

Tutorial H

Creating a Values-at-Risk Map

Within the Risk Assessment Pathways

Defining Values at Risk

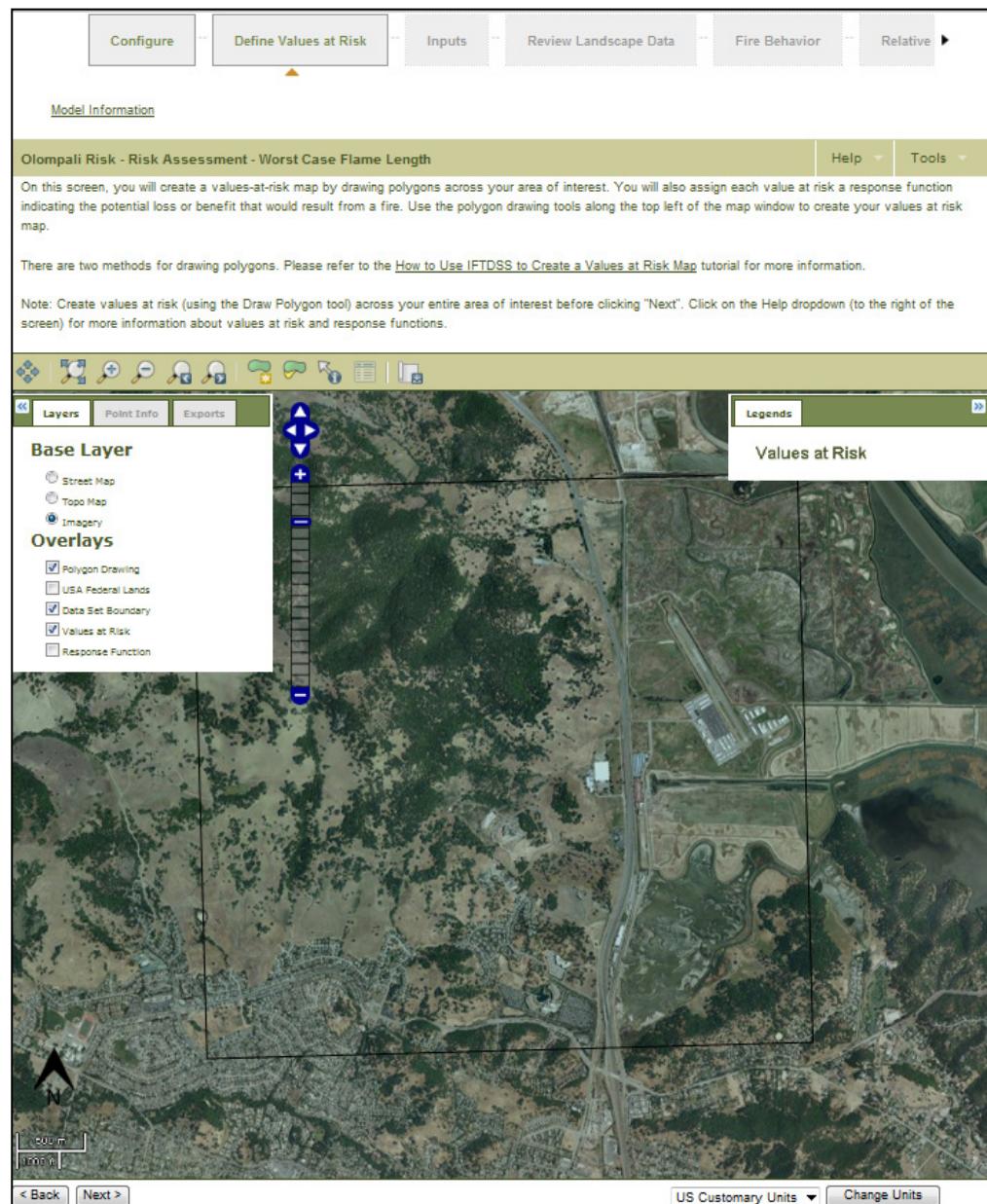
Note: Please refer to the risk assessment tutorials for more information.

This tutorial covers

- Using the map toolbar
- Defining values at risk
 - Drawing polygons
 - Assigning response functions
 - Editing polygons

You are at the **Define Values at Risk** step. Before choosing **Next** on this page, follow the instructions in this tutorial to create your values-at-risk map.

You'll be using the **Draw Polygon** tool to create a values-at-risk map across your entire area of interest.



Values at Risk and Response Functions

Values at risk, also known as highly valued resources, (HVR) are features on the landscape that are influenced positively and/or negatively by fire.

A value at risk can have ecological, economic, or social importance.

Some examples of values at risk include

- Airports
- Archeological sites
- Conifer forests
- Highway buffers
- Historic buildings
- Wildland-urban interface

Response Function	Description	Net Value Change Multiplier Based on User-Defined Flame Length Classes			
		Low	Moderate	High	Very High
1	All fire is beneficial; strong benefit at low and moderate fire intensities and moderate benefit at high and very high intensity.	+80	+80	+40	+40
2	All fire is beneficial; moderate benefit at low fire intensity and mild benefit at higher intensity.	+50	+20	+20	+20
3	Strong benefit at low fire intensity, decreasing to a strong loss at very high fire intensity.	+60	+20	-20	-60
4	Moderate benefit at low fire intensity, decreasing to a moderate loss at very high fire intensity.	+30	+10	-10	-30
5	Slight benefit or loss at all fire intensities.	0	0	0	0
6	Mild increasing loss from slight benefit or loss at low intensity to a moderate loss at very high intensity.	0	-10	-20	-30
7	Moderate increasing loss from mild loss at low intensity to a strong loss at very high intensity.	-10	-30	-50	-80
8	Slight benefit or loss at all fire intensities, except a moderate loss at very high intensity.	0	0	0	-50
9	Slight benefit or loss at low and moderate fire intensities and a mild loss at high and very high intensities.	0	0	-20	-20
10	Mild loss at all fire intensities.	-20	-20	-20	-20
11	Moderate loss from fire at all fire intensities.	-50	-50	-50	-50
12	Strong loss from fire at all fire intensities.	-80	-80	-80	-80
13	Loss increases from slight loss at low intensity to strong loss at very high intensity.	-10	-60	-70	-80
14	Slight benefit or loss from fire at low and moderate intensities and a strong loss from fire at high and very high intensities.	0	0	-80	-80

(Table modified from Calkin et al, 2010a.)

