A16: Working with and Analyzing Vector Data in R (2)

The goal of this exercise is to build a function that will perform a series of geoprocessing operations. This is a reworking of a lab used in our GIScience course in which the same process is undertaken by building a ModelBuilder model in ArcGIS Pro. You will produce a simple function that summarizes the land area of different types of wetlands that may be impacted by a proposed highway. You should provide a written description of the process used to obtain the results. Resulting areas should be in **hectare units**. You will test your generated function using the provided data. Your function should accept the following arguments:

1. An input line feature representing a proposed highway
2. An input polygon wetland layer with several different wetland types differentiated
3. The name of a field that differentiates the wetland types in the polygon layer
4. The buffer distance to use that defines the area impacted by the proposed highway

The function should produce a data frame or tibble that provides the total area of each wetland type impacted in hectares units and count of wetlands of each type. The result does not need to include the resulting geometries: it can be an aspatial output. Only areas within the buffer extent should be considered, not the entire area of any wetland that intersects the buffer.

Once you have generated your function, you should test it on the provided data and use the results to answer the questions stated below. Deliver your results as an HTML webpage rendered from an R Markdown or Quarto file. Make sure to include all of your code, including the code that defines your function and the code used to test it. Also, include the description of how your function works and the answers to the questions below, including the table produced by the function and used to answer the questions.

Provided Data

TuckerCounty_CorridorH: line feature representing a proposed highway route

wetlands: polygon features representing wetland extents from the National Wetland Inventory (NWI); the "WET_TYPE" field differentiates wetland types in the data set

Answer the following questions using a buffer distance of 1.5 kilometers.

Q1: How many total wetlands are impacted?

Q2: What is the total area of impacted wetlands?

Q3: Which type of wetland has the largest number of impacted features?

Q4: Which type of wetland has the largest land area of impacted features?

Grading Criteria

- Correctness and completeness of function (15 Points)
- Description of how the function works (15 Points)
- Answer to questions (10 Points)