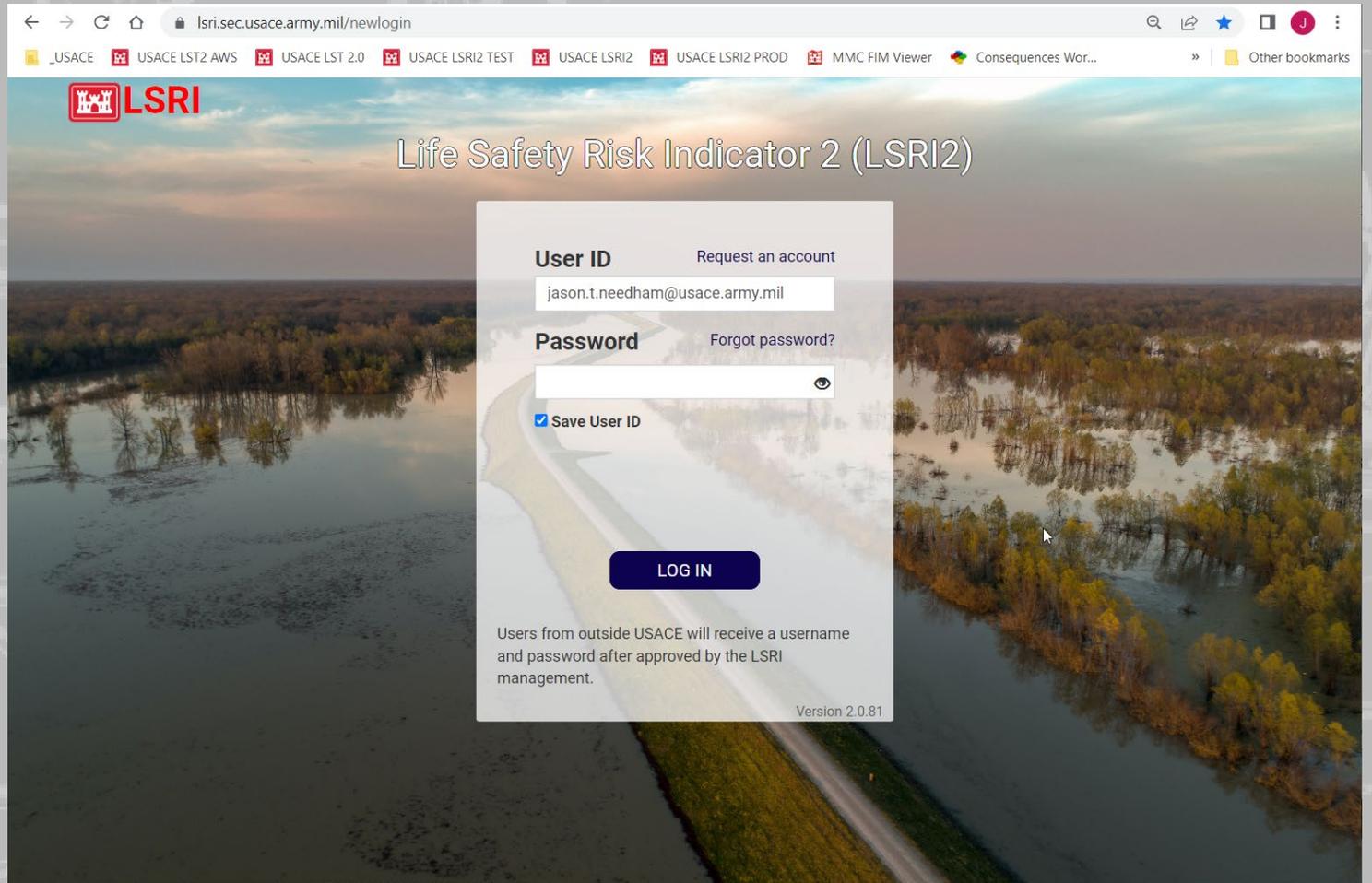


LIFE SAFETY RISK INDICATOR

APPLICATION IN PLANNING

Jason Needham, P.E.
USACE Risk Management
Center

A screenshot of a web browser displaying the Life Safety Risk Indicator 2 (LSRI2) login page. The browser's address bar shows 'lsri.sec.usace.army.mil/newlogin'. The page features a background image of a flooded landscape with trees and a road. The LSRI logo is in the top left. The main heading is 'Life Safety Risk Indicator 2 (LSRI2)'. A login form is centered, containing fields for 'User ID' (with the value 'jason.t.needham@usace.army.mil') and 'Password'. There are links for 'Request an account' and 'Forgot password?'. A 'Save User ID' checkbox is checked. A dark blue 'LOG IN' button is below the form. At the bottom of the form, a note states: 'Users from outside USACE will receive a username and password after approved by the LSRI management.' The version number 'Version 2.0.81' is in the bottom right corner of the form area. The browser's bookmark bar shows several USACE-related links and 'Other bookmarks'.

US Army Corps
of Engineers®



OVERVIEW



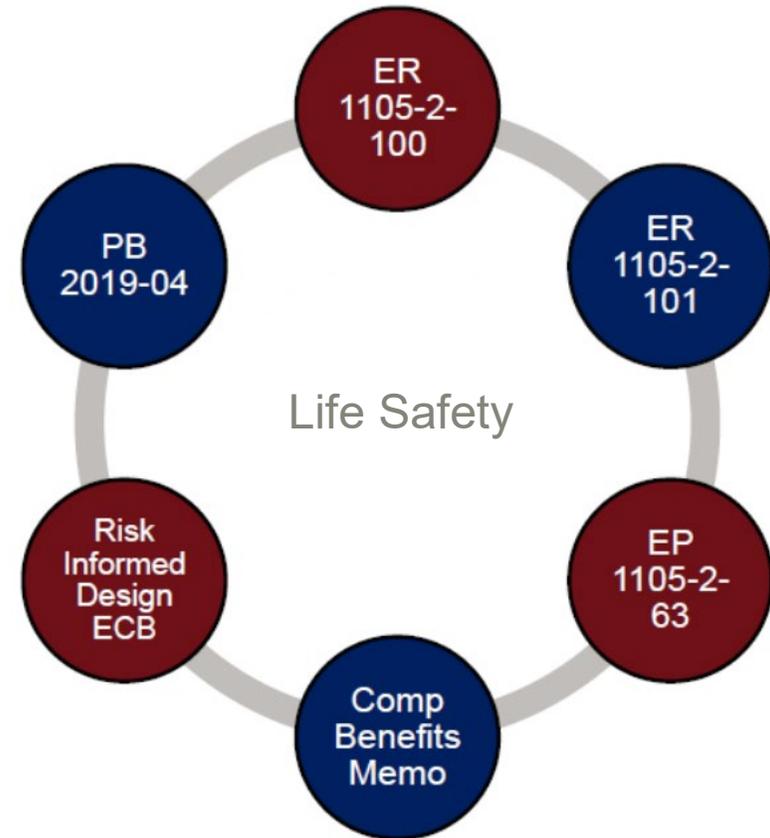
- Life Safety Risk Indicator (LSRI) Methodology
- LSRI Structure
- Application overview
- Validation example
- Q & A



LSRI APPLICATION



- The budget development process will use LSRI results to screen ongoing feasibility studies, PED and construction work packages to identify those for which *life safety benefits* might play a role in justifying funding.
- Not a new requirement
 - LSRI or **LSHI (Life Safety Hazard Indicator)** has been required for budgeting* for many years
 - Consistent, defensible results were difficult to obtain from previous methods
- Results in recommendation for additional study
- LSRI 2.0 leverages consequence methodology and framework of LST 2.0.
- Support initial understanding of life safety in flood and coastal storm risk management studies





LSRI METHODOLOGY OVERVIEW



Life Safety Risk Indicator (LSRI)



Purpose: Efficient methodology to “answer” the question:
How much will a proposed project reduce risk to life and property?

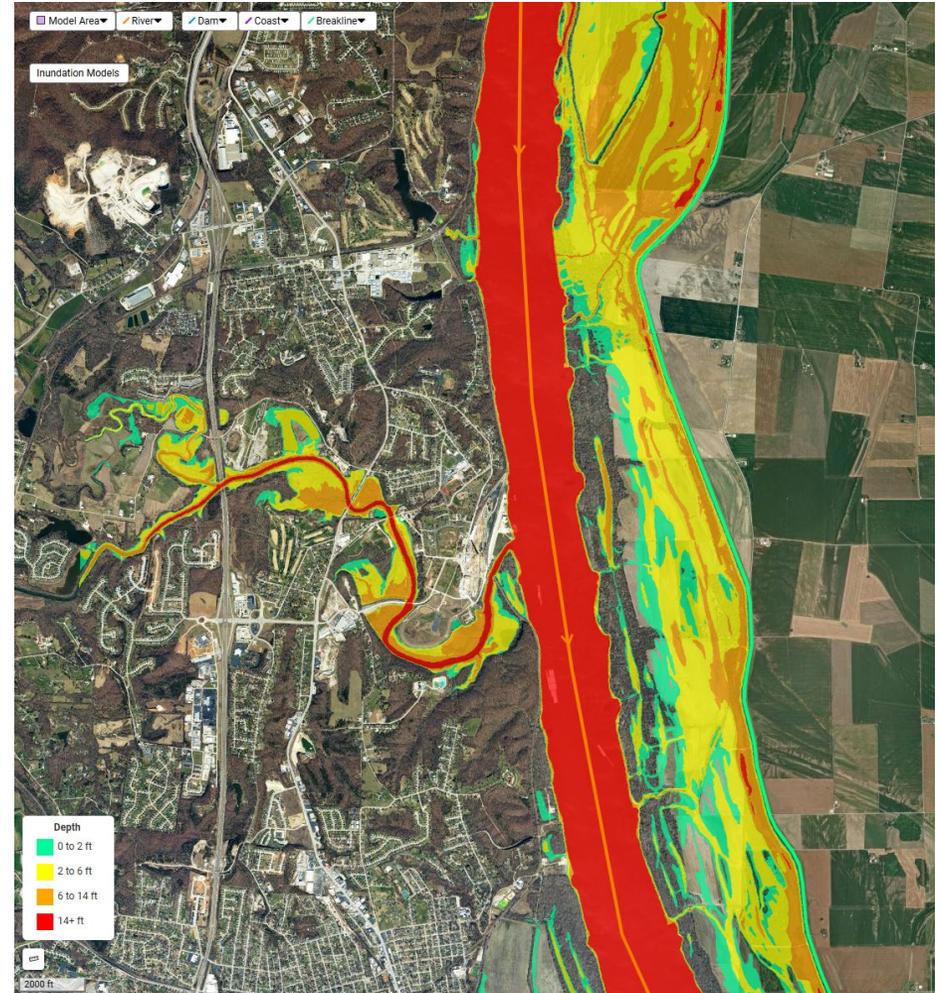
LSRI: A web-based application utilizing cloud computing for risk analysis that employs state-of-the-art methods and tools.



