DSS-WISE™ Web

Decision Support System for Water Infrastructural Security Web

User Manual
for
DSS-WISE™ Web
Version 4.0 – Beta Release

March 10, 2026

NCCHE
UNIVERSITY OF MISSISSIPPI

DSS-WISE™ Web

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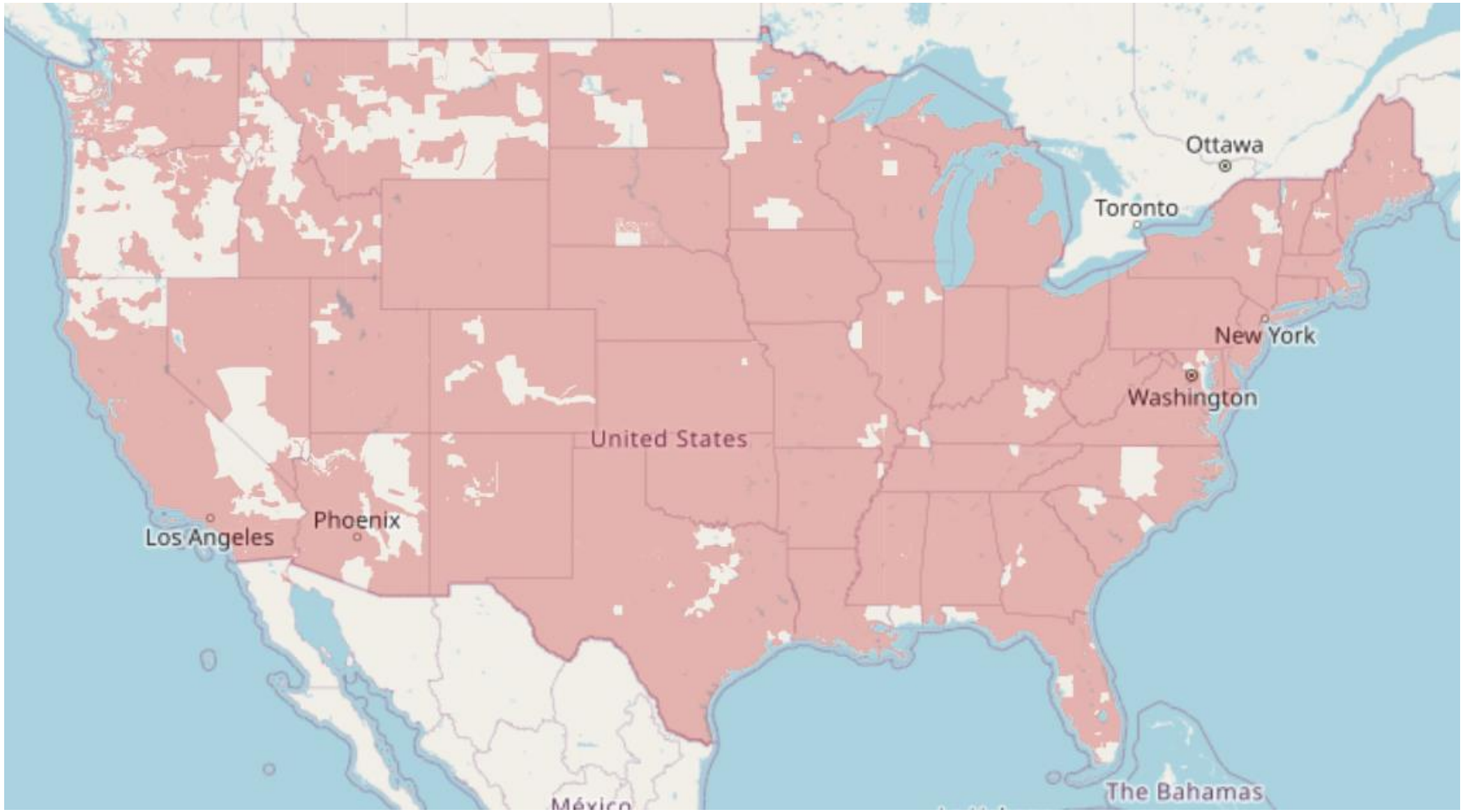
Section 1: Overview

This new 4.0 version of the DSS-WISE™ Web system is part of a broad effort funded through the of Department of Homeland Security Science and Technology Directorate, Engineer Research and Development Center and the FEMA National Dam Safety Program in order to bring improvements not only to the web interface, but to the backend system as well. The results of this work is a system that is much easier to navigate and use, with a flexible backend that allows for job prioritization and the ability to scale out to the cloud during peak usage of the system.

The DSS-WISE Web 4.0 beta release includes the following updates:

- Enable broad back-end system improvements as part of new user-facing updates, including a new, consolidated web front-end.
- Develop the ability to model levee breaches.
- Develop the ability for privileged users to submit high-priority simulations that may be run on the fastest available compute nodes.
- Update to USGS 3DEP 1-meter DEM data.
- Update simulation report map images.

Please note that this manual is meant to be a supplement to the version 3.0 user manual in order to highlight the features and functionality of the new DSS-WISE™ Web 4.0 system. The version 3.0 manual is available for download here: https://dsswiseweb.ncche.olemiss.edu/documentation/DSS-WISE_Web_v3_User_Manual.pdf



Map of USGS 3DEP 1-meter DEM data coverage in DSS-WISE™ Web version 4.0. As a result, groups with a 15-foot minimum cell size have been adjusted to 10 feet.

In addition to the transition to a unified web front-end with improvements to the overall look and feel of the interface, many changes were made to the DSS-WISE™ Web Viewer application including:

- Layers and elevation profile tool now open in a popup over the map on larger screens, allowing the prep step and the tool to be active at the same time.
- Layer list categories in the pop-up are now collapsible.
- The elevation profile tool now queries directly from the local visible elevation layer.
- The elevation profile tool, elevation layer visualization, and simulation DEM all use the same source data, including custom group DEM data.
- The elevation layer colormap now scales based on the histogram of data on-screen instead of linearly between MIN and MAX on screen, reducing the effect of outliers.
- Inactive user-drawn features are now styled differently to distinguish them from active ones.
- Editing map features now shows vertices.
- The map can now zoom to fractional levels.
- Removed the tool bar from the top of the left panel and moved relevant map tools to dedicated buttons on the map.
- Changing the selected user group in the Viewer is now accessed by clicking the group name in the page header.
- The dams search tool now searches both the dam name and the alternative name (usually the reservoir name) fields as well as the ID.

- The group-area check has been updated so that at least one active breach or water source has to be inside the group's area.
- Groups with a dedicated compute node/cluster can now optionally select to run on the default cluster instead.
- Added a vertical split-screen for the map/prep tool on mobile screens.
- Breaches now have a trigger condition of either a specified time or a structure overtopping depth/elevation.
- Breaches can now be named.
- Reduced cooldown timer on simulation submissions.
- The simulation ID with a direct link to the results page and queue position are now instantly available after simulation submission.
- Users can now log in on multiple devices at once.
- Logged-in sessions now last longer than the 10-hour maximum of the previous version.

Section 2: DSS-WISE™ Web Version 4.0 Interface

When accessing the new DSS-WISE™ Web website located at https://dsswiseweb-beta.ncche.olemiss.edu, the user is presented with a new entrance page to the Portal.

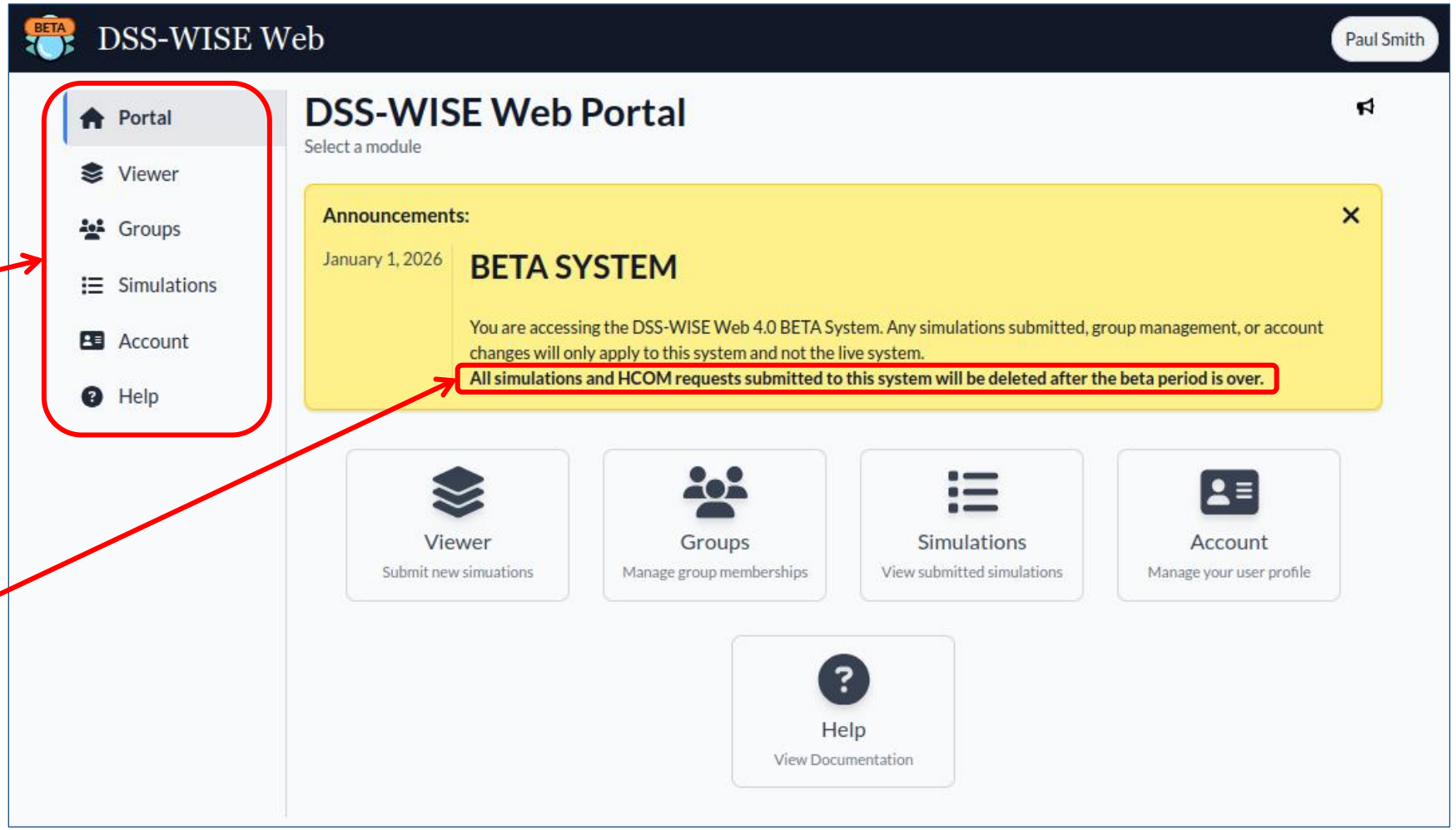
As noted on the front page, the system will initially be available only to existing users of the DSS-WISE™ Web system. New user signup will come at a later date.

Click the “Enter” button to access the Portal page.

