



January 5, 2020

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Project: Statewide Multi-Hazard Risk Assessments (TEIF/TEAL)
Project Number: FEMA-4273-DR-WV-0031
Performance Period: 6/20/2018 – 6/4/2021

Quarterly Report - Description of Work: 1st Quarter FY 2020 (10/01/2019 to 12/31/2019)

Dear Brian,

Below is the Description of Work completed during the 1st Quarter Fiscal Year 2020.

The work tasks are organized the same as the corresponding goals and deliverables. A total of 15 deliverables align with the work tasks or goals: 6 flood risk assessment, 5 landslide risk assessment, and 4 data development.

Table 1. Deliverables organized by three major work tasks: flood risk assessment, landslide risk assessment, and data development. There are a total of 15 principal work tasks or deliverables for the entire project. System administrative tasks are not included.

Major Work Tasks	Designation Letter	Work Tasks Goals Deliverables
Flood Risk Assessments	F	6
Landslide Risk Assessments	L	5
Data Development	D	4

Table 2. Work Completed for WV Statewide Multi-Hazard Risk Assessments

WORK TASKS / GOALS / DELIVERABLES (2018-2021)

HMGP Grant: Multi-Hazard Risk Assessments

FLOOD RISK ASSESSMENT

TASK F1: [Site-specific flood risk assessments for 287 Incorporated/Unincorporated Communities]

Employed FEMA’s OpenHazarus Flood Assessment Structure Tool (FAST) to generate flood loss estimates. Coordinated execution of utility with FEMA’s Hazus Support Team. Here is the link to the latest FAST utility download: <https://hazus-support.msc.fema.gov/Updates/112919/FAST.zip>

Example Building Flood Risk Assessment: Building ID 19-04-0013-0058-0000_97
<http://www.mapwv.gov/floodtest/?wkid=102100&x=-8659258&y=4763023&l=10&v=2>

Click on each tab to view information		
Address	Parcel	Risk
Building #1 in Parcel: 19-04-0013-0058-0000		
Flood Exposure for Building: 19-04-0013-0058-0000_97		
Building Replacement Cost	\$74,800	
Content Cost	\$37,400	
Building Area	1,088 sq ft	
Occupancy Class	RES1	
Number of Stories	1	
Year Built	1971 (Pre-FIRM)	
Foundation Type	Slab-on-Grade	
First Floor Height	1 ft above ground	
Water Depth-in-Structure	9.9 ft	
Flood Damage Estimates for Building: 19-04-0013-0058-0000_97		
Building Damage Pct	73%	
Building Loss USD	\$54,506	
Content Damage Pct	76%	
Content Loss USD	\$28,375	
Inventory Damage Pct	0%	
Inventory Loss USD	\$0	

Preliminary results in tabular and GIS formats need to be validated. A flood assessment report for Jefferson County will summarize flood loss estimates by community in tabular form and is the next milestone to accomplish.

TASK F2: [Statewide geodatabase of site-specific flood risk structures]

Continued preliminary data model development for the Flood Risk Assessment Geographic Information System (FRAGIS), a detailed geodatabase of the characteristics and damage estimates of structures in the Special Flood Hazard Areas. This input model data is referred to as “User-Defined Facilities” in FEMA’s Hazus modeling software.

Verified primary buildings and exposure values for structures located in the 100-year regulatory and non-regulatory floodplains for 16 counties: 5 counties in editing phase; 7 counties in QC; 4 counties in which the preliminary building flood risk assessment data has been published to WV Flood Tool.

Published draft schema for FRAGIS data streams:

https://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/Data_Streams_for_CRS_Self-Assessment_20191127.pdf

TASK F3: [3D flood risk visualizations]

No update.

TASK F4: [Assemble statewide composite flood risk products]

Updated statewide composite flood risk depth grids for flood loss estimate models. Performed a gap analysis of depth grids in Advisory A Zones for West Virginia and communicated results to State NFIP Office and FEMA Region III. Updated buildings in SFHA (bSF) for communities with completed enhanced building inventories.

TASK F5: [Update State Hazard Mitigation Plan]

No update.

TASK F6: [Publish flood risk data and products to WV Flood Tool]

Started configuring and publishing hazard risk assessment layers to FloodTest development server.

