**Lab 11: Accuracy Assessment of Thematic Maps**

Accuracy assessment of thematic maps is sometimes added to projects at the last minute, almost as an afterthought. But accuracy assessment is crucial to any mapping project and should be included and budgeted from the beginning. Yes, a supervised classification results in a thematic map! It can be as expensive as all of the rest of the project because of the field work required. In this exercise you won’t have to worry about budgets and you don’t get to do field work, but you *will* learn how to do a basic accuracy assessment (of a supervised classification) using Erdas tools.

**NOTE: You will use your saved supervised classification and signature file from the last lab. If for some reason you didn’t save your supervised classification, or you were absent last week, you can either redo or borrow from one of your lab-mates.**

1. Open your supervised classification from last week’s lab and open the signature file (.sig) that you saved by choosing (**Raster tab/Classification area/Supervised/Signature Editor**) and then **File/Open** from the signature editor window. Also open the image you used for the classification.
2. Now you will evaluate whether the supervised classification classified the pixels in your training data only as the class that you said they represented. This is a quick test of how good your training data were. If there is a lot of spectral confusion *within your training data* (meaning that pixels within your training polygons got classified as some other type), you can expect that your classified map won’t be very accurate. Select **Evaluate/Contingency** from the **Signature Editor**. Choose “**None**” for the **Non-parametric rule** and “**Maximum Likelihood**” for the **Parametric Rule**. Check the box for “**Pixel Percentages**.” Keep the **pixel** **count** box checked – you will get two confusion matrices – one showing percentages, the other showing pixel counts. Erdas will create an **error matrix** (contingency table, confusion matrix) using the selected training areas as reference. Normally the overall classification accuracy of your training areas should be >98%. If it isn’t, you can determine which classes are causing errors. One reason could be that the training area includes some other land cover classes besides what you said was there. The other explanation is that the two land cover types simply have very similar reflection. (**Worksheet question #1, bottom of page**)
3. You will now take a **stratified random sample** from your classified image and calculate **accuracy statistics** based on this sample. Open your supervised map in a Viewer window (pseudocolor) (if you haven’t already) and be sure to click the **fit to frame** box or adjust so that y ou can see the whole image. From the **Classification area** of the **Raster tab** on the main Erdas ribbon, choose **Supervised/Accuracy Assessment**. An empty table will appear. Choose **File/Open** and browse to your supervised classification image.

Now choose **Edit/Create-Add Random Points**. A new menu will appear. For the **Number of Points** type a number, X, where X = 5 \* (# of classes + 5); For example, if you have 5 classes, you would enter 50 because 5 \* (5+5) = 50. Click the button for **Stratified Random**. Check the **Use Minimum Points box** and type in 5 (a minimum of 5 points will be randomly placed in each class on the classified image). Click OK. If it reaches the maximum number of search points (a window will pop up) just keep clicking “yes” until it finishes.

On your Accuracy Assessment table choose **Edit/Show Class Values**. The values (DNs representing the classes) from the classified image for each random point will appear in the Class Value column. Now, turn this off. You don’t want this information skewing your interpretation of what each pixel should be. Now choose **View/Select Viewer** and left click in the Viewer window containing your classified image. Finally, click **View/Show All**. Circles with crosshairs will appear on the classified image to designate the locations of the random points. Your next job will be to decide, using the original **kitco image** (or Google Earth) *what you think* is REALLY on the ground at these points (in a real project you would visit these sites on the ground to determine this!) and fill in the **Reference Column** of the accuracy assessment table with the appropriate class number for that type. If you really have no clue what the pixel should be, delete it and move on.

Also, as you are doing this, make sure that you have no zeros, blank values, or values that do not correspond to the values (classes) in your classified image. Any of these can cause a crash. Also, save your table frequently. If you are paranoid, take screenshots or something prior to trying to run the accuracy assessment. For reasons we haven’t figured out, sometimes it crashes AND you lose the saved reference numbers. Which sucks.

Since we can’t go out in the field, you will just have to make your best guess based on your interpretation of the original image. Delete any points that fall outside the actual study area or you truly have no clue what class they should be in (select in table, right click, delete).

1. When you are finished, first, turn on the class values, then… things get odd in ERDAS again. For some people, just doing the report/accuracy report works. For others it crashes. First, take some screenshots, etc of your points and reference values. If things crash, you’ll have to re-enter all the reference values, and it’s a lot faster to go off a screenshot/pic than it is to look at every one again. Now, try running the error matrix and accuracy totals separately. To do this, goto report/options/ and turn off two of the three (see below image). Then click **Report/Accuracy Report**. Do this for both the error matrix and the accuracy totals (no need for the Kappa statistic). You \*should\* have enough now to carry on to the below questions.

Graphical user interface, text, application

Description automatically generated

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Worksheet**

**Accuracy Assessment**

NOTE: When you are inserting your confusion matrices, you will need to reformat what ERDAS provides. They should be formatted like:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | forest | bush | crop | urban | bare | water | total | users acc |
| forest | 440 | 40 | 0 | 0 | 30 | 10 | 520 | 0.85 |
| bush | 20 | 220 | 0 | 0 | 40 | 10 | 290 | 0.76 |
| crop | 10 | 10 | 210 | 10 | 50 | 10 | 300 | 0.70 |
| urban | 20 | 0 | 20 | 240 | 100 | 10 | 390 | 0.62 |
| bare | 0 | 0 | 10 | 10 | 230 | 0 | 250 | 0.92 |
| water | 0 | 20 | 0 | 0 | 0 | 240 | 260 | 0.92 |
| total | 490 | 290 | 240 | 260 | 450 | 280 |  |  |
| producers acc | 0.90 | 0.76 | 0.88 | 0.92 | 0.51 | 0.86 |  |  |
| overall |  |  |  |  |  |  |  | 73.15% |

1. Copy/paste/reformat the confusion matrices for the training site check into this answer sheet question. Note, this will take a lot of editing to make the confusion matrix legible. Are any of your training areas less than 98% correctly classified (producer’s accuracy)? If so, which are they and why do you think the training data were poor?
2. Copy/paste/reformat your confusion matrix and accuracy assessment for your supervised classification. Which classes were well mapped based on your assessment? Which classes had problems?
3. Why do you think there were problems with classes that were in error? Are these problems fixable? Do the off-diagonal elements of the error matrix give you any clues about why there were errors? Provide a general description of possible reasons for map errors that identify.