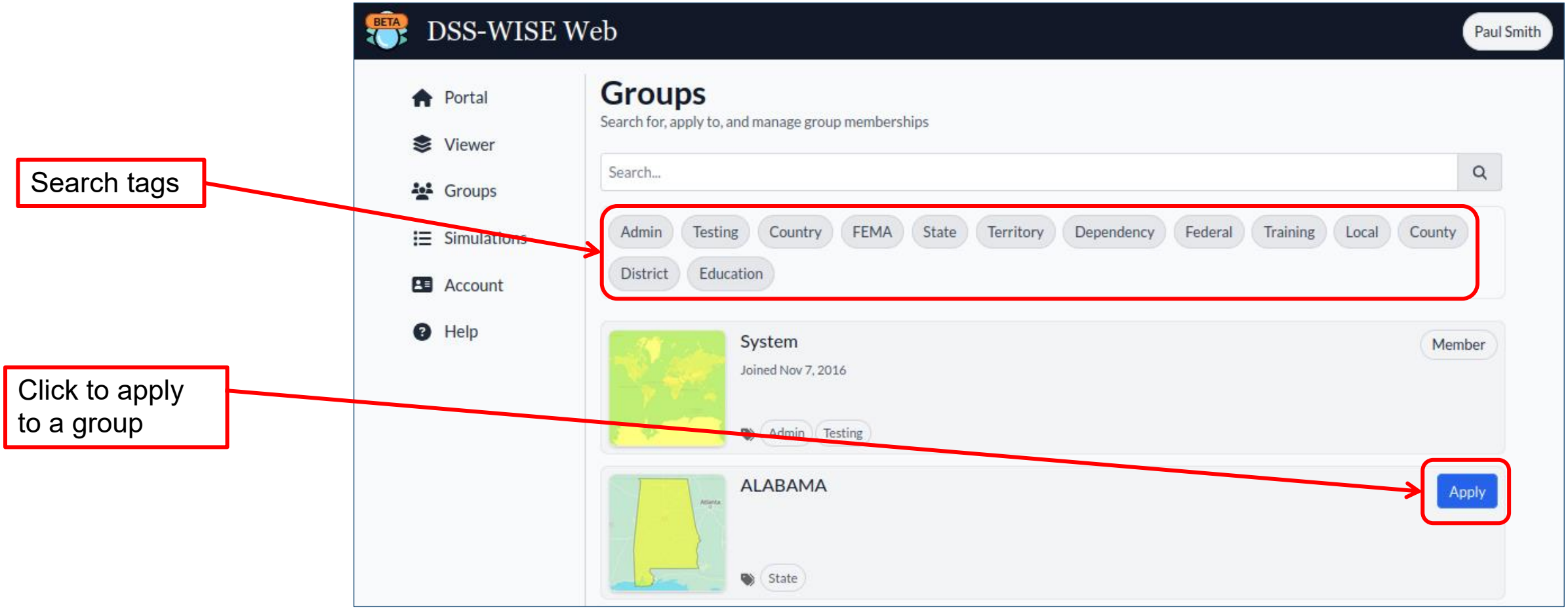
The main DSS-WISE™ Web Portal page provides access to the various functions of the site including the Viewer, group management, running simulations and results, account management and a help section. The help section includes access to quickstart tutorials, videos and manuals, a FAQ section, in-depth explanations of common error messages and detailed information about the data sources and datasets used by DSS-WISE™ Web.

Links to main website functions

Please note that all simulations submitted to the Beta version of the website **will be deleted** once the Beta system goes live!



Before accessing the DSS-WISE™ Web Viewer, it may be helpful to have a look around at some of the other functions first, since many enhancements and improvements have been made to the system. For example, in the “Groups” section, groups are now searchable via text or tags.



The “Simulations” section provides improvements to filtering as well, providing users with text search, as well as type, group and date filter options. It should be noted that the text search looks for simulation ID, project name, scenario name, and scenario description.

Pagination

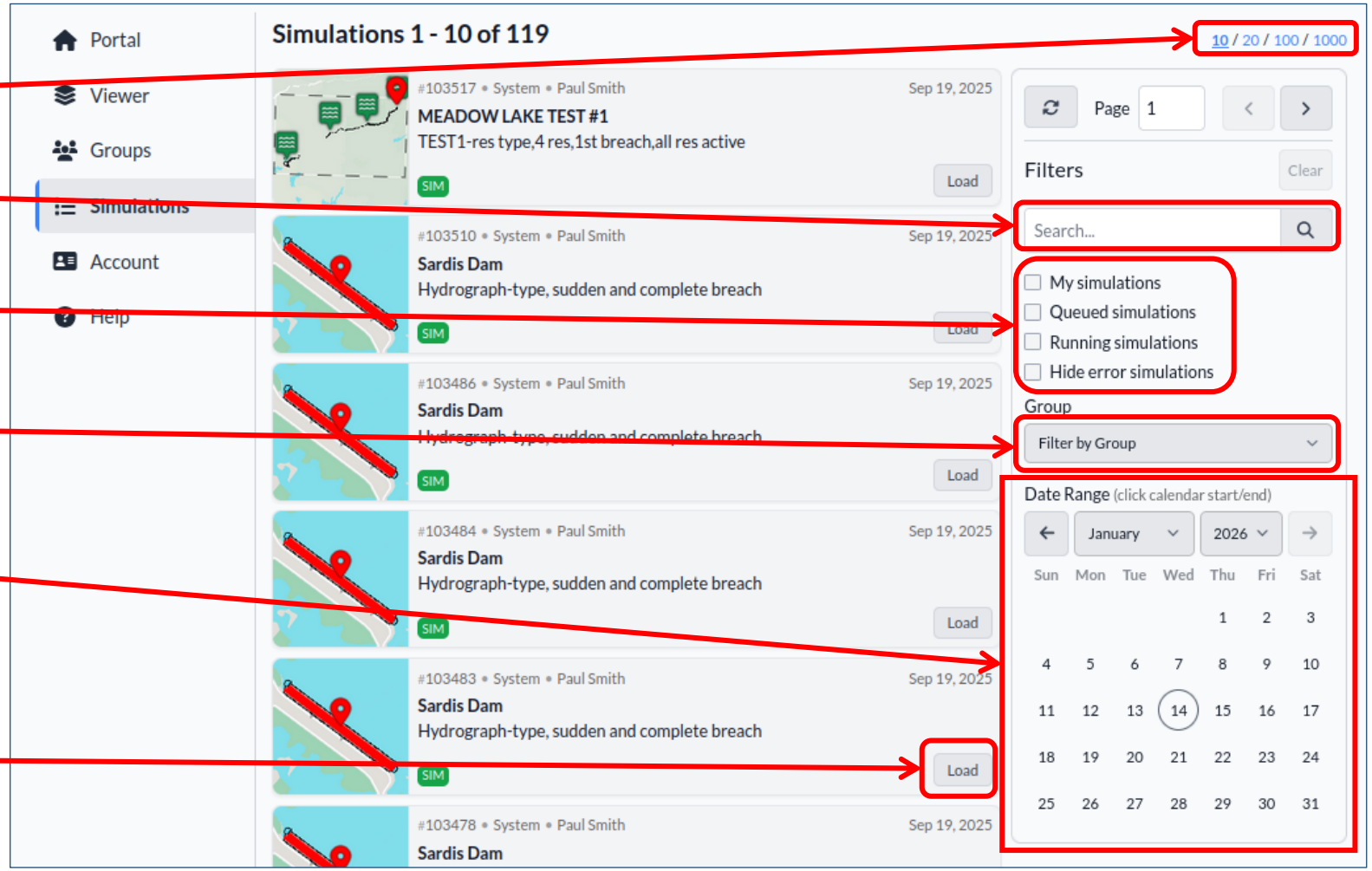
Text search

Type filter

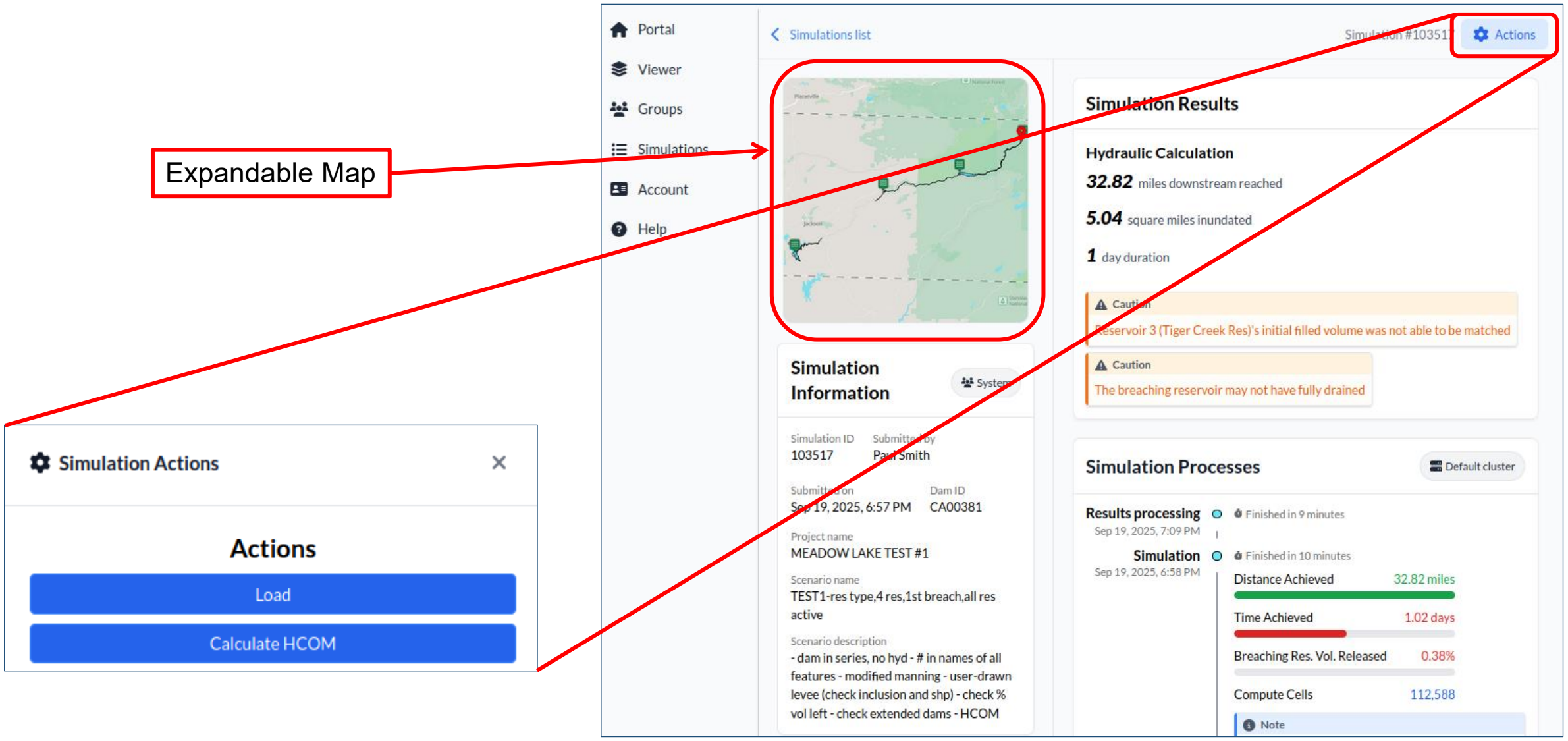
Group filter

Date filter

Note that the “Load simulation setup as new” functionality is available on the new simulation search page.



Information provided for individual simulations has been updated with an improved layout. The new page also indicates which compute cluster the job was assigned to. In addition, a new “Actions” button has been added.