<https://www.mapwv.gov/floodtest/?wkid=102100&x=-8659273&y=4763062&l=9&v=2>

The screenshot shows a sidebar menu for a flood risk assessment tool. The categories and their sub-options are:

- BUILDING-LEVEL RISK: 100-YEAR FLOOD**
 - Future Map Conditions
 - Building Exposure Cost
 - New Development & Basement
 - Building Damage Loss Estimate
- CRITICAL INFRASTRUCTURE**
 - Essential Facilities
 - Community Assets
 - Dams
 - Render By: Hazard Level Owner
 - Levees
- OPEN SPACE PRESERVED**
 - Mitigated Buyout Property
 - Private Land (Nature Preserves, Land Trusts)
 - Public Land (minus Fed. Lands)
- HIGH WATER MARKS & STREAM GAGES**
- OTHER NATURAL HAZARDS**
 - Landslides
- FLOOD DEPTH**

Story Maps: In partnership with others, continued development of web Story Maps for the major flood disasters of November 1985 and June 2016 in West Virginia.

- Flood Risk in West Virginia: What We Learned from the June 2016 Flood
<https://wvu.maps.arcgis.com/apps/Cascade/index.html?appid=32292859b21b44e99c0be706f6da8aa3>
- 2016 Flood: WV Flooded Towns, June 2016. The Historic Flooding of Southern West Virginia on June 23, 2016
<https://wvu.maps.arcgis.com/apps/Cascade/index.html?appid=7b98379452094cd6827dc8f09c8293bd>
- 1985 Flood: The Historic WV Flooding of November 4-5 1985
<https://wvu.maps.arcgis.com/apps/Cascade/index.html?appid=8c8fd107215443b98dbd61252a9c6c40>

Flood Risk Assessment Presentations and Meetings:

Presentation to FEMA Region III, USACE, NRCS, and WVU LUSD Law Clinic on 12/12/2019
https://data.wvgis.wvu.edu/pub/temp/FEMA/HMGP/Flood_RA_HMGP_meeting_20191212.pdf

Meeting with USACE Silver Jackets Team on 12/13/2019 to coordinate hazard mitigation grant support.
https://data.wvgis.wvu.edu/pub/temp/USACE/LRH_WestVirginia_Hazard_Grant_Mitigation_Support_PhaseII.pdf

Future presentation at 2020 Interagency Flood Risk Management Training Seminars on February 23 in St. Louis, Missouri. <https://evt.nfrmp.us/>

LANDSLIDE RISK ASSESSMENT

TASK L1: [Landslide Inventory]

Captured and published a total of 121,893 landslide incident points. Of these points, 93,043 were captured from previous landslide studies and 28,850 were mapped from Lidar-derived digital elevation sources.

TASK L2: [Landslide Method Development]

Knowledge experts employed at West Virginia University were identified and hired to collaborate on the project. Experts include Dr. Steve Kite (Geomorphologist), Dr. James Thompson (Soil Scientist), Dr. Aaron Maxwell (Geologist/Modeler), and Dr. Maneesh Sharma (Geologist/GIS).

- Generated a landslide susceptibility model for the Valley and Ridge physiographic region using a machine learning technique called Random Forest.
- Analyzed terrain and non-terrain (roads, hydrology, geology, soils) predictor variables. Professor Aaron Maxwell is conducting the modeling.

TASK L3: [County-Level Landslide Map and Report Generation]

Produced a pilot Landslide Susceptibility Map for Pendleton County.

TASK L4: [Publish to Landslide Web Application]

Updated operational, reference and background layers to Landslide Inventory Tool (www.mapwv.gov/landslide)

Two Story Maps associated with landslides

- West Virginia Landslides and Slide-Prone Areas, WVGES 1976 (<https://arcg.is/1KDnvg>)
- Causes of Landslides in Mountain State, West Virginia (<https://arcg.is/1SW0Sn>)

TASK L5: [Update State Plan]

No update

Landslide Risk Assessment Presentations and Meetings:

Presentation about project to WV Geological & Economic Survey on 10/10/2019

https://data.wvgis.wvu.edu/pub/temp/FEMA/HMGP/Landslides_WVGES_20191010.pdf

Meeting with Kentucky Geological Survey (Matt Crawford) on 10/31/2019. The KGS was awarded a FEMA Pre-Disaster Mitigation grant to create landslide inventory and susceptibility maps to support local hazard mitigation plans for five eastern Kentucky counties.

http://www.uky.edu/KGS/landslide/landslide_research_fema.php

Presentation to FEMA Region III on 12/12/2019

https://data.wvgis.wvu.edu/pub/temp/FEMA/HMGP/Landslides_HMGP_meeting_20191212.pdf

Future meeting on January 22 with Anne Carter Witt, Geohazards Specialist, Virginia Department of Mines, Virginia. Virginia has also received a FEMA grant for landslide hazards.

