



DSS-WISE™ HCOM: ASSESSMENT OF HUMAN CONSEQUENCES OF DAM-BREAK FLOODS

Release Date:
January 23, 2019

DEVELOPED, OPERATED AND MAINTAINED BY
NATIONAL CENTER FOR COMPUTATIONAL HYDROSCIENCE AND ENGINEERING
THE UNIVERSITY OF MISSISSIPPI

for



FEMA



What is DSS-WISE HCOM?

DSS-WISE HCOM is an analytical module for assessing human consequences of dam-break floods. It is provided under DSS-WISE Web portal as a post-processing companion module for web-based automated dam-break analysis tool DSS-WISE Lite. **DSS-WISE HCOM does not require any additional input from the user.** When user clicks on a button in Status and Results page, DSS-WISE HCOM uses the results provided by DSS-WISE Lite and population data from 2010 census and LandScan USA nighttime and daytime population data by Oak Ridge National Laboratory (ORNL) to provide four types of analysis:

1. Flood Hazard Mapping for humans
 - a) Flood hazard mapping for population caught outdoors
 - b) Flood hazard mapping for population caught indoors

1. Mapping of Potentially Lethal Flood Zones (PLFZ) for humans
 - a) PLFZ for children
 - b) PLFZ for adults

3. Analysis of the evolution of inundation areas by hazard classes

4. Analysis of Population at Risk (PAR) numbers by interfacing results from DSS-WISE Lite with population data
 - a) Nighttime PAR using LandScan USA nighttime population
 - b) Daytime PAR using LandScan USA daytime population
 - c) PAR analysis using 2010 census block data

What Are the Results Files Generated by DSS-WISE HCOM?

DSS-WISE HCOM produces a rich results package containing three types of results files:

1. a PDF report with text, tables and maps presenting a summary of the results produced by DSS-WISE HCOM
2. a Microsoft Excel file containing the following analysis results
 - a) Project Summary
 - b) Hazard Categories
 - c) Tabular data and stacked bar chart showing evolution of inundation area as a function of both time and flood hazard category
 - d) Tabular data and stacked bar chart showing evolution of nighttime PAR as a function of both time and flood hazard category
 - e) Tabular data and stacked bar chart showing evolution of daytime PAR as a function of both time and flood hazard category
 - f) Tabular data for all 2010 census blocks completely or partially affected by the inundation

What Are the Results Files Generated by DSS-WISE HCOM? (continued)

3. a series of shape files as listed below
 - a) ESRI shapefile of polygon type containing the polygons of flood hazard categories for people caught outdoors.
 - b) ESRI shapefile of polygon type containing the polygons of flood hazard categories for people caught indoors.
 - c) ESRI shapefile of polygon type containing the polygons of potentially lethal flood zones (PLFZs) for adults and children.
 - d) ESRI shapefile of polygon type containing the polygons of nighttime population density computed from LandScan USA
 - e) ESRI shapefile of polygon type containing the polygons of daytime population density computed from LandScan USA
 - f) ESRI shapefile of polygon type containing the 2010 census block polygons completely or partially filled by the inundation along with computed statistics of flood parameters within each area.

What Kind of Input Data is Needed?

DSS-WISE HCOM requires the results of a successful DSS-WISE Lite simulation launched on or after **January 21, 2019**. These simulations contain various additional results files that are used by DSS-WISE HCOM. Thus, although DSS-WISE HCOM is released on **January 23, 2019**, users should be able to go back and launch DSS-WISE HCOM analysis for their simulations on or after **January 21, 2019**.

No other input data is needed. The 2010 census data at the census block level and the gridded nighttime and daytime population data needed for the PAR analysis are stored in the DSS-WISE Web system.

How Do I Launch a DSS-WISE HCOM Analysis?

DSS-WISE Lite Analysis is launched from the new version of the status and results page, which has been released together with the DSS-WISE HCOM on January 23, 2019. For successful simulations launched on or after **January 21, 2019**, the Status and Results page displays a one click button (“Calculate HCOM”) to launch DSS-WISE HCOM analysis. If the button is not displayed, the DSS-WISE HCOM analysis cannot be launched for that simulation.

DSS-WISE HCOM analysis can only be launched once for a given DSS-WISE Lite simulation. The results are made available for download as a zip file. However, it is also possible to list and download the individual files from the status and results page.

Step by step instructions for the new status and results page are provided as part of this document. These instructions also explain how to launch DSS-WISE HCOM and how to download the results.

Updated Names of Files Generated by DSS-WISE Lite

The naming convention for all files generated by DSS-WISE Lite has been changed to be more consistent.

No	File Name	Description
1	xxxx_DSS-WISE_Lite_Final_Report.pdf	Automatically generated report in PDF format
2	xxxx_Inundation_Extent_3_mi.shp	ESRI shapefile of polygon type of the inundation extent when flood front reaches 3 mi
3	xxxx_Inundation_Extent_7_mi.shp	ESRI shapefile of polygon type of the inundation extent when flood front reaches 7 mi (if flood front reaches 7 mi)
4	xxxx_Inundation_Extent_15_mi.shp	ESRI shapefile of polygon type of the inundation extent when flood front reaches 15 mi (if flood front reaches 15 mi)
5	xxxx_Inundation_Extent_60_mi.shp	ESRI shapefile of polygon type of the inundation extent when flood front reaches 60 mi (if flood front reaches 60 mi)
6	xxxx_Flood_Arrival_Time_hr_polygons_upto_final.shp	ESRI shapefile of polygon type of the flood arrival times at predefined times
7	xxxx_Hmax_ft_polygons_upto_final.shp	ESRI shapefile of polygon type of the flood depths at predefined times
8	xxxx_DEM_ft.tif	Raster file of computational mesh with elevations in ft.
9	xxxx_Hmax_ft_upto_final.tif	Raster file of maximum flood depth D_{max} in ft.
10	xxxx_Arrival_Time_hr_upto_final.tif	Raster file of flood arrival time in hrs
11	xxxx_Input_Shapes.zip xxxx_breachpoint.shp xxxx_reservoirs.shp xxxx_structures.shp xxxx_extendedstructures.shp xxxx_bridges.shp xxxx_observationlines.shp	Collection of ESRI shapefiles used in scenario definition. <ul style="list-style-type: none"> • Location of breach point (point type) • Location of breach point (point type) • Crest lines of structures (polyline type) • Corrections to structure crest lines, if any (polyline type) • Location of bridge points (point type) • Location of observation lines (polyline type)
12	xxxx_Observation_Lines.zip OLIN_0000001.csv OLIN_0000011.csv	Contains csv ¹ files of the hydrographs extracted at observation lines (up to 10 user defined and one automatically defined) <ul style="list-style-type: none"> • csv file for observation line no 1 • • csv file for the last observation line
13	xxxx_Inundation_Extent_Final_yy.yyy_mi.shp	ESRI shapefile of polygon type of the maximum inundation extent
14	xxxx_Inundation_Extent_final_Final_yy.yyy_mi.kmz	KMZ file of the maximum inundation extent for viewing on Google Earth
xxxx	Job ID number	
yy.yyy	Maximum distance achieved by the flood front	

(1) Comma separated value file

New Results Files Generated by DSS-WISE Lite

Seven additional files have been added to the final results package.

No	File Name	Description
15	xxxx_DVmax_ft2ps_upto_final.tif	Magnitude of maximum specific discharge DV_{max} in ft ² /s
16	xxxx_DVmax_Arrival_Time_hr_upto_final.tif	Raster file of arrival time of DV_{max} in hrs
17	xxxx_Vmax_ftps_upto_final.tif	Raster file of magnitude of maximum velocity V_{max} in ft/s
18	xxxx_H_ft_at_final.tif	Raster file of flood depths (ft.) at the end of the simulation
19	xxxx_DVmax_ft2ps_upto_final.shp	ESRI shapefile of polygon type for the magnitude of maximum specific discharge DV_{max} in ft ² /s
20	xxxx_DVmax_Arrival_Time_hr_upto_final.shp	ESRI shapefile of polygon type for the arrival time of DV_{max} in hrs
21	xxxx_Vmax_ftps_upto_final.shp	ESRI shapefile of polygon type for the magnitude of maximum velocity V_{max} in ft/s
xxxx	Job ID number	

IMPORTANT NEW FEATURE:

The Status and Results page now allows downloading the entire results package as a single zipped file.

New Status and Results Page

The status and results page has been completely redesigned and improved:

1. The page is now dynamically constructed based on the type of the simulation and the stages of the work progress. Appropriate fields are displayed on the page based on the context by taking into account various status variables such as the type of simulation, work progress, availability of the information, etc.
2. More base layers and overlay layers are provided in a box to the left of the map
3. The box containing base and overlay layers can be hidden (by clicking “x” on the upper right hand corner”) to view the map in a larger area
4. The map area now displays the overlay layers of
 - Observation Lines,
 - Bridge Points,
 - Breached Width,
 - Impounding Structure,
 - Impounding Structure Base,
 - Filled Reservoir, and
 - Simulation Domain Extentin addition to Inundation Extent and Breach Center.

