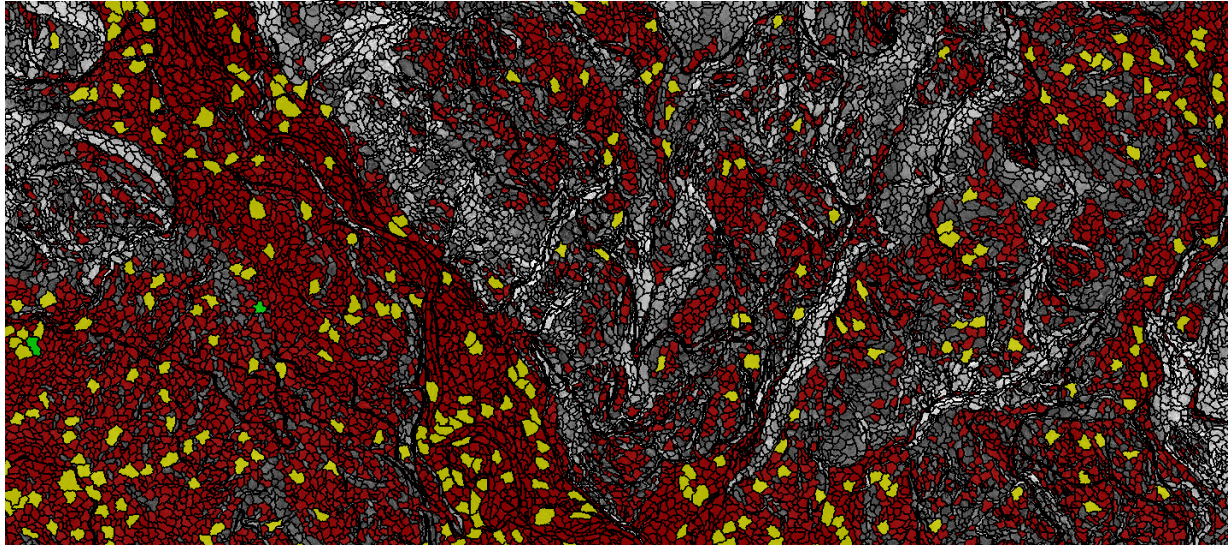


# EXERCISE 3

## Create Segments and Filters



### Introduction

In this exercise, you will use eCognition to find areas (segments) that are suitable for landing helicopters in the Gifford Pinchot National Forest. First, you will create segments using the slope raster you created in Exercise 1. You will then use filters to help find the most suitable areas for landing sites based on a few basic parameters. The first filter will find segments that have an average slope within the segment of less than or equal to 15 percent. The segments that satisfy the parameters of the first filter will then be filtered to exclude those that have an area of less than one acre. Finally, you will take the remaining segments and find ones that are relatively rectangular. What remains are segments that have an average slope of no more than 15 degrees, an area of more than an acre, and a fairly compact/rectangular shape.

### Objectives

- Learn how to create a segmentation ruleset.
- Create filters that sort through segments to remove those that don't fit desired parameters.

### Required Data

- **LandingZones.dpr**—this is the eCognition project you saved in Exercise 2.
- **Segmentation\_Rule\_Set.dcp (optional)**—pre-prepared rule set that allows you to skip Parts 2-3.

### Prerequisites

- eCognition installed and licensed on your computer



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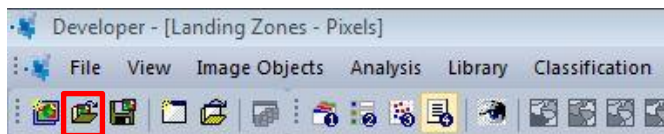
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## Part 1: Open eCognition

### A. Open eCognition and Load Project

1. If your eCognition project is not still open, then click the Start Menu and navigate to **All Programs, Trimble, eCognition Developer 9.2, eCognition Developer**.
  - i. If you have a shortcut on your desktop, double click the icon to open eCognition Developer.
2. Click the **Open Project** button (see below) and navigate to the **LandingZones** folder.



3. Open **LandingZones.dpr**.

### B. Load Pre-prepared Rule Set

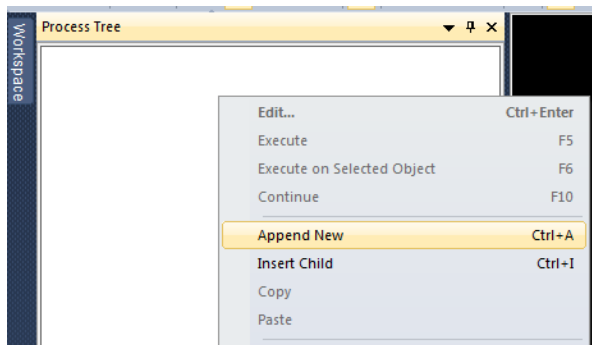
**Note:** If you do not want to spend the time to learn how to create a segmentation process and the filters that sort through the segments based on user-defined parameters, you can simply use the rule set provided to you. While it is recommended that you go through Parts 2 & 3 to get a solid understanding of how to create a segmentation rule set, the pre-prepared rule set will allow you to skip a few of the more complex steps of this workflow. If you would like to use the pre-prepared rule set, skip to Part 4, where you will find a note that instructs you how to load and execute this rule set. Then continue on through Part 4 to export your results. To learn more about how to adjust these parameters and how to subset your study area, see Appendices A & B.

## Part 2: Generate Segments

Now that you have opened the LandingZones project, you will begin creating segments using a few available parameters: Scale, Shape and Compactness. **Scale** is the simplest of the three, as it controls the size of segments, with high values creating larger segments and vice-versa. **Shape** is inversely proportional to Color (spectral values of raster—percent slope in this instance). So when Shape is given a value of 0.1, color (behind the scenes) is given a value (weight) of 0.9—and increases the influence of spectral information on the resultant segments. **Compactness** is inversely proportional to smoothness. One more thing to remember, Compactness is a modifier of Shape. This means that if Shape is set to a low value (e.g. 0.1) then the Compactness setting will have less influence (no matter how high the Compactness setting is) on the segmentation.

### A. Create Segmentation Using Slope Raster

1. Right click in the Process Tree window and select **Append New** from the menu that appears.



2. The Edit Process dialog box will open. In the **Name** field, type **Create Segments**, leave the default parameters and click **OK**.
3. Right-click in the Process Tree window again and select **Insert Child** from the menu.
4. Leave the **Automatic** checkbox checked. This will provide an automatic name for the “Child” that is based on the parameters you set.

**Note:** For Parent processes that you insert to organize your rulesets into blocks, we recommend you give them an intuitive name.

However, for Child processes that execute an algorithm you always need to leave the Automatic name option. This is necessary to avoid creating bugs or infinite loops in the rule set, which might be hard to find. You may receive a warning message the first time you set a Parent process (that you are using as an organizational placeholder) name to other than “do”; read the message and click Yes.

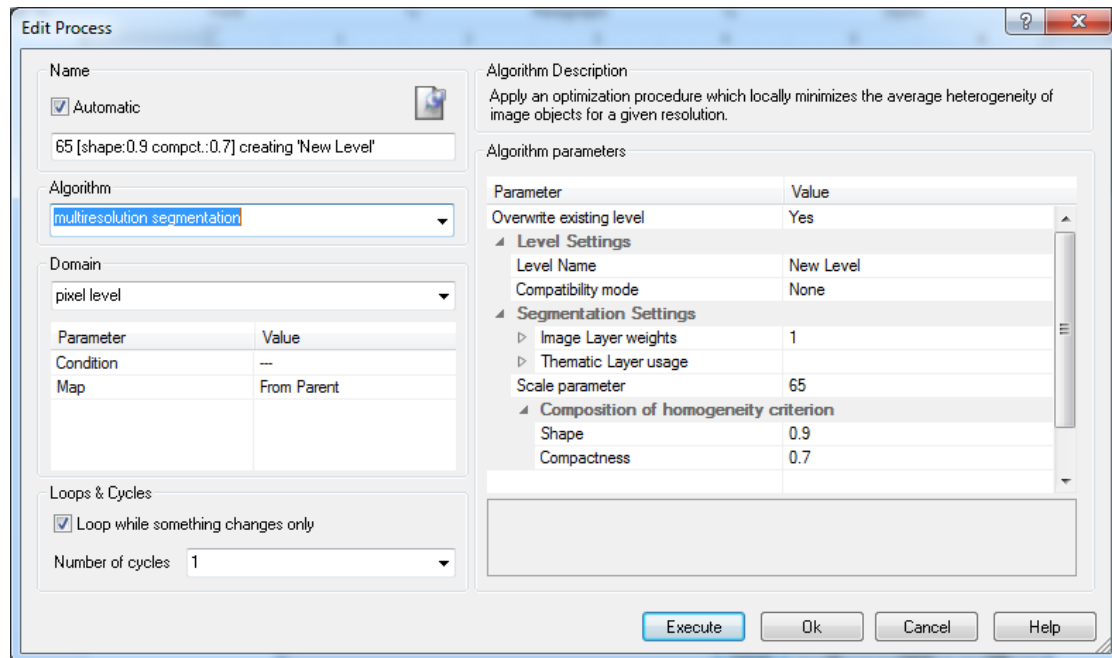
5. In the **Algorithm** drop down box choose **multiresolution segmentation**.

**Note:** If you begin typing the name of the algorithm you would like, the software automatically fills in the options that match. You can use your down arrows to select these - a shortcut compared to scanning and selecting from the full list of options.

6. In the **Domain** drop down box choose **pixel level** from the list if it isn’t already selected.
7. In the **Image Layer weights** field on the right side of the window, type in **1**.
  - i. If you had multiple layers or a multi-band raster, then you could assign greater importance to the layers or bands that are most useful for identifying your target feature.
8. Type **65** into the **Scale parameter** field. This controls the size of segments, where the larger numbers create bigger segments.
  - i. This value seems to be a sweet spot for creating segments that are mostly larger than an acre in size.
9. Set the **Shape** and **Compactness** parameters to **0.9** and **0.7** respectively.
  - i. These values were determined through an iterative process of testing many different parameter combinations (see Appendix B). These two parameters are set to their maximum extent. If these values are adjusted, then it may be necessary (or wise) to test different scale parameter values for the new shape and compactness thresholds.
  - ii. If the Shape value was set to a lower value, the outputs would group similar slope values, meaning that segments would be more oblong and irregular due to the nature of slopes.

- iii. If the Compactness parameter was lowered, the outputs would also be less square and, thus, less ideal for landing zones.

