

# DSS-WISE™ Lite: Web-based Automated Dam-Break Modeling/Mapping

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DSS-WISE™ Lite is a web-based, automated two-dimensional dam-break flood modeling and mapping capability developed by the National Center for Computational Hydroscience and Engineering (NCCHE), the University of Mississippi. The development of the web-based tool and its operation and maintenance is supported by the U.S. Federal Emergency Management Agency (FEMA).

## Accessing DSS-WISE™ Lite

DSS-WISE™ Lite service is accessible 24/7 to registered users from FEMA, federal agencies and state dam safety offices via the web portal DSSWISE™ Web.

<https://dsswiseweb.ncche.olemiss.edu/>

The portal offers a secure, web-based environment consisting of a graphical user interface and a map server.

## Components of DSS-WISE™ Web

DSS-WISE™ Web portal offers:

- A map viewer, which provides access to several analytical capabilities.
- A status and results page to list and manage the simulations, view and monitor simulation results, and download final results package.
- A web page for group managers to manage their groups, accept and reject memberships, etc.
- A web page with manuals, tutorials, webinars, frequently asked questions.

## Key Benefits of DSS-WISE™ Lite

- Expertise in numerical modeling is not required.
- Simulations can be set up very quickly with minimum user input data.
- Input files are automatically prepared using input data and national data sets.
- Numerical model uses a state-of-the-art upwind numerical scheme that can handle all types of fast unsteady flows, wet/dry interfaces, and discontinuities.
- Parallelized code offers extremely high computational speeds for operational real-time simulations for emergencies.
- Produces geospatial results files compatible with GIS software and HAZUS-MH.
- Can be used for hazard classification, ranking and prioritizing, EAP preparation and emergency response planning.



**FEMA**



**NCCHE**  
The University of Mississippi

## DSS-WISE™ Lite and Emergencies

DSS-WISE™ Lite capability was used during:

- Oroville Dam spillway incident in 2017.
- Dam safety emergencies in Texas during Hurricane Harvey in 2017.
- Emergency dam-break flood simulation and inundation mapping of all 36 dams in Puerto Rico during Hurricane Maria in 2017.
- Emergency simulations during Hurricane Florence in 2018.

## Need for DSS-WISE™ Lite

DSS-WISE™ Lite responds to the needs of dams sector stakeholders (FEMA, federal agencies, state dam safety offices).

More than 90,000 dams are registered in the National Inventory of Dams (NID):

- 17% of 15,498 high-hazard dams and 13% of 11,882 significant hazards do not yet have an emergency action plan (EAP).
- Some of the existing EAP's are outdated and many others are not up to standards.
- 65% of the dams belong to private owners, who lack technical and financial means to prepare an EAP.
- Hazard classification of dams change in time due to downstream development.
- The dam safety is the responsibility of the states that do not have the human and financial resources to track the hazard classification of thousands of dams under their jurisdictions.

DSS-WISE™ Lite assists FEMA and the DHS S&T to achieve their mission by addressing these challenges listed above through free-of-charge web-based tool that is available 24/7 to stakeholders of dams sector for both the preparedness and response to flood hazard.

## Usage Statistics (as of 9/16/2018)

Total number of active users	598
Total number of simulations	9,431
Number of dams simulated	2,217
Average number of simulations/day	32
Number of user states	37/50
Number of user FEMA Regions	10/10
Number of user federal agencies	9

\* DSS-WISE™ Lite was released on 11/8/2016.

## Performance of DSS-WISE™ Lite

- 99% of the simulations has a down-stream distance less than 75 miles.
- For 79% of the simulations the auto-mated data preparation takes less than 1 minute.
- 84% of the users receive the results in less than 30 minutes, and 93% of the users receive them in less than 2 hours.
- Inundation area has 100,000 to 500,000 cells for 48% of the simulations. For 99.5% of the simulations the inundation area has less than 5 million cells.
- 74% of the simulations are high-resolution with cell sizes of 20 to 30 ft.
- 74% simulations are performed with computational speeds 100 to 1,000 times faster than reality.

## Future Developments

DSS-WISE™ Lite is currently being improved with funding from FEMA, DHS S&T and the State of California:

- Ability to generate a composite DEM using the highest resolution wherever it is available
- Allowing states to provide their own high-resolution DEM
- Ability to model dams in series
- Manual input of user defined levees
- Incorporation of local levees
- Creating a new simulation from a previous one
- Breach parameter calculator
- Improvement of the simulation and model outputs
- Improvement of the results package
- Stage-volume curve of estimated reservoir bathymetry