The screenshot displays the 'Status & Results' page for simulation #13111. The interface includes a map with a layer control panel on the left, simulation progress indicators, and a list of downloadable results.

Base Layers: OpenStreetMap, Mapbox Streets, Mapbox Light, Mapbox Outdoors, Mapbox Dark, ESRI World Imagery, Mapbox Satellite, Mapbox Satellite Streets, Mapbox Elevation Encoded, Bing Satellite, NCCHE Modified USGS DEM, Blank.

Overlay Layers: Observation Lines, Bridge Points.

Simulation Progress:

- Human Consequences: Finished (Jan 22, 2019 9:51:46 pm) @ 12 min
- Simulation: Finished (Jan 22, 2019 9:05:17 pm) @ 14 min
- Data Prep: Finished (Jan 22, 2019 9:02:21 pm) @ less than a minute

Simulation Details:

Project name	Scenario name	Scenario description	Scenario Properties
Sabalo Lake Dam	Sunny Day Partial Breach	Sunny day breach: Top of the Dam, Partial Failure.	Cell size: 20 ft Breach type: Partial breach Breach width: 300 ft Breach formation time: 0.3 hr Breach elevation: 805.9 ft Failure elevation: 852 ft Failure volume: 7,745 ac-ft

Downloads:

- Simulation Results Package (10.30 MB)
- Final Report (1.42 MB)
- Raster Files (7.63 MB)
- Maximum Depth Polygons (247.29 KB)
- Arrival Time Polygons (4.53 MB)
- Maximum Specific Discharge Polygons (267.51 KB)
- Maximum Specific Discharge Arrival Time Polygons (94.59 KB)
- Maximum Velocity Polygons (139.96 KB)
- Inundation Extent at 3 miles (33.52 KB)
- Inundation Extent at 7 miles (20.66 KB)
- Final Inundation Extent (29.67 KB)
- Observation Lines (13.39 KB)
- Inundation Extent KMZ File (63.52 KB)
- Input Features (5.02 KB)
- Human Consequences Results Package (17.33 MB)
- HCOM Final Report (17.46 MB)
- HCOM PAR Analysis Results (43.33 KB)
- HCOM Potentially Lethal Flood Zones (77.42 KB)
- HCOM Hazard Level to People Indoors (212.14 KB)
- HCOM Hazard Level to People Outdoors (225.45 KB)
- HCOM PAR by Census Blocks (129.92 KB)
- HCOM Nighttime Population Density (7.9 KB)
- HCOM Daytime Population Density (4.62 KB)

New Status and Results Page (continued)

5. Separate fields are provided to provide information on input data preparation, DSS-WISE Lite simulation and DSS-WISE HCOM simulation

- Human Consequences field provides information on the progress of DSS-WISE HCOM. At the end of the simulations some results (nighttime PAR, daytime PAR, inundated area, and number of counties involved) are summarized for quick reference.
- Simulation field provides information on the progress of DSS-WISE Lite simulation. It displays slide bars of distance achieved and time achieved. A separate display shows dynamically the released and remaining reservoir volumes.
- Data Prep field provides information on input data. It displays progress of the work. At the end, it gives the percentage of reservoir volume match.

6. Simulation Details (such as Project name, Scenario name, Scenario description, and Scenario properties) are summarized in a separate field.

7. DSS-WISE Lite results can be downloaded in a single zip file. However, it is also possible to display the list of all files and download them individually.

8. DSS-WISE HCOM results can be downloaded in a single zip file. However, it is also possible to display the list of all files and download them individually.

The screenshot displays the DSS-WISE Web interface. At the top, it shows the status 'Status & Results' and the user 'DSSWISE-WEB ADMIN'. The main content area is divided into several sections:

- Base Layers:** A map showing the simulation area with various layers like OpenStreetMap, Mapbox Streets, and Mapbox Outdoors.
- Overlay Layers:** A list of layers including Observation Lines and Bridge Points.
- Human Consequences: Finished:** Shows simulation progress for Human Consequences with metrics like Nighttime PAR (229), Daytime PAR (93), and Inundated Area (1,254 acres).
- Simulation: Finished:** Shows simulation progress with metrics like Distance Achieved (10.16 miles), Time Achieved (1:09:07), and Reservoir Volume (88.1% Released, 11.9% Remaining).
- Data Prep: Finished:** Shows data preparation progress with a metric like Filled reservoir volume match: 100%.
- Simulation Details:** A table of simulation parameters including Project name (Selsco Lake Dam), Scenario name (Sunny Day Partial Breach), Scenario description (Sunny day breach, Top of the Dam, Partial Failure), Cell size (20 ft), Breach type (Partial breach), Breach width (300 ft), Breach formation time (0.3 hr), Breach invert elevation (805.9 ft), Failure elevation (852.9 ft), and Failure volume (7,745 ac-ft).
- Downloads:** A list of downloadable files and packages, including Simulation Results Package, Final Report, Raster Files, Maximum Depth Polygons, Arrival Time Polygons, Maximum Specific Discharge Polygons, Maximum Specific Discharge Arrival Time Polygons, Maximum Velocity Polygons, Inundation Extent at 3 miles, Inundation Extent at 7 miles, Final Inundation Extent, Observation Lines, Inundation Extent KMZ File, Input Features, Human Consequences Results Package, HCOM Final Report, HCOM PAR Analysis Results, HCOM Potentially Lethal Flood Zones, HCOM Hazard Level to People Indoors, HCOM Hazard Level to People Outdoors, HCOM PAR by Census Blocks, HCOM Nighttime Population Density, and HCOM Daytime Population Density.

Red arrows point from the text in the left column to the corresponding sections in the screenshot. The footer of the interface includes 'DSS-WISE™ Web', 'Help', 'FAQ', 'Documentation', 'Contact', 'Terms and Conditions', 'Privacy', and '©2019 UH NCEM'.

Status and Results Page Immediately After Submitting a Simulation

Click on the "x" to hide the left partition to display the map over the entire width.

User name is displayed. Clicking on the arrow displays a button that allows to log out.

Log Out

The simulation has just been launched. The input data is being prepared automatically.

There are no results. The map shows simulation set up details. Numerous base layers and overlay layers are available.

Data Prep field informs that the simulation is running. The start date and time and the direction since the beginning are indicated.

Simulation Details Field displays selected simulation setup data provided by user for convenience.

Download field is empty because there are no results to display yet.

Large number of Base Layers are now available. Only one base layer can be displayed at any time by clicking on the corresponding radio button.

A large number of Overlay Layers can be displayed on the map. Multiple overlay layers can be displayed together. The check box can be clicked to turn on and off a layer.

Base Layers

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points
- Inundation Extent
- Breach Center
- Reservoir Point
- Breached Width
- Impounding Structures
- Impounding Structure Base
- Footprints
- Filled Reservoir
- Simulation Domain Extent

General information box with various links

Status & Results

Home Portal About Help DSSWISE-WEB ADMIN

#13111 • SC00024 Jan 22, 2019 9:30:16 pm DSSWISE-WEB ADMIN UNITED STATES

Base Layers

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points

Data Prep: Running

Jan 22, 2019 9:30:21 pm less than a minute

Simulation Details

Project name Saluda Lake Dam	Scenario Properties
Scenario name Sunny Day Partial Breach	Cell size: 20 ft
Scenario description Sunny day breach. Top of the Dam. Partial Failure.	Breach type: Partial breach
	Breach width: 300 ft
	Breach formation time: 0.3 hr
	Breach invert elevation: 805.9 ft
	Failure elevation: 852 ft
	Failure volume: 7,745 ac-ft

Downloads

No results

DSS-WISE™ Web

Help
FAQ
Documentation

Contact
Terms and Conditions
Privacy

©2019 UM-NCCHE



Status and Results Page After Completion of Input Data Preparation

Simulation field has been added to the page. The field displays the date and time of the beginning of the simulation. It also indicates that the simulation has begun less than a minute ago. Estimated time to completion is provided as 37 minutes. The field displays the bars for

- **“Distance Achieved”**
Length of the bar corresponds to the downstream distance specified by the user. Distance already achieved is shown proportionally in color.
- **“Time achieved”**
Length of the bar corresponds to the simulation duration specified by the user. Simulation time already achieved is shown proportionally in color.
- **“Reservoir Volume”**
The length of the vertical bar represents the failure pool volume. Released and remaining volumes are shown as red and blue bars.

The number of compute cells correspond to number of wet cells that are being computed.

The user can click on the terminate simulation bar to end the simulation any time.

Information on status and results page is updated automatically every 5 minutes. The yellow circle shows the time to next update

- 5.00 min
- 3.75 min
- 2.50 min
- 0.75 min

The automated input data preparation has been completed. Simulation is running. The contents of the page will be updated every 5 minutes.

