**Geography (GEOG) 403/704 Spring 2022**

**Lab Ten**

**Agricultural and Forestry Applications**

**15 points**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Goal: The purpose of this exercise is to introduce you to the use of remote sensing data for monitoring changes in vegetation during the growing season. **ALWAYS READ**

**THROUGH THE ENTIRE LAB HANDOUT BEFORE BEGINNING YOUR COMPUTER SESSION.**

**Requirements:** You will be filling out two tables, preparing one graph from the tables, and answering six questions. Turn in your answers to the questions in a WORD file, as done for previous labs.

For this lab you have been provided with images of eastern Kansas and Nebraska. The images contain AVHRR NDVI data (see description below) at five time intervals in 2000 (KNGP2000\_4, mid-February; KNGP2000\_6, mid-March; KNGP2000\_8, mid-April; KNGP2000\_10, mid-May; and KNGP2000\_13, mid to late June). Also included is a vector file (KSTATE\_New--display with Quantitative symbol file) which can be overlaid on these images to help you locate the state boundaries.

The Normalized Difference Vegetation Index (NDVI) from the Advanced Very High Resolution Radiometer (AVHRR) takes advantage of the fact that active vegetation has a high reflectance in the NIR, and a low reflectance in the Red band. These properties make it easy to use these two bands to compute an index which displays higher values the “more active” the vegetation is. The NDVI is:

NDVI = (NIR - RED) / (NIR + RED)

This results in an index which varies from about -0.2 to +0.9 for actual data values, with the highest values corresponding to thick forest growth, and the lowest values coming from non-vegetated surfaces. In order to store these data in byte-binary format, they have been converted so that their values run from 0 to 200 (0 corresponds to -1, 100 to 0, and 200 to +1 in the usual NDVI scale). In order to change these values back to the usual NDVI index values, you need to subtract 100 and divide by 100.

Examples:

byte-binary storage format number is 163; (163 - 100)/100 = 0.63

byte-binary storage format number is 80; ( 80 - 100)/100 = -0.20

byte-binary storage format number is 100; (100 - 100)/100 = 0.00

**Note:** To find the byte-binary storage format numbers, launch the images using the CONTNDVI palette with Equal Intervals autoscaling (16 classes) and then employ the “Identify” function. Longitudes will be negative numbers. Be accurate to two decimal places in pinpointing the lat-long coordinates. Use Zoom or Linked Zoom to enlarge the area of interest and make obtaining the desired location accuracy easier.

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SUGGESTION: Put the five images into a raster group file with COLLECTION EDITOR, and then use the “Identify” and “Zoom” functions to obtain the necessary raw values below.

Question 1. Determine NDVI values for 40.82EN, 96.41EW (near Lincoln, NE) and 38.97EN, 95.25EW (near Lawrence, KS) on each of the five images. Fill in the following tables:

40.82°N, 96.41°W (near Lincoln, NE)

|  |  |  |
| --- | --- | --- |
| **Month** | **byte-binary format value** | **converted NDVI value** |
| February |  |  |
| March |  |  |
| April |  |  |
| May |  |  |
| June |  |  |

38.97°N, 95.25°W (near Lawrence, KS)

|  |  |  |
| --- | --- | --- |
| **Month** | **byte-binary format value** | **converted NDVI value** |
| February |  |  |
| March |  |  |
| April |  |  |
| May |  |  |
| June |  |  |

Question 2: Plot NDVI values for both stations on the same graph, with NDVI values on the Y axis and months on the X axis. Connect all the values for the same station with a line. Use different colors for the two different stations (You may use Excel if you wish, but use of this program for your graphs is not required).

Question 3: Comparing the two stations, do the changes in the NDVI values appear to occur at the same time in both location?

Question 4: Would more frequent data intervals help you determine the answer to question 3?

Question 5: How might information of this sort be used by an agriculturist or forest resource manager?

Question 6: What other data could be combined with this NDVI data to make it even more useful?