to add by creating a polygon using the Add/Edit Shapes button  that reflect the area of interest, then make the appropriate landscape edits to reflect the disturbance. (More information on Landscape Editing is available via the [Landscape Editing Topic](#).)

Next, you'll run a summary report and compare these fuel models with potential landscape fire behavior.

Summarizing the Landscape

Creating a Landscape/Auto97th Fire Behavior report will run fire behavior under 97th percentile weather conditions, make the outputs available in Map Studio, and summarize behavior and landscape features in a downloadable report with tables and charts. To create the report:



The screenshot shows the IFTDSS software interface. At the top, there is a navigation bar with links for 'My Home', 'Cycle' (highlighted with a red box A), 'My Workspace', 'Map Studio', and 'Playground'. Below the navigation bar is a circular 'Planning Cycle' diagram with four quadrants: 'Reporting' (top), 'Landscape Evaluation' (center), 'Strategic Planning' (right), and 'Monitoring' (bottom). The 'Landscape Evaluation' quadrant is highlighted with a red box B. The main content area is titled 'LANDSCAPE EVALUATION' and contains three tasks: 'LANDSCAPE SUMMARY' (Generate landscape summary report), 'LANDSCAPE EDIT' (Edit/correct landscape data), and 'LANDSCAPE FIRE BEHAVIOR' (Calculate landscape fire behavior). To the right, a modal window titled '~ Future Development ~' displays a message about ongoing improvements to the software. At the bottom, there is a 'Landscape Summary' section with a dropdown menu for 'Select Landscapes' (highlighted with a red box C) and a 'Create Report' button (highlighted with a red box D).

- Click on **Planning Cycle** in the top navigation.
- The cycle opens on the **Landscape Evaluation** stage by default, from there click the **Landscape Summary** task.
- In **Landscape Summary**, click the dropdown box next to **Select Landscapes**. If the newly created landscape didn't appear in the drop down, use the **Refresh** button after giving the landscape a short time to process. The landscape appears with a green check next to it (the check indicates it has downloaded completely to your IFTDSS account). From this same screen, create an automated report to summarize not only the landscape characteristics, but also the modeled fire behavior outputs specific to this landscape based on approximated worst case (97th percentile fuel moisture and wind) conditions.
- Click on **Request a Report** so the report can begin processing, it will take a few moments for the report to process. To make sure the report is complete click the **Refresh** button. When complete, a green checkmark will appear next to the report name, and the name will become a hyperlink.

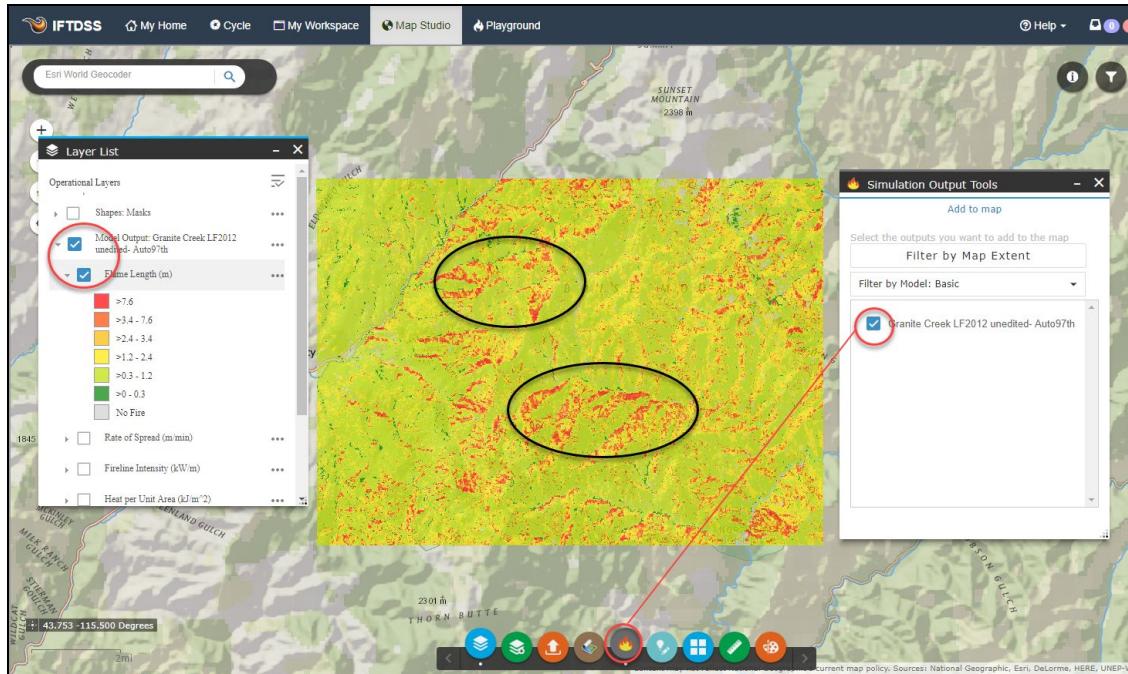


For this example we are going to view the fire behavior aspect of the report in Map Studio so it can be viewed with the landscape features, so close the report box and click the **View in Map Studio** button.



Comparing Landscape Features and Model Outputs with the Swipe Tool

After clicking **View in Map Studio**, the fire model layer will automatically open. For future use, you can remove that modeling layer, or add other modeling layers later, by clicking the **Simulation Output Tools** button  on the bottom of the screen.



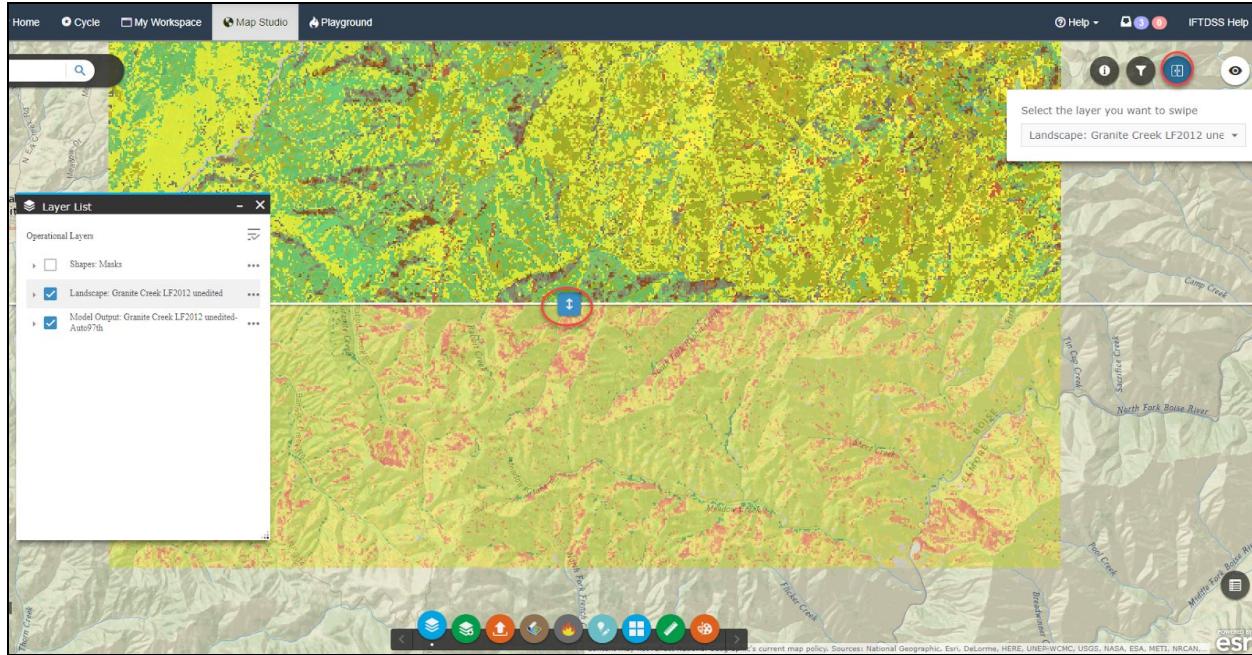
- Click the **Simulation Output Tools** button on the bottom of the screen.
- Ensure the box next to “Granite Creek LF2012 unedited-Auto97th” is checked, this layer will also be visible in **Layer List**. Check the appropriate boxes in **Layer List** to view Flame Lengths and the corresponding legend.

Zoom into an orange/red area where you can see concentrated areas high Flame Lengths projected by the summary model. Next you'll look at the fuel models and topography for that area of more intense fire behavior.

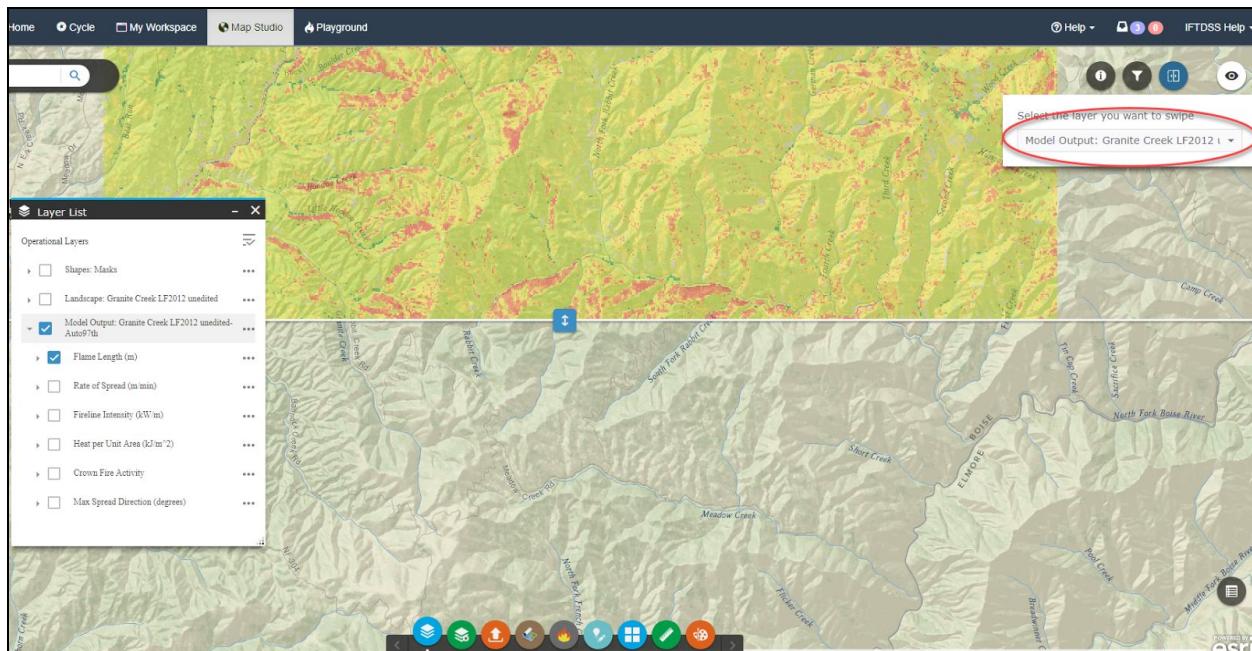
Set up the **Layer List** to have the Fuel Model checked for the Granite Creek Landscape layer, as well as Flame Lengths for the Auto97th modeled fire behavior output. You can quickly switch between layers to view changes by checking/unchecking the layers, or by using



the Swipe Tool



- Click the **Swipe Tool** .
- Next, specify the layers to swipe - the first layer selected will be the layer viewed on the top of the slider bar, the second layer checked in **Layer List** will be the layer on the bottom of the slider bar. In this case, "Granite Creek LF2012 unedited – Auto97th". Slide the bar in the middle of the screen up and down and notice that the areas with high flame lengths correspond to areas of Fuel Model 188 (TL8) with small patches 165 (TU5).