Simulation has already produced results. The flood inundation extent is displayed. The inundation extent will be automatically updated every five minutes

Input data preparation has been successfully completed in less than a minute. The procedure for the estimation of the unknown bathymetry was able to match 100% of the user specified failure pool volume. This is an important number. If this number is significantly smaller than 100%, the user should check the input data. There may be two causes:

1. an error/inconsistency in the input data provided by the user and/or
2. the data provided by the user is not in agreement with the base layer DEM.

Downloads field displays the intermediate inundation extent when the flood front reached a distance of 3 miles from the breach point. Click blue icon to download.

Status and Results Page During Simulation

Simulation field has progressed. The contents of the Simulation field have been updated.

- The distance covered is 7 miles
- 0.23 days of flood time have been completed thus far
- 78.2% of the initial failure pool volume has been released from the breach. 21.8% of the initial volume is still in the reservoir.
- Inundation area has expanded. The number of inundated cells that are computed has increased to 140,576.
- The simulation has started 7 minutes ago, and
- The time to completion is now estimated as 1.1 hours.

The screenshot displays the 'Status & Results' page for a simulation. At the top, it shows the project ID '#13111 • SC00024' and the start time 'Jan 22, 2019 9:30:16 pm'. The user is logged in as 'DSSWISE-WEB ADMIN' in the 'UNITED STATES'. A map shows the simulation area with various layers like 'OpenStreetMap' and 'Mapbox Streets'. Below the map, the simulation status is 'Running' since 'Jan 22, 2019 9:30:57 pm' for '7 mins' with '1.1 hrs estimated remaining'. Progress bars show 'Distance Achieved' at 7 miles and 'Time Achieved' at 0.23 days. Reservoir volume is 78.2% released and 21.8% remaining. A 'Data Prep: Finished' section shows 'Filled reservoir volume match: 100%'. The 'Simulation Details' section lists project name 'Saluda Lake Dam', scenario 'Sunny Day Partial Breach', and scenario description 'Sunny day breach. Top of the Dam. Partial Failure.'. Scenario properties include cell size (20 ft), breach type (Partial breach), breach width (300 ft), breach formation time (0.3 hr), breach invert elevation (805.9 ft), failure elevation (852 ft), and failure volume (7,745 ac-ft). The 'Downloads' section lists two files: 'Inundation Extent at 3 miles' (13.83 kB) and 'Inundation Extent at 7 miles' (28.86 kB), both as shapefiles. The footer contains 'DSS-WISE™ Web', 'Help', 'FAQ', 'Documentation', 'Contact', 'Terms and Conditions', 'Privacy', and '©2019 UM-NCCHC'.

The simulation is still running. The contents of the page are updated every 5 minutes.

The user can also update the web page any time using the controls of the browser he/she is using.

Downloads field displays the intermediate inundation extents when the flood front reached a distance of 3 miles and 7 miles from the breach point. Click on the corresponding blue icon to download the file.

Status and Results Page After DSS-WISE Lite Simulation is Successfully Completed

NEW

At the end of the DSS-WISE Lite simulation a new field, entitled **“Human Consequences”** has been added onto the page for launching DSS-WISE HCOM.

Clicking on the blue **“Calculate HCOM”** button launches DSS-WISE HCOM to assess human consequences of the flood computed by DSS-WISE Lite.

Human Consequences: Available

Calculate HCOM

Downloads field display the final results package as a zipped file. By clicking the blue icon all results can be downloaded as a single zipped file. Clicking on the **“List”** button displays the list of results files in the package. The listed files can be downloaded individually.

The screenshot displays the 'Status & Results' interface for a simulation. At the top, it shows the project ID '#131111 • SC00024' and the date 'Jan 22, 2019 9:30:16 pm'. The main area features a map of the Greenville, SC area with a blue line indicating the simulation path. Below the map, there are three summary cards: 'Human Consequences: Available' with a 'Calculate HCOM' button; 'Simulation: Finished' with a progress bar for 'Distance Achieved' (10.16 miles) and 'Time Achieved' (0.67 days); and 'Data Prep: Finished' with a 'Filled reservoir volume match: 100%' indicator. A 'Simulation Details' section lists project and scenario information, and a 'Downloads' section shows a 'Simulation Results Package' (10.38 MB) with a 'List' button and a download icon.

Simulation: Finished	Data Prep: Finished
Jan 22, 2019 9:30:57 pm • 14 mins	Jan 22, 2019 9:30:21 pm • less than a minute
Distance Achieved: 10.16 miles	Filled reservoir volume match: 100%
Time Achieved: 0.67 days	
189,327 compute cells	
Reservoir Volume: 88.1% Released, 11.9% Remaining	

DSS-WISE Lite simulation is finished. The system is ready for launching DSS-WISE HCOM simulation.

Since the simulation is completed, the map displays the maximum inundation map.

Simulation is finished. The contents of the Simulation field have been updated to provide final statistics:

- The distance covered is 10.16 miles, which is a little longer than the user specific downstream distance.
- Since the flood tip reached the downstream distance specified by the user, the simulation ended after computing 0.67 days of flood time.
- 88.1% of the initial failure pool volume has been released from the breach. 11.9% of the initial volume is still in the reservoir. The user should check if this remaining volume is expected based on the specified breach invert elevation.
- Maximum number of inundated cells is displayed as 140,576.
- The simulation was completed in 14 minutes.

Status and Results Page After DSS-WISE HCOM Analysis is Launched

DSS-WISE HCOM Analysis has just been launched and occupies the first position in the queue.

Status & Results Home Portal About Help **DSSWISE-WEB ADMIN**

#13111 • SC00024 Jan 22, 2019 9:30:16 pm **DSSWISE-WEB ADMIN** UNITED STATES

Base Layers

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points

Human Consequences: Queued
less than a minute
Queue position: 1

Simulation: Finished
Jan 22, 2019 9:30:57 pm 14 mins

Distance Achieved 10.16 miles	Reservoir Volume 88.1% Released 11.9% Remaining
---	--

Data Prep: Finished
Jan 22, 2019 9:30:21 pm less than a minute
Filled reservoir volume match: 100%

Simulation Details

Project name Saluda Lake Dam	Scenario Properties
Scenario name Sunny Day Partial Breach	Cell size: 20 ft
Scenario description Sunny day breach. Top of the Dam. Partial Failure.	Breach type: Partial breach
	Breach width: 300 ft
	Breach formation time: 0.3 hr
	Breach invert elevation: 805.9 ft
	Failure elevation: 852 ft
	Failure volume: 7,745 ac-ft

Downloads

Simulation Results Package 10.38 MB
Zipped results package containing final report, shapefiles, gridded raster files, and other outputs

DSS-WISE™ Web

Help Contact Terms and Conditions Privacy
FAQ Documentation

©2019 UM-NCCHC

The user has launched DSS-WISE HCOM by clicking on “Calculate HCOM” button less than a minute ago.

“Human Consequences” field has been updated to indicate that the human consequences analysis is queued. The job has the first position in the queue.

Status and Results Page While DSS-WISE HCOM Analysis is Running

DSS-WISE HCOM Analysis is running.

#13111 • SC00024 Jan 22, 2019 9:30:16 pm

DSSWISE-WEB ADMIN UNITED STATES

Base Layers

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Dark
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHC Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points

Human Consequences: Running
Jan 22, 2019 9:51:46 pm less than a minute

Simulation: Finished
Jan 22, 2019 9:30:57 pm 14 mins

Distance Achieved: 10.16 miles

Reservoir Volume: 88.1% Released, 11.9% Remaining

Data Prep: Finished
Jan 22, 2019 9:30:21 pm less than a minute

Filled reservoir volume match: 100%

Simulation Details

Project name: Saluda Lake Dam

Scenario name: Sunny Day Partial Breach

Scenario description: Sunny day breach. Top of the Dam. Partial Failure.

Scenario Properties

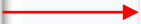
- Cell size: 20 ft
- Breach type: Partial breach
- Breach width: 300 ft
- Breach formation time: 0.3 hr
- Breach invert elevation: 805.9 ft
- Failure elevation: 852 ft
- Failure volume: 7,745 ac-ft

Downloads

Simulation Results Package 10.38 MB
Zipped results package containing final report, shapefiles, gridded raster files, and other outputs

DSS-WISE HCOM analysis has been running less than a minute.

The field has been updated to show the start date and time of the HCOM analysis.



Status and Results Page After DSS-WISE HCOM Analysis is Successfully Completed

DSS-WISE HCOM analysis is successfully completed in 12 minutes.

The field has been updated to highlight some of the key results:

- Nighttime population at risk (PAR) was found to be 229 people based on the LandScan USA gridded population data.
- Daytime population at risk (PAR) was found to be 93 people based on the LandScan USA gridded population data.
- Total inundation area (based on the DSS-WISE Lite simulation reaching 10.16 miles from the breach point) is 1,264 acres.
- The inundation area concerns three counties.

IMPORTANT NOTE: For a given DSS-WISE Lite, the DSS-WISE HCOM analysis can only be launched once. The results remain available for download indefinitely.