10. Press **OK** to close the dialog box (see below).

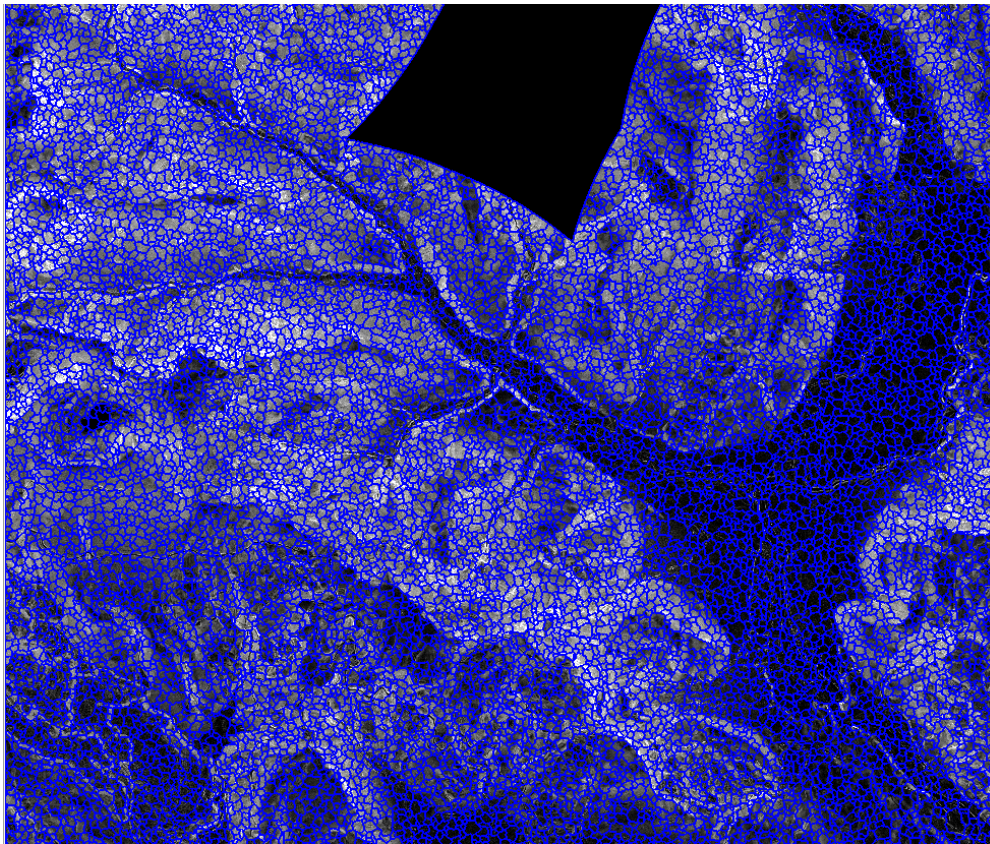


- i. Notice that this child has been added below Create Segments.

11. Right-click on the **Create Segments** process and select **Execute**.

- i. It may take 15-20 minutes, perhaps more, to run the process depending on the processing power of your computer. The output (zoomed in) will look similar to the below image.
  - (a) Notice that an estimated time of completion is provided in the bottom left of the window.
  - (b) If you are working on your own dataset and want to test the parameters without the long wait time, refer to the Appendix for instructions on creating subsets.





12. After the segmentation has completed, take a moment and review the resulting segments, paying special attention to their shape (the detailed nature of their boundaries) and their compactness (the linearity of them). Appendix B addresses how to adjust these parameters (scale, shape and compactness) to influence the shape, size and spectral influence for segment outputs.

**Note:** In the Process Tree panel, you may have noticed that the name of the child process has automatically filled with information that reflects the current algorithm parameters (default parameters for now).

It also displays the time it took to complete the process, 15:21.015 (minutes, seconds, milliseconds) in the example below. This information is invaluable when troubleshooting rule sets that take too long to run on your full image set. You can use these times to determine which process is taking the longest to run (or not completing).



## Part 3: Create Classes

In the previous section, you created segments for the entire study area. However, many of these segments will not meet the basic requirements for a landing zone. Therefore, you will have to create

filters that will sift through the segments to identify those that meet average slope, shape and area parameters. The classes that you will create in this section correspond with those three primary parameters for identifying suitable landing zones, and will be pivotal for filtering the segments in Part 4.

## A. Create Classes

1. You now need to create the classes that will be populated with the results from the filters. Open the Class Hierarchy window by clicking the **Classification** drop down and selecting **Class Hierarchy**. If necessary, click and drag the window to the side of the eCognition screen to dock it. It may automatically dock to the middle right of the eCognition screen.
2. Right-click in the **Class Hierarchy** window. Select **Insert Class**.
3. In the **Class Description** window that appears type **Slope** into the **Name** field and change the color (to the right of the Name) to **red** if it isn't already.
4. Leave all the other defaults and press **OK** to close the window.
5. Right-click in the **Class Hierarchy** window again and select **Insert Class**.
6. In the **Class Description** window that appears type **Area** into the Name field and change the color to a shade of green.
7. Leave all the other defaults and press **OK** to close the window (see below).
8. Right-click in the **Class Hierarchy** once more. Select **Insert class**.
9. In the **Class Description** window that appears type **Shape** into the Name field and change the color to yellow.
10. Leave all the other defaults and click **OK** to close the window. The Class Hierarchy sidebar should now look similar to the image below.

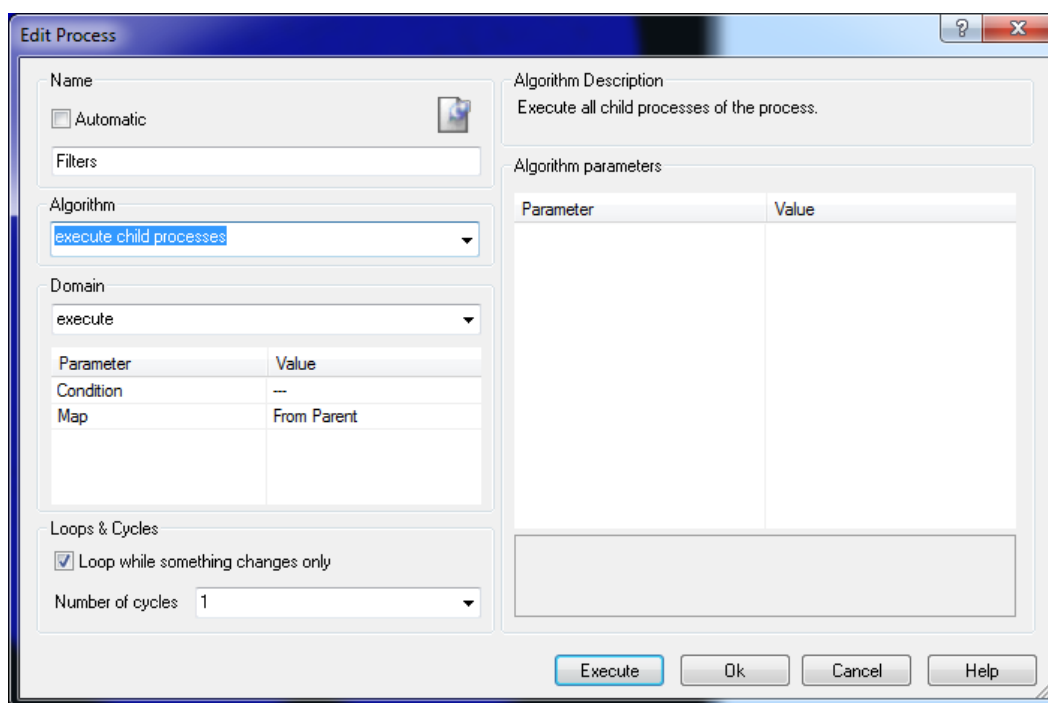


## Part 4: Create Filters

Using the classes you just created, you will now write some conditional statements will filter out unsuitable landing zones. These filters will be appended to the Create Segments process in the Process Tree.

### A. Create Parent Process Called Filters

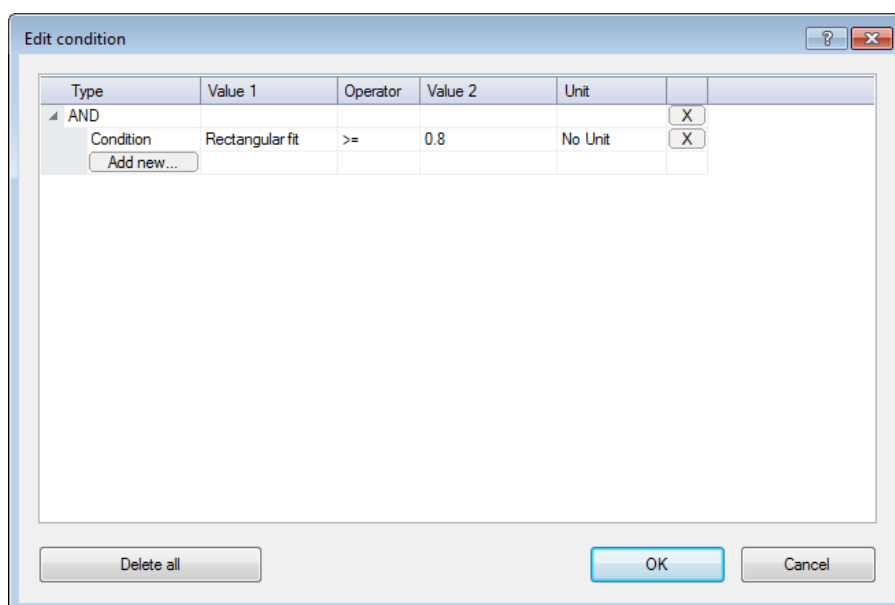
1. Right-click on the **"65 [shape:0.9 compct.:0.7] creating 'New Level'"** child process in the **Process Tree** sidebar. Choose **Append New**. This will insert another Parent level process below the segmentation process.
2. In the **Edit Process** dialog, type **Filters** into the **Name** section text box. You are creating a Parent process.
3. Leave the default parameters and click **OK** to close the window (see below).



## B. Create Shape Filter

1. You will now create the filters that will narrow down the number of segments you have to choose from based on the classes you just created. Right-click on the **Filters** in the Process Tree and select **Insert child**.
2. Select **assign class** in the **Algorithm** drop down box. Type it to find it quickly.
3. Within the **Domain** section, click the cell next to the **Condition** parameter and select the button with three dots. An **Edit condition** window should appear.
4. In the **Value 1** column next to **Condition**, click on the drop down box and select **From Feature**.
5. In the **Object Features** category, expand **Geometry, Shape, Rectangular fit**. This will add Rectangular Fit to the Value 1 field.
6. Under the **Operations** column click **>=** (greater than or equal to) and type **0.8** under the **value 2** column.
7. Leave the **Unit** set to **No Unit**.
8. Select **OK** on the window (see below).