HEC-RAS



LifeSim



Part of a suite of web-based screening tools including the Levee Screening Tool and Dam Screening Tool



RISK AND THE LSRI



HAZARDS

What are the hazards and how likely are they to occur?

Simplifying assumption:
Proposed project will perform as intended.

PERFORMANCE

How will the infrastructure perform in the face of these hazards?

CONSEQUENCE

Who and what are in harm's way?
How susceptible to harm are they?
How much harm is caused?



RISK = f (HAZARD, PERFORMANCE, CONSEQUENCE)

Problem Statement:

What is the lowest level-of-effort that can be applied to generate credible risk results?



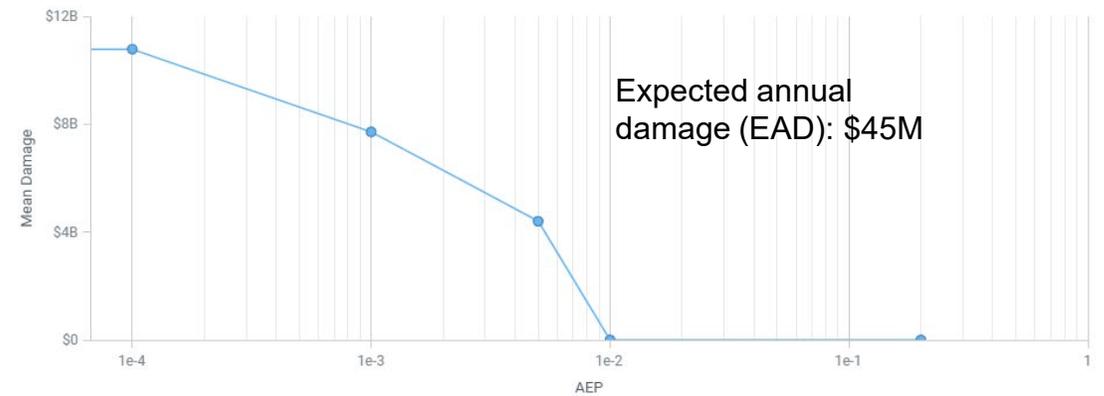
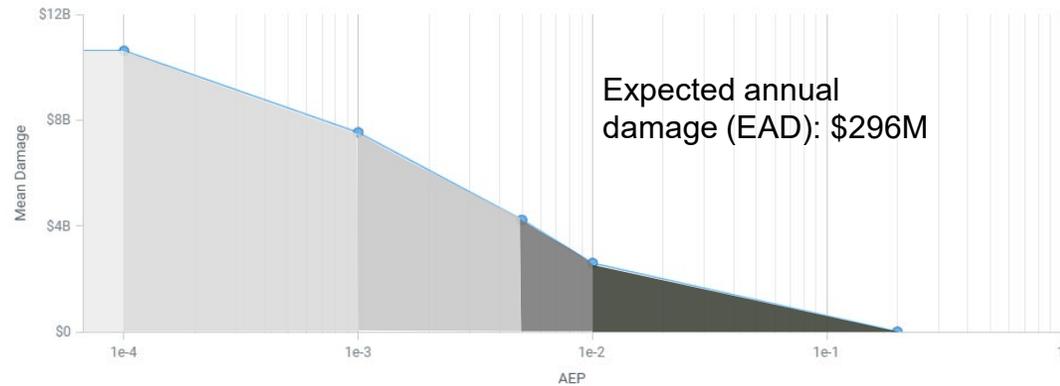
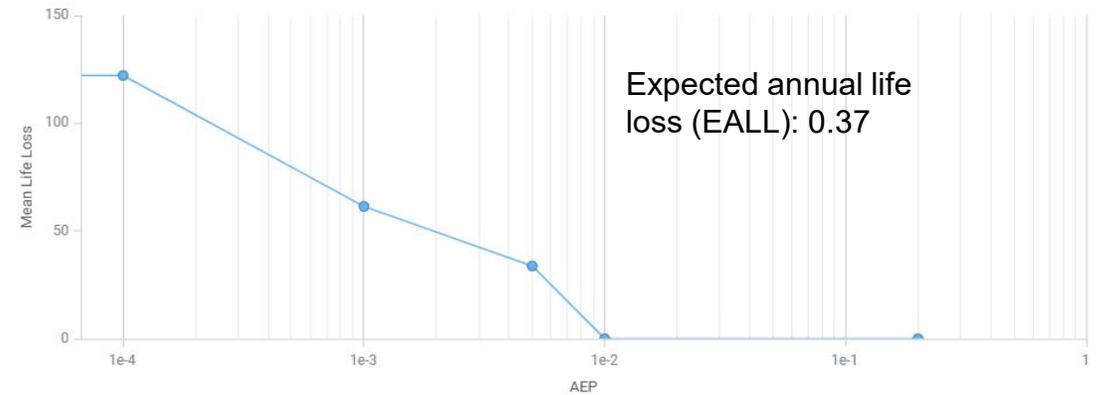
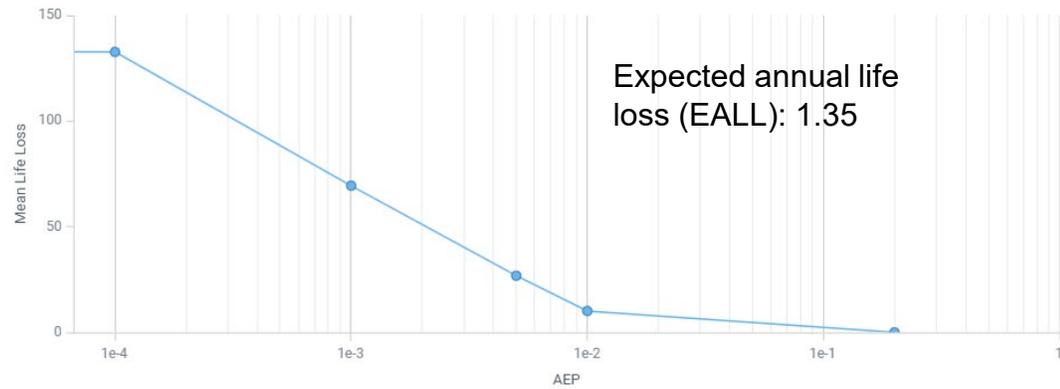
RISK CALCULATION



Estimate difference between "existing" and "with project" risk

Existing

With Project



Expected Annual Life Loss Reduced = $1.35 - 0.37 = 0.98$



LIFE LOSS ESTIMATION BASICS



Life loss calculation essential elements:

- Initial distribution of people
- Redistribution of people
 - Warning
 - Response
 - Evacuation potential
- Flood characteristics
 - Arrival time, depth, velocity
- Shelter provided by final location
- Fatality rates
- Indirect life loss





LIFE LOSS ESTIMATION BASICS



Life loss calculation essential elements:

- Initial distribution of people → National Structure Inventory (NSI)
- Redistribution of people → User inputs for:
 - 1. Evacuation Planning
 - 2. Community Awareness
 - 3. Flood Warning Effectiveness
 - 4. Hazard Advance Notice
- Warning
- Response
- Evacuation potential
- Flood characteristics → HEC-RAS
 - Arrival time, depth, velocity
- Shelter provided by final location → LifeSim
- Fatality rates



LSRI APPLICATION

ACCESS AND MAIN PROJECT WINDOW



ACCESS LSRI



URL: <https://lsri.sec.usace.army.mil/>

To get an account, send request to:
dll-cwbi-lsri-support@usace.army.mil

Enter Username and Password at
login screen

- Username: your email address
- Password: Provided in email

Life Safety Risk Indicator 2 (LSRI2)

User ID [Request an account](#)

jason.t.needham@usace.army.mil

Password [Forgot password?](#)

Save User ID

LOG IN

Users from outside USACE will receive a username and password after approved by the LSRI management.