Status & Results Home Portal About Help DSSWISE-WEB ADMIN

#13111 • SC00024 Jan 22, 2019 9:30:16 pm DSSWISE-WEB ADMIN UNITED STATES

Base Layers

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points

Human Consequences: Finished
Jan 22, 2019 9:51:46 pm 12 mins

Nighttime PAR:	229
Daytime PAR:	93
Inundated Area:	1,264 acres
South Carolina counties:	3

Simulation: Finished
Jan 22, 2019 9:30:57 pm 14 mins

Distance Achieved	10.16 miles
Time Achieved	0.67 days
Reservoir Volume	88.1% Released
	11.9% Remaining

Data Prep: Finished
Jan 22, 2019 9:30:21 pm less than a minute

Filled reservoir volume match: 100%

Simulation Details

Project name Saluda Lake Dam	Scenario Properties
Scenario name Sunny Day Partial Breach	Cell size: 20 ft
Scenario description Sunny day breach. Top of the Dam. Partial Failure.	Breach type: Partial breach
	Breach width: 300 ft
	Breach formation time: 0.3 hr
	Breach invert elevation: 805.9 ft
	Failure elevation: 852 ft
	Failure volume: 7,745 ac-ft

Downloads

Simulation Results Package 10.38 MB Zipped results package containing final report, shapefiles, gridded raster files, and other outputs	List Download
Human Consequences Results Package 17.33 MB Zipped results package containing final report, shapefiles, gridded raster files, and other outputs	List Download

DSS-WISE™ Web

Help
FAQ
Documentation

Contact
Terms and Conditions
Privacy

©2019 UM-NCCH

DSS-WISE HCOM Analysis is completed.

Since both DSS-WISE Lite and DSS-WISE HCOM runs have been completed, the Status and Results page show the final results and the page is no longer updated every 5 minutes.

Downloads field now display also the final results package for DSS-WISE HCOM as a zipped file. By clicking the blue icon all DSS-WISE HCOM results can be downloaded as a single zipped file. Clicking on the "List" button displays the list of results files in the package. The listed files can be downloaded individually.

Status and Results Page: Hiding Layers Panel to Display a Larger Map

Clicking on "x" hides the layers panel

Map is now displayed over the entire width

To bring back the layers panel, click on this icon

The screenshot shows the 'Status & Results' page for a simulation. The top navigation bar includes 'Home', 'Portal', 'About', 'Help', and a user profile 'DSSWISE-WEB ADMIN'. The main content area features a map of a reservoir area with various overlays. The left sidebar contains a 'Base Layers' panel with a close button 'x' and an 'Overlay Layers' panel with several checked items. Below the map, there are three summary cards: 'Human Consequences: Finished', 'Simulation: Finished', and 'Data Prep: Finished'. A 'Feedback' button is visible on the right side.

Status & Results Home Portal About Help **DSSWISE-WEB ADMIN**

#13111 • SC00024 Jan 22, 2019 9:30:16 pm **DSSWISE-WEB ADMIN** UNITED STATES

Base Layers x

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points
- Inundation Extent
- Breach Center
- Reservoir Point
- Breached Width
- Impounding Structures
- Impounding Structure Base
- Footprints
- Filled Reservoir
- Simulation Domain Extent

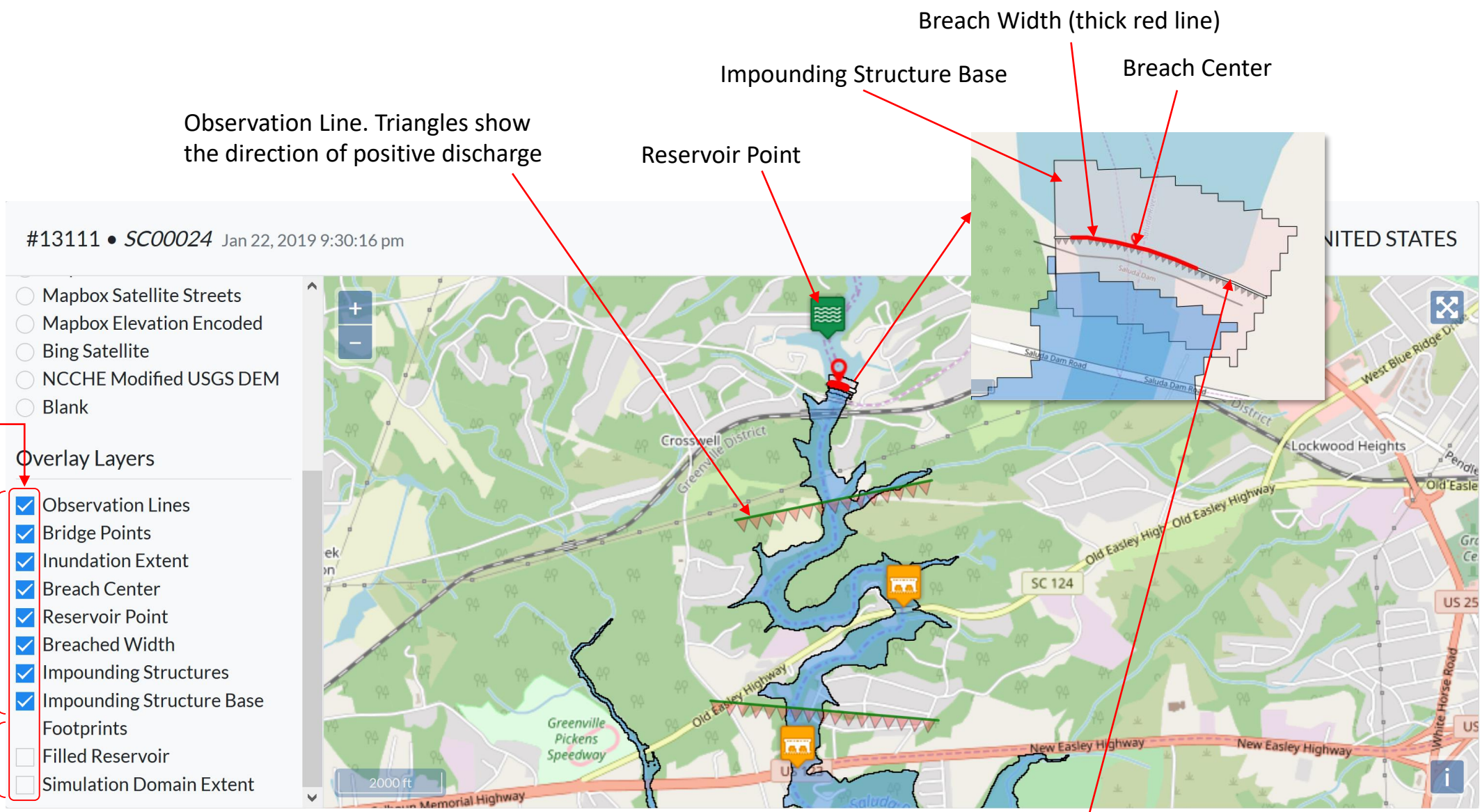
Human Consequences: Finished
Jan 22, 2019 9:51:46 pm ⌚ 12 mins

Simulation: Finished
Jan 22, 2019 9:30:57 pm ⌚ 14 mins

Data Prep: Finished
Jan 22, 2019 9:30:21 pm ⌚ less than a minute

Feedback

Status and Results Page: Overlay Layers that can be Displayed on the Map



Any combination of Overlay Layers can be displayed by toggling on/off the check box next to it

These Overlay Layers are displayed by default

These Overlay Layers can also be displayed by clicking on the check box next to it

Observation Line. Triangles show the direction of positive discharge

Reservoir Point

Impounding Structure Base

Breach Width (thick red line)

Breach Center

Impounding Structure (crest line captured by the user). Since the crest line is also used as an Observation Line for the breach hydrograph, triangles are attached to show the direction of positive discharge

Status and Results Page: Base Layers that can be Displayed on the Map

The screenshot shows the 'Status & Results' interface. At the top, there is a navigation bar with 'Home', 'Portal', 'About', 'Help', and a user profile 'DSSWISE-WEB ADMIN'. Below the navigation bar, the page title is '#13111 • SC00024 Jan 22, 2019 9:30:16 pm'. The main content area features a map of a region with several overlays. On the left, a 'Base Layers' panel lists various map styles, with 'OpenStreetMap' selected. Below it, an 'Overlay Layers' panel shows 'Observation Lines' and 'Bridge Points' checked. At the bottom, three status boxes indicate 'Human Consequences: Finished', 'Simulation: Finished', and 'Data Prep: Finished'.

Only one Overlay Layer can be displayed at a time by clicking on the corresponding radio button.

