Customer and Data Services (CDS)

Hazus Release 3.0

User Release Notes

Version 0.4

November 13, 2015

Document Management History

Revision History

Version Number	Date	Summary of Changes	Team/Author
0.1	10/05/15	Initial version	Risk MAP CDS
0.4	11/13/2015	Additional information	Risk MAP CDS
0.5	11/13/2015	Added the default EQ Scenario to Known Issues	Risk MAP CDS

Table of Contents

1. Introduction

Hazus Release 3.0 is part of a larger effort within the Risk MAP program to modernize the Hazus application. The primary goals of the Hazus Modernization effort are to:

1. Modernize the application from a technical standpoint to make best use of new software, databases, and spatial analysis products
2. Provide functional updates which allow Hazus to more closely align with Risk MAP program objectives

The current version of Hazus, Release 2.2 SP01 which was deployed on May 18, 2015, included functional changes in support of the Risk MAP program but did not include any modernization of the underlying software architecture.

The November 16, 2015 release of Hazus 3.0 addressed some of these architectural changes. This release will be provided as a full versioned release, made available for download through the Hazus MSC website. State data files available for download on the MSC website will also be updated to be compatible with Hazus 3.0, and the current option of downloading either a homogeneous or dasymetric datasets will be removed and replaced with a single, unified dataset incorporating both types of data.

Since this release will be a major version update for the Hazus software, users of any older Hazus versions will need to uninstall Hazus on their computers and install the new version. Users who want to know a little more about how to install or uninstall Hazus can check out the Download Tutorial and Quick Reference Guide on the FEMA Document Library and the Getting Started Guide, also available in the Document Library. Note: although the container may say 2.1 manuals, these are the most recent versions and can be used with more recent versions of Hazus.

Users wishing to preserve their study regions and transfer them to Hazus 3.0 may do so, but only if they are operating on the most recent version of Hazus (2.2 SP01). They will be able to follow the steps outlined in the Getting Started Guide to extract their study regions in Hazus 2.2 SP01 and then upload them into Hazus 3.0 once it is downloaded. Users that are operating on a version of Hazus older than 2.2 SP01 will not be able to extract their study regions and upload to Hazus 3.0 due to major underlying changes occurring in this release. For questions or issues, feel free to contact the Hazus Help Desk at helpdesk@support.hazus.us.

Note: An imported Hazus 2.2 (SP01) Flood model study region can be easily imported to view results in Hazus 3.0, however the Hazard (Delineate Floodplain) & Analysis should be rerun in Hazus 3.0 due to Hazard changes.

Hazus 3.0 software will include the following changes:

- Migration of the current database structure away from the Personal Geodatabase (pGDB) format to SQL Server Spatial format
- Migration of all VB6 code in the Flood model to a combination of C# and .NET
- Support at the state level for both homogeneous and dasymetric state data, while also making the dasymetric dataset as the default for analysis
- SQL Server-compatible version of CDMS
- Repair of several major defects in block-level aggregation in the Flood and Hurricane models

2. Contents of the Release

Flood Model

- VB6 code is converted into C#
    - The Hazus Flood model was largely dependent on the VB6 code, which is outdated and needed to be replaced
    - The latest version of .Net Framework (4.5) was used for the solution.
    - There are little to no other impacts on models besides Flood, with user interface largely looking and functioning similar to as it has in the past
    - As recommended by Esri, higher level API-GeoProcessing Tools (GP Tools) will be used (instead of ArcObjects), as applicable
- Provided the Digital Elevation Model (DEM) download location after the U.S. Geological Survey (USGS) discontinued the http://seamless.usgs.gov/ National Elevation Dataset (NED) download and moving it to a different location, now using fixed (1" by 1") tiles. In cases where users are finding missing tiles or other NED specific issues, questions can be directed to the USGS Help Desk at tnm_help@usgs.gov
- The default riverine damage function for RES1 has changed to the IWR value instead of the FIA value
- Repair of several major defects in block-level aggregation, and the Flood and Hurricane models, including:
    - When updating DDF functions, an issue was discovered with how foundation types are handled, resulting in incorrect results for certain types
        - The updated code now produces a value for flood-depth-in-structure which takes into account the flood depth and the foundation type/height
    - Interpolated return period calculation issue affected hydrology statistics (level 1 riverine analysis)
    - Watershed and block-level community aggregation failures or slowness when using dasymetric data
- Alignment with Benefit Cost-Analysis (BCA) Tool

- This change was pushed back from the release of Hazus Modernization Task 3 due to some lingering latent defects
- FEMA BCA depth-damage functions for mitigation investment decisions have diverged from Hazus in the past, but are now better aligned with the Hazus Flood model