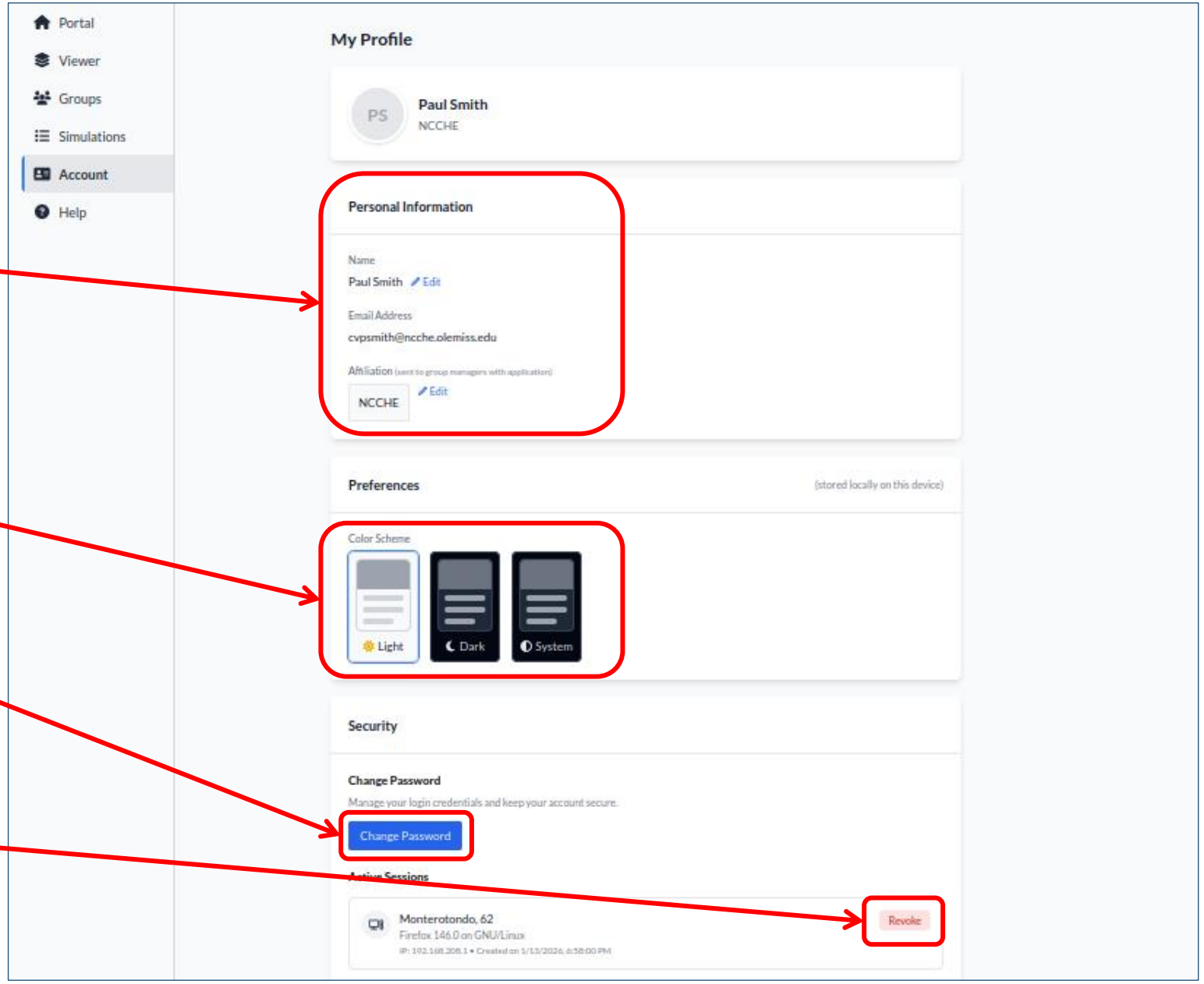
A new “Account” section has been added with support for password/device/affiliation management, as well as dark mode!

Edit personal details

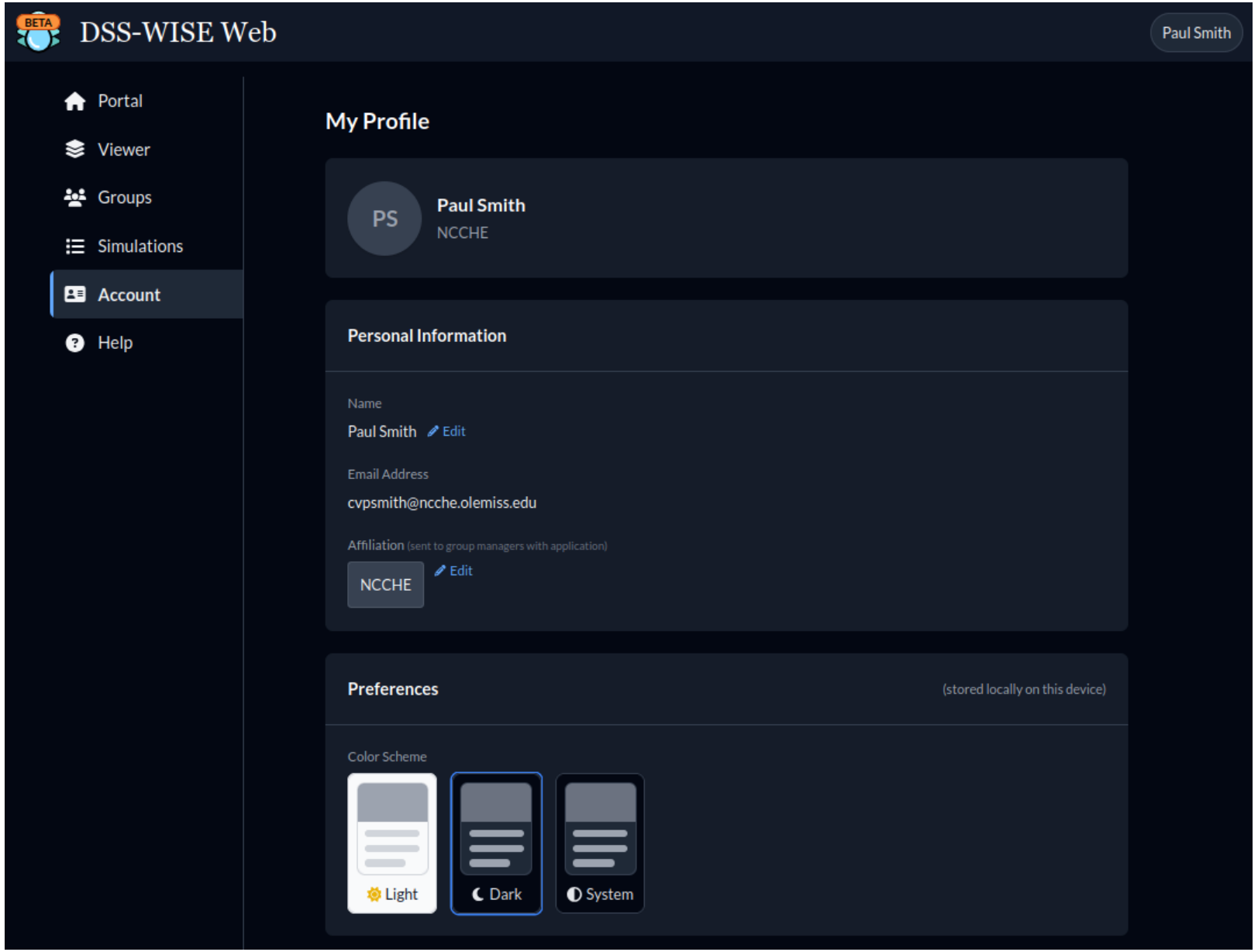
Light/Dark mode

Change password

Revoke/log out from a device



Here is a look at dark mode in action. Note that this setting is **stored locally on the device**, so it must be set on a per-device basis.

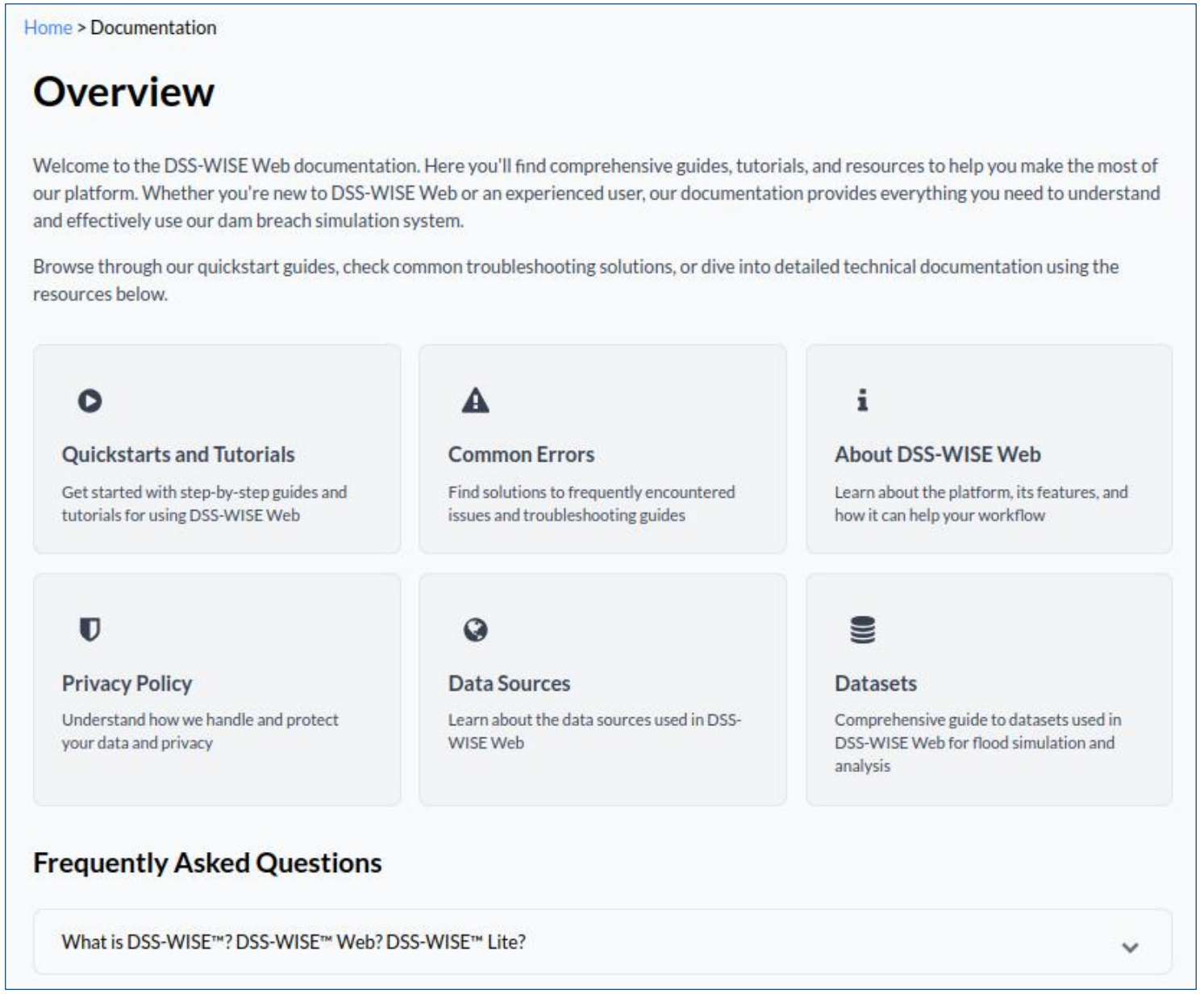


Clicking on the “Help” section takes the user to the documentation page. Here, clicking on the “Quickstarts and Tutorials” button will provide access to quickstart guides and user manuals.

In addition, the user has access to the DSS-WISE™ Web webinar, which may be viewed directly from the website.

There are also PDF documentation sets for several DSS-WISE™ Web short courses.

There are additional sections featuring common error messages, a history of the DSS-WISE™ Web system, our privacy policy, and details about the various data sources and datasets in use by the system.