Response functions describe the effect of fire on the values at risk.

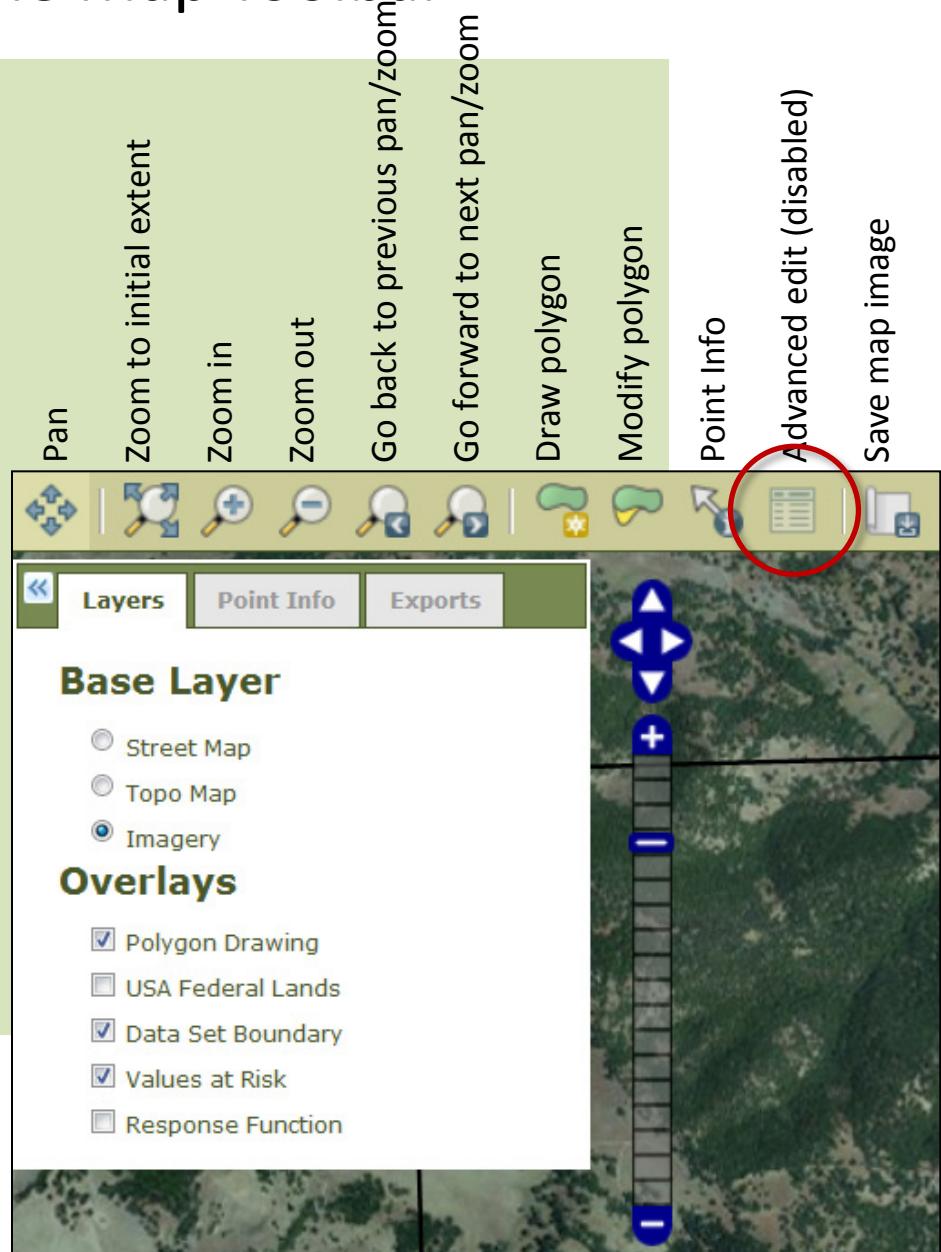
Response functions are mathematical relationships between fire characteristic (e.g., flame length) and fire outcome (see the table above; this table is also available in the online help). There are 14 pre-defined response functions.

Introducing the Map Toolbar

The map toolbar, located at the top of the map, provides tools for drawing your values at risk.

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

Tools that are disabled are faded out (for example, the **Advanced Edit** tool, circled here in red).



Defining Values at Risk

In the next few steps, you will create a values-at-risk map by drawing and assigning response functions to polygons across the landscape.