Version 2.0.81



MAIN PROJECT BROWSING WINDOW



LSRI Life Safety Risk Indicator 2.1.1 PROJECTS JASON NEEDHAM | FACILITATOR HELP LOGOUT

MY PROJECTS RECENTLY ACCESSED

[CREATE NEW PROJECT](#) Click at any time to get back to project list [EXCEL DOWNLOAD](#)

Show 50 entries Project Type: All Show Inactive Projects Clone a project Search:

ID	PROJECT NAME	DIVISION	DISTRICT	P2 PROJECT #	STATUS	STATE	PHASE	LAST MODIFIED	LSRI	CSSL	PROJECT TYPE	ACTION(S)
1315	Barn							2/3/2023 14:43:23			Testing	
1286	Bear Creek - Test							1/26/2023 15:27:25			Testing	
1146	Berryessa Dam							12/28/2022 16:33:48			Testing	
1241	Castle Rock							1/28/2023 18:02:01			Testing	
1294	Castle Rock - New Terrain							2/1/2023 08:58:27			Testing	
1304	Castle Rock - New Terrain - full mom							2/6/2023 13:15:46			Testing	
1310	Castle Rock - New Terrain - full mom - riverine							2/13/2023 10:33:05			Testing	
1703	Chartiers Creek - Tribes + Terrain Test - JTN	Great Lakes And Ohio River	Pittsburgh		New Start	Pennsylvania	Feasibility	8/27/2024 11:28:17			Testing	
1284	CO							1/26/2023 13:37:27			Testing	
1497	Coastal Test							10/30/2023 12:24:04			Testing	
1269	Coastal Texas Protection and Restoration Project	Southwestern	Galveston	500145	New Start	Texas	Pre-Const. Engineering and Design (PED)	12/19/2024 16:49:07	1.41e+1	\$85,609	Testing	
1122	DST Training							12/30/2022 10:04:47			Testing	
1130	Guadalupe River - San Jose, CA				Continuing	California	Feasibility	12/19/2024	3.46e-1	\$5,783,689	Testing	
1257	Lago de la Plata Dam										Testing	

Table contains list of all projects you have created.

Share with others



PROJECT INFORMATION TAB



Project - Berryessa Dam



Project Information Consequences Risk

Project Overview

Project Name:

Project Type: P2 Project Number:

Project Purpose:

Phase Status: Phase Completion:

Phase:

Phase Activity:

Project Description:

Location Information

State: Division:

District: EROC:

Location Description:

Enter "Testing" for project type and "Technical Analysis" for Purpose.



LSRI APPLICATION

CONSEQUENCES – INUNDATION TAB

Goal: Create inundation that “roughly” represents the extents, depths, velocities and timing of flooding for user defined scenarios.



CONSEQUENCES TAB – INUNDATION



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute Consequence Results

System Features

NAME	TYPE	ACTION(S)
Model Area	2D Flow Area	
Levee System 5605170001	2D Breakline	
Mississippi River	River Reach	

Terrain Parameters

Prepare Terrain Data: LSRI Terrain User Uploaded Terrain

Download NED Terrain to LSRI Download Complete

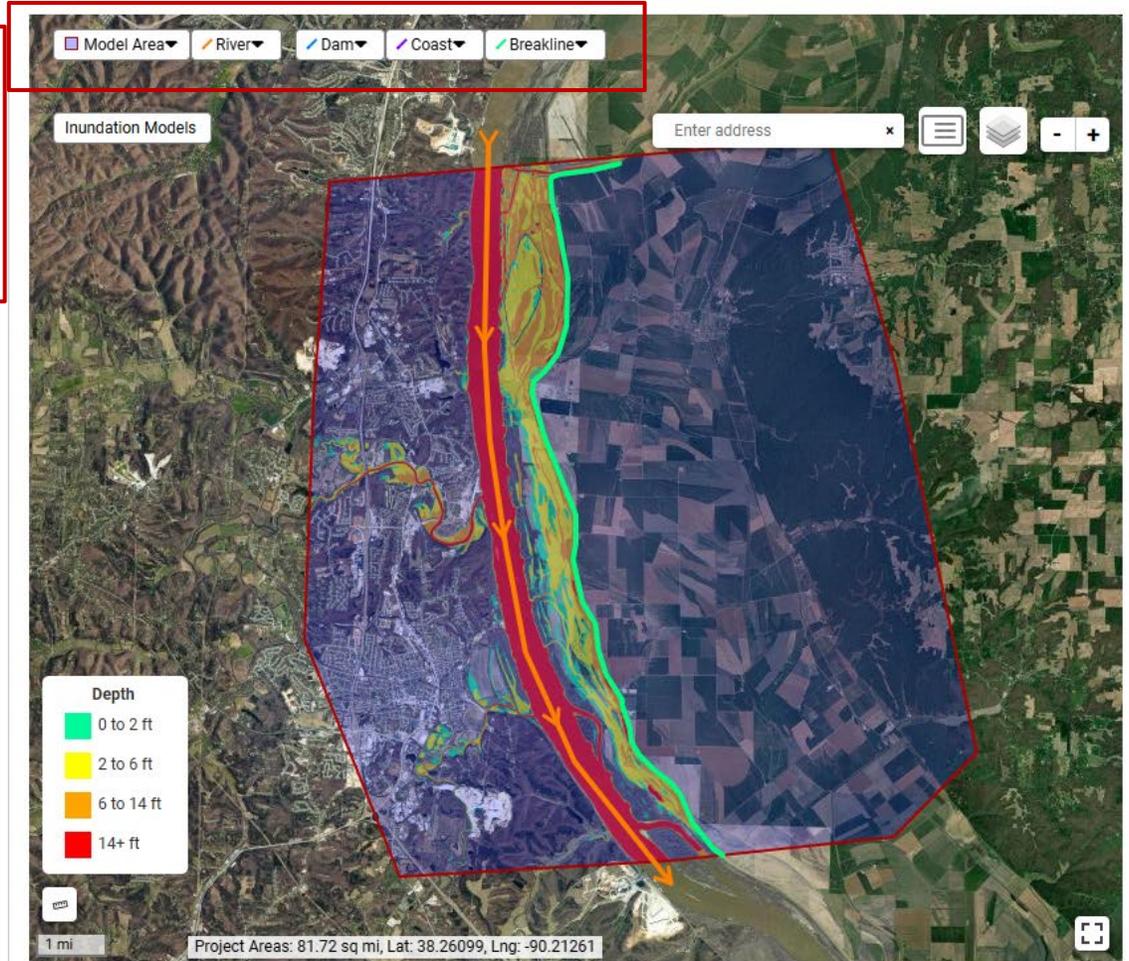
+ ADD NEW TERRAIN MOD

TERRAIN MOD NAME	LAST PROCESSED	ACTION(S)
Base	Success: 1/8/2025 10:38:49	

Flood Scenarios

+ ADD NEW

FLOOD SCENARIO NAME	MODEL CREATION	LAST COMPUTED	ACTION(S)
10K cfs	LSRI Data Entry	Success: 1/22/2025 16:52:19	
100K cfs	LSRI Data Entry	Success: 1/22/2025 18:26:55	
500K cfs	LSRI Data Entry	Success: 1/22/2025 18:34:26	





CONSEQUENCES TAB – INUNDATION



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute

System

Terrain options:

1. Download 10 meter from 3DEP
2. Upload terrain (HEC-RAS or GeoTiff)
3. Modify existing 3DEP or GeoTiff

NAME		
Model Area	2D Flow Area	
Levee System 5605170001	2D Breakline	
Mississippi River	River Reach	

Terrain Parameters

Prepare Terrain Data: LSRI Terrain User Uploaded Terrain

[Download NED Terrain to LSRI](#) Download Complete

[+ ADD NEW TERRAIN MOD](#)

TERRAIN MOD NAME	LAST PROCESSED	ACTION(S)
Base	Success: 1/8/2025 10:38:49	

Flood Scenarios

[+ ADD NEW](#) [UPLOAD](#) [RAS QUEUE](#) [DOWNLOAD](#)

FLOOD SCENARIO NAME	MODEL CREATION	LAST COMPUTED	ACTION(S)
10K cfs	LSRI Data Entry	Success: 1/22/2025 16:52:19	
100K cfs	LSRI Data Entry	Success: 1/22/2025 18:26:55	
500K cfs	LSRI Data Entry	Success: 1/22/2025 18:34:26	



CONSEQUENCES TAB – INUNDATION

TERRAIN MODIFICATIONS



Terrain Modifications

Name: Description: Feature: Modification Method: Width: Side Slope: Max Extent Width:

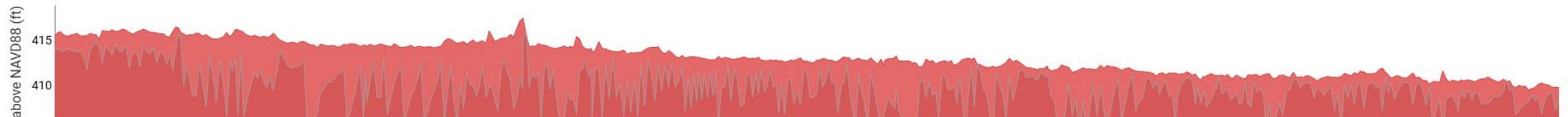
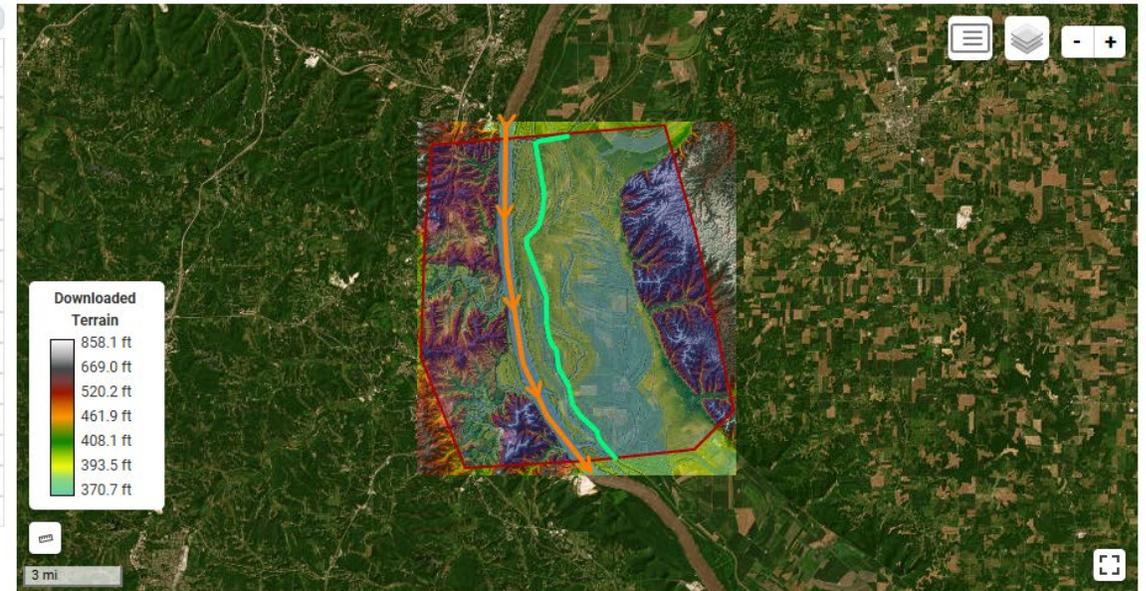
EXPORT IMPORT