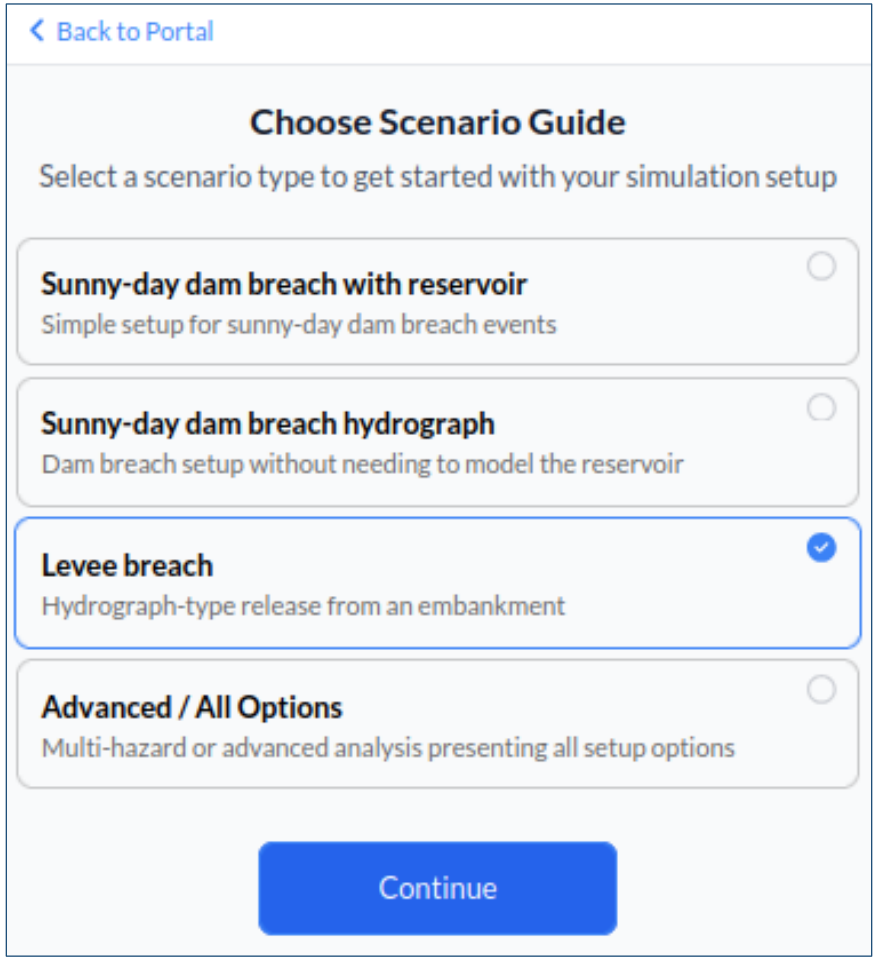


Section 3: Levee Breach

As one of the primary goals of this new 4.0 version is the development and release of a new tool to simulate levee breaches, it is appropriate to become familiar with the new DSS-WISE™ Web Viewer interface through the introduction of this tool to setup and submit a levee breach simulation.

For the simplest of breaches, three things must be defined: a levee, a breach center point, and a hydrograph. The new 4.0 version of DSS-WISE™ Web features an Artificial Neural Network (ANN) in order to estimate the breach discharge hydrograph using levee height, upstream slope and clay content fraction value sliders as input to the ANN.

The first step is to select “Levee Breach” from the Scenario Guide in the DSS-WISE™ Web Viewer and click the “Continue” button.



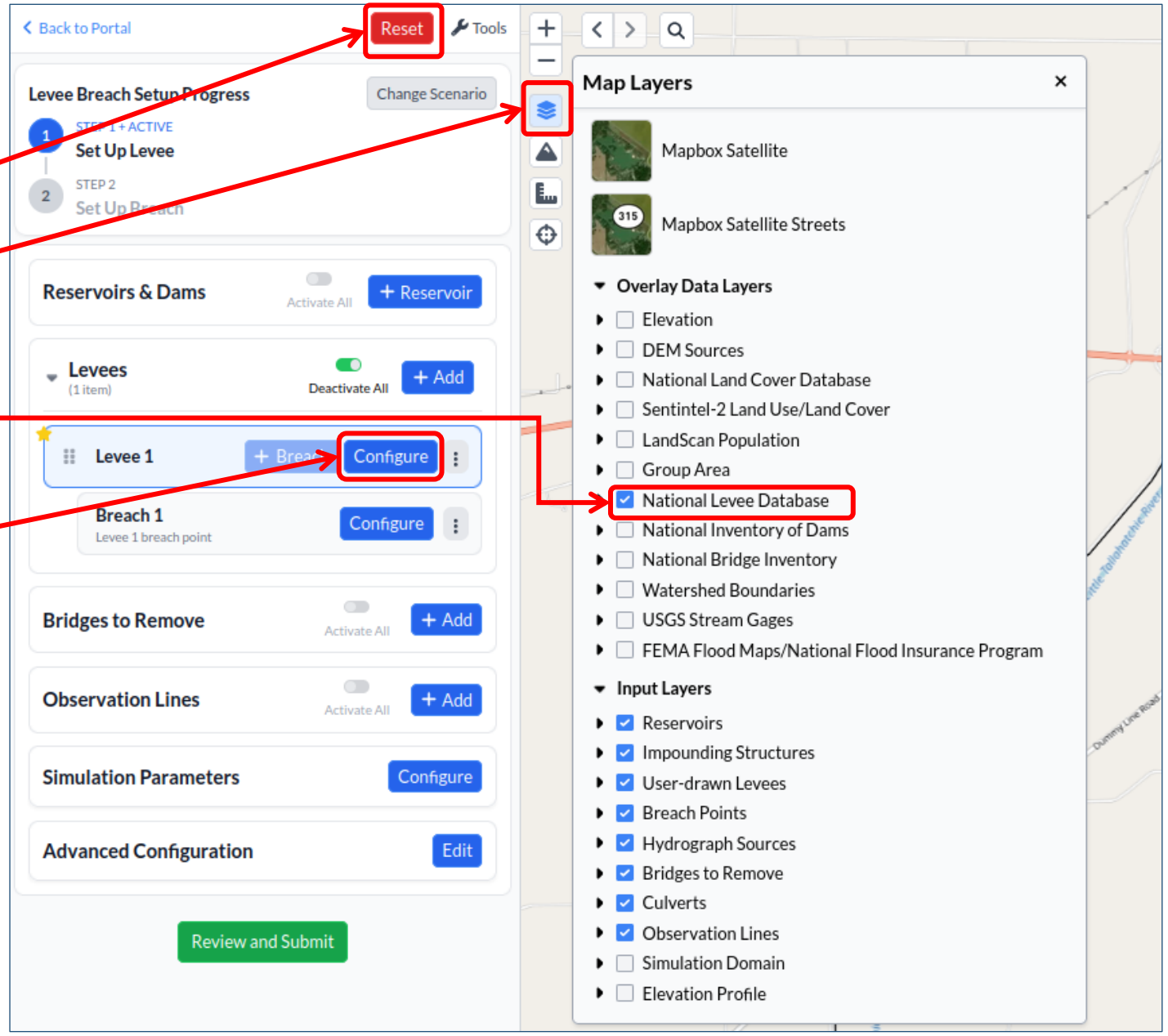
It may be useful to click on the “Map Layers” button in the map window in order to turn on the “National Levee Database” overlay map layer.

Scenario “Reset” button, available at any time during setup

Map Layers button

National Levee Database

Levee Configure button



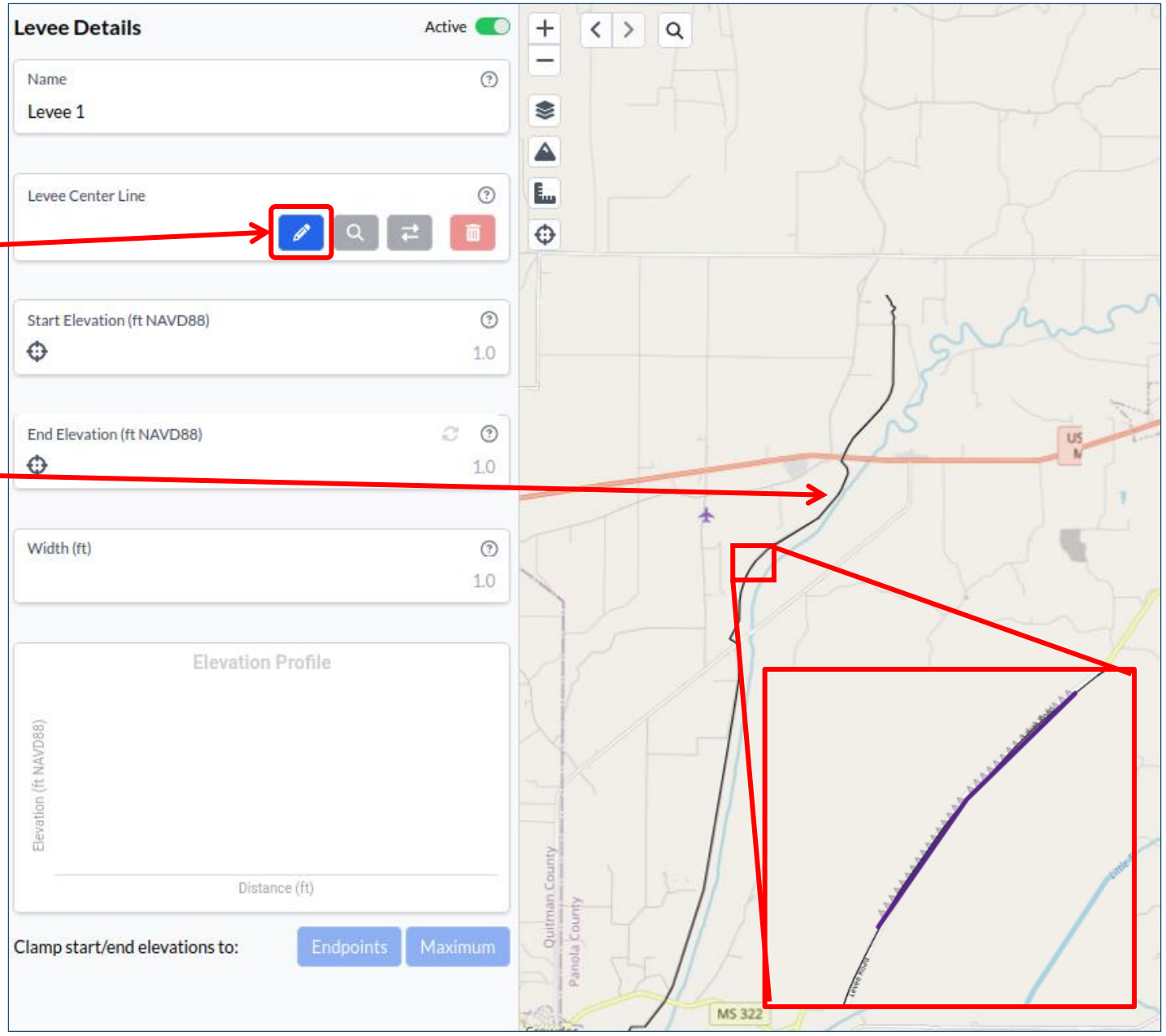
Next, click the “Configure” button inside the “Levee 1” element in order to configure the levee details

This takes us to the “Levee Details” dialog, where we may define the levee by clicking to input the center line vertices.