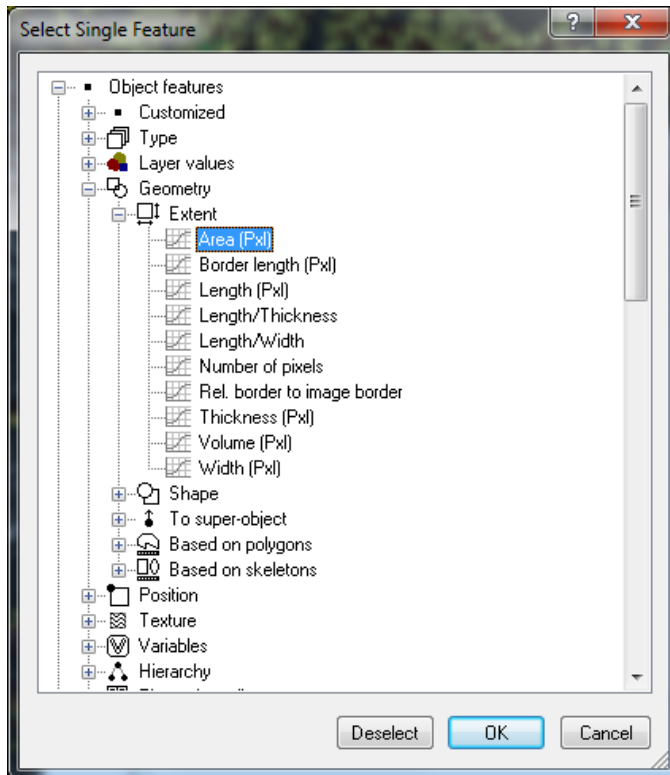




9. Now click in the cell beside the **Class filter** parameter within the **Domain** section and click on the button with three dots that appears.
10. In the **Edit Classification Filter** window that appears click on the **Area** check box and then click OK to close the window.
11. Click on the word **unclassified** under the **Value** column and click the drop down arrow.
12. Select **Shape** from the list that appears.
13. Click **OK** (see below).

## C. Create Area Filter

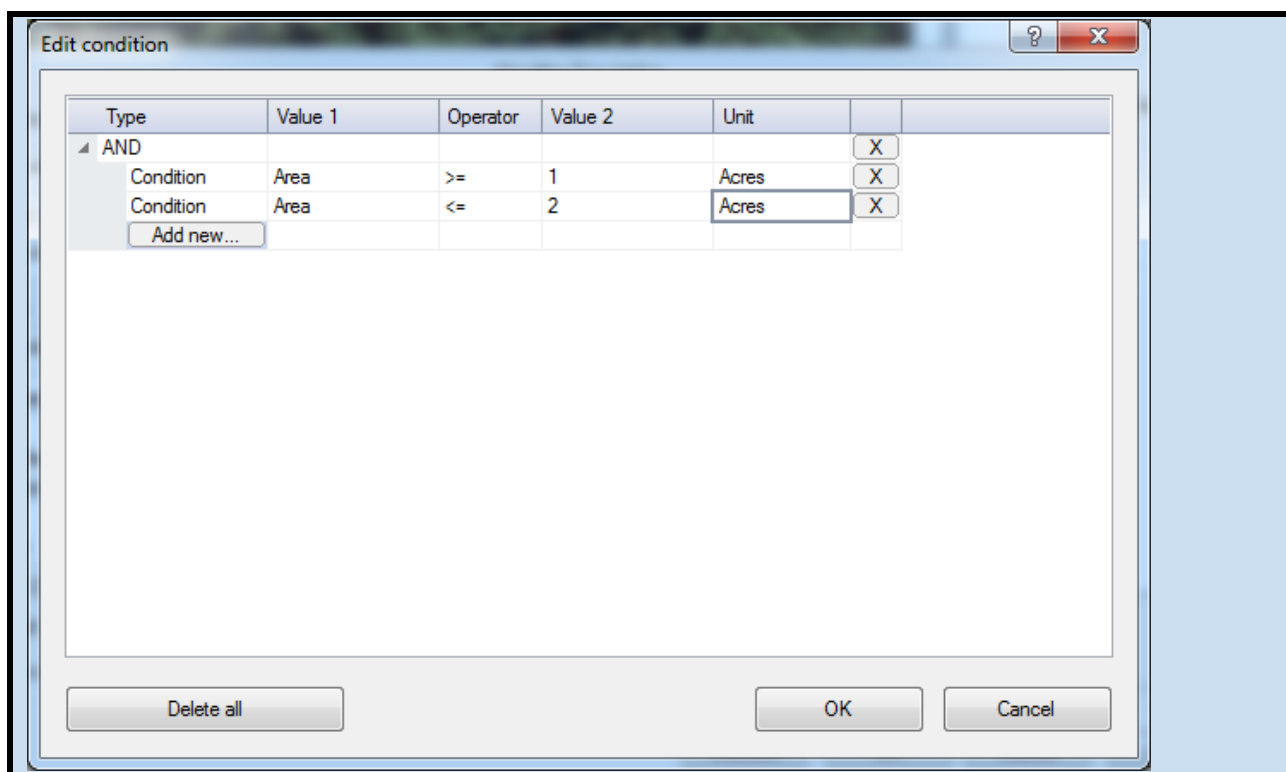
1. In the Process Tree, right-click on **Filters** and click **insert child** from the context menu.
2. In the **Algorithm** drop down menu, choose **Assign class**. Begin typing to find it faster.
3. Within the **Domain** section, click in the box next to the **Condition** parameter and then click the box with three dots that appears.
4. In the Edit condition window that pops up, click the cell next to **Condition**, click the drop down arrow and choose **From Feature**.
5. Under the **Object Features** category, expand the **Geometry** and **Extent** categories, then click **Area (Pxl)**. Click **OK** to add Area to the Value 1 condition.



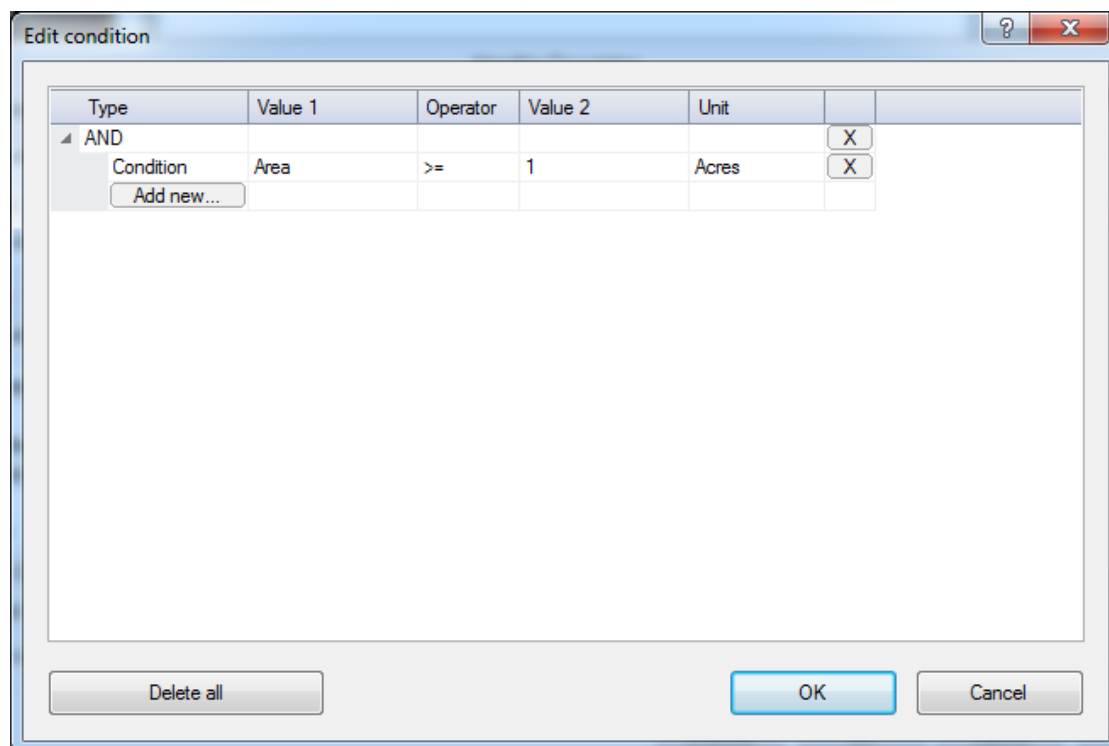
6. Click the cell under the **Operator** column, click the drop down arrow and select “>=” (greater than or equal to).
7. Type **1** in the Value 2 column.
8. Select the cell under **Unit**, click the drop down arrow and set the Unit to **Acres**.

**Note:** You have the option of adding a second conditional statement that sets a maximum area size for the segments. This would limit the number of potential landing zones that are output from this filtering process. By moving on with just the single conditional statement that only sets a minimum size, you will increase the number of options available to choose from.

1. Click the **Add new** button below the Condition line you just created. An empty conditional statement is added to the Edit condition window.
2. Click the cell next to **Condition**, then click the drop down arrow and choose **From Feature**.
3. Under the **Object Features** category, expand the **Geometry** and **Extent** categories, then click **Area (PxI)**. Click **OK** to add Area to the Value 2 condition.
4. Click the cell under the **Operator** column, click the drop down arrow and select “<=” (less than or equal to).
5. Type **2** in the Value 2 column (you can set whatever threshold you desire).
6. Select the cell under **Unit**, click the drop down arrow and set the Unit to **Acres**.
7. The Edit condition window would look like the below image if you add the second conditional statement.

