Imagery, Automation, and Applications

(Final Assignment Analysis Document)

Aims and questions

This project was designed to inspect the satellite images of northern California and to answer the questions of how much of agriculture land was damaged by flood, which counties suffered the most and how many people suffered because of this.

Workflow (Analysis Steps)

Analysis of the water cover difference between January 1997 and October 1996.

Two sets of satellite image cassettes were downloaded from the website https://earthexplorer.usgs.gov/. and USGS (https://earthexplorer.usgs.gov/) One was from mid-January 1997 with heavily submerged areas, and the other, for comparison, from October 1996, when the waters of rivers and streams were still within the banks. The Composite Ranges Tool was run for each downloaded group. Then supervised classifications were performed on both images, which included five categories: water, agricultural fields, plants, arid lands, and urban areas. Each chapter contained about 20-25 training samples. Scatter plots were made to assess the reliability of the training samples. The samples were slightly modified and the maximum likelihood rating tool was run for both images. Raster data revealed, so the sorted raster was ready for further analysis.

- Find Landsat 8 Images on USGS (map 1996 and 1997)

- Process images with Composite Bands tool and changing symbology to match correct bands

- Use Image Classification Menu to open Training Sample Manager to classify your image regions and to manage those classifications, as requested.

- Evaluate validity of classification samples and optimize to create an input signature file needed for max likelihood Classification. Take a screen shot.

- Build 5 Step Model as requested

1. Step 1 Maximum Likelihood Classification for November 1996 RGB Raster
2. Step 2 Maximum Likelihood Classification for January 1997 RGB Raster
3. Step 3 Extract by Attributes using Water classification number from attributes table for November 1996 Max. Likelihood Output
4. Step 4 Extract by Attributes using Water classification number from attributes table for January 1997 Max. Likelihood Output
5. Step 5 Raster Calculator to compare rasters and output flood zone

- Build Acceptable Map document using Model Product

- Add Title, Legend, Image Title, Scale, Compass, Data Source, Date and Author.

Create a map

The 1996, 1997 classification results with Flood were selected for display and several steps were taken to change the masked classified

raster into a map. The raster was re-sampled to change the cell size from 30 to 500 m in order to obtain a lower resolution of the raster and to facilitate the next steps of the setup (Tool: Resample). Then the raster was converted to polygons (raster to polygon tool). After the polygons were resolved (Dissolve Tool), and smoothed (Smooth Polygon Tool), the class names were attached (Join field tool) and the polygons were ready to create the map in Layout view.

consequences

The results showed that Yolo, Colusa and Sutter counties suffered the most due to the consequences of the floods. The flooded land was mainly farmland with some inhabited areas and barren lands. The map shows active agricultural land buried under water. According to county statistics and population data for 1990, about 16,000 to more than 340,000 lived in these counties, many of whom suffered from flood events. Other counties, such as Sacramento, Solano, and others have also suffered the consequences of apparent flooding. About 4 square to 7 thousand hectares of their land was flooded.

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