Levee Center Line button

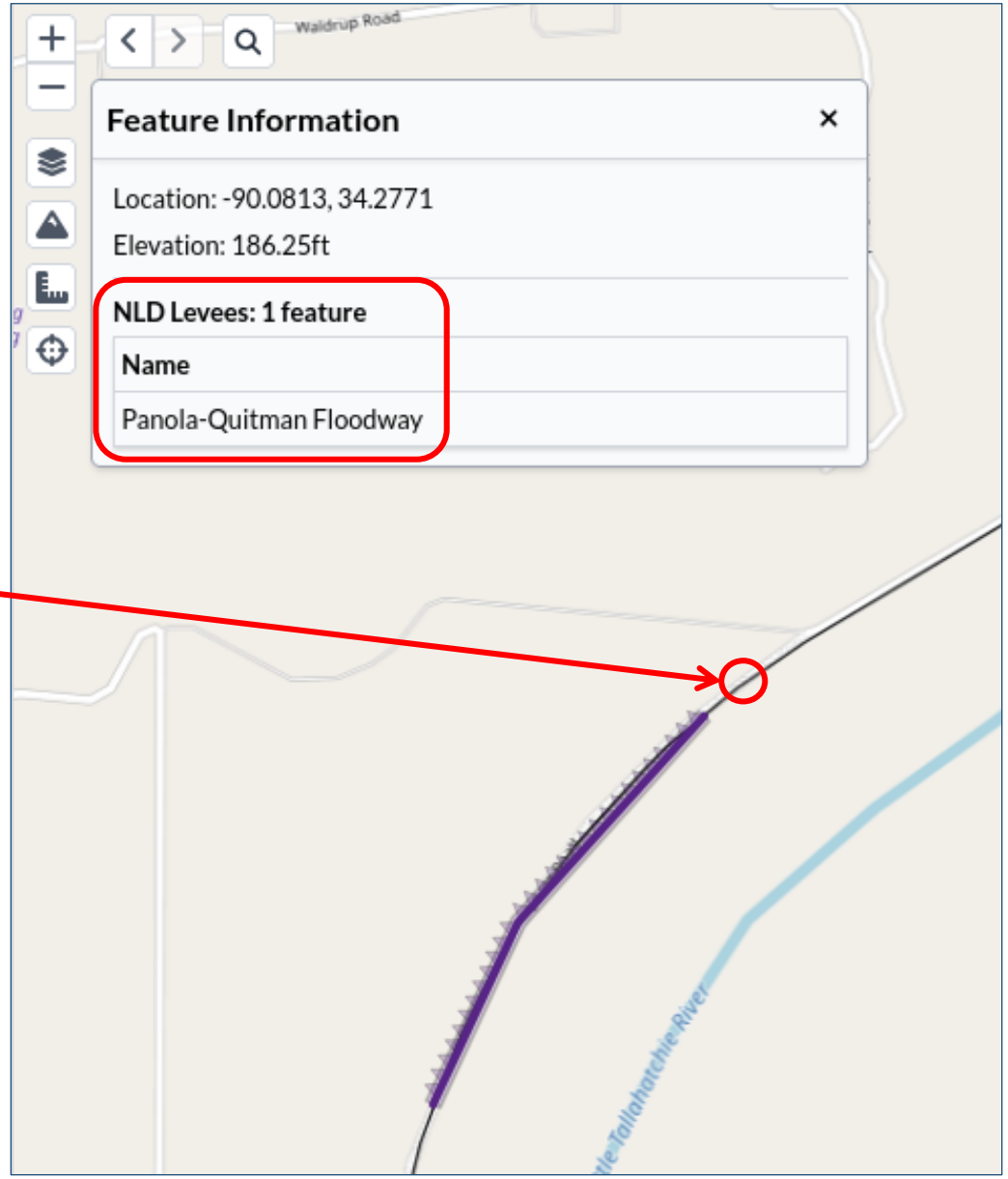
Note the levee shown on the map here by turning on the National Levee Database layer

The levee feature should be drawn with the same convention as with other features in the Viewer, in that "downstream" is to the right when looking from one point to the successive one. Do this by first clicking on the Levee Center Line button, then clicking the first point. Subsequent single-clicks define line segments of the levee center line. Finally, double-click to complete the definition of the levee.



Since the National Levee Database layer has been enabled, it is possible to click on any part of the levee in order to obtain information about the feature at that point. This holds true for *any* feature in an Overlay Data layer that has been enabled, but note that this is *not true* for user-defined features.

Click here for feature information

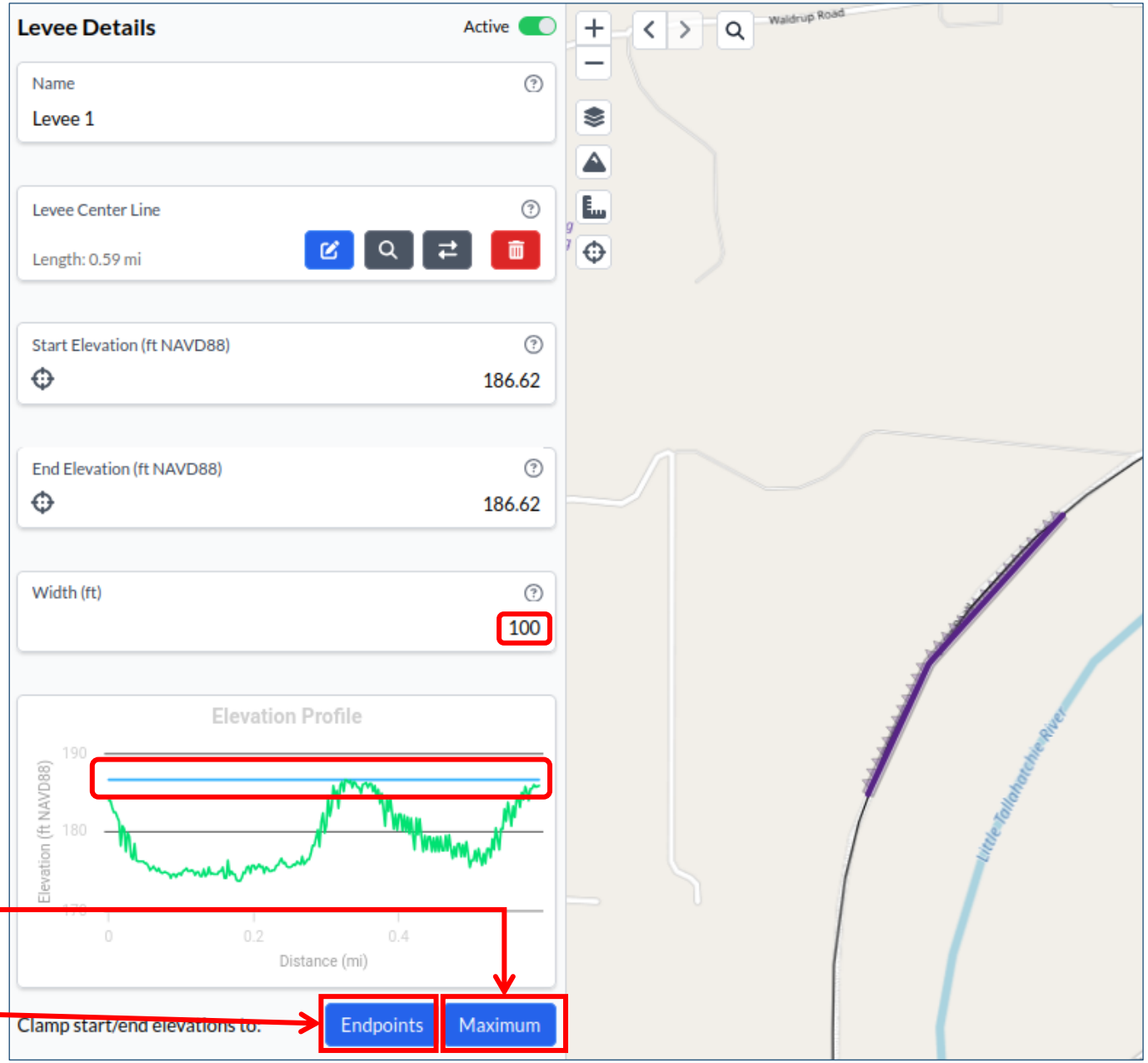


After the levee has been defined, we must enter the levee width with half being to the left of the Levee Center Line and half being to the right. For this example, we can set it to 100ft.

By default, we must enter both starting and ending elevations. The line's elevation will change linearly from the start elevation to the end elevation. You can click the crosshairs icon to the left of the input and then click a point on the map to select the elevation elevation at that point.

However, it is also possible to set the elevation along the entire levee to either a linear feature from the start point of the Levee Center Line to the end point of the Levee Center Line, or to the maximum elevation extracted along the feature.

We can now click the “Done” button and move on to defining the breach parameters.



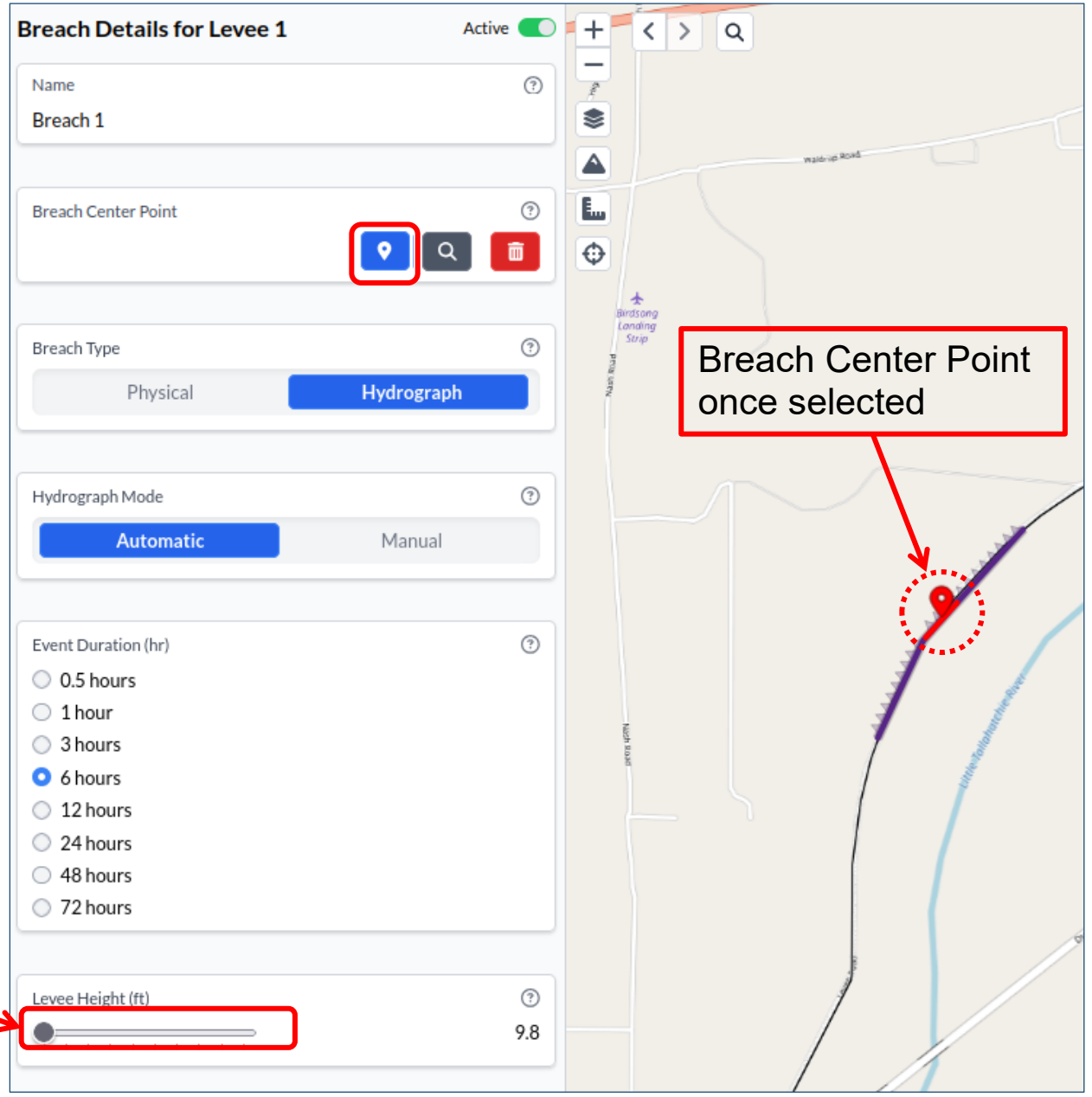
Clamp to maximum elevation

Linear clamp from start to end points

Click on the “Configure” button inside the “Breach 1” element to move on to the Breach Details dialog.