INTERPOLATE RESET

STATION (FT)	TERRAIN ELEVATION	MINIMUM TERRAIN ELEVATION
26535.65	408.96	412.68
26591.92	411.45	412.78
26711.23	405.71	413.09
26833.06	409.68	412.80
26957.24	409.74	412.98
27084.22	412.04	412.91
27211.51	408.23	412.82
27338.83	411.78	412.77
27468.09	410.43	412.88
27597.69	407.61	412.91
27727.47	407.78	413.05
27853.56	411.06	412.90
27974.74	411.09	412.83
28092.45	408.53	412.91
28205.35	411.25	412.83

Showing 211 to 225 of 484 entries

Previous 1 ... 14 15 16 ... 33 Next



PROCESS TERRAIN

CLOSE



CONSEQUENCES TAB – INUNDATION



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute Consequence Results

Flood Scenario Editor

Name: 500K cfs [Optional Parameters](#)

Description: Enter description

Terrain Mod: Base

Boundary Conditions

NAME	TYPE	CONDITIONS
Mississippi River	River Reach	Upstream User-Defined H _y
		Downstream Normal Depth S
Model Area	2D Flow Area	Outflow NDS = 0.001

RUN STATUS QUEUE VIEW MAP

Inundation Models

Click on dam feature to view available time series outputs

FLOOD S	FOR SIO	LSRI Data Entry	Success: 1/22/2025 18:26:55
100K cfs	LSRI Data Entry	Success: 1/22/2025 18:26:55	
500K cfs	LSRI Data Entry	Success: 1/22/2025 18:34:26	

Project Areas: 81.72 sq mi, Lat: 38.28823, Lng: -90.20678



CONSEQUENCES TAB – INUNDATION



Flood Scenario Editor

Name: [Optional Parameters](#)

Description:

Terrain Mod:

Boundary Conditions

NAME	TYPE	CONDITIONS
Mississippi River	River Reach	Upstream <input type="text" value="User-Defined Hy"/>
		Downstream <input type="text" value="Normal Depth S"/>
Model Area	2D Flow Area	Outflow NDS = 0.001

Trapezoidal Complex

Type:

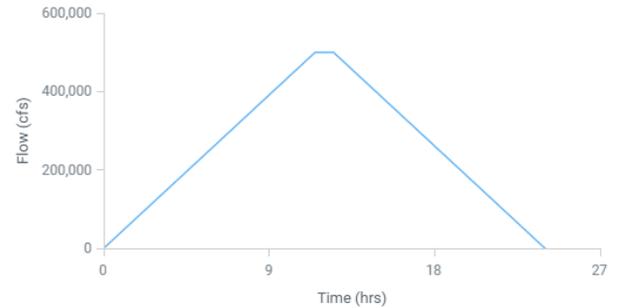
Base (cfs):

Total Duration (hrs):

Peak (cfs):

Peak Duration (hrs):

Critical Flow for Hazard Time (cfs):



Flood Scenario Editor

Name: [Optional Parameters](#)

Description:

Terrain Mod:

Boundary Conditions

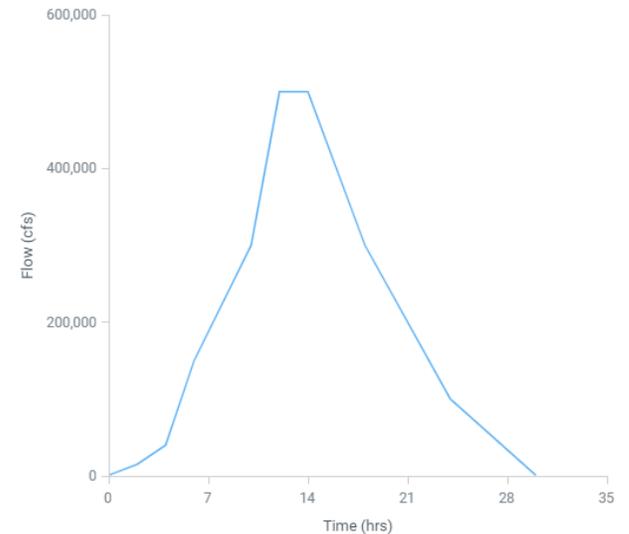
NAME	TYPE	CONDITIONS
Mississippi River	River Reach	Upstream <input type="text" value="User-Defined Hy"/>
		Downstream <input type="text" value="Normal Depth S"/>
Model Area	2D Flow Area	Outflow NDS = 0.001

Trapezoidal Complex

Type: Time Unit:

#	Time (hrs)	Flow(cfs)
5	10	300000
6	12	500000
7	14	500000
8	18	300000
9	24	100000
10	30	1000
11		
12		

Critical Flow for Hazard Time (cfs):





CONSEQUENCES TAB – INUNDATION



Flood Scenario Editor

Name: 500K cfs

Description: Enter description

Terrain Mod: Base

Boundary Conditions

NAME
Mississippi River
Model Area

RUN STATUS

Confirm

500K CFS

Model run request sent to

500K CFS

RasWrapper Console v1.0 (7/2)

Starting module from command

500K CFS

```
Creating Model
RAS PROCESS ID:22124
English Units
User defined hydrograph fit
Time(min),Loading(flow/stage
(0,1000 120,15000 240,40000

Checking Inputs

Setting Up Geometry
Creating Mesh
```

Extent calculated from geometry.
Extent EPSG: 3857
Creating png files with dataset: Depth
Writing 104 profiles.
Creating depth maps... 0%
Creating depth maps... 10%
Creating depth maps... 21%
Creating depth maps... 32%
Creating depth maps... 44%
Creating depth maps... 55%
Creating depth maps... 67%
Creating depth maps... 77%
Creating depth maps... 89%
Creating depth maps... 100%
Export Complete

01/23/2025 05:47:58 Publication Finished.

CLOSE

CLOSE



ADVANCED USERS – INUNDATION REFINEMENTS



There are various tips and tricks on how to setup inundation to make it more accurate and efficient, including but not limited to:

- Model area mesh cell size
- River alignment cell size, Manning’s N value override
- Optional parameters including time steps, Courant #, etc

Feature Parameters: River Reach

Feature Name	Mississippi River
River Width	100
Floodplain Width Multiplier	3
Preferred Min Cell Size	200
Manning's N (blank to not override)	0.035
Loading Location	Upstream End of Line
Loading Line Snap to Exterior of Flow Area	False (can increase flow area)
Restrict Geometry to Flow Area	True
Include Refinement Region	True

SAVE CANCEL

Feature Parameters: 2D Model Area

Analysis Area Cell Size (ft) 500

SAVE CANCEL

Optional Parameters

Computation Options

Include Warm-Up in Run:

Warm-Up Method: Warmup

Warm-Up Time Input Type: River Velocity (ft/s)

Warm-Up Time Input Value: 1

Force Run Time (hrs) After Loading: Computed

Solver Equations: Diffusion

Computational Timestep: 30 Seconds

Adjust Timestep with Courant Number:

Maximum Courant Number: 3

RESTORE ALL DEFAULTS

CLOSE



CONSEQUENCES TAB – INUNDATION RESULTS



Inundation Structure Inventory LifeSim Compute Consequence Results

System Features

NAME	TYPE	ACTION(S)
Model Area	2D Flow Area	
Levee System 5605170001	2D Breakline	
Mississippi River	River Reach	

