

1. Start by georeferencing the map
 - a. In Browser, select XYZ tiles and drag open street maps into QGIS plot
 - b. Change projection (bottom right corner that likely says EPSG...) -> type in 3857 and select WGS 84 / Pseudo-Mercator (this is the projection of google maps)
 - c. Zoom in to Isles of Shoals in map
 - d. Add georeferencer from plugins dropdown
 - e. Select raster from dropdown -> georeferencer
 - f. In georeferencer, click file -> open raster -> open picture map of kelp beds
 - g. Click settings -> transformation settings
 - i. Transformation type = polynomial 2
 - ii. Resampling method = nearest neighbour
 - iii. Target SRS = choose same project as above (WGS 84/Pseudo-Mercator)
 - iv. Compression = LZW
 - v. Check use 0 for transparency
 - vi. Check save GCP points
 - h. Add control points (you need at least 6 and want to place them on obvious features like corners)
 - i. Click add point from toolbar
 - ii. Add point on map in georeferencer
 - iii. When it asks you to enter map coordinates, select 'from map canvas'
 - iv. Select the same point on your open street maps map (or whatever map you have uploaded)
 - v. After you choose at least 6, delete any points with high residuals or reselect points if needed
 - vi. Click file -> start georeferencing
 - vii. You should now see the map overlaying the island in the main QGIS screen
 - viii. The file should have automatically saved as a tif file
2. Now we digitize...
 - a. Download Gimp (other programs may work, but I'm only familiar with Gimp...)
 - b. In Gimp, open the modified tif file we just created in QGIS
 - c. Choose select -> by color
 - d. Choose one color of patch and outline it, you may have to shift+click around the patch to ensure all the areas are selected and check patches of the same color too
 - e. Copy and paste (Ctrl + C and Ctrl + V; this copies what you just selected and makes it a new layer)
 - f. Right click the layer and select to new layer
 - g. Click the eye icon on the original layer (you should now see the shapes you've selected by color)
 - h. Export the file (choose no compression)
 - i. You now need to open this file as a raster in the georeferences and georeference it

- j. Once you do this, it will save into the main QGIS file and you can polygonize the raster (*note that some of the the polygonize functions are a bit picky; I use rasterpixels to polygons)
- k. Now you have a shapefile! You can dissolve the file to have a single polygon which gives us the capability to do area calculations, etc.