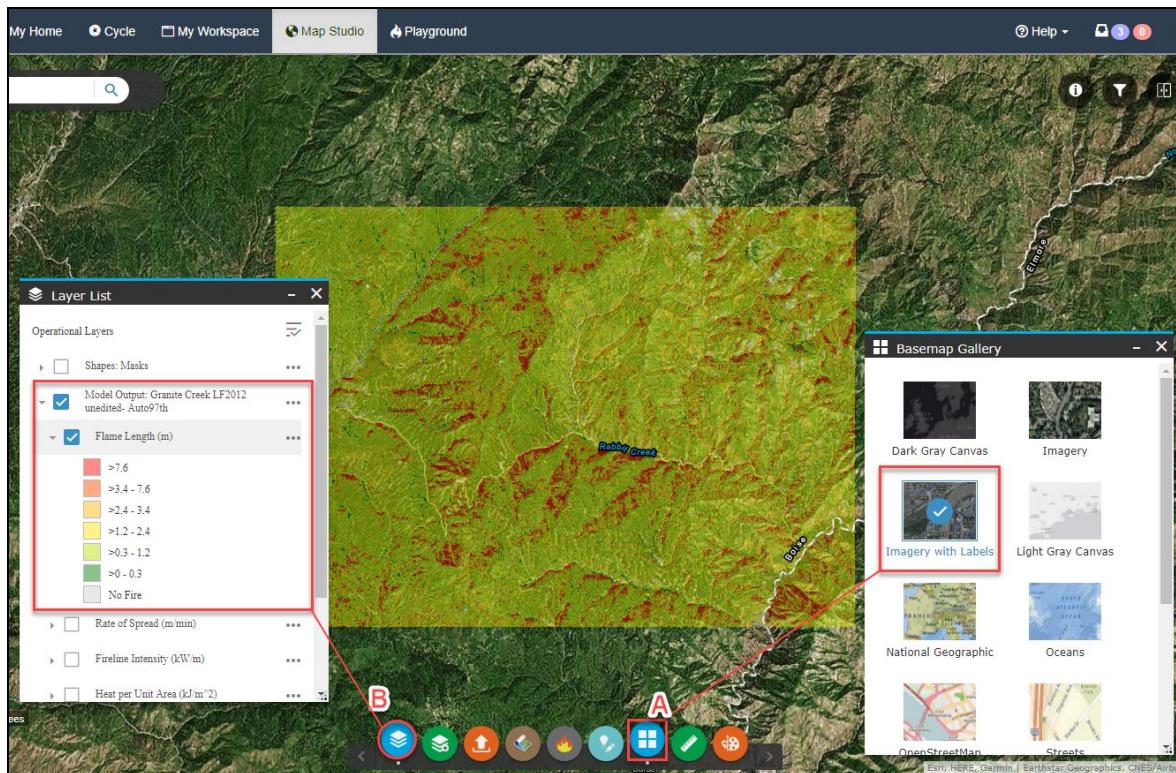


Next you'll want to view the topography to see if there is a theme in the areas displaying more intense fire behavior. Uncheck the boxes in the **Layer List** then re-check the "Granite Creek LF2012 unedited – Auto97th" layer. This will display only that behavior layer, and allow you to see the topography underneath. If this does not occur on your map, try selecting the Model Output: Granite Creek by clicking on it from the Swipe dialog that appears in the top right of Map Studio. (For more about the Swipe Tool, see the [Swipe Tool Help Topic](#)).

As you swipe up and down you can see that the areas displaying the more intense fire behavior are all west or northwest facing slopes. Wrapping up this analysis by repeating this process in the northern part of the landscape, you notice there appears to be several areas that would produce more intense fire behavior. Also compare other aspects of fire behavior, such as Rate of Spread and Crown Fire Activity.

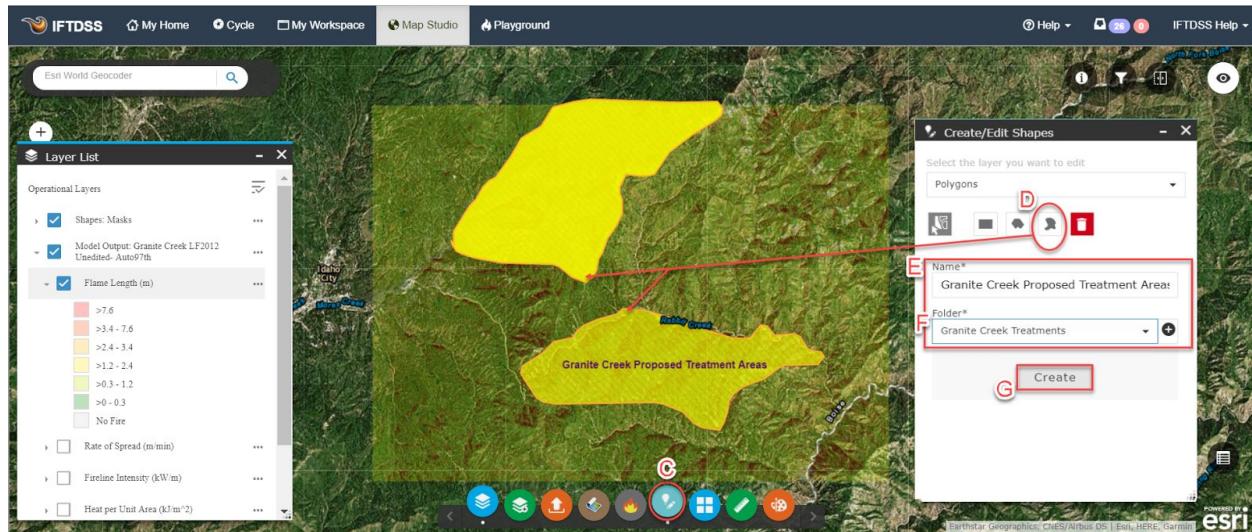
With this information, you decide to create two Areas of Interest, or areas on which you'd like to focus the analysis and treatments.

Creating Areas of Interest



- To create an Area of Interest, or polygon, change the **Basemap Gallery** layer to “Imagery with Labels” so you can see landscape imagery.

- B. Then set up the **Layer List** to show the 97th percentile fire behavior output layer for Flame Lengths, and set the transparency so you can see roads and topography as you create your Area of Interest, or treatment area.



- C. Select the **Create/Edit Shapes** button at the bottom of the screen and ensure **Polygons** is selected in the dropdown box in **Create/Edit Shapes**.
- D. Select **Freehand Polygon** option, and draw a shape around one of the areas of significant fire behavior. Next, select the button again and draw a shape around the second area that exhibited significant fire behavior. You'll concentrate on these areas for developing and comparing treatments to meet the objectives of reducing the fire hazard in this area, and returning low intensity fire to this landscape.
- E. Name this “Granite Creek Proposed Treatment Areas”
- F. Select the “Granite Creek Treatments” folder. This will ensure the Area of Interest is filed in the same location in **My Workspace** as all the other Granite Creek project files.
- G. Click **Create**. These two shapes will now be saved as a single shapefile and available in the **Layer List** in Map Studio, as well as in your “Granite Creek Treatments” folder in **My Workspace**.

Reviewing the Landscape Summary Report

Now that you've thoroughly reviewed the map to assess the landscape, modeled fire behavior, and areas for treatment, you'll want to look at the corresponding landscape and fire behavior summary reports.



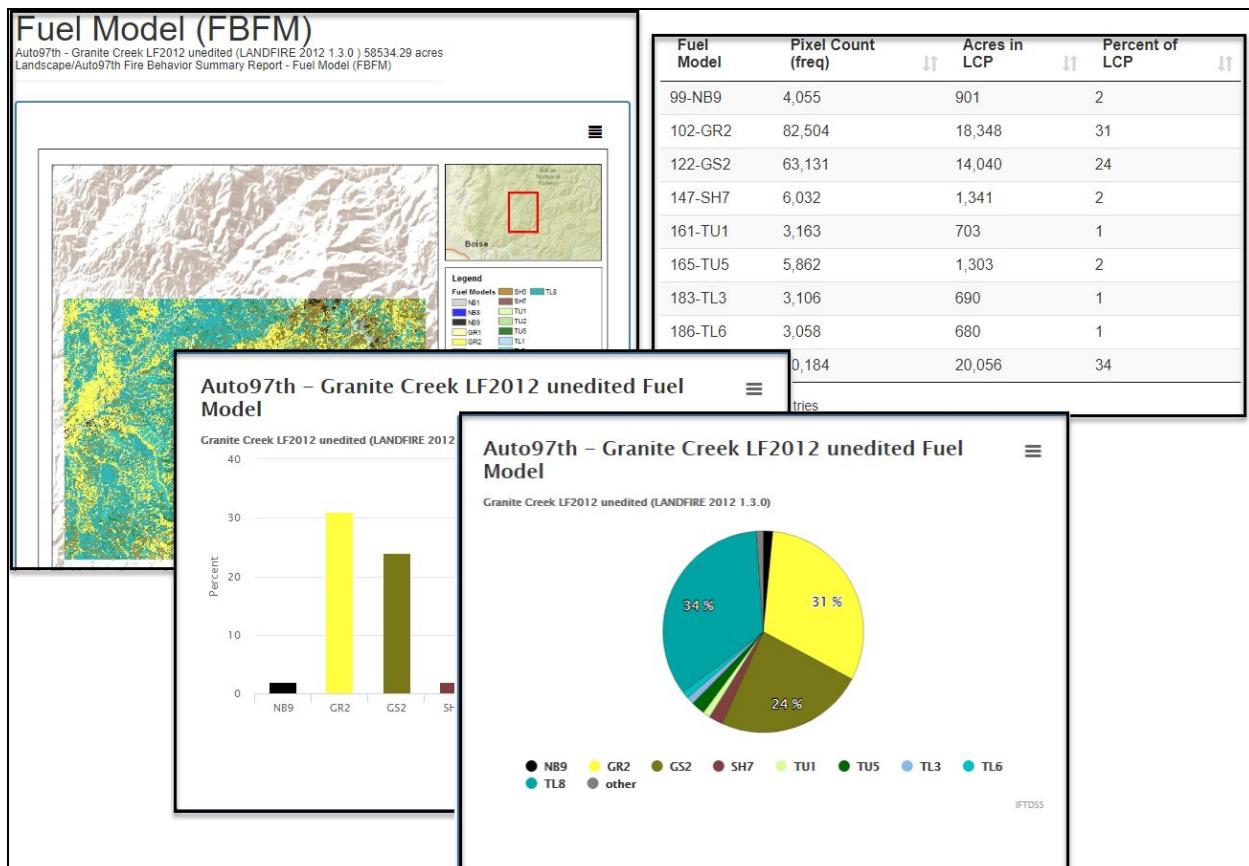
The screenshot shows the IFTDSS application interface. At the top, there are tabs for 'My Home', 'Cycle', 'My Workspace' (which is highlighted with a red box), 'Map Studio', and 'Playground'. Below the tabs is a breadcrumb navigation: 'My Workspace / Granite Creek Treatments / My Workspace'. On the left, a sidebar titled 'Display' lists 'All', 'Shape', 'Model Output', 'Report', and 'Landscape'. Under 'Folders', 'Granite Creek Treatments' is selected (highlighted with a red box) and expanded, showing 'Playground' and 'My Workspace'. The main content area shows a table of workspace items:

Name	Type	Owner	Created	Status
Granite Creek Proposed Treatment Areas	Shape	iftdss.help	Oct 24, 2017 8:05:37 PM	
Granite Creek LF2012 unedited - Auto97th	Report	iftdss.help	Oct 24, 2017 7:41:46 PM	Completed
Granite Creek LF2012 unedited - Auto97th	Model Output	iftdss.help	Oct 24, 2017 7:41:46 PM	Completed
Granite Creek LF2012 unedited	Landscape	iftdss.help	Oct 24, 2017 7:32:07 PM	Completed

To the right of the table is a detailed view of the selected report: 'Granite Creek LF2012 unedited - Auto97th Report'.

- Name: Granite Creek LF2012 unedited - Auto97th
- Type: Report
- Owner: iftdss.help
- Created: Oct 24, 2017 7:41:46 PM
- ID: 8009
- Status: Completed
- Report type: Auto97th Fire Behavior

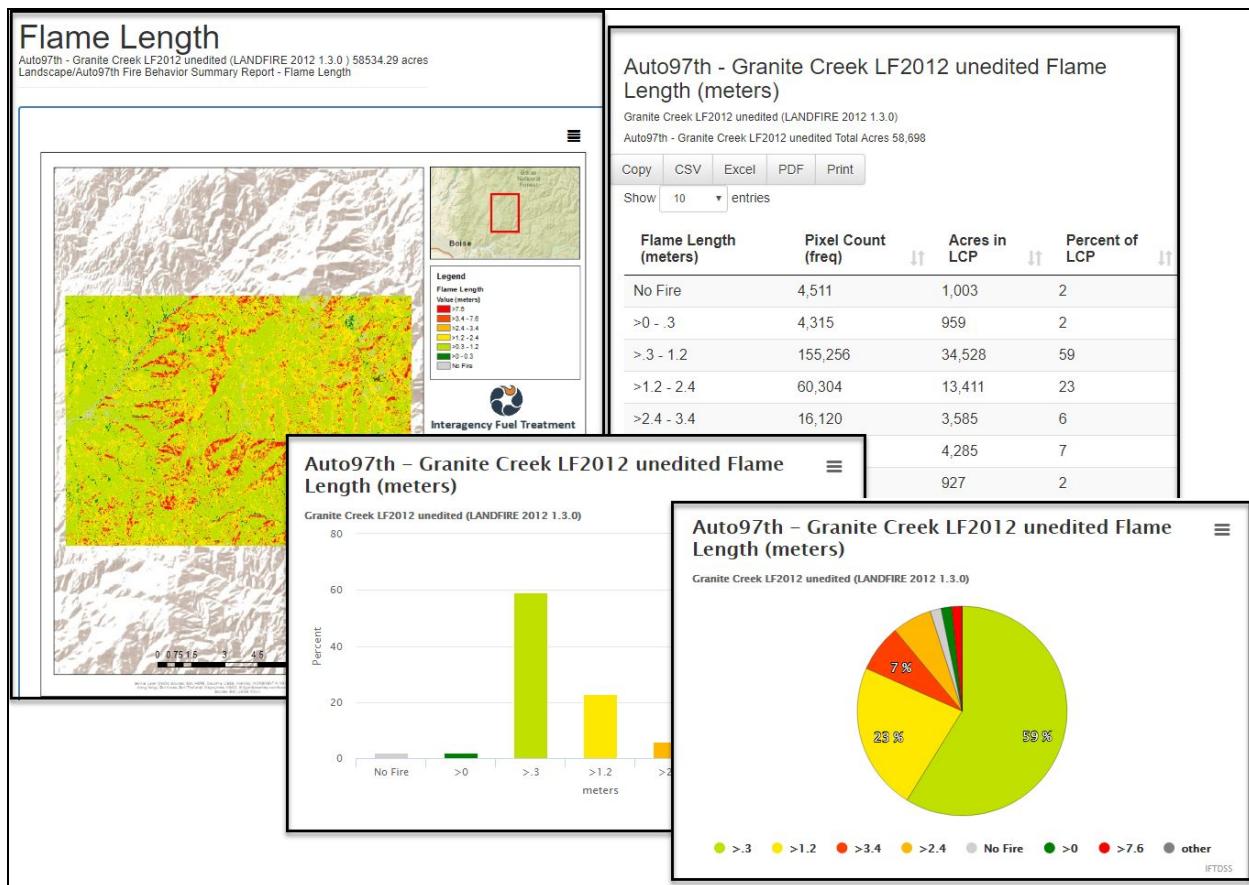
- Navigate away from Map Studio and click on **My Workspace** at the top of the screen,
- Because the Landscape was assigned to the Granite Creek Fuels folder when you first created it, the model output and Summary Reports are all stored there too by default. Select the "Granite Creek Treatments Folder" in the panel on the left of the screen. As you navigate you'll notice the information in the right-hand panel changes too, updating as you move through different screens.
- Select the "Granite Creek LF2012 unedited - Auto97th" report file and click the **View Summary** button. The report will open in a new browser tab.