Terrain Parameters

Prepare Terrain Data: LSRI Terrain User Uploaded Terrain

Download NED Terrain to LSRI Download Complete

+ ADD NEW TERRAIN MOD

TERRAIN MOD NAME	LAST PROCESSED	ACTION(S)
Base	Success: 1/8/2025 10:38:49	

Flood Scenarios

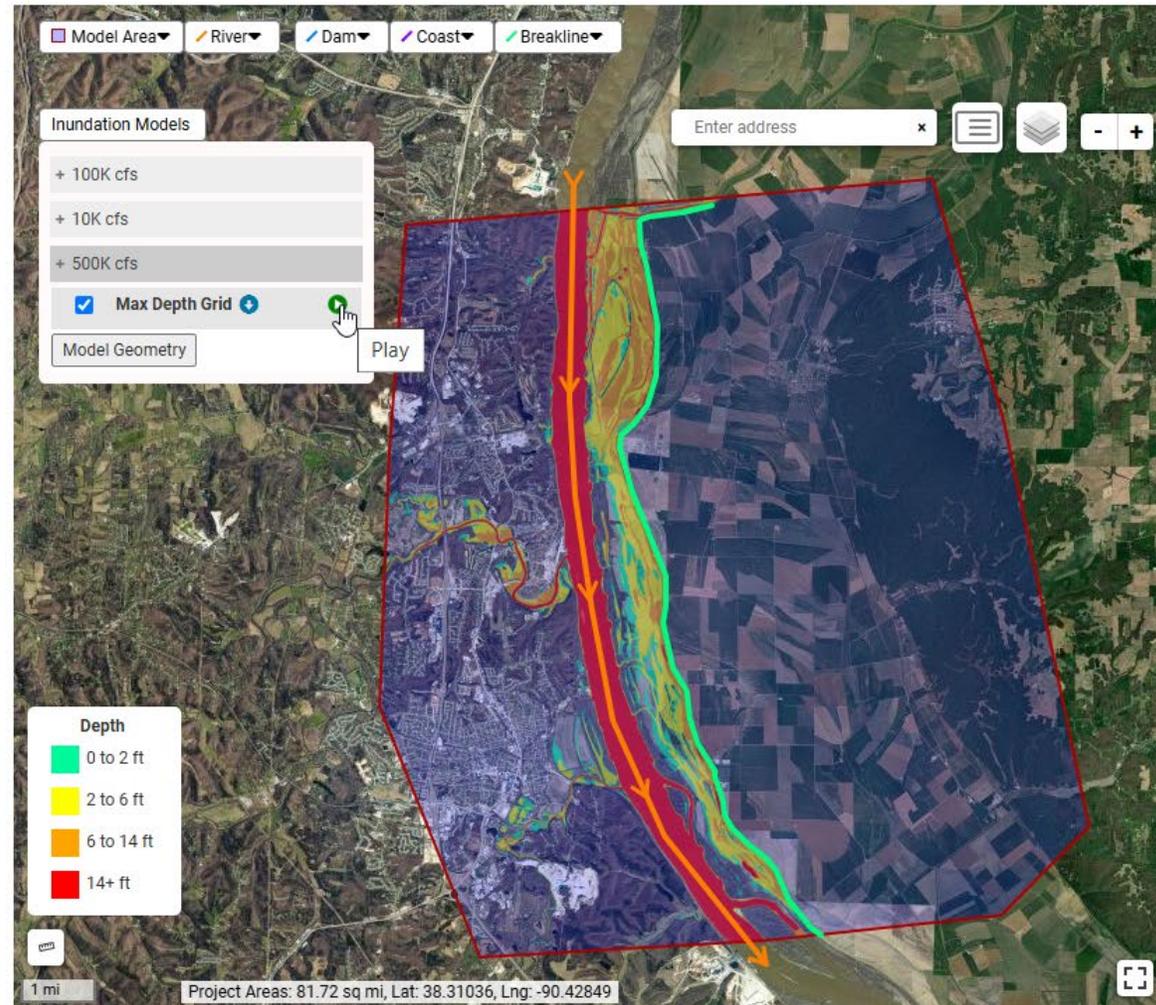
+ ADD NEW

UPLOAD

RAS QUEUE

DOWNLOAD

FLOOD SCENARIO NAME	MODEL CREATION	LAST COMPUTED	ACTION(S)
10K cfs	LSRI Data Entry	Success: 1/22/2025 16:52:19	
100K cfs	LSRI Data Entry	Success: 1/22/2025 18:26:55	
500K cfs	LSRI Data Entry	Success: 1/22/2025 21:47:58	





LSRI APPLICATION

CONSEQUENCES – STRUCTURE INVENTORY TAB



CONSEQUENCES TAB – STRUCTURE INVENTORY



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute Consequence Results

+ ADD NEW STRUCTURE INVENTORY

Base Inventory (Updated 1/22/2025 22:01:58)



Project Area Information

[Map](#) | [Structure Summary](#)

Structure Inventory ▾

Base Data

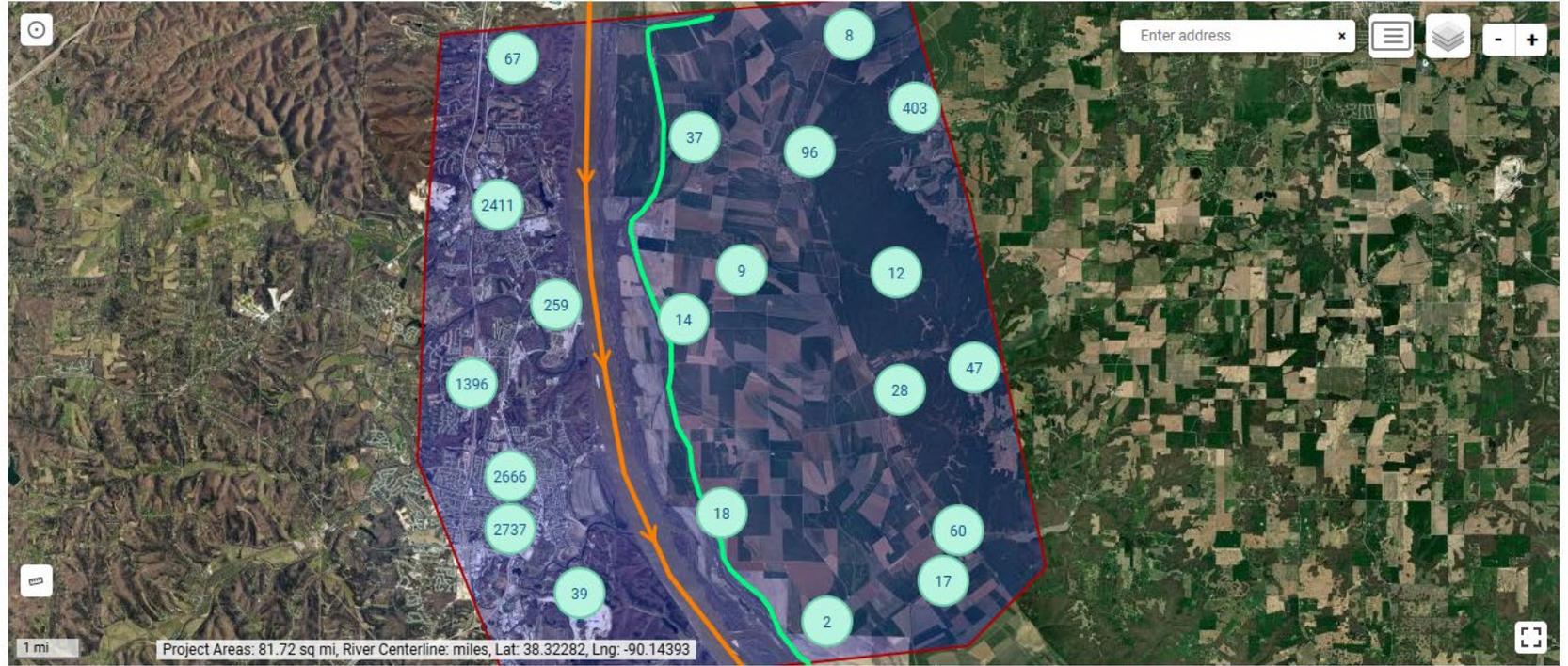
Day population in Project Area	23,597
Night population in Project Area	24,900
Number of Structures in Project Area	10,326
Property Value in Project Area (\$1000s)	6,552,291

Index Factors

Population Day Index Factor *	<input type="text" value="1"/>
Population Night Index Factor *	<input type="text" value="1"/>
Property Value Index Factor *	<input type="text" value="1"/>

Indexed Data (Used In Compute)

Daytime Population Estimate	23,597
Nighttime Population Estimate	24,900
Number of Structures in Project Area	10,326
Property Value in Project Area (\$1000s)	6,552,291



Comments

Enter Comment



CONSEQUENCES TAB – STRUCTURE INVENTORY



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute Consequence Results

+ ADD NEW STRUCTURE INVENTORY

Base Inventory (Updated 1/22/2025 22:01:58)



Project Area Information

[Map](#) | [Structure Summary](#)

Structure Inventory ▾

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Indexed Data (Used In Compute)

Daytime Population Estimate	23,597
Nighttime Population Estimate	24,900
Number of Structures in Project Area	10,326
Property Value in Project Area (\$1000s)	6,552,291

Enter address x

Damage Category: RES
 Number of Stories: 1
 Occupancy Type: RES1-1SWB
 Night population: 2
 Day population: 1
 Total Value: \$304,298

300 ft | Project Areas: 81.72 sq mi, River Centerline: miles, Lat: 38.23665, Lng: -90.37828

Comments

Enter Comment



CONSEQUENCES TAB – STRUCTURE INVENTORY



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute Consequence Results

+ ADD NEW STRUCTURE INVENTORY

Base Inventory (Updated 1/22/2025 22:01:58)



Project Area Information

[Map](#) | [Structure Summary](#)

Structure Inventory ▼

Base Data

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Index Factors

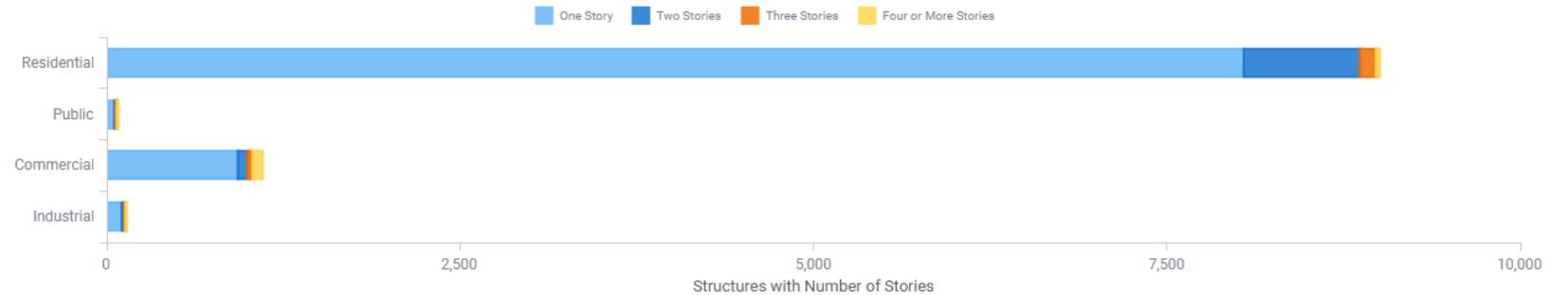
Population Day Index Factor *	<input type="text" value="1"/>
Population Night Index Factor *	<input type="text" value="1"/>
Property Value Index Factor *	<input type="text" value="1"/>

