Florida Flood Gauge Monitor

Documentation

Paul Fishwick and Claude Code

February 2026

1 Overview

The Florida Flood Gauge Monitor is a web application that displays real-time water level data from over 500 USGS monitoring stations across Florida. Users can explore an interactive map, view 7-day historical charts for individual gauges, and generate AI-powered narratives explaining water level behavior.

2 Architecture

The application is built with the following technologies:

- **React + TypeScript** – UI framework
- **Vite** – Build tool and dev server
- **Leaflet** – Interactive map rendering via OpenStreetMap
- **Recharts** – Time series chart visualization
- **Google Gemini API** – AI-generated gauge stories
- **USGS Water Services API** – Live gauge data source

3 Features

3.1 Interactive Map

The main view displays all active USGS flood gauges in Florida as blue markers on an OpenStreetMap base layer, as shown in Figure 1. Users can pan and zoom to explore gauge locations across the state.

3.2 Gauge Chart

Clicking on any gauge marker opens a bottom panel displaying a 7-day historical chart of water level changes, as shown in Figure 2. The y-axis shows water level change in feet, and the x-axis shows the date range. A "Story" button is available to generate an AI explanation.

3.3 AI-Generated Story

The Story feature uses Google Gemini to generate a narrative explanation of the water level data, as shown in Figure 3. Three detail levels are available:

- **Summary** – One to two sentences

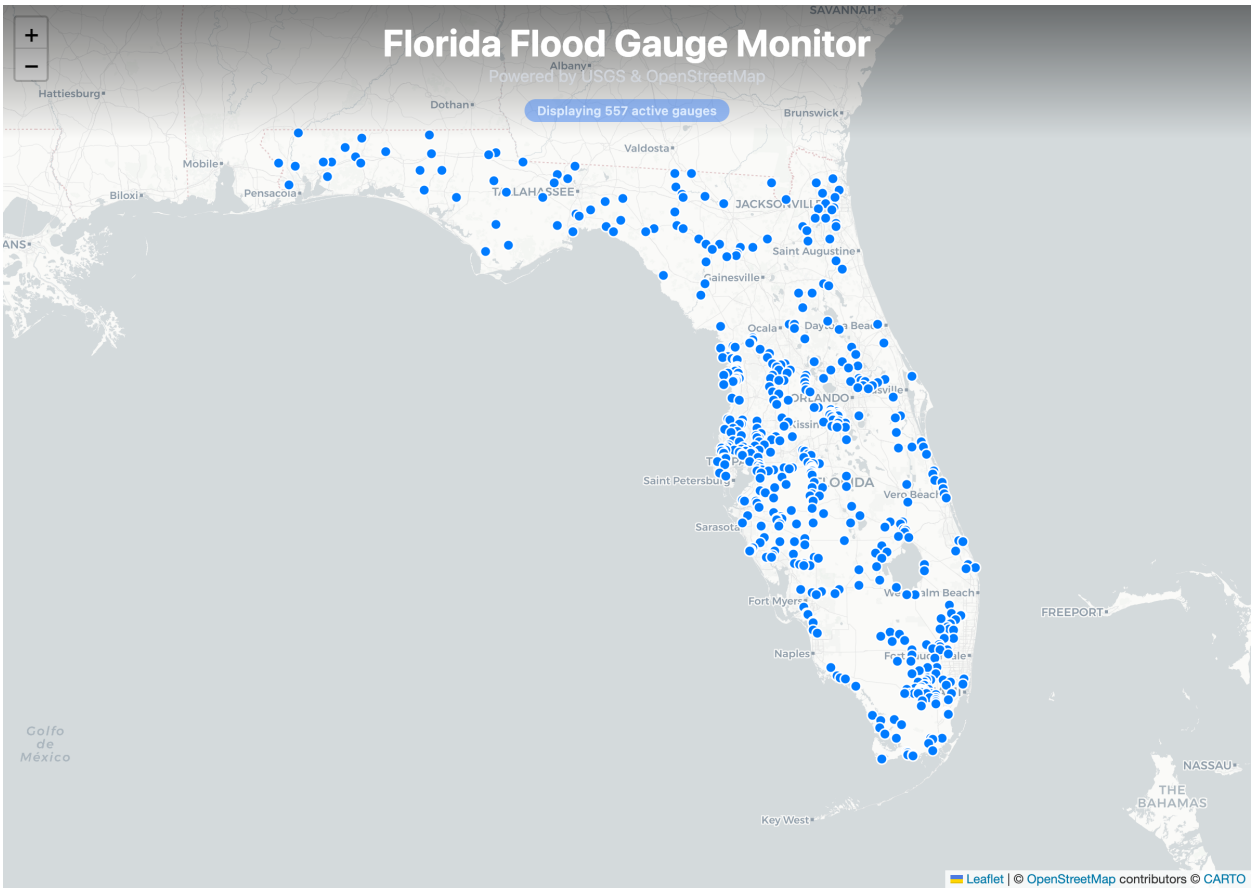

Figure 1: Main map view showing 557 active USGS flood gauges across Florida.

- **Standard** – A single paragraph
- **Detailed** – Two to three paragraphs

All three levels are fetched concurrently and cached, so switching between them is instant.

4 Setup

4.1 Prerequisites

- Node.js (v18+)
- npm

4.2 Installation

```
npm install
```

4.3 API Key Configuration

The Story feature requires a free Google Gemini API key. Obtain one at https://aistudio.google.com, then create a `.env.local` file in the project root:

```
VITE_GEMINI_API_KEY=your_key_here
```

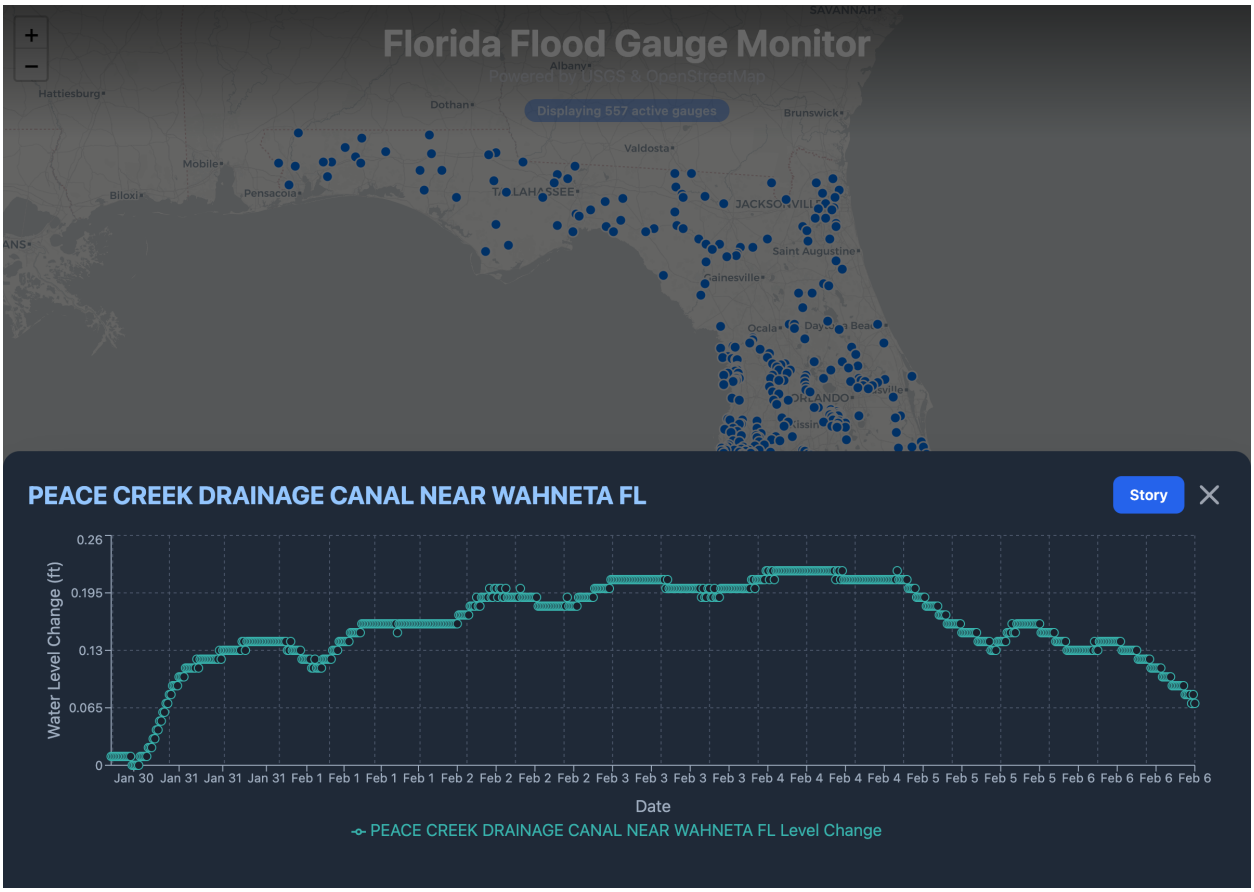

Figure 2: Historical water level chart for a selected gauge, with the Story button visible.