All of the Landscape characteristics and Fire Behavior outputs you viewed in Map Studio are quantitatively displayed in several different formats in this report. You'll find a lot of value in these reports because they break each component (Canopy Cover, Canopy Base Height, Rate of Spread, etc.) down in a way that makes it even easier, after viewing the spatial data, to assess the landscape and 97th percentile modeled fire behavior. For example, in viewing the Fuel Model map (upper left corner), you can see that there is a lot of Fuel Model TL8 on the landscape, but it's not until you take a look at the graphs that you can really assess that, in fact, 35% of this landscape is attributed to the TL8 fuel model.

Take a good look at the report in it's entirety, including the Flame length outputs:

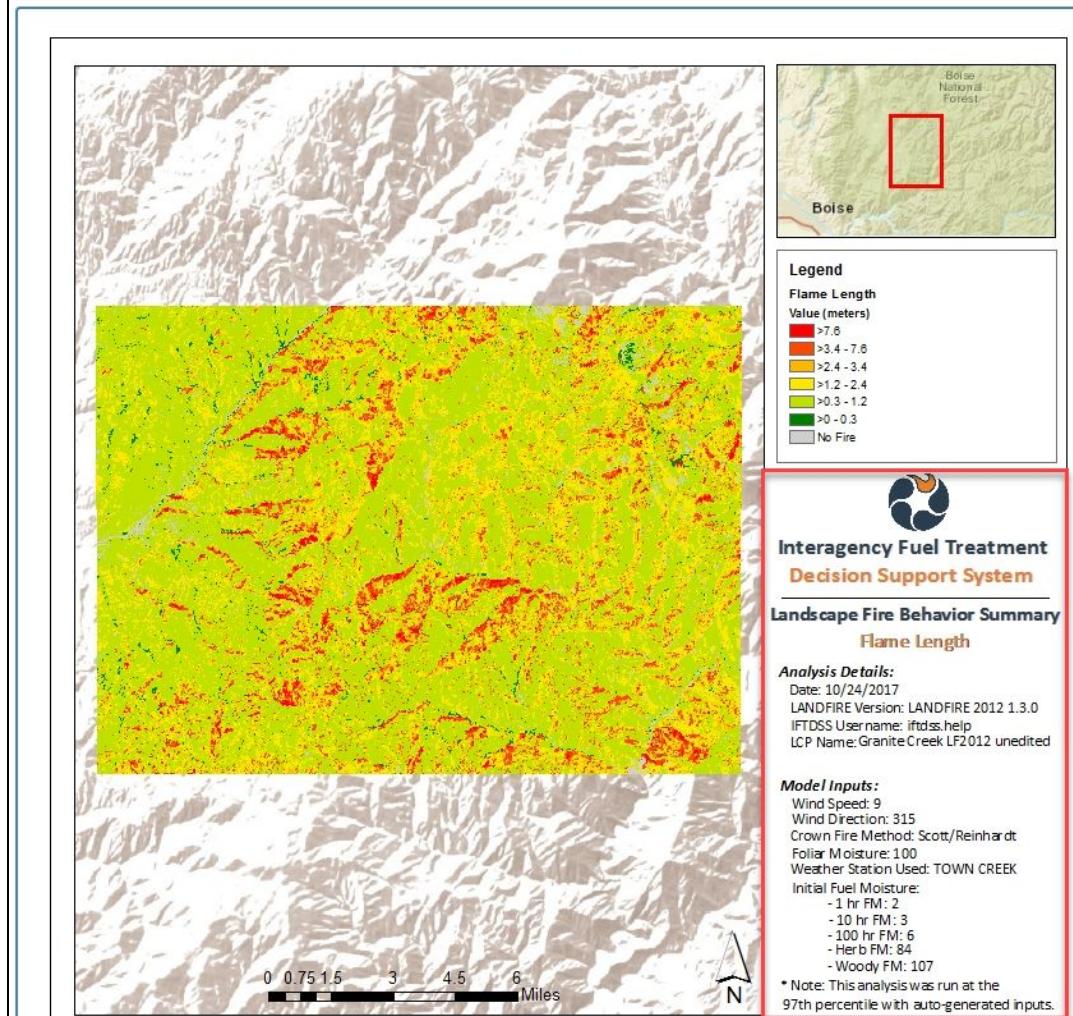


These graphs indicate that, given 97th percentile weather and fuel moisture conditions, a little over half of this landscape will experience Flame Lengths of >.3 meters, while another 1/3rd will experience Flame Lengths >1.2 meters. The specific areas on this landscape where more intense, "problem" fire behavior is seen, is where our treatments are focused.

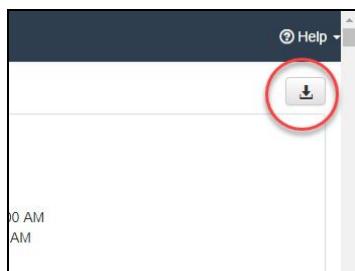


Flame Length

Auto97th - Granite Creek LF2012 unedited (LANDFIRE 2012 1.3.0) 58534.29 acres
Landscape/Auto97th Fire Behavior Summary Report - Flame Length



Notice the Auto97th Fire Behavior section of the report has recorded the 97th percentile weather and fuel moisture inputs used to run the fire behavior model. You'll want to use these values when you re-run the fire behavior model a little later, so scroll up to the top of the report, look to the top right, and click the **Download** button to save this report as a pdf on your local machine.





Now, it's time to develop some treatment alternatives.

Developing Treatment Alternatives

Now that you have a baseline Landscape and Fire Behavior data, and some specific areas within the landscape for which you'd like to propose treatments to meet the preliminary objectives, you'll move on to the Develop Treatment Alternatives workflow, under the **Strategic Planning** stage of the **Cycle**. This will allow you to develop and compare fuels treatment alternatives so you can determine how changes in the fuels characteristics affect fire behavior outputs.

I select the **Develop Treatment Alternatives** task.

The screenshot shows the IFTDSS interface with the 'Strategic Planning' cycle selected. On the left, there is a circular diagram representing the cycle phases: Reporting, Landscape Evaluation, Strategic Planning (highlighted in orange), Monitoring, and Implementation Planning. Below this is a section titled 'Not sure where to start?' with a 'Create Landscape Now' button. The main area is titled 'STRATEGIC PLANNING' and contains three cards: 'DEVELOP TREATMENT ALTERNATIVES' (selected and highlighted with a red border), 'QUANTITATIVE RISK' (Future Development), and 'PRIORITIZE TREATMENTS' (Future Development). To the right, there is a detailed description of the 'Develop Treatment Alternatives' task, a numbered list of steps, and a note about saved files.

Develop Treatment Alternatives

Develop alternatives to determine how different fuels treatments and their spatial arrangement affect landscape characteristics and fire behavior. Generate maps and reports to compare landscapes and fire behavior model outputs. Use outcomes to determine the best fuels management strategy to meet your project objectives.

1. Select or create an Originating Landscape
2. Edit landscape characteristics to create Landscape Alternatives
3. Enter fire behavior model inputs
4. Run fire behavior models on Landscapes
5. Compare landscape characteristics and resultant fire behavior outputs between Landscapes on maps and in reports

Note: All edited landscapes, model run outputs, and comparison reports created herein will be stored in your Workspace in the same folder as your Originating Landscape (chosen in

The next screen brings up the 5 steps in the Develop Treatment Alternatives task.

Pick a landscape and area of interest



The screenshot shows the IFTDSS interface with the 'Develop Treatment Alternatives' tab selected. In the main workspace, there are two dropdown menus: 'Select Landscape' (containing 'Granite Creek LF2012 unedited') and 'Area of Interest' (containing 'Granite Creek Proposed Treatment Areas'). Below these are buttons for 'Create on Map' and 'Landscape Details'. The 'Landscape Details' section provides metadata: Name (Granite Creek LF2012 unedited), Date Created (Oct 24, 2017 7:32:07 PM), Source Data (LANDFIRE 2012 1.3.0), and Bounds (n:43.8855 e:-115.5846 s:43.7675 w:-115.8098). To the right, a panel titled 'Select an Originating Landscape' contains a note about running comparisons once per extent, a hint about split-screen mode, and information about selected landscapes including LANDFIRE data and resolution.

- First, select the "Originating Landscape" (Granite Creek LF2012 unedited) and the
- Area of Interest (shapefile Granite Creek Proposed Treatments) created earlier in Map Studio.

Notice the Right Hand Panel has some good information regarding how to use the landscapes correctly in this task. Make it a point to read through these panels for each page, they contain really helpful information.

Edit the landscape to simulate treatment scenarios

Next, move to the **Edit Landscape** tab, where you'll select a Default Fuels Treatment rule, and apply it to the landscape to simulate a thin and pile burn. Then you can see what effect the proposed treatment has on your Area of Interest. To do this:



A. Double check that "Granite Creek LF2012 unedited" landscape is selected

B. Select the "Thin: Slash Removed default" rule under the "Add Default Fuels Treatment/Disturbance Edit Rule". Note: if you hover over your mouse over the "Light Thinning; Pile Burning" it will give you the details on what the rule represents.

C. Choose the "Light Thinning: Pile Burning" option

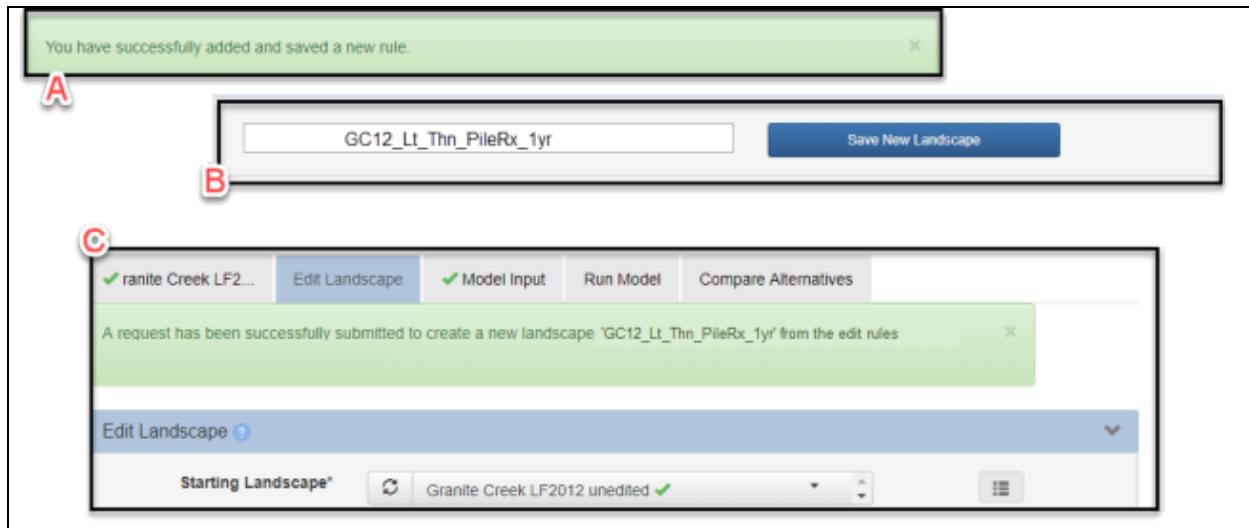
D. Select 1 year since disturbance

E. Select the "Granite Creek Proposed Treatment Areas" mask to apply the rule to

F. Click the **Add to Rules** button

This rule will mimic thinning the Area of Interest to about 80% present density by removing understory up to 8" DBH, with subsequent pile burning of thinned material. This information appears if you hover over the "Light Thinning: Pile Burning" option described in step C above. Alternatively, the description of each default rule can be read in the [Landscape Editing - Default Fuel Treatment and Disturbance Topic](#) of Help Center.

You'll also like to mimic a broadcast burn after these first entries, but apply that edit in a subsequent edit session. While you could create a second rule that would be applied after the first (See the [Rule Ordering Consideration help topic](#) for more details on these), you'll apply one at a time so it's easier to track the results of the rule on the landscape. It's always a good idea to assess your landscape after editing to ensure it's been applied correctly and makes sense.