Indexed Data (Used In Compute)

Daytime Population Estimate	23,597
Nighttime Population Estimate	24,900
Number of Structures in Project Area	10,326
Property Value in Project Area (\$1000s)	6,552,291

DAMAGE CATEGORY	POPULATION				STRUCTURE		
	UNDER 65 DAY	OVER 65 DAY	UNDER 65 NIGHT	OVER 65 NIGHT	# STRUCTURES	STRUCTURAL VALUE (\$1000)	CONTENT VALUE (\$1000)
Residential	8,468	2,817	20,856	2,817	9,006	1,851,349	925,675
Public	3,408	24	21	0	79	175,840	181,391
Commercial	7,110	952	510	664	1,101	1,374,604	1,424,326
Industrial	780	38	32	0	140	255,000	364,107
Total	19,766	3,831	21,419	3,481	10,326	3,656,793	2,895,498

[Number of Stories](#) | [Construction Type](#) | [Foundation Height](#)



Comments

Enter Comment



NATIONAL STRUCTURE INVENTORY (NSI)



- Developed by USACE to support damage assessments
- Based on data from nationally available data sources
 - Microsoft building footprints, Longitudinal Employer-Household Dynamics, National Center for Education Statistics, etc.
- Freely available
- Details here:
 - <https://www.hec.usace.army.mil/confluence/nsi/technicalreferences/latest/technical-documentation>



LSRI APPLICATION

CONSEQUENCES – LIFESIM COMPUTE

Estimate potential loss of life and direct property damages for the flood scenarios created on the inundation tab



CONSEQUENCES TAB – LIFESIM COMPUTE



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute Consequence Results

+ ADD NEW EM SCENARIO

Base EM Scenario (Updated 1/22/2025 21:48:29)



▶ EXPAND ALL

Evacuation Planning ⓘ

Which category best describes the emergency evacuation planning for the community or communities located in the impacted area?

Unknown ▼

▶ Comments (0 characters)

Community Awareness ⓘ

Which category best describes the flood risk awareness of the community or communities located in the impacted area?

Unknown ▼

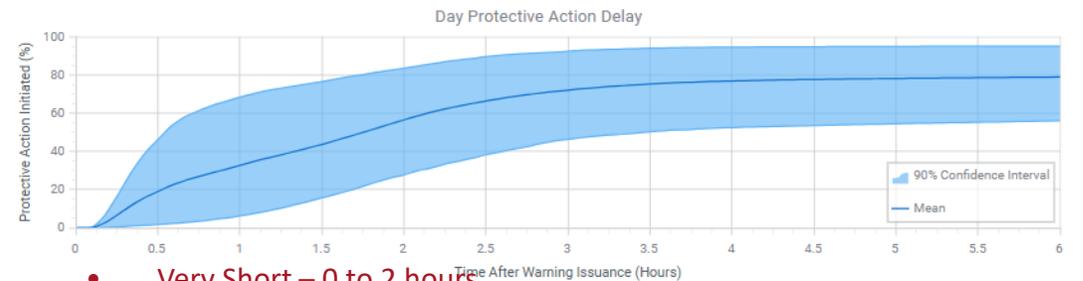
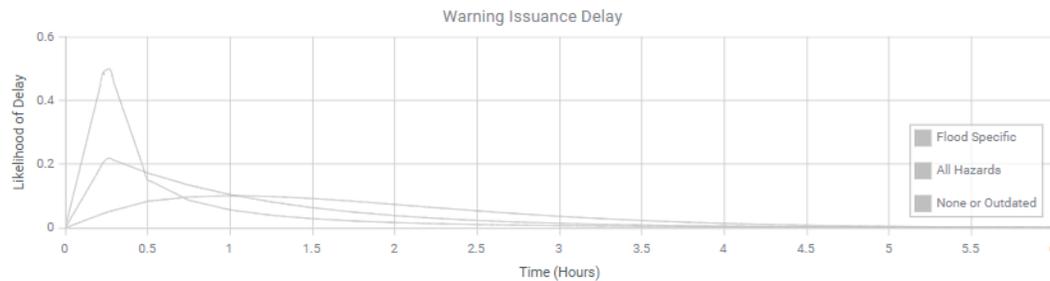
▶ Comments (0 characters)

Flood Warning Effectiveness ⓘ

Which category best describes the flood warning capabilities of the community or communities in the impacted area?

Unknown ▼

▶ Comments (0 characters)



Hazard Advanced Notice

How would you describe the amount of warning time available prior to first structure getting wet?

▶ Comments (0 characters)

- Very Short – 0 to 2 hours
- Short – 2 to 4 hours
- Moderate – 4 to 8 hours
- Long – 8 to 24 hours
- Very Long – 24 to 48 hours

Moderate ▼

+ ADD NEW LIFESIM COMPUTE RUN LIFESIM STATUS LIFESIM QUEUE

LIFESIM COMPUTE NAME	FLOOD SCENARIO	LAST HEC-RAS RUN	STRUCTURE INVENTORY	EM SCENARIO	INCLUDE IN LIFESIM	ACTION(S)
Base Lifesim Compute	Select an option... ▼	N/A	Select an option... ▼	Select an option... ▼	<input checked="" type="checkbox"/> Not Run	



CONSEQUENCES TAB – LIFESIM COMPUTE



Project Information **Consequences** Risk

Inundation Structure Inventory LifeSim Compute Consequence Results

+ ADD NEW EM SCENARIO

Base EM Scenario (Updated 1/22/2025 21:48:29)

▶ EXPAND ALL

Evacuation Planning ?

Select the rating that best describes the threatened community's flood emergency evacuation planning. Contact the local emergency management agency (EMA) for information about evacuation planning for the community or communities located within the model area polygon. Based on the current evacuation plan, if any, and other relevant information collected from people familiar with evacuation planning in the area, rate evacuation planning using the following guidelines:

- Flood Specific – The local EMA maintains a warning and/or evacuation plan for the community that contains specific information about the content of a message that would be provided in the case of a flood emergency. That content includes a description of the flood threat, specific information on the locations at risk, what actions the public should take and how to take them (which evacuation routes to take), when the at-risk population should start and complete those actions, and why taking those actions is a good idea. Also, a successful recent evacuation regardless of evacuation plan detail could lead to an acceptable rating.
- All Hazards – The local EMA maintains a warning or evacuation plan for the threatened community, but it does not have message templates or directions that would suggest the information defined under the Acceptable rating would be provided to the public in a timely manner.
- None or Outdated – An evacuation plan does not exist for the threatened community.

communities located

ated in the impa

es in the impacte

warning issuance delay



CONSEQUENCES TAB – LIFESIM COMPUTE



+ ADD NEW EM SCENARIO

Base EM Scenario (Updated 1/22/2025 21:48:29)



▶ EXPAND ALL

Evacuation Planning

Which category best describes the emergency evacuation planning for the community or communities located in the impacted area?

Unknown

▶ Comments (0 characters)

Community Awareness

Which category best describes the flood risk awareness of the community or communities located in the impacted area?

Unknown

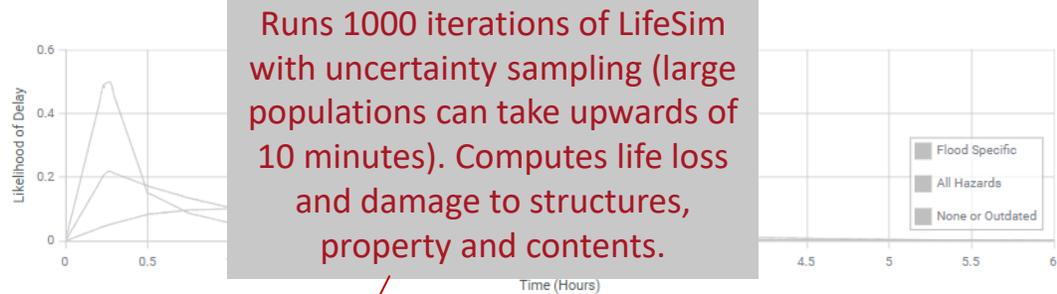
▶ Comments (0 characters)

Flood Warning Effectiveness

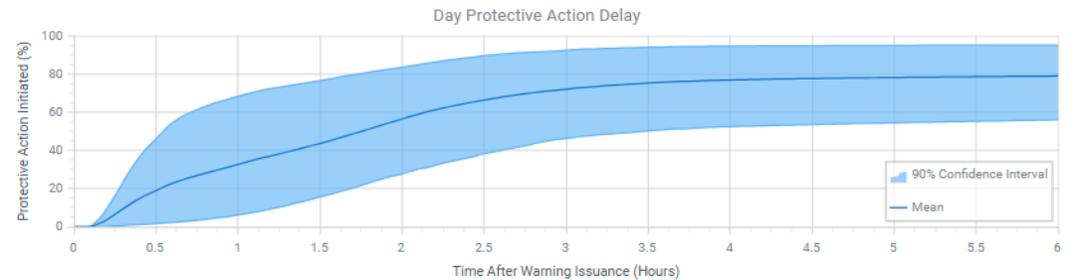
Which category best describes the flood warning capabilities of the community or communities in the impacted area?

