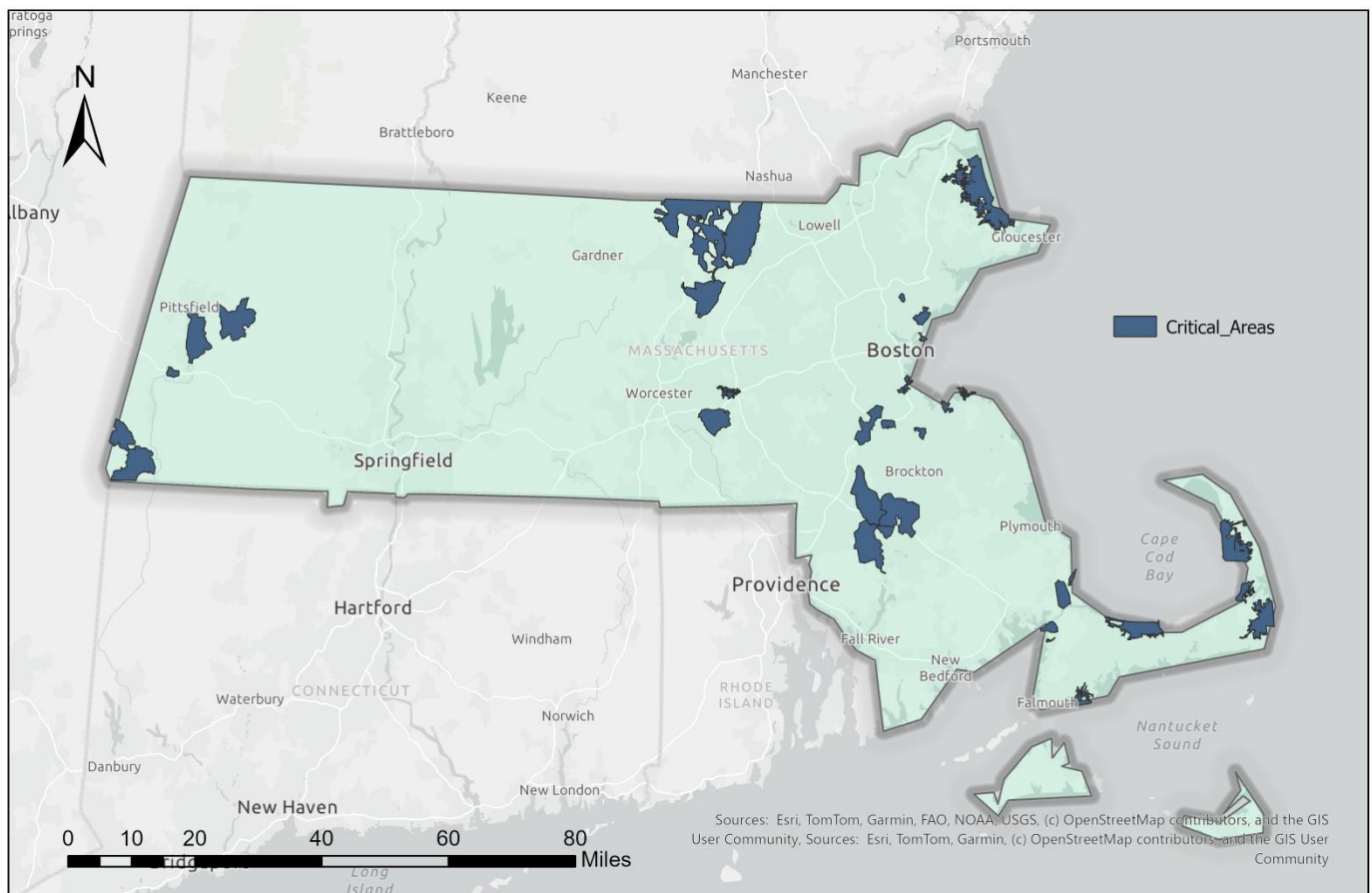


Areas of Critical Environmental Concern (ACEC) Analysis

Project Overview

This project analyzes Massachusetts Areas of Critical Environmental Concern (ACEC) using the MassGIS (April 2009) dataset. Data preparation was performed in QGIS, and data cleaning and visualization were completed in Python using pandas, matplotlib, and seaborn. The goal of the project is to explore ACEC distribution, acreage, and designation trends across the state, providing insights to support conservation planning and environmental awareness. Code and charts are maintained on GitHub (<https://github.com/AlyssaPacheco2721/Massachusetts-acec>).

Massachusetts Areas of Critical Environmental Concern



Author: Alyssa Pacheco

Data Source: MassGIS Data – Areas of Critical Environmental Concern (April 2009)

Data Source

- MassGIS Data: Areas of Critical Environmental Concern (April 2009)

This dataset represents ACECs in Massachusetts, which receive recognition due to the quality, uniqueness, and significance of their natural and cultural resources.