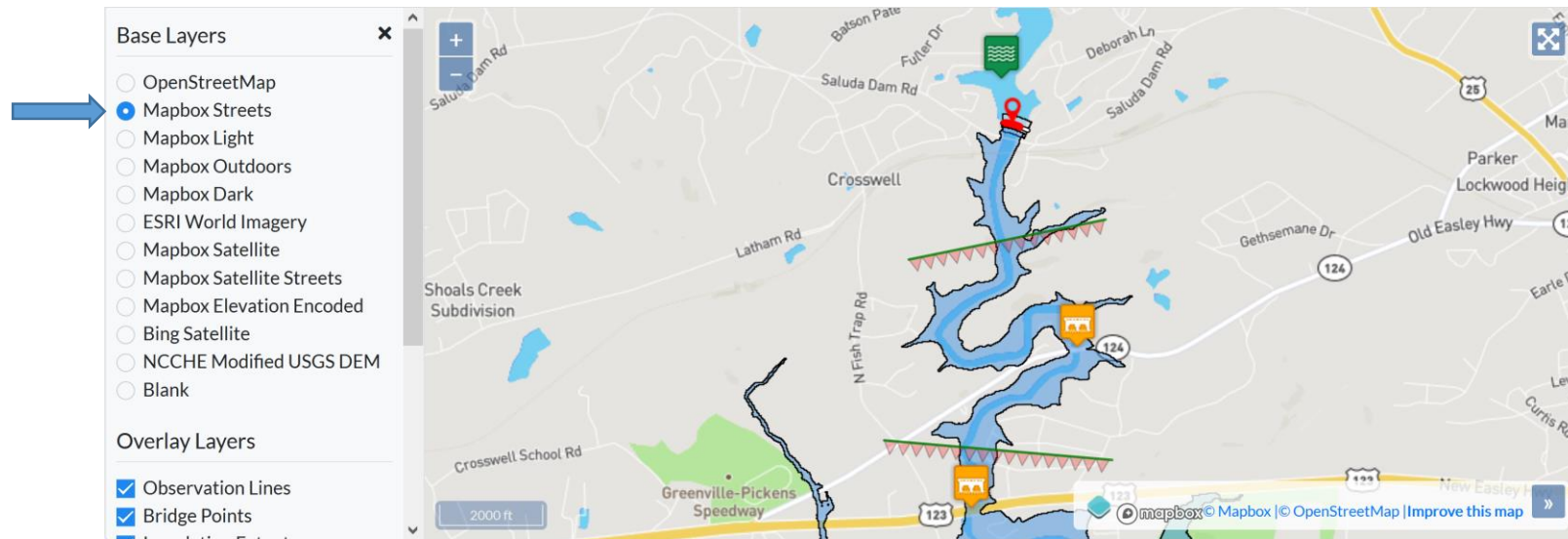
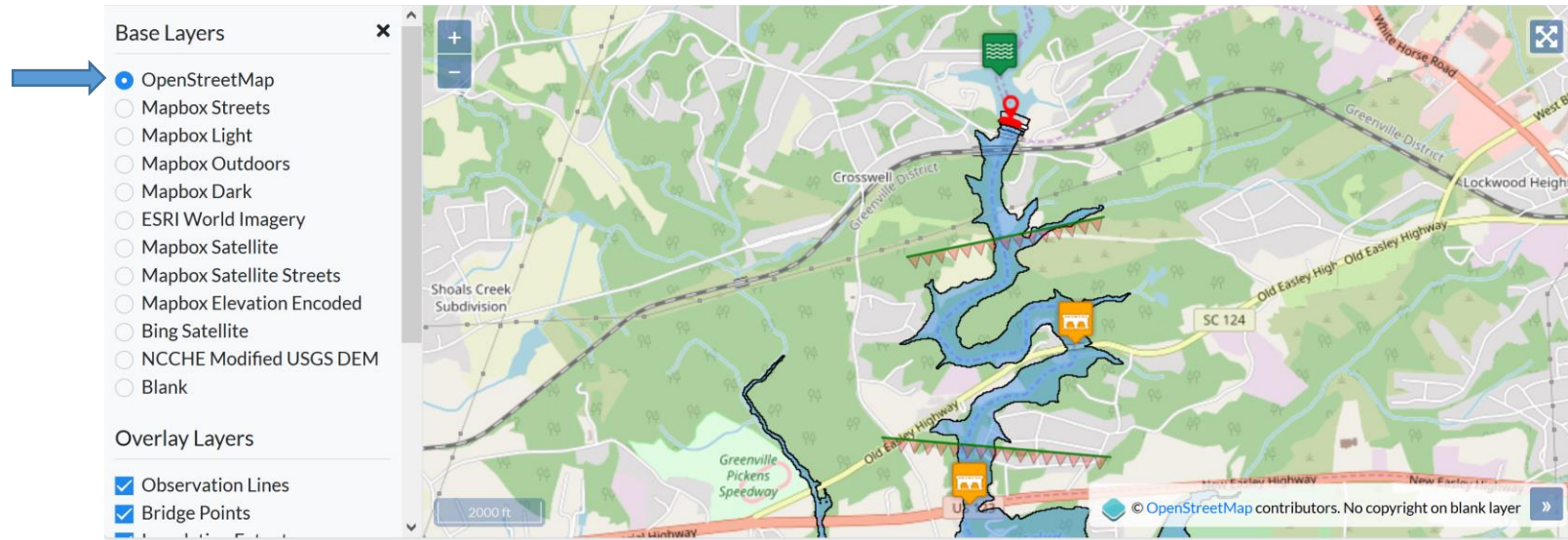
Feedback

Click on the information button to display the source and copyright information for the current Base Layer.

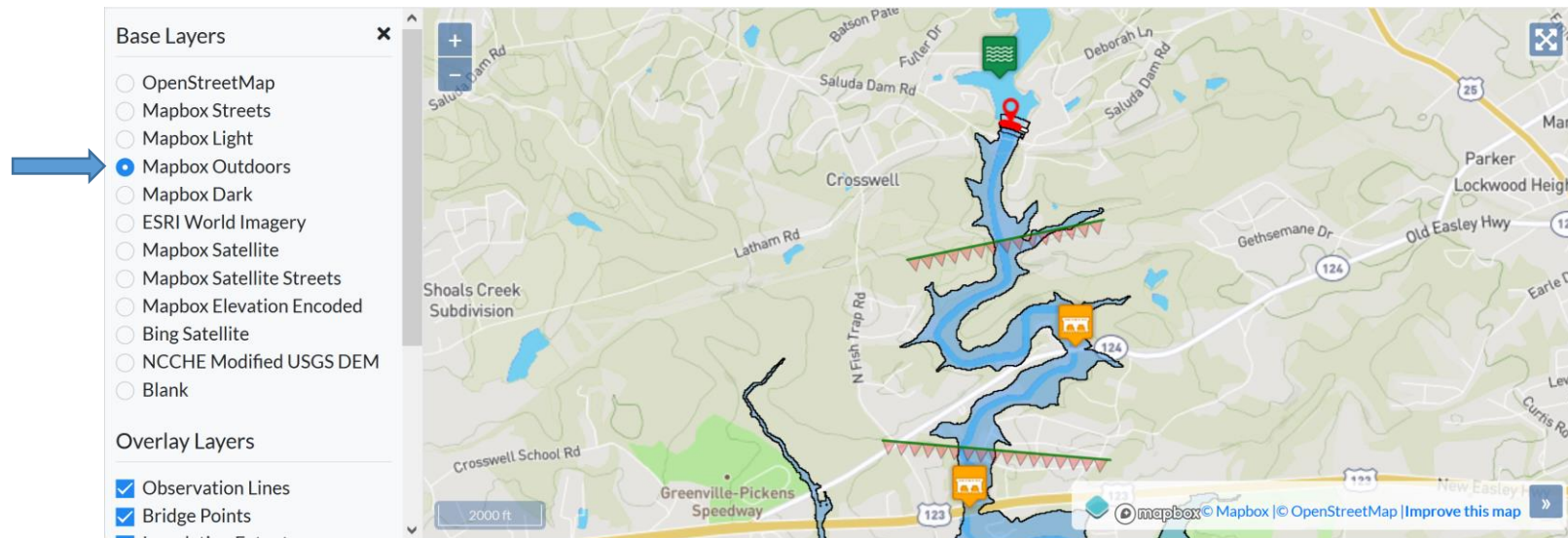
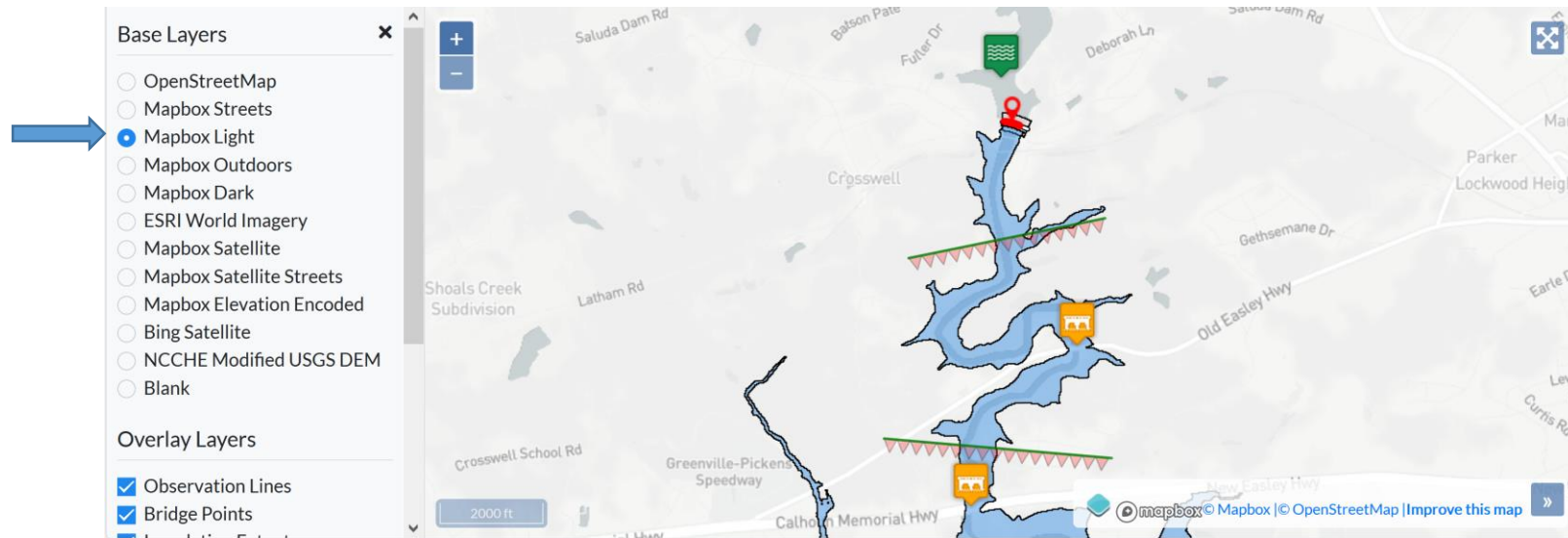
Click on the double arrow to hide the layer information.