- A. After clicking the **Add to Rules** button, a notification appears to confirm the rule had been added.
- B. Since you're just implementing this one rule for now, scroll to the bottom of the screen, name the landscape so its easy to see what treatment it represents (GC12_Lt_Thn_PileRx_1yr), and click **Save New Landscape**.
It is recommended to keep the landscape names around 30 characters in length for later reporting steps to run smoothly in the IFTDSS system.
- C. Once the new landscape is saved, a notification will appear at the top of the screen that lets me know it has been successfully submitted.

Enter parameters for a fire behavior modeling scenario

In the **Modeling Input** tab you'll use 97th percentile weather and fuel moisture inputs when running the fire behavior model. Open the pdf copy of the Auto97th report you saved earlier. You could also obtain this information again anytime by accessing the Auto97th report in **My Workspace**, but with a pdf, you don't have to navigate back and forth through IFTDSS.



A

B

C

Model Input

These inputs will be used in the next tab (Run Model) to apply to any of your landscapes.

- Wind** - Enter 20 foot windspeed and direction in degrees from north (0 degrees).
- Crown Fire Inputs** - Choose a crown fire method and enter tree foliar moisture content in percent. (These inputs only affect crown fire models).
- Initial Fuel Moisture** - Enter dead (1,10, and 100 hour size classes) and live (herbaceous and woody) fuel moistures in percent.
- Optional: Add Row** - Add additional rows to specify fuel moisture by fuel model. Multiple rows may be added. Any fuels not addressed by a specific row will use the values in the top row by default.

Important! You cannot iterate and calibrate here. Once you select Run Model in the next tab, your inputs and resulting outputs are locked - you will no longer be able to change them.

- Enter the inputs for wind, crown fire inputs, and initial fuel moisture
- By not clicking **+ add row** under the "Initial Fuel Moisture" section, the fuel moistures will remain the same for all fuel models across the landscape. If you had clicked **+ add row**, you could enter specific fuel models and assign unique moisture conditions for each one.
- Click **Save Inputs** at the bottom of the screen and move to the **Run Model** tab.

Running Fire Behavior

You'll want to run the fire behavior model on both of these landscapes here so you can compare the results:

A

B

Landscape: listed here. No landscape has been selected.

Run Name: Granite Creek LF2012 unedited, GC12_Lt_Thn_PileRx_1yr

Run Status:

Important! Once you select Run Model in the next tab, your inputs and resulting outputs are locked - you will no longer be able to change them.



- A. Examine the names next to each of the landscapes, if you wanted, you could rename them here
- B. Click **Run Model** next to each landscape.

Next, move to the **Compare Alternatives** tab.

Compare Alternatives

Once on the **Compare Alternatives** tab, you'll select each landscape you want to compare. They will be numbered in the order you select them, and from reading the right hand panel information, you'll see that this order is very important:

Landscape

- 2 Granite Creek LF2012 unedited
- 1 GC12廖_Thn_PileRx_1yr

Model Run

- Granite Creek LF2012 unedited
- GC12廖_Thn_PileRx_1yr

Compare in Summary Report

Treatment Alternatives Summary Compare Report
Area of Interest: Granite Creek Proposed Treatments

Report Name:	Action
Landscape Compare Summary Report	Create Report
Fire Behavior Compare Summary Report	Create Report

- A. First, select the edited landscape so it has a "1" next to it. Then, select the original landscape, so it has a "2" next to it. This order tells IFTDSS to calculate the difference created by our treated landscape (1) on our original landscape (2). For example, if our new landscape has flame lengths of 3 feet, and the original has flame lengths of 7 feet, the difference will be: $3 - 7 = -4$. Or in other words, a 4 foot *reduction* in flame length from the treatment.
- B. Now you'll want to view comparison outputs on the map and as a report. First, click the **Compare in Summary Report** button
- C. Click both **Create Report** buttons so they can begin processing.

Landscape

- 2 Granite Creek LF2012 unedited
- 1 GC12廖_Thn_PileRx_1yr

Model Run

- Granite Creek LF2012 unedited
- GC12廖_Thn_PileRx_1yr

Completed

Compare on Map

Compare in Summary Report

Compare Alternatives

Here you will see a list of landscapes and model runs based on the Model Input tab and selected in the Run.

Check the boxes to select landscapes to compare after clicking the 'Compare in Summary Report' button.

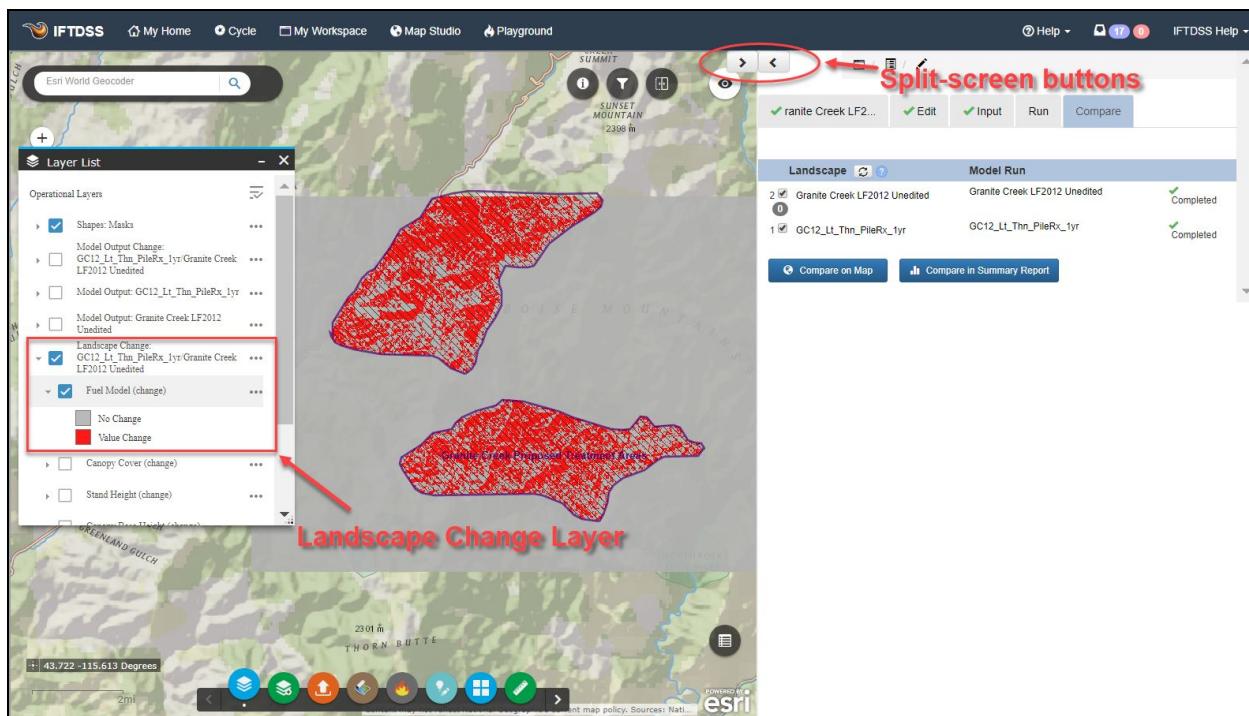
- you can compare up to 10 landscapes here, just be sure to select the first 10 landscapes in the Model Input tab.

- D. Next click the **Compare on Map** button to view results on the map. Wait for the map to appear in splitscreen mode, then click **Compare on Map** once more, and give the caparison layers a few seconds to download.

Comparing the Alternatives

After clicking **Compare on Map**, the map appears in split screen mode. This feature allows you to view information from each tab on the right side of the screen, while allowing you to view the map on the left. You can open or close this feature anytime by selecting the opposing arrows icon at the top of the screen.

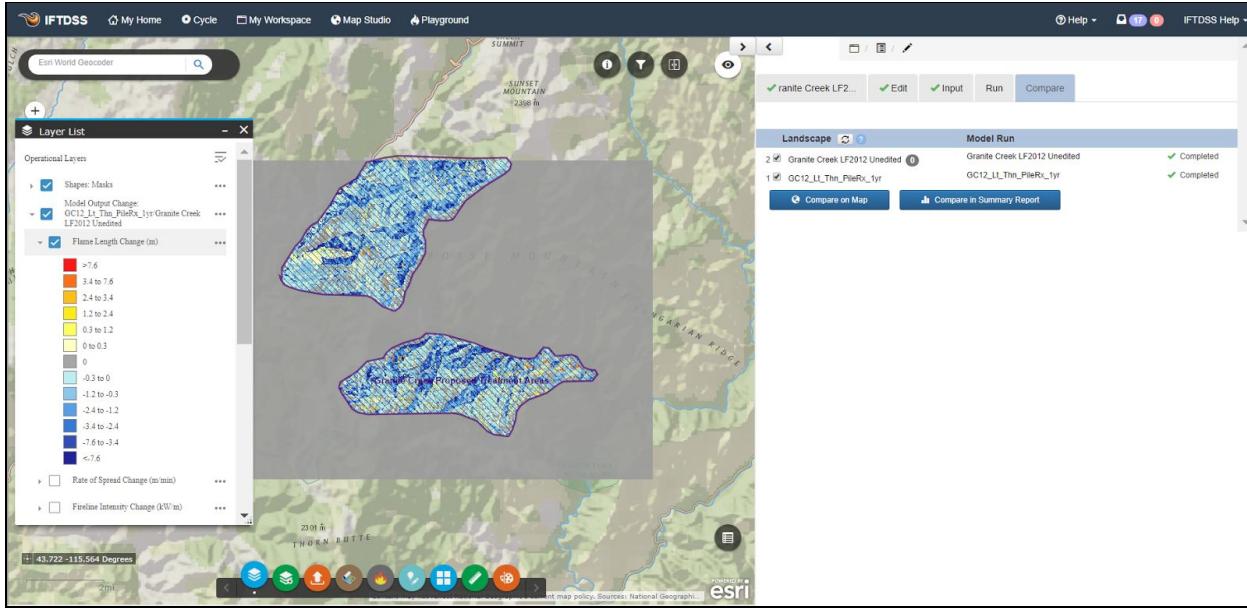
Initially you'll see a simple landscape change map (if you don't see this map and the basic landscape instead, wait a few more seconds or click the "Compare on Map button again) , indicating which pixels experienced a Fuel Model change post-treatment.



To view the change in Flame Length after the treatment, open **Layer List** and check the box next to: "Model Output Change: GC12_Lt_Thn_PileRx_1yr/Granite Creek LF2012 unedited". This layer shows the difference between post-treatment and pre-treatment Flame Lengths. With a glance you can see that all the dark blue showing on those West/Northwest facing slopes that had initially shown very high flame lengths, are now indicating significantly



decreased flame lengths and fire intensity.



To get back to these maps later, you can either access them in your project folder in **My Workspace**, or select this landscape in the **Develop Treatment Alternatives** task, and click through each tab to get back to this point.

To access the summary reports, you can either find them in our project folder in **My Workspace**, or click the button again and click on the links displayed in the pop-up box. In this case, go to **My Workspace** and select "GC12_Lt_Thn_PileRx_1yr/Granite Creek LF2012 unedited - compareLCP...", you may have to hover over the shortened name to display the full name. Once this is selected, click **View Summary**.

My Workspace

This is the storage location where you access all generated products. You can view, edit, or delete files, request and view reports, and view spatial files in Map Studio.

Left Margin: On the left, click the **Display** filter to view files by type. Click **Folders** to view all available folders. Click a folder name to open its files in the center pane.

Center: Lists the files in a given folder, with the option to **Create Folder**.

Each file type has a corresponding icon shown to the left of its name, which include:

- Report
- Landscape Files
- Model Outputs
- Shapes
- Model Inputs

Each file indicates owner (user account) and status (requested, created, running, completed, or failed). Click a file name to drop down the available actions and view additional info on each file in the right hand panel.

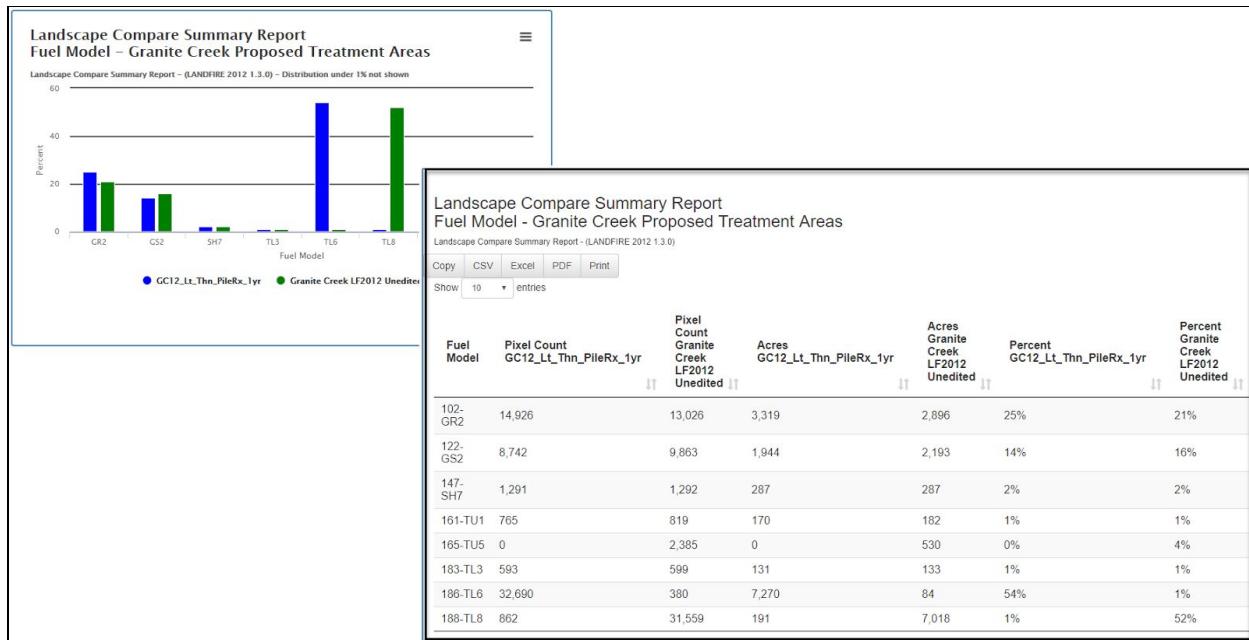
Note: When clicking on landscape files that have been edited, you will see an option to "View Edit Rules". This displays the edits that were made on that landscape.

