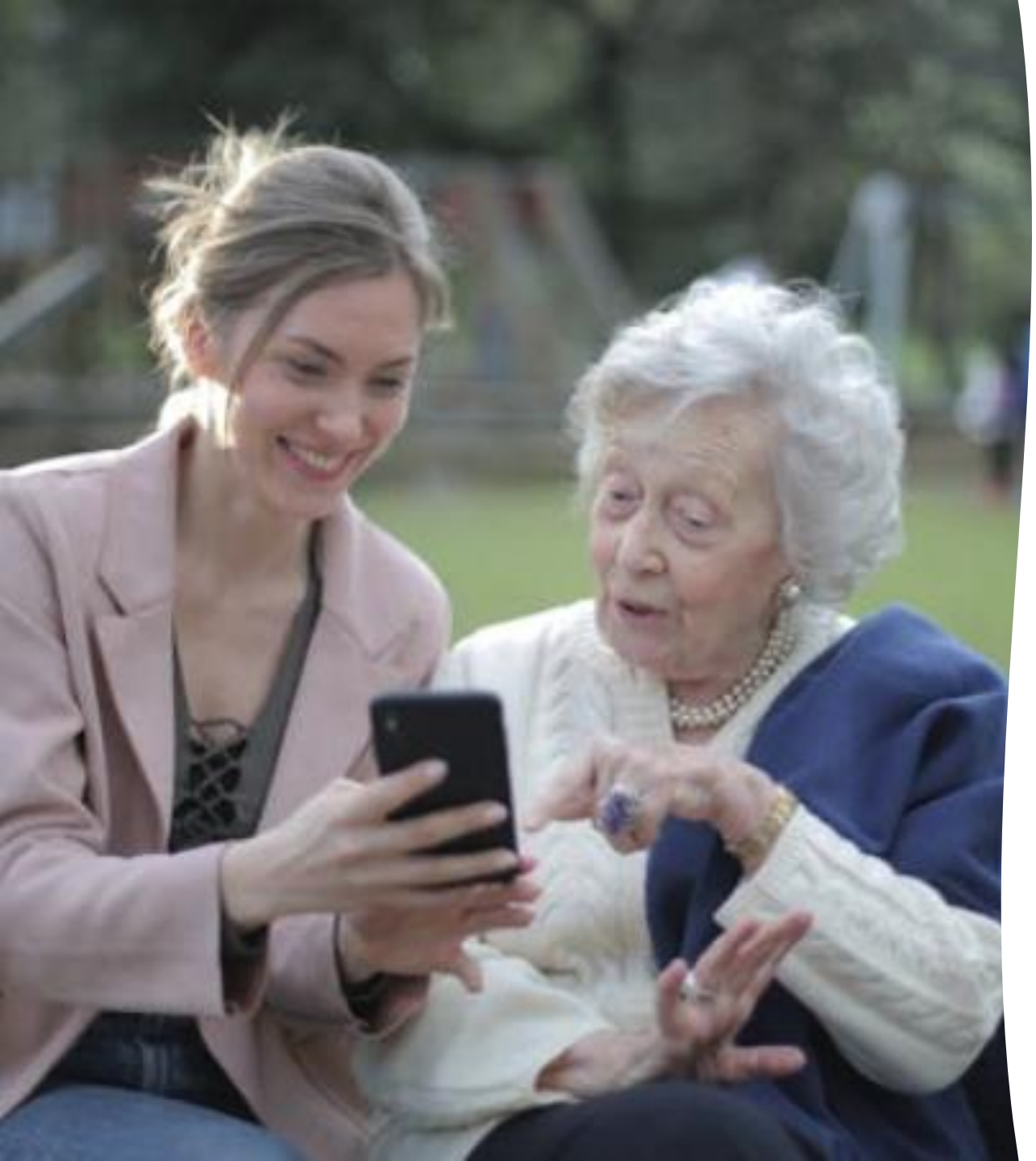
Created by:

Austin Hegarty, Cody Rosa,

Josh Remillard, and Ryan Shirlock

Introduction



Project Context

- Context of Precipi-Tracker
  - Historical Rainfall
  - Water storage
    - Reduce bills
  - Intended Audience
    - Farmers
    - Off the radar
    - As large as anyone

Goals and Features

- Goals
  - Build project to fall in line with original idea
  - Map API
  - User friendly website
  - Database
  - Repo for public
- Features
  - Interactive map on web browser
  - Mobile friendly website
  - Historical rainfall data
  - Different relative views
  - Dynamically updated heat-map

Group Member Major and Roles

- Austin Hegarty
  - Software Engineering
  - Original idea, back-end and light front-end
- Cody Rosa
  - Software Engineering
  - Back-end/Database
- Josh Remillard
  - Computer Engineering
  - Front-end and Fact finding / project research
- Ryan Shirlock
  - Computer Information Technology
  - Front-end

Design Phase

First Semester (Fall 2024)

Design GANTT Chart

- Used for preliminary planning of our time and resources for the semester
- GANTT website presents it better

Requirement Design

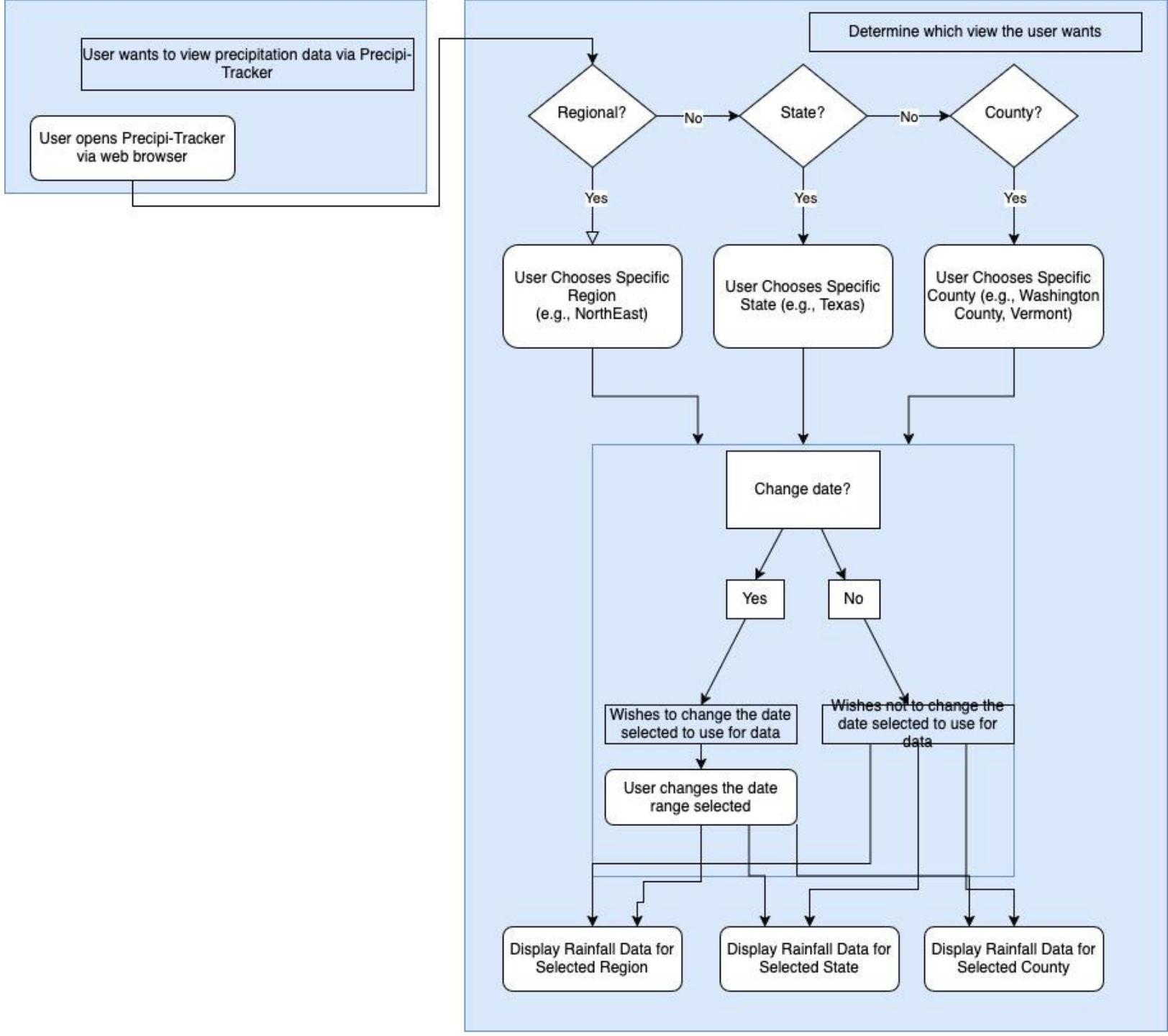
- How will clients view precipitation data
  - Region view
  - State view
  - County view
- How will the date range be selected