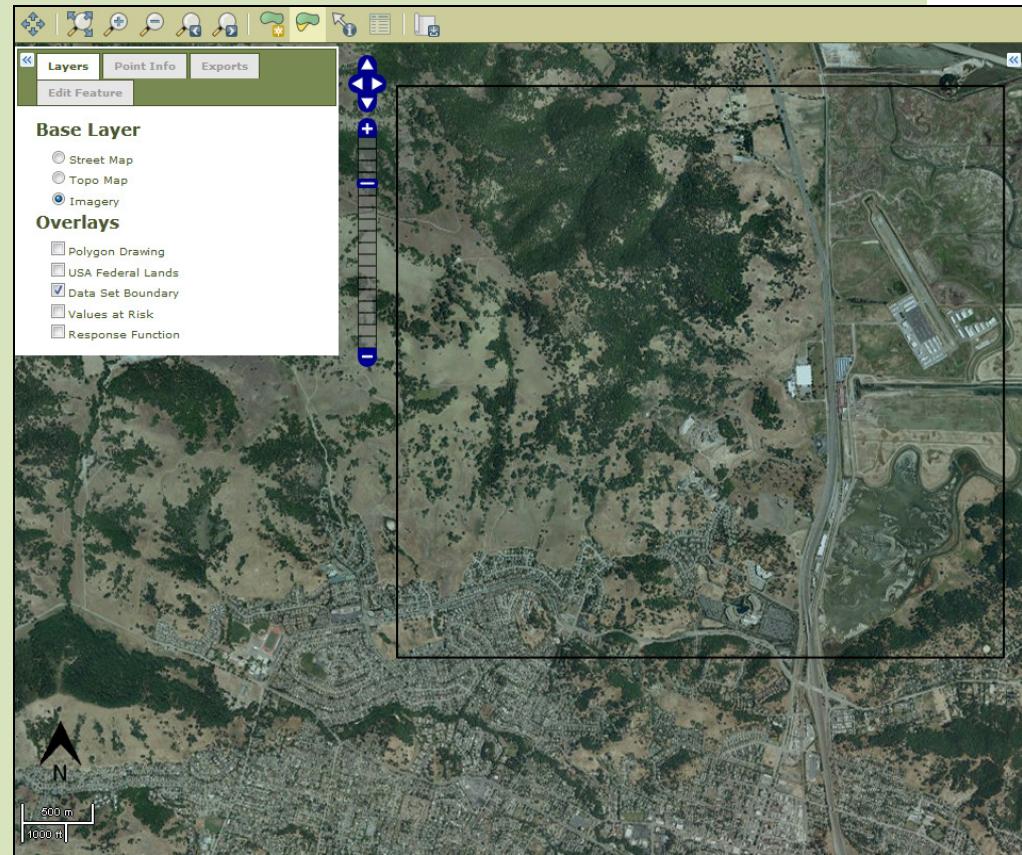
There are two methods for using the map tools to draw polygons.

1. The **freeform drawing method** is useful when

- You want to quickly and easily draw polygons.
- You have a small area of interest.
- You can see the entire area your polygon will encompass without moving the map.

2. The **point and click method** is useful when

- You want to zoom in to make a detailed polygon.
- You need to move the map (using the pan tool) while you are drawing a polygon.



These polygon drawing methods are discussed on pages 6 through 9.

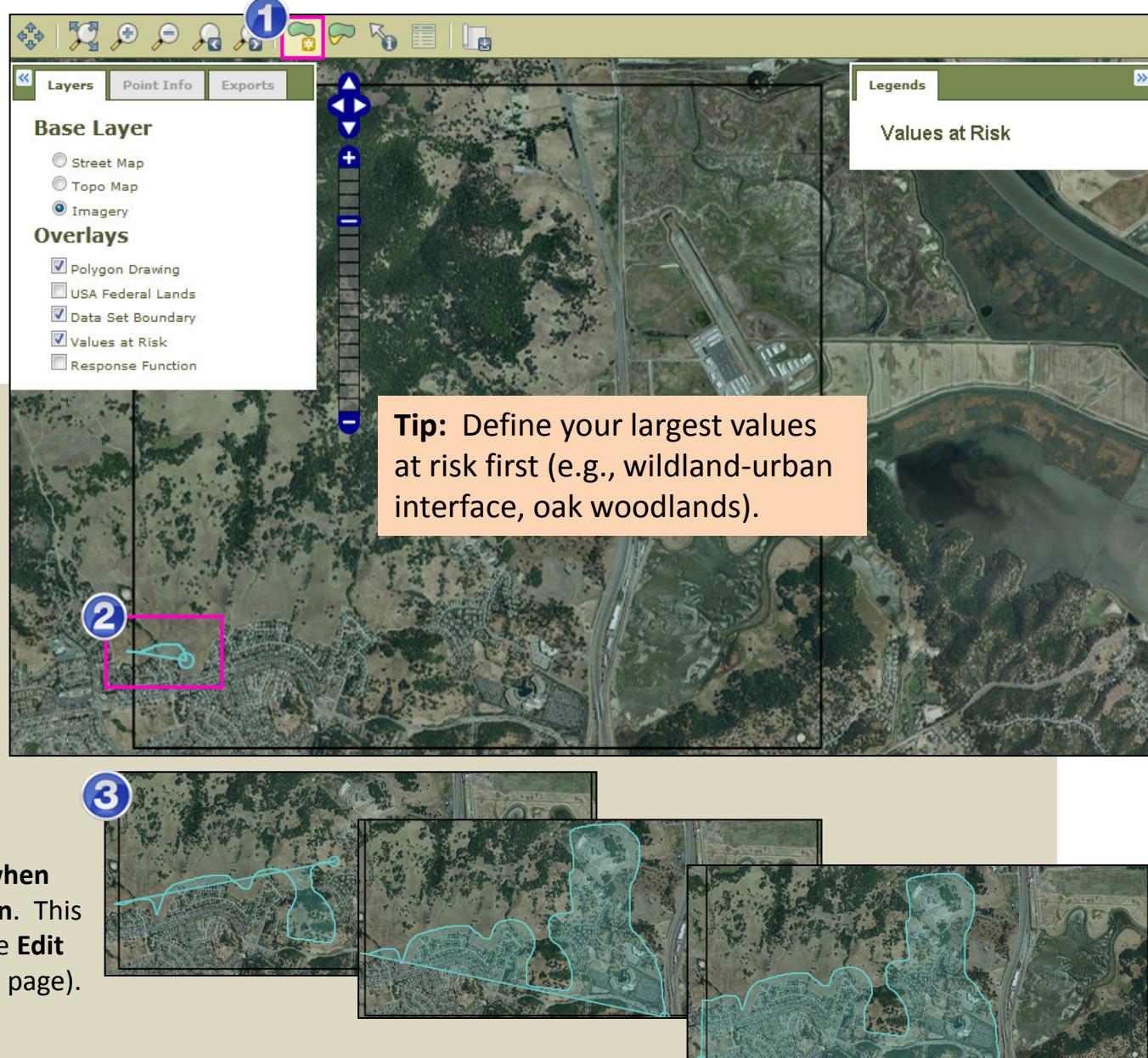
Defining Values at Risk – Freeform Drawing Method

