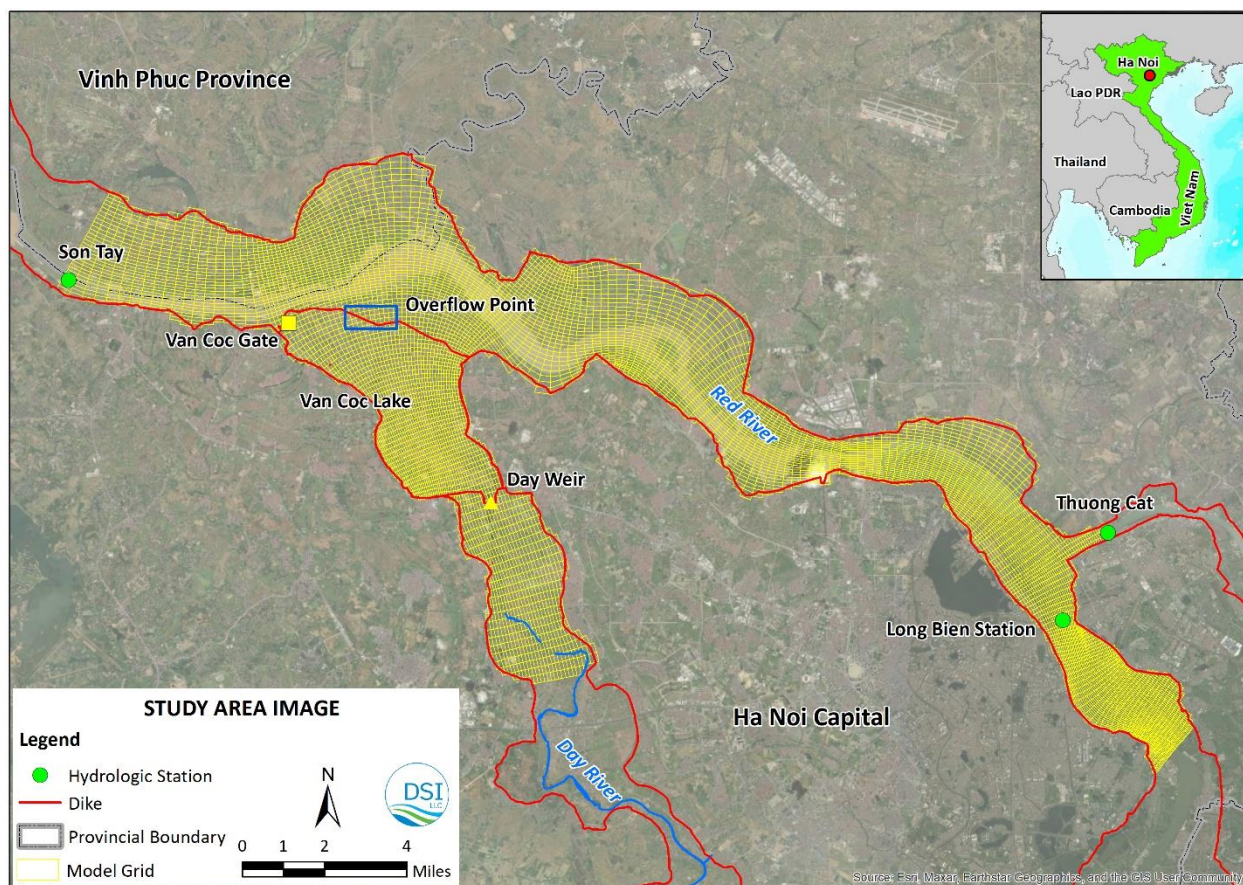


Read Me:

**Model Name:** DM-28\_Red River\_Flood\_Control

**Objective:** Use EFDC+ Explorer (EE) and EFDC+ to simulate hydrodynamics to evaluate the effectiveness of hydraulic structures, including the Van Coc Gate and Day Weir, in mitigating flood risks for Hanoi, Vietnam. Two scenarios were developed to simulate the impact of these structures under extreme flood conditions, specifically the catastrophic 1971 flood. By analyzing the hydrodynamic behavior of the Red River system, the study aims to provide insights into the performance of existing flood control measures and highlight the role of Van Coc Lake as a regulating reservoir.

**Model Grid:** 9,033 horizontal grid cells, with 216 rows and 123 columns



**Figure 1 Model grid.**

**Folder Structure:**

**Data:** This folder contains data that can be used with the model. These data include bathymetry, upstream flow boundaries, and downstream water level boundaries.

**Model:** EFDC model that can be loaded in EE to pre- and post-process. It includes Non-Operational\_Scenario 1 (Base Model) and Operational\_Scenario 2.

**Grid:** This folder contains grid for building the model

- RedRiver\_FloodControl.cvl: CVL grid format, EE uses this grid type for building model

**Maps-Images:** This folder contains the maps / images of the study area. The formats of the maps / images can be \*.geo (geo-referenced file), \*.jgw, \*.jpg etc.

- Location of the research area.png

**Test\_record file:** This file is just a record file that informs which EFDC+ executable was used to run the model.

**Modules Activated:** Hydrodynamics.

**Disclaimer:** The model is provided to our users to demonstrate that EFDC\_Explorer and EFDC+ can accurately simulate hydraulic structures. The model is running as expected however this shouldn't be considered as a final product as the model can be improved / refined to get improved results.