Tools & Technology

- **QGIS** for data preparation
- **Python** (pandas, matplotlib, seaborn)
- **GitHub** for version control and code sharing

Workflow

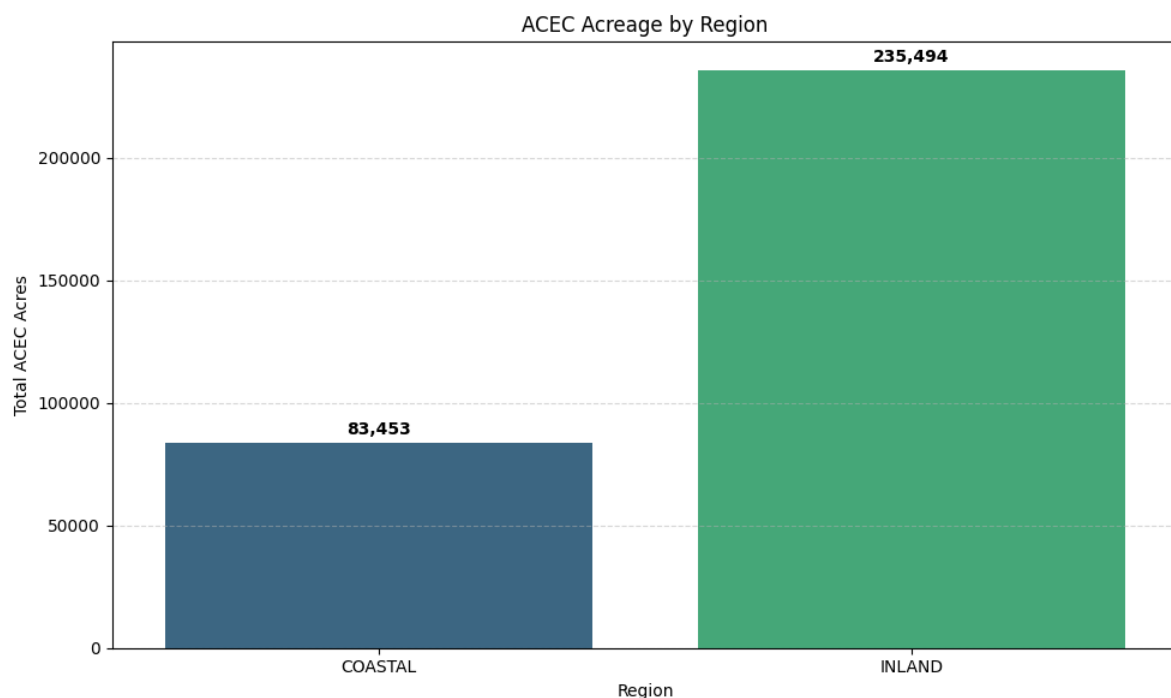
1. Inspect and clean the CSV attribute table in Python, handling missing values.
2. Prepare spatial data in QGIS, ensuring correct projection and data consistency.
3. Generate visualizations in Python: bar chart by region, scatter plot of ACEC vs GIS acreage, and line chart of designations over time.
4. Maintain version control and share code on GitHub for transparency and reproducibility.

Visualizations

Below are the key charts generated from the ACEC attribute table:

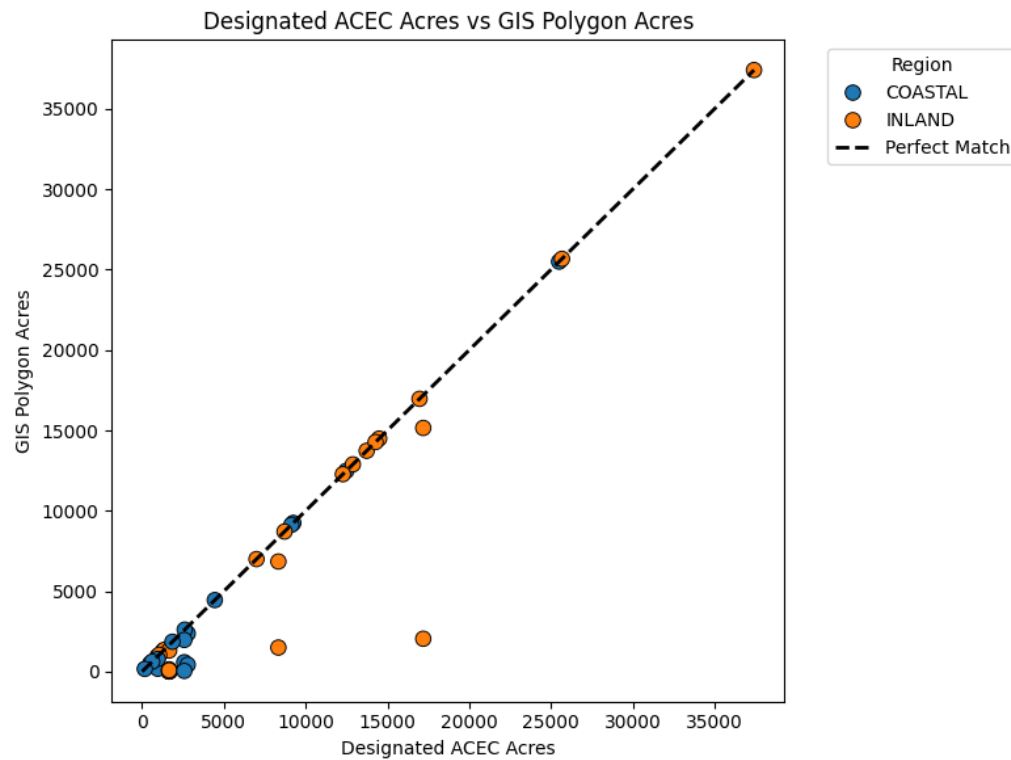
- **Bar Chart — ACEC acreage by region**