In this step, you use the freeform drawing method to **define values at risk** and assign each value at risk a response function.

In this example, you draw a polygon over the wildland-urban interface.

- 1 Select the **Draw Polygon** tool.
- 2 While holding down the **Shift** key, click on the map, hold down the left mouse button and start drawing your first polygon.
- 3 Continue to hold down the shift key and left mouse button. Moving the mouse as if it were a pencil, draw your polygon (outlining the wildland-urban interface).

Let go of the left mouse button when you are done drawing the polygon. This creates the polygon and opens the **Edit Feature** panel (shown on the next page).



Using the Edit Feature Panel to Define Values at Risk

After you create the polygon, the **Edit Feature** panel appears. To edit the polygon,

- 1 Name the polygon.
- 2 Give the polygon a color.



- Click on the **Color** text box. A color wheel appears.
- Use the color wheel to choose a color.
- Use the inner box to choose the shade of the color selected.

- 3 Assign a response function to the polygon (see page 17 and the box to the right on this page).
- 4 Choose **Submit** to save the polygon data.

Tip: Click on **Response Functions** under the **Help** dropdown menu to read a description of each response function and to find additional resources.

The screenshot shows the 'Edit Feature' panel overlaid on a map. The panel has tabs for 'Layers', 'Point Info', and 'Exports', with 'Edit Feature' selected. Step 1 highlights the 'Name' field containing 'Wildland Urban Interface'. Step 2 highlights the 'Color' field showing the hex code '#ecc65f'. Step 3 highlights the 'Response Function' field showing 'RF 12: Strong loss'. Step 4 highlights the 'Submit' button. A pink arrow points from the text in the green box to the 'Response Function' field. The map view shows a polygon representing the Wildland Urban Interface, overlaid on a satellite image of a landscape.

Here we have assigned to the wildland-urban interface the response function **RF 12: Strong loss** (which means Response Function 12: Strong loss from fire at all fire intensities). IFTDSS automatically fills in the response function values. See page 17 for a list of the response functions.

Defining Values at Risk – Point and Click Method

Next, define another value at risk.

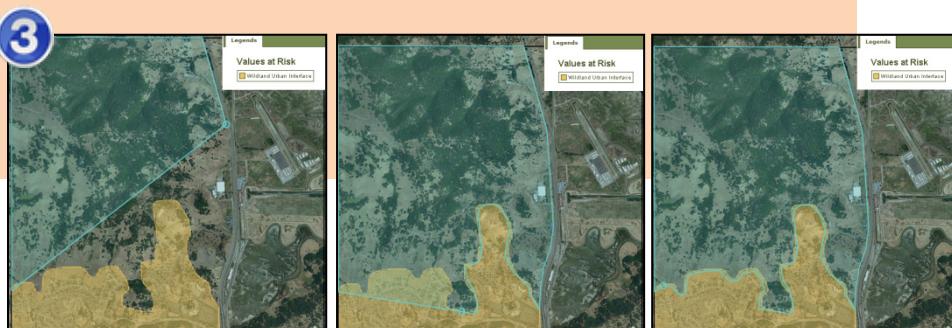
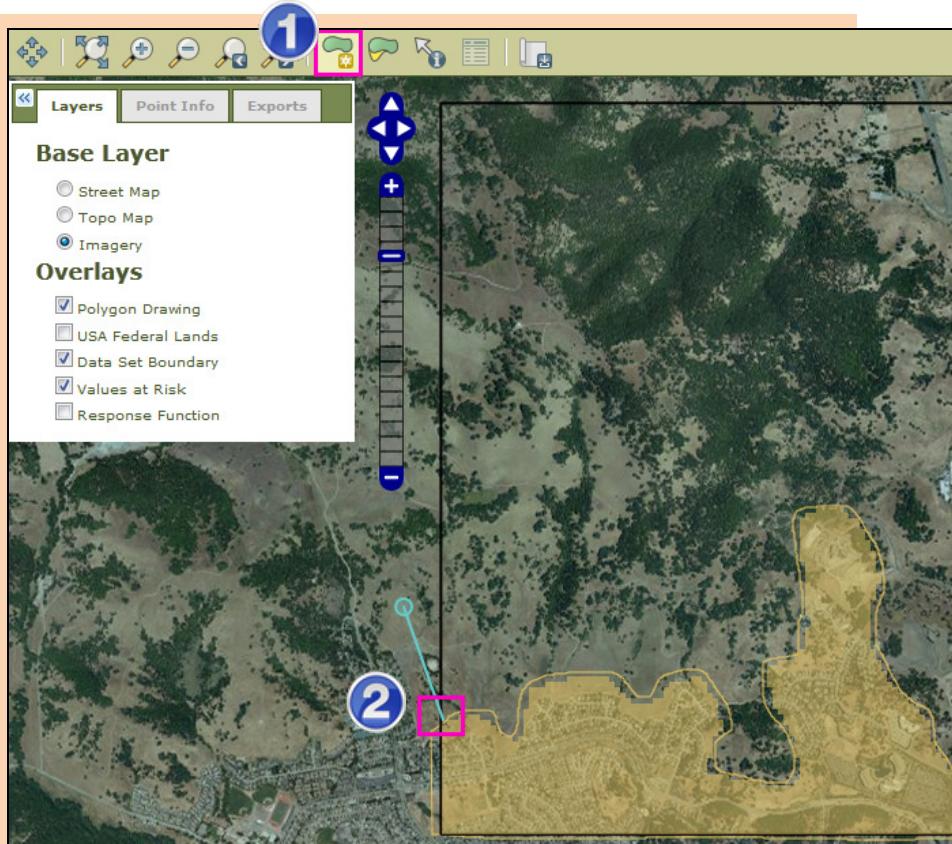
In this example, use the **point and click method** to draw a polygon over the private land (oak woodlands).