Unknown

▶ Comments (0 characters)



Runs 1000 iterations of LifeSim with uncertainty sampling (large populations can take upwards of 10 minutes). Computes life loss and damage to structures, property and contents.



Hazard Advanced Notice

How would you describe the amount of warning time available prior to first structure getting wet?

Moderate

▶ Comments (0 characters)

+ ADD NEW LIFESIM COMPUTE **RUN LIFESIM** STATUS LIFESIM QUEUE

LIFESIM COMPUTE NAME	FLOOD SCENARIO	LAST HEC-RAS RUN	STRUCTURE INVENTORY	EM SCENARIO	INCLUDE IN LIFESIM	ACTION(S)
Base Lifesim Compute	Select an option...	N/A	Select an option...	Select an option...	<input checked="" type="checkbox"/> Not Run	



LSRI APPLICATION

CONSEQUENCES – CONSEQUENCE RESULTS

Review LifeSim Results



CONSEQUENCES TAB – CONSEQUENCE RESULTS



Project Information **Consequences** Risk

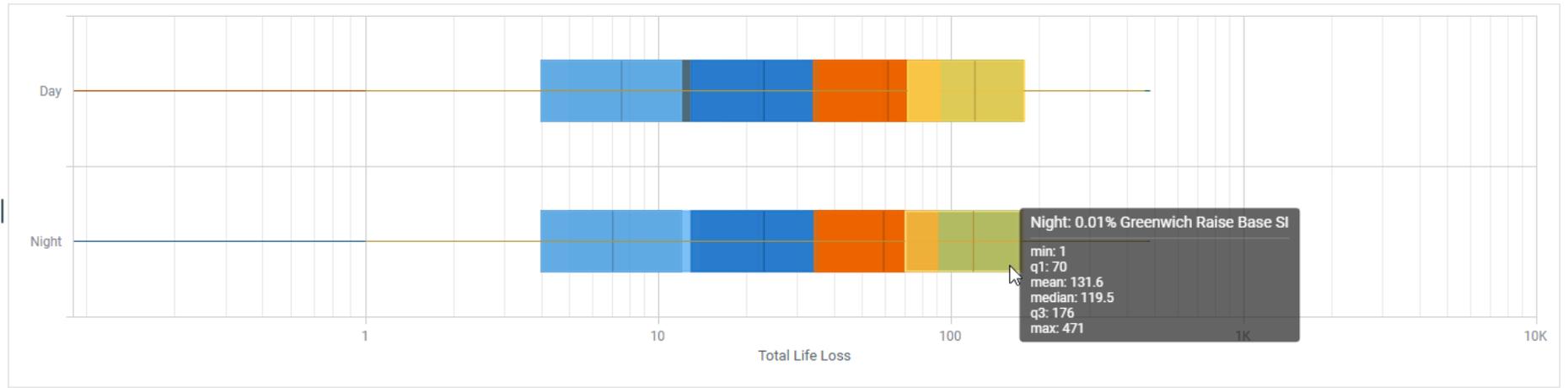
Inundation Structure Inventory LifeSim Compute Consequence Results

▶ Consequence Narrative (0 characters)

Summary Results

- Select All
- Base Lifesim Compute
- 0.5% Base Inventory
- 0.1% Base Inventory
- 0.01% Base Inventory
- 1% with Non-structural
- 0.5% with Non-structural
- 0.1% with Non-structural
- 0.01% with Non-structural
- 1% Greenwich Raise Base SI
- 0.5% Greenwich Raise Base

Selected Consequence
Life Loss



Default x-axis scale:

Auto x-axis scale:



LSRI APPLICATION

RISK TAB



RISK TAB



Project Information Consequences **Risk**

+ ADD NEW RISK

RISK CALCULATION NAME	EXPECTED ANNUAL LIFE LOSS	EXPECTED ANNUAL DAMAGE	COMPARE WITH	EALL REDUCED	EAD REDUCED	ACTION(S)
Existing conditions	1.35	\$296,509,019.64	Select one...	N/A	N/A	
Greenwich Road Raise	1.19	\$234,236,433.97	Existing conditions	0.16	\$62,272,585.68	
Raised buildings near Battery	1.21	\$291,197,296.06	Existing conditions	0.14	\$5,311,723.58	
SBMs to 13'	0.37	\$44,632,745.68	Existing conditions	0.98	\$251,876,273.96	

+ ADD LSRI

RISK CALCULATION NAME	EXPECTED ANNUAL LIFE LOSS REDUCED	EXPECTED ANNUAL DAMAGE REDUCED	EXPECTED PROJECT COST	CSSL ?	SUBMIT FOR LSRI	ACTION(S)
Z - LSRI Submit - 1% Proposed Design	0.96	\$246,714,843.71	\$151,013,000.00	\$157,037,345.15	<input checked="" type="checkbox"/>	



LSRI risk table. It is a slightly modified approach to quickly calculate potential risk reduction.



RISK TAB



Add additional rows for each flood scenario. Need at least 2.

First row is the annual exceedance probability of event for when damages start to occur in project area. If unknown, 0.1 (10-year) is usually a reasonable estimate.

Risk Calculation

Risk Calculation Name

Existing conditions

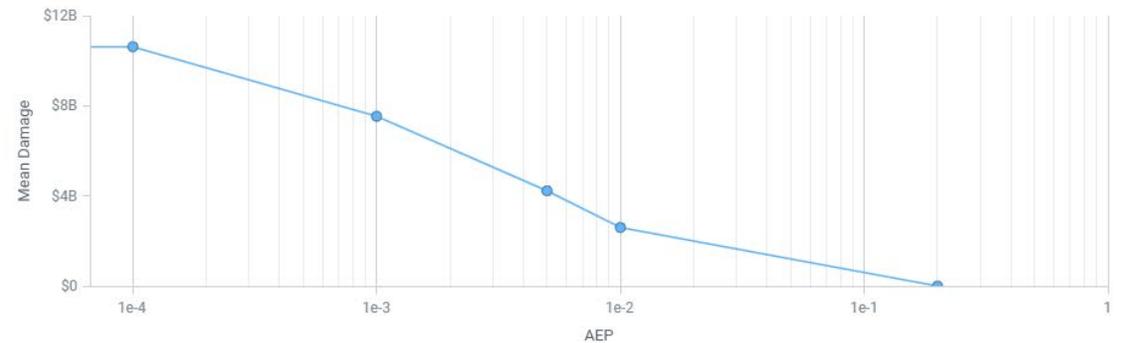
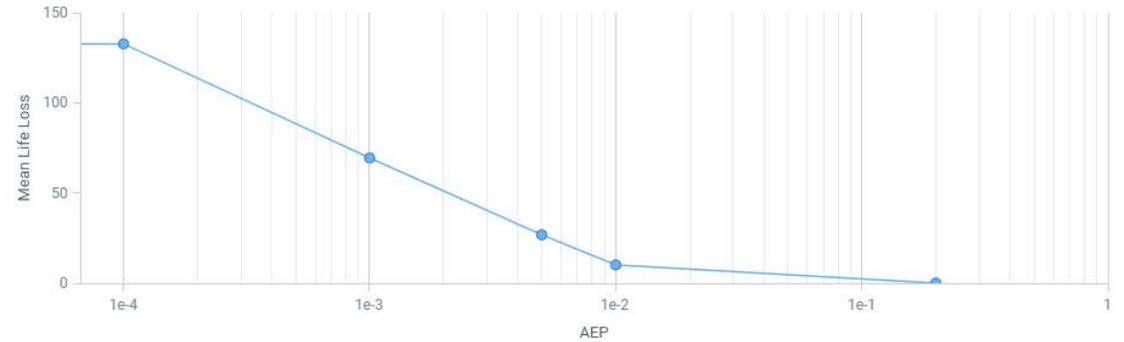
+ ADD ROW EALL: 1.35

EAD: \$296,509,019.64

AEP	LIFESIM COMPUTE	MEAN LIFE LOSS	MEAN DAMAGE	ACTIONS
0.2	N/A	0	\$0.00	
0.01	Base Lifesim Compute	10.12	\$2,596,998,354.84	
0.005	0.5% Base Inventory	26.80	\$4,223,661,450.84	
0.001	0.1% Base Inventory	69.43	\$7,532,495,827.37	
0.0001	0.01% Base Inventory	132.73	\$10,619,252,253.36	

Annual exceedance probability associated with user defined inundation scenario.

Automatically populated from LifeSim results.