Earthquake Model

- When using the map to select a historic EQ event, the Identify box may show up behind the map. Users may need to move the map view to see the results from additional identification queries
- Fire Following Earthquake (FFE) has been disabled

Hurricane Model

- A fix to certain essential facilities falling outside the dasymetric Census Block boundaries was throwing an error in the Hurricane model
- Fixed Hospital damage and functionality summary report "This field name is not known" error in Crystal Reports Viewer
- Fixed the Hurricane model Global Summary Report for the Florida state

Hazus Shell and Utilities

- There are no specific changes to the Hazus Shell or additional Utilities (such as CDMS)
- CDMS support for state databases in SQL Server Format

Data Changes

- Migration of the current database structure away from personal Geodatabase (pGDB) format to SQL Server spatial format
  - pGDBs are Microsoft Access databases with significant size and performance constraints for Hazus user needs
  - SQL Server Express (with spatial option) was chosen as the replacement for pGDBs
  - Version 2008 R2 (the same version currently used in Hazus study region creation) was used for the 3.0 release
  - Spatial data is stored as Geometry type in SQL Server
  - A few small pGDB databases will remain for intermediate steps to maintain performance
  - DTS packages are removed in this 3.0 release
    - DTS is an extract, transform, load (ETL) tool from Microsoft
    - DTS packages were used to copy and aggregate data from default pGDB state databases to SQL Server Express databases
    - The primary reason why DTS was used in Hazus is that data resided in two different database platforms: default state data (attributes and spatial) in MS Access pGDBs and study region/final results attribute data in SQL Server Express

        - Since MS Access-based pGDBs are replaced with SQL Server Express, Hazus is using a single database platform for source data and study region/final results
        - New custom components were developed to replace functionality currently provided through DTS
    - Future changes will seek to migrate SQL Server 2008 R2 to SQL Server 2014 for Phase II of Hazus Modernization
- Features that were previously found in the syBoundary.mdb are now found in the syHazus SQL Server database.
- Support for both homogeneous and dasymetric state data, while also making the dasymetric dataset as the default for analysis
    - Users will now only have to download one state dataset per state on the Map Service Center website, with dasymetric serving as the default for analysis
    - Differences between the two datasets:
        - Homogeneous – building exposure is assumed to be uniformly (homogeneously) distributed throughout a Census block. Hazus-MH has historically used homogeneous Census data
            - Using homogeneous blocks can inflate loss numbers due to the assumption that building exposure is evenly distributed across the whole block, while in reality the exposure is never uniformly distributed
            - Users have been moving toward user defined facilities (UDFs) because of this
        - Dasymetric – undeveloped areas are removed from the blocks using Land Use-Land Cover (LULC) data
            - Dasymetric building stock distribution is a big improvement over the homogeneous distribution
            - Losses are more realistic, and less inflated for most areas as compared to homogeneous distribution
            - No impact to Earthquake and Hurricane models because those analyze at Census Tract level
    - A separate document will be provided detailing how dasymetric data is different from homogeneous and what users can do to switch between the two. Users can contact the Hazus Help Desk with any questions at helpdesk@support.hazus.us
- Spatial edits to the inventory data (Aggregate and Site Specific) cannot be done utilizing the ArcMap Editor tool. For aggregate data, users must export the data to a file or personal geodatabase (fGDB, pGDB), make their edits and then re-import back into the SQL Server database. Site specific data can be edited in the same manner, although users can also edit the location of site specific data within a study region, by changing the Latitude and Longitude values for each structure within the Inventory data browsers

3. Known Issues

- Puerto Rico was not an option for hurricane in Hazus 3.0. Risk MAP PTS Contractor RAMPP had developed coastline data (and hurricane data) for PR in 2013-2014 and delivered it to FEMA Region II. The expectation was that this data had been integrated into the Hazus 3.0 release
- Users cannot create study regions that start with a number or are entirely numeric as the study region name (Such as a county FIPs or Watershed). For example, the name cannot be '12100201' or '12County,' but it can be named as '_12100301,' 'HUC12100301,' or 'County12'
- Users cannot create study regions using state name abbreviation (i.e., CA, NY, DE)
- Using the Hazus DEM download tool, when the window opens asking if you want to save the file, it opens up directly behind the DEM Extent window. We've encountered this using Chrome, Firefox and IE and in Windows 7 and 8.1. Be sure to move the window to see the download windowHawaii Hurricane model is not functional due to code and data changes that are needed; this will be addressed with a patch after Hazus 3.0 release
- Default Scenario Soil Type (D) is over ridden by the PGA/PGV Soil type; workaround – open current Scenario wizard and confirm all defaults; this will likely be addressed with a patch after Hazus 3.0 release