- 1 Select the **Draw Polygon** tool.
- 2 Click on the map and release to start drawing your first polygon.
- 3 Move the mouse to a new point and click to add another point. Before moving on, make sure the point is established (by moving the mouse away from the point). Continue this process until you are done drawing your polygon.

Double-click when you are done drawing the polygon to create the polygon and to open the **Edit Feature** panel (shown on the next page).



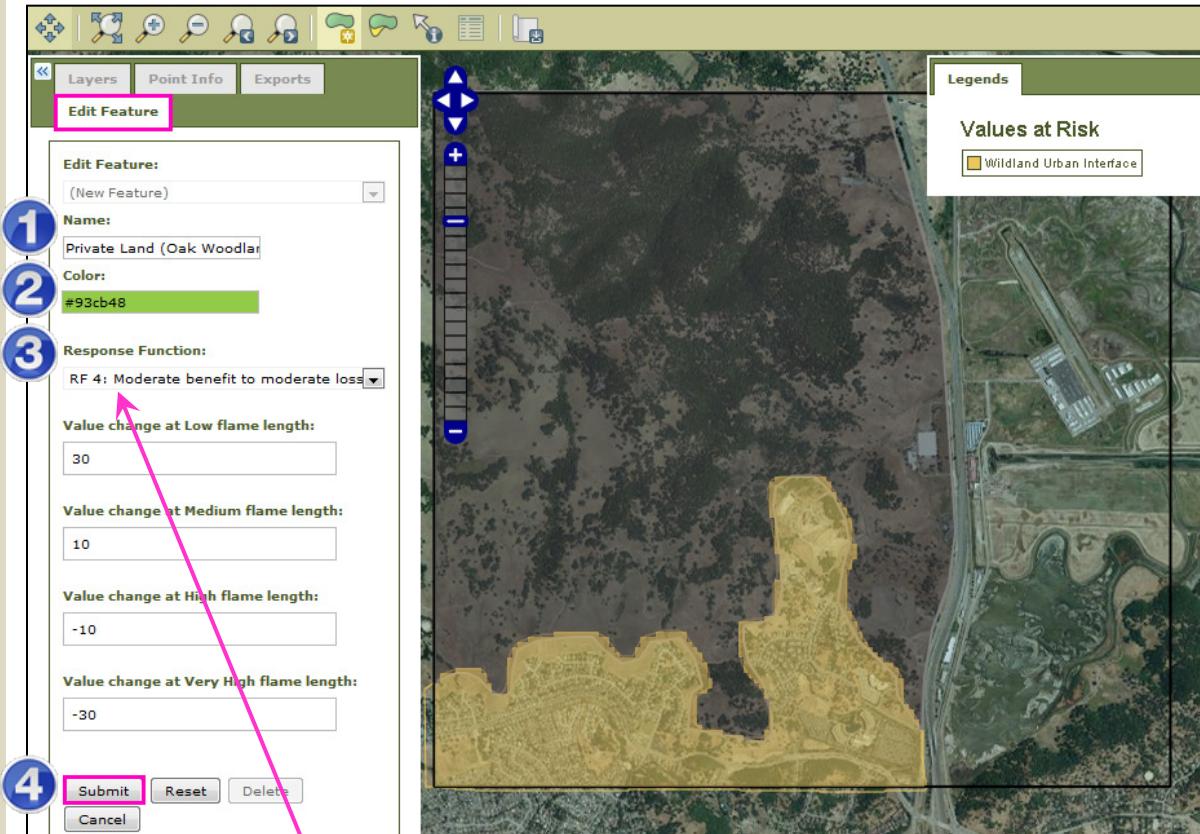
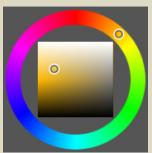
Tip: Overlap your polygons. This insures that all pixels in your project area will be assigned a response function.