Note: If trying to delete a file that cannot be deleted because it is used by another file or process in ITDSS, an alert message will appear.

Name	Type	Owner	Created	Status
GC12_LU_Thn_PileRx_1yr - LCP/Granite Creek Proposed Treatment	Report	itdss:help	Nov 1, 2017 7:33:26 PM	Completed
GC12_LU_Thn_PileRx_1yr/Granite Creek LF2012 Undeleted - compa	Report	itdss:help	Oct 1, 2017 7:33:26 PM	Completed
View Summary				
Delete				
GC12_LU_Thn_PileRx_1yr/model/Granite Creek Proposed Treatment	Report	itdss:help	Nov 1, 2017 7:33:24 PM	Completed
GC12_LU_Thn_PileRx_1yr/Granite Creek LF2012 Undeleted - compa	Report	itdss:help	Nov 1, 2017 7:33:24 PM	Completed
GC12_LU_Thn_PileRx_1yr_Rx_1Yr - LCP/Granite Creek Proposed T	Report	itdss:help	Oct 31, 2017 11:32:48 PM	Completed
Granite Creek LF2012 Undeleted - LCP/Granite Creek Proposed T	Report	itdss:help	Oct 31, 2017 11:32:48 PM	Completed
GC12_LU_Thn_PileRx_1yr_Rx_1Yr/Granite Creek LF2012 Undeleted	Report	itdss:help	Oct 31, 2017 11:32:48 PM	Completed
GC12_LU_Thn_PileRx_1yr_Rx_1Yr - model/Granite Creek Proposed	Report	itdss:help	Oct 31, 2017 11:32:48 PM	Completed
Granite Creek LF2012 Undeleted - model/Granite Creek Proposed	Report	itdss:help	Oct 31, 2017 11:32:48 PM	Completed
GC12_LU_Thn_PileRx_1yr_Rx_1Yr/Granite Creek LF2012 Undeleted	Report	itdss:help	Oct 31, 2017 11:32:48 PM	Completed
Granite Creek LF2012 Undeleted	Model Output	itdss:help	Oct 31, 2017 10:51:44 PM	Completed
GC12_LU_Thn_PileRx_1Yr	Model Output	itdss:help	Oct 31, 2017 10:51:43 PM	Completed
GC12_LU_Thn_PileRx_1Yr_Rx_1Yr	Model Output	itdss:help	Oct 31, 2017 10:51:42 PM	Completed
GC12_LU_Thn_PileRx_1Yr_Rx_1Yr	Landscape	itdss:help	Oct 31, 2017 10:43:50 PM	Completed
GC12_LU_Thn_PileRx_1Yr	Landscape	itdss:help	Oct 31, 2017 10:29:29 PM	Completed
Granite Creek LF2012 Undeleted Landscape Fire Behavior Input	Model Input	itdss:help	Oct 30, 2017 6:30:43 PM	Completed
Granite Creek LF2012 Undeleted - Auto97th	Report	itdss:help	Oct 30, 2017 6:25:16 PM	Completed
Granite Creek LF2012 Undeleted - Auto97th	Model Output	itdss:help	Oct 30, 2017 6:25:16 PM	Completed
Granite Creek LF2012 Undeleted	Landscape	itdss:help	Oct 30, 2017 6:24:44 PM	Completed
Granite Creek Proposed Treatment Areas	Shape	itdss:help	Oct 24, 2017 8:05:37 PM	Completed

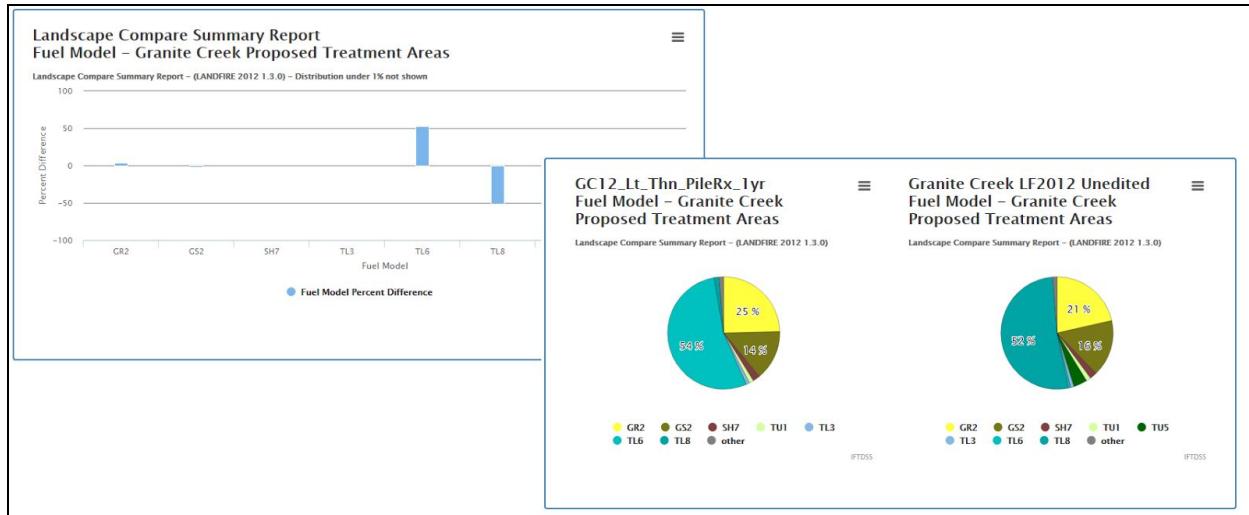


After opening the project folder, navigate to the "Landscape Compare Report" and click the **View Summary** button.



Review the pre- and post-treatment results for each landscape characteristic. These reports have the same quantitative components as the reports you viewed earlier, but they compare the change in acreages in the specified treatment area, or mask, before and after the selected treatment was applied.

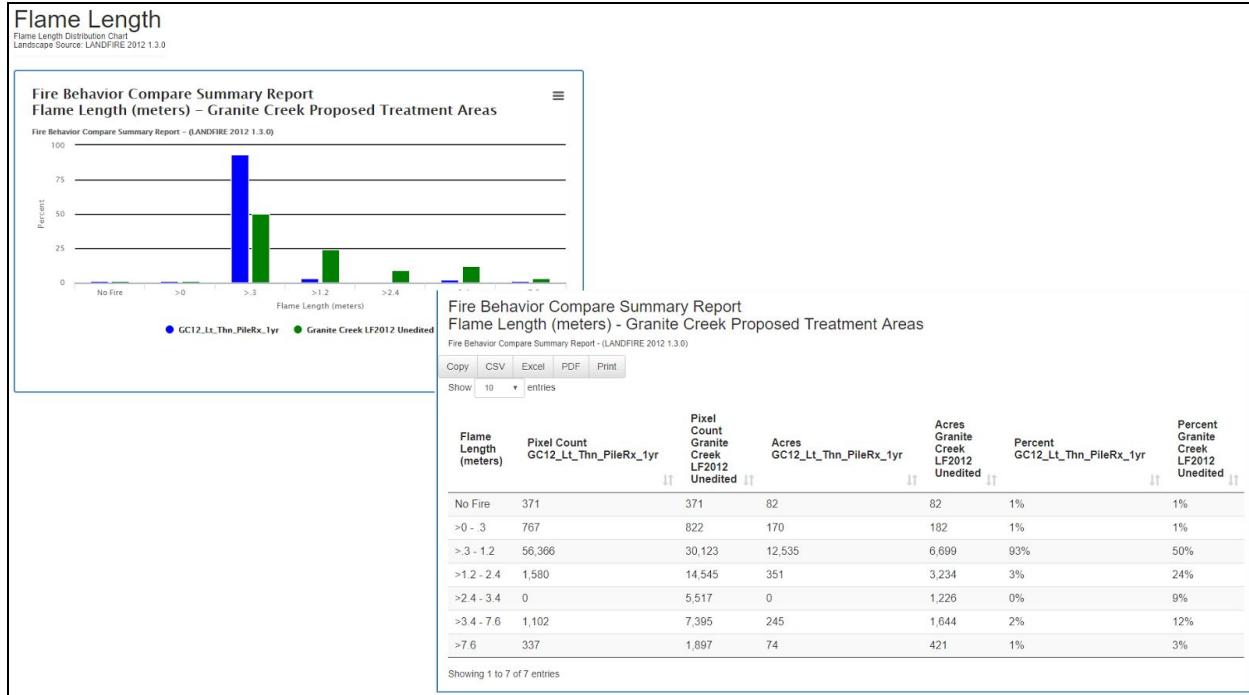
In the bar graph, we can see that green corresponds to pre-treatment fuel models in the treatment area, while blue corresponds to post-treatment. It appears that most of the TL8 acres were changed to TL6 post-treatment. Looking at the tabular data below, we can see that in fact, 54% of the treatment area has changed to Fuel Model TL6 with this treatment.



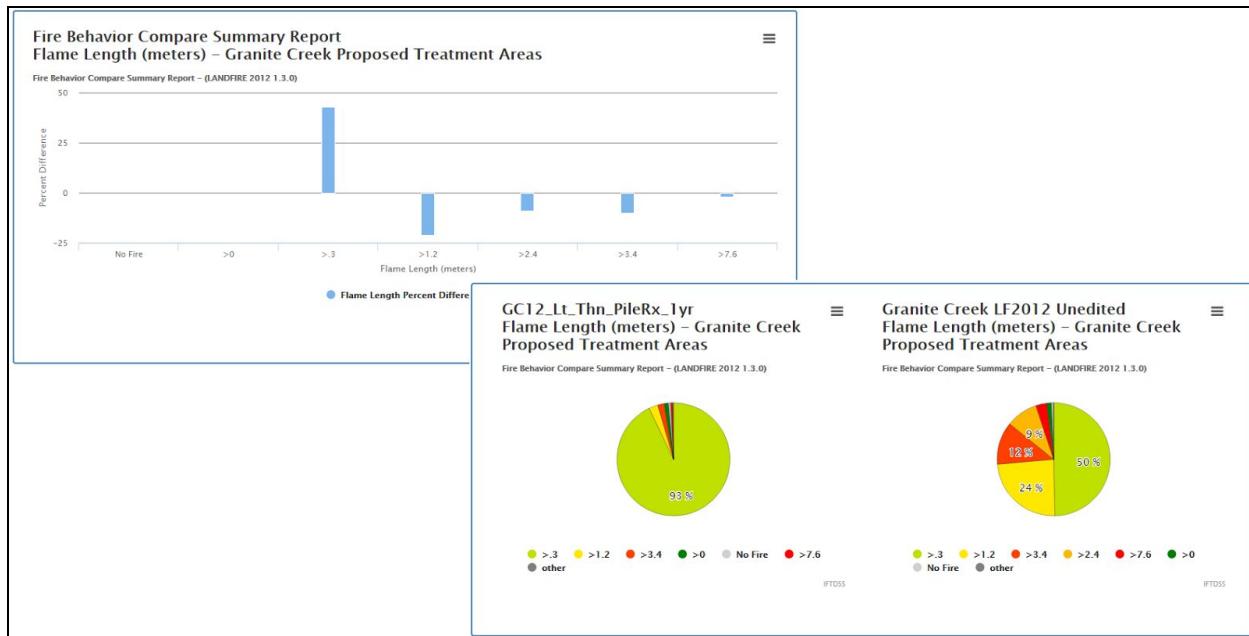


The Fuel Model Percent Difference graph and pie charts tell the same story.

Next, go to **My Workspace** and navigate to the Fire Behavior (Model) Compare Report, "GC12_Lt_Thn_PileRx_1yr/Granite Creek LF2012 unedited - compare model...", and click **View Report**.



As in the landscape Compare Report, green correlates to pre-treatment, while blue indicates post-treatment results in the bar chart. You can see from this bar chart that the number of acres in the lower Flame Length bins goes up post-treatment, while the number in the higher Flame Length bins goes down, indicating a decrease in higher Flame Length post-treatment. The table to the right quantitatively supports this, clearly showing the acres shifting toward the lower flame length bins, post-treatment.