SAVE AND CLOSE

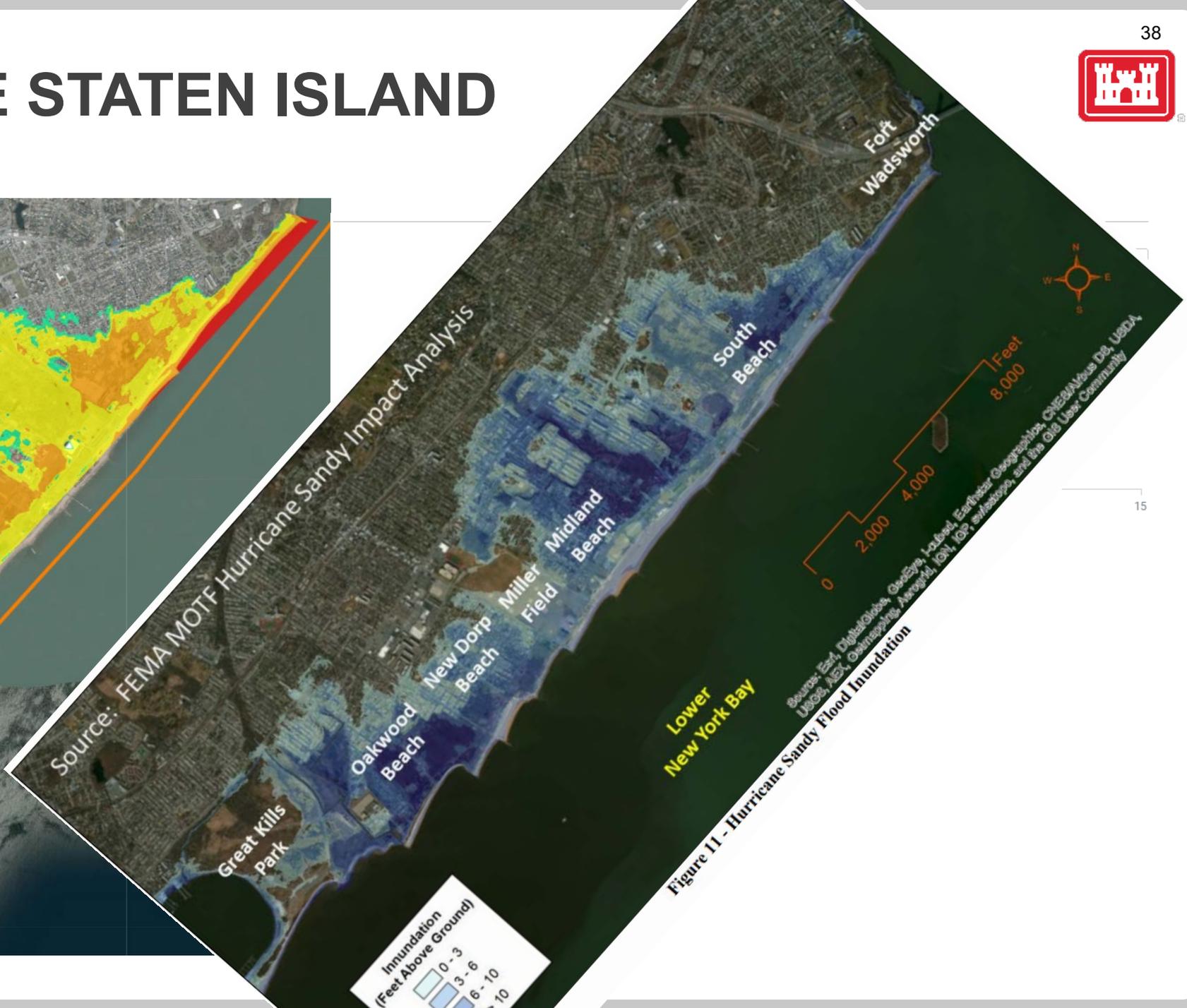
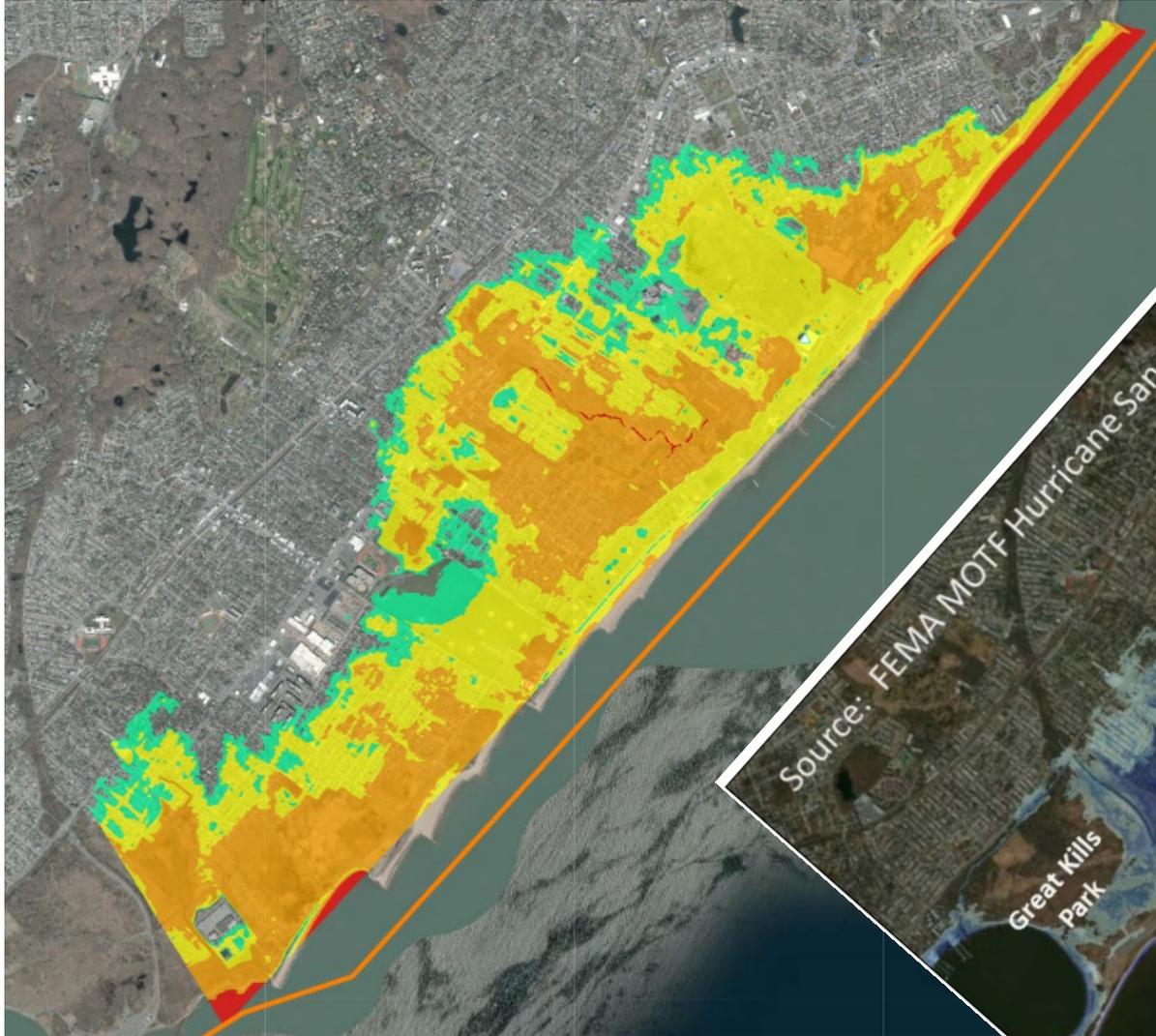


LSRI APPLICATION

EXAMPLE VALIDATION STUDY



SOUTH SHORE STATEN ISLAND



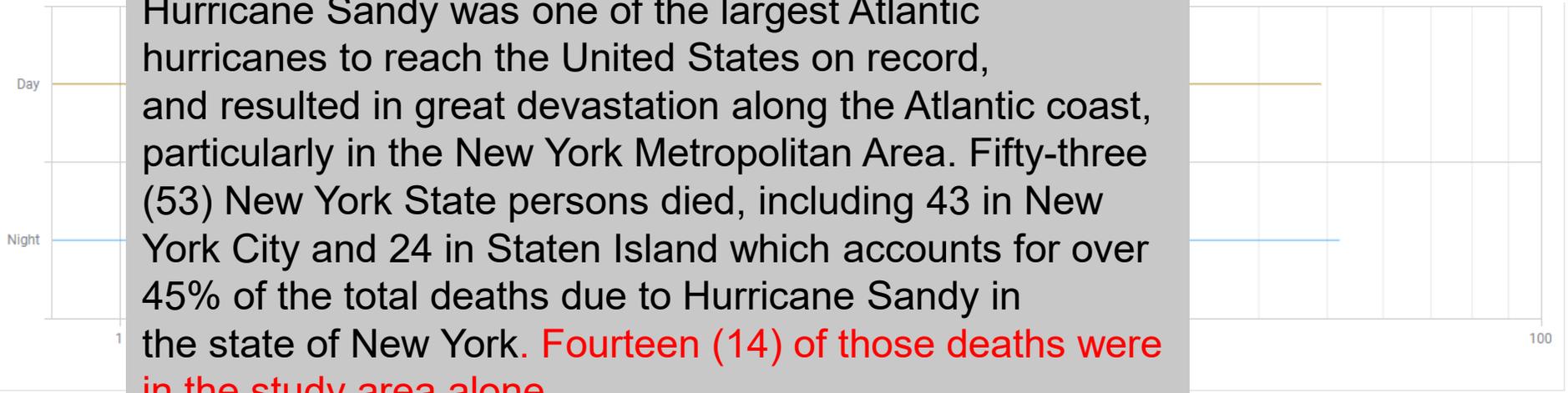


SOUTH SHORE STATEN ISLAND



Selected Consequence

Life Loss



Inundation Group Results

PARAMETER	DAY	NIGHT
PAR	30,793	30,793
Exposed Population	1,629	1,627
% of PAR Exposed	5.29%	5.28%
Median Life Loss	9	9
Fatality Rate	0.55%	0.55%
Mean Life Loss (Exposure Weighted)	11.23	
Mean Life Loss as % of PAR	0.04%	
Weighted Fatality Rate (% of Exposed PAR)	0.60%	
Property Damages	\$1.50B	
# Structures Inundated	9,273	



LSRI BENEFITS



Accessibility

- Web-based application (no installation or downloads required)
- Username and password is only requirement to access
- Collaboration - easy to allow other users to view and/or edit screenings

Scalability

- Complete screening-level risk assessment with minimal data requirements in less than a day
- Allows for more refined, detailed user input to reduce uncertainty
- HEC-RAS models and LifeSim data can be downloaded and refined to support traditional analysis in later phases

Transparency

- Applies industry standard tools and processes to develop components of risk estimate
 - HEC-RAS for inundation mapping
 - NSI and LifeSim for estimating potential economic damage and life loss
- Users can download models from tools above for review outside of the LSRI
- Users can upload results from existing HEC-RAS models for use within LSRI