© OpenStreetMap contributors. No copyright on blank layer

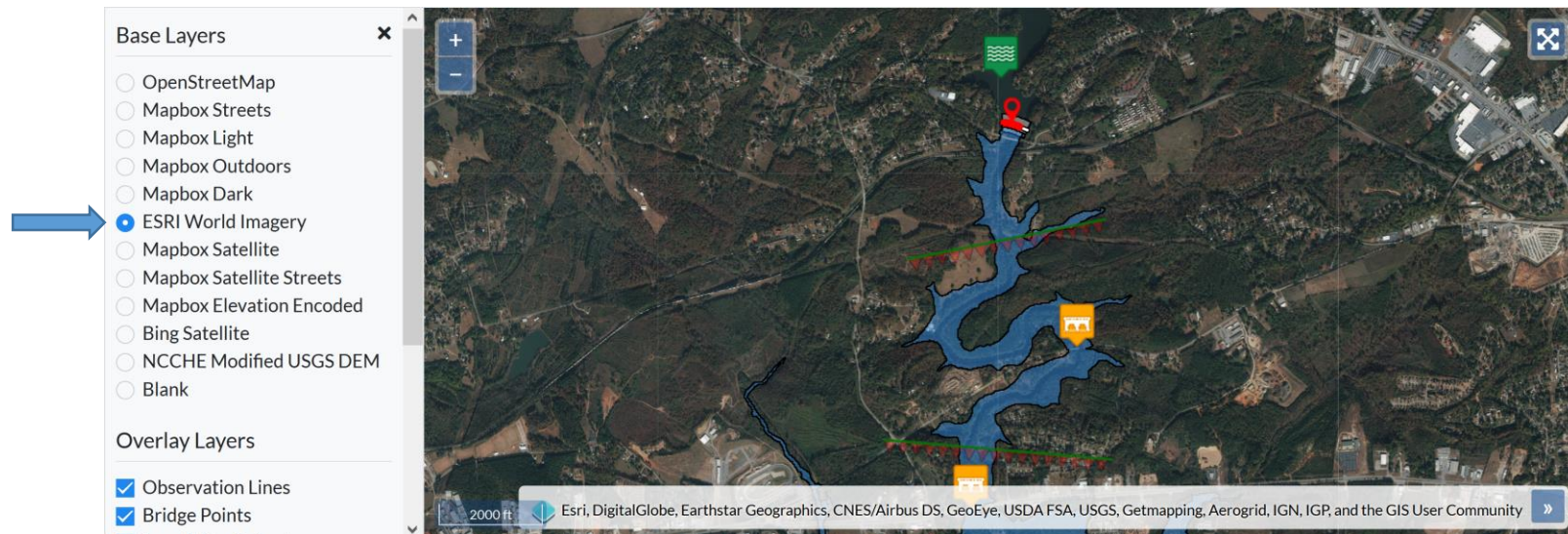
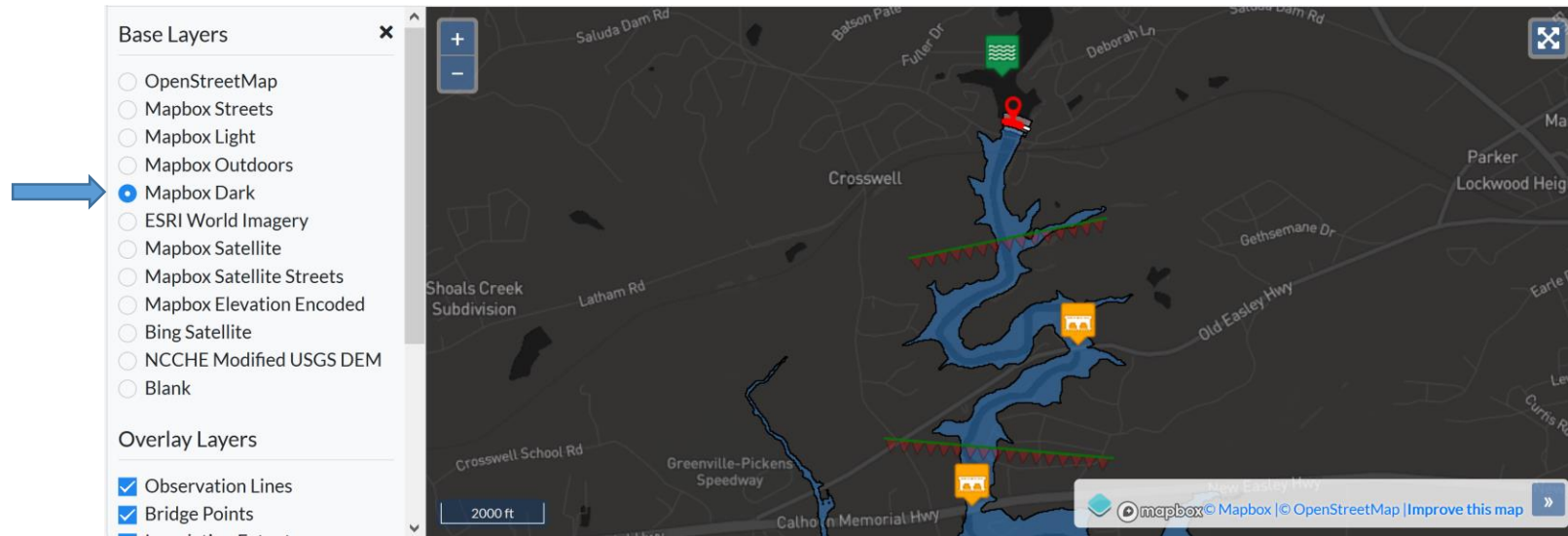
Status and Results Page: Base Layers that can be Displayed on the Map (continued)