The Percent Difference Graph for Flame Lengths demonstrates the shift toward lower Flame Lengths post-treatment. You can see the positive percent difference in the >.3 m bin, while the bins correlating to higher Flame Lengths indicate a drop in the percent difference.

The Pie Charts tell the same story, plainly showing the smaller sections of red/orange/yellow in the post-treatment chart.

Scroll through the rest of the Fire Behavior Compare Summary Report to view the rest of fire behavior characteristics.

Adding an Additional Treatment to Treatment Alternatives

Lets look at the effects of applying a subsequent broadcast burn after the light thinning/pile burning. One of our objectives is to re-introduce low intensity fire in this area and it's an important step in treating this landscape. Additionally, we can see how this additional treatment will affect modeled fire behavior.



Screenshot of the IFTDSS interface showing the 'Develop Treatment Alternatives' workflow. The 'Edit Landscape' tab is selected. A red box highlights the 'Select Landscape' and 'Area of Interest' sections.

Select Landscape:
Granite Creek LF2012 unedited

Area of Interest:
Granite Creek Proposed Treatment Areas

Or Create a New Landscape:

Landscape Details

Landscape Name: Granite Creek LF2012 unedited
Date Created: Oct 24, 2017 7:32:07 PM
Landscape Source Data: LANDFIRE 2012 1.3.0

Owner: iftdss.help
Landscape Status: ✓
Resolution (meters): 30

Navigate to the Develop Treatment Alternatives workflow again and select the Originating Landscape and Area of Interest. Next I move to the **Edit Landscape** tab.

Screenshot of the IFTDSS interface showing the 'Edit Landscape' dialog box. A red box highlights the 'Starting Landscape' dropdown and the 'Add Default Fuels Treatment Edit Rule' section. The dialog includes tabs for Order, Mask, and Landscape Edit Rule.

A: Starting Landscape: GC12_Lt_Thn_PileRx_1yr

B: Select Treatment / Disturbance Type:
 Thin Slash Removed Thin Slash Remains Clear Cut Wildland Fire

C: Select Severity:
 Low severity fire Moderate severity fire High severity fire

D: Select Time Since Treatment / Disturbance:
 1 Year 2 to 5 Years 5 to 10 Years 1-year post-treatment

E: Apply to Landscape Mask (optional):
Granite Creek Proposed Treatment Areas

F: Add to Rules Cancel

Help Panel:

Make changes as necessary to correct extracted LANDFIRE data to reflect known conditions in order to create an Existing Condition (EC) landscape and fuels treatment rules.

Starting Landscape: Select from dropdown; this can be your Originating Landscape (O) or landscapes edited from O. We recommend your first edits be to create an EC landscape here if you have not yet, and then use your EC landscape as the Starting Landscape to create treatment alternatives. For subsequent alternatives, Alternative Landscapes may also be selected as a Starting Landscape and edited to create additional alternatives. Click the **?** button to determine if this starting landscape already has rules applied.

Important: Each rule is applied based on the order you add it, and Default rules are always applied before User Created rules. See the [Rule Ordering Topic](#) for more information.

- Add Default Fuels Treatment/Disturbance Edit Rule:
 - Select Treatment/Disturbance Type, Severity, and Time Since Treatment/Disturbance (Note: Hover over radio button options under a given Treatment/Disturbance Rule Types to see a detailed description for each).
 - Optional: Apply to Landscape Mask if desired. Limits edits to user specified extent.
- Add User Created Edit Rule:
 - Add row(s) to identify condition where you want to make a change.
 - Then add row(s) to indicate what to change the value(s) to (Example: change FM SH4 to GR1).
 - Optional: Apply to Landscape Mask if desired. Limits edits to user specified extent.

- A. This time, choose the landscape with our earlier edits as the Starting Landscape: "GC12_Lt_Thn_PileRx_1yr".
- B. Select the **Wildland Fire** Default Rule and
- C. specify **Low severity fire**. As before, you can hover over this text or consult the [help topic](#) page for the detailed explanation of the rule.
- D. Select a treatment time of 1 Year.



E. Apply this rule to our "Granite Creek Proposed Treatment Areas" mask.

F. Then click **Add to Rules**.

As before, give the landscape a detailed name: "GC12_Lt_Thn_PileRx_1yr_Rx_1Yr" and click **Save New Landscape**.

Landscape	Run Name	Run Status
Granite Creek LF2012 unedited	Granite Creek LF2012 unedited	Completed
GC12_Lt_Thn_PileRx_1yr	GC12_Lt_Thn_PileRx_1yr	Completed
GC12_Lt_Thn_PileRx_1yr_Rx_1Yr	GC12_Lt_Thn_PileRx_1yr_Rx_1Yr	Run Model

skip the Model Input tab this time, that input was saved from our last run and we need to keep our weather parameters constant in order to compare the results of the landscape changes.

Go to the **Run Model** tab and click the **Run Model** button.

Next, move to the **Compare Alternatives** tab.

Compare Alternatives

Here you will see a list of landscapes and model runs. You can select the Model Input you want to compare against the landscapes tab.

Check the boxes to compare (a "1" and a "2" box):

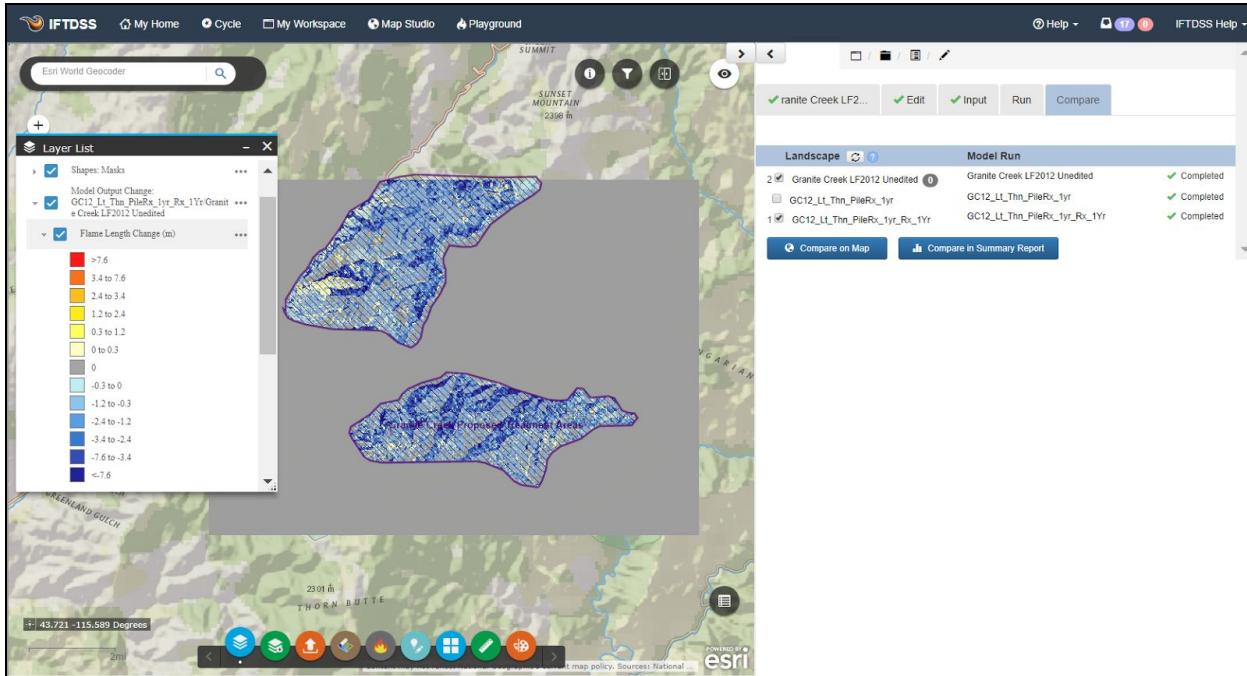
- you can compare more than one landscape at a time. Be sure that the boxes are checked to compare all the selected landscapes.

Once 2 boxes have been selected, click the "Compare" button.

Compare the original landscape with this new one by selecting:

- "GC12_Lt_Thn_PileRx_1yr_Rx_1Yr" as landscape "1", then
- select "Granite Creek LF2012 unedited" as landscape "2".
- Next, click **Compare in Summary Report** and initiate those reports
- click **Compare on map**, to get a map view of our changes.

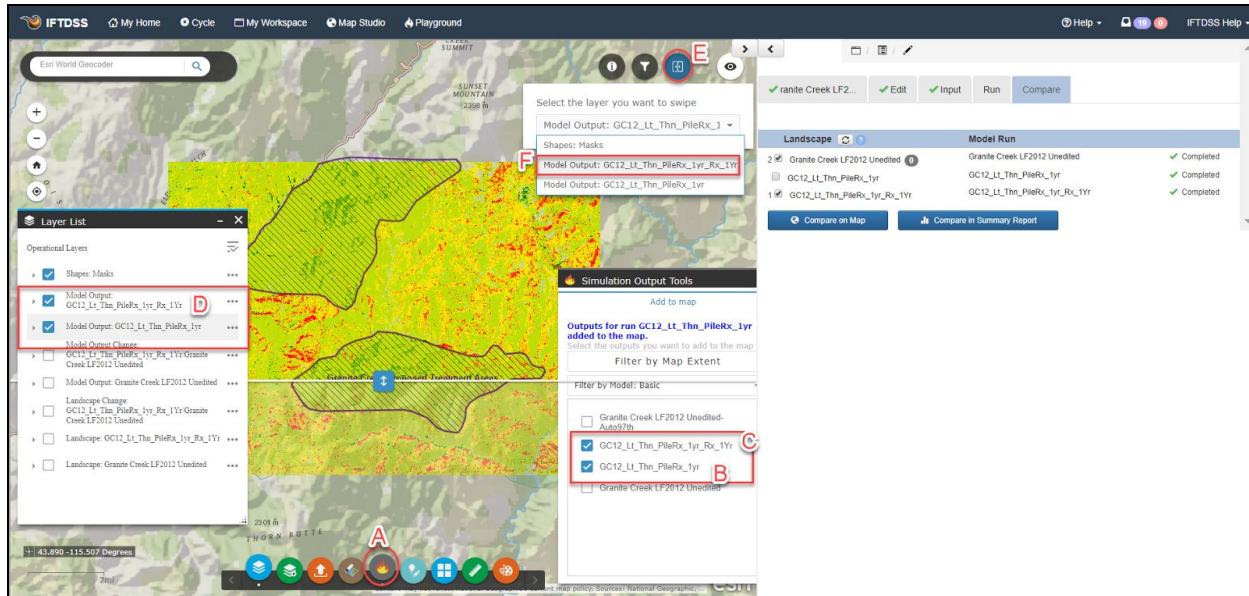
Comparing Added Treatments



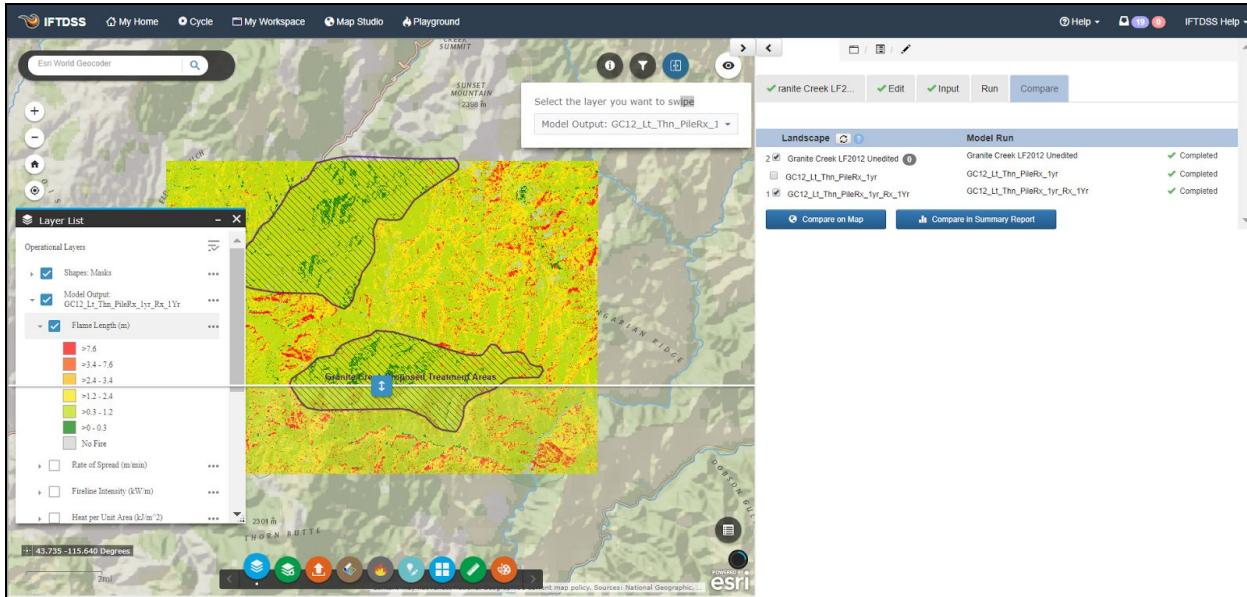
When the map opens click the **Compare on Map** button once more and open the **Layer List** to toggle between the comparison layers.