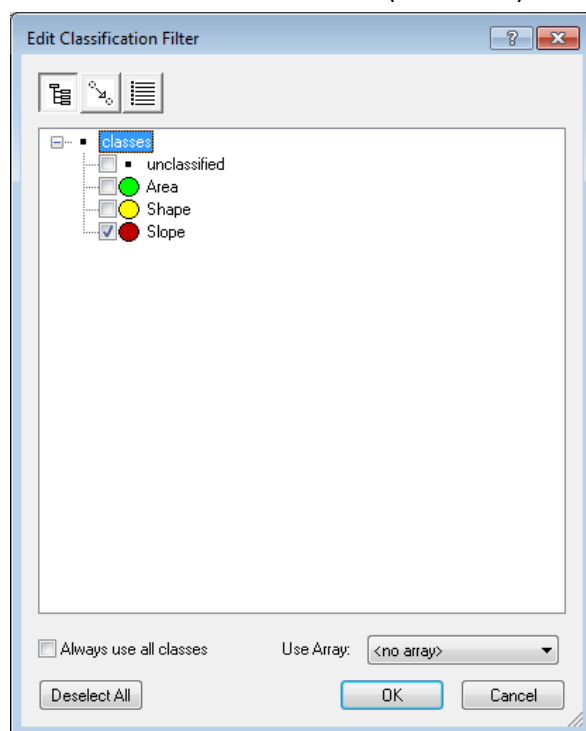


9. Click **OK** to close the window (see below).

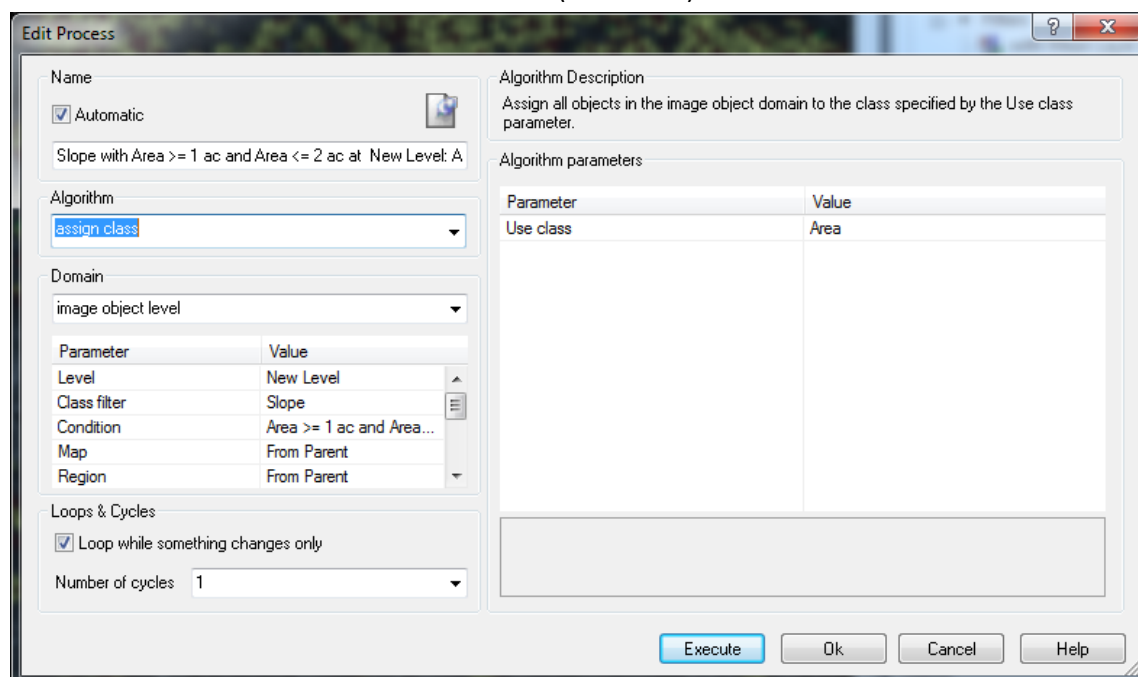


10. In the Edit condition window, click in the cell beside the **Class filter** parameter and click on the button with three dots that appears.

11. In the **Edit Classification Filter** window that appears, click on the **Slope** check box and then click **OK** to close the window (see below).

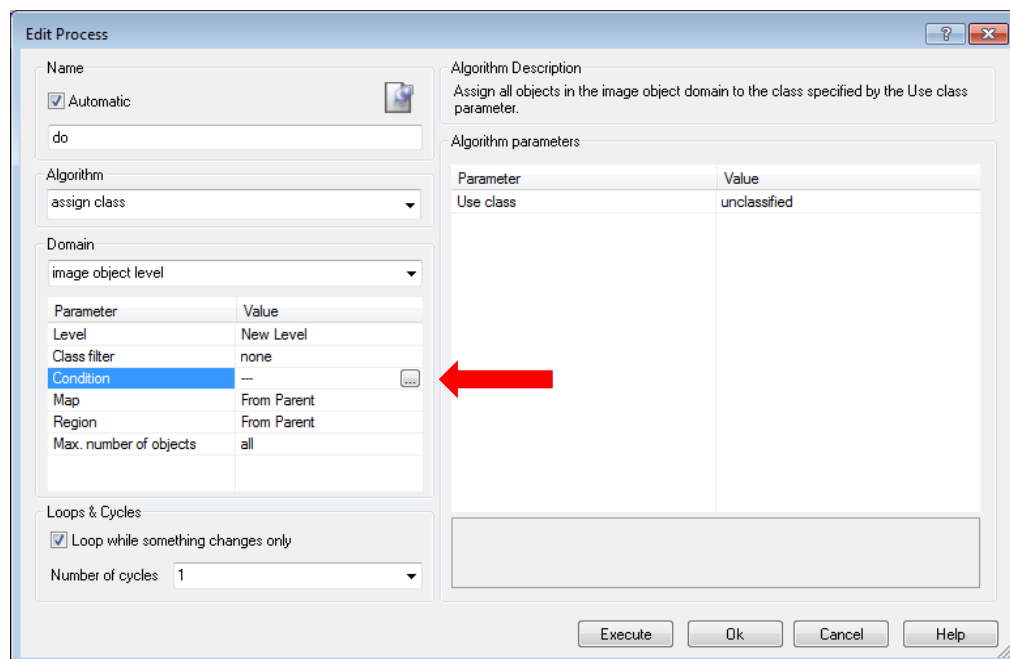


12. On the right side of the Edit Process window, click on the word **unclassified** under the Value column in the **Algorithm Parameters** section and click the drop down arrow.
13. Select **Area** from the list that appears.
14. Click **OK** to close the Edit Process window (see below).

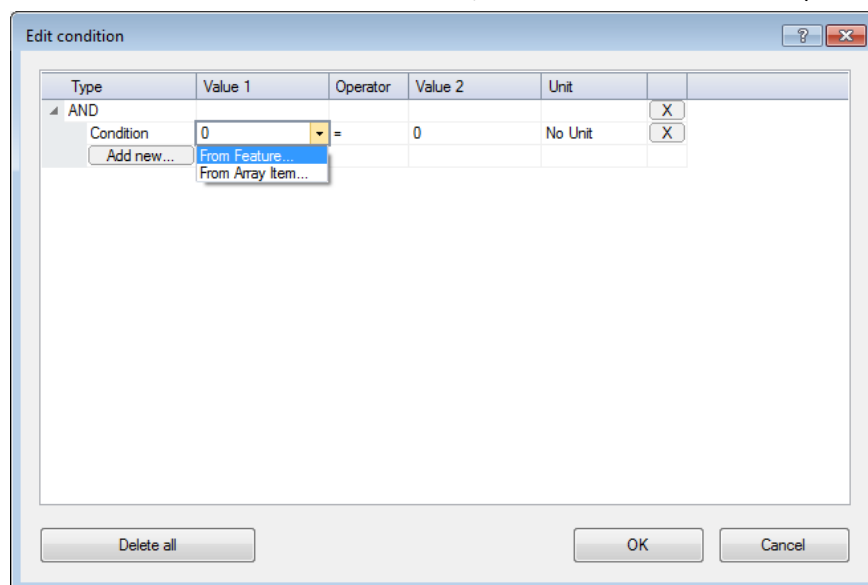


## D. Create Slope Filter

1. In the Process Tree, right-click on the new process called **Filters** you just created and select **Insert Child**.
2. Keep the defaults in the Name section.
3. Choose **assign class** from the **Algorithm** drop down box. Begin typing it to find it faster.
4. Within the **Domain** section, click in the cell next to the **Condition** parameter, then click the button with three dots (see below).

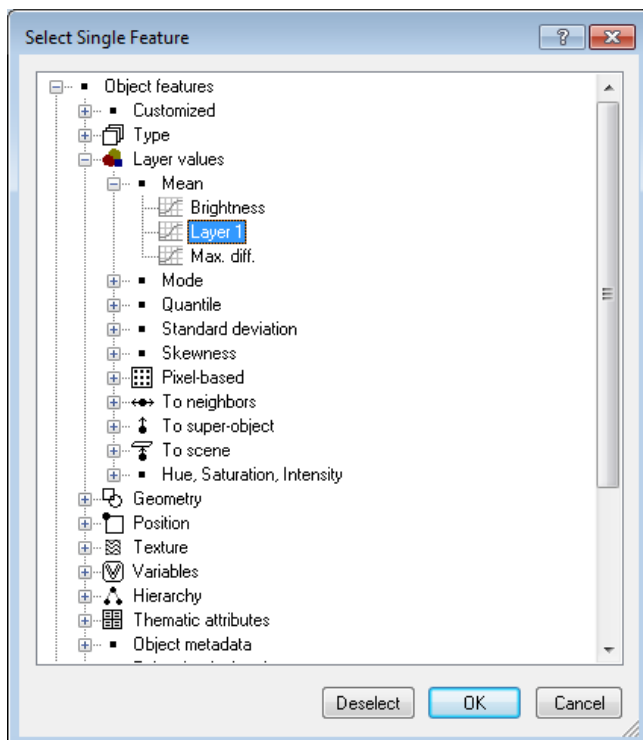


5. In the **Edit Condition** dialog box that opens, select the drop down box that is located next to Condition and in the Value 1 column, and choose **From Feature** (see below).