Requirement Design

- Where is the data coming from
- Where to store/host the data
- What systems will need to be implemented
- What kind of devices will the clients be using
- Determining which Map API to implement
  - Google Maps
  - Leaflet.js (OpenStreetMap)

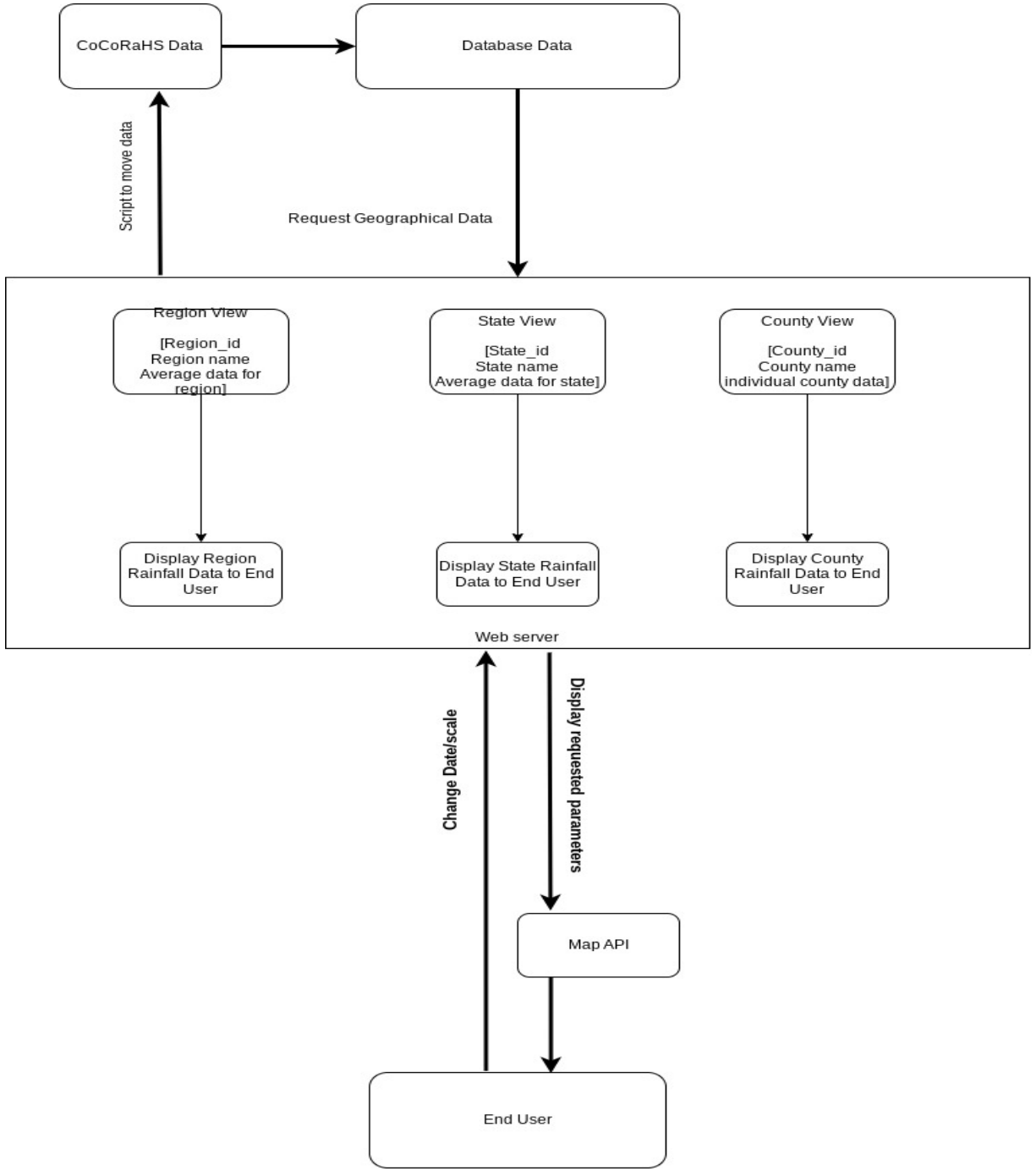
User Interaction

- Define how Precipi-Tracker behaves
- Relative to the view the client specifies
- For a given date range