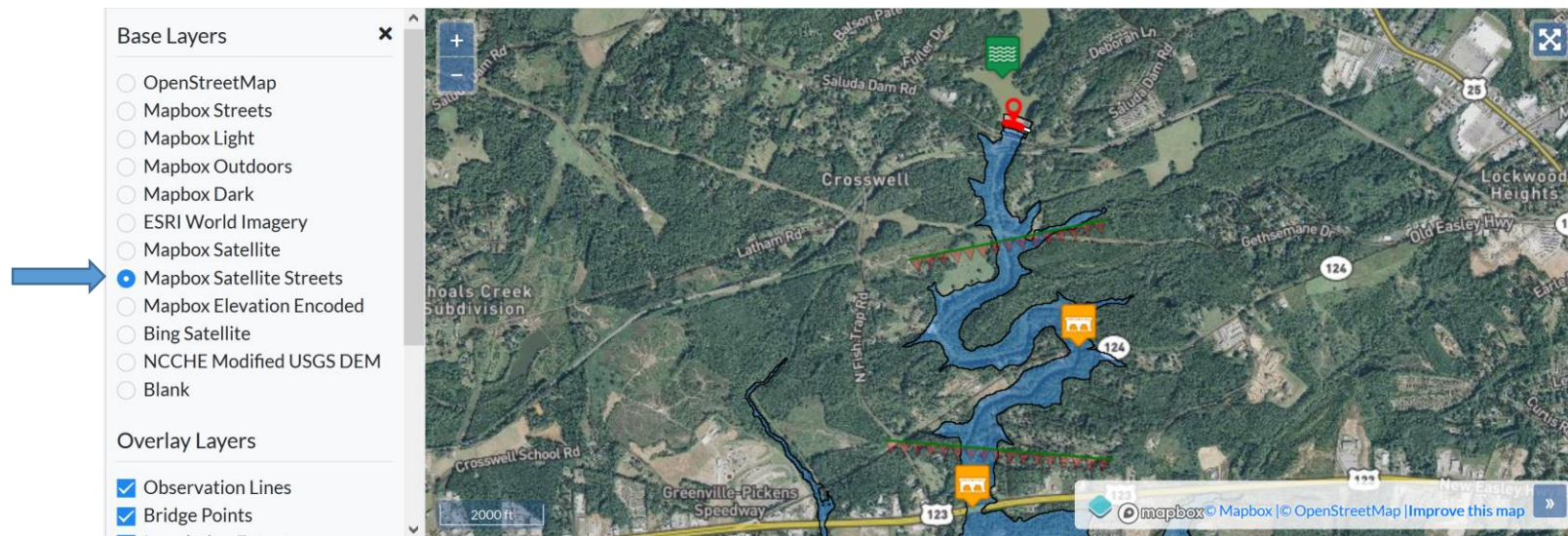
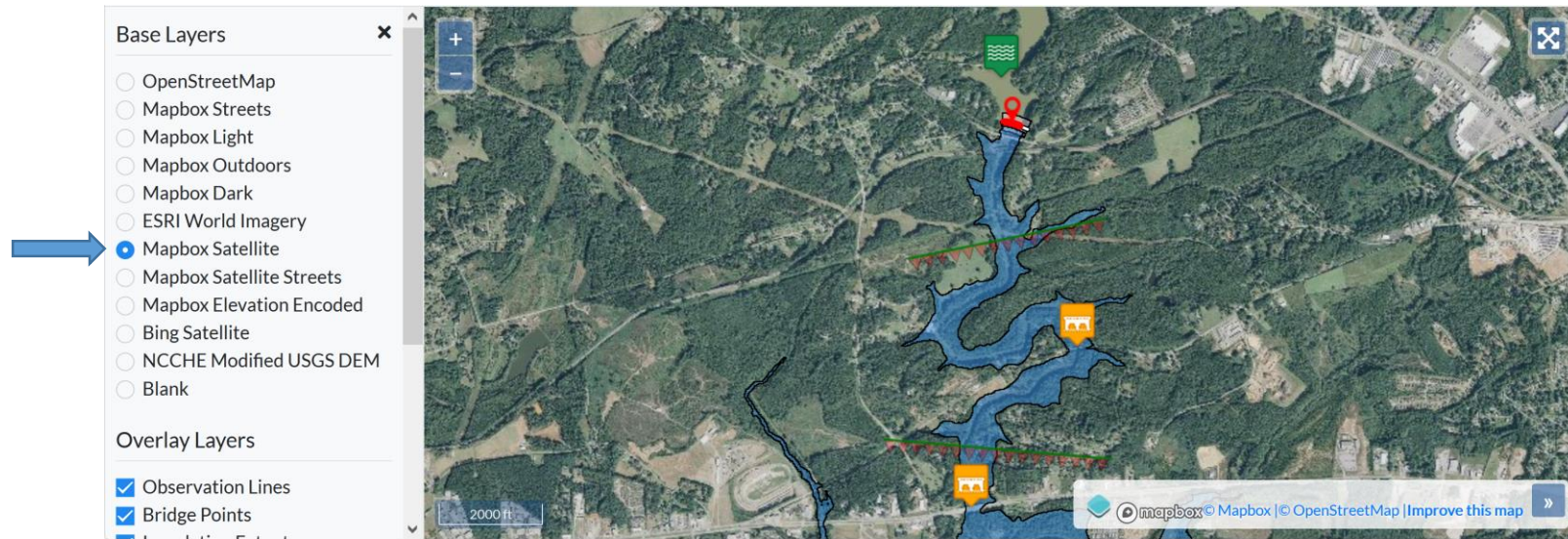
Status and Results Page: Base Layers that can be Displayed on the Map (continued)



Status and Results Page: Base Layers that can be Displayed on the Map (continued)



Status and Results Page: Base Layers that can be Displayed on the Map (continued)



Status and Results Page: Base Layers that can be Displayed on the Map (continued)

Base Layers

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points

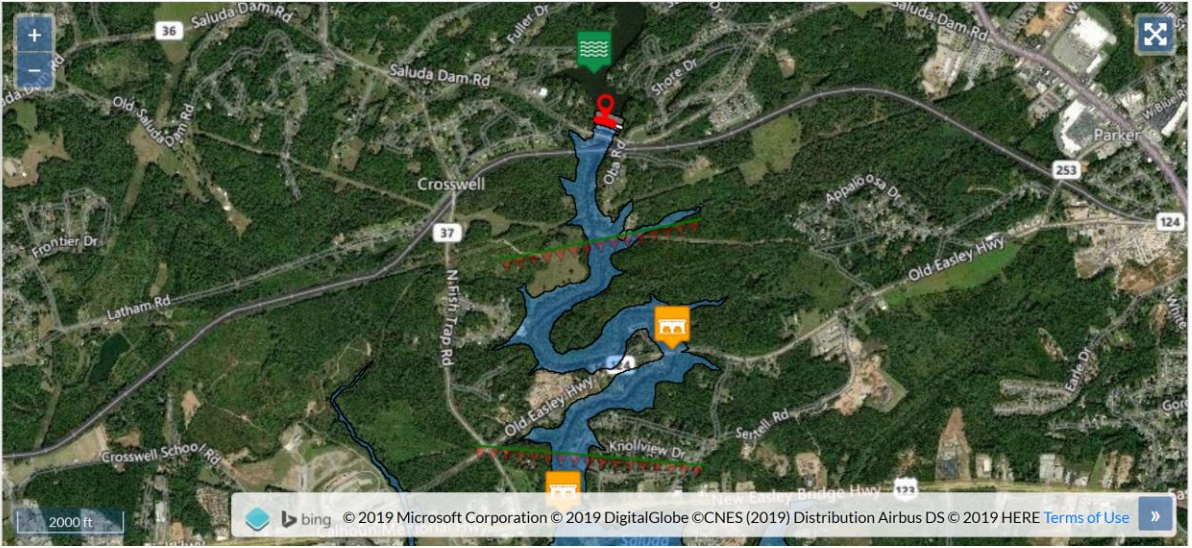


Base Layers

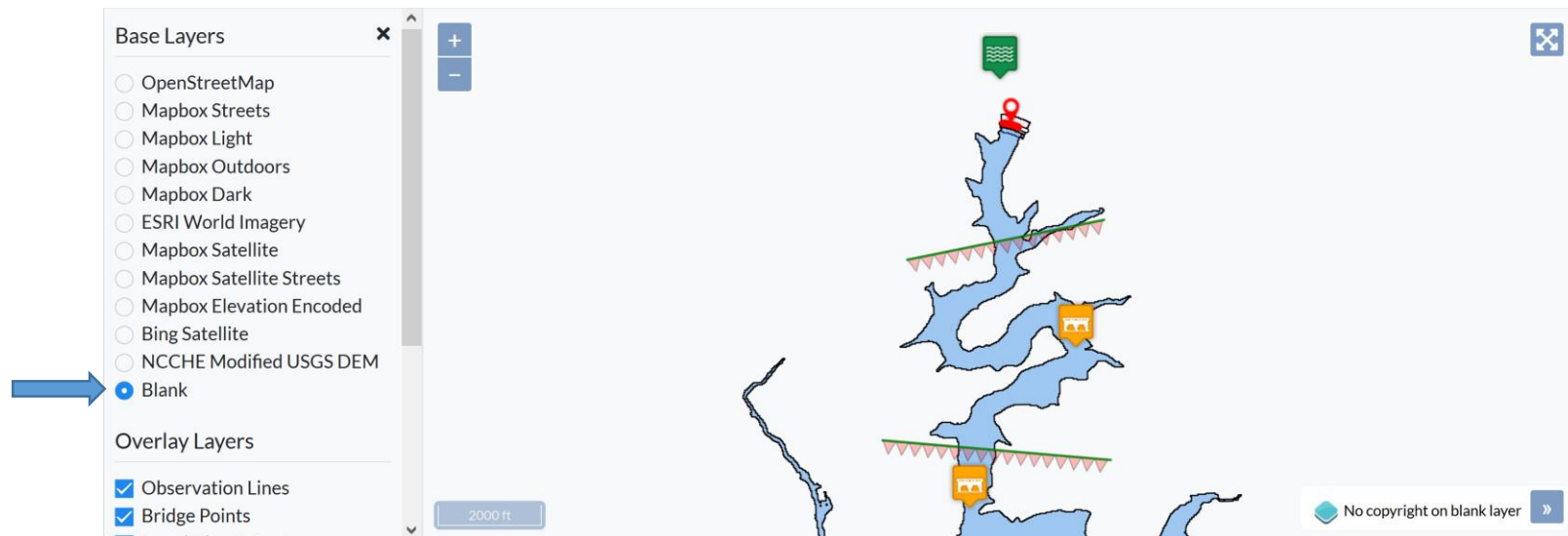
- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points



Status and Results Page: Base Layers that can be Displayed on the Map (continued)



Status and Results Page: List of Files Generated by DSS-WISE Lite

Files Generated by DSS-WISE Lite Simulation

The screenshot shows the 'Status & Results' page for a simulation. It includes a map, simulation progress indicators (Human Consequences, Simulation, Data Prep), simulation details (Project name: Saluda Lake Dam, Scenario name: Sunny Day Partial Breach), and a 'Downloads' section listing various output files. A red arrow points from a callout box to the 'List' icon in the Downloads section.