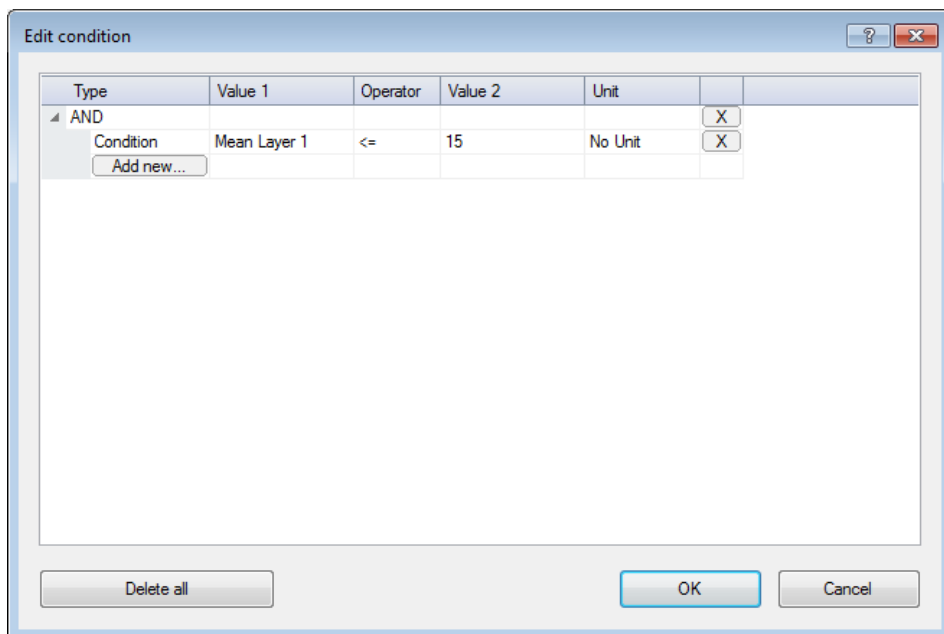




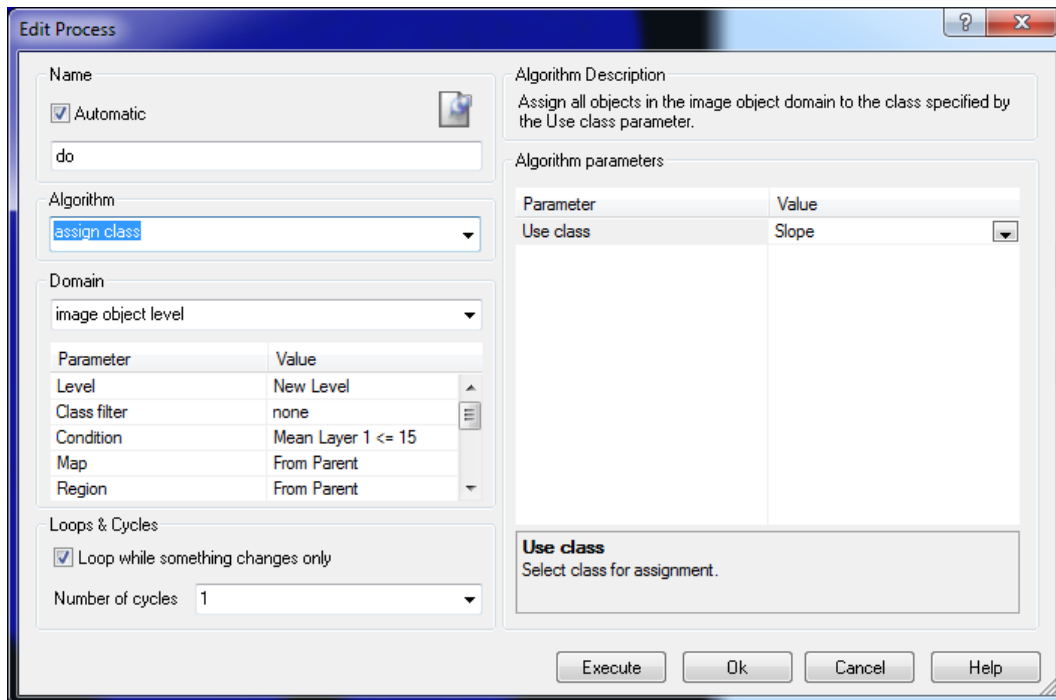
- From the **Select Single Feature** dialog box that pops up, double-click the following categories: **Object Features** (if it isn't already expanded), **Layer values**, **Mean** and then **Layer 1** (see below). This adds Layer 1 to the Value 1 condition in the Edit condition window. Click **OK**.



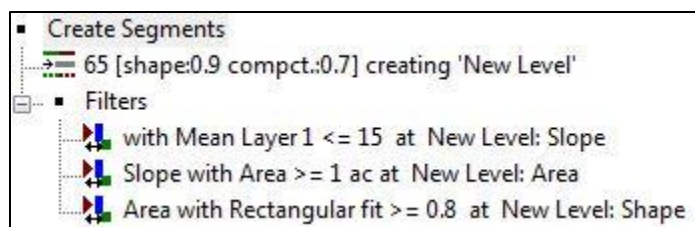
- In the **Operation** column select '**<=**' (less than or equal to) then type **15** in the **Value 2** column. Leave Unit as **No Unit**.
- Click **OK** to close the Edit condition dialog box (see below).



9. On the right side of the window under the Algorithm parameters section, you are going to select which class the output of this filter will be populated into. Click on the word **unclassified** under the Value column and click the drop down arrow.
10. Select **Slope** from the list that appears.
11. Select **OK** to close the window (see below).



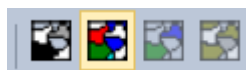
12. The resulting Process Tree should look like the below image.



- i. The naming of these filters can be somewhat confusing. Focus on the final portion of each parameter to understand how these filters correspond with the classes (area, shape and slope) that you created. The first filter addresses slope, the second area and the third shape.

## E. Execute Filters

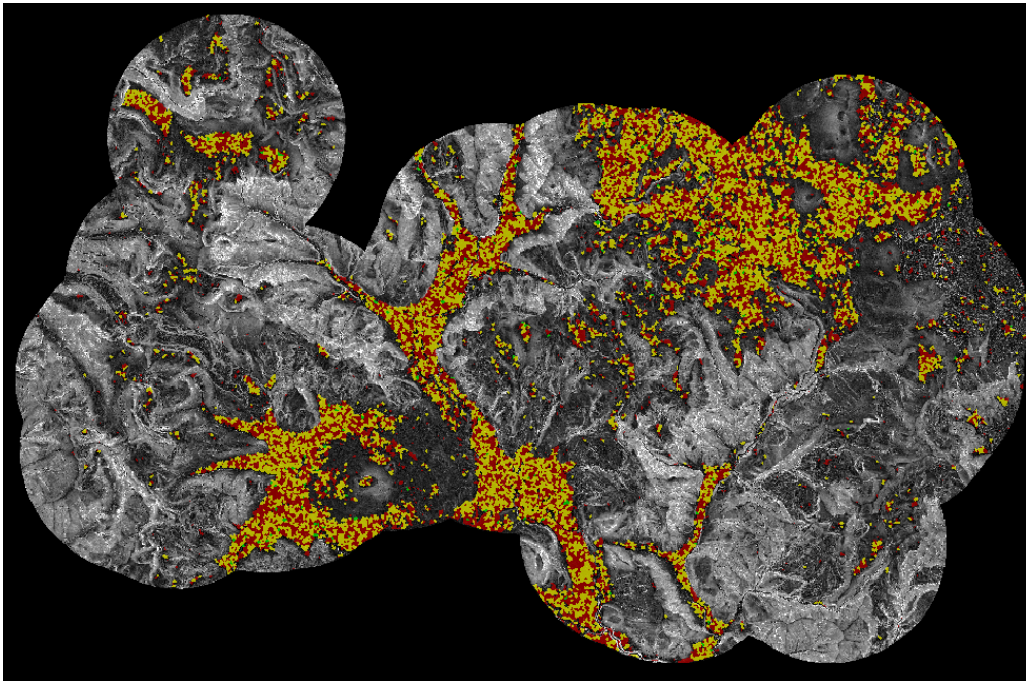
1. Right click on the **Filters** in the **Process Tree** and select **Execute** to run all three filters.
2. To view your results click the **View Classification** button on the main toolbar at the top of the window (see image below).



- To remove the outlines of the segmentation polygons, click the **Transparent/ Non-transparent** outlined objects button (see image below) on the main toolbar until the outlines disappear. Click it again to show the segment's outline.



- Your results should resemble the following image.



- The **red** polygons represent the segments that satisfy the slope filter only. The **green** polygons represent the segments that satisfy both the slope and area filters. The **yellow** polygons represent the segments that satisfy all filter parameters. Therefore, the yellow segments are the ones you will export in the next step.

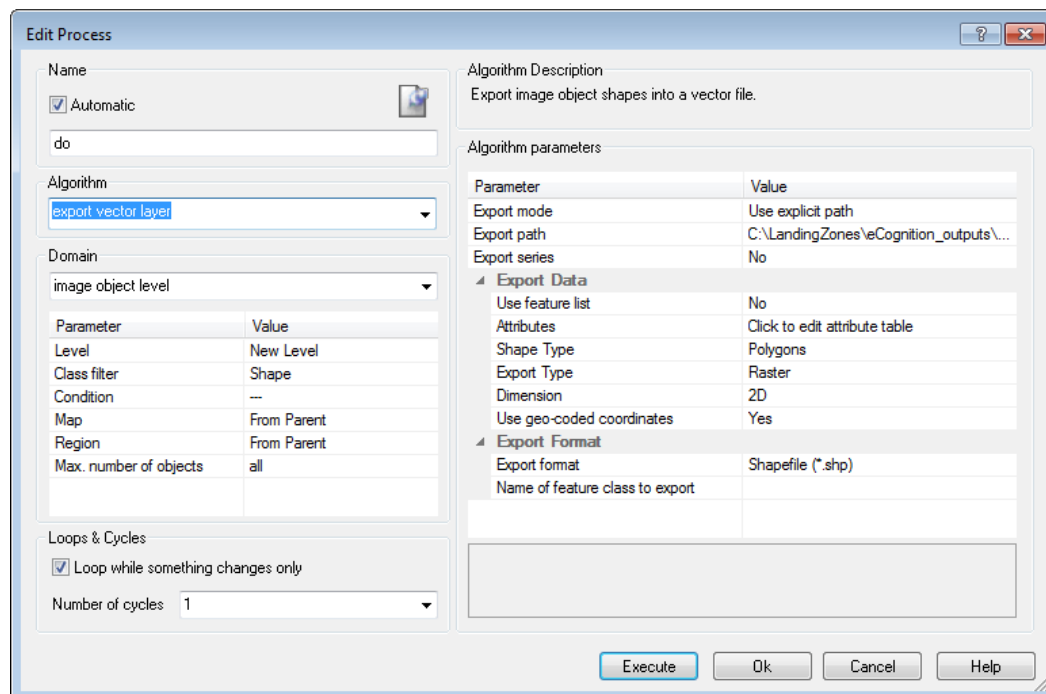
## Part 5: Export Results

Now that you have finished our segmentation and iterative filtering of the segments, you have the final outputs. The final Slope class should reflect the parameters of all three filters. The final step in eCognition will be to export a shapefile that can be displayed and manipulated in ArcMap. Instructions for saving your project and the rule set are also provided.

*Note: If you have chosen the option to use the pre-prepared rule set, simply right click anywhere in the **Process Tree** and select **Load Rule Set**. Using the panel on the left to navigate to the location of your **LandingZones** folder (C:\LandingZones), select **Segmentation\_Rule\_Set.dcp** and click **OK**. To execute the entire rule set that includes the segmentation process and the filters, right-click **Create Segments** at the top of the Process Tree and select **Execute**. Once this has finished (~15 minutes), follow the remaining steps in this section.*

### A. Export Shapefile

1. Right-click on the **Create Segments** process in the Process Tree and select **Append new**.
2. Change the **Name** to **Export Classification Result**.
3. Click **OK**.
4. Right-click on the new **Export Classification** results and select **Insert Child**.
5. In the Edit Process dialog box, click the drop down box under **Algorithm** and select **export vector layer**.
6. On the left side of the window in the **Domain** section, click in the cell next to **Class filter** and click the button with three dots that appears.
7. In the **Edit Classification Filter** window click in the check box next to shape to choose the **Shape** class to be exported.
8. Click **OK** to close the window.
9. On the right side of the window in the **Algorithm parameters** section, click under the **Value** column beside **Export mode**. Click the drop down arrow and select **Use explicit path**.
10. In the next cell down beside **Export path**, click to make a button with three dots appear, click it.
11. In the window that appears, navigate to the **eCognition\_outputs** folder (**C:\LandingZones\eCognition\_Outputs**) and name the output **LandingZones\_Segments**. Then click **Open**.
12. In the Export Data section, change the **Shape type** to **Polygons**.
13. Check to make sure that **Export format** is **Shapefile** (see below).