A summary chart showing ACEC acreage summarized by REGION (aggregated to provide a regional comparison of ACEC size). This visualization highlights which regions contain larger designated areas.



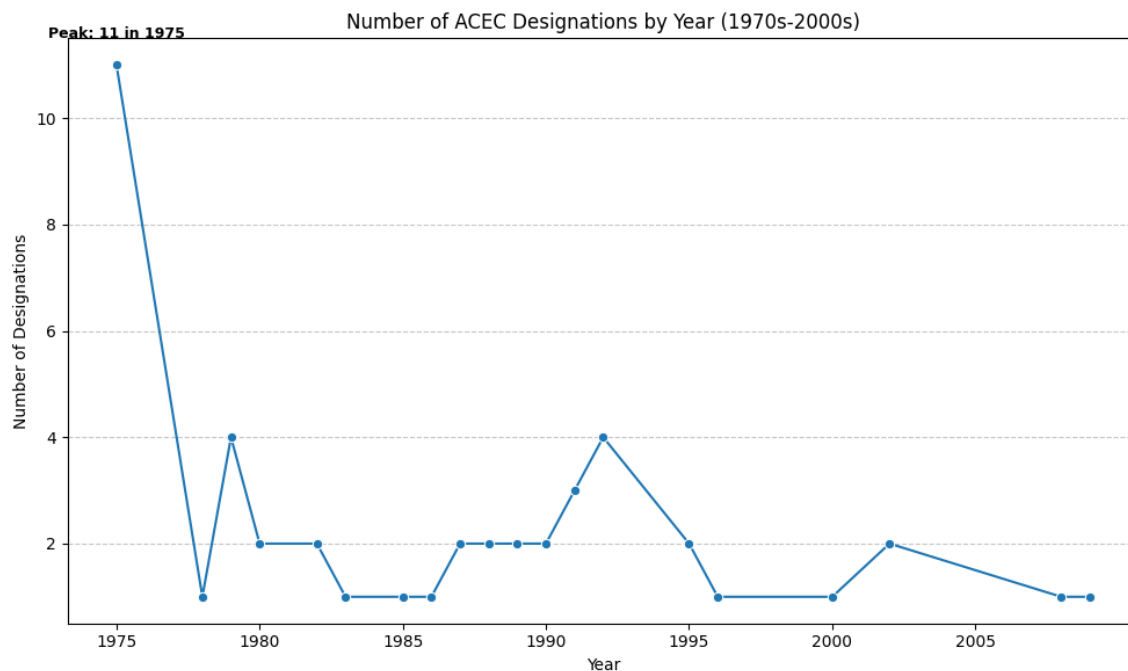
- Scatter Plot — Designated ACEC acres vs. GIS polygon acres**

Compares ACEC_ACRES (the official designated acreage) with POLY_ACRES (GIS-measured polygon area). Coloring points by REGION reveals regional patterns and any discrepancies between designated and measured area.



- Line Chart — ACEC designations over time**

Uses DES_DATE converted to year to count ACEC designations per year. This trend plot shows when designations occurred historically and can highlight periods of increased conservation activity.



Key Insights

- Certain regions, such as [Region Name], contain the largest total ACEC acreage.
- Scatter plot shows minor discrepancies between official and GIS-measured areas, suggesting potential differences in record-keeping or measurement methods.
- Line chart indicates periods of increased ACEC designation, particularly in [decade/year range], reflecting historical conservation initiatives.

Challenges

- Some ACEC records had missing DES_DATE values, which were handled using pandas to ensure accurate trend analysis.
- Ensuring consistency between GIS polygon measurements and attribute table acreages required careful data inspection.

Next Steps

- Extend the analysis to include mapping ACECs in an interactive GIS dashboard.
- Combine with priority habitat data to assess overlap with endangered species areas.
- Explore temporal patterns in designations in relation to policy changes or conservation programs.

GitHub Repository

- View the project code and charts here:
 - <https://github.com/AlyssaPacheco2721/Massachusetts-acec>