

## Directions for Using .AFE Model for Snag Feature Extraction and for Using Script to Resolve Individual Snags and Adjust Height

### Using .AFE Model to Resolve Snag Polygons:

1. Prepare your image(s) by georeferencing
2. Construct ROI polygon
3. Clip image to ROI or slightly larger
4. Using Feature Analyst in ArcGIS, run the Batch Processing module with the provided .AFE model and your image(s).
5. Clip output by mask if desired/necessary
6. Save polygon outputs to desired locations

### Using the Script to Resolve Snag Polylines:

This script provides a novel approach for delineating snag shadow locations from a shapefile with simple (1 shadow - 1 shape) and complex (many shadows – 1 shape) polygons by finding the local maximum lengths of lines running the length of each polygon shape.

This can be done using the results from any desired method that outputs snag shadow features as polygons.

1. Copy the polygon and ROI shapefiles to a working folder
2. Construct a fishnet:
  - A. Buffer your ROI by a distance =  $(.5) * ((\text{longest side of ROI}) - (\text{shortest side of ROI}))$
  - B. In the Data Management Toolbox, Feature Class Folder, select Create Fishnet.
  - C. Set the output.
  - D. Set the template extent to the buffered ROI shapefiles.
  - E. Set the number of Columns to that so the output will have line spacings equal to half that of the width of the snag polygons (this may take lots of trial and error, spacing was .2m in original method utilizing 1:12000 imagery)
  - F. Use the Editing toolbar edit the fishnet shapefile.
  - G. Select all the features in the fishnet shapefile and click the rotate button.
  - H. Do not use the cursor to rotate. Click the “a” key and a window will open prompting a rotation angle
  - I. Rotate until the fishnet lines are in alignment with the directions of the shadows. For example, if the image was taken at 9:00 AM (non-Daylight Savings Time) on the spring equinox, you would expect the angle of rotation to be around 120 degrees (give or take a few depending on the positioning in the time zone). Record the final angle of rotation(azimuth).
  - J. Save edits.
3. Make sure the Custom Find\_Snags Toolbox and its accompanying python (.py) script, local\_maxima\_snag\_script, is saved to a local directory.
4. Add this Toolbox to the default list of Toolboxes in ArcGIS.
5. Edit the Toolbox so the source information directs to the downloaded python script.
6. Go to the US Naval Observatory's Sun or Moon Altitude/Azimuth Table (<http://aa.usno.navy.mil/data/docs/AltAz.php>) and using Form B, select measurements for the sun, enter the year and date the source imagery was taken, as well as it's latitude and longitude, and set the tabular interval to 1 minute. (You can set the time zone if you like but it is not necessary).
7. Find the altitude (angle of elevation) that corresponds to the azimuth (angle of rotation) that was

recorded in step 2.I. Record this number.

8. Finally Run the Find\_Longest\_Snags scripting tool in ArcGIS

A. Set the inputs for the working folder, the snag polygon shapefile, the rotated fishnet shapefile, the ROI, and the projection file (you might need to find the correct projection file in ArcCatalog and save it to the working folder beforehand).

B. Set the angle to the altitude angle derived in step 7.

C. Use the slider to pick a (unadjusted) minimum height for the output snags. A higher minimum will speed processing time by eliminating short lines that are most likely noise.

9. When script finishes, the working folder will contain a shapefile called final\_output showing polylines of snag shadow locations with attributes for each feature estimating the height of each snag.

10. (Optional). If you wish to perform a height adjustment, open the attribute table of "final\_output" and click "Add Field." Create a new field as type: Double and set the precision and accuracy to the desired length. Right click on the new field and open "Field Calculator." In the code box write:

```
[SNAG_HT] * Adjustment_factor
```

The adjustment factor is a number of your choosing.