DATA DEVELOPMENT & EXCHANGE OF RISK INFORMATION

TASK D1: [Statewide Building Inventory]

Continued the structure-level inventory of all buildings and facilities exposed to multi-hazards. Data resources for site-specific building information and identification include the site address, parcels, assessment records, leaf-off imagery, building footprints, insurance and business databases, critical facilities, etc. This task provides the building exposure information for multi-hazard assessments.

TASK D2: [Fill in GIS Data Gaps of Key Reference Layers]

Two statewide data contracts were awarded to vendors to fill GIS data gaps for select communities. The development of GIS map reference layers, specifically parcels, addresses, and aerial imagery, is necessary to fulfill the requirements of county and state hazard risk assessments and products. Parcels/assessment records, E-911 addresses, and leaf-off imagery are important for pinpointing and cataloging at-risk structures.

- PARCELS/ADDRESSES: Contract awarded to Atlas Geographic Data Inc. for parcel/address mapping for targeted communities
 - [http://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/Contracts/Digital_Tax_Maps_and_Addresses-Contract_20190114_\(U19ATLAS\).pdf](http://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/Contracts/Digital_Tax_Maps_and_Addresses-Contract_20190114_(U19ATLAS).pdf)
 - Parcel MOUs signed by six county assessor offices; FEMA grant dollars obligated \$306,513; local government cost share \$27,474
 - Address MOUs signed for by seven county offices; four in progress; FEMA grant dollars obligated \$75,920; local government cost share \$81,629
- 2019 LEAF-OFF AERIAL IMAGERY: Contract awarded to Blue Mountain / Thrasher Group for leaf-off imagery for targeted counties
 - http://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/Contracts/WV_State_Aerial_Imagery_Contract_U19THRASHER_20190227.pdf
 - Leaf-Off imagery MOUs signed for 13 counties
 - FEMA grant dollars obligated \$56,958; local government cost share \$205,536
 - Atlas Geographic Data Inc. and WVGISTC performed QC on imagery deliverables
 - Mingo and Webster Counties could not be flown in 2019 and will be flown spring 2020
 - Identifying counties for acquisition of spring 2020 aerial imagery

TASK D3: [Report Data Gaps of Reference Layers]

Data gaps of key reference layers for select communities continue to be identified and corrected under Task D2.

TASK D4: [Exchange Risk Assessment Information]

Drafted community engagement document:

https://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/Community_Self-Assessment_for_HMP_Draft_20191210.docx

Work continuing on risk assessment for Jefferson County pilot and information exchange.

Project Overview: The Statewide Hazard Mitigation Project funded by the FEMA Hazard Mitigation Grant Program (HMGP) involves three major components. The grant recipient and sub-recipient are the State Hazard Mitigation Office (Brian Penix) and the WV GIS Technical Center at West Virginia University (Kurt Donaldson), respectively. Refer to [Project Narrative](#) for more details.

- **Flood Risk Assessments**: Create site-specific flood risk assessments for 287 communities (232 municipalities and 55 unincorporated areas. Referred to as the Total Exposure in Floodplains (TEIF) project. Results will be published on the WV Flood Tool (www.mapwv.gov/flood) and to the Flood Risk Assessment Geographic Information System (FRAGIS).
- **Landslide Risk Assessments**: Generate landslide incident and susceptibility maps for 55 counties. Referred to as the Total Exposure in Areas of Landslides (TEAL) project. Results will be published on the WV Landslide Tool (www.mapwv.gov/landslide).
- **GIS Data Development**: The development of complete and current community boundaries, parcels, site addresses, and leaf-off imagery is necessary to fulfill the requirements of county and state hazard risk assessments and products. These GIS data layers are essential for pinpointing and estimating building loss for at-risk structures and facilities.

Link to Project Narrative: http://data.wvgis.wvu.edu/pub/temp/FEMA/FRA/p/WVU-1_HMGP_ProjectNarrative_09282018.pdf

Timeline: The performance period for the Statewide Multi-Hazard Risk Assessments (Project Number: FEMA-4273-DR-WV-0031) is 6/20/2018 to 6/4/2021. Outputs of this project include the flood and landslide risk assessments for upcoming local and state hazard mitigation plan updates.

Please contact me if you have any questions.

Sincerely,



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