**Edit Process**

Name: ☒ Automatic  
do

Algorithm: **export vector layer**

Domain: **image object level**

Parameter	Value
Level	New Level
Class filter	Shape
Condition	---
Map	From Parent
Region	From Parent
Max. number of objects	all

Loops & Cycles: ☒ Loop while something changes only  
Number of cycles: 1

Algorithm Description: Export image object shapes into a vector file.

Algorithm parameters:

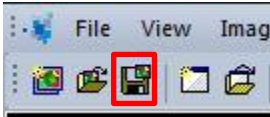
Parameter	Value
Export mode	Use explicit path
Export path	C:\LandingZones\eCognition_outputs\...
Export series	No
<b>Export Data</b>	
Use feature list	No
Attributes	Click to edit attribute table
Shape Type	Polygons
Export Type	Raster
Dimension	2D
Use geo-coded coordinates	Yes
<b>Export Format</b>	
Export format	Shapefile (*.shp)
Name of feature class to export	

Buttons: Execute, Ok, Cancel, Help

14. Click **OK** to close the window.
15. Right click on **Export Classification Result** and select **Execute** from the menu.

## B. Save Rule Set and Project

1. To save your eCognition project that contains the slope raster and rule set (Process Tree), simply click the **Save** button in the top left of the window (see below).



2. To save the rule set you have created in this exercise, right click anywhere within the **Process Tree** window and select **Save Rule Set**.
3. Navigate to the **LandingZones** folder (**C:\LandingZones**) and save the rule set as **Segments\_ruleset.dcp**, or whatever name is intuitive for you. You can also save the ruleset with details about the parameters used (e.g. Segments\_sc65\_sh0p9\_cmp07).
  - i. The default file type is \*.dcp, which is the native eCognition ruleset file extension.
4. Click **Save**.

**Congratulations!** You have successfully completed this exercise. You are now familiar with creating projects in eCognition and establishing rule sets that identify segments based on the parameters and filters you create.

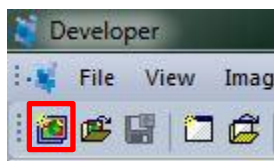


## Appendix A: Create Subset of Data

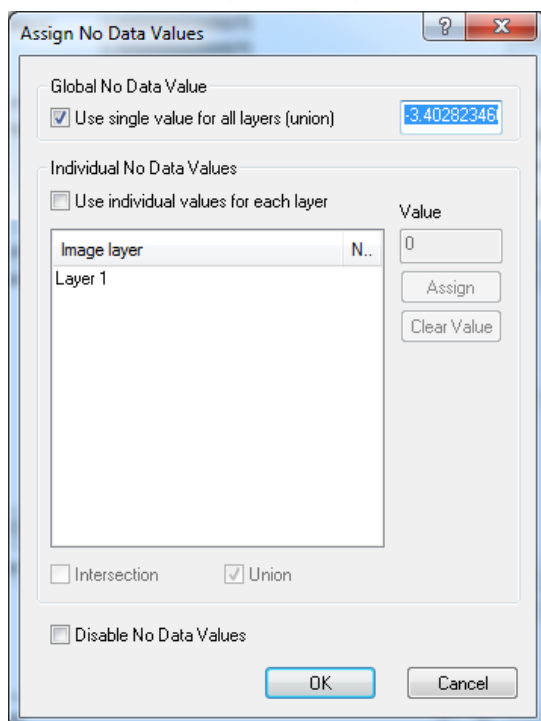
When you are working with your own data, you will find it useful and way more efficient to define an image area subset within your eCognition project setup so that you can efficiently test the segmentation and filter settings. This is particularly useful when the image datasets are large and processing the entire dataset may be too time consuming to go through multiple iterations (as is the case with this dataset). Once you feel comfortable with your parameters you can run the processing on the entire area. To create a subset, you need to start a New Project, as the Subset Selection option is not available when you have already done any processing.

### A. Subset Selection

1. To start a **New Project**, open a new **eCognition Developer** window and select the **Create New Project Button** in the top left of the window.



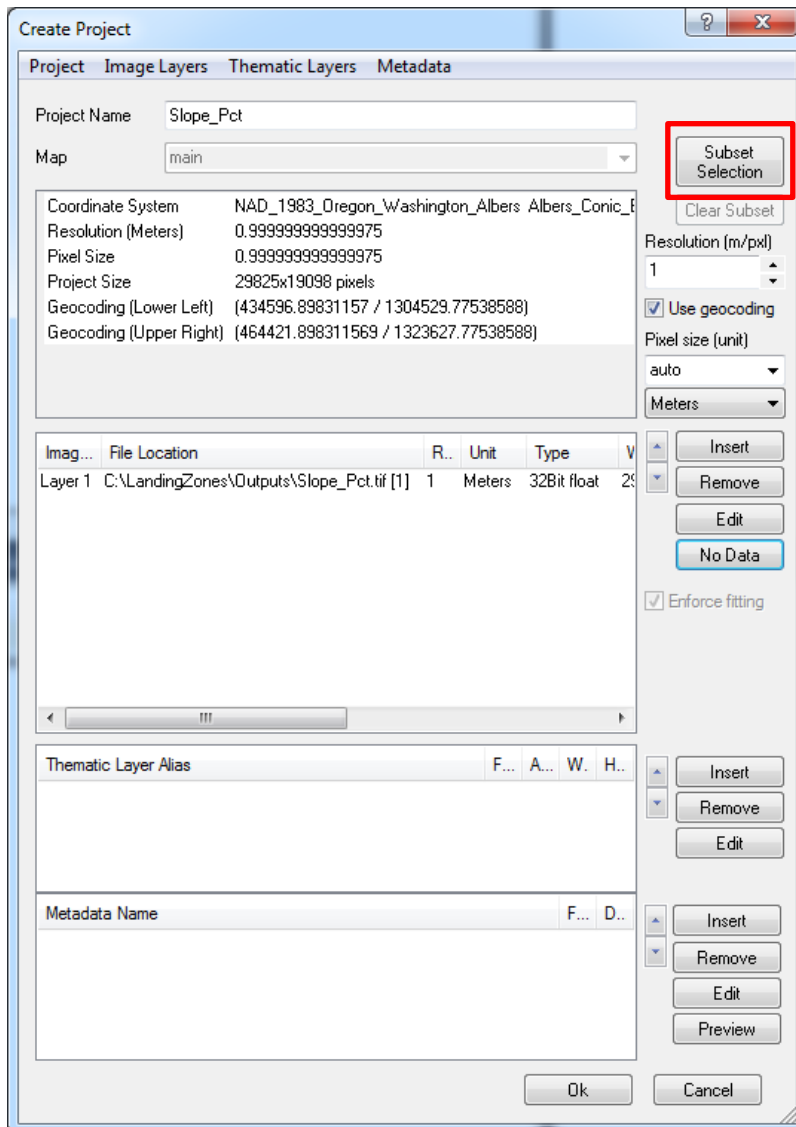
2. In the **Create Project** window, navigate to the folder location of your desired raster (C:\LandingZones\_Outputs for the dataset provided), select it and click **OK**.
3. Next, enter the **No Data** value by clicking the **No Data** button and entering: **-3.40282346639e+038** into the Global No Data Value section at the top of the Assign No Data Values window (see below).



4. Alternatively, if you have already created the project and haven't started any processing, click the **File** menu and from the drop down locate and click **Modify Open Project** (near the

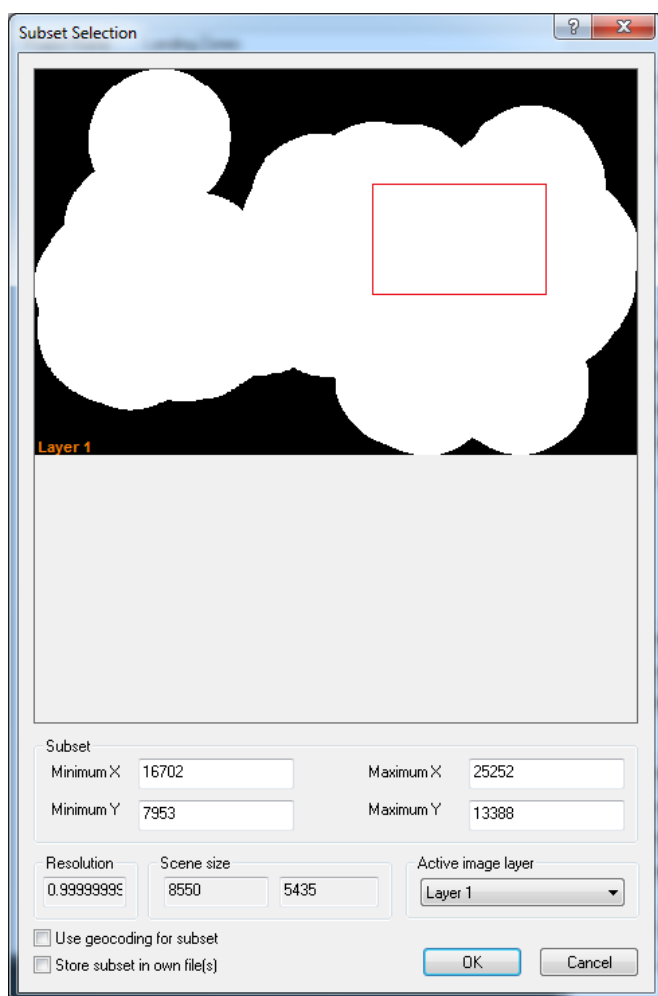
bottom). The Modify Project dialog opens. This is where you can change any of the project settings—aliases, project name, or even add more data.

5. Next, click the **Subset Selection** button (see below).



6. In the Subset Selection dialog, use your cursor to click and drag a bounding box that will define the area of interest. You can also do this by specifying the X and Y coordinates (see below).