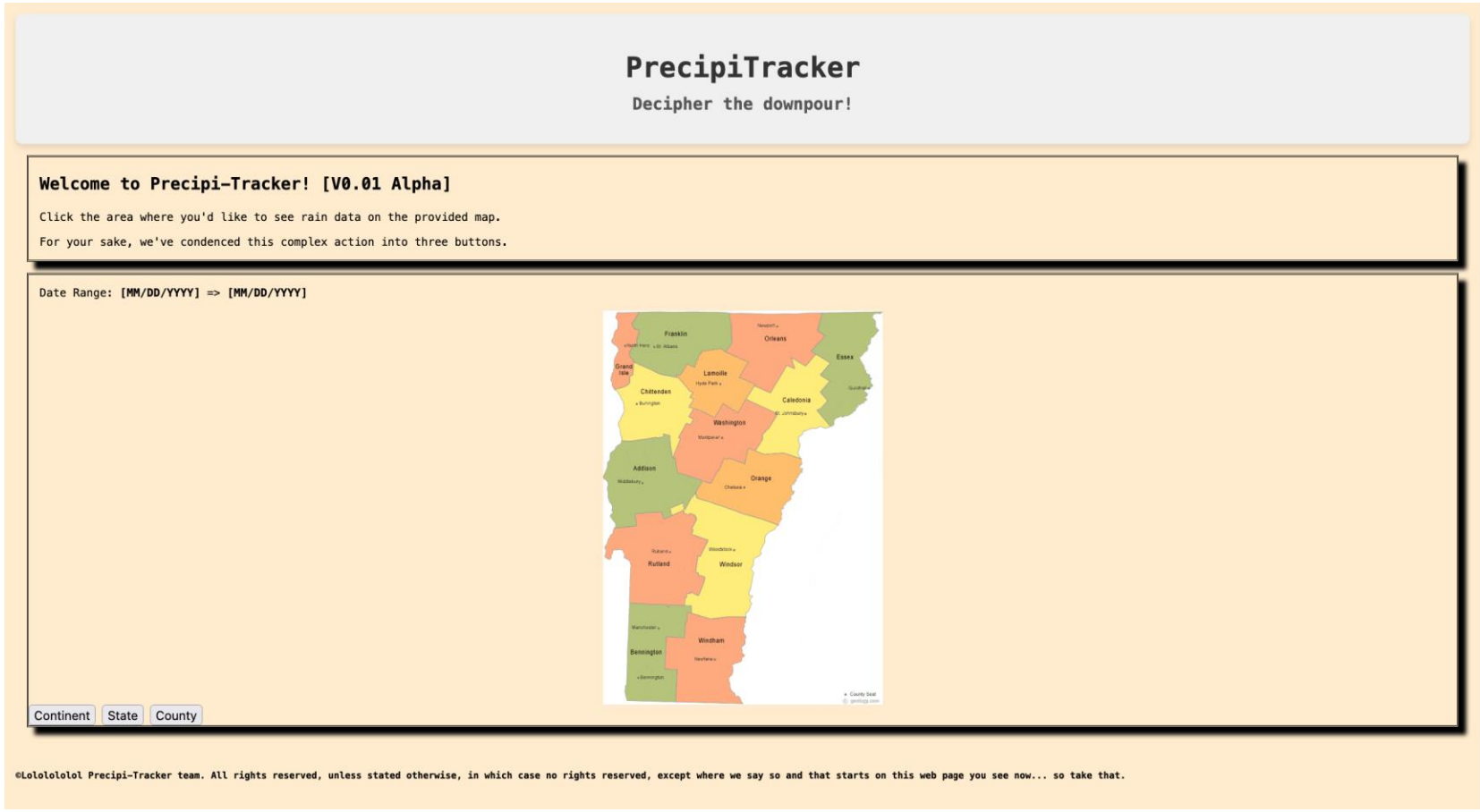
Assessing Data Flow

- How will the data be imported / exported?
- How will the data be used within the application?



Website Design and Model

- Rough prototype
  - Drafted December 2024
  - Used to give life to internal design



Preliminary Setup

- GitHub Repository Setup
  - Standard setup for our WebApp