Click this icon to list all files available in the final results package. Click again to hide the list.

Click this icon to display all files as a single zipped file.

Click blue icon for any listed file to download it individually.

This block shows a detailed view of the 'Downloads' section. It lists various files generated by the simulation, each with a description and a download icon. The files include:

- Simulation Results Package** (10.38 MB): Zipped results package containing final report, shapefiles, gridded raster files, and other outputs.
- Final Report** (1.62 MB): PDF Document describing simulation.
- Raster Files** (7.83 MB): Gridded raster files for DEM, maximum depth, and arrival time.
- Maximum Depth Polygons** (247.79 kB): Shapefile containing polygons of maximum depth intervals.
- Arrival Time Polygons** (143.86 kB): Shapefile containing polygons of arrival time intervals.
- Maximum Specific Discharge Polygons** (267.51 kB): Shapefile containing polygons of maximum specific discharge intervals.
- Maximum Specific Discharge Arrival Time Polygons** (94.59 kB): Shapefile containing polygons of maximum specific discharge arrival time intervals.
- Maximum Velocity Polygons** (139.96 kB): Shapefile containing polygons of maximum velocity intervals.
- Inundation Extent at 3 miles** (13.83 kB): Shapefile containing inundation extent at 3 miles.
- Inundation Extent at 7 miles** (28.86 kB): Shapefile containing inundation extent at 7 miles.
- Final Inundation Extent** (39.67 kB): Shapefile containing inundation extent at the end of the simulation at 10.164 miles.
- Observation Lines** (13.39 kB): Tabulated CSV files of time vs. discharge and cumulative volume.
- Inundation Extent KMZ File** (63.52 kB): Google Earth KMZ file showing final inundation extent.
- Input Features** (5.02 kB): Shapefiles containing drawn input features.
- Human Consequences Results Package** (17.33 MB): Zipped results package containing final report, shapefiles, gridded raster files, and other outputs.

Status and Results Page: List of Files Generated by DSS-WISE HCOM

Status & Results Home Portal About Help **DSSWISE-WEB ADMIN** UNITED STATES

#13111 • SC00024 Jan 22, 2019 9:30:16 pm

Base Layers

- OpenStreetMap
- Mapbox Streets
- Mapbox Light
- Mapbox Outdoors
- Mapbox Dark
- ESRI World Imagery
- Mapbox Satellite
- Mapbox Satellite Streets
- Mapbox Elevation Encoded
- Bing Satellite
- NCCHE Modified USGS DEM
- Blank

Overlay Layers

- Observation Lines
- Bridge Points

Human Consequences: Finished
Jan 22, 2019 9:51:46 pm ⏱ 12 mins

Nighttime PAR: 229
Daytime PAR: 93
Inundated Area: 1,264 acres
South Carolina counties: 3

Simulation: Finished
Jan 22, 2019 9:30:57 pm ⏱ 14 mins

Distance Achieved: 10.16 miles
Time Achieved: 07:21 days
189,327 compute cells
11.9% Remaining

Data Prep: Finished
Jan 22, 2019 9:30:21 pm ⏱ less than a minute

Filled reservoir volume match: 100%

Simulation Details

Project name: Saluda Lake Dam

Scenario name: Sunny Day Partial Breach

Scenario description: Sunny day breach, Top of the Dam, Partial Failure.

Scenario Properties

- Cell size: 20 ft
- Breach type: Partial breach
- Breach width: 300 ft
- Breach formation time: 0.3 hr
- Breach invert elevation: 805.9 ft
- Failure elevation: 852 ft
- Failure volume: 7,745 ac-ft

Downloads

- Simulation Results Package** 10.38 MB
Zipped results package containing final report, shapefiles, gridded raster files, and other outputs
- Human Consequences Results Package** 17.33 MB
Zipped results package containing final report, shapefiles, gridded raster files, and other outputs
- HCOM Final Report** 17.46 MB
PDF Document describing the results of this HCOM calculation
- HCOM PAR Analysis Results** 43.33 kB
MS Excel spreadsheet containing tabulated results of population at risk analysis
- HCOM Potentially Lethal Flood Zones** 77.42 kB
Shapefile containing polygons of flood zones potentially lethal to adults and children
- HCOM Hazard Level to People Indoors** 23.21 kB
Shapefile containing polygons of hazard levels to people caught indoors in the flooded extent
- HCOM Hazard Level to People Outdoors** 235.65 kB
Shapefile containing polygons of hazard levels to people caught outdoors in the flooded extent
- HCOM PAR by Census Blocks** 129.92 kB
Shapefile containing polygons of census blocks in the inundation extent
- HCOM Nighttime Population Density** 7.9 kB
Shapefile containing polygons of nighttime population density derived from LANDSCAN data
- HCOM Daytime Population Density** 6.62 kB
Shapefile containing polygons of daytime population density derived from LANDSCAN data

DSS-WISE™ Web

Help
FAQ
Documentation

Contact
Terms and Conditions
Privacy

©2019 UM-NCCHE

Click this icon to list all files available in the final results package. Click again to hide the list.

Click this icon to display all files as a single zipped file.

Click blue icon for any listed file to download it individually.

Files Generated by DSS-WISE HCOM Analysis

Downloads

- Simulation Results Package** 10.38 MB
Zipped results package containing final report, shapefiles, gridded raster files, and other outputs
- Human Consequences Results Package** 17.33 MB
Zipped results package containing final report, shapefiles, gridded raster files, and other outputs
- HCOM Final Report** 17.46 MB
PDF Document describing the results of this HCOM calculation
- HCOM PAR Analysis Results** 43.33 kB
MS Excel spreadsheet containing tabulated results of population at risk analysis
- HCOM Potentially Lethal Flood Zones** 77.42 kB
Shapefile containing polygons of flood zones potentially lethal to adults and children
- HCOM Hazard Level to People Indoors** 23.21 kB
Shapefile containing polygons of hazard levels to people caught indoors in the flooded extent
- HCOM Hazard Level to People Outdoors** 235.65 kB
Shapefile containing polygons of hazard levels to people caught outdoors in the flooded extent
- HCOM PAR by Census Blocks** 129.92 kB
Shapefile containing polygons of census blocks in the inundation extent
- HCOM Nighttime Population Density** 7.9 kB
Shapefile containing polygons of nighttime population density derived from LANDSCAN data
- HCOM Daytime Population Density** 6.62 kB
Shapefile containing polygons of daytime population density derived from LANDSCAN data

ACKNOWLEDGEMENTS

The funding provided by the following agencies are gratefully acknowledged:

- The U.S. Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) provided the funding for the development of the DSS-WISE™ Lite and DSS-WISE™ Web and its operation and maintenance was provided by means of a 5-year sole-source contract (2015-2020).
- The U.S. Department of Energy, Argonne National Laboratory (ANL) provided the funding for the development of the DSS-WISE HCOM through a one-year subcontract (2017-2018).

We also gratefully acknowledge that:

- the funding from Division of Safety of Dams (DSOD) of the California Department of Water Resources allowed the development of a backend framework, which was leveraged to enhance the Status and Results page.
- the funding from Department of Homeland Security, Science and Technology, allowed the enhancement of the Status and Results page by providing additional results files and displaying of numerous base and overlay layers on the map.

LandScan USA data is developed by Oak Ridge National Laboratory. Our special thanks goes to Dr. Olufemi A. Omitaomu and Dr. Amy Rose from Geographic Information Science and Technology Group, Computational Sciences and Engineering Division, for their assistance in clarifying various issues related to LandScan USA data.

LandScan data layers were provided by the Argonne National Laboratory (ANL).

The authors gratefully acknowledge the permission given by the Dam Safety and Stormwater Permitting Division, S.C. Dept. of Health & Environmental Control (DHEC) and CDM Smith to use the example of Saluda Dam for the demonstration of DSS-WISE HCOM.

We would like to extend our special thanks to

- Christian Carleton, Office of Water Projects (OWP) at Sacramento State, who reviewed the early version of the HCOM report and provided corrections.
- Mr. Kyle Pfeiffer from National Preparedness Analytics Group, Decision and Infrastructure Sciences Division at ANL, Mr. James Demby and Dr. Gokhan Inci from National Dam Safety Program at FEMA, DHS, who reviewed the project at various stages and provided invaluable feedback.