Using the Edit Feature Panel to Define Values at Risk

After double-clicking to create the polygon, the **Edit Feature** panel appears. To edit the polygon,

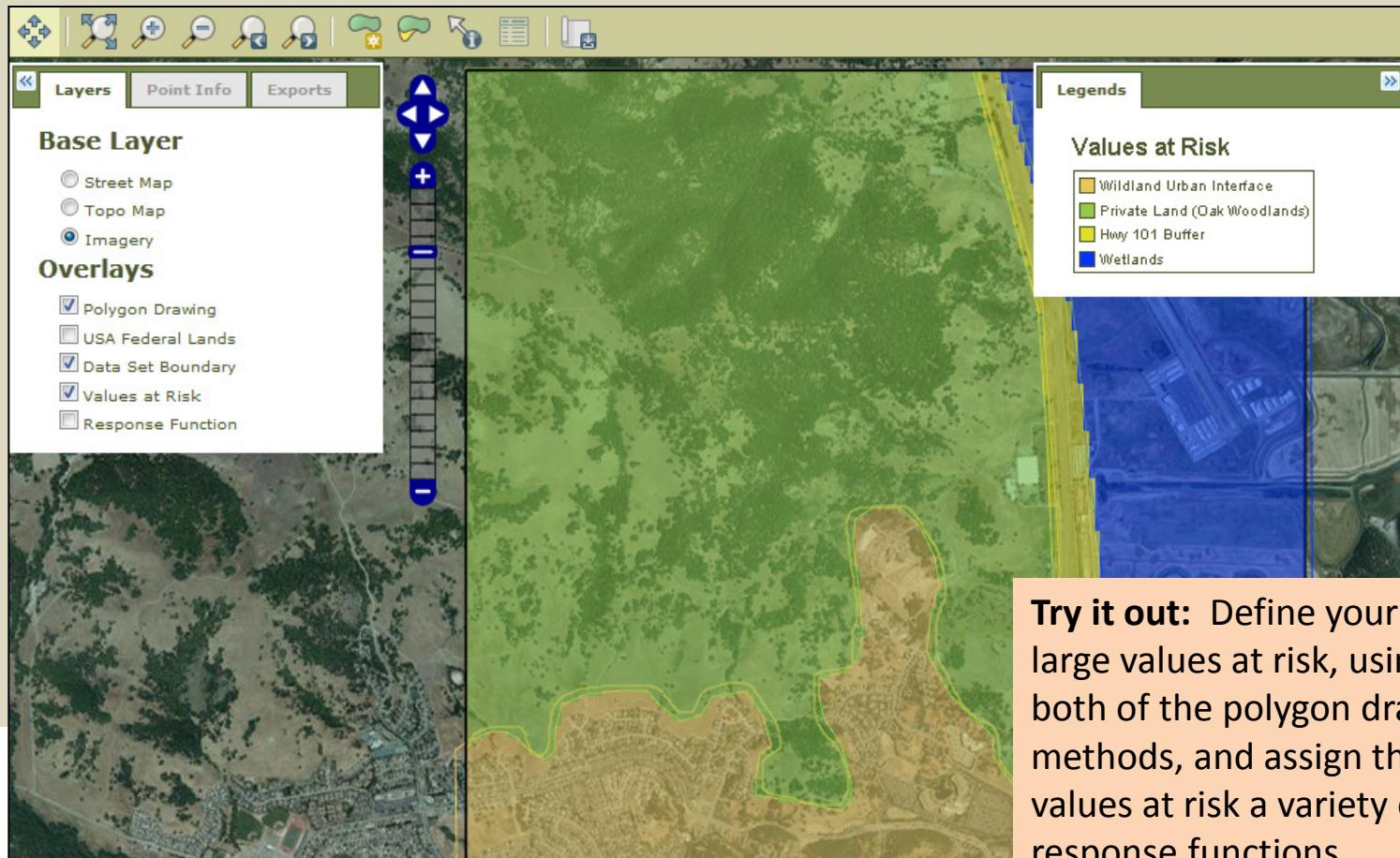
- 1 Name the polygon.
- 2 Give the polygon a color.
 - Click on the **Color** text box. A color wheel appears.
 - Use the color wheel to choose a color.
 - Use the inner box to choose the shade of the color selected.
- 3 Assign a response function to the polygon (see page 4 and the box to the lower right on this page).
- 4 Choose **Submit** to save the polygon data.



Here we have assigned to the oak woodland the response function **RF 4: Moderate benefit at low fire intensities to moderate loss at high fire intensities**. As before, IFTDSS automatically fills in the response function values.

Defining Larger Values at Risk

Continue the steps on pages 6 through 9 until you fill your entire area of interest with polygons representing the larger values at risk. **Define your largest values at risk first** (e.g., wildland-urban interface, oak woodlands).