Like before, select the model change layer to evaluate flame length reduction. Though we're curious about these changes to fire behavior and fuel models, this is only a comparison of the original untreated landscape with this new treated landscape. What you'll really want to know is how much of an effect this added treatment of low severity wildfire, or a broadcast burn, will have compared to just the light thinning and pile burn we applied earlier. You'll need to compare the first treatment to the second one to answer this.

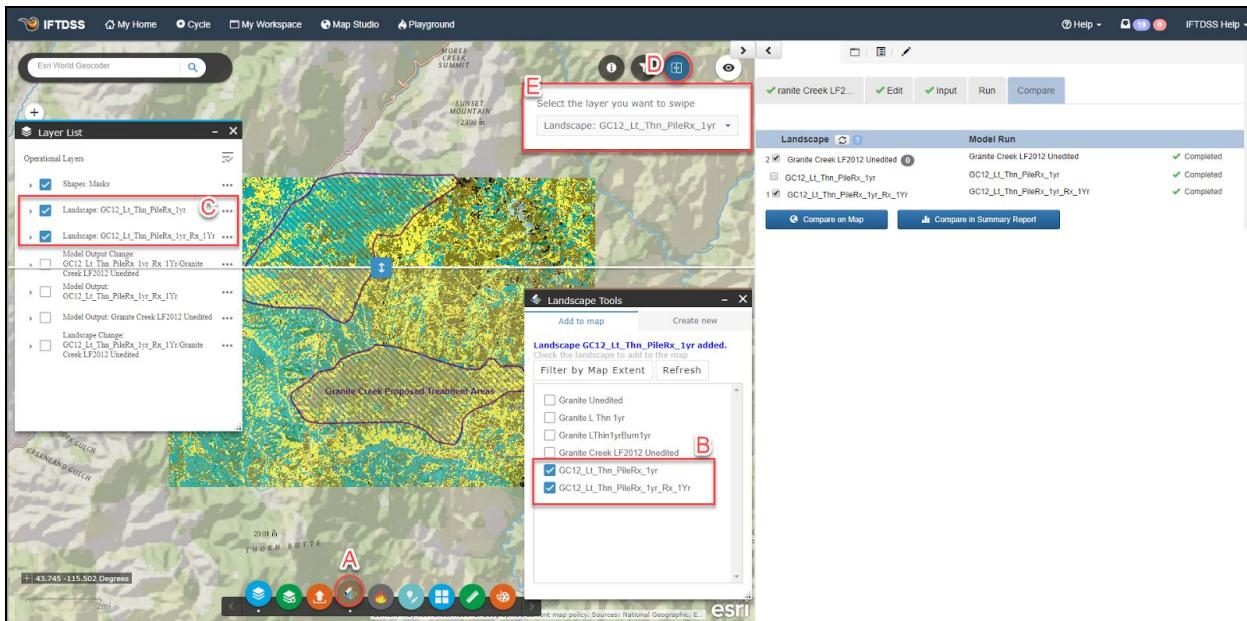
To best compare these “treatments” (default disturbance edits) on the landscape, first use the **Swipe Tool**:



- Click on **Simulation Output Tools** and check the boxes next to:
- "GC12_Lt_Thn_PileRx_1yr" the first treatment of thinning and pile burning
- "GC12_Lt_Thn_PileRx_1yr_Rx_1Yr" the second treatment which follows the thin with a low severity burn.
- Make sure these layers are displayed at the top of the **Layer List** in this image the first treatment (thin and pile burn only) is the top layer, followed by the second treatment (thin and pile burn followed by a prescribed burn).
- Click the **Swipe Tool**.
- You can control the layers that appear in the **Swipe Tool** using the box in the top right of the map that appears once the **Swipe Tool** is clicked. The layer selected in this box will be the layer that appears in the top half of the slider, and hidden on the bottom half.



The light thin and pile burn, followed by low Severity wildfire (Broadcast burn) is shown on top, and light thin and pile burn only on the bottom. Sliding back and forth and looking at the legend indicates that Flame Lengths were in fact reduced by up to a meter in some areas with just the addition of the Low Severity Wildfire! Next you'll want to see how the Fuel Models have changed with the addition of the Low Severity Wildfire.



Set the **Layer List** up again, this time opening

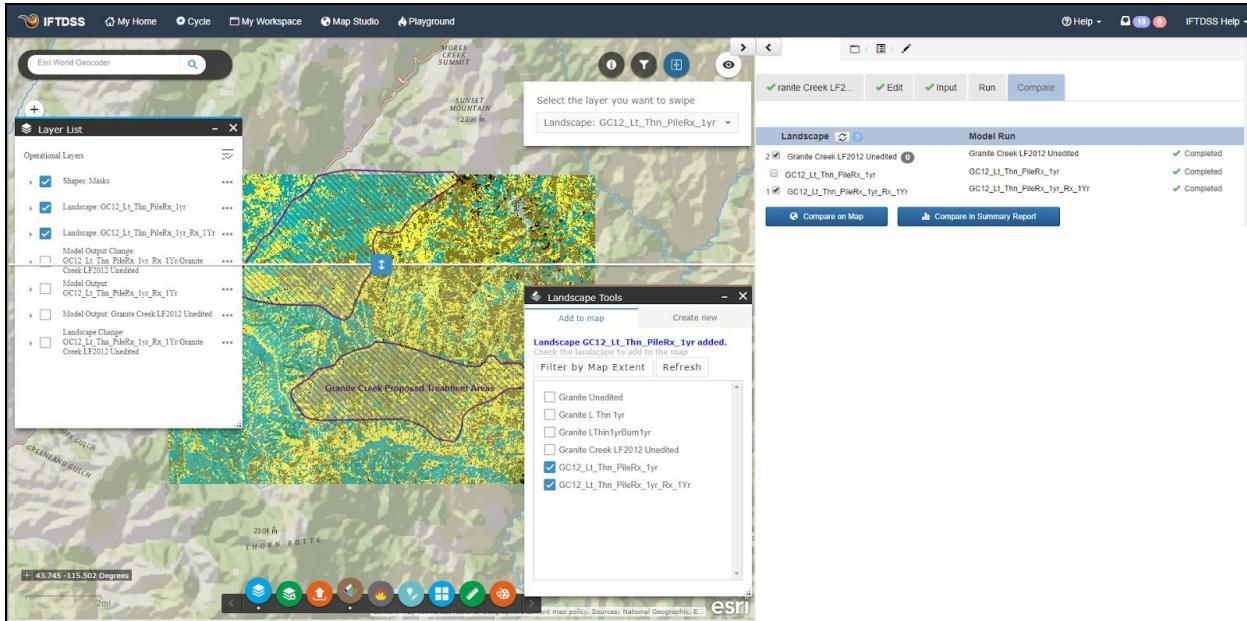
- Landscape Tools**
- Select the two treatment layers



C. Make sure these layers appear on the **Layer List**

D. Click the **Swipe Tool**

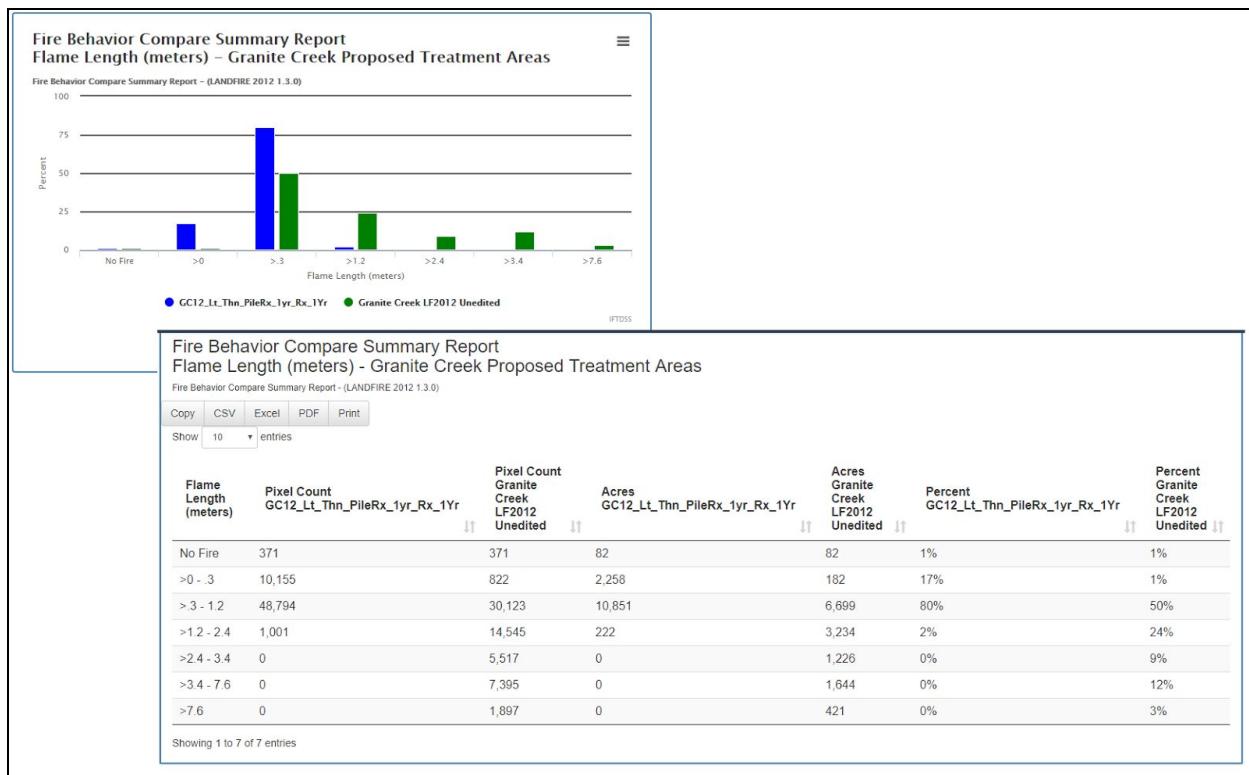
E. Set the layers to swipe.



We can see from comparing these two edited landscapes, as well as the Landscape Change Map earlier, that there was a significant shift in Fuel Model between the thinning/pile burn treatment, and the addition of the low severity wildfire.

Next, open the **Compare Summary Reports** to get the full picture and make a more informed decision about what treatments should be applied to achieve the preliminary objectives.

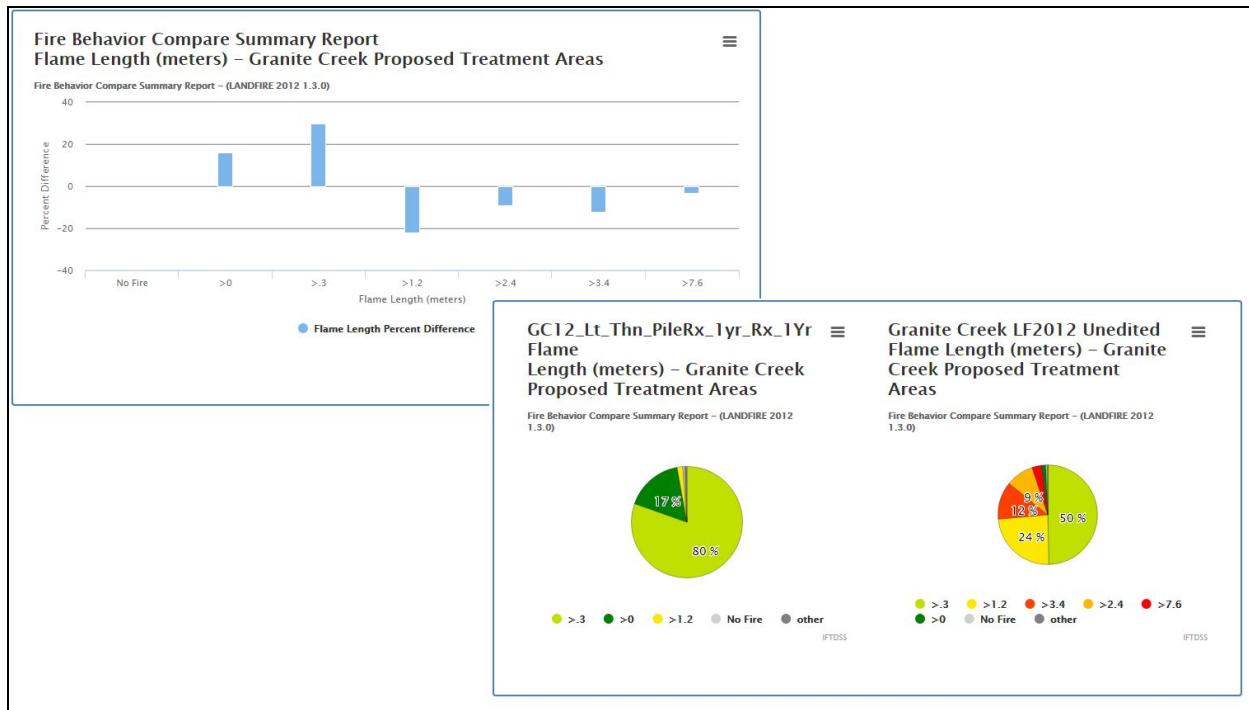
Navigate to **My Workspace** and open the Fire Behavior Summary Compare Report.



The Fire Behavior Compare Reports for a modeled Light Thin/Pile Burn/Low Severity Broadcast Burn treatment show even more of a difference in pre and post-treatment fire behavior.

The Flame Length Bar Chart shows a large increase in the post-treatment acreage for lower Flame Length bins and no post-treatment acres in the higher Flame Length bins.