- Lemuria's role in Precipi-Tracker
  - Database & Webserver
    - Professor Chapin Helped set up Server & SSL Certificate

Implementation Phase

Second Semester (Spring 2025)

Implementation GANTT Chart

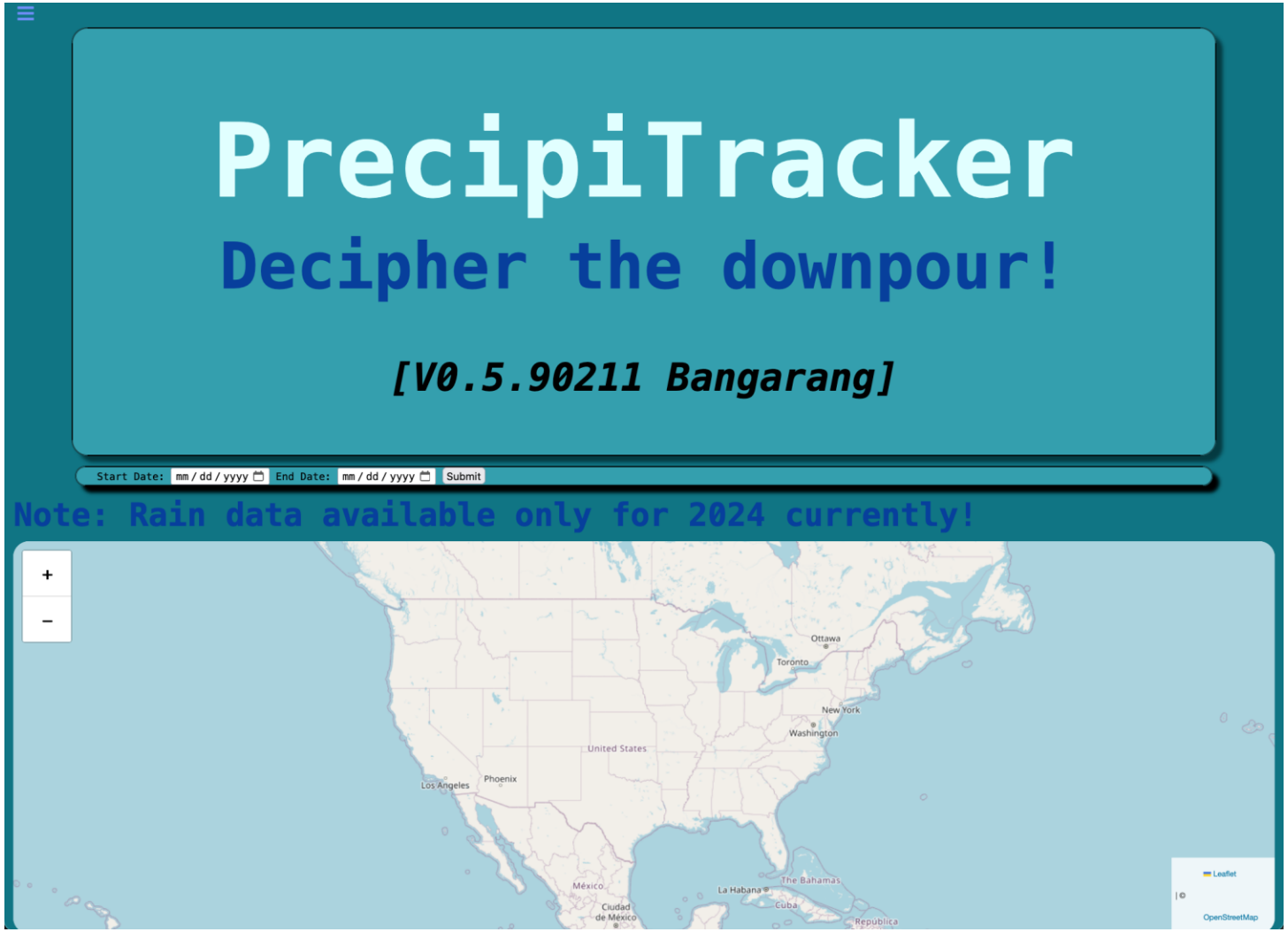
- Used for preliminary planning of our time and resources for the semester
- GANTT website presents it better