The application functions fully without an API key; only the Story feature is unavailable.

4.4 Running

```
./start
```

This script kills any existing process on port 5173, starts the Vite dev server, and opens the browser.

5 License

This project is released under the MIT License.

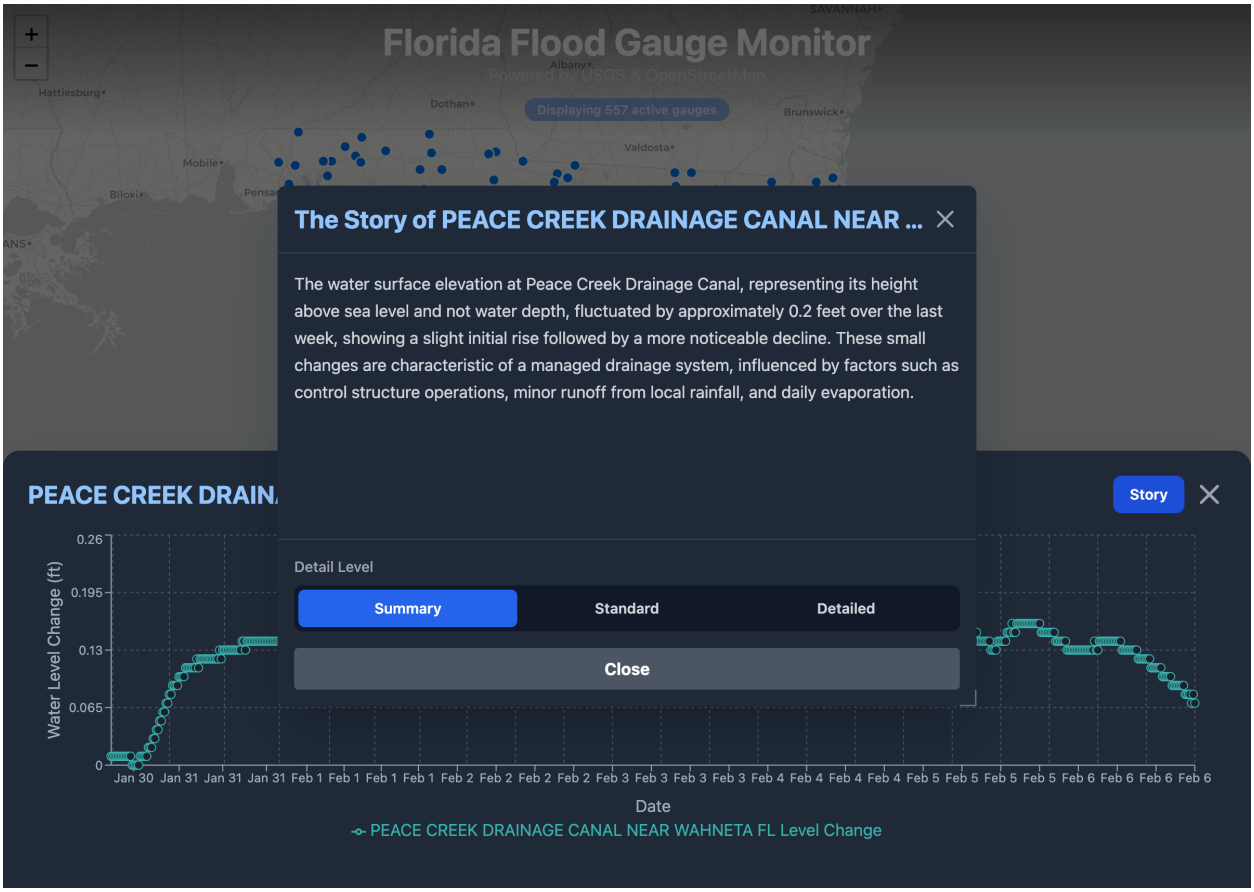

Figure 3: AI-generated story modal explaining water level behavior for a selected gauge.