The table indicates the pre-treatment percentage of pixels in the >0-.3m Flame Length bin is 1%, while post-treatment the percentage went up to 17%. Conversely, the percentage of post-treatment pixels in the 3 highest Flame Length bins is 0, indicating a significant decrease in Flame Lengths post-treatment, across the treatment area.

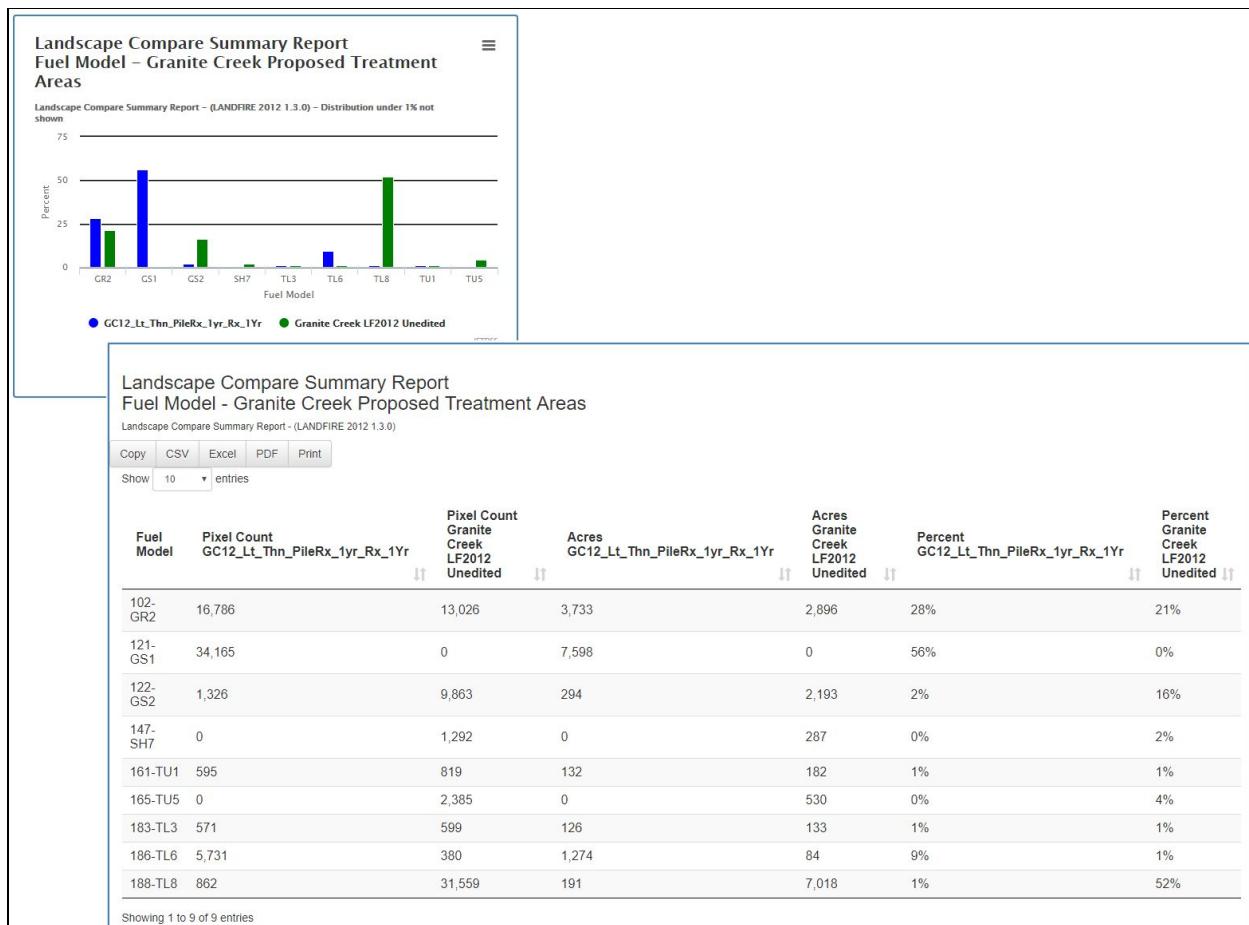


The Percent Difference Graph for Flame Lengths demonstrates the shift toward lower Flame Lengths post-treatment. You can see the significant positive percent difference in the >0 meter bin, while the bins correlating to higher Flame Lengths indicate a drop in the percent difference.

The Pie Charts tell the same story, plainly showing the shift to significantly lower flame lengths in the post-treatment chart.

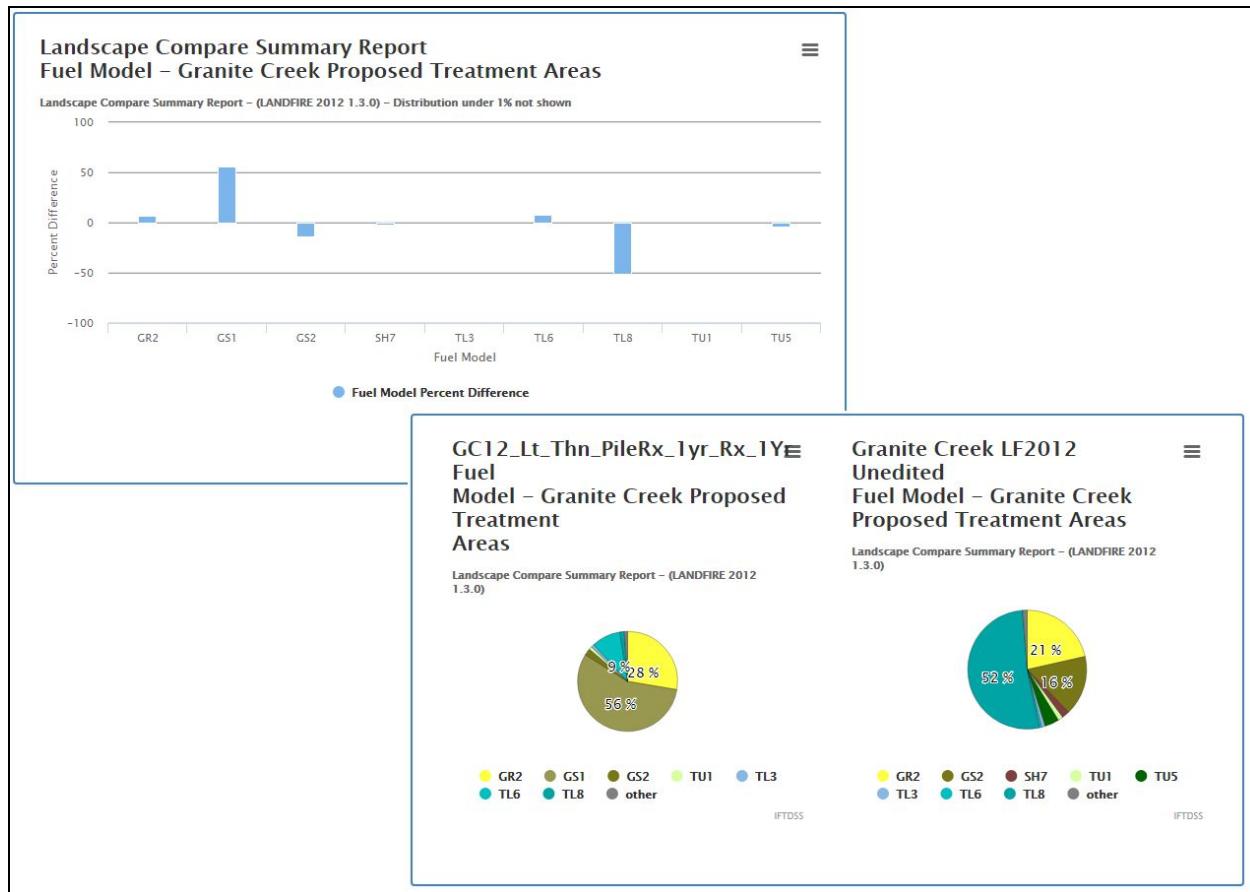
Scroll through the rest of the fire behavior model outputs in the report. Their story is the same, significantly reduced Rates of Spread, as well as almost no Crown Fire Activity post-treatment.

Next, navigate back to **My Workspace** and open the Landscape Compare Summary Report.



The Landscape Compare Reports for a modeled Light Thin/Pile Burn/Low Severity Broadcast Burn treatment show quite a change in Fuel Model pre- vs. post-treatment.

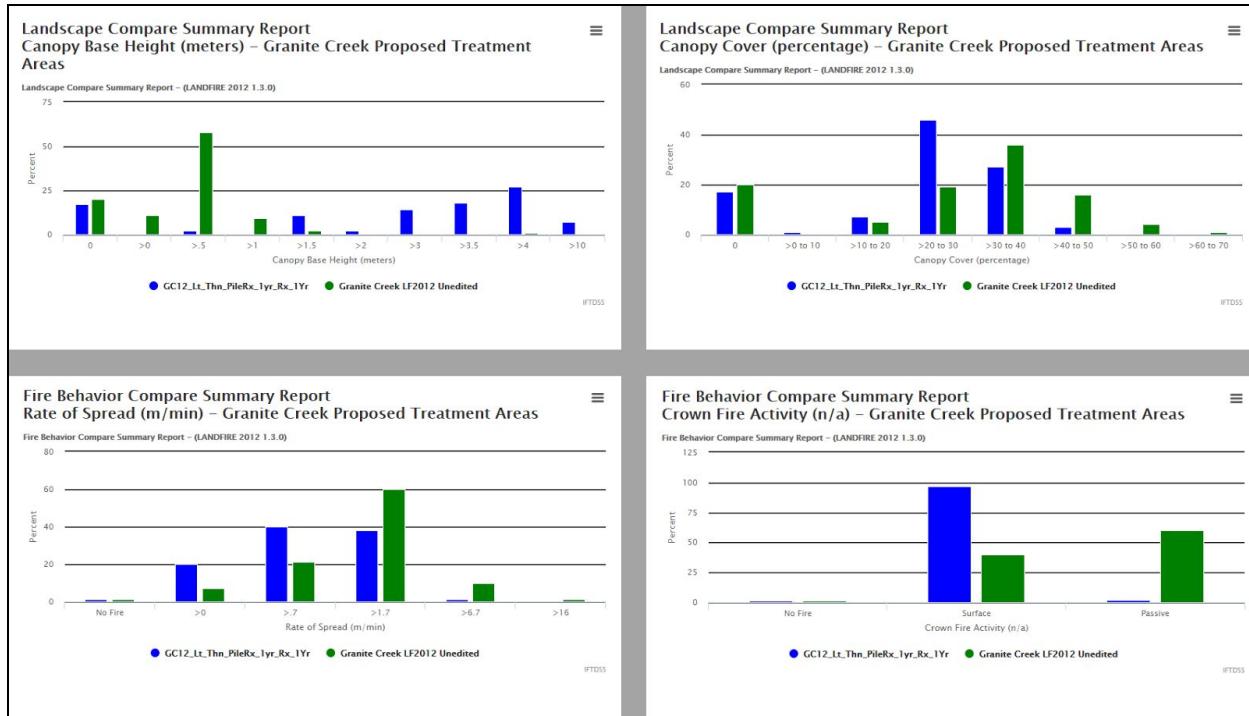
From the compare bar graph, we can tell that a significant portion of the TL8 Fuel Model (Long-Needle Litter) has shifted to the GR2 (Low Load, Dry Climate Grass) and GS1 (Low Load, Dry Climate Grass-Shrub) Fuel Models, 1 year post-treatment. The table to the right confirms this quantitatively, indicating that 52% of the treatment area was comprised of a TL8 Fuel Model pre-treatment, while just 1% of the treatment area was a TL8 Fuel Model post-treatment. Conversely, none of the treatment area contained the GS1 Fuel Model pre-treatment, while post-treatment over 50% of the treatment area was comprised of Fuel Model GS1.



The Percent Difference chart reflects the shift in Fuel Model displayed by the Bar Graph and table above, clearly showing the drop in the TL8 Fuel Model, as well as the increase in the GS1 Fuel Model post-treatment.

The Pie Charts visually display these changes in Fuel Model as well.

Review the rest of the Landscape Compare Summary Report and note the changes in the various landscape characteristics. Pay particular attention to the increase in Canopy Base Height, as well as the decrease in Canopy Cover, post-treatment. This coincides with the information we see in the rest of the report, and reiterates the fact that this series of treatments will help achieve the stated objectives, which were to: reduce surface fuel loading and the overall horizontal and vertical fuelbed continuity in order to reduce the fire hazard to adjacent private land and the community of Idaho City; and return low intensity fire to fire adapted vegetation communities.



Conclusion

We could continue this process and model a more invasive treatment, such as heavier thinning or increased mortality from a more severe broadcast (prescribed) burn, but these results will achieve our initial preliminary objectives, and are a good place to start with a project proposal for the District ID Team.

From this process, it's clear that the expected fire behavior, given 97th percentile fire weather and fuel moisture conditions, in the identified treatment areas is much more intense than what would be considered characteristic in this frequent, but low intensity, fire regime. The reports and maps will demonstrate how these proposed treatments will help achieve the preliminary objectives to reduce surface fuel loading and the overall horizontal and vertical fuelbed continuity, as well as helping to return low intensity fire in these treatment areas.