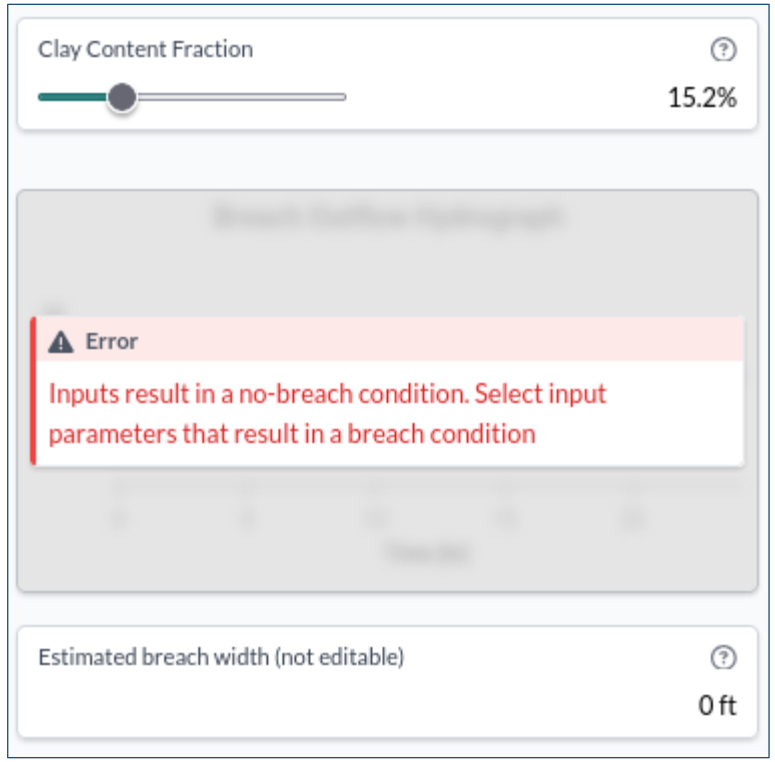
Here, we click on the “Breach Center Point” button and click a point along the Breach Center Line to designate as the breach point.

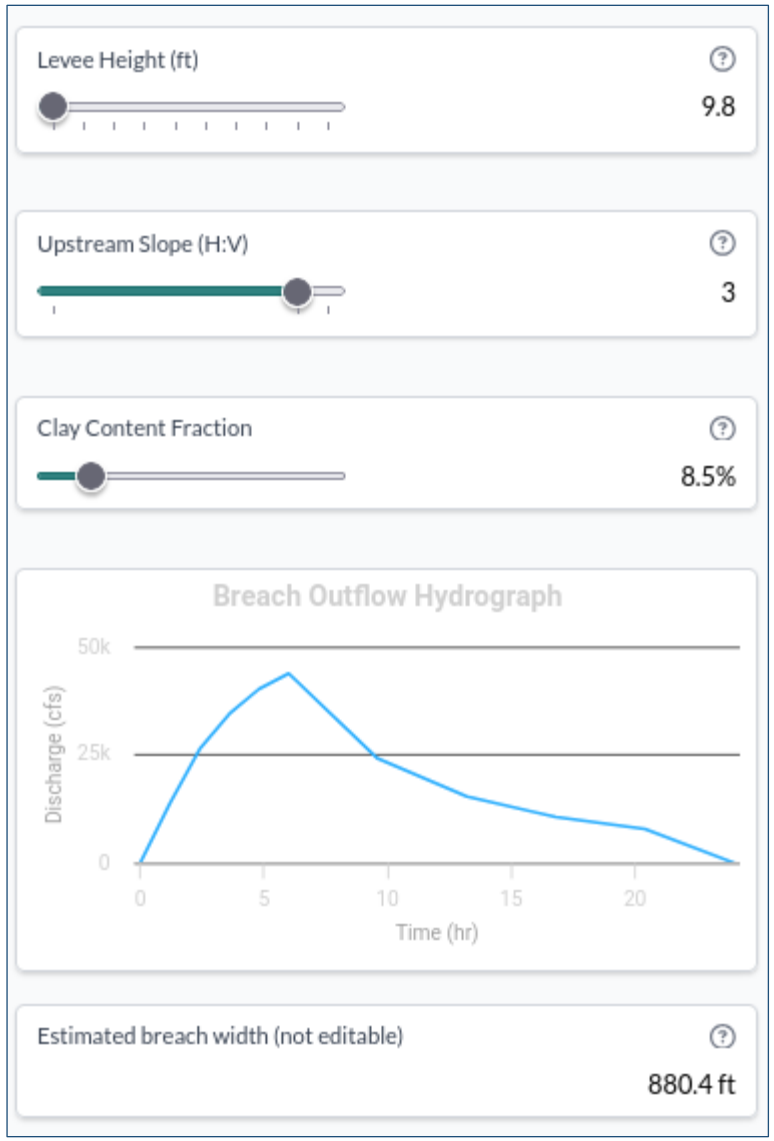
Here we see the “Automatic” Hydrograph Mode which, as mentioned earlier, utilizes an Artificial Neural Network (ANN) in order to estimate the breach discharge hydrograph. Here we can use the slider bars to adjust the levee height, upstream slope and clay content fraction values that serve as inputs to the ANN.



ANN input slider bar for Automatic Hydrograph Mode

Here is a closer look at the slider inputs for the trained ANN and the resulting breach inflow hydrograph. Note that the hydrograph and the estimated breach width values change in real-time as the sliders are adjusted. Additionally, the hydrograph will report an error if the selected clay content fraction percentage will result in a no-breach condition.





2.5 Breach Conditions

Failure Conditions

Structure Name:	Levee 1
Structure Type:	levee
Failure Mode:	Total Breach
Breach Width (ft):	2015.3
Breach Location (Latitude/Longitude):	37.8946707299/-96.6460760709
Levee Hydrograph Mode:	Automatic

Automatic Levee Breach Hydrograph Parameters

Soil Record ID:	813
Soil Erodibility (cm³/(N·s)):	8.65
Critical Shear Stress (Pa):	5.44
Sediment Diameter (mm):	55.70
Porosity:	0.134
Clay Content (%):	18.8
Headcut Coefficient:	0.000601
Cohesion (Pa):	22000

ANN-Generated Breach Hydrograph

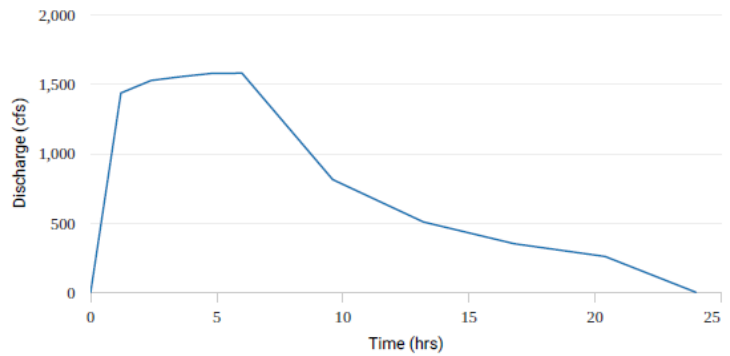


Figure 1: Breach inflow hydrograph for: Levee 1.

Parameters for automatic ANN-generated breach hydrograph are described in detail in the results report.

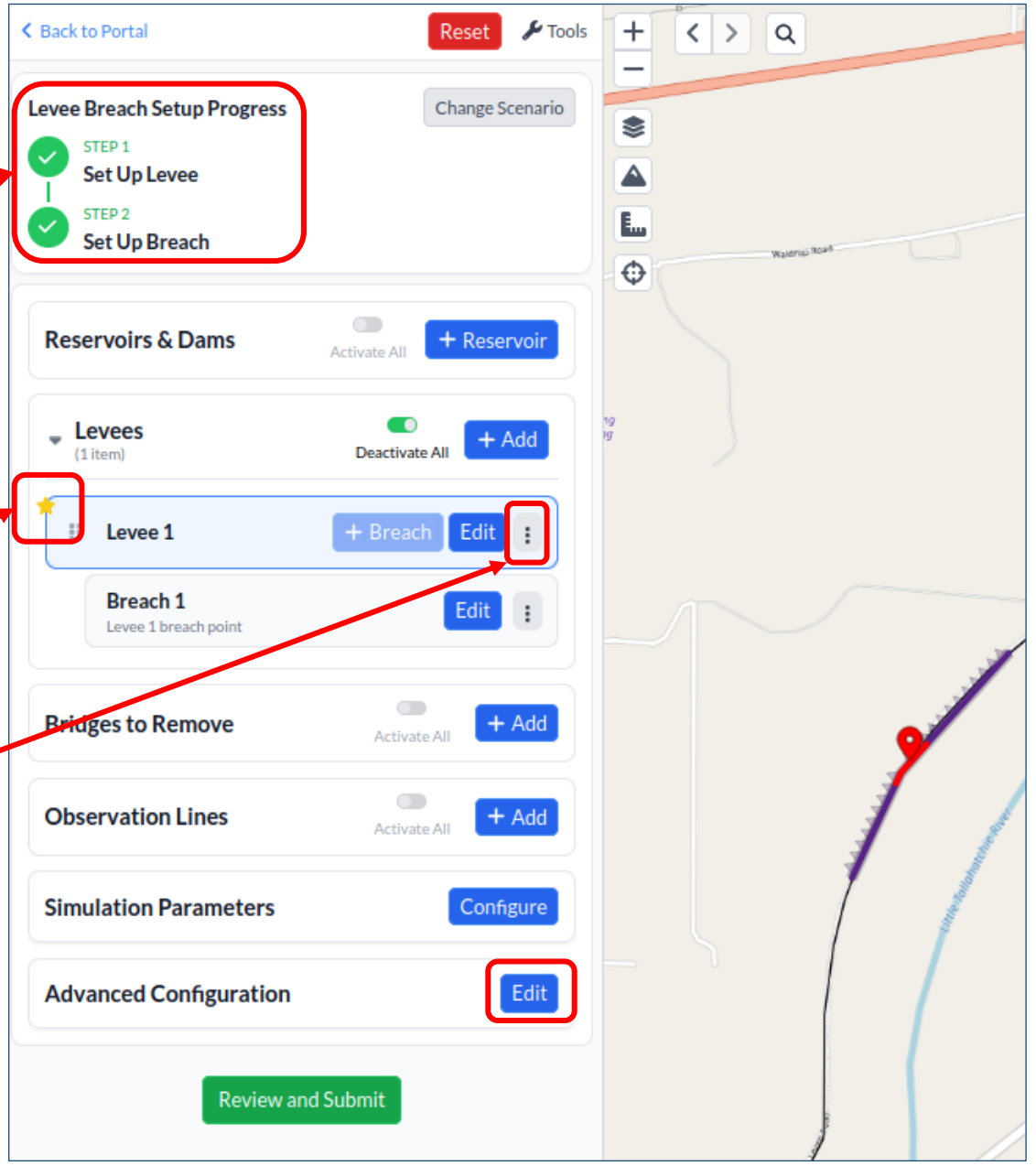
Finally, we may click the “Done” button and get ready to submit the job for processing. But first, let’s take a look at the “Advanced Configuration” options by clicking the “Edit” button in that element.

Everything checks out!