Frontend implementation - HTML

- Implementing responsive web design
  - Desktop vs Mobile devices
- Considerations for user interaction on multiple platforms
  - Having a menu structure suitable for use on both types
- Publicly available resources
  - W3Schools used as an example for our menu structure
- Implementing the map API
  - Adjusting button locations and zoom level boundaries for map
  - Adding custom overlays for region, state, and county views

Frontend implementation

- Website has evolved throughout the semester
  - Header and menu placement
  - Date range moved into menu
  - Using a standardized hamburger menu icon
  - Making the map full screen
- Each version has been viewable on Lemuria throughout the semester



Frontend Challenges

- Map API geolocation
  - Depends on an SSL certificate to secure the host-client connection
  - Setbacks with SSL implementation
    - Generating a certificate signing request
    - Time constraints influenced implementation

Backend Implementation

- Python Scripts for Data Conversion
  - CoCoRahs_To_SQL_Statements.py
- Database & SQL
  - SQL Reports generated by our conversion script
  - Database Schema
- PHP
  - DBConnection.php
  - Api.php
- JavaScript
  - Api.js
  - DataLayer.js
  - Date.js
  - Main.js
  - Map.js
  - Utils.js

Bug / Defect Testing

- Date Bugs
  - When date changes were submitted, incorrect dates were passed to the api.php script
- Map Bugs
  - If a user happened to increase and decrease their zoom level repeatedly, multiple layers would appear over one another.
- FIPS / ID Defect
  - In our original implementation of the database, states were stored with a custom ID created by us, this turned out to cause a lot of issues when matching data via FIPS geographical codes (Federal Information Processing)

Live Demo

Precipi-Tracker

Conclusion

If we had more time...

- Snowfall counterpart
- Update the database automatically
- Dynamically updated legend
- Client geolocation

Citations/Credit

- Group Members
  - Created the project
- Peter Chapin
  - Assisted in many backend concerns and issues
- CoCoRaHS
  - Website which gathered the data we used
- Open Street Map using Leaflet.js
  - Map API
- Tiger Shape Files and Census Files
  - Defined the shapes for geographical areas

Releasing Project to Public

- Public since creation of repo
- Intend to keep public for future reference and evolution
  - ccrdev/precipitracker: Precipi-Tracker Senior Project

- Link to Lemuria: http://lemuria.cis.vermontstate.edu/ptracker/precipitracker/Code/

Questions?