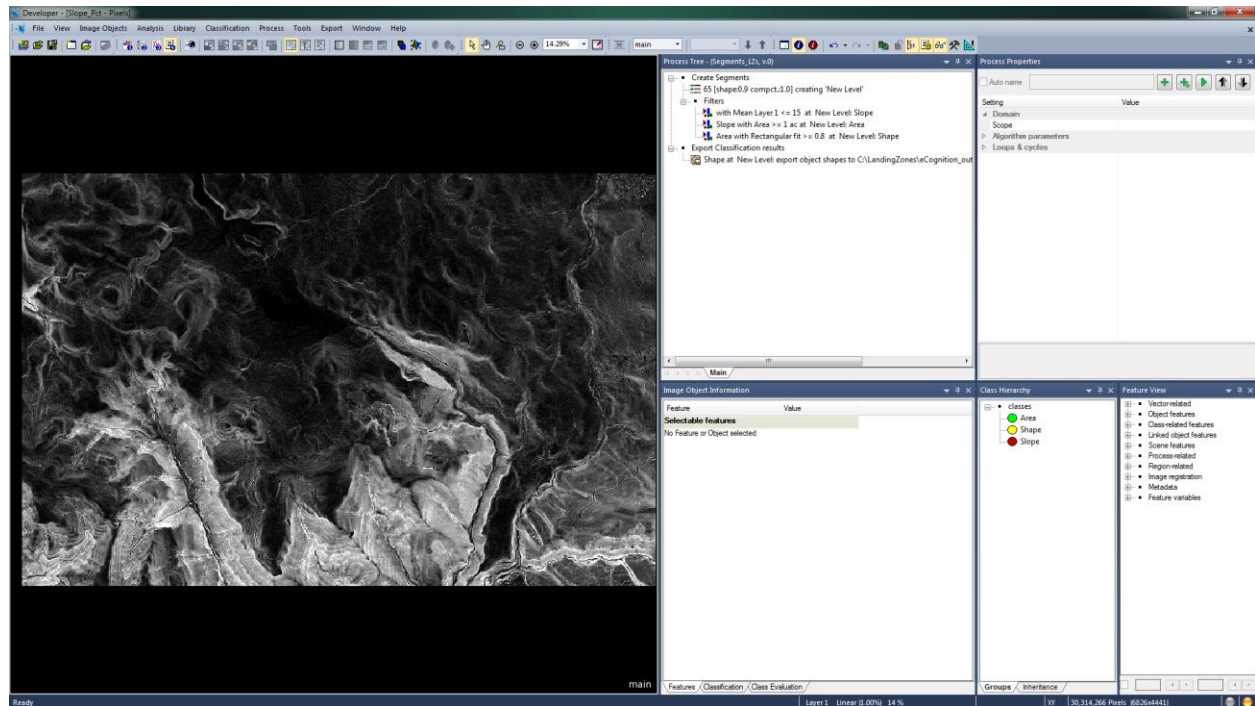
- i. Note that the smaller you make this subset, the faster processing will be.
- ii. You may want to use an even smaller subset than that indicated in the below image.



7. The **Active image layer** dropdown allows you to change the gray scale image view by selecting a different band or layer to display. This can be useful for identifying where your subset will be.
8. Click **OK** once you have selected a subset area. This does not need to be exactly the same as the one displayed above, but it is important to choose a relatively small subset to cut down on processing time.
9. Click **OK** in the Create Project (or Modify Project) window to finalize the subset.
10. To revert to the full extent of the dataset, click **File** and **Modify Open Project**.
11. In the Modify Project dialog, click **Clear Subset** and then **OK**.

## B. Load Rule Set

1. Right click in the empty **Process Tree** panel and select **Load Rule Set**.
2. Navigate to the desired rule set (.dcp file), select it and click **OK** (see below).



- i. You can now right click **Create Segments** in the Process Tree and select **Execute** to test the rule set on the subset.
- ii. If you want to move on to the next Appendix where you will experiment with different parameters, leave this project window open.

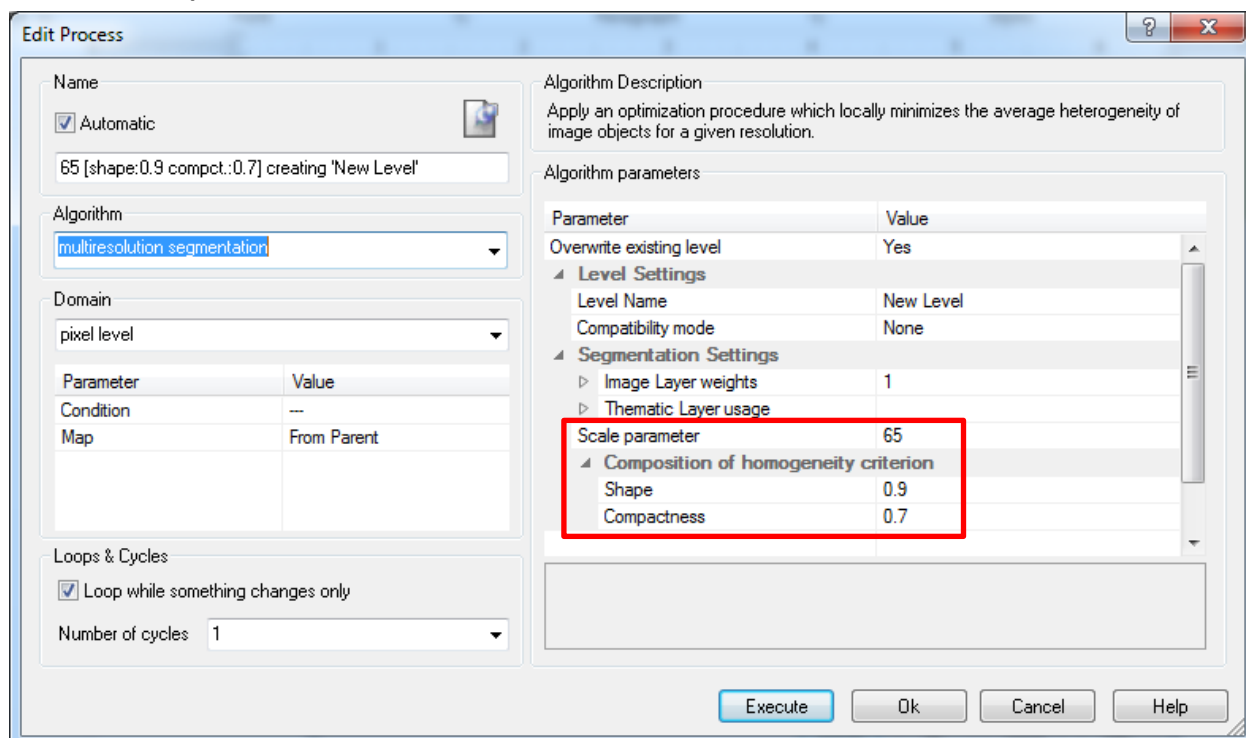
## Appendix B: Experimenting With Parameters

When experimenting with the segmentation parameters, there are three primary components to focus on: Scale, Shape and Compactness. The following section addresses these parameters and demonstrates how adjusting them impacts the outputs. This is important to know for those interested in transferring this workflow to a new study area, which might have different thresholds for factors such as area.

### A. Shape and Compactness

These parameters can vary greatly based on the specific objective of your segmentation. For people interested in segmenting a forest into distinct stands, they may want to use a lower shape value, which will give a greater weight to the spectral values of the image (slope in this case). In this workflow, however, you use a slope filter to select segments that have an average slope less than or equal to 15 percent. Because of that, giving greater influence to the clustering similar slope values isn't necessary. By setting the shape and compactness values to their highest extent, the resulting segments are relatively square, which is ideal for landing zones.

1. With the rule set you created in this exercise loaded into the subset workspace, double click "65 [shape:0.9 compact:0.7] creating 'New Level'" in the Process Tree.
2. This will open the Edit Process window where you can adjust the three segmentation parameters (see below). You can simply click in the cell next to **Scale Parameter**, **Shape** and **Compactness** to edit the values.



**Edit Process**

Name: ☒ Automatic  
65 [shape:0.9 compact:0.7] creating 'New Level'

Algorithm: **multiresolution segmentation**

Domain: pixel level

Parameter	Value
Condition	--
Map	From Parent

Loops & Cycles: ☒ Loop while something changes only  
Number of cycles: 1

Algorithm Description: Apply an optimization procedure which locally minimizes the average heterogeneity of image objects for a given resolution.

Algorithm parameters:

Parameter	Value
Overwrite existing level	Yes
<b>Level Settings</b>	
Level Name	New Level
Compatibility mode	None
<b>Segmentation Settings</b>	
Image Layer weights	1
Thematic Layer usage	
Scale parameter	65
<b>Composition of homogeneity criterion</b>	
Shape	0.9
Compactness	0.7

Buttons: Execute, Ok, Cancel, Help

3. Before you begin experimenting, it is recommended that you open up an empty PowerPoint and add several New Slides that you can use to copy and paste the results from this experimentation. By doing this, you can visually compare the results of adjusting the Shape and Compactness parameters.

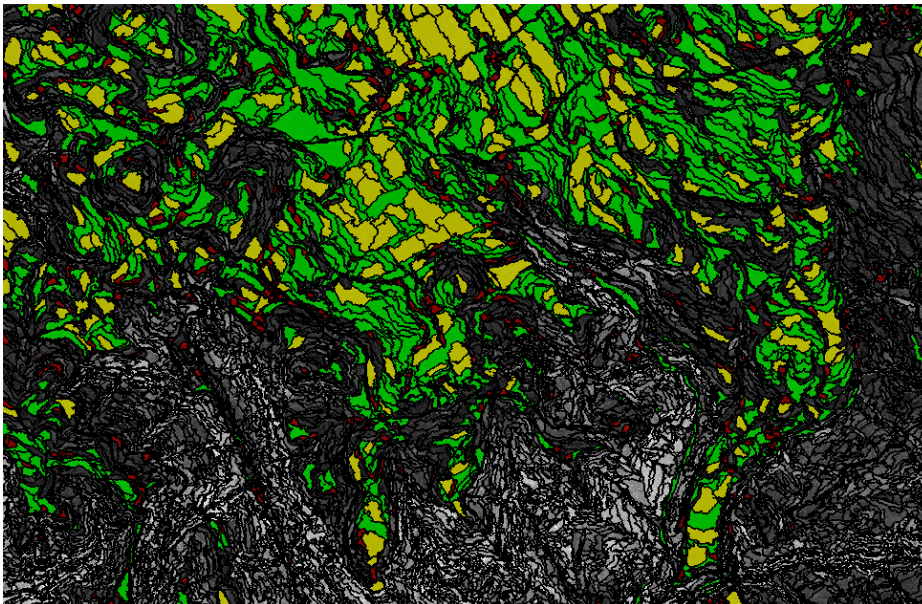


4. Once you have a PowerPoint window open, you can begin playing around with the **Shape** and **Compactness** parameters by iteratively testing different combinations of parameter values—this is where the more “subtle” changes between segment outputs begin to unfold. Using the table below as a guide, you will **create segment outputs** for each of the combinations between the Shape and Compactness parameters (Leave the Scale parameter fixed). In the first round, set the **Shape to 0.1** and the **Compactness to 0.1** and click **OK**.
  - i. If you wanted to compare the raw segments, you could click **Execute** in the Edit Process window. But since the filters are important to this workflow and take relatively little time to process, you should, instead, run both the segmentation and the filter processes.
5. Right-click **Create Segments** at the top of the Process Tree and click **Execute**.
  - i. This should take about a minute to process.

