**VDSS\_ZIP\_BORDER\_STATUS.R - README**

**Author: Dylan Craig**

**Date Last Updated: 12/29/2024**

**File Name: VDSS\_ZIP\_BORDER\_STATUS.R**

**Purpose**

This script identifies neighboring counties for Virginia based on geographic boundaries. It uses TIGRIS shapefiles to analyze and output neighboring counties and their FIPS codes, facilitating further geospatial analysis and policy applications.

**Overview**

The script performs geospatial analysis to:

1. Retrieve county boundaries for Virginia using TIGRIS.
2. Identify neighboring counties for each county in Virginia.
3. Generate dataframes of neighboring counties by name and FIPS code.
4. Export the results in Excel format for use in related analyses.

**Datasets and Tools**

**Input Data:**

1. **TIGRIS Shapefiles:** Provides Virginia county boundaries with geographic coordinates and FIPS codes.

**Output Files:**

1. **virginia\_bordering\_counties.xlsx:** Lists Virginia counties and their neighboring counties by name.
2. **virginia\_bordering\_counties\_fips.xlsx:** Lists Virginia counties and their neighboring counties by FIPS code.

**Dependencies:**

* **R Libraries:**
  + sf: For handling spatial data and operations.
  + dplyr: For data manipulation.
  + tigris: For accessing TIGER/Line shapefiles.
  + pbapply: For adding progress bars to list operations.
  + openxlsx: For writing data to Excel files.

**Script Functionality**

**1. Loading County Boundaries:**

* Uses tigris to retrieve Virginia county boundaries for the year 2022.
* Transforms the data to CRS 4326 (WGS84) for spatial consistency.

**2. Identifying Neighboring Counties:**

* Defines a function to find neighboring counties using sf spatial operations.
* Identifies all neighboring counties for each county in Virginia.

**3. Creating Dataframes:**

* Generates neighbors\_df, listing counties and their neighbors by name.
* Generates neighbors\_fips\_df, replacing county names with corresponding FIPS codes for all neighboring relationships.

**4. Saving the Results:**

* Exports the neighbors dataframe with names to virginia\_bordering\_counties.xlsx.
* Exports the neighbors dataframe with FIPS codes to virginia\_bordering\_counties\_fips.xlsx.

**File Output**

1. **virginia\_bordering\_counties.xlsx:**
   * Lists each Virginia county and its neighboring counties by name.
2. **virginia\_bordering\_counties\_fips.xlsx:**
   * Lists each Virginia county and its neighboring counties by FIPS code.

**Usage**

1. Ensure all required R libraries are installed.
2. Execute the script in an R project environment.
3. Access the output files in the Data Outputs/VDSS\_Zip\_Border\_Status/ directory.

**Notes**

* The accuracy of the analysis depends on the quality of the TIGRIS shapefiles.
* Ensure the FIPS codes are up-to-date and correctly formatted in the TIGRIS data.
* The results are suitable for geospatial analysis and further integration with other datasets.