Note that, with the addition of levee breaches in version 4.0, it is necessary to specify the “main” breach which becomes the focus of reporting downstream distance and other metrics in the PDF report generation.

This levee is designated as the “main” focus of breach reporting

Use the “three dot” menu of an element in order to designate a structure as the “main” item.

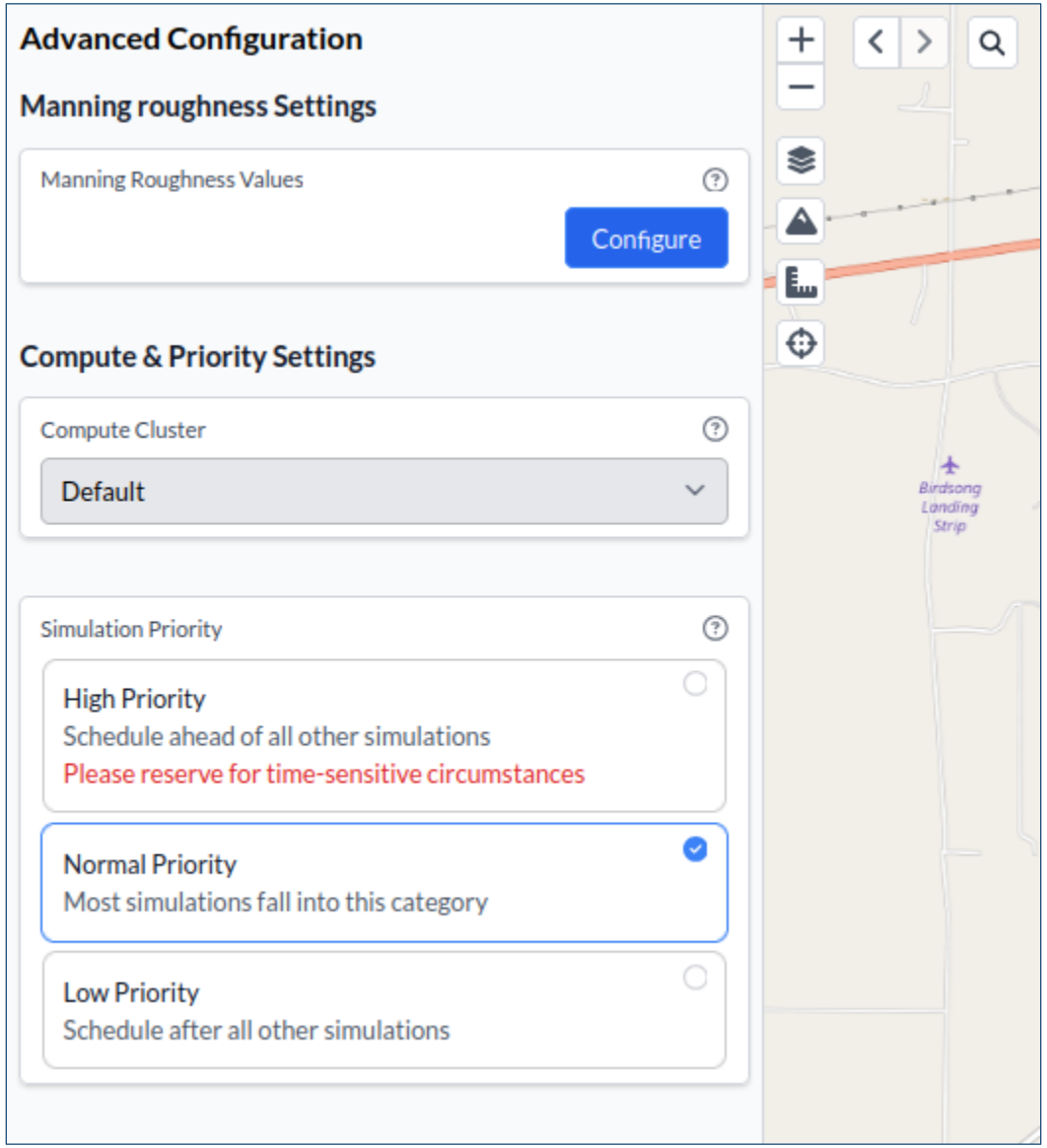


Here we have the option to edit ndividual Manning Roughness values.

In addition, there are options for compute and priority settings. Here we can designate which compute cluster to use, depending on what clusters are available to us as a member of our group(s).

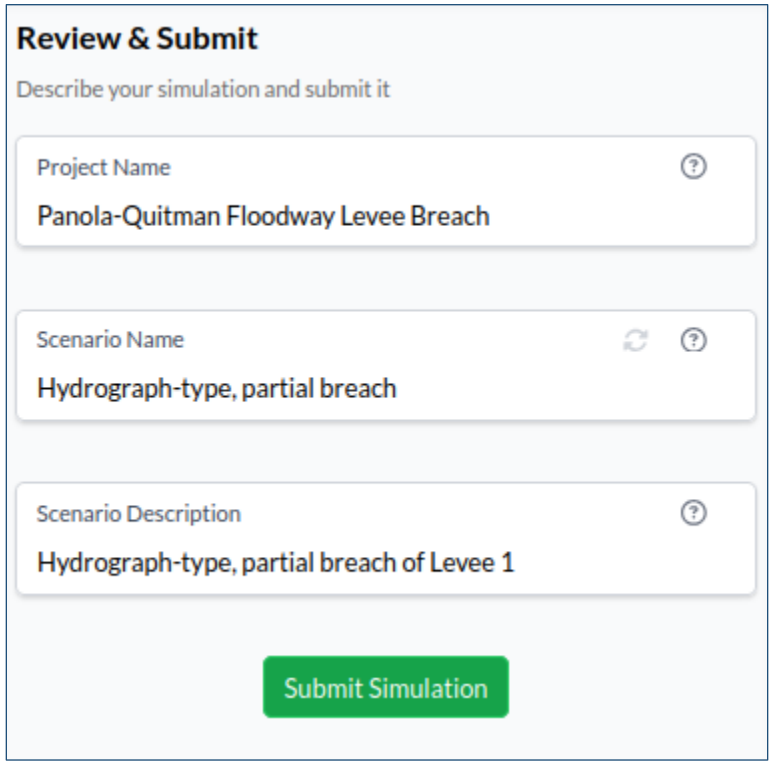
The priority setting determines the order in which simulations are scheduled to run. Simulations from higher priority levels are scheduled before any from levels below. Please be be mindful of limited system resources when requesting high priority.

Click the “Done” button to exit this dialog, then click the “Review and Submit” button to move on to the final step.



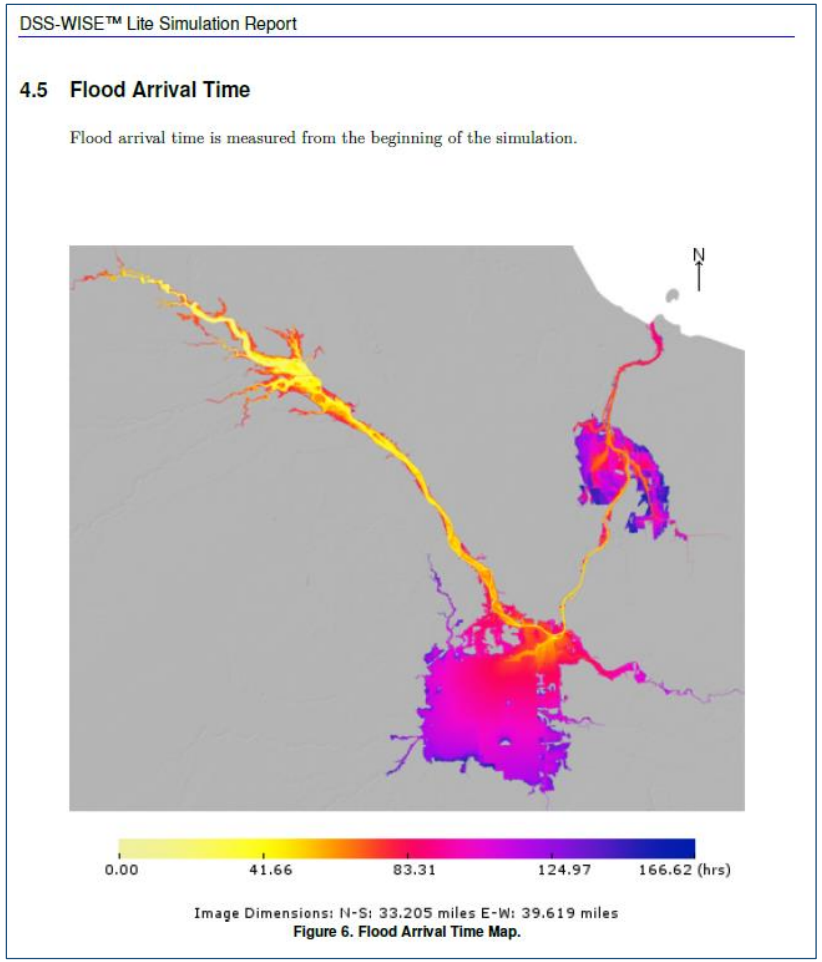
Before final submission, we are given the opportunity to provide a proper project name as well as detailed scenario descriptions.

It is useful to be as descriptive as possible here, since these fields may be used in the future for search terms on the “Simulations” page. This is especially relevant when searching for different scenarios within the same project.

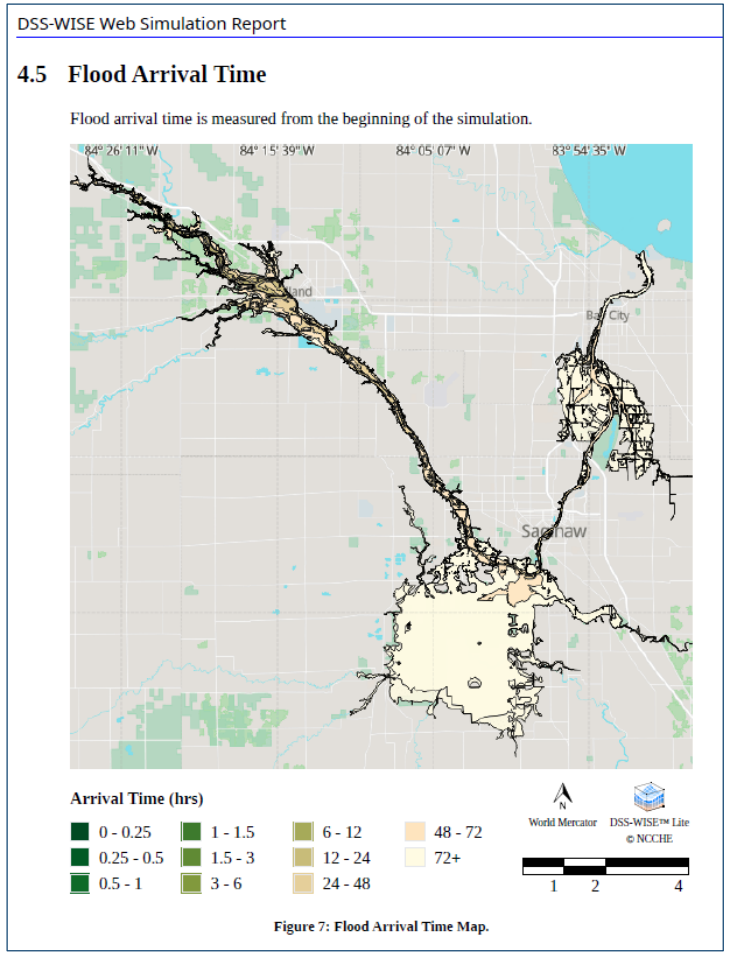


Section 5: Results

Much of the new development work for version 4.0 has been related to the production of updated simulation report map images. The following are some examples from this effort.