**Files in Data Folder:****Bathymetry:**

- Bathymetry.xyz and bathymetry.p2d

**Boundaries:** contains time series data for setting the models's boundaries

**References:**

Anh, S. H., T. Tabata, K. Hiramatsu, M. Harada and L.N. Chung 2020 *An optimal scenario for the emergency solution to protect the Hanoi Capital from flood disaster of the Red River by using the Van Coc Lake*, J. Flood Risk Manag, 1–20. <https://doi.org/10.1111/jfr3.12661>.

**Model Boundary Settings for Non-Operational\_Scenario 1 (Base Model):****Upstream Boundary:**

- US inflow at SonTay.txt

**Downstream Boundary:**

- DS water level Location 2.txt
- DS water level Location 3.txt

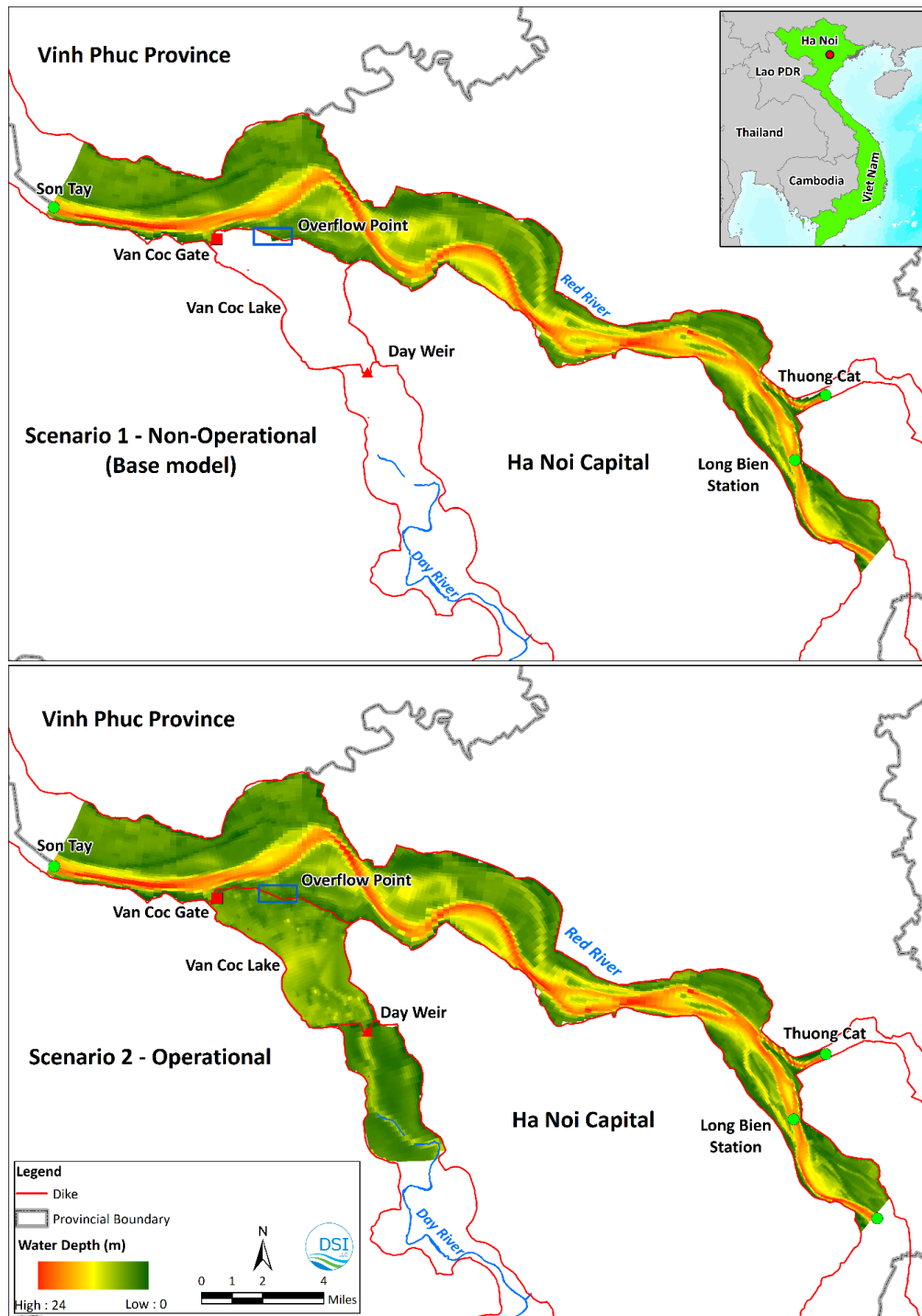
**Model Boundary Settings for Operational\_Scenario 2:****Upstream Boundary:**

- US inflow at SonTay.txt

**Downstream Boundary:**

- DS water level Location 1.txt
- DS water level Location 2.txt
- DS water level Location 3.txt

**Model results:**



**Figure 2 Water Depth at Peak Flood Time (Scenario 1 and 2).**