		Shape		
		0.1	0.3	0.9
Compactness	0.1			
	0.4			
	1.0			

6. The result of this process should look similar to the below image, depending on your subset selection. Remember that setting a low Shape value will give significant weight to the color (slope values), which is why the segments in the below image are long and seem to be mirroring the sides of slopes. They are also thin and stretched out because the Compactness value is low.
7. To visualize the results as you did in the earlier sections of this exercise, ensure that the **View Classification, Pixel View or Object Mean View** and **Transparent/Non-transparent outlined objects** options are selected (see highlighted buttons below).

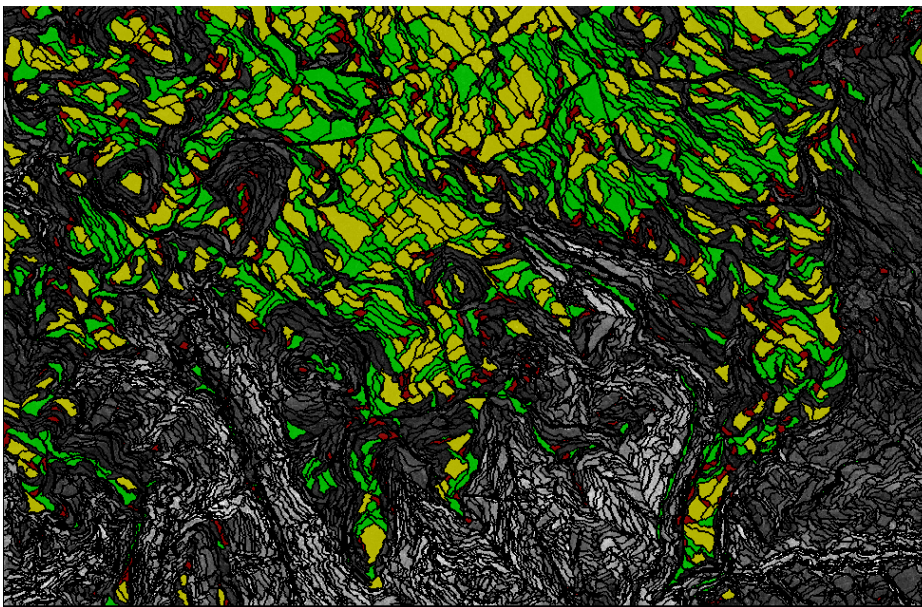




8. Hold **Ctrl**, **Alt** and **PrintScrn** (button at the top of most keyboards, to the right of F12). This should take a screenshot of the window you have selected. Paste the screenshot into PowerPoint (**Ctrl + V** or **right-click, paste**).

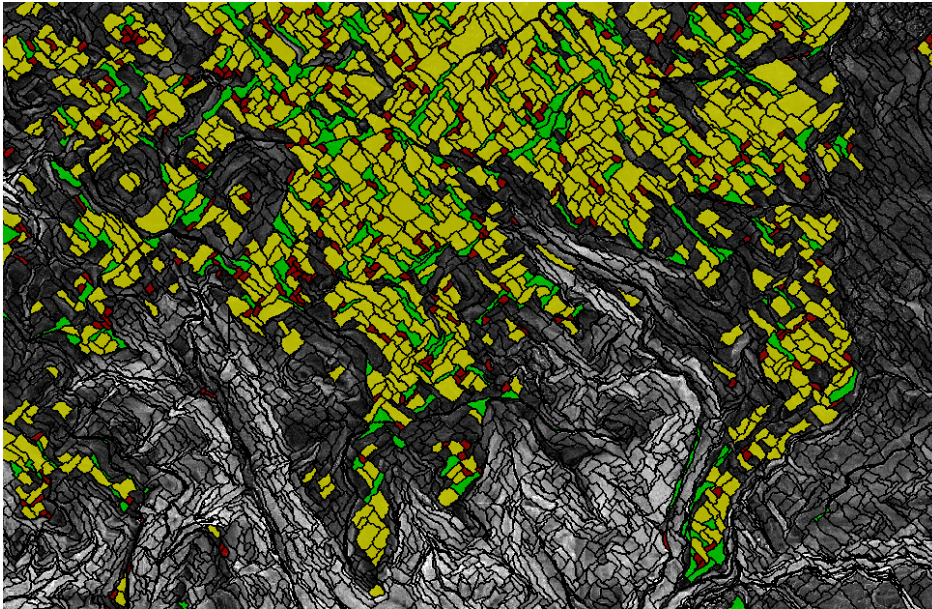
i. Alternatively, you can use a Snipping tool to capture and save images from your screen.

9. Continue on to the next iteration, setting the **Shape value to 0.3** and leaving the **Compactness value to 0.1**. The result will look similar to the below image.



10. For the next iteration (**Shape: 0.9** and **Compactness: 0.1**), you should notice a drastic difference in segments (see below).





11. Continue to test these parameters using the table provided to guide your parameter alterations. The goal of this process is to get a better grasp on how to influence the segmentation process with these settings.

## B. Scale Parameter

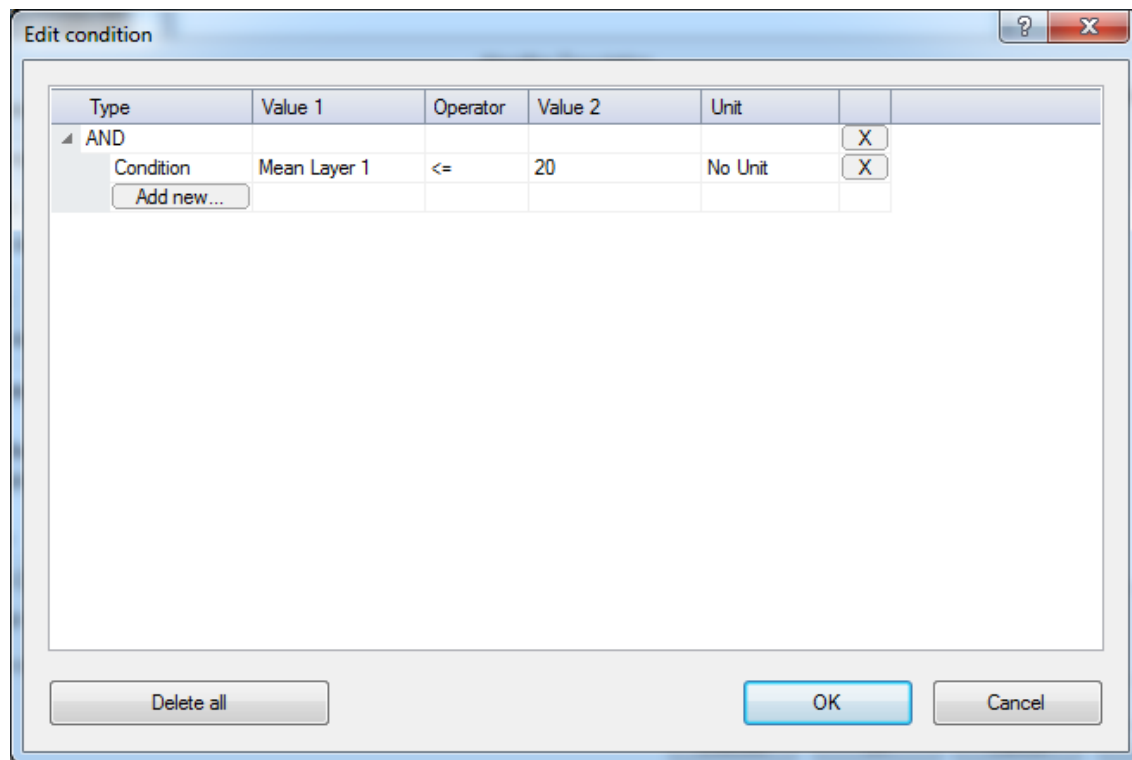
1. Identify a **Shape** and **Parameter** combination that you would like to test further.
2. Next, change the scale parameter by double clicking "**65 [shape:x.x compct:.x.x] creating 'New Level'**" in the Process Tree.
3. Change the scale parameter to 55 and click **OK**. By adjusting the Scale Parameter by a factor of 10, the outputs will show drastic differences in the size of segments.
4. Right-click **Create Segments** in the Process Tree and select **Execute**.
  - i. One of the issues that you can run into with increasing the Scale parameter too much is that the segments will be significantly larger than an Acre and, because of that, the segments are more likely to contain old growth trees. Segments containing old growth will be deleted later in this workflow (Exercise 4), so it is ideal to have the segments closer to an acre than 2 acres.
5. You should notice that the number of red segments increase as you lower the Scale Parameter. This is because those red segments satisfy the mean slope filter, but do not meet the Area filter that is set at a minimum of 1 acre. Those segments that satisfy the area and slope filters (not shape) are green, while the segments that satisfy all filter settings are yellow.

## C. Adjust Filters

Adjusting filters is a relatively simple process. To create new filters, you can follow the instructions provided in Part 3 and set the desired thresholds for area, shape and slope.

1. Double click the second filter called "**with Mean Layer 1 <= 15 at New Level: Slope.**" This will open the Edit Process window.

2. Under the Domain section of the Edit Process window, click in the cell next to **Condition** and then click the three dots symbol to open up the **Edit Condition** window.
3. Let's say that you want to adjust the mean slope parameter to select only the segments with a mean slope below 20 percent. Click within the **Value 2 column** for the conditional statement and **type 20**.
4. Click **OK** (see below).



Type	Value 1	Operator	Value 2	Unit	
AND					X
Condition	Mean Layer 1	<=	20	No Unit	X
Add new...					

Delete all OK Cancel

- i. An advantage of increasing the mean value threshold even a small amount is that there would be more potential landing zones to choose from. This could be ideal for stands that are located further away from valleys (where flatter land is abundant) because it would provide more options
5. To see how these sorts of adjustments will impact the selection of potential landing zones, simply right click the **Filters** heading in the **Process Tree** and select **Execute**. This will filter the segments in a matter of seconds.

**Note:** If you are interested in learning more about segmentation processes in eCognition, visit GTAC's [Geospatial Training and Awareness website](#) and navigate to the remote sensing self-paced online tutorials. There you will find an introductory and advanced course for eCognition (Image Processing section).