Old Flood Arrival Time map



New Flood Arrival Time map

DSS-WISE™ Lite Simulation Report

4.4 Maximum Flood Depth

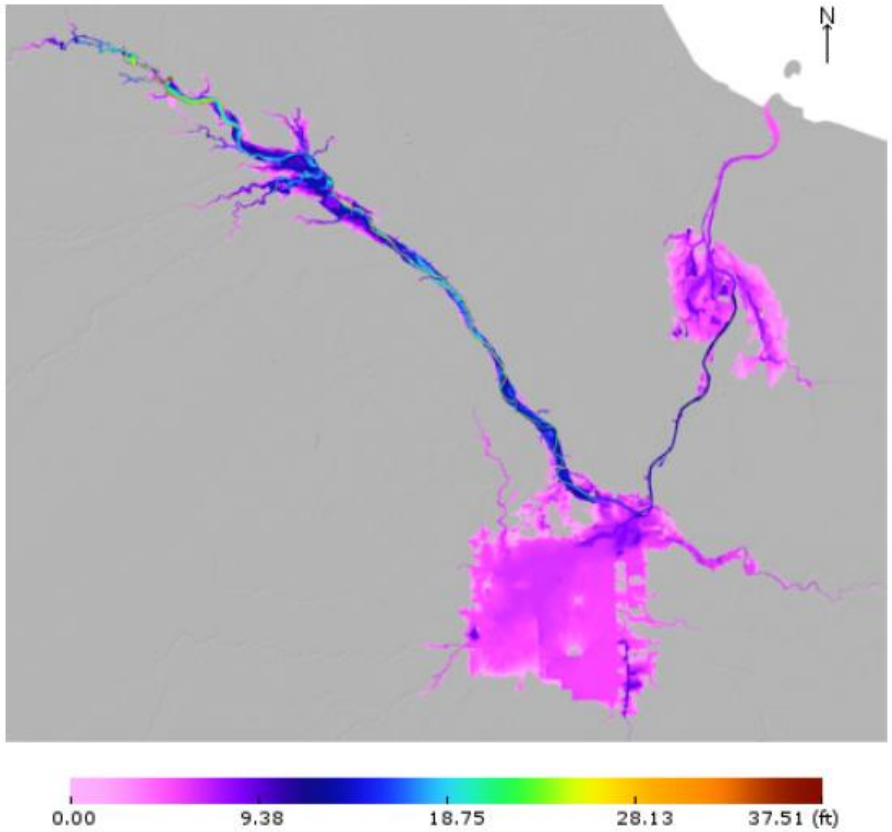


Image Dimensions: N-S: 33.205 miles E-W: 39.619 miles

Figure 5. Maximum Flood Depth Map.

Old Maximum Flood Time map

DSS-WISE Web Simulation Report

4.4 Maximum Flood Depth

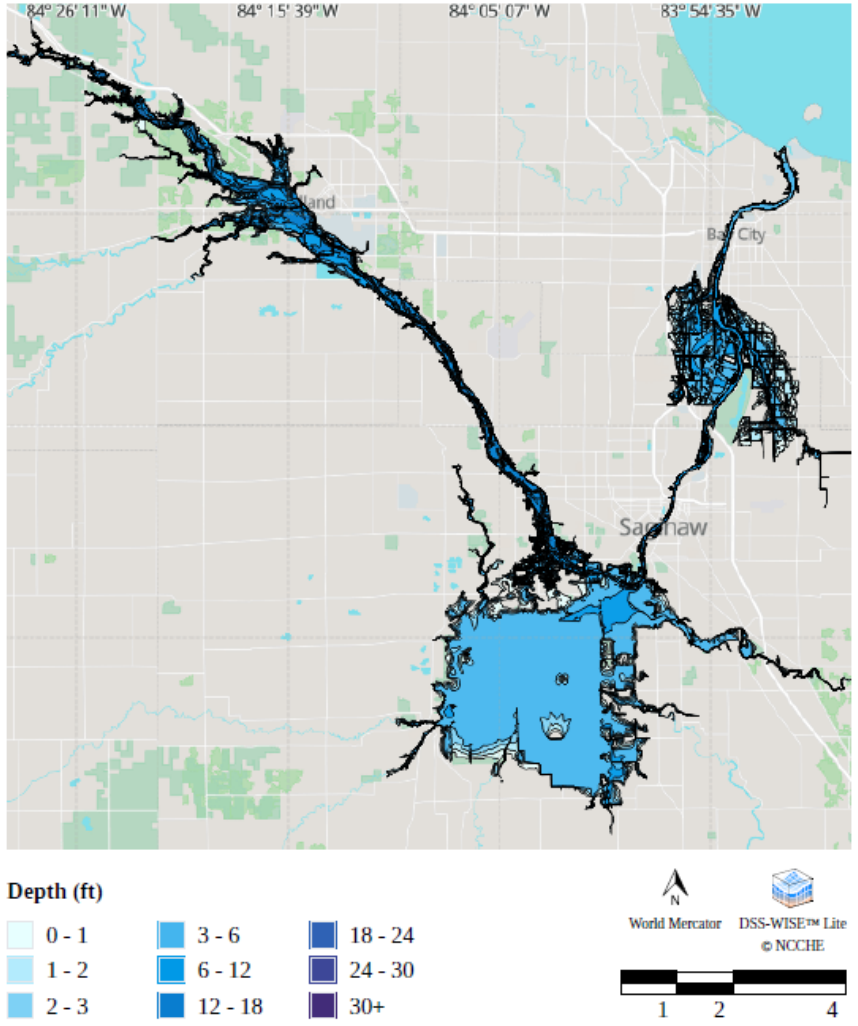
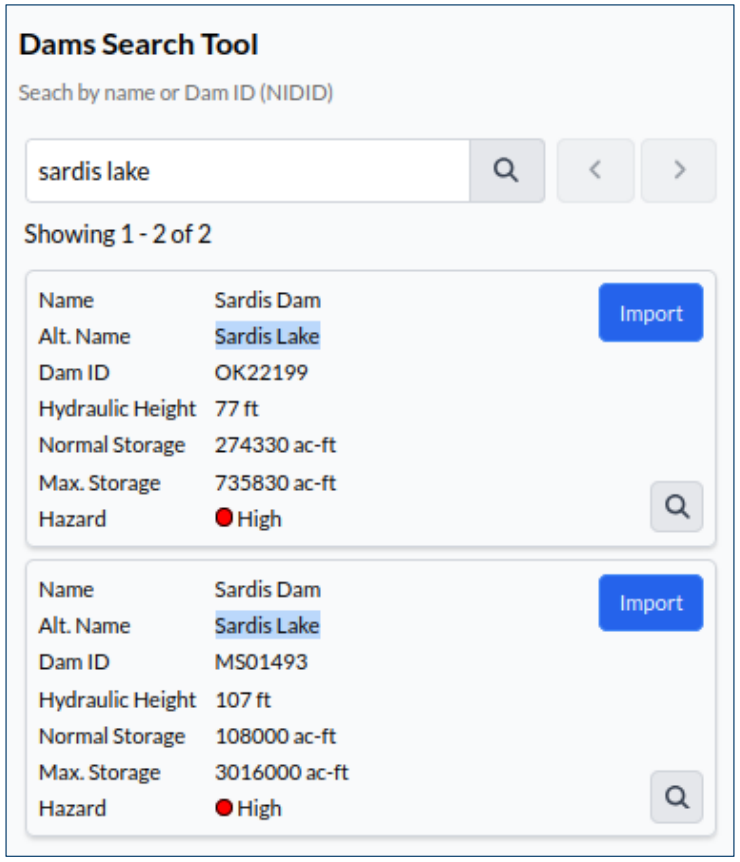


Figure 6: Maximum Flood Depth Map.

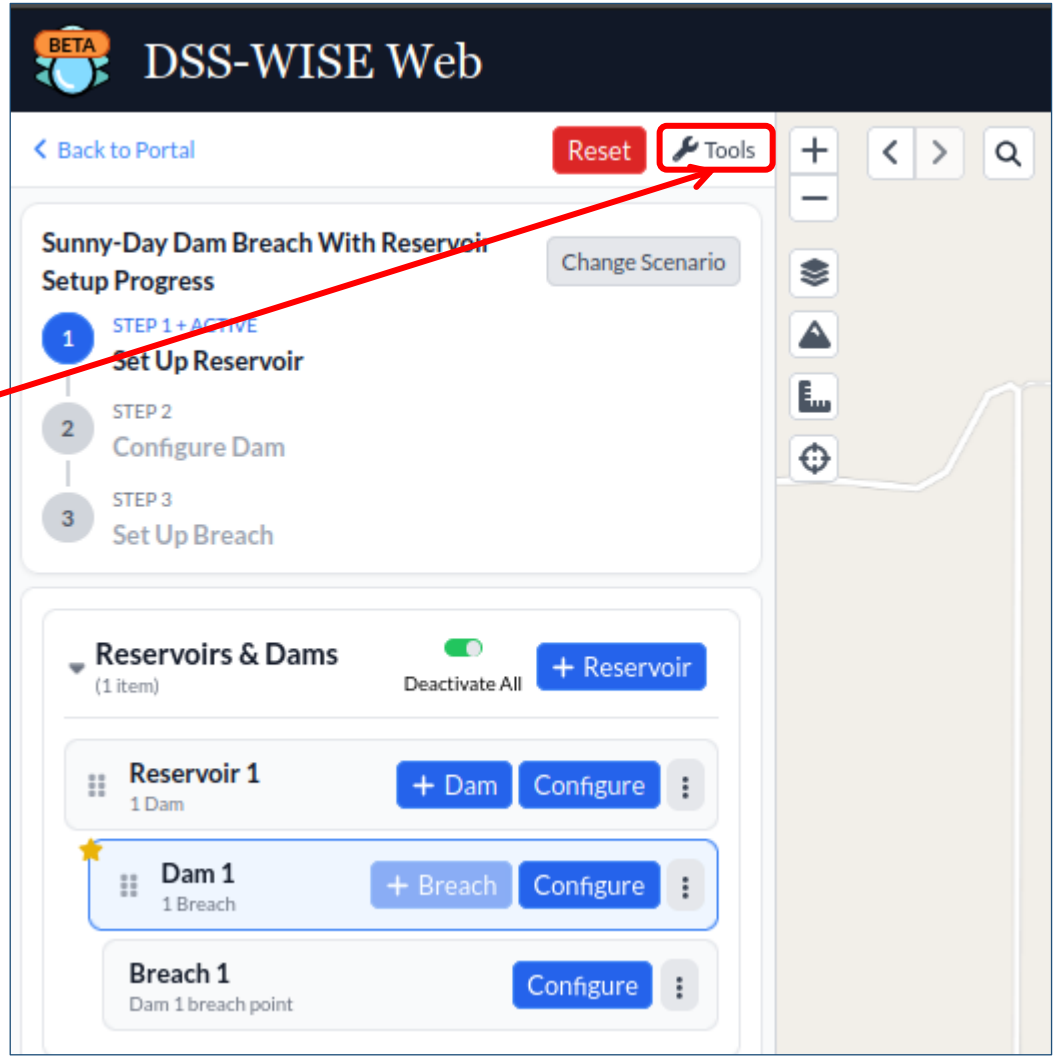
New Maximum Flood Time map

The “Tools” menu button is available at any time during the Scenario setup process.

This menu includes an improved dams search tool which now searches both the dam name and the alternative name (usually the reservoir name) fields, as well as the NIDID.



Tools Menu



Contact Information

- **Technical questions:** Please contact the DSS-WISE Web support team at admin@dsswiseweb.ncche.olemiss.edu .
- **Administrative questions:** Please contact the Project PI, Dr. Mohammad Al-Hamdan (Director of NCCHE and Professor of Civil Engineering), at alhamdan@ncche.olemiss.edu.

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