

LAB ASSIGNMENT V

Geography 177 Remote Sensing of the Environment October 28, 2002

In this short lab, we are going to produce a water/land mask, enhance the two portions of the image independently, and then assemble them back together. We will use commands *mklut*, *lutx*, *histeq*, *gauss*, *mux*, and *bitcom*.

Change into your working directory and copy the file *dunes.ipw* into it.

1. Using **IPWTOOL3** examine the histograms for each band of *dunes.ipw*. Select the *Histograms* option under *Tools*.

- a. How do some of the basic histogram features vary depending on image band?
- b. Do any of the histograms appear to have more than one peak?
- c. Why do you think we would want to stretch water and land independently?
- d. Which band do you think will work best for discriminating water from land?

2. Strip off the single band that you identified in item *1d* above (let's call it **boc** for short (band of choice)). Use **demux** at the command line to do this.

3. Identify a threshold DN value (we'll call it #) for the single band image that discriminates between land and water. The threshold value should be chosen so that any pixel with a DN value above the threshold will be land, and any pixel with a DN value below the threshold will be water. Choose your threshold carefully.

4. Now create a look up table (call it *lut*). If you type *textedit* at the command line, a text editor will open up for you so that you can create and save your look up table.

The file *lut* should look like:

```
0 0
# 0
#+1 1
255 1
```

This will assign all input values from 0 to # to an output value of 0, and will assign all input values from #+1 to 255 to an output value of 1.

5. Now create a water mask image by applying the look up table to *boc*.

```
> interp < 'lut' | mklut | lutx -i 'voc' > 'mask.water'
```

lut is the file name for your saved look up table, *boc* is the name of the band of choice and *mask.water* is the name of your new mask image.

6. Take a look at your new mask image using **xv2**.

- a. How many values does it contain?
- b. If your threshold hasn't worked well, then do it again with a better threshold.
- c. What value do the water pixels have?
- d. What value do the land pixels have?

7. Repeat 4, 5, and 6, only this time produce a land mask instead of a water mask.

8. Now you will produce two masked images. The first one will be an image where the land pixels are unchanged and the water pixels are all set to zero. The second one will be an image

where the water pixels are unchanged and the land pixels are all set to zero. To produce the first one do:

```
> mux 'boc' 'mask.water' | bitcom -a -m > 'boc.mask.water'
```

Repeat the command to make boc.mask.land. View these images and make sure they have come out okay.

9. Now, choose three image bands that you want to use to make your final composite. I suggest either 741 or 541, but you can use any that you want. Whichever you choose, demux them from the original dunes image. Produce water masked and land masked versions of each of the three bands.

10. It is finally time to do the radiometric enhancements. To do the enhancement for the land area type:

```
> hist < 'band#.mask.water' | histeq -i 1,255 | lutx -i 'band#.mask.water' > 'band#.mask.water.histeq'
```

Now do the same thing for the water area by typing:

```
> hist < 'band#.mask.land' | histeq -i 1,255 | lutx -i 'band#.mask.land' > 'band#.mask.land.histeq'
```

- a. How do the results look?
- b. What does the argument -i 1,255 mean?
- c. What do you think happens if you do not specify this argument?
- d. Try the same procedures using the gaussian stretches instead.
- e. Which stretches do you like best.
- f. Do the same for you other two chosen bands.

11. Once you have identified your favorite stretches (indicated below with the .fav extension) for both water and land areas for all three bands then it is time to put the water and land areas back together.

```
> mux 'band#.mask.land.fav' 'band#.mask.water.fav' | bitcom -x > 'band#.fav'
```

Do the same for your other two bands.

12. At last, mux together your three custom stretched bands.

```
> mux 'band#.fav' 'band#.fav4' 'band#.fav' > 'dunes.fav'
```

how does the result look?

14. Tell me the directory paths and file names for your final result.

Finally, clean up your directory so that you don't use up too much disk space.