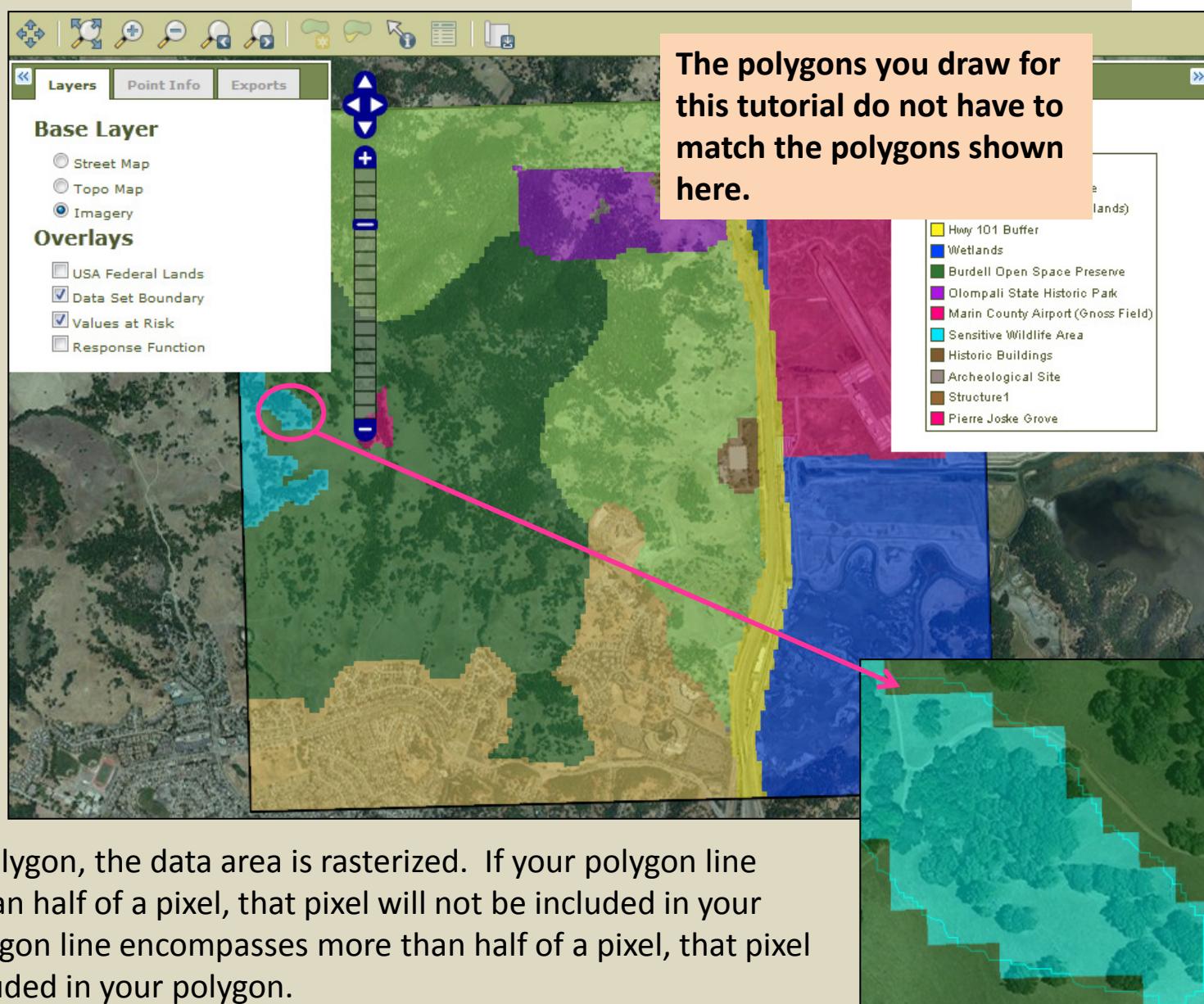
Try it out: Define your own large values at risk, using both of the polygon drawing methods, and assign those values at risk a variety of response functions.

Defining Smaller Values at Risk

After defining your larger values at risk, **draw smaller values of risk** (e.g., archeological sites, endangered species habitat, structures) on top of the larger values at risk.

The smaller polygons replace the larger polygons beneath.

Tip: Creating a detailed values-at-risk map (with multiple response functions) produces better outputs.



Once you create a polygon, the data area is rasterized. If your polygon line encompasses less than half of a pixel, that pixel will not be included in your polygon. If your polygon line encompasses more than half of a pixel, that pixel will be included in your polygon.

Defining Values at Risk – Assigning a Background

In order for IFTDSS to calculate an output in the risk pathways, all grid cells within an area of interest need a response function. To fill this requirement without having to define values at risk for every pixel, you can assign a background to your values-at-risk map. The following steps show how to do so. Any grid cells not captured within a polygon will be assigned the response function assigned to the background.

1 Select the **Modify Polygon** tool.

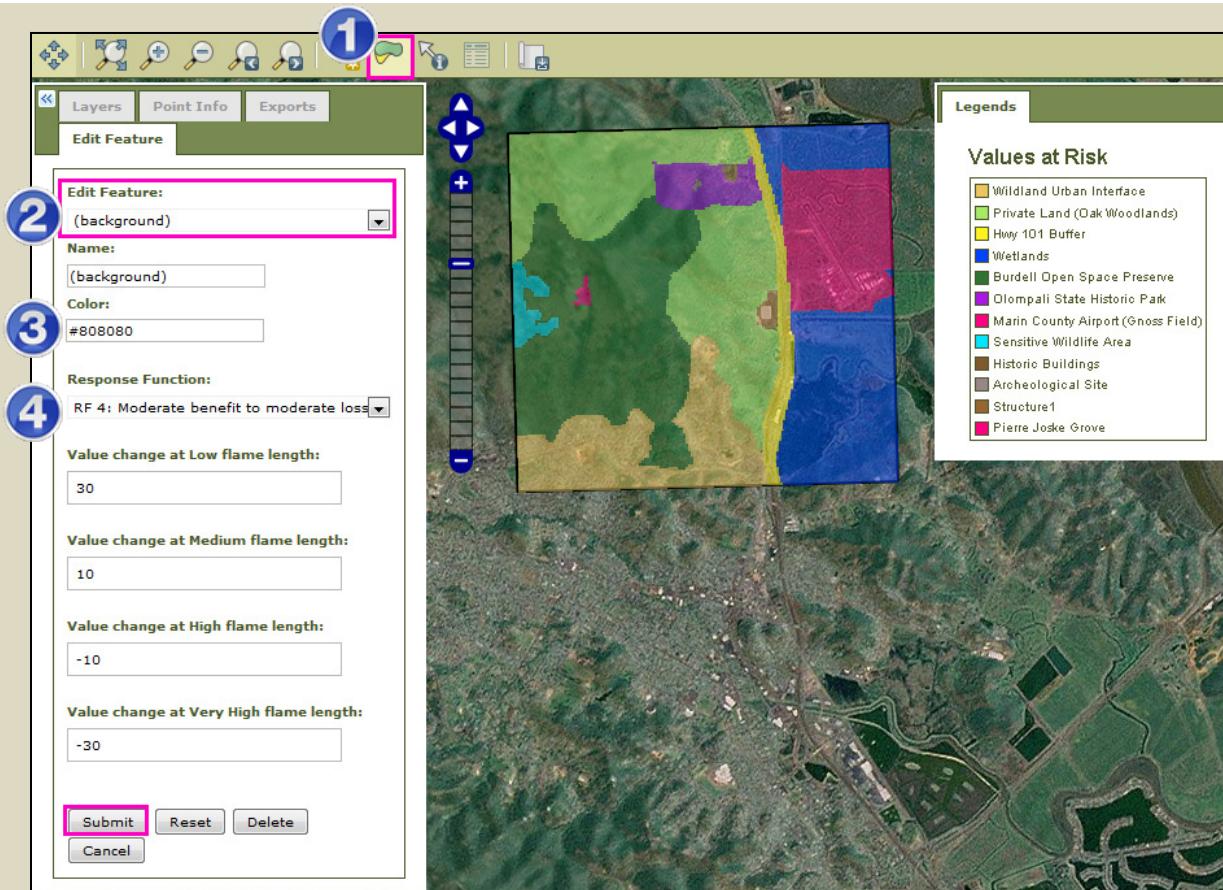
2 Under the **Edit Feature** drop-down, (background) is automatically selected.

