Lake Pulse Web Portal (MVP)

# Project Overview

The Lake Pulse is a web-based platform designed to provide comprehensive information about every lake in the United States. Leveraging an integrated map feature, users can search, visualize, and interact with lake data seamlessly. The portal aims to foster community engagement through dedicated community boards for each lake, offer shopping functionalities, and incorporate advanced features like AI-driven chat support and data dashboards over time. The project focuses on developing a robust and user-friendly UI, relying on a partner for lake data collection.

# Objective

To develop a scalable and intuitive web portal that enables users to:

* Access detailed information about lakes across the US.
* Efficiently search and visualize lake data using interactive maps.
* Engage with communities centered around individual lakes.
* Expand functionalities over time to include shopping, AI chat support, and comprehensive data dashboards.

The initial focus (MVP) will be on establishing the core features: server setup, user authentication, basic portal infrastructure, and essential search capabilities.

# Functional Requirements: - MVP

## 1. User Authentication

* **Authentication:** Implement user sign-up, login, and logout functionalities using Amazon Cognito.
* **Login Page:** User registration and login forms.

## 2. Basic Portal Setup

* **Server Configuration:** Set up the server environment to support the web portal, ensuring scalability and security.
* **Navigation:** Develop a clear and intuitive navigation structure for easy access to all major sections.

## 3. User Interface Components

* **Dashboard/Homepage:**
  + Overview of portal features.
  + Quick access to search functionalities and user-specific sections.

## 4. Search Functionality

* **Search by Name:**
  + Users can select a state to view all lakes within that state.
  + Further search by entering lake names within the selected state.
* **Search by Map:**
  + Interactive map using LeafletJS to plot lakes based on latitude and longitude.
  + Enable zooming and dragging to view individual lakes or grouped results.
  + Display search results in a separate pane alongside the map.
* **Search Results:**
  + Basic tabular display of lake data.
  + Inclusion of simple charts using Nivo or D3JS for visual data representation.

## 5. Individual Lake Page

* **Map Display:**
  + Highlight the specific lake on the interactive map.
* **Basic Information:**
  + Display essential details about the lake (e.g., size, location, depth).
* **Latest Statistics:**
  + Show recent data points relevant to the lake.
* **Trends:**
  + Visualize data trends over time using charts.
* **Weather Information:**
  + Integrate a paid weather API to display current weather conditions for the lake area.

## 6. My Lakes

* **Saved Lakes Collection:**
  + Allow users to save and manage a personalized list of lakes.
  + Display basic data for each saved lake for quick reference.

## 7. Analytics Integration

* **Google Analytics:**
  + Track user interactions and navigation patterns within the portal.

# Technology Stack

* **Page Analytics:** Google Analytics
* **Mapping:** LeafletJS (<https://leafletjs.com/)>
* **Charting:** Nivo, D3JS
* **Frontend:** React (React-leaflet library can be used)
* **Backend:** C#, ASP.NET CORE

# Assumptions

* **Data Readiness:** Lake data provided by the partner is well-structured and readily integrable. (Either we require APIs or other source of data formats)
* **Scope Stability:** Requirements remain consistent without significant changes during development.
* **Tools & Infrastructure:** Necessary development tools and infrastructure are in place from the start.

**Future Enhancements (Post-MVP)**

1. ****Individual Lake Page****
   * **Plotting, drawing polygons**
   * **Uploading/Adding data**
2. ****Community Boards****
   * Implement message boards tied to user logins for each lake community.
3. ****Field Notes****
   * Enable users to add and view personal notes related to specific lakes.
4. ****Shopping Features****
   * Introduce e-commerce functionalities related to lake activities and merchandise.
5. ****AI Chatbot****
   * Develop an AI-driven chatbot to assist users with queries and navigation.
6. ****Advanced Data Dashboards****
   * Create comprehensive dashboards for in-depth data analysis and visualization.