If you prefer, you can change the background's name from (background).

3 Assign the background a color.

4 Assign the background a response function.

Assigning the background a response function of 4 tells IFTDSS to assume that the areas without a polygon will burn with a moderate benefit under low flame lengths to a moderate loss under very high flame lengths.



Editing Values at Risk

You can also edit your polygons using the **Modify Polygon** tool.

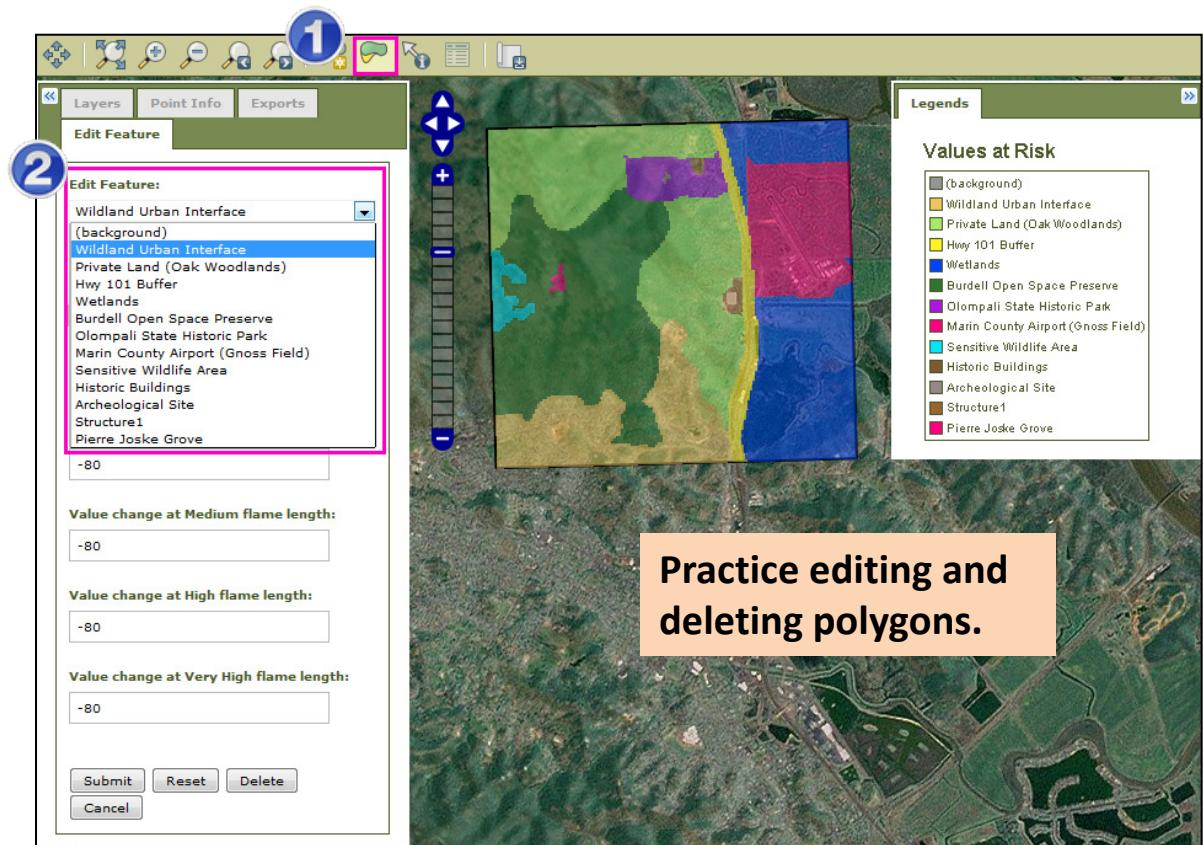
1 Select the **Modify Polygon** tool.

2 Select the feature (value at risk) you would like to edit using the **Edit Feature** drop-down list.

In the **Edit Feature** panel, you can edit the polygon's name, color, or response function.

You can also delete a polygon using the **Delete** button at the bottom of the panel.

If you delete a polygon, the assigned background will replace the deleted polygon.



Reviewing Your Values-at-Risk Map

You can use the **Layers** panel to view your values at risk or the response functions that you assigned to your values at risk.

The response function layer is shown on the right.

To save your values-at-risk map for use in future runs, type a descriptive name into the “Save Polygons As:” text box.

Note: Please refer to the more detailed [risk assessment tutorials](#) for detailed help for the next set of risk assessment steps.

